Technical Support
See the Support Web site for documentation, technical updates, drivers and downloads, warranty information, and software revisions.

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Patents


Inquiries regarding patented technology should be directed to ClearCube Corporate Headquarters.
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Preface

How to Use This Guide

This guide explains how to install and set up ClearCube Technology, Inc. R-Series chassis, blades and components necessary for managed desktop environments. We recommend that you familiarize yourself with the ClearCube architecture and product descriptions and read through all installation and setup procedures before beginning installation.

If you encounter any issues, contact ClearCube Support using the contact information provided on the inside front cover of this manual and in Appendix B, Technical Support on page 131.

FCC Warning

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual, may cause interference to radio and television reception. Changes or modifications not expressly approved by ClearCube Technology, Inc. could void the user's authority to operate the equipment under FCC rules.
California Proposition 65 Statement

WARNING: ClearCube products contain chemicals, including lead, known to the State of California to cause cancer, birth defects, or other reproductive harm. Wash hands after handling.

ClearCube products should be disposed of in accordance with local laws governing computer equipment disposal.

WEEE Information

The products described in this document are subject to regulation under the European Union Directive 2002/96/EC, that mandates separate waste collection, treatment, and recycling of electronic products. This directive is commonly known as WEEE, for Waste from Electrical and Electronic Equipment, and its intent is to promote the safe and sensible disposal of products that have outlived their usefulness.

The “crossed-out” trash bin symbol, shown above, identifies products that should be recycled, not simply discarded. ClearCube Technology, Inc. supports the reuse, recycling, recovery, and responsible disposal of all products.

ClearCube Technology, Inc. is committed to meeting the requirements of the European Union WEEE Directive. The goal of the directive is to reduce the environmental impact due to the disposal of electrical and electronic equipment that has reached the end of its useful service life.

ClearCube products are sold exclusively to commercial and industrial customers and not to private households. Under the WEEE legislation terms, commercial and industrial customers have the responsibility to ensure that all electrical and electronic equipment is disposed of properly and in accordance with all applicable laws and local regulations. For more information, email recycle@clearcube.com, or call (866) 652-3400 or +1 (512) 652-3400.

Materials used in this product, if not disposed of properly, could have adverse effects on the environment and on human health. Do not dispose of these products in unsorted municipal waste containers. Deliver electronic waste only to an approved recycling facility, a treatment facility, or both. If one is not available, contact ClearCube for assistance.
Medical and Clinical Use of ClearCube Products

ClearCube products are not designed with components and testing for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human. Applications of ClearCube products involving medical or clinical treatment can create a potential for death or bodily injury caused by product failure, or by errors on the part of the user. Because each end-user system environment is customized and differs from ClearCube testing platforms and because a user may use ClearCube products in combination with other products in a manner not evaluated or contemplated by ClearCube, the user is ultimately responsible for verifying and validating the suitability of ClearCube products whenever ClearCube products are incorporated in a system, including, without limitation, the appropriate design, process and safety level of such system or application.

Symbols

Symbols are displayed on the hardware described in this document to convey specific information to the operator and service person. It is important to understand the intended meaning of these symbols. The following list shows each symbol displayed on ClearCube Technology, Inc. products and explains the meaning of each symbol.

Refer to Manual
Used on the equipment’s rating label to direct the operator or service person to this manual for additional information.

Shock Hazard
This symbol indicates the presence of electric shock hazards. Enclosures marked with these symbols should only be opened by qualified service personnel. Refer to the manual for additional information.

Power
Identifies the soft-start switch located on a blade used to power a blade on and off.

Fuse
Located on equipment rating label. Symbol is accompanied with the specifications needed for replacement. Only qualified technicians should perform this operation.

Protective Earth Terminal
This symbol identifies the terminal that is used to connect all metal parts of an enclosure through an external conductor to ground for protection against electrical shock in a fault condition.
The following caution and warning symbols are used in this document to indicate situations that merit checking this or another manual, or situations that could result in damage to equipment or physical injury.

**Ground Bond Terminal**
This symbol identifies the ground bond terminal. This terminal is used to connect the ground bonding conductor, or the combination of conductive parts, to earth ground for safety purposes.

**Equipment Protection Class II**
May be located on the power adapter’s rating label. Indicates that equipment is double–insulated from hazardous voltages. Not to be confused with Class 2, a US National Electrical Code (NEC) circuit classification.

The following caution and warning symbols are used in this document to indicate situations that merit checking this or another manual, or situations that could result in damage to equipment or physical injury.

**CAUTION:** A Caution notice in this manual indicates that equipment damage or minor injury may result if proper procedures are not followed.

**WARNING:** A Warning notice in this manual indicates that catastrophic equipment damage or serious injury, including death, may result if proper procedures are not followed.

---

**Safety Guidelines**

Before undertaking any troubleshooting or maintenance procedure, carefully read all **WARNING** and **CAUTION** notices. Equipment displaying warning or caution notices contains voltage hazardous to human life and is capable of inflicting personal injury.

- **Installations**—You must install ClearCube equipment in accordance with local electrical codes. Equipment might be subject to inspection.

- **Chassis grounding**—ClearCube’s chassis is designed with a three-conductor IEC 60320 appliance inlet that—with the proper power cord—connects the building’s external protective earthing conductor to all accessible metal parts of the enclosure. To minimize shock hazard, make sure your electrical power outlet has an appropriate earth safety ground that is connected each time you power on the equipment.

Swedish safety regulations require the following statement:

—Apparaten skall anslutas till jordat uttag när den anslutas till ett nätverk.—
Finnish safety regulations require the following statement:

— Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan.—

- **Power cord selection**—ClearCube or ClearCube distributors provide power cords that are specifically designed for use with particular pieces of equipment and are approved for use by the local authority having jurisdiction in the country where the equipment is put into service. Refer to the installation sections of this manual for specific power cord requirements. For information about obtaining replacement power cords, see Appendix B. Technical Support on page 131.

- **Power adapters**—ClearCube or ClearCube distributors provide power adapters that are specifically designed for use with particular pieces of equipment and are approved for use by the local authority having jurisdiction in the country where the equipment is put into service. Refer to the installation sections of this guide for specific power cord requirements. For information about obtaining replacement power adapters, see Appendix B. Technical Support on page 131.

- **IT power systems**—ClearCube equipment has been evaluated and found to be compatible with IT power distribution systems with a phase-to-phase voltage not to exceed 240 V.

- **Live circuits**—Operating personnel and service personnel must not remove protective covers when operating the ClearCube chassis. Adjustments and service to internal components must be undertaken by qualified service technicians. During any service of this product, other than replacing a Blade PC or externally accessible modules on the expansion backplane, the main connector to the premise wiring must be disconnected. Dangerous voltages may be present under certain conditions. Use extreme caution.

- **Explosive atmosphere**—Do not operate the chassis in conditions where flammable gases are present. Under such conditions this equipment is unsafe and may ignite the gases or gas fumes.

- **Part replacement**—Only service equipment with parts that are exact electrical and mechanical replacements. Contact your authorized ClearCube Technology, Inc. reseller for information about replacement parts. Installation of parts that are not direct replacements will void the warranty and may cause harm to personnel operating the chassis. Furthermore, damage or fire may occur if replacement parts are unsuitable.

- **Modification**—Do not modify any part of the chassis or Blade PC from its original condition. Modifications may result in hazards.

- **Laser Safety**—The Fiber Transceiver has been evaluated and certified to an EN 60825-1 — Safety of laser products. See Appendix D. Regulatory Compliance on page 135 for additional references.

---

**CAUTION:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
ClearCube products that use lasers display the following graphic on the rating label:

![CLASS 1 LASER PRODUCT](image)

- Marked devices comply with the FDA code of Federal 21 CFR 1040 per Notice 50 and/or the Canadian Radiation Emitting Devices Act REDR C1370.

---

**Additional Regulatory and Safety Documentation**

You can find additional regulatory- and safety-related documentation on the Support Web site at [http://www.clearcube.com/support/](http://www.clearcube.com/support/). Select a product model from the drop-down lists (Blade PC, Desktop Device, or Backpacks/Cages). From the product page, click the orange **Regulatory Docs** link to display download links for the product’s regulatory and safety documentation.
Chapter 1. R-Series Architecture and Product Overview

The ClearCube architecture delivers Intel®-based PC functionality to users from a secure, centralized location. This architecture increases IT manageability and security, and provides mission-critical reliability, performance, and uptime improvements with lowered costs. Replacing a traditional PC with a ClearCube Cloud Desktop (Admin C/Port, zero client, or thin client) saves space, increases security, eliminates fan noise, and simplifies cabling. The key components of the ClearCube Architecture include (devices not shown to scale):

**Blade PCs**
Computers in a dense form factor that use Intel® CPUs. Blades are typically remotely located. See 1.1 “R-Series Blade PC” on page 4 for more information about blades.

**Host card**
A PCIe® card based on TERA processors that is installed in a computing device (such as a Blade PC or a VM). Host cards use PCoIP® technology to enable zero clients to connect to blades to provide high resolution graphics, audio, and video and full USB peripheral support.

**Chassis**
Hold multiple Blade PCs and enable the management of all external cables connect to blades from a single location. An R4300 accepts a variety of plug-in module options that allow device connection, management, and administration. See 1.2 “R-Series Chassis” on page 7 for more information about chassis.
Chapter 1. R-Series Architecture and Product Overview

Cloud Desktop (zero client or thin client)
A remote desktop unit (PCoIP zero client or thin client), typically placed on a desk, to which users connect peripherals such as a monitor, keyboard, and pointing device. See 1.4 “Cloud Desktops: Zero Clients and Thin Clients” on page 11 for more information about zero clients and thin clients.

Admin C/Port
A remote desktop unit used for local administration of R3082D blades in R-Series chassis. See 1.5 “Admin C/Port” on page 12 for more information about Admin C/Ports.

Sentral system management software
ClearCube Sentral™ is a software suite that provides system management capabilities (including connection brokering, mass storage lockout, alerting, and much more) for a ClearCube environment. Sentral takes advantage of monitoring hardware that is built into blades, chassis, and Cloud Desktops. For more information about Sentral, see ClearCube Sentral Administrator’s Guide. (Sentral management software is an optional component.)
The picture below shows the main R-Series architecture components.

Figure 1. R-Series architecture

See 2.4 “Common Deployment Types” on page 22 for more information about the ClearCube architecture and examples of several common R-Series deployments.

This guide is one of a series of manuals that describe the ClearCube architecture. Other manuals include:

- *PCoIP User’s Guide*
- *Sentral Administrator’s Guide*
- *C/Port and Multi Video Extender User’s Guide*
1.1 **R-Series Blade PC**

The sections below provide an overview of R-Series blades and identify the buttons and indicators on a blade’s front panel.

### 1.1.1 Blade PC Overview

The ClearCube Blade PC is a dedicated computer that delivers full PC functionality to the desktop from a centralized location. Each R-Series Blade PC contains all industry-standard components of a desktop PC: processor, memory, hard drive, video support, and Ethernet. You can easily connect peripherals to the Blade PC through USB ports on a client device that is connected to the blade over a network. Additionally, a USB port is located on the front of the blade. You can load application software onto your Blade PC through peripherals connected to the USB ports, or via the Ethernet connection on each blade.

The rear of an R4300 chassis provides network and USB connectors when an R-Series blade is in a chassis, as shown in Figure 6 on page 9 and in the tables in 3.4 “Chassis Modules and Bays” on page 33.

**Figure 2** shows R-Series Blade PCs.

![R3161D and R3082D](image)

**Figure 2. R-Series Blade PCs**

See 2.4 “Common Deployment Types” on page 22 for examples of Blade PCs in R-Series deployments.

### 1.1.2 Front Panel: Power Controls and Indicators

R-Series blade front panels provide power controls and various indicators. The sections below show the front panels of each R-Series blade.
1.1.2.1 R3082D
The picture and table below show the R3082D front panel and describe front panel feature.

NOTE
The R3082D front panels shown here pertain to blades with serial numbers ZSR03923 and higher. Older R3082D models use a front panel that differs slightly. For documentation about R3082D Blade PCs with earlier (lower) serial numbers, see Revision H of this document.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
</table>
| A      | Power button and indicator | **Button:** Press to power on and off blade. Press and hold for three seconds to force power off.  
**Indicator:** Button is illuminated (solid) when power is on, and off when power is off. |
| B      | Reset button and indicator | **Button:** Press to reset blade power.  
**Indicator:** Flashes to indicate storage drive activity. |
| C      | USB 3.0 Port | For USB peripherals and devices. |

1.1.2.2 R3161D
The picture and table below show the R3161D front panel and describe front panel features.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>USB 3.0 Ports</td>
<td>For USB peripherals and devices.</td>
</tr>
</tbody>
</table>
| B      | Power button and indicator | **Button:** Press to power on and off blade. Press and hold for three seconds to force power off.  
**Indicator:** Button is illuminated (solid) when power is on, and off when power is off. |
| C      | Reset button and indicator | **Button:** Press to reset blade power.  
**Indicator:** Flashes to indicate storage drive activity. |
1.1.3 Blade PC Labels (MAC Address and Configuration Information)

Labels on R-Series blades provide important information about the blade (MAC addresses, serial numbers, Microsoft COA, and more).

The Media Access Control address (MAC address) labels detail each network adapter and host card (if applicable).

The following sections show the location of the labels on each blade.

1.1.3.1 R3082D Labels
The picture below shows the labels on an R3082D that specify each network adapter MAC address and additional information.

![Labels on R3082D Blade PCs](image)

Figure 3. Labels on R3082D Blade PCs
1.1.3.2 R3161D
The picture below shows the labels on an R3161D that specify each network adapter MAC address and additional information.

![Labels on R3161D Blade PCs]

Blade Part Number and Regulatory Compliance
Blade Serial Number, MAC Address, and System Configuration
Host Card MAC and ID

Figure 4. Labels on R3161D Blade PCs

1.1.4 Blade PC Serial Number
The blade serial number (located on a label shown in the figure above) is useful if you need to identify a blade or a blade model. R-Series blade serial numbers use the following syntax:

- **R3082D**
  ZSRnnnnn (where ZSR is the serial number prefix, and nnnnn is a five-digit number)

- **R3161D**
  ZRHnnnnn (where ZRH is the serial number prefix, and nnnnn is a five-digit number)

1.2 R-Series Chassis

The ClearCube R-Series chassis is a centralized chassis that houses up to eight single-slot Blade PCs or up to four dual-slot Blade PCs. A standard 42 U, 19-inch rack can hold as many as 14 chassis, for a total of 112 single-slot Blade PCs, 56 dual-slot blades, or a combination of both. Figure 5 below shows a chassis with Blade PCs installed.
Each chassis is a self-contained unit providing Ethernet connections, Admin C/Port connections, airflow management, and power connections for Blade PCs. The R4300 Chassis features interchangeable modules for maximum flexibility. Each chassis provides system management connections through network and RS-485 links that you can daisy chain from chassis to chassis. The R4300 also features dual, redundant power supplies and dual AC power inputs (see Figure 6 on page 9).

The R4300 chassis provides advanced monitoring and switching functionality, with software support for these modules provided by Sentral Connection Broker and Endpoint Manager software. Sentral communicates with the chassis through an Ethernet connection on the management controller (Remote Management Module, or RMM) in each R4300. The RMM is installed inside the R4300 and does not take up a blade slot.

Figure 5. R-Series chassis front view
1.3 Fiber Optic Extension System

The Fiber Optic Extension System adds fiber optic connectivity to the ClearCube architecture using multi-mode fiber optic cables.

The system is compatible with ClearCube R4300 chassis and R-Series blades. It securely extends user desktops from centralized Blade PCs to a distance as great as 2000 meters (6562 feet) over a pair of 62.5 micron multi-mode fibers. The system consists of two components: a ClearCube Fiber Transceiver and a fiber-based zero client or thin client.
1.3.1 Fiber Transceiver

The Fiber Transceiver, shown in Figure 7, is a 1U high, rack-mounted device designed to work with fiber zero clients or thin clients in a ClearCube architecture.

![Figure 7. ClearCube F6150-160 Fiber Transceiver](image)

The F6150-160 Fiber Transceiver converts signals sent between fiber clients (zero clients and thin clients) and ClearCube blades. A single 16-port Transceiver supports two R4300 chassis or 16 Blade PCs. Each blade in a chassis is connected to the transceiver by an Ethernet cable (≤ 10 meters).

See 2.4 “Common Deployment Types” on page 22 for examples of Fiber Transceivers in R-Series deployments.
1.3.2 Fiber Clients

Fiber clients (zero clients and thin clients) provide digital fiber connections to blades and other remote devices, with ports for standard USB and other peripheral devices. Fiber clients connect to a fiber transceiver (shown above).

For more information about fiber clients, see the documentation included with the fiber zero client or thin client. See the section below for more information about clients.

See 2.4 “Common Deployment Types” on page 22 for examples of fiber clients in R-Series deployments.

