# Altos R920 Installation Configuration Guide

**Abstract**

This document provides you a quick OS installation guide on Altos R920, including Windows Server 2008, Windows Server 2008 x64, Windows Server 2003 R2, Windows Server 2003 R2 x64 Edition, Red Hat Enterprise Linux 5.0 (32-bit & 64-bit), SuSE Linux Enterprise Server 10 (32-bit & 64-bit), VMware ESX Server 3.5 and SCO UnixWare 7.1.4.

Version 1.2

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CONTENTS

## INTRODUCTION

This article describes the Altos R920 Installation Configuration guide:

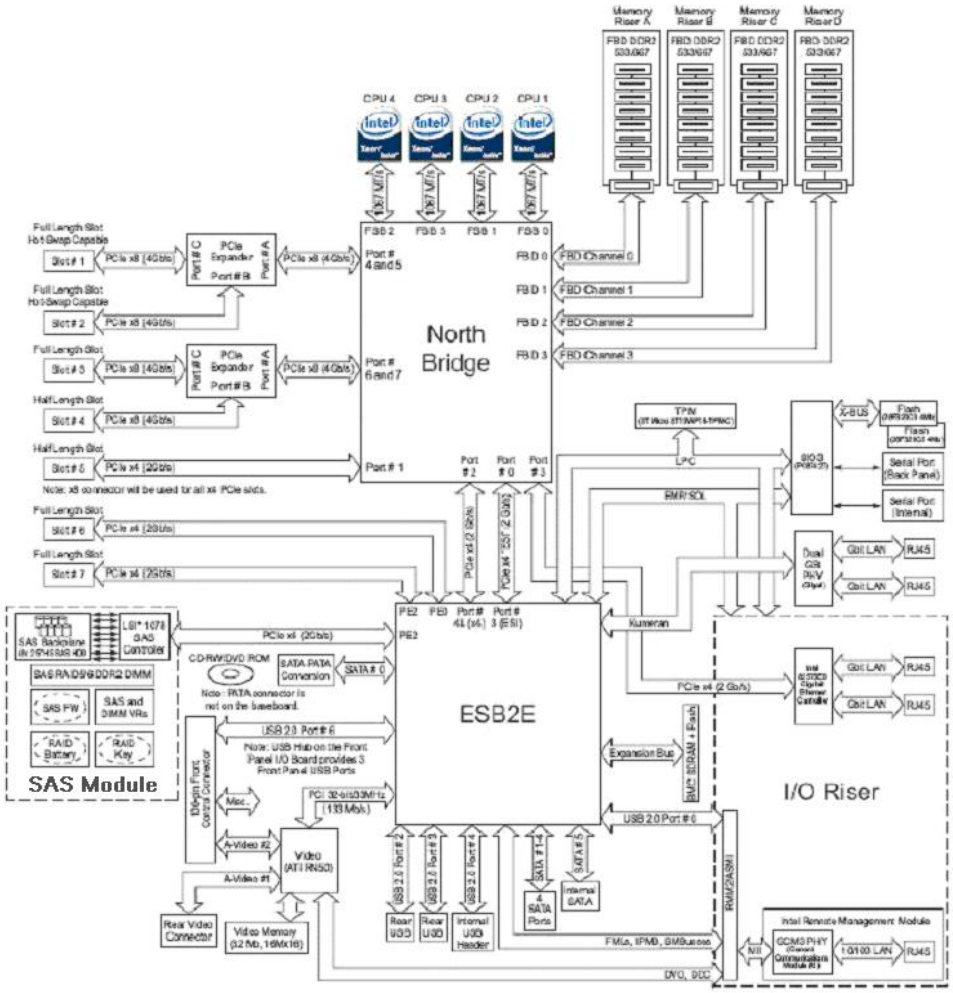
- Hardware parts give you a briefly and quick hardware information about Altos R920
- The operating system installation tips.

HARDWARE SPECIFICATION

| | |
|---|---|
| **Model** | Altos R920 |
| **Processor** | • Quad-core Intel Xeon processors 7300 sequence (Tigerton QC) at 1.60Hz or above Frequency<br>• Dual-Core Intel Xeon processors 7200 sequence (Tigerton DC) at 2.40Hz or above Frequency |
| **Front Side Bus** | 1066 MHz |
| **Cache** | • 2 x 2MB L2 cache<br>• 2 x 3MB L2 cache<br>• 2 x 4MB L2 cache |
| **Chipset** | Intel chipset<br>• North Bridge: Intel 7300<br>• South Bridge: Intel 6321 (ESB2E) |
| **Memory** | • Four memory boards<br>• Four FB-DIMM memory channels<br>• Eight DIMM sockets per board. Support 1GB/2GB/4GB FBDIMM DDR2-667 registered with ECC<br>• Maximum memory of 128GB<br>• Up to 21 GB/s maximum bandwidth for FB-DIMM 667<br>• Support memory sparing and memory mirroring |
| **Storage Interface** | • LSI SAS 1078 SAS controller<br>• Two SATA ports |
| **Expansion Slots** | • Two hot-plug x8 PCI Express slots<br>• Two x8 PCI-Express slots<br>• Three x8 PCI-Express slots (w/ x4 throughput) |
| **VGA** | Onboard ATI ES1000 video controller w/ 32 MB SDRAM |
| **SATA Controller** | Two SATA port |
| **SAS Controller** | LSI SAS 1078 8-port controller<br>• Support RAID 0, 1, and 1E |
| **SAS RAID Controller** | Integrated SAS Hardware RAID<br>• Support RAID 0, 1, 5, 6, 10, 50 and 60<br>• 512MB of cache (DDR2 667 registered)<br>• BBU support |
| **LAN Controller** | • Onboard Intel 82563EB Dual port Gigabit Ethernet Controller |

| | |
|---|---|
| | Option<br>• Can install I/O expansion module with additional Intel 82575EB Dual port Gigabit Ethernet Controller support |
| **BMC** | BMC (Baseboard Management Controller)<br>• IPMI 2.0 compliant<br>Option<br>• Can install ARMC/3 R2 with Virtual Media and remote KVM support |
| **Availability sub-system** | |
| **System Power Supply** | 1570W 1+1 Redundant Power Supply |
| **Storage Subsystem** | |
| **Drive Bays** | • One 5.25″ front accessible drive bays for TBU<br>• One slime type optical drive bay<br>• One disk cage |
| **Hard Disks** | • Up to 8 SAS 2.5″ HDD |

## System Block Diagram



## DIMM POPULATION GUIDELINE

### Memory population

#### Population with one memory board

| DIMM slot | Memory board A | Memory board B | Memory board C | Memory board D | Total Memory |
|---|---|---|---|---|---|
| 1 to 2 | 2 x 1 GB | | | | 2 GB |
| 1 to 4 | 4 x 1 GB | | | | 4 GB |
| 1 to 6 | 6 x 1 GB | | | | 6 GB |
| 1 to 8 | 8 x 1 GB | | | | 8 GB |
| 1 to 2 | 2 x 2 GB | | | | 4 GB |
| 1 to 4 | 4 x 2 GB | | | | 8 GB |
| 1 to 6 | 6 x 2 GB | | | | 12 GB |
| 1 to 8 | 8 x 2 GB | | | | 16 GB |
| 1 to 2 | 2 x 4 GB | | | | 8 GB |
| 1 to 4 | 4 x 4 GB | | | | 16 GB |
| 1 to 6 | 6 x 4 GB | | | | 24 GB |
| 1 to 8 | 8 x 4 GB | | | | 32 GB |

#### Population with two memory boards

| DIMM slot | Memory board A | Memory board B | Memory board C | Memory board D | Total Memory |
|---|---|---|---|---|---|
| 1 to 2 | 2 x 1 GB | 2 x 1 GB | | | 4 GB |
| 1 to 4 | 4 x 1 GB | 4 x 1 GB | | | 8 GB |
| 1 to 6 | 6 x 1 GB | 6 x 1 GB | | | 12 GB |
| 1 to 8 | 8 x 1 GB | 8 x 1 GB | | | 16 GB |
| 1 to 2 | 2 x 2 GB | 2 x 2 GB | | | 8 GB |
| 1 to 4 | 4 x 2 GB | 4 x 2 GB | | | 16 GB |
| 1 to 6 | 6 x 2 GB | 6 x 2 GB | | | 24 GB |
| 1 to 8 | 8 x 2 GB | 8 x 2 GB | | | 32 GB |
| 1 to 2 | 2 x 4 GB | 2 x 4 GB | | | 16 GB |
| 1 to 4 | 4 x 4 GB | 4 x 4 GB | | | 32 GB |
| 1 to 6 | 6 x 4 GB | 6 x 4 GB | | | 48 GB |
| 1 to 8 | 8 x 4 GB | 8 x 4 GB | | | 64 GB |

#### Population with four memory boards

| DIMM slot | Memory board A | Memory board B | Memory board C | Memory board D | Total Memory |
|---|---|---|---|---|---|
| 1 to 2 | 2 x 1 GB | 2 x 1 GB | 2 x 1 GB | 2 x 1 GB | 8 GB |
| 1 to 4 | 4 x 1 GB | 4 x 1 GB | 4 x 1 GB | 4 x 1 GB | 16 GB |
| 1 to 6 | 6 x 1 GB | 6 x 1 GB | 6 x 1 GB | 6 x 1 GB | 24 GB |
| 1 to 8 | 8 x 1 GB | 8 x 1 GB | 8 x 1 GB | 8 x 1 GB | 32 GB |
| 1 to 2 | 2 x 2 GB | 2 x 2 GB | 2 x 2 GB | 2 x 2 GB | 16 GB |
| 1 to 4 | 4 x 2 GB | 4 x 2 GB | 4 x 2 GB | 4 x 2 GB | 32 GB |
| 1 to 6 | 6 x 2 GB | 6 x 2 GB | 6 x 2 GB | 6 x 2 GB | 48 GB |
| 1 to 8 | 8 x 2 GB | 8 x 2 GB | 8 x 2 GB | 8 x 2 GB | 64 GB |
| 1 to 2 | 2 x 4 GB | 2 x 4 GB | 2 x 4 GB | 2 x 4 GB | 32 GB |
| 1 to 4 | 4 x 4 GB | 4 x 4 GB | 4 x 4 GB | 4 x 4 GB | 64 GB |
| 1 to 6 | 6 x 4 GB | 6 x 4 GB | 6 x 4 GB | 6 x 4 GB | 96 GB |
| 1 to 8 | 8 x 4 GB | 8 x 4 GB | 8 x 4 GB | 8 x 4 GB | 128 GB |

### Memory population with sparing

#### Population with two memory boards

| DIMM slot | Memory board A | Memory board B | Memory board C | Memory board D | Total Memory | |
|---|---|---|---|---|---|---|
| | | | | | Physical memory | Detected by OS |
| 1 to 2 | 2 x 1 GB | 2 x 1 GB | | | 4 GB | 3 GB |
| 1 to 4 | 4 x 1 GB | 4 x 1 GB | | | 8 GB | 7 GB |
| 1 to 6 | 6 x 1 GB | 6 x 1 GB | | | 12 GB | 11 GB |
| 1 to 8 | 8 x 1 GB | 8 x 1 GB | | | 16 GB | 15 GB |
| 1 to 2 | 2 x 2 GB | 2 x 2 GB | | | 8 GB | 6 GB |
| 1 to 4 | 4 x 2 GB | 4 x 2 GB | | | 16 GB | 14 GB |
| 1 to 6 | 6 x 2 GB | 6 x 2 GB | | | 24 GB | 22 GB |
| 1 to 8 | 8 x 2 GB | 8 x 2 GB | | | 32 GB | 30 GB |
| 1 to 2 | 2 x 4 GB | 2 x 4 GB | | | 16 GB | 12 GB |
| 1 to 4 | 4 x 4 GB | 4 x 4 GB | | | 32 GB | 28 GB |
| 1 to 6 | 6 x 4 GB | 6 x 4 GB | | | 48 GB | 44 GB |
| 1 to 8 | 8 x 4 GB | 8 x 4 GB | | | 64 GB | 60 GB |

NOTE. DIMM slot 1 in memory boards A and B is configured to sparing unit.

#### Population with four memory boards

| DIMM slot | Memory board A | Memory board B | Memory board C | Memory board D | Total Memory | |
|---|---|---|---|---|---|---|
| | | | | | Physical memory | Detected by OS |
| 1 to 2 | 2 x 1 GB | 2 x 1 GB | 2 x 1 GB | 2 x 1 GB | 8 GB | 6 GB |
| 1 to 4 | 4 x 1 GB | 4 x 1 GB | 4 x 1 GB | 4 x 1 GB | 16 GB | 14 GB |
| 1 to 6 | 6 x 1 GB | 6 x 1 GB | 6 x 1 GB | 6 x 1 GB | 24 GB | 22 GB |
| 1 to 8 | 8 x 1 GB | 8 x 1 GB | 8 x 1 GB | 8 x 1 GB | 32 GB | 30 GB |
| 1 to 2 | 2 x 2 GB | 2 x 2 GB | 2 x 2 GB | 2 x 2 GB | 16 GB | 12 GB |
| 1 to 4 | 4 x 2 GB | 4 x 2 GB | 4 x 2 GB | 4 x 2 GB | 32 GB | 28 GB |
| 1 to 6 | 6 x 2 GB | 6 x 2 GB | 6 x 2 GB | 6 x 2 GB | 48 GB | 44 GB |
| 1 to 8 | 8 x 2 GB | 8 x 2 GB | 8 x 2 GB | 8 x 2 GB | 64 GB | 60 GB |
| 1 to 2 | 2 x 4 GB | 2 x 4 GB | 2 x 4 GB | 2 x 4 GB | 32 GB | 24 GB |
| 1 to 4 | 4 x 4 GB | 4 x 4 GB | 4 x 4 GB | 4 x 4 GB | 64 GB | 56 GB |
| 1 to 6 | 6 x 4 GB | 6 x 4 GB | 6 x 4 GB | 6 x 4 GB | 96 GB | 88 GB |
| 1 to 8 | 8 x 4 GB | 8 x 4 GB | 8 x 4 GB | 8 x 4 GB | 128 GB | 120 GB |

NOTE. DIMM slot 1 in memory boards A, B, C, and D is configured to sparing unit.

## Memory population with mirroring

### Population with four memory boards

| DIMM slot | Memory board A | Memory board B | Memory board C (Mirror) | Memory board D (Mirror) | Total Memory | |
|---|---|---|---|---|---|---|
| | | | | | Physical memory | Detected by OS |
| 1 to 2 | 2 x 1 GB | 2 x 1 GB | 2 x 1 GB | 2 x 1 GB | 8 GB | 4 GB |
| 1 to 4 | 4 x 1 GB | 4 x 1 GB | 4 x 1 GB | 4 x 1 GB | 16 GB | 8 GB |
| 1 to 6 | 6 x 1 GB | 6 x 1 GB | 6 x 1 GB | 6 x 1 GB | 24 GB | 12 GB |
| 1 to 8 | 8 x 1 GB | 8 x 1 GB | 8 x 1 GB | 8 x 1 GB | 32 GB | 16 GB |
| 1 to 2 | 2 x 2 GB | 2 x 2 GB | 2 x 2 GB | 2 x 2 GB | 16 GB | 8 GB |
| 1 to 4 | 4 x 2 GB | 4 x 2 GB | 4 x 2 GB | 4 x 2 GB | 32 GB | 16 GB |
| 1 to 6 | 6 x 2 GB | 6 x 2 GB | 6 x 2 GB | 6 x 2 GB | 48 GB | 24 GB |
| 1 to 8 | 8 x 2 GB | 8 x 2 GB | 8 x 2 GB | 8 x 2 GB | 64 GB | 32 GB |
| 1 to 2 | 2 x 4 GB | 2 x 4 GB | 2 x 4 GB | 2 x 4 GB | 32 GB | 16 GB |
| 1 to 4 | 4 x 4 GB | 4 x 4 GB | 4 x 4 GB | 4 x 4 GB | 64 GB | 32 GB |
| 1 to 6 | 6 x 4 GB | 6 x 4 GB | 6 x 4 GB | 6 x 4 GB | 96 GB | 48 GB |
| 1 to 8 | 8 x 4 GB | 8 x 4 GB | 8 x 4 GB | 8 x 4 GB | 128 GB | 64 GB |

NOTE. DIMM slots in memory boards C and D are configured as mirroring units.

## OS INSTALLATION TIPS

Below is Altos R920 OS certification matrix:

| Operating System | Service Pack | Status | Note |
|---|---|---|---|
| Windows Server 2008 Enterprise Edition | n/a | Certified | 1, 2, 3 |
| Windows Server 2008 Enterprise x64 Edition | n/a | Certified | 1, 2, 3 |
| Windows Server 2003 R2 Enterprise Edition | SP2 | Certified | |
| Windows Server 2003 R2 Enterprise x64 Edition | SP2 | Certified | |
| Red Hat Enterprise Linux 5.0 | N/A | Certified | |
| Red Hat Enterprise Linux 5.0 EM64T | N/A | Certified | |
| SuSE Linux Enterprise Server 10 | SP1 | Certified | |
| SuSE Linux Enterprise Server 10 EM64T | SP1 | Certified | |

NOTE1. Altos R920 BIOS 23 (or later), BMC 17 (or later) and FRUSDR 14 (or later) are required to support Windows Server 2008.

NOTE2. This Windows Server 2008 certification also applies to Standard Edition and Web Server 2008.

NOTE3. EasyBUILD 8.0 build 200 (or later) can support Windows Server 2008.

The drivers required for the OS installation can be found on the EasyBUILD 8.0 build 100. We suggest that you use the drivers contained in the EasyBUILD 8.0 build 100, as these drivers are tested and qualified by Acer.

There are two ways you can get the drivers. You can either make diskettes from Resource CD, or put the Resource CD in the CD-ROM drive and search the driver directly from the Resource CD.

NOTE. In this section, we assume the OS is installed on the HDD connected to the integrated SAS hardware RAID.

NOTE. You need an USB floppy for applying driver during OS installation if there is no built-in driver for disk controller driver in the OS.

## Windows Server 2008 Enterprise x64 Edition (with Integrated SAS Hardware RAID)

Below information describes how to manually install Windows Server 2008 Enterprise x64 Edition on Altos R920 with integrated SAS hardware RAID.

### BIOS Required

Altos R920 BIOS 23 (or later), BMC 17 (or later) and FRUSDR 14 (or later) are required to support Windows Server 2008.

### Drivers Required

For Windows Server 2008 x64 Installation, the following device drivers are required.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | 8.240.50.3000 | EasyBUILD 8.0 build 200 (or later) |
| Onboard Chipset | 8.6.1.1001 | EasyBUILD 8.0 build 200 (or later) |
| Integrated SAS hardware RAID | 2.20.0.64 | EasyBUILD 8.0 build 200 (or later) |
| Onboard Gigabit Ethernet | 9.12.17.0 | EasyBUILD 8.0 build 200 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 10.2.28.0 | EasyBUILD 8.0 build 200 (or later) |
| Trusted Platform Module | N/A | OS built-in |
| IOAT | 1.2.79.9 | EasyBUILD 8.0 build 200 (or later) |
| SAS Hot-swap backplane | N/A | OS built-in |

### Software Required

The management utility for integrated SAS hardware RAID and NIC can be found in the EasyBUILD 8.0 build 200 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| RAID Web Console 2 | 2.34 | EasyBUILD 8.0 build 200 (or later) |
| PROSet Utility | 13.0.44.0 | EasyBUILD 8.0 build 200 (or later) |

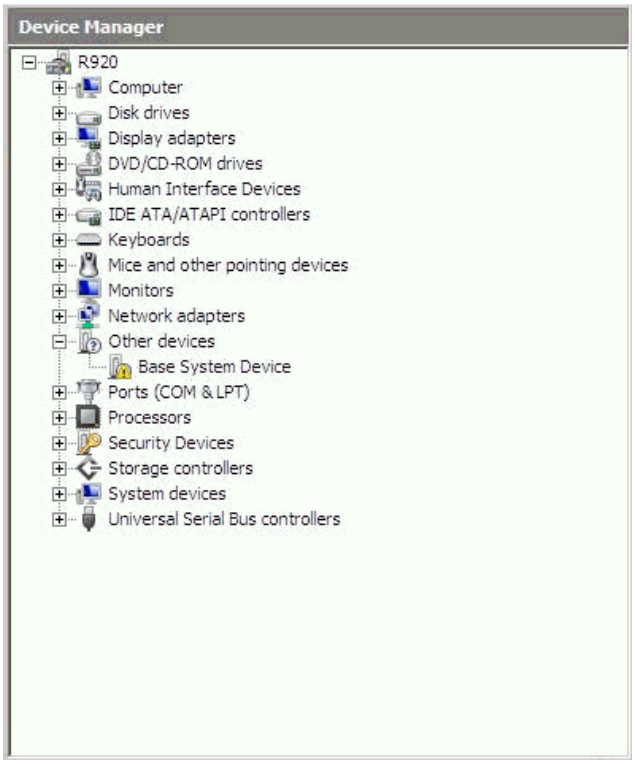
### Configuring Integrated SAS Hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

NOTE. The Windows Server 2008 x64 can recognize integrated SAS hardware RAID. Please replace the driver with the one provided by EasyBUILD. You need an external USB floppy drive or USB Flash drive to load driver during the OS installation.