1.4 Cloud Desktops: Zero Clients and Thin Clients

ClearCube Cloud Desktops include zero clients using PCoIP technology and thin clients (typically with embedded operating systems). Cloud Desktops connect to Blade PCs over a standard Ethernet network. Zero clients and thin clients deliver video and peripheral signals to a user from a Blade PC, allowing users to work over standard switched networks.

Cloud Desktops extend the ClearCube product line to let IT managers use their existing IP network and cabling infrastructure, regardless of the distance between users' physical locations and their centralized Blade PCs or other remote computing devices. ClearCube management software—Sentral—enables IT administrators to manage assets and users, perform connection brokering, and more.
See 2.4 “Common Deployment Types” on page 22 for examples of clients in R-Series deployments.

For detailed instructions about setting up, using, and managing Cloud Desktops, see the documentation included with the zero client or thin client. For information about PCoIP technology, see PC-over-IP™ System User’s Guide on the Support site at www.clearcube.com/support/. The picture below shows several ClearCube clients.

![ClearCube clients](image)

**Figure 9. ClearCube clients**

### 1.5 Admin C/Port

The Admin C/Port, shown below, is a desktop unit that Administrators can use to connect to R3082D blades for administrative purposes, such as blade configuration. The Admin C/Port supports a 200-meter (660-foot) connection distance from the blade and has two USB 1.1 ports, PS/2 mouse and keyboard ports, speaker and microphone ports, and SVGA video output port. For more information, see the Admin C/Port sections in this guide and see C/Port and Multi Video Expander User’s Guide.

**NOTE** R3161D blades do not support Admin C/Ports.
Figure 10. ClearCube Admin C/Port

See 2.4 “Common Deployment Types” on page 22 for examples of Admin C/Ports in R-Series deployments.
1.6 Blade Video Options and Monitor Support

The sections below show monitor support for each R-Series blade.

1.6.1 R3082D Monitor Support

R-Series Blade PCs support up to four monitors. The table below shows supported host card and zero client combinations that provide the specified number of monitors and resolutions. Various zero client options are available.

Table 1. R3082D monitor support

<table>
<thead>
<tr>
<th>Monitors</th>
<th>Resolution</th>
<th>Host Card</th>
<th>Copper</th>
<th>Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1920 x 1200</td>
<td>V5430</td>
<td>CD9522, CD9622, CD9624, CD9722, CD9724</td>
<td>CD7522, CD7622, CD7624, CD7722, CD7724</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V5420</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2560 x 1600</td>
<td>V5430</td>
<td>CD9522, CD9622, CD9624, CD9722, CD9724</td>
<td>CD7522, CD7622, CD7624, CD7722, CD7724</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V5420</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1920 x 1200</td>
<td>V5430</td>
<td>CD9522, CD9622, CD9624, CD9722, CD9724</td>
<td>CD7522, CD7622, CD7624, CD7722, CD7724</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V5420</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2560 x 1600</td>
<td>V5430</td>
<td>CD9542, CD9642, CD9644, CD9742, CD9744</td>
<td>CD7542, CD7642, CD7644, CD7742, CD7744</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1920 x 1200</td>
<td>V5430</td>
<td>CD9542, CD9642, CD9644, CD9742, CD9744</td>
<td>CD7542, CD7642, CD7644, CD7742, CD7744</td>
</tr>
<tr>
<td>4</td>
<td>1920 x 1200</td>
<td>V5340</td>
<td>CD9542, CD9642, CD9644, CD9742, CD9744</td>
<td>CD7542, CD7642, CD7644, CD7742, CD7744</td>
</tr>
</tbody>
</table>

NOTES:

a Single-monitor in this resolution is supported by enabling the host card’s Host Driver Function and installing Teradici Host Driver Software on the corresponding Blade PC.

b Requires dual-link, Y-cable adapter included with zero client
1.6.2 **R3161D Monitor Support**

R-Series Blade PCs support up to four monitors. The table below shows supported host card and zero client combinations that provide the specified number of monitors and resolutions. Various zero client options are available.

Table 2. R3161D monitor support

<table>
<thead>
<tr>
<th>Monitors</th>
<th>Resolution</th>
<th>Host Card</th>
<th>Zero clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1920 x 1200 a</td>
<td>V5320</td>
<td>CD9522, CD9622, CD9624, CD9722, CD9724</td>
</tr>
<tr>
<td>2</td>
<td>1920 x 1200</td>
<td>V5320</td>
<td>CD9522, CD9622, CD9624, CD9722, CD9724</td>
</tr>
<tr>
<td>4</td>
<td>1920 x 1200</td>
<td>V5340 (with V5320 installed)</td>
<td>I9440</td>
</tr>
</tbody>
</table>

**NOTES:**

a Single-monitor in this resolution is supported by enabling the host card’s Host Driver Function and installing Teradici Host Driver Software on the corresponding Blade PC.
Chapter 2. Network Planning and Site Preparation

2.1 Rack and Cabinet Requirements

Before installing the components of the ClearCube Architecture it is important to properly prepare the site where you will install chassis and Blade PCs. This chapter provides important information about how to plan for installation.

Figure 11. Standard 19-inch rack and standard 19-inch cabinet
Figure 11 above shows a rack and a cabinet, frequently used to hold ClearCube chassis. A standard 42U rack or cabinet can hold as many as 14 chassis.

Fully enclosed electrical cabinets are the preferred option for mounting your ClearCube chassis. When using cabinets, make sure that:

- Front and rear panels and doors are vented to provide sufficient airflow for intake and exhaust.
- Ensure that you have at least 34 inches (86cm) of interior depth measured from the front of the unit to accommodate the cabling that exits from the rear of the chassis.
- Provide adequate space on the back of the rack or cabinet to allow servicing the cables and equipment.

You can fit cabinets with casters to improve mobility and to ease access when servicing.

2.1.1 Space and Floor Support

Before installing racks, chassis, and blades, verify that your rack and floor can support the weight of a fully-loaded rack. If your initial installation contains fewer than seven chassis, ensure that your rack and floor can support the weight of a fully-loaded rack so you can add additional blades and chassis in the future. If you are installing other equipment in the rack or cabinet, take this additional weight into consideration.

The following table details the weight of a 42U rack or cabinet with 14 fully-loaded chassis (not including the weight of the cabling or the rack).

NOTE When planning for the space required in your data center, include 36 inches in front of each cabinet to provide adequate room when you remove blades from chassis.
2.1.2 Cooling and Airflow

As described above, obtain ClearCube Power and Cooling Requirements Spreadsheets to determine cooling requirements for your ClearCube deployment.

The following list shows items to consider when addressing cooling and airflow for R4300 chassis.

R-Series chassis draw cool air (25 degrees Celsius) in through the front of the chassis, and exhausts it out the back.

- Ensure that the air conditioning and ventilation system for the installation area can accommodate your installation’s thermal load. Contact ClearCube Support for detailed power and cooling requirements tables.

- The rear of the chassis has air vents for Blade PC fans. The fan openings must be at least five inches from any airflow-impeding barriers such as walls, the rear of the rack door or panel, large bundles of cables, and so on. The availability of an air exit path from these fans is imperative for the efficient operation of units. Failure to provide sufficient air venting will result in a thermal overload of Blade PCs. If the chassis is installed in a cabinet, use a fully vented rear door or panel.

CAUTION: Failure to provide sufficient space and room ventilation will result in overheating that can cause eventual unit failure not covered as part of unit warranty.
• Each chassis produces varying amounts of heat, depending on processor activity. Contact ClearCube Support for detailed power and cooling requirements tables. See Appendix B, “Technical Support” on page 131 for information about contacting ClearCube Support.

2.2 Chassis and Blade Power Requirements

The ClearCube Support site provides *ClearCube Power and Cooling Requirements Spreadsheets* that you can use to determine power and cooling requirements for ClearCube Blade PC and chassis deployments. Documentation and tools provide:

• Tables describing chassis power requirements
• Data center branch circuit requirements for various chassis and blade deployment scenarios
• Power requirements for uninterruptible power supply (UPS) sizing
• Maximum and minimum British thermal unit (BTU) values
• BTU calculator with features enabling you to adjust the percentage of users and application intensity

To download *ClearCube Power and Cooling Requirements Spreadsheets*:

1. See the following URL: [http://www.clearcube.com/support/](http://www.clearcube.com/support/).
2. In the Product Support section, find your blade model in the **Blade PCs** drop-down list.
3. Click the **Manuals** link below the product description.
4. Click the **Power & Cooling Requirements** link to download an archive file. The archive file contains spreadsheets for various product configurations. Choose the appropriate spreadsheet and read the included instructions about how to calculate cooling requirements.

ClearCube systems centralize computing components in a single location, which centralizes power requirements in one area. Although the ClearCube solution reduces the overall power required when compared to traditional PCs, power demands in the data center are often increased. Use the power and current specifications (see link below) to ensure that your facilities can provide the required power safely without tripping circuit breakers.

Ensure that your power circuits can safely handle the maximum current that a chassis can draw (see the Mains Supply Requirement columns in the *ClearCube Power & Cooling*...
Requirements spreadsheets). If your existing power circuit cannot handle the maximum current, you must have additional power system capacity installed by a qualified electrician.

If you are putting multiple chassis assemblies on a single power circuit, ensure that the circuit can safely handle the combined maximum currents of all chassis.

**CAUTION:** Make sure your power strips, power grid, and circuit breakers can safely provide the required current. Ensure that any extension cords used meet local safety regulations and local fire codes.

When installing uninterruptible power supplies (UPS), consult your UPS specifications for proper sizing. ClearCube provides kVA columns in the spreadsheets for reference. See the ClearCube Power and Cooling Requirements Spreadsheets on the ClearCube Support site at http://www.clearcube.com/support/ for detailed power and cooling requirements.

## 2.3 Cable Requirements

The chassis uses Ethernet network cables with RJ45 connectors to connect to clients (zero clients, thin clients, and Admin C/Ports) and to an Ethernet network. Cables can be CAT5, CAT5e, CAT6, or CAT6e cables. Admin C/Ports require straight-through cables with all four twisted pairs available (Admin C/Ports are used for administration of R-Series blades in R-Series chassis). Network connections follow standard Ethernet guidelines. In practice, identical copper media can be used for clients and for network connections, although ClearCube recommends using different cable colors for clients and network connections to simplify installation and maintenance.

If there are fiber optic segments in a network, ensure that fiber optic cables are appropriate for client connectors, transceiver connectors (if applicable) and for any other devices in the fiber portion of the network.

A chassis’s Network Module (16-port) provides Ethernet connections (see 3.4.1 “Installing and Removing R4300 Modules” on page 36, including Figure 18 on page 34 and Table 9 on page 42).

The list below shows the maximum number of cables that a fully-loaded chassis supports:

- One Ethernet cable to connect an Admin C/Port to a Blade PC (see 3.5.4 “Admin C/Port Cabling” on page 49 for more information)
- Up to 16 Ethernet cables (in the case of eight Blade PCs with dual network ports) for Blade PC connections to a network switch or hub.
- Up to six short, color-coded cables are provided for chassis configuration and to daisy-chain chassis:
  - up to 2 green cables for RS485 control chain ports on the Management Module (Control In and Out ports, see Figure 19 on page 35 and Table 8 on page 40)
– up to 2 red cables for Sparing ports on the Connect Module (Spare In and Out ports, see Figure 19 on page 35 and Table 6 on page 38), and
– up to two yellow cables for Admin ports on the Connect Module (Admin In and Out ports, see Figure 19 on page 35 and Table 6 on page 38).

See 3.5 “Chassis Cabling” on page 44 for more information about cabling and for examples of cabling R-Series products.

### 2.4 Common Deployment Types

The sections below shows several common deployments of R-Series products. For more information about:

- the chassis modules shown below, see 3.4.1 “Installing and Removing R4300 Modules” on page 36.
- cabling examples shown below, see 2.3 “Cable Requirements” on page 21 and 3.5 “Chassis Cabling” on page 44.

#### 2.4.1 Dedicated Networks

ClearCube recommends separating client and blade network traffic as shown in this section. The figure below shows a deployment of clients (zero clients using PCoIP technology, thin clients, or VMs) connected to blades in an R-Series chassis. In this deployment:

- Clients (#7) are connect to Blade PCs in an R-Series chassis (#1).
- Switches separate client network traffic from blade data (regular) network traffic:
  - A client protocol/communication switch (#4) is connected to the chassis Network Module’s secondary ports and is dedicated to client communication.
  - A blade data network switch (#10) is connected to the chassis Network Module’s primary ports and is dedicated to blade data.
• Chassis are easily daisy-chained to up to 14 other chassis in a deployment using short, red cables for sparing (#15), yellow cables for Admin C/Port (#14) connection, and green cables (#13) for a control chain. These configuration and administration cables are optional.

• A blue management cable (#12) connects the chassis to optional Sentral management software.

• An optional Admin C/Port (#16) is connected to the chassis for use when local Blade PC administration is required (note that R3082D Blade PCs do not require an Admin C/Port for administration tasks such as viewing BIOS screens).

Table 4. Key for Figure 12

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R4300 chassis</td>
</tr>
<tr>
<td>2</td>
<td>Secondary network ports for client communication protocol</td>
</tr>
<tr>
<td>3</td>
<td>Primary network ports for blade data traffic (regular network traffic)</td>
</tr>
<tr>
<td>4</td>
<td>Client protocol/communication switch</td>
</tr>
</tbody>
</table>
2.4.2 Shared Network

ClearCube recommends separating client and blade network traffic as shown in the previous section. If your environment does not permit this separation, the R4300 chassis’ primary and secondary ports can be connected to the same network switch. See 3.4.1 “Installing and Removing R4300 Modules” on page 36, Figure 18 on page 34, and the text below the figure for additional information about the Network Module and other chassis modules.

See 3.5 “Chassis Cabling” on page 44 for information about the Control Chain, Admin Daisy Chain, and Spare Daisy Chain cited in the figure above.

### Table 4. (Continued) Key for Figure 12

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Optional fiber transceiver for fiber clients</td>
</tr>
<tr>
<td>6</td>
<td>Copper or fiber cables (depending on copper or fiber clients)</td>
</tr>
<tr>
<td>7</td>
<td>Remote clients (zero clients, thin clients, VMs)</td>
</tr>
<tr>
<td>8</td>
<td>Optional switch</td>
</tr>
<tr>
<td>9</td>
<td>Optional Sentral management software</td>
</tr>
<tr>
<td>10</td>
<td>Blade data network switch</td>
</tr>
<tr>
<td>11</td>
<td>LAN/production network</td>
</tr>
<tr>
<td>12</td>
<td>Optional management cable for device administration through Sentral</td>
</tr>
<tr>
<td>13</td>
<td>Optional chassis control daisy chain cabling (connecting up to 14 chassis)</td>
</tr>
<tr>
<td>14</td>
<td>Optional Admin C/Port daisy chain cabling (for remote chassis and blade management)</td>
</tr>
<tr>
<td>15</td>
<td>Optional spare blade daisy chain cabling</td>
</tr>
<tr>
<td>16</td>
<td>Optional local C/Port cabling for local blade management</td>
</tr>
</tbody>
</table>

See 3.4.1 “Installing and Removing R4300 Modules” on page 3600, Figure 18 on page 34, and the text below the figure for additional information about the Network Module and other chassis modules.
2.5 R4300 Chassis IP Address

The R4300 chassis Remote Management Module (RMM) default startup configuration is set to DHCP (Dynamic Host Configuration Protocol), which automatically requests an IP address from a DHCP server. If you do not have a DHCP server, the R4300 chassis defaults to a static IP address of 192.168.1.251. If there is no DHCP server in your environment, set the IP Mode to Fixed IP and assign it a unique IP.

For more information about the RMM, configuration, and RMM commands, see 3.6 “Remote Management Module (RMM) Configuration” on page 51.
Chapter 3. Chassis and Blade PC Installation

The following instructions are intended for use by IT technicians familiar with computer systems and hardware configuration.

3.1 Tools for Installation

All procedures shown in the following installation procedures can be performed with the following tools:

- #2 Phillips screwdriver
- Admin C/Port adjustment tool (included in Chassis Accessory Kit)

A 1/4-inch nut driver with a magnetic tip is suggested for removing and replacing the self-tapping sheet metal screws used on the chassis.

3.2 Shipment Components

Upon receipt of your shipment, carefully examine the outside of all the boxes before opening. **If you find any external damage, do not open the boxes.** Contact and notify the shipper that damage has occurred and request an inspection by them before proceeding.

The following components are shipped in separate boxes:

- **Chassis**—This should be the first box to be opened and used in the installation process after the racks or cabinets have been installed.
Chapter 3. Chassis and Blade PC Installation

3.3 Chassis Installation

3.3.1 Unpacking the Chassis

Open the chassis box, remove the packing material, and check the chassis for any visible damage. Contact the carrier for an immediate on-site inspection if damage is found. If there are no visible problems, remove the unit from the box and set it on a flat working surface.

R4300 modules are packaged individually and shipped in a carton separate from the chassis, with their appropriate patch cables in each package. See Figure 18 on page 36 and the tables following for information about R4300 chassis modules.

3.3.2 Installing the Chassis

CAUTION: To avoid equipment damage and potential personal injury, assemble and position the chassis without blades installed.

CAUTION: When installing, uninstalling, or servicing a chassis or its components, ensure all power is removed from these devices by disconnecting all power cords from the rear of the chassis.

ClearCube offers two methods to mount chassis in a rack:

• Chassis Accessory Kit (part number G091147), included with all chassis

• Chassis Rapid Mount (CRM) kit (part number G091075S), available separately (see 3.3.2.2 “Chassis Rapid Mount Kit” on page 31).

The standard Chassis Accessory Kit fits all standard 19-inch racks and provides a set of front and back mounting brackets, with the necessary hardware. The optional CRM kit is specially
designed to fit ClearCube-supplied cabinets and racks that feature four posts with square mounting holes for snap-in rack nuts. While this is a standard style for mounting hardware, not all third-party racks can accept the CRM kit.

If you plan to use a cabinet enclosure, ensure that you have at least 34 inches (86 cm) of interior depth measured from the front of the unit, to accommodate the cabling that exits from the back of each chassis. The spacing between the front and back rails can be no more than 30 inches (76 cm).

A chassis assembly using the Chassis Accessory Kit can be installed either from the front or from the back of the rack. A chassis assembly using the CRM kit can be installed only from the front of the rack.

Begin installing your chassis assemblies at the bottom of the rack or cabinet. This provides support for each chassis before it is securely mounted, and greatly simplifies getting the chassis square and level in the rack.

### 3.3.2.1 Standard Chassis Mounting Hardware

To install a chassis using the standard Chassis Accessory Kit, do the following:

1. When installing into a cabinet enclosure, loosely attach the back adjustable mounting brackets to the chassis with 5 screws on each side.

2. Position the chassis in the cabinet so that the front of the chassis lines up with the front rail and then slide the adjustable back brackets into place. Tighten the screws that hold the back brackets in place.

3. With the back brackets firmly attached to the chassis, slide the chassis into the cabinet from the back. Open the front bezel of the chassis and then attach the front brackets with three screws on each side that pass from the inside of the chassis to tapped holes in the brackets on the outside.

   **NOTE** For your convenience, the front brackets can be attached from either the inside or the outside of the chassis.

4. Using the hardware provided with your cabinet, attach the chassis mounting brackets to the cabinet rails.

   **CAUTION:** To avoid equipment damage and potential personal injury, never install the chassis with only the front bracket as an attachment.

5. If you are installing a chassis into a two-post rack with only a central mounting point, use the front brackets attached at the center of gravity of the chassis. The center of gravity is 14.7 inches (37 cm) back from the front faceplate. A set of rack ear mounting holes is provided at this location (the third group of 3 holes back). This point should line up with
the rack sidebars to assure maximum stability of the rack. Figure 13. below shows a two-post open rack with one chassis installed, properly centered in the rack.

NOTE The CRM kit cannot be used in a two-post rack, as shown in the following figure.

Figure 13. Side view of chassis centered in a two-post rack

6. Attach the AC power cord(s) packaged and supplied with the chassis and route it to the back panel power connector(s) and then to a surge-protected power source such as an uninterruptible power supply (UPS) or power strip. Use the cable retention clamp on the chassis to avoid inadvertently disconnecting the power.

If your ClearCube system installation is part of a larger office renovation or deployment, complete the chassis hardware installation and wiring, but delay installation of the Blade PC computers until the rest of the area has been finished and cleaned.

If installing R4300 chassis assemblies, the R4300 modules can be installed now, but installation should be delayed until construction cleanup is completed. Modules are required to complete cabling, but preliminary cabling for Admin C/Ports and clients can be completed without the modules being installed.
3.3.2.2 Chassis Rapid Mount Kit
The Chassis Rapid Mount (CRM) kit allows installing chassis in a cabinet enclosure or other rack that provides both front and back posts.

**CAUTION:** This system is only for use with square hole, 4-post racks with front to back spacing of 21.25 inches to 29.25 inches.

**CAUTION:** Fully extending the chassis removes the chassis from the rack. Ensure the chassis is adequately supported before fully extending or removing it. Otherwise, the chassis may fall and can cause damage and injury.

**CAUTION:** Chassis mounted in a rack using a CRM Kit are designed to remain stationary after being secured to a rack using the CRM thumb screws. CRM Kits do not enable chassis to serve as shelves or supports.

7. To install a chassis using the CRM kit, do the following:

1. Unscrew the thumbscrew holding each pair of chassis and rack brackets together, and slide the brackets apart.

2. Mount the chassis bracket to the chassis with 6 flathead screws. Repeat on the other side.

**NOTE** The chassis and rack brackets are interchangeable side-for-side.
3. Determine the location and holes to be used to mount the rack ears on the rack bracket. A guide is provided in the CRM packaging. Insert rack ears on spring-loaded slider to the back side of the back rack post.

![Diagram of rack bracket attachment points]

**Figure 15. Rack bracket attachment points**

4. Pull the rack bracket forward and insert the front rack ears on the back bracket into holes on the front side of the front post. Push forward on the ears until the latch snaps and locks into place. Ensure the front ears are placed into the corresponding holes as the back ears, so that the rack bracket is level. To remove, pull the finger tab inward with your finger and slide the ears forward.

5. Repeat steps 2 and 3 with the other chassis bracket on the opposite side of the rack, in mirrored orientation. Ensure that the brackets are level with respect to each other.

6. Slide the chassis and brackets onto the rack brackets from the front. Ensure the “U” channels on the chassis bracket engage the flanges on the rack bracket.

7. Slide the chassis all the way onto the rack brackets until flush with the front of the rack.

8. Fully tighten the thumb screws with a Phillips head screwdriver.

9. Attach the AC power cord(s) packaged and supplied with the chassis and route it to the back panel power connector(s) and then to a surge-protected power source such as an uninterruptible power supply. Use the cable retention clamp on the chassis to avoid inadvertently disconnecting the power.

The cabling and module installation notes from the previous section, 3.3.2.1 “Standard Chassis Mounting Hardware” on page 29, apply to this procedure.
3.3.3 Chassis Power Requirements

The *Power & Cooling Requirements Spreadsheets* on the ClearCube Support site provide tools and detailed information about chassis power and cooling requirements. See 2.2 “Chassis and Blade Power Requirements” on page 20 for an overview of the spreadsheets and for instructions about downloading them.

3.3.4 Chassis Power Receptacles, Redundant Power, and Power Cords

The R4300 chassis has two power receptacles that provide redundant power sources. For redundant AC inputs and increased reliability, *each power receptacle must be connected to a separate branch power circuit*. If only one power cord is connected to the R4300 chassis, it is powered only by one circuit.

Use the AC power cord packaged and supplied with your chassis. For systems shipped to countries that utilize a 100-130-volt power system, the included power cord is rated at 15 amps. Systems shipped to countries with 208-240-volt power systems are packaged with power cords rated at 10 amps.

| NOTE | Older model chassis (R4200 and lower) used 10-amp-rated power cords—these cords are NOT approved for use with R4300 model chassis on 100-130-volt power systems. |

The standard 10-amp power cords are acceptable for use with the Fiber Transceiver. See “Safety Guidelines” on page xii for more information.

Make sure power strips, power grid, and circuit breakers can safely provide required current. Ensure any extension cords used meet local safety regulations and fire codes. When specifying uninterruptible power supplies (UPS) be sure to include the Fiber Transceiver peak current draws in your calculations to ensure the UPS has adequate capacity.

3.4 Chassis Modules and Bays

The R4300 chassis’ hot-swappable modules provide a wide range of options for Admin C/Port and client connections to blades and to the network. You can install chassis modules when the chassis is installed or when blades are installed. Because these modules provide all the data I/O for the system, cabling cannot be completed until these modules are in place.
The picture below shows the main R4300 Chassis modules.

![Connect Module](image1)
![Remote Management Module (RMM)](image2)
![Network Module](image3)

**Figure 16. Main R4300 modules**

**Connect Module**
This module provides connectors for Admin C/Ports, USB ports, and sparing.

**Network Module**
This module provides Ethernet connections.

**Remote Management Module**
This module provides network and daisy-chain control connections, chassis health indicators, and fan speed control. The Status LEDs in the blue area above the Management Bay are shared between the sets of connectors to provide information about each kind of connection to each blade in a manageable fashion.

Each chassis module fits in a bay. The list below shows the externally-accessible module bays:

- Connect Bay
- Management Bay
- Network Bay

The picture below shows each of the main chassis modules inserted in the designated chassis bays on the rear apron of the R4300 chassis.

---

**CAUTION:** To avoid equipment damage and potential personal injury, always install the chassis in the rack before installing any blades in it.
Figure 17. R4300 module bays

Note that some module features are color-coded to show that their functions are inter-related. For example, features coded blue are for monitoring the status of the various connection ports on the R4300.
The picture below shows an exploded view of the R4300 chassis and modules.

Figure 18. R4300 exploded view

### 3.4.1 Installing and Removing R4300 Modules

The R4300 modules (Figure 16.) are installed by sliding them into their respective bays and seating the connector. The three bays (Figure 17.) are of different sizes and shapes, and a module cannot be accidentally inserted into the wrong bay. All modules are hot-swappable, and can be replaced without affecting any existing switching configurations within the chassis. The picture below shows the small label on each module that indicates its position in the R4300 chassis.
To remove a Connect, Management, or Network module, press down on the module’s green lever (or levers) until the module is released, and pull the module out of its bay.

**NOTE** When hot-swapping modules from an R4300, remove the module and wait for at least 5 seconds before replacing it.

Table 5 on page 38 provides details of the features of the modules, and describes their interactions.

### 3.4.2 Connect Module and Chassis Status LEDs

The Connect Module provides connectors for Admin C/Ports, USB ports, and sparing (see 3.5.2 “Spare Allocation Examples” on page 45 for information about blade sparing).
Note that some features are color-coded to show that their functions are inter-related. For example, features coded blue are for monitoring the status of the various connection ports on the R4300.

<table>
<thead>
<tr>
<th>Connectors</th>
<th>Label</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADMIN IN</td>
<td>Yellow</td>
<td>RJ45 connection that links the Admin C/Port into the Admin daisy chain, or passes the Admin connection to another chassis by connecting to that chassis’ ADMIN OUT port. As many as 14 chassis per Control Chain can be connected on one Admin daisy chain. A Control Chain can have more than one Admin daisy chain.</td>
</tr>
<tr>
<td></td>
<td>ADMIN OUT</td>
<td>Yellow</td>
<td>RJ45 connection that links to the ADMIN IN connection of the next chassis in the Admin daisy chain. On the end of the Admin daisy chain opposite the Admin C/Port, this connector is not used.</td>
</tr>
<tr>
<td></td>
<td>SPARE IN</td>
<td>Red</td>
<td>RJ45 connection that links a Spare blade into the Spare daisy chain, or passes the Spare connection to another chassis by connecting to that chassis’ SPARE OUT port. As many as 14 chassis per Control Chain can be connected on one Spare daisy chain. A Control Chain can have more than one Spare daisy chain. Not populated on ACM.</td>
</tr>
<tr>
<td></td>
<td>SPARE OUT</td>
<td>Red</td>
<td>RJ45 connection that links to the SPARE IN connection of the next chassis in the Spare daisy chain. On the end of the Spare daisy chain opposite the Spare blade, this connector is not used. Not populated on ACM.</td>
</tr>
<tr>
<td></td>
<td>C/PORTS</td>
<td>—</td>
<td>RJ45 connections that connect the digital and analog signals to each individual end user’s Admin C/Port. The numbers correspond to the blade slot numbers on the front of the chassis. Not populated on ACM.</td>
</tr>
<tr>
<td></td>
<td>USB</td>
<td>—</td>
<td>These connections provide USB 2.0 on blades equipped with back-panel USB capability.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEDs</th>
<th>Label</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STATUS</td>
<td>Blue</td>
<td>These indicator LEDs work in conjunction with the Mode button on the RMM to provide status information for three key functions: 1) blade digital link, 2) USB ports, and 3) blade network ports. By pressing the Mode button on the RMM, administrators can step through the three modes in sequential order. See Table 6 on page 39 for a description of the LED functions.</td>
</tr>
</tbody>
</table>
### 3.4.3 Chassis Status LEDs

The table below shows the Connect Module status LEDs.

**Table 6. R4300 status LEDs**

<table>
<thead>
<tr>
<th>Status</th>
<th>Blue LED Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td>• Admin C/Port connection status</td>
</tr>
<tr>
<td></td>
<td>– Green = good digital link to blade</td>
</tr>
<tr>
<td></td>
<td>– Red = bad digital link to blade</td>
</tr>
<tr>
<td></td>
<td>– Off = no blade</td>
</tr>
<tr>
<td></td>
<td>• USB connection status</td>
</tr>
<tr>
<td></td>
<td>– Green = USB available</td>
</tr>
<tr>
<td></td>
<td>– Red = USB not available</td>
</tr>
<tr>
<td></td>
<td>– Off = no blade</td>
</tr>
<tr>
<td></td>
<td>• Network connection status</td>
</tr>
<tr>
<td></td>
<td>– Green = good network connection</td>
</tr>
<tr>
<td></td>
<td>– Off = no network connection, or no blade</td>
</tr>
<tr>
<td>C/PORTS</td>
<td>Blue LED that, when lit, indicates that the Status LEDs above the Management Bay</td>
</tr>
<tr>
<td></td>
<td>module are displaying status for the Admin C/Port connections. Not populated on ACM.</td>
</tr>
<tr>
<td></td>
<td>The Status LEDs display these conditions for Admin C/Ports:</td>
</tr>
<tr>
<td></td>
<td>• Green = good digital link to blade</td>
</tr>
<tr>
<td></td>
<td>• Red = bad digital link to blade</td>
</tr>
<tr>
<td></td>
<td>• Off = no blade</td>
</tr>
<tr>
<td>USB</td>
<td>Blue LED that, when lit, indicates that the Status LEDs above the Management Bay</td>
</tr>
<tr>
<td></td>
<td>module are displaying status for the USB connections. The Status LEDs display these</td>
</tr>
<tr>
<td></td>
<td>conditions for USB connections:</td>
</tr>
<tr>
<td></td>
<td>• Green = USB available</td>
</tr>
<tr>
<td></td>
<td>• Red = USB not available</td>
</tr>
<tr>
<td></td>
<td>• Off = no blade</td>
</tr>
</tbody>
</table>
3.4.4 Remote Management Module (RMM)

The Remote Management Module provides network and daisy-chain control connections, chassis health indicators, and fan speed control (see 3.5 “Chassis Cabling” on page 44 for more information about Daisy and Control Chains). The Status LEDs in the blue area above the Management Bay are shared between the sets of connectors to provide information about each kind of connection to each blade in a manageable fashion.

Note that some features are color-coded to show that their functions are inter-related. For example, features coded blue are for monitoring the status of the various connection ports on the R4300.

<table>
<thead>
<tr>
<th>Connectors</th>
<th>Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet LEDs</td>
<td></td>
</tr>
<tr>
<td>LINK</td>
<td>ACTIVITY</td>
</tr>
</tbody>
</table>

### Table 7. R4300 Remote Management Module features

<table>
<thead>
<tr>
<th>Label</th>
<th>Color Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL IN</td>
<td>Green</td>
<td>RJ45 connection that receives control and management signals from the previous chassis in the Control Chain via RS-485. As many as 14 chassis can be connected per Control Chain.</td>
</tr>
<tr>
<td>CONTROL OUT</td>
<td>Green</td>
<td>RJ45 connection that passes control and management signals to the next chassis in the Control Chain via RS-485.</td>
</tr>
<tr>
<td>MANAGEMENT</td>
<td>—</td>
<td>RJ45 connection that passes control and management signals from the chassis to the Sentral console via Ethernet. Has two LEDs in socket to indicate Ethernet link speed and activity. Connection is self-adapting and does not require a crossover cable.</td>
</tr>
</tbody>
</table>

### Switches

<table>
<thead>
<tr>
<th>Label</th>
<th>Color Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE</td>
<td>Blue</td>
<td>Push button switch that toggles through the blue Mode Selected LEDs on the Connect and Network Modules. Press this switch to display status for the connections whose blue LED is lit.</td>
</tr>
<tr>
<td>FAN MAX</td>
<td>—</td>
<td>Push button switch that defeats the temperature sensor in the Fan Pack Module to set fans to maximum speed.</td>
</tr>
</tbody>
</table>
Table 7. (Continued) R4300 Remote Management Module features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RST</td>
<td>Pinhole switch that resets the RMM power. Switching information is not affected. RMM configuration information is not affected.</td>
</tr>
<tr>
<td>DFLT</td>
<td>Pinhole switch that resets the RMM configuration information to the default configuration settings, and then resets the RMM power. See Table 11 on page 54 for a list of defaults. Switching information is not affected.</td>
</tr>
<tr>
<td><strong>LEDs</strong></td>
<td></td>
</tr>
<tr>
<td>RMM MODE</td>
<td>Bi-color LED indicates RMM Mode</td>
</tr>
<tr>
<td></td>
<td>• Green = Primary</td>
</tr>
<tr>
<td></td>
<td>• Yellow = Secondary</td>
</tr>
<tr>
<td></td>
<td>• Off = Standby</td>
</tr>
<tr>
<td>DHCP</td>
<td>Bi-color LED indicates IP address assignment mode</td>
</tr>
<tr>
<td></td>
<td>• Green = DHCP</td>
</tr>
<tr>
<td></td>
<td>• Off = fixed IP address</td>
</tr>
<tr>
<td>DC POWER</td>
<td>Bi-color LED indicates power supply status</td>
</tr>
<tr>
<td></td>
<td>• Green = 2 supplies good</td>
</tr>
<tr>
<td></td>
<td>• Red = 1 supply bad</td>
</tr>
<tr>
<td></td>
<td>• Off = no power or RMM not seated properly</td>
</tr>
<tr>
<td>HEALTH</td>
<td>Bi-color LED indicates system health</td>
</tr>
<tr>
<td></td>
<td>• Green = good</td>
</tr>
<tr>
<td></td>
<td>• Amber = RMM firmware update in progress</td>
</tr>
<tr>
<td></td>
<td>• Red = bad</td>
</tr>
<tr>
<td></td>
<td>• Off = no power or RMM not seated properly</td>
</tr>
<tr>
<td></td>
<td>See the <em>Sentral Administrator's Guide</em> for more information on RMM Status indicators</td>
</tr>
<tr>
<td>LINK</td>
<td>Bi-color LEDs that indicate Ethernet link speed</td>
</tr>
<tr>
<td></td>
<td>• Green = 100 Mb/sec.</td>
</tr>
<tr>
<td></td>
<td>• Amber = 10 Mb/sec.</td>
</tr>
<tr>
<td>ACTIVITY</td>
<td>Green LED – flashing indicates activity</td>
</tr>
</tbody>
</table>
### 3.4.5 Network Module

The Network Module (Model R4363 [EP2]) provides Ethernet connections.