1. Please make a driver diskette from the EasyBUILD first before the installation.
2. Click on “Load Driver” when “Where do you want to install Windows” message displayed.
3. Select “**Integrated Intel(R) RAID Controller SROMBSASFC (A:\oemsetup.inf)**” as target driver
4. After loading the RAID driver from diskette, you could click “Drive options” to partition the drive.
5. Follow the normal procedure to finish the installation.
6. After the installation completes, you would see the following devices with yellow mark in Device Manager.




Chipset Driver Installation

1. Please insert the EasyBUILD into the optical drive
2. Expand **Drivers -> Altos R920 -> Chipset**, select **Windows**

**Server 2008 x64** and click on **Setup**.

3. Follow the instruction to install the driver and reboot the server after the chipset driver is installed.

Gigabit Ethernet Driver Installation

1. There is built-in Ethernet controller driver with Widows Server 2008 x64. Please update the driver with EasyBUILD. Please do the same on both of the Gigabit Ethernet devices.
2. Please insert the EasyBUILD into the optical drive
3. Expand **Drivers -> Altos R920 -> Network adapters -> Intel 82563EB Gigabit Ethernet Controller**, select **Windows Server 2008 x64** and click on **Setup**.
4. After installing the driver, you would see **Intel(R) PRO/1000 EB Network Connection with I/O Acceleration** listed in Network adapters.

IOAT Driver Installation

The Base System Device with yellow mark in Device Manger is the IOAT device. After the Gigabit Ethernet controller driver installation completed at previous step, you would see **Intel 7300 Chipset QuickData Technology Device** listed in System devices.

VGA Driver Installation

1. Windows will treat onboard VGA as Standard VGA device. You can find the ATI ES1000 driver in EasyBUILD. Please insert the EasyBUILD into the optical drive.
2. Expand **Drivers -> Altos 920 -> Graphics adapters -> ATI ES1000**, select **Windows Server 2008 x64** and click on **Setup**.
3. Follow the instruction to install the VGA driver and reboot the server after the driver is installed.

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Gigabit Ethernet available on Altos R920.

The driver for the two additional Gigabit Ethernet will be installed automatically if you’ve installed the onboard Gigabit Ethernet driver at previous step.

RAID Utility Installation

1. Please insert the EasyBUILD into the optical drive.

2. Expand **Utilities** -> **Altos R920 -> Integrated SAS hardware RAID**, select **RAID Web Console 2 (Windows)** and click on **Setup.**

3. Follow the instruction and use the default setting to complete the RAID Utility Installation.

Network Utility Installation

The PROSet utility for the onboard Gigabit Ethernet controller will be installed automatically when you installing the onboard Gigabit Ethernet driver.

## Windows Server 2008 Enterprise Edition (with Integrated SAS Hardware RAID)

Below information describes how to manually install Windows Server 2008 Enterprise Edition on Altos R920 with integrated SAS hardware RAID.

BIOS Required

Altos R920 BIOS 23 (or later), BMC 17 (or later) and FRUSDR 14 (or later) are required to support Windows Server 2008.

Drivers Required

For Windows Server 2008 Installation, the following device drivers are required.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | 8.240.50.3000 | EasyBUILD 8.0 build 200 (or later) |
| Onboard Chipset | 8.6.1.1001 | EasyBUILD 8.0 build 200 (or later) |
| Integrated SAS hardware RAID | 2.20.0.32 | EasyBUILD 8.0 build 200 (or later) |
| Onboard Gigabit Ethernet | 9.12.17.0 | EasyBUILD 8.0 build 200 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 10.2.28.0 | EasyBUILD 8.0 build 200 (or later) |
| Trusted Platform Module | N/A | OS built-in |
| IOAT | 1.2.79.9 | EasyBUILD 8.0 build 200 (or later) |
| SAS Hot-swap backplane | N/A | OS built-in |

Software Required

The management utility for integrated SAS hardware RAID and NIC can be found in the EasyBUILD 8.0 build 200 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| RAID Web Console 2 | 2.34 | EasyBUILD 8.0 build 200 (or later) |
| PROSet Utility | 13.0.44.0 | EasyBUILD 8.0 build 200 (or later) |

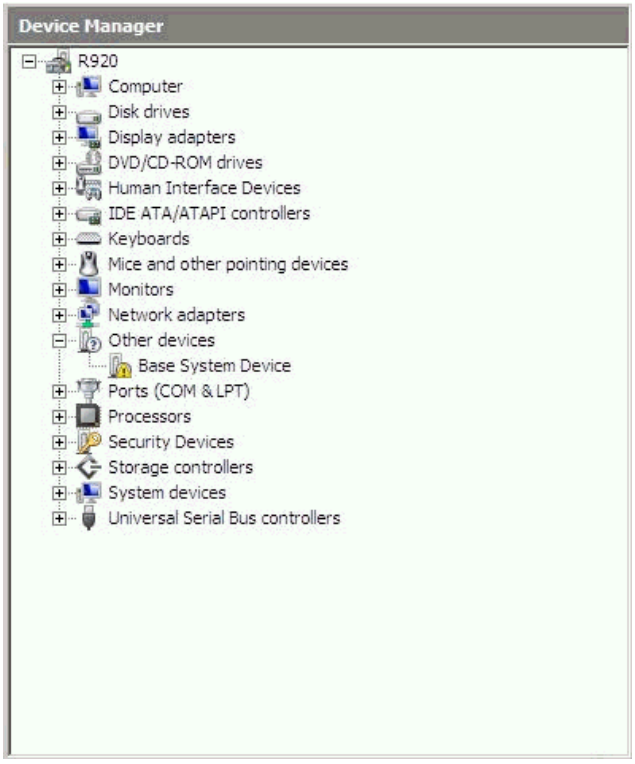
Configuring Integrated SAS Hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

NOTE. The Windows Server 2008 x64 can recognize integrated SAS hardware RAID. Please replace the driver with the one provided by EasyBUILD. You need an external USB floppy drive or USB Flash drive to load driver during the OS installation.

1. Please make a driver diskette from the EasyBUILD first before the installation.
2. Click on “Load Driver” when “Where do you want to install Windows” message displayed.
3. Select “**Integrated Intel(R) RAID Controller SROMBSASFC (A:\oemsetup.inf)**” as target driver
4. After loading the RAID driver from diskette, you could click “Drive options” to partition the drive.
5. Follow the normal procedure to finish the installation.
6. After the installation completes, you would see the following devices with yellow mark in Device Manager.




Chipset Driver Installation

1. Please insert the EasyBUILD into the optical drive
2. Expand **Drivers -> Altos R920 -> Chipset**, select **Windows Server 2008 x64** and click on **Setup**.
3. Follow the instruction to install the driver and reboot the server after the chipset driver is installed.

Gigabit Ethernet Driver Installation

1. There is built-in Ethernet controller driver with Widows Server 2008 x64. Please update the driver with EasyBUILD. Please do the same on both of the Gigabit Ethernet devices.
2. Please insert the EasyBUILD into the optical drive
3. Expand **Drivers -> Altos R920 -> Network adapters -> Intel 82563EB Gigabit Ethernet Controller**, select **Windows Server 2008 x64** and click on **Setup**.
4. After installing the driver, you would see **Intel(R) PRO/1000 EB Network Connection with I/O Acceleration** listed in Network adapters.

IOAT Driver Installation

The Base System Device with yellow mark in Device Manger is the IOAT device. After the Gigabit Ethernet controller driver installation completed at previous step, you would see **Intel 7300 Chipset QuickData Technology Device** listed in System devices.

VGA Driver Installation

1. Windows will treat onboard VGA as Standard VGA device. You can find the ATI ES1000 driver in EasyBUILD. Please insert the EasyBUILD into the optical drive.
2. Expand **Drivers -> Altos 920 -> Graphics adapters -> ATI ES1000**, select **Windows Server 2008 x64** and click on **Setup**.
3. Follow the instruction to install the VGA driver and reboot the server after the driver is installed.

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Gigabit Ethernet available on Altos R920.

The driver for the two additional Gigabit Ethernet will be installed automatically if you've installed the onboard Gigabit Ethernet driver at previous step.

RAID Utility Installation

4. Please insert the EasyBUILD into the optical drive.
5. Expand **Utilities** -> **Altos R920 -> Integrated SAS hardware RAID**, select **RAID Web Console 2 (Windows)** and click on **Setup.**
6. Follow the instruction and use the default setting to complete the RAID Utility Installation.

Network Utility Installation

The PROSet utility for the onboard Gigabit Ethernet controller will be installed automatically when you installing the onboard Gigabit Ethernet driver.

## Windows Server 2003 Enterprise x64 Edition (with Integrated SAS Hardware RAID)

Below information describes how to manually install Windows Server 2003 Enterprise x64 Edition on Altos R920 with integrated SAS hardware RAID.