The table below shows each Network Module feature.

<table>
<thead>
<tr>
<th>Connectors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI/SEC</td>
<td>Blue LED that, when lit, indicates that the Status LEDs above the Management Bay module are displaying status for the Primary or Secondary Ethernet connections.</td>
</tr>
<tr>
<td>ETHERNET</td>
<td>RJ45 connections that provide Ethernet connections for each Blade PC in the chassis. Label numbers correspond to the blade slot numbers on the front of the chassis. R4363 (EP2)—GB Primary ports (right side) and GB Secondary ports (left side)</td>
</tr>
</tbody>
</table>

### 3.4.6 Power Modules

The R4300 contains two Power Supply Units (PSUs) and a Dual Input Module (DIM). With the redundancy provided by two PSUs and two power inputs, the R4300 will stay running even if one PSU fails, or a power input fails, or if a PSU and a power input fail together.

The PSUs are factory-installed, field-replaceable units. Each PSU has a green LED visible through the fan pack that indicates its powered-on status. If one of the PSUs fails, the **DC POWER** status LED on the RMM turns red to indicate a failure, and the green LED on the failed power supply turns red.

The DIM allows providing redundant power inputs. For best reliability, attach a power cord to both receptacles, and plug the cords into separate power sources. When using only one power source, plug it into the receptacle labeled **A** for best reliability. The DIM is not hot-swappable.
Fuses on the DIM can be accessed by powering down the chassis and removing the fan module.

**CAUTION: DOUBLE POLE/NEUTRAL FUSING**
The DIM employs fuses in both the neutral and hot lines. Please contact ClearCube or a ClearCube-certified technician for assistance with servicing or replacing these modules or replacing the fuses in them.

Fuses

Dual AC Input Module (DIM)

Power Supply Unit (PSU)

**Figure 20. R4300 power modules: DIM and PSU**

### 3.4.7 Module Serial Numbers

The first three characters of the module’s serial number, shown on the back apron and visible when the module is installed in its bay, are the same as the module’s abbreviation. For example, the serial number XCM12345 identifies a 8 x 8 Connect Module.

<table>
<thead>
<tr>
<th>Serial Number Format</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACMxxxxx</td>
<td>R4380 – Administrator Connect Module</td>
</tr>
<tr>
<td>XCMxxxxx</td>
<td>R4387 – 8 x 8 Connect Module (C/Port Switching)</td>
</tr>
<tr>
<td>RMMxxxxx</td>
<td>R4345 – Remote Management Module</td>
</tr>
<tr>
<td>EP2xxxxx</td>
<td>R4363 – Ethernet Passthrough 16-Port GB Module (EP2)</td>
</tr>
<tr>
<td>FPMxxxxx</td>
<td>R4320 – Fan Pack Module (contains Variable Fanspeed Controller)</td>
</tr>
<tr>
<td>DIMxxxxx</td>
<td>R4315 – Dual AC Input Module</td>
</tr>
<tr>
<td>PSUxxxxx</td>
<td>R4316 – Power Supply Unit</td>
</tr>
</tbody>
</table>
3.5 Chassis Cabling

This section provides an overview of inter-chassis connections.

**NOTE** If you use pre-assembled cables for Admin C/Port connections, be sure that the cables use and terminate all four twisted wire pairs. Standard Ethernet works with only two of the four pairs connected, but the Admin C/Port operates only when all four pairs of wire are used.

An R4300 chassis links the blades in the chassis to their respective clients and to control signals. In addition to client connections, three signal paths are provided:

- **Control Chain** – The RS-485-based control and management chain between chassis. A Control Chain contains one Primary controller—a Remote Management Module (RMM). A Control Chain can contain as many as 14 chassis.

- **Admin Daisy Chain** – The link between an Admin C/Port and the chassis served by that Admin C/Port. An Admin Daisy Chain can connect from 1 to 14 chassis within a single Control Chain. The Admin Daisy Chain uses the same ClearCube proprietary data link that connects blades to Admin C/Ports.

- **Spare Daisy Chain** – The link between a spare blade and the chassis served by that spare blade. A Spare Daisy Chain can connect from 1 to 14 chassis within a single Control Chain. The Spare Daisy Chain uses the same ClearCube proprietary data link that connects blades to Admin C/Ports.

### 3.5.1 Daisy Chain Distance Limitations

**Table 10** below shows the distance and node limitations on the Admin and Spare Daisy Chains for various Admin C/Ports used with the R4300.

<table>
<thead>
<tr>
<th>Admin C/Port Model</th>
<th>C7130 (P/N 091154) Rev C02 or Lower</th>
<th>C7130 (P/N 091154) Rev D01 or Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distance from R4300</strong></td>
<td>10 M</td>
<td>100 M</td>
</tr>
<tr>
<td>Admin Daisy Chain (number of chassis)</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Spare Daisy Chain (number of chassis)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
### 3.5.2 Spare Allocation Examples

When using the Sentral management software *sparing* feature, if a blade PC or VM becomes unavailable because of hardware or software failures, administrators can allocate a new Blade PC or VM to an end user almost immediately. (See *Sentral Administrator’s Guide* for more information about blade sparing.)

When using the spare switching feature of the chassis, you must consider how to arrange the spares blades and how many to use. The chassis can support a ratio of one spare for one active Blade PC. A more common ratio is one spare for every seven active blades. The lowest ratio of sparing that ClearCube recommends is one spare for 47 Blade PCs (configured by daisy-chaining the spare connections). **Figure 21** on page 45 shows example sparing scenarios.

<table>
<thead>
<tr>
<th>NOTE</th>
<th>Sparing is a switching function of the R4300 chassis. If no spare blade is connected to the Spare Daisy Chain, or if the Spare blade is completely powered down, the spare switch action will succeed but the user will not be connected to a usable blade.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Spare Ratio 1:7</th>
<th>Spare Ratio 1:47</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chassis 1</strong></td>
<td><strong>Chassis 1</strong></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Chassis 2</strong></td>
<td><strong>Chassis 2</strong></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Chassis 3</strong></td>
<td><strong>Chassis 3</strong></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Chassis 4</strong></td>
<td><strong>Chassis 4</strong></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Chassis 5</strong></td>
<td><strong>Chassis 5</strong></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Chassis 6</strong></td>
<td><strong>Chassis 6</strong></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

**Figure 21.** Spare allocation examples

For a dual-slot Blade PC, verify that the Admin C/Port cable is plugged into the even-numbered port (for example, for a Blade PC installed in chassis slots 3 and 4, the C/Port cable should be plugged into port 4). See 3.5.4 “Admin C/Port Cabling” on page 49 for more information.
3.5.3 Connecting Chassis Cables

To connect cables to R4300-equipped chassis, do the following (see the pictures on the following pages):

1. Label, identify, or use different color cables to discriminate between desktop and network wiring. This color code is recommended, and matches the jumper cables provided by ClearCube:
   - Control Chain – Green
   - Admin Daisy Chain – Yellow
   - Spare Daisy Chain – Red

2. Daisy-chain the CONTROL OUT port on the top chassis in the rack to the next lower chassis’ CONTROL IN port using the green daisy-chain cable. Continue this daisy chain to connect all chassis in the rack.

3. Connect the MANAGEMENT port on at least one of the RMMs to your Ethernet network hub or switch. For the best reliability, connect redundant RMMs to more than one switch and/or subnet to better protect against network-related failures. As many as 14 RMMs per You can connect Control Chains to a network to provide failover capability. In most scenarios, connecting three Control Chains to a network is adequate.

   **NOTE** Do not use an Ethernet port on the chassis for this connection.

4. Connect network cables from the Network Module (Figure 17. “R4300 module bays” on page 35) to your Ethernet network patch panel, hub, or switch.

5. Daisy-chain the ADMIN IN port on one chassis to the ADMIN OUT port on the next chassis using the yellow daisy-chain cable provided. Connect the remaining ADMIN OUT port to the Admin C/Port.

   If any Admin C/Port users also use a Multi-Video Expander (MVX) with multiple monitors, the Admin C/Port should also be equipped with an MXV and multiple monitors. Otherwise, video from a blade equipped with an MVX will not be viewable at the Admin C/Port.

6. Daisy-chain the SPARE IN port on one chassis to the SPARE OUT port on the next chassis using the red daisy-chain cable provided. Connect the remaining SPARE IN port to the Spare blade’s C/PORT port.
ClearCube suggest routing the cables down the sides of the rack to the back panel, with the network cables on one side and the desktop cables on the other.

![Diagram of R4300 daisy-chain cabling example](image)

**Figure 22. R4300 daisy-chain cabling example**

| NOTE | Systems will not work correctly if you connect a network cable to a chassis' Admin C/Port jack or if you connect an Admin C/Port cable to a network jack. These are common installation errors and should be one of the first things checked when troubleshooting a problem with a system's operation. See 3.5.4 “Admin C/Port Cabling” on page 49 for additional information. |
After connecting one end of an Ethernet cable to the appropriate odd-numbered secondary port on the rear of the chassis, you have multiple options about how to connect the other end of the cable:

- **Direct connection to a zero client**—You can use homerun cabling, or a direct connection, between a blade and a zero client. Connect one end of an Ethernet cable to the chassis port.
reserved for PCoIP communication (as noted above), and then connect the other end of the cable to the Ethernet port of a zero client.

- **Connect to a network**—You can connect a blade to a network that zero clients can access. Connect one end of an Ethernet cable to the chassis port designated for PCoIP communication (as noted above), and then connect the other end of the cable to a network switch or router. Ensure that the blade and the client are on the same subnet or, if they are on different subnets, that the devices can communicate.

- **Connect to a network reserved for PCoIP traffic**—To isolate PCoIP traffic on a specific network, connect one end of an Ethernet cable to the chassis port reserved for PCoIP communication (as noted above), and then connect the other end of the cable to a network designated for PCoIP traffic.

For detailed information about setting up, configuring, and using zero clients and hosts (blades), see *PC-over-IP System User’s Guide*.

### 3.5.4 Admin C/Port Cabling

You can connect an Admin C/Port to a blade for administration functions, such as viewing pre-OS video BIOS screens (note that you can view pre-OS video on an R3082D Blade PC using a zero client).

Use an Ethernet cable (with all four twisted wire pairs connected and terminated) to connect an Admin C/Port to the C/Port connectors on the left-most edge of the Connect Bay on the rear of an R4300 chassis. See Figure 16 on page 34 and Table 5 on page 38.

The sections below show important differences between single- and dual-slot blade PCs.

#### 3.5.4.1 Single-Slot Blade PCs

When connecting an Admin C/Port to an R3082D, use the C/Port connector on the Connect Module that corresponds to the slot that the blade is in (the Connect Module is located on the rear of the chassis on the far left side, as shown in Table 5 on page 38). For example, if an R3082D is in chassis slot 3, connect your Admin C/Port cable to C/Port connector 3.

#### 3.5.4.2 Dual-Slot Blade PCs

When connecting an Admin C/Port to a dual-slot blade (such as an R3040S), only use C/Port connectors 2, 4, 6, or 8 on the Connect Module (located on the far left side of the chassis). For example, if an R3040S is in chassis slots 3 and 4, connect your Admin C/Port to connector 4. Connect Admin C/Port cables to the Connect Module, as shown in Table 5 on page 38.

### 3.5.5 Fiber Transceiver and Cable Requirements

See *ClearCube F6150 Fiber Transceiver User’s Guide* for information about installing and using the fiber transceiver and for information about transceiver power requirements.

---

**CAUTION:** The Fiber Transceiver is a Class I Laser Product. See **“Safety Guidelines”** on page xii for additional information.

---

**CAUTION:** Make sure your power strips, power grid, and circuit breakers can safely provide the required current. Ensure that any extension cords used meet local safety regulations and fire codes. When specifying uninterruptible power supplies (UPS) be sure to include the Fiber Transceiver peak current draws in your calculations to ensure the UPS has adequate capacity.

The F6150 Fiber transceiver contains 16 media converters. Each media converter accepts:

- An Ethernet cable to connect the transceiver to a ClearCube chassis (CAT5, CAT5e, CAT6, or CAT6e Ethernet cable)
- A fiber cable to connect each media converter to a fiber client (multi-mode, 50µm or 62.5µm fiber cable with an SC connector on the transceiver end)

---

The fiber optic cables from the output of the Transceiver can be home runs to the individual fiber zero client or thin clients, or they can be patch cables that run to one or more fiber patch panels.

The following requirements apply to the ClearCube Fiber Optic Extension System:

- **Power budget:**
  - must be 6 dB or less (including the cable itself) through all connections between the transceiver and the fiber client

---

*Figure 24. F6150 Fiber Transceiver*
3.6 Remote Management Module (RMM) Configuration

The Remote Management Module provides network and daisy-chain control connections, chassis health indicators, and fan speed control (see 3.4.4 “Remote Management Module (RMM)” on page 40 for more information).

The sections below

• explain Remote Management Module (RMM) auto-negotiation

• show how to configure RMM settings, and

• show how to reset all RMM settings.

3.6.1 About RMM Control Chain and Auto-Negotiation

A Remote Management Module (RMM) in an R4300 chassis enables remote management of the chassis. Each RMM provides an Ethernet connection, allowing it to control a chain of as many as 14 chassis. If an RMM is not connected to Ethernet, it does not auto-negotiate, and provides control and monitoring only for the chassis in which it is installed.

The RMM has three auto-negotiation modes:

• Primary (including jumper-strapped Primary)

• Secondary

• Standby

The R4300 Remote Management Module uses the following auto-negotiation rules:

• An RMM must be active (that is, powered up and functioning correctly) to assert its status as Primary or other.

• If a jumper-configured RMM is present in a chain, that RMM is always Primary, as shown in Figure 25..
• Never jumper-configure an RMM in a Control Chain that also contains a legacy model RMC (Remote Management Card), which is no longer supported.

**NOTE**
Maintain the default setting of JP1 on the RMM (auto-negotiation enabled). See Figure 25 on page 52. Change this setting only at the recommendation of ClearCube Technical Support or a ClearCube Support Engineer.

### 3.6.2 Configuring RMM

ClearCube recommends using Sentral as the primary configuration tool for RMMs. See the *Sentral Administrator’s Guide* for complete information. The RMM can also be configured with Telnet. To configure an RMM using Telnet, do the following:

1. Open a command window and enter

   
   ```
   telnet RMM_IPAddress
   ```

   where `RMM_IPAddress` is the IP address of the RMM to be configured.

2. Enter the password for the RMM (no characters are echoed), and type

   ```
   cfg all
   ```
The picture below shows the RMM command prompt.

![RMM command prompt](image)

**Figure 26. RMM parameters from a Telnet command prompt**

3. Enter the command to change a parameter in the format:

```
cfg ParameterName Value
```

where `ParameterName` is the parameter and `Value` is its desired new value.

4. When finished changing parameters, type `exit` to close the Telnet window.
3.6.3 Resetting RMM to Factory Defaults

In normal use, the RMM is configured using Sentral. However, it can be reset to its factory configurations by pressing the DFLT pinhole switch on the back of the RMM. Table 11 provides the default RMM settings. For information on configuring an RMM with Sentral, see the Sentral Administrator’s Guide.

Table 11. R4300 RMM default configuration settings

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Function</th>
<th>Setting Options</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPMode</td>
<td>IP Address Mode</td>
<td>Static</td>
<td>DHCP</td>
</tr>
<tr>
<td>RMMIP</td>
<td>RMM Fixed IP Address</td>
<td>Ignored if IP Mode = DHCP</td>
<td>192.168.1.251</td>
</tr>
<tr>
<td>RMMNetmask</td>
<td>RMM Netmask</td>
<td>Ignored if IP Mode = DHCP</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>RMMGateway</td>
<td>RMM Gateway</td>
<td>Ignored if IP Mode = DHCP</td>
<td>192.168.1.1</td>
</tr>
<tr>
<td>RMMLocation1</td>
<td>RMM Location 1</td>
<td>User-editable text string</td>
<td>Blank</td>
</tr>
<tr>
<td>RMMEtherSpeed</td>
<td>RMM Ethernet Speed</td>
<td>Auto</td>
<td>10</td>
</tr>
<tr>
<td>RMMEtherDuplex</td>
<td>RMM Ethernet Duplex</td>
<td>Auto</td>
<td>Half</td>
</tr>
<tr>
<td>RMMLocation2</td>
<td>RMM Location 2</td>
<td>User-editable text string</td>
<td>Blank</td>
</tr>
<tr>
<td>SessionTimeout</td>
<td>Session Time-out</td>
<td>Time period for which the session ID is honored</td>
<td>120 seconds</td>
</tr>
<tr>
<td>SMIP</td>
<td>Sentral Primary Console IP Address</td>
<td>xxx.xxx.xxx.xxx</td>
<td>192.168.1.252</td>
</tr>
<tr>
<td>SMPort</td>
<td>Sentral Management Port</td>
<td>TCP port to the Sentral console</td>
<td>8080</td>
</tr>
<tr>
<td>Logging</td>
<td>Logging</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
<tr>
<td>LogServerIP</td>
<td>Log Server IP Address</td>
<td>Only if logging is enabled</td>
<td>192.168.1.253</td>
</tr>
<tr>
<td>LogServerPort</td>
<td>Log Server Port</td>
<td>TCP port to the Log Server</td>
<td>8080</td>
</tr>
<tr>
<td>LogLevel</td>
<td>Logging Level</td>
<td>• 2 — Errors, Warnings, and Notes</td>
<td>2 (highest)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 — Errors and Warnings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0 — Errors only</td>
<td></td>
</tr>
<tr>
<td>Alerting</td>
<td>Alerting</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
<tr>
<td>AlertServerIP</td>
<td>Alert Server IP Address</td>
<td>Only if alerting is enabled</td>
<td>192.168.1.254</td>
</tr>
<tr>
<td>AlertServerPort</td>
<td>Alert Server Port</td>
<td>TCP port to the Alert Server</td>
<td>8080</td>
</tr>
<tr>
<td>AlertLevel</td>
<td>Alert Level</td>
<td>• 2 — Errors, Warnings, and Notes</td>
<td>2 (highest)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 — Errors and Warnings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0 — Errors only</td>
<td></td>
</tr>
<tr>
<td>CommunityString</td>
<td>Community String</td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>SSL</td>
<td>SSL</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
<tr>
<td>SSH</td>
<td>SSH</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

Note: All RMM Alerts are in English.
Remote Management Module (RMM) Configuration

3.6.4 Updating RMM Firmware

To update RMM firmware, you need to have a TFTP server configured on your network. The firmware can be installed using Telnet or using Sentral. You need to first install the firmware on the Primary RMM of each Chassis Group, and then propagate the firmware update to the rest of the RMMs in the group.

Although downgrading a firmware version is possible with the RMM architecture, it is never recommended.

3.6.4.1 Using Telnet

To install an RMM firmware update using telnet, do the following:

1. Download the firmware update package from the ClearCube Support Web site.
2. Unzip the package, and copy the files to the directory where the TFTP server is configured to get the file.
3. Telnet into the Primary RMM and verify your RMM firmware version.

Table 11. (Continued) R4300 RMM default configuration settings

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Function</th>
<th>Setting Options</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telnet</td>
<td>Telnet (un-encrypted)</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>http</td>
<td>HTTP (un-encrypted port 80)</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>AuthMode</td>
<td>Authentication mode</td>
<td>Domain</td>
<td>Local</td>
</tr>
<tr>
<td>AuthGroup</td>
<td>Authentication group</td>
<td>Group names on active directory</td>
<td>N/A</td>
</tr>
<tr>
<td>Username</td>
<td>Username</td>
<td>Text string, when in local mode</td>
<td>clearcube</td>
</tr>
<tr>
<td>Password</td>
<td>Password</td>
<td>Text string, when in local mode</td>
<td>clearcube</td>
</tr>
<tr>
<td>Timestamp</td>
<td>Timestamp</td>
<td>Seconds since Jan. 1, 1970</td>
<td>Set from real-time clock</td>
</tr>
<tr>
<td>RMMPoll</td>
<td>RMM Poll</td>
<td>Time period for RMM “heartbeat”</td>
<td>5 minutes</td>
</tr>
<tr>
<td>SMIP2</td>
<td>Sentral Secondary Console IP Address</td>
<td>192.168.1.1252</td>
<td></td>
</tr>
</tbody>
</table>

NOTE For failover between Primary and Secondary RMMs to occur successfully, the RMMs must have the same password, and Alerting and Logging must be activated. See Sentral Administrator’s Guide for more information.

NOTE Do not remove any R4300 modules when updating the RMM firmware. This can cause the firmware to become corrupted. The HEALTH LED on the RMM displays an amber signal when firmware is being updated.
a. Telnet into the Primary RMM by entering the following at a command prompt:

telnet RMMIPAddress

where RMMIPAddress is the IP address for the RMM.

b. Log in to the RMM, and enter the following command:

ver

If the RMM is version 5.x or higher, continue with this procedure. If the RMM is version 4.x or lower, contact ClearCube Technical Support.

4. Enter the following command to update the Primary RMM:

tftp rmm52b2 TFTPServerIPAddress

where TFTPServerIPAddress is the IP address for the TFTP server.

The Primary RMM firmware will be updated along with firmware for the other modules in this chassis. When the firmware update is completed, the RMM restarts automatically.

5. After the RMM restarts, log into the RMM again and enter the following command:

sfw 0

The other RMMs and modules in this Chassis Group are updated.

3.6.4.2 Using Sentral

To update firmware using Sentral, the following pre-existing conditions must be met:

- The R4300 Chassis Group to be updated must already be discovered within Sentral.
- A TFTP Server must be configured in Sentral's Console Configuration screen, and running.
- The firmware update must be in a directory that is visible to the Sentral Console.

To update RMM firmware using Sentral, do the following:

1. Download the update package from the ClearCube support Web site.

2. Unzip the update package and read the enclosed Technical Bulletin (a PDF file) to learn any special considerations for the package.
3. Copy the package to a directory visible to the Sentral Console.

4. From the Functional menu, select Management > Chassis.

5. In the Tasks menu, click Update Firmware.

6. Select the primary RMM from the Primary Execution Pane.

7. In the Tasks menu, click on Select for Update.

8. In the Serial Number column, select the serial number of the chassis containing the RMM to be updated.

9. Click Browse and choose the firmware update file.

10. Press Update Now. The Primary RMM and the other modules in this chassis are updated.

After the Primary RMM has been updated, do the following to update the other RMMs in the Chassis Group:

1. From the Functional menu, select Management > Chassis.

2. In the Tasks menu, click Update Firmware.

3. In the Tasks menu, click on Update Group.

4. Select the Chassis Group that contains the RMM you just updated, and click Select for Update.

5. Select Browse and browse for the update file.

6. Press Update Now. The other RMMs and modules in this Chassis Group are updated.

After updating each Chassis Group, re-discover the Chassis Group. For more information, see the Sentral Administrator’s Guide.

### 3.7 Unpacking Blades

Once the chassis has been installed and connected to power and signal connections, open the Blade PC boxes and remove the Blade PCs.
Chapter 3. Chassis and Blade PC Installation

Examine each Blade PC for damage as a result of shipping. If you find any damage contact the carrier to file a claim and call the ClearCube Customer Service Department for replacement.

| ! | Do not use any Blade PC that shows any sign of damage. Subsequent damage from a defect caused by shipping could be extensive. |

3.8 Installing Blades

Never leave a Blade PC out in the open. It should either be in the chassis or in its storage box. Dust, dirt, and other debris can cause problems so keep blades clean by keeping them installed or in their boxes.

| ! | CAUTION: Never force blades into a chassis. Mishandling blades can cause critical hardware failure, data loss, or both. |
| ! | CAUTION: Fully extending the chassis removes the chassis from the rack. Ensure the chassis is adequately supported before fully extending or removing it. Otherwise, the chassis may fall and can cause damage and injury. |
| ! | CAUTION: Chassis mounted in a rack using a CRM Kit are designed to remain stationary after being secured to a rack using the CRM thumb screws. CRM Kits do not enable chassis to serve as shelves or supports. |

To install a blade:

1. Lower the front bezel on the chassis by depressing the latches on each side.

2. Orient each blade right-side up (LCD panel on the bottom) and then slowly insert the blade into the chassis by lining up the blade edges with both the top and bottom guides in the chassis.

3. Start inserting blades with the left-most slot. There will be a slight resistance to insertion when the back connector goes into the backplane socket.

| NOTE | The R3040S (and other ClearCube dual-slot blades) can only be inserted into chassis slots 1&2, 3&4, 5&6 and 7&8. |
Installing Blades

When properly seated, the Blade PC is flush with the front edge of the bottom guide bracket.

4. After inserting all blades, raise the chassis front bezel and snap into place.

5. In a rack installation, you can lock the chassis front bezel using a Kensington lock on each side of the chassis. In a cabinet installation, use a locking front door to secure the chassis and blades.

Blades have three options for power state after AC power recovery. AC power failure could mean either the whole chassis losing power and recovering, or just unplugging and plugging a blade back in. The three options are:

- **Power On** – After power is reapplied, the blade powers up and stays on.
- **Stay Off** – After power is reapplied, the blade stays off
- **Last State** – After power is reapplied, the blade returns to the power state that it had when the power was lost. For example, if the blade was off when it was power was lost, it stays off; if the blade was on when power was lost, it turns on and stays on.

The default power settings for the R-Series blades are **Power On**.

When a blade is inserted into a chassis, it takes approximately 30 seconds for the chassis and its RMM to detect the blade and relay its information to Sentral.

Note that the blue LCD panel and the C/Port indicator remain lit, independently of whether the blade is powered on. These indicators run off of chassis power. After the first on/off cycle, you can power the blade back on from the shutdown state by either pushing the power button on the blade or the Reset/Power button on the Admin C/Port.
3.9 Removing Blades

Before removing a blade from a chassis, be sure to note the following.

**CAUTION:** Always completely power down a blade using the power button or by shutting down the OS before removing it from a chassis. Removing a blade before completely powering down can cause critical hardware failure, data loss, or both.

**CAUTION:** Fully extending the chassis removes the chassis from the rack. Ensure the chassis is adequately supported before fully extending or removing it. Otherwise, the chassis may fall and can cause damage and injury.

**CAUTION:** Chassis mounted in a rack using a CRM Kit are designed to remain stationary after being secured to a rack using the CRM thumb screws. CRM Kits do not enable chassis to serve as shelves or supports.

To remove a blade, perform the following steps:

1. Lower the front bezel on the chassis by depressing the latches on each side.

2. Power down the blade and pull gently on the handle until it slides out. Be sure to support both ends of the blade when you remove it completely from the chassis.

**CAUTION:** Never forcefully remove blades from a chassis. Mishandling blades can cause critical hardware failure, data loss, or both.

**CAUTION:** Some surfaces on the blade may be hot, especially when the blade has been powered on. Remove and handle the blade with care.

Never leave a Blade PC unprotected when not in use. It should either be in the chassis or in its storage box. Dust, dirt, and other debris can cause problems so keep blades clean by keeping them installed or in their boxes.
3.10 Network Connections: Chassis Ethernet Adapters

Blade PC Ethernet adapters are located on the Network Module, located on rear of the R4300 chassis.

Network ports are divided into primary and secondary groups, and each chassis slot has a primary and secondary port. A number above or below each port shows the port's chassis slot (see the picture below).

The sections below show each blade and the connectors available on the Network Module. See 3.10.2 “Mapping OS Network Connections to Chassis NICs” on page 61 for additional information.

![Secondary Ports and Primary Ports](image)

**Figure 27. The primary and secondary ports in an R-Series chassis Network Module**

### 3.10.1 Chassis Primary and Secondary Ports

When R3082D and R3161D Blade PCs are installed in a chassis, the primary port is Gigabit Ethernet, and the secondary port is dedicated for PCoIP communication. Connect cables to the primary and secondary port numbers on the Network Module (shown in Figure 27 on page 61) that correspond to the blade’s slot in the chassis. For example, if a blade is in chassis slot number 6, connect cables to primary port 6 and to secondary port 6.

### 3.10.2 Mapping OS Network Connections to Chassis NICs

The sections below show how Windows OS LAN connections are mapped to Ethernet ports on the Network Module on the rear of the R4300 chassis.
3.10.2.1 R3082D
After you insert an R3082D Blade PC in a chassis, the Windows operating system shows two network connections in the Network Connections window (click Start > Control Panel and then double-click Network Connections to display connections). The following table shows how each network connection that your OS displays is mapped to the Ethernet ports (Primary & Secondary) on the rear of the chassis (shown Figure 27 on page 61).

<table>
<thead>
<tr>
<th>LAN Connection Shown in OS</th>
<th>Port on Chassis Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Area Connection</td>
<td>Primary port</td>
</tr>
<tr>
<td>Local Area Connection 2</td>
<td>Secondary Port</td>
</tr>
</tbody>
</table>

3.10.2.2 R3161D
After you insert and R3161D Blade PC in a chassis, the Windows operating system shows one local area (network) connection. This network connection corresponds to the Primary port on the rear of the R4300 chassis. The Secondary port of the chassis slot is a dedicated PCoIP port for the R3161D blade. See 3.10 “Network Connections: Chassis Ethernet Adapters” on page 61 for more information about R4300 Chassis ports.

3.11 Performing Windows Setup (OOBE)

The first time you power on a ClearCube blade after installing a Windows operating system, you must complete Windows Setup (also called Windows out-of-box experience, or OOBE). The sections below show how to proceed through Windows setup for each R-Series Blade PC.

Before you begin, ensure you:

- have recorded the MAC address of the host card in the blade to which you are connecting. The host card MAC address is shown on the video configuration label on the side of the blade (see 1.1.3 “Blade PC Labels (MAC Address and Configuration Information)” on page 6 for more information).

- understand the PCoIP device IP address configuration options (DHCP or static fallback) and have any necessary network devices in place. See the zero client and blade Quick Start Guides for more information.

- inserted the blade you are setting up in a chassis, set up a compatible zero client, and connected the devices to the same network.

The steps below show how to connect to an R3082D blade from a zero client to perform Windows setup (the steps below describe Windows 7 setup; depending on your operating system, messages and screens might be different).
1. From the zero client OSD (on-screen display), click **Connect**.

   **Result:** Messages are displayed about host discovery and then the Discovered Hosts screen is displayed.

2. From the Discovered Hosts screen, find the MAC address or IP address of the host card (that is, the blade) to which you are connecting. Select the host card and click **OK**.

   **Result:** The zero client connects to the host card. Pre-OS screens (such as boot messages and a ClearCube splash screen) are displayed.

3. After several moments, Windows operating system setup messages are displayed, including **Starting Windows** and **Setup is updating registry settings**. Proceed through Windows setup as appropriate for your environment.

   The blade reboots when Windows setup is complete. You can now deploy your blade.

### 3.12 Video Configuration

Blade video configuration options vary depending on the video components installed in the blade. You can configure blade video using:

- Windows operating system display settings (for all blades and configurations)
- GPU driver (for blades with GPU cards installed)

Depending on blade model, basic video configuration steps include:

- Enabling multiple monitors
- If applicable, configuring video for Windows Setup (the first time the blade is powered on after installing a blade operating system image)
- Specifying the order of monitors in a multi-monitor setup
- Additional, optional video configuration, including specifying resolution, and so on.

See [1.6 “Blade Video Options and Monitor Support”](#) on page 14 for information about video configuration options for R-Series blades.

The following sections describe blade video capabilities and options.
3.12.1 Video Configuration Steps

After connecting to a host and enabling displays through Windows operating system display settings or through the GPU driver interface, you can perform additional video configuration such as specifying:

- **Resolution**
  This is the number of pixels displayed horizontally and vertically. (See 1.6 “Blade Video Options and Monitor Support” on page 14 for information about monitor support options for R-Series blades.) Higher resolutions use more pixels per inch of screen area, which generally provides an image with more detail. ClearCube recommends seeing your display documentation for information about the monitor’s native resolution or the resolution that the manufacturer recommends.