Drivers Required

For Windows Server 2003 R2 x64 Installation, the following device drivers are required.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | 8.24.3-060405a-038923C-Intel | EasyBUILD 8.0 build 100 (or later) |
| Onboard Chipset | 8.4.0.1011 | EasyBUILD 8.0 build 100 (or later) |
| Integrated SAS hardware RAID | 2.15.0.64 | EasyBUILD 8.0 build 100 (or later) |
| Onboard Gigabit Ethernet | 9.10.8.0 | EasyBUILD 8.0 build 100 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 10.1.17.0 | EasyBUILD 8.0 build 100 (or later) |
| Trusted Platform Module | 1.0.4.14 | EasyBUILD 8.0 build 100 (or later) |
| IOAT | 1.2.78.6 | EasyBUILD 8.0 build 100 (or later) |
| SAS Hot-swap backplane | 5.0.6262.1 | EasyBUILD 8.0 build 100 (or later) |

Software Required

The management utility for integrated SAS hardware RAID and NIC can be found in the EasyBUILD 8.0 build 100 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| Microsoft Scalable Networking Pack | N/A | http://www.microsoft.com/downloads/details.aspx?FamilyID=778ee6fe-5359-4c2f-b89d-f35f2b1b83cd&DisplayLang=en |
| RAID Web Console 2 | 2.19-00 | EasyBUILD 8.0 build 100 (or later) |
| PROSet Utility | 12.3.31.0 | EasyBUILD 8.0 build 100 (or later) |

Configuring Integrated SAS Hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

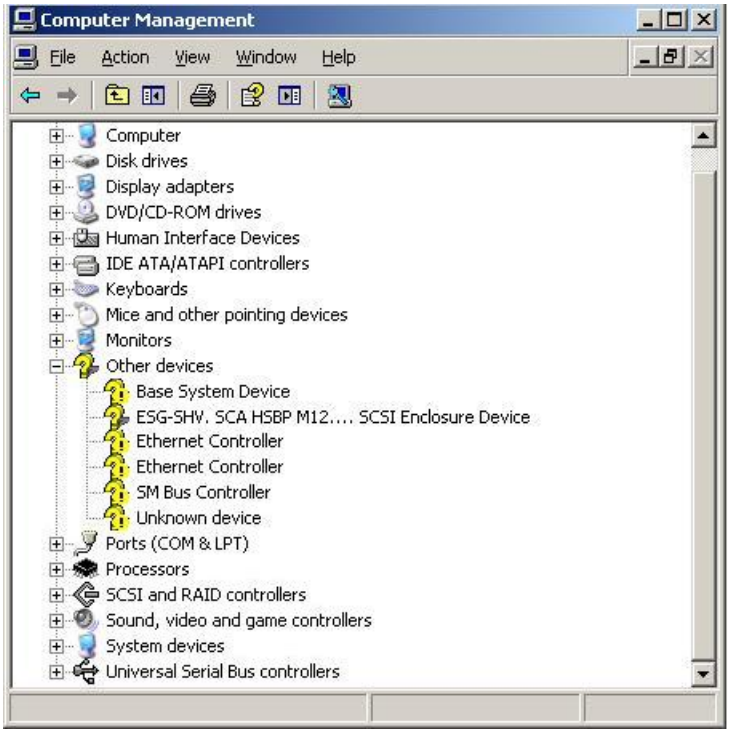
Installation Tips

NOTE. There is no built-in driver for integrated SAS hardware RAID in the OS. You need an USB floppy for applying driver during the OS installation.

1. As Windows Server 2003 x64 R2 can't recognize the integrated SAS hardware RAID, you need to make a driver diskette from the EasyBUILD 8.0 build 100 first before the installation.
2. Press F6 at the start of installation to provide the driver disk for the integrated SAS hardware RAID.
3. Select "**Intel SAS RAID Controller Driver (Server 2003 for x64)**" as target driver.
4. After loading the RAID driver from diskette, follow the normal procedure to finish the installation.

Chipset Driver Installation

1. After the installation completes, you would see the following devices with yellow mark in Device Manager.




2. Please insert the EasyBUILD 8.0 build 100 into the optical drive
3. Expand **Drivers -> Altos R920 -> Chipset**, select **Windows Server 2003 x64** and click on **Setup**.
4. Follow the instruction to install the driver and reboot the server after the chipset driver is installed.

Gigabit Ethernet Driver Installation

1. There are two **Ethernet Controller** listed under **Other device** in Windows Device Manager. It should be the onboard Intel 82563EB Gigabit Ethernet controller. You could find the driver in EasyBUILD 8.0 build 100. Please do the same on both of the devices.
2. Right-click on the **Ethernet Controller** and select **Update Driver**.
3. Select **No, not this time**. Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for NIC driver in Driver required section.
7. refer to directory of the 82563EB driver in Driver Required section
8. Click on **Next** and follow the instruction to finish the driver update.
9. After installing the driver, you would see **Intel(R) PRO/1000 EB Network Connection with I/O Acceleration** listed in Network adapters.

IOAT Driver Installation

1. For **Base System Device** listed under **Other device** in Windows Device Manager, it should be the IOAT device. You could find the driver in EasyBUILD 8.0 build 100.
2. Right-click on the **Base System Device** and select **Update Driver**.
3. Select **No, not this time**. Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for

IOAT driver in Driver required section.

7. Click on **Next** and follow the instruction to finish the driver update.

8. After installing the driver, you would see **Intel(R) 7300 Chipset QuickData Technology Device – 360B** listed in System devices.

SAS Backplane Driver Installation

1. There is an **ESG-SHV, SCA HSBP M12.... SCSI Enclosure Device** listed under **Other device** in Windows Device Manager. It is the hot-swap SAS backplane for R920.

2. Right-click on the **ESG-SHV, SCA HSBP M12.... SCSI Enclosure Device** and select **Update Driver**.

3. Select **No, not this time.** Do not connect to Windows Update to search the driver.

4. Select **Install from a list or specific location (Advanced)**.

5. Select **Search the best driver these locations** and check **Include this location in the search**.

6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for Hot-swap backplane driver in Driver required section.

7. Click on **Next** and follow the instruction to finish the driver update.

8. After installing the driver, you would see **Intel (r) SCA Hotswap Backplane** listed in System devices.

TPM Driver Installation

1. For **Unknown Device** listed under **Other device** in Windows Device Manager, it should be the TPM device. You could find the driver in EasyBUILD 8.0 build 100.

2. Right-click on the **Unknown Device** and select **Update Driver**.

3. Select **No, not this time**. Do not connect to Windows Update to search the driver.

4. Select **Install from a list or specific location (Advanced)**.

5. Select **Search the best driver these locations** and check **Include this location in the search**.

6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for IOAT driver in Driver required section.
7. Click on **Next** and follow the instruction to finish the driver update.
8. After installing the driver, you would see **STMicroelectronics Trusted Platform Module** listed in System devices.

VGA Driver Installation

1. Windows will treat onboard VGA as Standard VGA device. You can find the ATI ES1000 driver in EasyBUILD 8.0 build 100. Please insert the EasyBUILD 8.0 build 100 into the optical drive.
2. Expand **Drivers -> Altos R920 -> Graphics adapters -> ATI ES1000**, select **Windows Server 2003 x64** and click on **Setup**.
3. Follow the instruction to install the VGA driver and reboot the server after the driver is installed.
4. After installing the driver, you would see **ATI ES1000** listed in Display adapters.

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Intel 82575EB Gigabit Ethernet available on Altos R920.

1. For the two more **Ethernet Controller** listed under **Other device** in Windows Device Manager, it should be the Intel 82575EB Gigabit Ethernet controller on the I/O Expansion module. You could find the driver in EasyBUILD 8.0 build 100. Please do the same on both of the devices.
2. Right-click on the **Ethernet Controller** and select **Update Driver**.
3. Select **No, not this time**. Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for

NIC driver in Driver required section.

7. Click on **Next** and follow the instruction to finish the driver update.
8. After installing the driver, you would see **Intel(R) PRO/1000 EB Network Connection** listed in Network adapters.

Microsoft Scalable Networking Pack Installation

You can find the Microsoft Scalable Networking Pack for Windows Server 2003 x64 in the Microsoft website: http://www.microsoft.com/downloads/details.aspx?FamilyID=778ee6fe-5359-4c2f-b89d-f35f2b1b83cd&DisplayLang=en

1. Download the SNP from Microsoft website.
2. Double-click on the downloaded file to run the installation program.
3. Follow the instruction to install the SNP and reboot the server after the SNP is installed.

NOTE. The Windows Server 2003 R2 x64 SP2 has included Microsoft Scalable Networking Pack. You don’t need to install this package.

RAID Utility Installation

1. Please insert the EasyBUILD 8.0 build 100 into the optical drive.
2. Expand **Utilities** -> **Altos R920 -> Integrated SAS Hardware RAID**, select **RAID Web Console 2(Windows)** and click on **Setup.**
3. Follow the instruction and use the default setting to complete the RAID Web Console 2 installation.

Network Utility Installation

1. Please insert the EasyBUILD 8.0 build 100 into the optical drive.
2. Expand **Utilities -> Altos R920 -> Intel PRO/1000 Network Adapter**, select **PROSet Utility (Windows Server 2003 x64)** and click on **Setup**.
3. Follow the instruction and use the default setting to complete the PROSet utility installation.

## Windows Server 2003 Enterprise Edition (with Integrated SAS Hardware RAID)

Below information describes how to manually install Windows

Server 2003 R2 Enterprise Edition on Altos R920 with integrated SAS hardware RAID.

Drivers Required

For Windows Server 2003 R2 Installation, the following device drivers are required.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | 8.24.3-060405a-038923C-Intel | EasyBUILD 8.0 build 100 (or later) |
| Onboard Chipset | 8.4.0.1011 | EasyBUILD 8.0 build 100 (or later) |
| Integrated SAS hardware RAID | 2.15.0.32 | EasyBUILD 8.0 build 100 (or later) |
| Onboard Gigabit Ethernet | 9.10.8.0 | EasyBUILD 8.0 build 100 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 10.1.17.0 | EasyBUILD 8.0 build 100 (or later) |
| Trusted Platform Module | 1.0.4.15 | EasyBUILD 8.0 build 100 (or later) |
| IOAT | 1.2.78.6 | EasyBUILD 8.0 build 100 (or later) |
| SAS Hot-swap backplane | 5.0.6262.1 | EasyBUILD 8.0 build 100 (or later) |

Software Required

The management utility for integrated SAS hardware RAID and NIC can be found in the EasyBUILD 8.0 build 100 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| Microsoft Scalable Networking Pack | N/A | http://www.microsoft.com/downloads/details.aspx?FamilyID=778ee6fe-5359-4c2f-b89d-f35f2b1b83cd&DisplayLang=en |
| RAID Web Console 2 | 2.19-00 | EasyBUILD 8.0 build 100 (or later) |
| PROSet Utility | 12.3.31.0 | EasyBUILD 8.0 build 100 (or later) |

Configuring Integrated SAS Hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

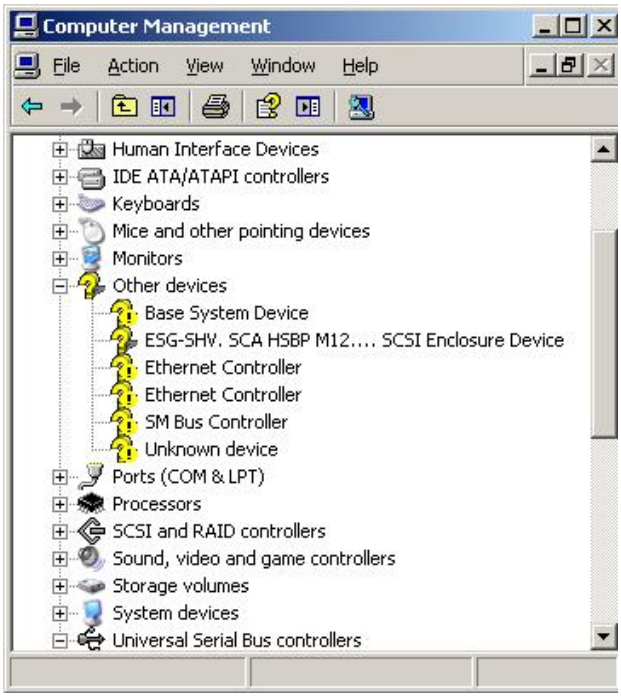
NOTE. There is no built-in driver for integrated SAS hardware

RAID in the OS. You need an USB floppy for applying driver during the OS installation.