- **Desktop appearance**
  You can configure how your desktop is displayed on multiple displays, including duplicating (or mirroring) displays so all monitors display the same image, extending the desktop across all monitors so you can move windows back and forth between all monitors, and turning off displays.

- **Display order**
  You can configure how the operating system orders the displays connected to a zero client. A simple method is to make the virtual arrangement of displays the same as their physical arrangement. Specifying this arrangement from the operating system’s display settings ensures that mouse movements are contiguous from the edge of one display to the adjacent edge of the next display. For example, suppose you have two displays side by side and drag a window from the left display to the right display. When the window reaches the edge of one monitor, it moves to the adjacent edge of the next monitor.

![Figure 28. Dragging a window from the left monitor to the right monitor](image)
From the Control Panel’s display settings area (shown in the following figures), drag numbered icons representing your displays to the location that you want. Specifying and identifying the primary monitor is helpful in this scenario.

![Identifying the primary monitor](image)

**Figure 29. Identifying the primary monitor**

- **Orientation**

If your business needs require that you physically rotate your displays, you can specify the appropriate landscape or portrait orientation in the Control Panel’s display settings area. Note that you can specify a different orientation for each display.

![Configuring display orientation using operating system](image)

**Figure 30. Configuring display orientation using operating system**

ClearCube recommends using the host’s operating system to configure display settings. For Microsoft Windows 7 operating systems, right-click an empty portion of the host’s desktop and select **Screen resolution** (other Windows operating system menus can be different; display settings are available from the Control Panel).

### 3.12.2 Using a Single Monitor with a Dual Zero Client

This section shows how to use a single monitor with a dual zero client by installing Tearadici® Host Driver software and configuring a blade’s dual-monitor host card. This
procedure resolves a `Source signal on other port` message that can be displayed on monitors when only one monitor is connected.

3.12.2.1 Enabling the Host Driver Function
The steps below show how to enable the Host Driver Function from a dual host card's Administrative Web Interface (AWI).

1. From a Web browser, enter the host card's **IP address** (if the browser displays a warning about the security certificate, you can safely dismiss the message).
   
   **Result:** The Log In screen is displayed.

2. Enter a password if one is specified for the device, and then click **Log In**.
   
   **Result:** The PCoIP Host Card page is displayed.

3. From the menu located in the upper-left portion of the screen, click **Configuration > Host Driver Function**.
   
   **Result:** The Host Driver Function page is displayed.

4. Click **Enable Host Driver Function** and then click **Apply**.
   
   **Result:** A Success page is displayed. Click **Reset**.

5. A message is displayed about resetting the processor and the Blade PC. Click **OK**.
   
   **Result:** The message is dismissed and the Success page is displayed again. Click **Continue**.

6. Restart the Blade PC.
   
   **Result:** When the blade powers on again, two PCI-E devices are displayed in the Device Manager. After installing the Host Driver Software in the next procedure, these will function normally.

Continue by installing PCoIP Host Driver software as shown below.

3.12.2.2 Installing PCoIP Host Driver Software
The steps below show how to install a supported version of Teradici Host Driver Software on a Blade PC containing a host card to which a dual-monitor zero client attaches.

**NOTE** Be sure that you have the 32- or 64-bit installer appropriate for your operating system.
1. Double-click the PCoIP Host Software installer (.msi file).

   **Result:** The Wizard starts. Click **Next**.

2. Accept the license agreement and click **Next**.

3. Accept the default installation location or specify one and click **Next**.

4. Click **Install**.

   **Result:** Progress messages are displayed.

5. Click **Finish**.

You can now deploy the zero client for use with one monitor. Note that PCoIP Host Software application is located in the Teradici folder in the Start menu, and the Unknown device icons associated with the Host Driver are no longer displayed in the Device Manager.

---

### 3.13 Blade BIOS and CMOS Operations

The sections below show how to flash a Blade PC BIOS and change CMOS settings.

#### 3.13.1 Flashing the Blade BIOS

You can flash (install or re-install) the BIOS for your blade. BIOS downloads, available from ClearCube Support, contain the following:

- BIOS files
- BIOS flash utility
- Instructions about how to use the flash utility

From the ClearCube Support site (http://www.clearcube.com/support/), select your **blade** from the drop-down list, and then click the **BIOS** link, located under the blade description. Save and then extract the archive file. Read the enclosed **readme.txt** file for detailed instructions about flashing the BIOS.

#### 3.13.2 Changing BIOS Settings

You can change BIOS settings using the BIOS setup utility. To access the utility, power on a blade and press the **F2** key when the ClearCube splash screen appears (the splash screen should provide prompts about additional options and corresponding keys to press).
From the BIOS setup utility you can configure boot sequence, hard drive settings, power-up defaults, power management settings and more. (Note that you can select the first boot device without entering the BIOS setup utility. Follow the on-screen prompts as the blade boots. If you are booting from a USB CD or DVD drive, select CDROM or USB CD/DVD (do not select removable device.)

See 4.8 “Replacing the CMOS Memory Battery” on page 108 for information about changing a CMOS battery.

---

ClearCube Blade PCs uses a lithium coin-cell battery for backing up parameter memory. When you change a battery, remove the old battery and wait at least 30 seconds before inserting the new battery. Otherwise, memory corruption may occur, and may require sending the blade back to ClearCube for repair.

---

The sections below show how to clear existing BIOS settings and reset BIOS passwords.

### 3.13.3 Clearing CMOS Settings

CMOS settings include customizations to the default BIOS settings, system time, date, and the like. The sections below show who to clear CMOS settings on R-Series blades.

#### 3.13.3.1 R3082D CMOS

R3082D Blade PC motherboards provide a jumper to clear all current CMOS settings. JP1 is the clear CMOS header. By default, the jumper is on pins 1 and 2 for normal operation.
The following figures show the location of the JP1 header (for R3082D) and the jumper positions.

Perform the following steps to clear all CMOS settings.

1. Power down the blade and remove the blade from the chassis (if the blade is not in an enclosure—for example, for configuration—ensure that power is disconnected).

2. Locate the JP1 header (see Figure 31 on page 69).

3. Use needle-nose pliers to move the jumper from the default position (on pins 1 and 2) to the reset/clear position (on pins 2 and 3).

4. Wait 30 seconds.

5. Using your pliers, move the jumper back to the default position (on pins 1 and 2).

6. Return the blade in a chassis as described in 3.8 “Installing Blades” on page 58.

7. Power on the blade.

The CMOS is cleared, including system time and date, and any administrator or user passwords. You can now enter BIOS setup to make any necessary changes by pressing F2 when prompted while starting the blade.
3.13.3.2 R3161D CMOS
Remove and then replace the motherboard battery to clear R3161D CMOS settings. See 4.8.2 “R3161D Battery” on page 109 for detailed instructions.

3.13.4 R3161D BIOS Security Jumper
The BIOS Security jumper controls the BIOS mode for R3161D blades. The picture below shows the location and pin numbering of the jumper.

![Jumper Picture]

The table below shows the jumper setting modes.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Jumper Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Pins 1-2</td>
<td>BIOS uses the current configuration information and passwords (if any) for boot operations.</td>
</tr>
</tbody>
</table>
3.14 Operating System Images and Software

The sections below show requirements for custom operating system images for R-Series Blade PCs.

### 3.14.1 Operating System Image Requirements

As noted in the previous section, if you are re-imaging a ClearCube blade or are installing a custom image on a blade, note that blades require specific firmware, motherboard chipset drivers, device drivers, and more.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Jumper Setting</th>
<th>Description</th>
</tr>
</thead>
</table>
| Lockdown| Pin 2-3        | BIOS uses current configuration information and passwords for boot operations, except:  
  • All POST hotkeys are suppressed (prompts are not displayed and keys, such as F2 or F10, are not accepted).  
  • Power Button menu is not available (see Intel motherboard documentation for more details)  
  BIOS updates are not available except for automatic recovery due to flash corruption. |
| Configuration | None | BIOS Recovery Update process if a matching .bio file is found.  
  Recovery Update can be cancelled by pressing the ESC key.  
  If the Recovery Update was cancelled or a matching .bio file was not found, a Config Menu is displayed. The Config Menu consists of the following, followed by the Power Button Menu selection (see Intel motherboard documentation for more details about the Power Button menu):  
  1. Suppress this menu until the BIOS Security Jumper is replaced.  
  2. Clear BIOS User and Supervisor Passwords  
  3. Reset Intel AMT to default factory settings.  
  4. Clear Trusted Platform Module (TPM-encrypted data is not accessible after TPM is cleared).  
  F2. Intel Visual BIOS.  
  F4. BIOS Recovery. |

**NOTE** ClearCube devices do not necessarily support every driver for firmware that vendors provide. To ensure that your devices support drivers and firmware, only use drivers and firmware obtained from ClearCube.
The following procedure provides an overview of steps and items required when imaging and configuring ClearCube blades, and it assumes you are creating and installing a Windows® 7 operating system. The menu options specified here might be different in other Windows operating systems.

| NOTE | Ensure that you perform steps and install components in the order listed below. Failure to do so can cause unsupported behavior. |

1. Ensure that you obtain drivers for your blade or VM from the ClearCube Support site at http://www.clearcube.com/support/. All drivers and downloads cited in this procedure are available on the Support site.

2. Connect to the blade you are imaging. Connect an Admin C/Port to the chassis slot that the blade is in (see 3.5.4 “Admin C/Port Cabling” on page 49 for more information). If you do not have an Admin C/Port or have display issues, see Tech Bulletin TB00264, Video Configuration When Powering on R-Series Blades for the First Time (OOBE). From the Support site, select the R-Series blade you are imaging. From the blade's home page, click Tech Bulletins.

3. Install the operating system.

4. Install the Intel® chipset driver appropriate for your blade.

5. Configure PCI Express® power management:
   a. Click Start > Control Panel > Power Options. (If the Control Panel View by option is set to Category, click Start > Control Panel > Hardware and Sound > Power Options).
   b. Select any power plan (you must perform this procedure for all power plans) and click Change plan settings > Change advanced power settings to display the Power Options dialog box.
   c. Expand the PCI Express item. From the Link State Power Management drop-down menu select Off. Click OK to save your changes, close the window, and return to the Edit Plan Settings window. (Note that you have saved your PCI Express settings even though Cancel is the only option available in the Edit Plan Settings window. This is normal behavior.)

Ensure that you specify this setting for all power plans.

6. For blades using PColIP technology only: From the Edit Plan Settings window, select Never in the Put the computer to sleep drop-down box. Click Save changes. Repeat this step for all power plans.

7. Install the Intel network adapter driver appropriate for your blade.

8. Optionally, install an appropriate RAID driver.
9. Optionally, install the Intel AMT driver. Note that AMT support typically requires BIOS-level configuration.

10. Install the video driver in your blade’s driver download. Note that driver downloads are categorized according to blade, video, and operating system configurations.

11. **For systems using PCoIP technology only**: Optionally, install **PCoIP Host Software** on the blade or VM containing a host card. The version of the PCoIP Host Software must be compatible with the host card and the zero client firmware versions.

12. Install drivers for any additional peripherals or hardware.

13. **For blades using PCoIP technology only**: From a compatible zero client, connect to the blade you are imaging to install zero-client-specific drivers (see *PC-over-IP® System User’s Guide* at [http://www.clearcube.com/support/](http://www.clearcube.com/support/) for instructions about connecting zero clients and blades):
   
   a. Install the **Realtek® HD Audio** driver.
   
   b. If the zero client has a DB9 video jack, install the **DB9 driver**.
   
   c. If the zero client contains an internal Common Access Card (CAC) reader or uses an external reader, install the **Common Access Card (CAC)** driver.

### 3.14.2 Re-installing System Software

ClearCube blades are normally shipped with operating system factory-installed. Other operating systems may be available. All factory-installed operating systems are images customized specifically for ClearCube blades, and each blade model uses an image version that is specific to that blade model.

**NOTE** Be sure to see 3.11 “Performing Windows Setup (OOBE)” on page 62 for important information about video configuration requirements for booting an operating system for the first time.

Installing an operating system image from one blade model onto another blade model (for example, installing the system image from an R3082D onto an R3161D) will result in a system failure and will require re-imaging the blade with the correct version, or reinstalling the operating system.

**NOTE** Be sure to see 3.14.1 “Operating System Image Requirements” on page 71 and 3.11 “Performing Windows Setup (OOBE)” on page 62 for important, related information.

Standard system imaging tools are compatible with ClearCube blades and system images. In the event that operating system re-installation is necessary, or a custom image is desired, see the procedure above or contact ClearCube Technical Support for assistance.
3.15 Connecting to a Blade from a Zero Client

The steps below show how to create a PCoIP session to connect to a Blade PC from a zero client.

Before you begin:

- Record the hostcard MAC address displayed on a label on the side of the blade. Remember that this MAC address is different than the blade MAC address. If you are using a PCoIP management console (such as Sentral), you can also record the host card’s IP address (this is different than the blade’s network adapter IP address).

- Ensure that zero client is connected to the secondary port on the back of the chassis that corresponds with the slot that the blade is in (see Figure 17 on page 35 and 3.4.5 “Network Module” on page 42 for pictures of the Network Connection module). Connect the zero client to the chassis using a direct connection or using a network switch).

1. Press the **power button** on the front of the blade to power it on, and then press the **power button** on the front of the zero client to power it on.

2. From a monitor connected to the zero client, click the **Connect** button.

   **Result:** After several moments the zero client identifies host cards to which it can connect. The zero client on-screen display (OSD) lists one or more host card IP addresses and their corresponding MAC addresses.

3. Select the blade’s **host card** (IP address or MAC address) from the list and click **OK**. Host card MAC addresses are located on a label on the side of the blade.

   **Result:** The zero client and blade establish a PCoIP session displaying the blade’s desktop.

3.16 Additional Features

The sections below explain additional Blade PC features.

3.16.1 **Hardware-Based Mass Storage Lockout**

R3082D Blade PCs offer a unique Mass Storage Lockout (MSL) security feature that disables the use of USB mass storage devices (such as flash drives, floppy drives, CD-ROM drives, and
so on) from ClearCube clients. Note that when MSL is set, USB ports on the front of a blade and on the rear of a chassis are operational while USB access is prohibited from remote clients.

MSL is disabled by default. To enable MSL and prevent access to USB devices, set a jumper on the blade’s motherboard.

Note that PCoIP host cards and ClearCube Sentral provide software-based MSL to prevent the use of mass storage devices.

**NOTE** When the MSL jumper is physically set to lock out mass storage devices, software-based MSL cannot override this hardware-based setting.

Use needle-nose pliers to move the jumper, as described in the following steps.

1. Power down the blade and remove it from the chassis (if the blade is not in an enclosure—for example, for maintenance—ensure that power is disconnected).

2. Locate the MSL header. MSL header JP6 is located below the video card and to the right of the Ethernet port on the bottom edge of the blade, as shown in the following figure (the Clear CMOS header is to the right of the MSL header; ensure that you move the jumper on the MSL header).

![Figure 32. The JP6 MSL header on an R3082D Blade PC](image-url)
3. Use needle-nose pliers to move the jumper. Perform one of the following steps:

- **To enable MSL**
  Move the JP6 jumper to pins **1 and 2**. This setting *prevents* access to USB devices from the client that is connect to the blade. Now, when a user inserts a USB device in a connected client, the message **USB device not authorized** is displayed.

- **OR** —

- **To disable MSL**
  Move the JP6 jumper to pins **2 and 3**. This setting *enables* access to USB devices from the client that is connected to the blade. This is the default position.

4. Return the blade to a chassis as described in 3.8 “Installing Blades” on page 58.

5. Power on the blade.

Depending on the MSL option you set, access to USB devices connected to the blade or to the client is enabled or disabled.

### 3.16.2 Software-Based Mass Storage Lockout

You can set permissions for USB devices from a blade’s PCoIP host card Administrative Web Interface (AWI). The picture below shows the message displayed on the zero client when MSL is set on an host card: Mass Storage and Hub USB Device Classes prohibited by host.

![PCoIP Host Card AWI](image)

*Figure 33. The Mass Storage prohibited by host message in the host card AWI*

The steps below show how to set mass storage lockout on a PCoIP host card.
1. From a Web browser on the same network at the PCoIP host card, enter the host card’s IP address. You can find the host card’s IP address by consulting the zero client Discovered Hosts screen. Depending on your browser security settings, you might need to dismiss several security warnings.

2. From the Host Card’s main menu, click Permissions > USB.

![PCoIP host card USB Permissions from the Administrative Web Interface](image)

Figure 34. PCoIP host card USB Permissions from the Administrative Web Interface


4. Click Apply. You must restart the blade before changes take effect. Note that clicking the Reset button on the Web interface does not reset the processor.
Chapter 4. Hardware Upgrade and Replacement Procedures

The ClearCube architecture simplifies upgrading Blade PCs. All blade hardware and software components are classified as one of the following:

**Customer Replaceable Units (CRUs)**

Items that customers can replace.

**Field-Replaceable Units (FRUs)**

Items that trained service providers and ClearCube Systems Engineers (SEs) can replace, either on site or through an RMA process.