1. As Windows Server 2003 R2 can't recognize the integrated SAS hardware RAID, you need to make a driver diskette from the EasyBUILD 8.0 build 100 first before the installation.
2. Press F6 at the start of installation to provide the driver disk for the integrated SAS hardware RAID.
3. Select "**Intel SAS RAID Controller Driver (Server 2003 32-bit)**" as target driver.
4. After loading the RAID driver from diskette, follow the normal procedure to finish the installation.

Chipset Driver Installation

1. After the installation completes, you would see the following devices with yellow mark in Device Manager.




2. Please insert the EasyBUILD 8.0 build 100 into the optical drive
3. Expand **Drivers -> Altos R920 -> Chipset**, select **Windows Server 2003** and click on **Setup**.
4. Follow the instruction to install the driver and reboot the server after the chipset driver is installed.

Gigabit Ethernet Driver Installation

1. There are two **Ethernet Controller** listed under **Other device** in Windows Device Manager. It should be the onboard Intel 82563EB Gigabit Ethernet controller. You could find the driver in EasyBUILD 8.0 build 100. Please do the same on both of the devices.
2. Right-click on the **Ethernet Controller** and select **Update Driver**.
3. Select **No, not this time**. Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for NIC driver in Driver required section.
7. Click on **Next** and follow the instruction to finish the driver update.
8. After installing the driver, you would see **Intel(R) PRO/1000 EB Network Connection with I/O Acceleration** listed in Network adapters.

IOAT Driver Installation

1. For **Base System Device** listed under **Other device** in Windows Device Manager, it should be the IOAT device. You could find the driver in EasyBUILD 8.0 build 100.
2. Right-click on the **Base System Device** and select **Update Driver**.
3. Select **No, not this time**. Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for IOAT driver in Driver required section.
7. Click on **Next** and follow the instruction to finish the

driver update.

8. After installing the driver, you would see **Intel(R) 7300 Chipset QuickData Technology Device – 360B** listed in System devices.

SAS Backplane Driver Installation

1. There is an **ESG-SHV, SCA HSBP M12.... SCSI Enclosure Device** listed under **Other device** in Windows Device Manager. It is the hot-swap SAS backplane for R920.
2. Right-click on the **ESG-SHV, SCA HSBP M12.... SCSI Enclosure Device** and select **Update Driver**.
3. Select **No, not this time.** Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for Hot-swap backplane driver in Driver required section.
7. Click on **Next** and follow the instruction to finish the driver update.
8. After installing the driver, you would see **Intel (r) SCA Hotswap Backplane** listed in System devices.

TPM Driver Installation

1. For **Unknown Device** listed under **Other device** in Windows Device Manager, it should be the TPM device. You could find the driver in EasyBUILD 8.0 build 100.
2. Right-click on the **Unknown Device** and select **Update Driver**.
3. Select **No, not this time**. Do not connect to Windows Update to search the driver.
4. Select **Install from a list or specific location (Advanced)**.
5. Select **Search the best driver these locations** and check **Include this location in the search**.
6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for IOAT driver in Driver required section.

7. Click on **Next** and follow the instruction to finish the driver update.

8. After installing the driver, you would see **STMicroelectronics Trusted Platform Module** listed in System devices.

VGA Driver Installation

1. Windows will treat onboard VGA as Standard VGA device. You can find the ATI ES1000 driver in EasyBUILD 8.0 build 100. Please insert the EasyBUILD 8.0 build 100 into the optical drive.

2. Expand **Drivers -> Altos R920 -> Graphics adapters -> ATI ES1000**, select **Windows Server 2003** and click on **Setup**.

3. Follow the instruction to install the VGA driver and reboot the server after the driver is installed.

4. After installing the driver, you would see **ATI ES1000** listed in Display adapters.

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Intel 82575EB Gigabit Ethernet available on Altos R920.

1. For the two more **Ethernet Controller** listed under **Other device** in Windows Device Manager, it should be the Intel 82575EB Gigabit Ethernet controller on the I/O Expansion module. You could find the driver in EasyBUILD 8.0 build 100. Please do the same on both of the devices.

2. Right-click on the **Ethernet Controller** and select **Update Driver**.

3. Select **No, not this time**. Do not connect to Windows Update to search the driver.

4. Select **Install from a list or specific location (Advanced)**.

5. Select **Search the best driver these locations** and check **Include this location in the search**.

6. Click on **Browse** and specify the path for the driver. Please refer to the EasyBUILD Version 8.0 build 100 for NIC driver in Driver required section.

7. Click on **Next** and follow the instruction to finish the driver update.

8. After installing the driver, you would see **Intel(R) PRO/1000 EB Network Connection** listed in Network adapters.

Microsoft Scalable Networking Pack Installation

You can find the Microsoft Scalable Networking Pack for Windows Server 2003 in the Microsoft website: http://www.microsoft.com/downloads/details.aspx?FamilyID=c65f4a89-f4da-463e-a496-4b5abd660bf9&DisplayLang=en

1. Download the SNP from Microsoft website.
2. Double-click on the downloaded file to run the installation program.
3. Follow the instruction to install the SNP and reboot the server after the SNP is installed.

NOTE. The Windows Server 2003 R2 SP2 has included Microsoft Scalable Networking Pack. You don’t need to install this package.

RAID Utility Installation

1. Please insert the EasyBUILD 8.0 build 100 into the optical drive.
2. Expand **Utilities** -> **Altos R920 -> Integrated SAS Hardware RAID**, select **RAID Web Console 2(Windows)** and click on **Setup.**
3. Follow the instruction and use the default setting to complete the RAID Web Console 2 installation.

Network Utility Installation

1. Please insert the EasyBUILD 8.0 build 100 into the optical drive.
2. Expand **Utilities -> Altos R920 -> Intel PRO/1000 Network Adapter**, select **PROSet Utility (Windows Server 2003)** and click on **Setup**.
3. Follow the instruction and use the default setting to complete the PROSet utility installation.

## Red Hat Enterprise Linux 5.0 EM64T (with Integrated SAS Hardware RAID)

Below information describes how to manually install Red Hat Enterprise Linux 5.0 EM64T on Altos R920 with integrated SAS hardware RAID.

Drivers Required

For Red Hat Enterprise Linux 5.0 EM64T Installation, the following device drivers are required.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | N/A | Built-in |
| Onboard Chipset | N/A | Built-in |
| Integrated SAS hardware RAID | 00.00.03.09 | EasyBUILD 8.0 build 100 (or later) |
| Onboard Gigabit Ethernet | 7.6.9 | EasyBUILD 8.0 build 100 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 1.0.8 | EasyBUILD 8.0 build 100 (or later) |
| Trusted Platform Module | No driver | N/A |
| IOAT | 2.15 | EasyBUILD 8.0 build 200 (or later) |
| SAS Hot-swap backplane | N/A | Built-in |

Software Required

The management utility for integrated SAS hardware RAID can be found in the EasyBUILD 8.0 build 100 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| RAID Web Console 2 | 2.19-01 | EasyBUILD 8.0 build 100 (or later) |

Configuring integrated SAS hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

NOTE. There is no built-in driver for Integrated SAS hardware RAID in the Red Hat Enterprise Linux 5.0 EM64T. You need an external USB floppy drive for applying driver during the OS installation.

1. Since Red Hat Enterprise Linux 5.0 EM64T cannot recognize the integrated SAS hardware RAID, you need to make a driver diskette from the EasyBUILD 8.0 build 100 first before the installation.
2. Type **linux dd** when the prompt **boot:** appears at the start.
3. Please select the **sda** as the **Driver Disk Source**.

4. Follow the instruction to load the integrated SAS hardware RAID driver from the driver diskette.
5. At the package selection step, select **Software Development** for the installation package.
6. Please follow the normal procedure to finish the installation.

Gigabit Ethernet Driver Installation

NOTE. Please install the kernel-devel-<version> package with the CD #1 of Red Hat Enterprise Linux 5 EM64T prior to install the Gigabit Ethernet driver.

NOTE. Please install the kernel-PAE-devel-<version> package with the CD #1 of Red Hat Enterprise Linux 5 EM64T prior to install the Gigabit Ethernet driver in PAE mode kernel.

1. You can find the Intel 82563EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82563EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

```
# mount /dev/dvd /mnt
# cp –R /mnt/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
```

2. Remove the OS built-in NIC driver

```
# rmmod e1000.ko
```

3. Change the directory to the driver source and install the driver

```
# cd /tmp/src/
# make install
# insmod e1000.ko
```

4. Run the kudzu utility, it will auto detect the Intel 82563EB network controller and help you to configure it.

```
# kudzu
```

5. Restart the network service to bring up both of the network interfaces.

```
# service network restart
```

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Intel 82575EB Gigabit Ethernet available on Altos R920.