To maintain your ClearCube warranty and ensure proper operation, only use ClearCube approved commodities when performing upgrades of CRU components.

The following table details hardware and software components in R-Series blades and indicates if each component is a CRU or an FRU.

<table>
<thead>
<tr>
<th>Blade Component</th>
<th>R3161D</th>
<th>R3082D</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers</td>
<td>CRU</td>
<td>CRU</td>
<td>See 4.3 “Drivers” on page 84.</td>
</tr>
<tr>
<td>Operating System</td>
<td>CRU</td>
<td>CRU</td>
<td>See OS manufacturer documentation. Additionally, see 3.15.2 “Re-installing System Software” on page 77, 3.16 “Configuring RAID for R3040S Blade PC” on page 77, and 5.5 “Boot Issues” on page 124.</td>
</tr>
</tbody>
</table>
Chapter 4. Hardware Upgrade and Replacement Procedures

Table 14. (Continued) Blade Components and CRU/FRU Designation

<table>
<thead>
<tr>
<th>Blade Component</th>
<th>R3161D</th>
<th>R3082D</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Card</td>
<td>Not Applicable CRU</td>
<td>CRU</td>
<td>Requires CMOS reset after installation. See the <em>Quick Start Guide</em> that accompanies upgrade kit.</td>
</tr>
<tr>
<td>PCoIP Host Card</td>
<td>CRU</td>
<td>CRU</td>
<td>Requires CMOS reset after installation. See the <em>Quick Start Guide</em> that accompanies upgrade kit.</td>
</tr>
<tr>
<td>Memory Modules</td>
<td>CRU</td>
<td>CRU</td>
<td>Requires CMOS reset after installation. See 4.4 “Memory” on page 85.</td>
</tr>
<tr>
<td>Hard Drive</td>
<td>CRU</td>
<td>CRU</td>
<td>See 4.5 “Hard Drives” on page 89</td>
</tr>
<tr>
<td>Hard Drive Cable</td>
<td>CRU</td>
<td>CRU</td>
<td>See 4.5 “Hard Drives” on page 89</td>
</tr>
<tr>
<td>Front LCD Panel</td>
<td>CRU</td>
<td>CRU</td>
<td>See 4.7 “Replacing Front Panels” on page 96.</td>
</tr>
<tr>
<td>Chassis Interposer Card</td>
<td>CRU</td>
<td>CRU</td>
<td>See 4.9 “Replacing Blade Interposer Cards” on page 112.</td>
</tr>
<tr>
<td>CPU Fan</td>
<td>Not Applicable CRU</td>
<td>CRU</td>
<td>See 4.6 “CPU Fans” on page 92.</td>
</tr>
<tr>
<td>CMOS Battery</td>
<td>CRU</td>
<td>CRU</td>
<td>See 4.8 “Replacing the CMOS Memory Battery” on page 108.</td>
</tr>
<tr>
<td>CPU</td>
<td>Not Applicable FRU</td>
<td>FRU</td>
<td>Requires CMOS reset after installation. Return blade to ClearCube to replace CPUs.</td>
</tr>
<tr>
<td>CPU Heat Sink</td>
<td>Not Applicable FRU</td>
<td>FRU</td>
<td>Return blade to ClearCube to replace CPU heat sinks.</td>
</tr>
</tbody>
</table>

Other components such as the processor or motherboard are not intended for field replacement. Removal voids your warranty. Contact ClearCube Technical Support for assistance.
A complete Blade PC is easily upgraded by lowering the chassis front bezel, slowly pulling out the old Blade PC, and then replacing with a new Blade PC.

**CAUTION:** Some surfaces on the blade may be hot, especially when the blade has been powered on. Remove and handle the blade with care.

**CAUTION:** All upgrades should be performed by a qualified computer technician. Take proper precautions to avoid damaging electrostatic discharges by working at a grounded computer equipment repair bench. Damage caused by improper upgrade procedures will void your warranty.

**CAUTION:** Disconnect all sources of power before servicing the R4300 chassis.

### 4.1 About Electrostatic Discharge (ESD)

Prevent ESD (electrostatic discharge) damage to blades, hardware, and blade components by wearing protective devices such as wrist straps, sole grounders, and conductive shoes. If these are unavailable, always discharging your body and components before performing any blade maintenance and upgrades (for example, by touching a grounded, unpainted, metal object). ESD can vary depending on many environmental conditions, including clothing that users wear and how users handle blades and components. ESD damage can potentially cause unsupported component behavior including failure. Always perform ESD prevention steps before performing any procedure shown in this chapter.
4.2 R3161D Side Panel

The R3161D side panel protects most blade components and assists blade cooling. You must remove the side panel to access most blade components. The picture below shows the side panel installed on an R3161D blade.

![R3161D Side Panel](image)

Figure 35. The R3161D Side Panel

The sections below identify side panel features, and show how to remove and replace the R3161D side panel.
4.2.1 R3161D Side Panel Features

The picture below shows the R3161D side panel and identifies panel features.

![R3161D Side Panel Features](image)

**Figure 36. R3161D side panel features**

4.2.2 Removing the Side Panel

The steps below show how to remove the R3161D side panel.

1. Be sure to take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Remove the two screws from the side cover mounting holes (see the previous figure for the location of the mounting holes).

3. Remove the three screws attaching the hard drive carrier to the blade. The arrows in the picture below show the location of the hard drive carrier screws.

![Removing the Side Panel](image)
4. Note that the hard drive cables are connected to the hard drive. Slightly raise the right edge of the hard drive carrier being sure not to disconnect the hard drive cables.

5. Slide the side cover toward the front of the blade and raise the side cover up as shown in the picture below.

You can now access R3161D components for maintenance and upgrade procedures detailed in the sections below.

### 4.3 Drivers

You can obtain drivers for ClearCube blades from the ClearCube Support site at the following URL: [http://www.clearcube.com/support/](http://www.clearcube.com/support/).

To obtain drivers:

1. From the Support site, select the product for which you need drivers from the drop-down lists near the middle of the page.

2. From the product page, click **Drivers**, located below the product description.

3. Under the drivers heading, click the link for the drivers you require. Depending on your browser, you should receive a message indicating that the download has started. Click **OK** and specify a location to save the file.

4. Navigate to the location where the driver archive file is saved. The archive should include a readme file that provides information about extracting and installing the drivers.
4.4 Memory

Only use ClearCube-supplied or ClearCube-approved memory modules.

| NOTE | Always reset CMOS after installing memory modules. See the following sections for more information. |

4.4.1 Model R3082D

The sections below provide an overview of R3082D memory requirements and explain how to install different memory configurations.

4.4.1.1 R3082D Memory Overview

The R3082D motherboard supports DDR3 1600, 1333, and 1066 MHz Dual Inline Memory Modules (DIMMs), and provides four 240-pin DDR3 SDRAM DIMM sockets in two channels (channel A and channel B), as shown in the following figure.

Figure 37. Detail of R3082D Memory Channels and Sockets
4.4.1.2 Important Installation Considerations
Ensure the following when you are populating DIMMs.

- Reset CMOS after installing new memory modules, as described in 3.14.2 “Changing CMOS Settings” on page 73 and 3.14.3 “Clearing CMOS Settings” on page 73.
- Only use DIMMs supplied by ClearCube.
- Ensure that DIMMs are the same speed and size.

4.4.1.3 Installing 1 DIMM
1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.
2. Pull open the tabs on either side of the memory socket 1 (the black socket of channel A).
3. Insert a DIMM in socket 1. Align the DIMM in the socket guides and firmly press down until the tabs snap into place.
4. Reset CMOS as noted above.

4.4.1.4 Installing 2 DIMMs
1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.
2. Pull the tabs on either side of the memory socket away from the module to remove the existing DIMMs.
3. Insert the new DIMMs in sockets 1 and 2 (the black socket of both channels). Align the DIMM in the socket guides and firmly press down until the tabs snap into place.
4. Reset CMOS as noted above.

4.4.1.5 Installing 3 DIMMs
1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.
2. Pull the tabs on either side of the memory socket away from the module to remove the existing DIMMs.
3. Insert DIMMs in sockets 1 and 2 (the black socket of both channels) as described above.
4. Continue by installing the third DIMM in socket 3 or 4 (the blue socket of either channel).
5. Reset CMOS as noted above.

4.4.1.6 Installing 4 DIMMs
1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.
2. Pull the tabs on either side of the memory socket away from the module to remove the existing DIMMs.

3. Insert DIMMs in sockets 1 and 2 (the black sockets of both channels) as described above.

4. Install a matched pair of DIMMs in sockets 3 and 4 (the blue sockets of both channels).

5. Reset CMOS as noted above.

### 4.4.2 Model R3161D

The sections below provide an overview of R3161D memory requirements and explain the implications of different memory configurations.

#### 4.4.2.1 R3161D Memory Overview

The R3161D motherboard provides two 204-pin sockets. The motherboard support the following features:

- Two (dual channel) 1.35 V DDR3L (low-voltage) SO-DIMMs

  **NOTE** The R3161D motherboard does not support 1.5 V memory modules.

- 1333 and 1600 MHz SO-DIMMs

- Two independent memory channels with interleaved mode support (discussed below)

- Unbuffered, Non-ECC SO-DIMMs (single-sided or double-sided)

- Maximum total system memory: 16 GB (with 4 GB memory technology)

  **NOTE** If you install only one SO-DIMM, be sure to install it in the upper memory socket.

- Minimum recommended total system memory: 1 GB

- Serial Presence Detect

#### 4.4.2.2 R3161D Memory Configurations

When working with memory modules, take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81. The list below shows the types of memory organization that R3161D processors support.
Dual channel (Interleaved) mode
This mode offers the highest throughput for practical applications. Enable this mode by installing SO-DIMMs of equal memory capacities. Technology and device width can vary from one channel to the other but the installed memory capacity for each channel must be equal. If channels use SO-DIMMs with different speeds, the blade uses the slowest memory timing.

Single channel (Asymmetric) mode
This mode is the same as single channel bandwidth operation. An R3161D blade uses this mode when a single SO-DIMM is installed or when the memory capacities are unequal. Technology and device width can vary from one channel to the other. If channels use SO-DIMMs with different speeds, the blade uses the slowest memory timing.
4.5 Hard Drives

The following sections describe how to work with hard drives (HDD, or hard disk drives) in R-Series blades.

4.5.1 Considerations When Working with Hard Drives

Ensure that you observe the following when working with HDDs:

- Depending on the type of hard drive, mechanisms can be sensitive to mechanical shock, and are most vulnerable when handled as an unmounted unit. Handle them gently, especially when setting them down on a work surface.
- Remove drive cables by pulling on the cable connector, not by pulling the cable. Pull the connector straight out, not at an angle.
- Imaged drives swapped between dissimilar blade models will not function correctly.
- Store unused drives in an anti-static bag in a climate-controlled area.

4.5.2 Upgrading Hard Drives

To replace or upgrade a hard drive in an R-Series blade, perform the following steps.

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Power off the blade and remove it from the chassis. Place the blade on a stable surface, such as a desk or bench.

3. Remove the hard drive carrier (shown in the following figure) from the blade frame.
   a. Remove SATA data cables and power cables from the hard drives and, optionally, from the motherboard.
b. Remove the 3 screws attaching the hard drive carrier to the blade (your R-Series blade might look different than the blade shown below).

![Figure 39. Location of hard drive carrier screws](image)

4. Remove the 4 screws connecting the hard drive to the carrier (note that these screws are smaller than the screws you removed in the previous step). Remove the old hard drive and set it aside (contact the hard drive manufacturer or ClearCube for recycling information).

<table>
<thead>
<tr>
<th>NOTE</th>
<th>You will need a screwdriver that you can insert through 6 mm holes to remove 2 of the screws attaching the hard drive to the rear or the carrier, as shown in the following figure.</th>
</tr>
</thead>
</table>

![Figure 40. Removing the hard drive screws](image)

5. Attach the new hard drive.

a. Carefully place the new hard drive in the hard drive carrier, ensuring that the:
   – Manufacturer label faces the correct direction, as shown above
   – SATA power and data connectors face the end of the carrier that extends past the side walls, as shown above
   – Carrier and hard drive screw holes are aligned
b. Use the four small screws you removed in step 4 to connect the hard drive to the carrier.

6. Reconnect the carrier to the blade using the three screws you removed in step 3.

7. Reconnect the SATA power and data cables. Ensure that the hard drive manufacturer label faces down (faces the motherboard), and that the SATA power and data connectors point toward the fan and the front of the blade. If you removed the SATA cables from the motherboard, ensure that you reconnect them.

Your hard drive is now installed. Reset CMOS as described in 3.14.2 “Changing CMOS Settings” on page 73 and 3.14.3 “Clearing CMOS Settings” on page 73.
4.6 CPU Fans

The following sections describe how to replace R-Series CPU fans.

4.6.1 R3082D Fans

The R3082D CPU fan is attached to the CPU heatsink by a bracket.

Perform the following steps to replace the CPU fan.

1. take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Power off the blade and remove it from the chassis. Place the blade on a stable surface, such as a desk or a bench.
3. Disconnect the fan power cable, located immediately above the fan, from the motherboard header labeled **CPU FAN1**.

![CPU FAN1 Power Cable Header](image1)

**Figure 42. Location of the header for the fan power cable**

4. Use a Phillips screwdriver to remove both bracket screws from the heatsink.

**NOTE**

Do not remove the heatsink from the motherboard. Only remove the fan bracket, as shown in the following figure.

![Heatsink and Fan](image2)

**Figure 43. Location of the bracket screws on the heatsink**
5. Remove the 4 screws from the bracket and remove the bracket from the fan.

![Removing the fan bracket screws](image1)

**Figure 44.** Removing the fan bracket screws

6. Now attach the bracket to the new fan. Ensure that the:
   - Power cable exits the bottom of the fan
   - Bracket is oriented so that flange holes are on the bottom
   - Bracket is attached to the side of the fan housing where the rotating fan blades are located

![Ensure correct orientation of the fan and bracket](image2)

**Figure 45.** Ensure correct orientation of the fan and bracket
An indicator on the bottom of the fan shows the direction of airflow.

![Airflow Indicator on Bottom of Fan](image1)

**Figure 46. Arrow showing direction of airflow**

Ensure that air flows toward the heatsink and toward the rear of the blade.

![Airflow toward Rear of Blade](image2)

**Figure 47. Ensure air flows to the rear of the blade**

Place the bracket on the side of the fan where the rotating blades are located. Insert 4 screws you removed in the previous step and tighten.

7. Attach the fan to the heatsink by replacing the two screws you removed in step 4. Ensure the fan is mounted so the power cable:
   - Is on the bottom, against the motherboard
   - Exits the right side of the fan, closest to the CPU FAN1 header on the motherboard

8. Connect the power cable to the **CPU FAN1** header on the motherboard.

The fan is now replaced. You can now return the blade to a chassis as described in **3.8 “Installing Blades”** on page 58.

### 4.6.2 R3161D Fans

The R3161D motherboard include an integrated blower to cool the CPU. R3161D blades do not include replaceable CPU fans.
4.7 Replacing Front Panels

The sections below show how to replace the front panels of R-Series blades.

4.7.1 R3082D Front Panels

This section describes how to replace an R3082D blade front panel.

NOTE R3082D blades use different front panels depending on the date of manufacture. As shown below, R3082D front panels might differ.

The table below shows R3082D serial numbers and the different front panels that they use.

<table>
<thead>
<tr>
<th>R3082D Serial Number</th>
<th>Front Panel Type</th>
<th>Appearance</th>
<th>For Replacement Instructions...</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSR03923 and higher</td>
<td>LED</td>
<td></td>
<td>See 4.7.1.1 “R3082D with LED Front Panel” on page 97.</td>
</tr>
<tr>
<td>(See label on the side of the blade for serial number)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZSR03922 and lower</td>
<td>LCD</td>
<td></td>
<td>See 4.7.1.2 “R3082D with LCD Front Panel” on page 101.</td>
</tr>
<tr>
<td>(See label on the side of the blade for serial number)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The picture below shows the front and rear of an LED front panel assembly.

![Figure 48. LED front panel assembly](image)

**4.7.1.1 R3082D with LED Front Panel**

This section shows how to remove and replace an LED front panel for an R3082D blade. If your R3082D has an LCD front panel, see “R3082D with LCD Front Panel” below. (See 4.7.1 “R3082D Front Panels” on page 96 for details about different R3082D front panels.)

**Remove the LED Front Panel**

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Power off the blade and remove it from the chassis. Place the blade on a stable surface, such as a desk or a bench.

3. Lay the blade on its side so the motherboard is facing up.

Some surfaces on the blade may be hot, especially when the blade has been powered on. Remove and handle the blade with care.
4. Use a #1 Phillips drive to remove the 4-40, ¼-inch flat head screw on the side of the front panel sheet metal. The picture below shows the location of the screw.