1. You can find the Intel 82575EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82575EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   ```
   # mount /dev/dvd /mnt

   # cp –R /mnt/Disk/R920/NIC/83575EB/linux/. /tmp
   ```

2. Change the directory to the driver source and install the driver

   ```
   # cd /tmp/src/

   # make install

   # insmod igb.ko
   ```

3. Run the kudzu utility, it will auto detect the Intel 82563EB network controller and help you to configure it.

   ```
   # kudzu
   ```

4. Restart the network service to bring up both of the network interfaces.

   ```
   # service network restart
   ```

IOAT driver installation

1. Please remove the old version of IOAT driver from the system manually.

   ```
   # cd /lib/modules/$(uname -r)/kernel/drivers/dma

   # mv ioatdma.ko ioatdma.ko.bak
   ```

2. You can find the IOAT driver in EasyBUILD. Please copy the driver from the EasyBUILD to HDD first.

   Copy the IOAT driver to /tmp

   ```
   # cd /tmp

   # tar zxf ioatdma-<ioat version>.tar.gz
   ```

3. Install the IOAT driver

   ```
   # cd ioatdma-<ioat version>

   # make install
   ```

4. Load the IOAT driver

   ```
   # modprobe dca

   # cd ioatdma

   # insmod ioatdma.ko
   ```

```
# modprobe ioatdma

# ll /sys/class/dma/
```

When IOAT driver installation completed, you could see subdirectories and files for each subdirectory of /sys/class/dma folder.

RAID Utility Installation

NOTE. Please install the compat-libstdc++-296-2.96-138.i386.rpm and compat-libstdc++-33-3.2.3-61.i386.rpm packages with the CD #3 of Red Hat Enterprise Linux 5 EM64T prior to install the RAID Web Console 2.

1. You can find the RAID Web Console 2 in EasyBUILD 8.0 build 100. Please refer to directory of the RAID Web Console 2 in Software Required section and copy the utility from the EasyBUILD 8.0 build 100 to HDD first.

```
# mount /media/cdrecorder

# cp –R /media/cdrecorder/app/r920/Integrated_SAS/Linux/. /tmp
```

2. Install RAID Web Console 2 utility

```
# cd /tmp/

# unzip ir3_Linux_RWC2_v2_19_01.zip

# chmod 755 install.sh

# chmod 755 RunRPM.sh

# ./install.sh
```

3. Type y to accept the license agreen and select 1 for full installation.

4. To start RAID Web Console 2 on, select **applications -> System Tools -> RAID Web Console 2 Startup UI**

## Red Hat Enterprise Linux 5.0 (with Integrated SAS Hardware RAID)

Below information describes how to manually install Red Hat Enterprise Linux 5.0 on Altos R920 with integrated SAS hardware RAID.

Drivers Required

For Red Hat Enterprise Linux 5.0 Installation, the following device drivers are required.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | N/A | Built-in |

| | | |
|---|---|---|
| Onboard Chipset | N/A | Built-in |
| Integrated SAS hardware RAID | 00.00.03.09 | EasyBUILD 8.0 build 100 (or later) |
| Onboard Gigabit Ethernet | 7.6.9 | EasyBUILD 8.0 build 100 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 1.0.8 | EasyBUILD 8.0 build 100 (or later) |
| Trusted Platform Module | No driver | N/A |
| IOAT | 2.15 | EasyBUILD 8.0 build 200 (or later) |
| SAS Hot-swap backplane | N/A | Built-in |

Software Required

The management utility for integrated SAS hardware RAID can be found in the EasyBUILD 8.0 build 100 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| RAID Web Console 2 | 2.19-01 | EasyBUILD 8.0 build 100 (or later) |

Configuring integrated SAS hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

NOTE. There is no built-in driver for Integrated SAS hardware RAID in the Red Hat Enterprise Linux 5.0. You need an external USB floppy drive for applying driver during the OS installation.

1. Since Red Hat Enterprise Linux 5.0 cannot recognize the integrated SAS hardware RAID, you need to make a driver diskette from the EasyBUILD 8.0 build 100 first before the installation.
2. Type **linux dd** when the prompt **boot:** appears at the start.
3. Please select the **sda** as the **Driver Disk Source**.
4. Follow the instruction to load the integrated SAS hardware RAID driver from the driver diskette.
5. At the package selection step, select **Software Development** for the installation package.
6. Please follow the normal procedure to finish the

installation.

Gigabit Ethernet Driver Installation

NOTE. Please install the kernel-devel-<version> package with the CD #1 of Red Hat Enterprise Linux 5 EM64T prior to install the Gigabit Ethernet driver.

NOTE. Please install the kernel-PAE-devel-<version> package with the CD #1 of Red Hat Enterprise Linux 5 EM64T prior to install the Gigabit Ethernet driver in PAE mode kernel.

1. You can find the Intel 82563EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82563EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   # mount /dev/dvd /mnt

   # cp –R /mnt/Disk/R920/NIC/Intel/pro1000.lx/. /tmp

2. Remove the OS built-in NIC driver

   # rmmod e1000.ko

3. Change the directory to the driver source and install the driver

   # cd /tmp/src/

   # make install

   # insmod e1000.ko

4. Run the kudzu utility, it will auto detect the Intel 82563EB network controller and help you to configure it.

   # kudzu

5. Restart the network service to bring up both of the network interfaces.

   # service network restart

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Intel 82575EB Gigabit Ethernet available on Altos R920.

1. You can find the Intel 82575EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82575EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   # mount /dev/dvd /mnt

```
# cp –R /mnt/Disk/R920/NIC/83575EB/linux/. /tmp
```

2. Change the directory to the driver source and install the driver

   ```
   # cd /tmp/src/
   # make install
   # insmod igb.ko
   ```

3. Run the kudzu utility, it will auto detect the Intel 82563EB network controller and help you to configure it.

   ```
   # kudzu
   ```

4. Restart the network service to bring up both of the network interfaces.

   ```
   # service network restart
   ```

IOAT driver installation

1. Please remove the old version of IOAT driver from the system manually.

   ```
   # cd /lib/modules/$(uname -r)/kernel/drivers/dma
   # mv ioatdma.ko ioatdma.ko.bak
   ```

2. You can find the IOAT driver in EasyBUILD. Please copy the driver from the EasyBUILD to HDD first.

   Copy the IOAT driver to /tmp

   ```
   # cd /tmp
   # tar zxf ioatdma-<ioat version>.tar.gz
   ```

3. Install the IOAT driver

   ```
   # cd ioatdma-<ioat version>
   # make install
   ```

4. Load the IOAT driver

   ```
   # modprobe dca
   # cd ioatdma
   # insmod ioatdma.ko
   # modprobe ioatdma
   # ll /sys/class/dma/
   ```

When IOAT driver installation completed, you could see subdirectories and files for each subdirectory of /sys/class/dma folder.

RAID Utility Installation

NOTE. Please install the compat-libstdc++-296-2.96-138.i386.rpm and compat-libstdc++-33-3.2.3-61.i386.rpm packages with the CD #2 of Red Hat Enterprise Linux 5 prior to install the RAID Web Console 2.

1. You can find the RAID Web Console 2 in EasyBUILD 8.0 build 100. Please refer to directory of the RAID Web Console 2 in Software Required section and copy the utility from the EasyBUILD 8.0 build 100 to HDD first.

```
# mount /media/cdrecorder

# cp –R /media/cdrecorder/app/r920/Integrated_SAS/Linux/. /tmp
```

2. Install RAID Web Console 2 utility

```
# cd /tmp/

# unzip ir3_Linux_RWC2_v2_19_01.zip

# chmod 755 install.sh

# chmod 755 RunRPM.sh

# ./install.sh
```

3. Type y to accept the license agreen and select 1 for full installation.

4. To start RAID Web Console 2 on, select **applications -> System Tools -> RAID Web Console 2 Startup UI**

## SUSE Linux Enterprise Server 10 SP1 EM64T Installation (with integrated SAS hardware RAID)

Below information describes how to manually install SUSE Linux Enterprise Server 10 SP1 EM64T on Altos R920 with integrated SAS hardware RAID.

Drivers Required

For SUSE Linux Enterprise Server 10 SP1 EM64T Installation, the following device drivers are required. The drivers can be found in the EasyBUILD 8.0 build 100 (or later).

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | N/A | Built-in |
| Onboard Chipset | N/A | Built-in |
| Integrated SAS hardware RAID | 00.00.03.05 | Built-in |
| Onboard Gigabit Ethernet | 7.6.9 | EasyBUILD 8.0 build 100 (or later) |

| | | |
|---|---|---|
| Add-on Gigabit Ethernet on I/O expansion module | 1.0.8 | EasyBUILD 8.0 build 100 (or later) |
| Trusted Platform Module | No driver | N/A |
| IOAT | 2.15 | EasyBUILD 8.0 build 200 (or later) |
| SAS Hot-swap backplane | N/A | Built-in |

Software Required

The management utility of integrated SAS hardware RAID can be found in the EasyBUILD 8.0 build 100 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| RAID Web Console 2 | 2.19-01 | EasyBUILD 8.0 build 100 (or later) |

Configuring integrated SAS hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

1. Please use the built-in driver of SUSE Linux Enterprise Server 10 SP1 EM64T to install the OS.
2. Boot the system with SUSE Linux Enterprise Server 10 SP1 EM64T CD #1.
3. Follow the instruction to install the OS.
4. At the Installation Settings, select the Software and click on **Details.** Select “Package Groups” in the Filter drop-down menu, then click Development -> sources to add **kernel** package. Select “Patterns” in the Filter drop-down menu, then add **C/C++ Compiler and Tools** packages. Then, select **Accept**.
5. Follow the instruction to complete the installation.

Gigabit Ethernet Driver Installation

1. You can find the Intel 82563EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82563EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   The SUSE Linux Enterprise Server 10 can automatically mount the EasyBUILD 8.0 build 100 DVD at /media/<easybuild> folder when inserting the DVD media.

```
# cp –R /media/<easybuild>/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
```

Or you can manually mount EasyBUILD 8.0 build 100 DVD with the command:

```
# mount /dev/dvd /mnt
```

```
# cp –R /mnt/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
```

2. Remove the OS built-in NIC driver

```
# rmmod e1000.ko
```

3. Change the directory to the driver source and install the driver

```
# cd /tmp/src/
```

```
# make install
```

```
# insmod e1000.ko
```

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Intel 82575EB Gigabit Ethernet available on Altos R920.

1. You can find the Intel 82575EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82575EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   The SUSE Linux Enterprise Server 10 can automatically mount the EasyBUILD 8.0 build 100 DVD at /media/<easybuild> folder when inserting the DVD media.

```
# cp –R /media/<easybuild>/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
```

   Or you can manually mount EasyBUILD 8.0 build 100 DVD with the command:

```
# mount /dev/dvd /mnt
```

```
# cp –R /mnt/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
```

2. Change the directory to the driver source and install the driver

```
# cd /tmp/src/
```

```
# make install
```

```
# insmod igb.ko
```

IOAT driver installation

1. Please remove the old version of IOAT driver from the

system manually.

# cd /lib/modules/$(uname -r)/kernel/drivers/dma

# mv ioatdma.ko ioatdma.ko.bak

2. You can find the IOAT driver in EasyBUILD. Please copy the driver from the EasyBUILD to HDD first.

   Copy the IOAT driver to /tmp

   # cd /tmp

   # tar zxf ioatdma-<ioat version>.tar.gz

3. Install the IOAT driver

   # cd ioatdma-<ioat version>

   # make install

4. Load the IOAT driver

   # modprobe dca

   # cd ioatdma

   # insmod ioatdma.ko

   # modprobe ioatdma

   # ll /sys/class/dma/

When IOAT driver installation completed, you could see subdirectories and files for each subdirectory of /sys/class/dma folder.

RAID Utility Installation

1. You can find the RAID Web Console 2 in EasyBUILD 8.0 build 100. Please refer to directory of the RAID Web Console 2 in Software Required section and copy the utility from the EasyBUILD 8.0 build 100 to HDD first.

```
# mount /media/cdrecorder

# cp –R /media/cdrecorder/app/r920/Integrated_SAS/Linux/. /tmp
```

2. Install RAID Web Console 2 utility

   # cd /tmp/

   # unzip ir3_Linux_RWC2_v2_19_01.zip

   # chmod 755 install.sh

   # chmod 755 RunRPM.sh

   # ./install.sh

3. Type y to accept the license agreen and select 1 for full installation.

4. To start RAID Web Console 2 on, select **applications -> System Tools -> RAID Web Console 2 Startup UI**

## SUSE Linux Enterprise Server 10 SP1 Installation (with integrated SAS hardware RAID)

Below information describes how to manually install SUSE Linux Enterprise Server 10 SP1 on Altos R920 with integrated SAS hardware RAID.

### Drivers Required

For SUSE Linux Enterprise Server 10 SP1 EM64T Installation, the following device drivers are required. The drivers can be found in the EasyBUILD 8.0 build 100 (or later).

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | N/A | Built-in |
| Onboard Chipset | N/A | Built-in |
| Integrated SAS hardware RAID | 00.00.03.05 | Built-in |
| Onboard Gigabit Ethernet | 7.6.9 | EasyBUILD 8.0 build 100 (or later) |
| Add-on Gigabit Ethernet on I/O expansion module | 1.0.8 | EasyBUILD 8.0 build 100 (or later) |
| Trusted Platform Module | No driver | N/A |
| IOAT | 2.15 | EasyBUILD 8.0 build 200 (or later) |
| SAS Hot-swap backplane | N/A | Built-in |

### Software Required

The management utility of integrated SAS hardware RAID can be found in the EasyBUILD 8.0 build 100 (or later).

| Software | Version | EasyBUILD Version |
|---|---|---|
| RAID Web Console 2 | 2.19-01 | EasyBUILD 8.0 build 100 (or later) |

### Configuring integrated SAS hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

1. Please use the built-in driver of SUSE Linux Enterprise Server 10 SP1 EM64T to install the OS.
2. Boot the system with SUSE Linux Enterprise Server 10 SP1 EM64T CD #1.
3. Follow the instruction to install the OS.
4. At the Installation Settings, select the Software and click on **Details.** Select “Package Groups” in the Filter drop-down menu, then click Development -> sources to add **kernel** package. Select “Patterns” in the Filter drop-down menu, then add **C/C++ Compiler and Tools** packages. Then select **Accept**.
5. Follow the instruction to complete the installation.

Gigabit Ethernet Driver Installation

1. You can find the Intel 82563EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82563EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   The SUSE Linux Enterprise Server 10 can automatically mount the EasyBUILD 8.0 build 100 DVD at /media/<easybuild> folder when inserting the DVD media.

   ```
   # cp –R /media/<easybuild>/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
   ```

   Or you can manually mount EasyBUILD 8.0 build 100 DVD with the command:

   ```
   # mount /dev/dvd /mnt
   # cp –R /mnt/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
   ```

2. Remove the OS built-in NIC driver

   ```
   # rmmod e1000
   ```

3. Change the directory to the driver source and install the driver

   ```
   # cd /tmp/src/
   # make install
   # insmod e1000.ko
   ```

Gigabit Ethernet Driver Installation (I/O Expansion Module)

If the optional I/O Expansion module is installed on Altos R920, there are two additional Intel 82575EB Gigabit Ethernet

available on Altos R920.

1. You can find the Intel 82575EB driver in EasyBUILD 8.0 build 100. Please refer to directory of the 82575EB driver in Driver Required section and copy the driver from the EasyBUILD 8.0 build 100 to HDD first.

   The SUSE Linux Enterprise Server 10 can automatically mount the EasyBUILD 8.0 build 100 DVD at /media/<easybuild> folder when inserting the DVD media.

   ```
   # cp –R /media/<easybuild>/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
   ```

   Or, you can manually mount EasyBUILD 8.0 build 100 DVD with the command:

   ```
   # mount /dev/dvd /mnt
   # cp –R /mnt/Disk/R920/NIC/Intel/pro1000.lx/. /tmp
   ```

2. Change the directory to the driver source and install the driver

   ```
   # cd /tmp/src/
   # make install
   # insmod igb.ko
   ```

IOAT driver installation

1. Please remove the old version of IOAT driver from the system manually.

   ```
   # cd /lib/modules/$(uname -r)/kernel/drivers/dma
   # mv ioatdma.ko ioatdma.ko.bak
   ```

2. You can find the IOAT driver in EasyBUILD. Please copy the driver from the EasyBUILD to HDD first.

   Copy the IOAT driver to /tmp

   ```
   # cd /tmp
   # tar zxf ioatdma-<ioat version>.tar.gz
   ```

3. Install the IOAT driver

   ```
   # cd ioatdma-<ioat version>
   # make install
   ```

4. Load the IOAT driver

   ```
   # modprobe dca
   # cd ioatdma
   ```

```
# insmod ioatdma.ko

# modprobe ioatdma

# ll /sys/class/dma/
```

When IOAT driver installation completed, you could see subdirectories and files for each subdirectory of /sys/class/dma folder.

RAID Utility Installation

1. You can find the RAID Web Console 2 in EasyBUILD 8.0 build 100. Please refer to directory of the RAID Web Console 2 in Software Required section and copy the utility from the EasyBUILD 8.0 build 100 to HDD first.

```
# mount /media/cdrecorder

# cp –R /media/cdrecorder/app/r920/Integrated_SAS/Linux/. /tmp
```

2. Install RAID Web Console 2 utility

```
# cd /tmp/

# unzip ir3_Linux_RWC2_v2_19_01.zip

# chmod 755 install.sh

# chmod 755 RunRPM.sh

# ./install.sh
```

3. Type y to accept the license agreen and select 1 for full installation.

4. To start RAID Web Console 2 on, select **applications -> System Tools -> RAID Web Console 2 Startup UI**

## VMware ESX Server 3.5 (with integrated SAS hardware RAID)

Below information describes how to manually install VMware ESX Server 3.5 on Altos R920 with integrated SAS hardware RAID.

BIOS Required

Altos R920 BIOS 20 (or later) is required to support VMware ESX Server 3.5.

Drivers Required

Please use VMware ESX Server 3.5 built-in drivers for the installation on Altos R920.

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | N/A | OS Built-in |

| | | |
|---|---|---|
| Onboard Chipset | N/A | OS Built-in |
| Integrated SAS hardware RAID | 00.00.03.09 | OS Built-in |
| Onboard Gigabit Ethernet | 7.3.15 | OS Built-in |
| SAS Hot-swap backplane | N/A | OS Built-in |

Configuring integrated SAS hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

1. Please use the built-in driver of VMware ESX Server 3.5 to install the OS.
2. Boot the system with VMware ESX Server 3.5 CD
3. When “boot:” prompted, press Enter to continue.
4. Select your Keyboard.
5. Select your mouse.
6. Accept the VMware license agreement.
7. Select a partitioning option.
   - Recommended – Configures default partitions, based on the capacity of the hard drive.
   - Advanced – You specify all partition settings.
8. Select how the ESX Server will boot in Advanced Optioins.

   NOTE: VMware recommends to keep the default setting of “Form a drive (install on the MBR of the drive)” option.
9. Configure the ESX Serer host network IP address.

   NOTE: VMware recommends that you use a static IP address to simplify client access.
10. Follow the instruction to complete the installation of the VMware ESX Server 3.5.

Downloading the VMware Infrastructure Client

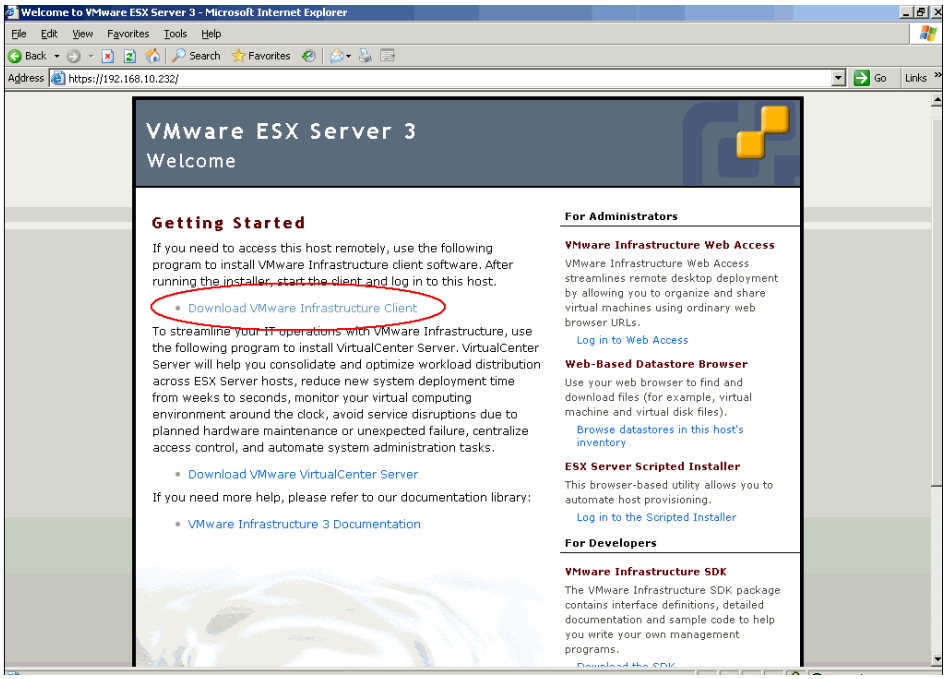
1. When the installation is completed, boot the system into VMware ESX Server 3.5. The below message displayed:

   To manage this ESX Server, use any browser to open the URL

   http://<IP address of the ESX Server>/
2. Please remotely connect the ESX Server from a console

system by typing in the IP address of the ESX Server with web browser.

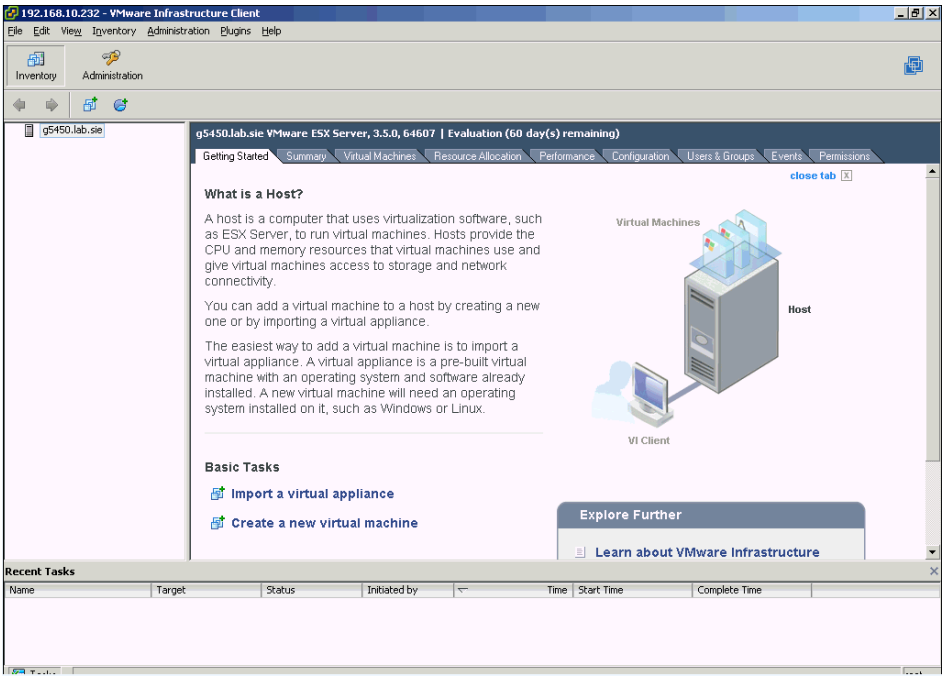
3. When you login, please click “Download VMware Infrastructure Client” to download the VMware Infrastructure Client utility.




VMware Infrastructure Client Installation on Windows

1. To install the VMware Infrastructure Client utility on your console system.
2. Launch VMware Infrastructure Client utility.


3. Now, you can manage the ESX Server or create virtual machines with the VMware Infrastructure Client utility.




## SCO UnixWare 7.1.4 Installation with integrated SAS hardware RAID)

Below information describes how to manually install SCO UnixWare 7.1.4 on Altos R920 with integrated SAS hardware RAID.

### BIOS Required

Altos R920 BIOS 25 (or later), BMC 18 (or later) and FRUSDR 14 (or later) are recommended to support UnixWare 7.1.4.

### Drivers Required

For SCO UnixWare 7.1.4 Installation, the following device drivers are required.

The drives can be also downloaded from Acer GCSD website.

http://csd.acer.com.tw/SI/Download2007.nsf/ServerWeb

| Device | Version | EasyBUILD Version |
|---|---|---|
| Onboard VGA | N/A | OS Built-in |
| Onboard Chipset | N/A | OS Built-in |
| Integrated SAS hardware RAID | 1.2 | Acer GCSD website. |
| Onboard Gigabit Ethernet | 10.2.15 | Acer GCSD website. |
| SAS Hot-swap backplane | N/A | OS Built-in |

Configuring integrated SAS hardware RAID

Please refer to the Appendix A. for the integrated SAS hardware RAID configuration.

Installation Tips

NOTE. There is no built-in driver for Integrated SAS hardware RAID in the SCO UnixWare 7.1.4. You need an external USB floppy drive for applying driver during the OS installation.

NOTE. To support the external USB floppy drive, the USB Controller must be enabled. However, please disable the USB 2.0 Controller option with BIOS Setup Utility to ensure SCO UnixWare 7.1.4 can recognize the external USB floppy drive. You could find USB 2.0 Controller option in Advanced > USB Configuration menu with BIOS Setup Utility.

1. Make the driver diskette.
2. Boot the system with UnixWare 7.1.4 Installation CD and follow the instructions.
3. When the below screen displayed, please insert the Integrated SAS hardware RAID driver diskette into the external USB floppy drive and select Install HBA drivers option. Then, press F10 to continue.

   > If you have Host Bus Adapter drivers on a diskette, CD-ROM, or removable USB storage media, select “Install HBA drivers”, insert the media and press <F10> to continue. If you do not have HBA media to install, select “Proceed with installation” and press<F10> to continue.

4. At the network setup stage, select Defer to skip the network installation. Install the network adapter after OS installation finished.

Gigabit Ethernet Driver Installation

1. Make the Intel 82563EB driver for UnixWare 7.1.
2. Copy the driver from floppy diskette to hard disk

   ```
   # mount -F dosfs /dev/fd0 /mnt
   # mkdir /temp
   # cp /mnt/e1008g.pkg /temp/.
   ```

3. Install the driver package

   ```
   # pkgadd -d /temp/e1008g.pkg
   ```

4. Launch **netcfg** utility and select **Hardware** -> **Add new LAN**

**adapter** to add the adapters and set the network settings.

```
# netcfg
```

OS Multiprocessor Support Installation

1. Launch the scoadmin and select Software_Managerment > Application Installer.
2. Insert the Installation CD and select **Install From: CD-ROM_1**.
3. Select **OSMP** and click on **Install**.
4. After you installed the **OSMP** and exit the **scoadmin**, DO NOT reboot the server. Please add **ACPI=Y** and **ENABLE_JT=Y** into the last entry of the /stand/boot first.

   ```
   #vi /stand/boot

   ...
   ACPI=Y
   ENABLE_JT=Y
   ```

5. Save the change, then reboot the server.

Maintenance Pack 3 Installation

1. Please download the Maintenance Pack 3 form SCO website and burn the image to a CD.
2. Mount the Maintenance Pack CD and run the install.sh

   ```
   #mount /dev/cdrom/cdrom1 /mnt
   #cd /mnt
   #./install.sh
   ```

3. Select Apply to install the update with default packages.
4. Reboot the server after installation completed.

# APPENDIX A: INTEGRATED SAS HARDWARE RAID CREATION

## Configuring Integrated SAS Hardware RAID

This section briefly shows how to create RAID with integrated SAS Hardware RAID.

### Starting Integrated SAS Hardware RAID Configuration Utility

To start Integrated SAS Hardware RAID Configuration Utility, press **CTRL-G** when you see the RAID BIOS during POST. After POST finished, the Adapter Selection page will show on the screen. Please click on **Start** to launch the configuration menu.

### Loading Factory Default Setting

1. In the Configuration menu, select **Adapter Properties**. The current adapter settings appear.
2. Click on **Next**, change the setting of **Set Factory Defaults** from **No** to **Yes** then click on **Submit**.
3. Exit the utility and reboot the system.

### Creating and Initialing a RAID Volume

1. Launch the Configuration menu.
2. Select **Configuration Wizard**
3. Select **Add Configuration** (default) and click on **Next**.
4. Select **Custom Configuration** (default) and click on **Next**.
5. Select the drives that you want to add into the array with **Ctrl** key. After you select the drives, click on **Accept DG** then **Next**.
6. Select the **RAID Level** you want to use, create the logical volume by specify the size at **Select Size** and click on **Accept** to create the logical volume.
7. After you create the logical volumes on all of the RAID volume, click on **Accept** and **Yes** to save the configuration.
8. Click on **Yes** to initialize the new logical drives. You will see all the logical drives listed.
9. Click on **Home** to go back to the configuration menu.
10. Now you can reboot the system and install the Operating System. Select **Exit**, click on **Yes** and press **Ctrl+Alt+Del** to reboot the system.

### Assigning a Hot Spare Disk

1. Launch the configuration menu.
2. Select a free disk marked as **UNCONF GOOD** and listed under

**Physical Drives**.

3. Select **Make Global HSP** or **Make Dedicated HSP** and click on **Go**.
4. Click on **Home** to go back to the configuration menu. You will see the disk marked as **HOTSPARE** in pink and listed under Physical Drives.

# APPENDIX B: INTEGRATED SAS IM CREATION

## Configuring Integrated SAS IM

This section briefly shows how to create integrated SAS IM (Integrated Mirroring).

### Starting Integrated SAS Configuration Utility

To start Integrated SAS Configuration Utility, press **CTRL-C** when you see the SAS BIOS during POST.

### Creating IM Volume

1. In LSI Logic Config Utility, select **SAS1078** and press Enter
2. In Adapter Properties screen, move cursor to **<RAID Properties>** and press Enter
3. When you are prompted to select a volume type, select **Create IM Volume**.
4. Move the cursor to the RAID Disk column and select a disk. To add the disk to the volume, change the No to Yes by pressing the + key, - key, or space bar.
5. Press **M** to keep the existing data on the first disk or press **D** to overwrite it.

   NOTE. All data in HDD will be erased when press **D**
6. When the volume has been fully configured, press **C** and then select **Save changes then exit this menu** to commit the changes.

### Assigning a Hot Spare Disk

1. In LSI Logic Config Utility, select **SAS1078** and press Enter
2. In Adapter Properties screen, move cursor to **<RAID Properties>** and press Enter
3. Move the cursor to the Hot Spr column and select a disk. To add the disk to the volume as hot spare, change the No to Yes by pressing the + key, - key, or space bar.
4. Select **Save changes then exit this menu** to commit the changes.