![Flat Head Screw](image1)

**Figure 49. Remove the screw on the side of the front panel sheet metal**

5. Use a #2 Phillips drive to remove the two 6-32, ¼-inch hex head screws connecting the front panel to the motherboard. The picture below shows the location of the screws.

![Hex Head Screws](image2)

**Figure 50. The front panel tab screws**

6. Remove the cable header from the motherboard, and gently lift the front panel assembly away from the blade.

7. Use a driver to remove the screws on the front of the front panel that fasten the circuit board to the front panel sheet metal. After removing the screws, gently remove the circuit board from the front panel.

Continue by connecting the new cable and circuit board to the front panel sheet metal as shown in the section below.

**Assemble and Connect the LED Front Panel**

These steps assume you have an LED front panel assembly.

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.
2. Connect the LED front panel cable to the replacement LED front panel circuit board as shown below.

**You must connect the front panel cable to the front panel circuit board as shown below. Connecting the cable incorrectly can damage the circuit board or the blade motherboard.**

When connecting the front panel cable to the front panel circuit board:

- Be sure the notch in the circuit board is located at the bottom-right
- Connect the cable to pins 1 to 10 (see the silk screen for the location of the pins), and
- Be sure the cable’s red marking is on the left.

![Figure 51. Connecting the cable to the LED front panel circuit board](image)

3. Align the metal standoffs on the circuit board with the smaller screw holes in the front panel sheet metal. Use a #2 Phillips screwdriver and the included 6-32 screws to fasten the circuit board to the front panel sheet metal.

![Figure 52. Aligning the circuit board and the front panel sheet metal](image)
4. Connect the 2 × 10 connector (shown in Figure 48 on page 97) to the motherboard. Note that the connector is keyed.

5. Fasten the front panel assembly to the blade frame, being sure to align the USB port on the front of the blade with the hole in the front panel. The picture below shows the front panel and the USB port.

![Figure 53. The LED front panel and USB port](image)

6. Fasten the front panel:

   - Align the front panel tabs with the holes on the front edge of the motherboard. Use a #2 Phillips drive to fasten with two 6-32, ¼-inch hex head screws.

   - Align the side of the front panel with the return on the blade frame. Be sure that the blade frame return is inside the front panel. Use a #1 Phillips drive to fasten with one 4-40, ¼-inch flat head screw.

![Front Panel Tab](image)

Blade Frame Return

Figure 53. The LED front panel and USB port

Your front LCD panel replacement is now complete.
4.7.1.2 R3082D with LCD Front Panel
This section shows how to remove an LCD front panel from an R3082D blade and replace it with an LED front panel. (See 4.7.1 “R3082D Front Panels” on page 96 for details about different R3082D front panels.)

Remove the LCD Front Panel
1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Power off the blade and remove it from the chassis. Place the blade on a stable surface, such as a desk or a bench.

3. Lay the blade on its side so the motherboard is visible.

4. Remove the LCD screw, shown in the following figure.

5. Remove the LCD panel.
   a. From the front of the blade, grasp the LCD panel and cable and lift the panel up.
b. Gently rotate the LCD panel clockwise. Ensure that you do not bind or break the tab extending through the hole shown below. It might help to push up on the lower tab from the outside of the blade.

![Figure 55. Positioning the LCD panel](image)

Ensure That Plastic Tab Is Clear of Blade Frame

Figure 55. Positioning the LCD panel

c. When the panel is clear of the USB connector, pull the panel out of the blade.

6. Remove the LCD by grasping the end of the cable and by grasping the base of the LCD panel. Pull apart to separate.

![Figure 56. Removing the LCD panel](image)
7. Remove the cable from the motherboard. The picture below shows the location of the cable and cable header.

![Diagram of cable and cable header]  

Figure 57. Removing the LCD cable from the motherboard

You have now removed the LCD front panel. Continue by assembling and connecting the LED front panel. See “Assemble and Connect the LED Front Panel” on page 98 for detailed instructions.

### 4.7.2 R3161D Front Panel

The sections below show how to replace an R3161D front panel circuit board.

#### 4.7.2.1 Assemble the circuit board and cable

The steps below show how to assemble the front panel circuit board and cable.

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Remove the circuit board and cable from the shipping container and packaging.
3. Connect the cable’s 20-pin connector to the header on the rear of the circuit board, being sure that the two 10-pin connectors exit the bottom of the board. The picture below shows the 20-pin connector, 20-pin header, and the correct orientation of the final assembly.

![Figure 58. R3161D front panel cable and circuit board](image)

Continue by disassembling the old R3161D front panel as shown in the following section.

### 4.7.2.2 Removing the Front Panel Assembly

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Remove the R3161D side panel as shown in 4.2.2 “Removing the Side Panel” on page 83.

3. The picture below shows the location of the USB assembly screws. Use a #2 Phillips screwdriver to remove the two 6-32 screws connecting the USB cable assembly to the front panel sheet metal. Set the screws aside and carefully move the USB cable assembly away from the front panel.

![Figure 59. Removing the R3161D USB cable assembly screws](image)

4. Remove all cables connected to the motherboard. Be sure to make detailed notes about the location of all cables so you can reconnect them later.

5. Remove the motherboard fasteners (the picture below shows the location of the fasteners):
   - Use a ¼-inch hex-head nut driver to remove the standoff on the left side of the motherboard.
– Use a #1 Phillips driver to remove the 4-40 screws on the right side of the motherboard. The picture below shows the location of the standoffs and screws.

**Figure 60. The location of the standoffs and screws fastening the motherboard to the blade frame**

Gently move the motherboard aside to reveal the gray ribbon cable.

6. Use a #1 Phillips driver to remove the two M3 screws below the power and reset buttons. The picture below show the location of the screws.

**Figure 61. Location of M3 screws**
7. Grasp the gray ribbon cable and gently pull the front panel circuit board from the front panel. Carefully remove the gray ribbon cable from the circuit board—grasp the black, plastic connector when removing the cable. Do not pull the cable.

![Figure 62. Removing the front panel circuit board from the front panel](image)

8. Carefully lift the motherboard and remove the ribbon cable, located near the thermal solution (blower, or fan). Grasp the plastic connector and remove the cable.

Continue by connecting the replacement circuit board as shown in the following section.

### 4.7.2.3 Replacing the Front Panel Assembly

This section shows how to mount the front panel circuit board and connect the ribbon cable to the motherboard.

1. Orient the front panel circuit board so the power buttons are facing you. You will connect the shorter, right-most portion of the cable (shown below) to the R3161D motherboard.

![Connect shorter, right-most portion of the cable to the motherboard](image)
2. Lift the motherboard and connect the shorter end of the cable (shown above) to the multi-colored, 10-pin front panel header. The picture below shows the location of the front-panel header and the cable after installation.

![Figure 63. Location of the front panel header and motherboard with front panel cable connected](image)

3. Insert the front panel circuit board into front panel sheet metal, and align the standoffs with the holes below the PWR and RST button holes. The picture below shows how to insert the front panel circuit board into the front panel sheet metal.

![Figure 64. Removing the front panel circuit board from the front panel](image)

4. Use a #1 Phillips screwdriver to fasten the circuit board to the front panel with two M3 screws.

5. Replace all components: fasten the motherboard to the hex standoffs, being sure that the front panel ribbon cable is flat. Fasten the USB assembly to the front panel sheet metal, and attach the side cover.
Chapter 4. Hardware Upgrade and Replacement Procedures

4.8 Replacing the CMOS Memory Battery

ClearCube blades use a lithium coin cell to maintain CMOS settings. When blades remain powered on or on stand-by power, these cells rarely require replacing. If you notice that CMOS settings do not appear to remain set, you may need to replace the battery. The CMOS memory battery is located under the hard drive on single-width blades, or under the primary hard drive (located closest to the power supply) on double-width blades.

Perform the following steps to replace the CMOS battery in an R-Series blade.

4.8.1 R3082D Battery

The steps below show how to replace the CMOS battery in an R3082D blade.

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Remove the blade from the chassis, as described in 3.9 “Removing Blades” on page 60. Lay the blade on a stable surface, such as a table top.

3. The R3082D CMOS battery is beneath the video card, just below the PCI-e riser. Ensure that you remove any installed host card. The following figure shows a blade with the host card removed and cables removed.

![Battery Location](Figure 65. Location of R3082D CMOS battery)
4. There is a release tab at the top of the battery holder that releases the battery when you push the tab away from the battery. Use a non-conductive tool (such as a plastic writing pen) to push the release tab and remove the battery with your fingers.

5. Allow at least 30 seconds for the CMOS memory to be lost before inserting a new battery.

**NOTE**  Be sure that battery polarity is correct when inserting the new battery.

ClearCube Blade PCs uses a lithium coin-cell battery for backing up parameter memory. When you change a battery, remove the old battery and wait at least 30 seconds before inserting the new battery. Otherwise, memory corruption may occur, and may require sending the blade back to ClearCube for repair.

6. Replace the blade in the chassis.

7. Power on the blade and restore any custom CMOS configuration settings.

Dispose of the old battery in an approved fashion.

### 4.8.2 R3161D Battery

The steps below show how to replace the CMOS battery in an R3161D blade.

1. Take steps to prevent electrostatic discharge by performing preventative measures shown in 4.1 “About Electrostatic Discharge (ESD)” on page 81.

2. Remove the blade from the chassis, as described in 3.9 “Removing Blades” on page 60. Lay the blade on a stable surface, such as a table top.

3. Remove the R3161D side panel as shown in 4.2.2 “Removing the Side Panel” on page 83.

4. The picture below shows the location of the USB assembly screws. Use a #2 Phillips screwdriver to remove the two 6-32 screws connecting the USB cable assembly to the
front panel sheet metal. Set the screws aside and carefully move the USB cable assembly away from the front panel.

![Image](image1.png)

Figure 66. Removing the R3161D USB cable assembly screws

5. Remove all cables connected to the motherboard. Be sure to make detailed notes about the location of all cable so you can reconnect them later.

6. The R3161D CMOS battery is on the underside of the motherboard. Remove the motherboard fasteners (the picture below shows the location of the fasteners):

   – Use a ¼-inch hex head nut driver to remove the standoffs on the left side of the motherboard.

   – Use a #1 Phillips screwdriver to remove the 4-40 screws on the right side of the motherboard.

![Image](image2.png)

Figure 67. The location of the standoffs and screws fastening the motherboard to the blade frame
7. Lift the motherboard and place it on a stable surface so the thermal solution (blower) is facing up. The picture below show the CMOS battery of the left side of the motherboard.

[Image]

Figure 68. Location of the CMOS battery and connector

8. Remove the CMOS battery connector from the motherboard header, then carefully remove the battery from the motherboard (an adhesive fastens the battery to the motherboard).

9. Allow at least 30 seconds for the CMOS memory to be lost before inserting a new battery.

**NOTE** Be sure that the polarity of the battery connector is correct when inserting the new battery.

ClearCube Blade PCs uses a lithium coin-cell battery for backing up parameter memory. When you change a battery, remove the old battery and wait at least 30 seconds before inserting the new battery. Otherwise, memory corruption may occur, and may require sending the blade back to ClearCube for repair.

10. Remove the paper backing from the new battery and place it on the motherboard near the thermal solution (blower).

11. Connect the battery connector to the 2-pin header

12. Replace all cables, the motherboard, and the side cover in the reverse order that you removed them.

13. Replace the blade in the chassis.

14. Power on the blade and restore any custom CMOS configuration settings.

15. Dispose of the old battery in an approved fashion.
4.9 Replacing Blade Interposer Cards

R-Series Blade PCs have interposer cards that enable data and signal transmission from the blade to the chassis backplane. Interposers are located on the bottom of the blade, as shown in the following figure.

![Figure 69. R-Series interposer card](image)

The steps below show how to replace blade interposer cards on R-Series blades.

1. Power down the blade and remove it from the chassis as described in 3.9 “Removing Blades” on page 60. Place the blade on a stable surface, such as a table, so that the interposer is facing up.

2. Unscrew and remove both screws securing the interposer to the blade.

![Figure 70. Remove these screws](image)
3. Use your finger to gently lift the right side of the shroud and remove it by sliding it to the left and off the interposer.

![Figure 71. Removing the shroud from the interposer](image1.png)

4. Remove the interposer:
   a. Using your right hand, place your thumb on the edge of the blade frame, just to the right of the interposer.
   b. Place the pad of your index finger on the edge of the circuit board. Gently push up with your finger until the interposer is free from the blade.

![Figure 72. Removing the interposer](image2.png)

Discard this interposer. Contact recycle@clearcube.com for information about recycling ClearCube products, or contact your local electronic waste recycling authority.

5. Place the plastic shroud on the replacement interposer.
   a. Hold the green interposer so the text and labels on the top face up, and hold the shroud so that the CLEARCUBE logo is facing up.
b. Hold the shroud above the interposer and slide the gold fingers on the left edge of the interposer though the slot on the left edge of the shroud.

![Figure 73. Inserting the interposer into the shroud](image)

Figure 73. Inserting the interposer into the shroud

c. Align the holes of both pieces, and make sure that the pins on the top of the interposer rest in the recesses on the underside of the shroud.

| NOTE | Do not push or force the interposer and shroud together; the shroud only rests on top of the interposer. |

6. Position the shroud and interposer over the gold fingers on the motherboard (R3082D) or interface board (R3161D), accessible on the edge of blade. Press down gently to fully seat the interposer.

![Figure 74. Seating the interposer on the motherboard](image)

Figure 74. Seating the interposer on the motherboard

7. Replace screws and screw the shroud and interposer into the blade frame.
4.10 R4300 Chassis

The sections below show how to replace R4300 chassis components.

4.10.1 Replacing R4300 Modules

R4300 modules are hot-swappable. To replace a module, do the following:

1. Label all cables attached to the module.
2. Remove the cables.
3. Press down on the two green levers on each side of the module.
4. Pull the module from its bay. The old module must remain out of the bay for at least five seconds for the replacement module to be recognized by the system.
5. Place the replacement module squarely in the bay, slide it in, and press firmly to seat it.
6. Replace the cables.

**NOTE** Management modules have only one lever.

Do not remove or insert R4300 modules during a firmware update. When the RMM Status LEDs are flashing amber, a firmware update is in progress.

4.10.2 Replacing the R4300 Fan Pack

To replace the Fan Pack on the R4300 chassis, perform the steps below:

**Use caution when hot-swapping R4300 Fan Packs. Be sure to follow the instructions below: prepare all materials, remove screws, and complete the fan pack replacement within 30 seconds. Failure to do so can cause overheating, device damage, or failure.**

1. Be sure to have a replacement Fan Pack and a #2 Phillips screwdriver ready.
2. ClearCube recommends powering down blades and R4300 chassis.

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Packs are hot-swappable; if you do not power down blades and the chassis before replacing a Fan Pack, be sure to complete the replacement (step 4 and step 5—removal of old Fan Pack and insertion of new Fan Pack) within 30 seconds to prevent overheating or damaging components.</td>
</tr>
</tbody>
</table>

If you are powering down devices:

a. Power down the blades in the chassis.

b. Unplug the chassis power cords.

If you are hot-swapping, continue to the following step.

3. Using a #2 Phillips screwdriver, remove the 5 screws on the back of the chassis that attach the fan pack.

4. Insert a finger in the slot on the left side of the fan pack and slowly pull the fan pack out.

5. Slowly insert the new fan pack to ensure proper seating of the connector.

6. Replace the screws to secure the fan pack.

7. If you powered down devices, replace the power cords and then power on the blades.

Figure 75. R4300 Fan Pack Attachment Points

4.10.3 Replacing an R4300 Power Supply Unit (PSU)

To replace a PSU in the R4300 chassis, do the following:

Use caution when hot-swapping R4300 PSUs. Be sure to follow the instructions below: prepare all materials, remove screws, and complete the fan pack replacement within 30 seconds. Failure to do so can cause overheating, device damage, or failure.
1. Before you begin, be sure to have a replacement PSU and a #2 Phillips screwdriver ready.

2. ClearCube recommends powering down blades and R4300 chassis.

   | NOTE |
   | PSUs are hot-swappable; if you do not power down blades and the chassis before replacing a PSU and Fan Pack, be sure to complete the Fan Pack replacement. |

   If you are **powering down** devices:

   a. Power down the blades in the chassis.

   b. Unplug the chassis power cords.

   If you are **hot-swapping**, continue to the following step.

3. Using a #2 Phillips screwdriver, remove the 5 screws on the back of the chassis that attach the fan pack.

4. Insert a finger in the slot on the left side of the fan pack and slowly pull the fan pack out.

5. Pull the failed PSU (the one with the red LED displaying) straight out until it clears the chassis.

6. Insert the replacement PSU and push it firmly until the connector seats. A green LED is displayed.

7. Slowly insert the new fan pack to ensure proper seating of the connector.

8. Replace the screws to secure the fan pack.

9. If you powered down devices, replace the power cords and then power on the blades.
Chapter 5. Troubleshooting

If you have any problems with your system, please check the following items prior to calling for support.

5.1 PCoIP Issues

5.1.1 Zero Client Unable to Discover Blade PC after Shutdown

A zero client might be unable to discover a Blade PC with a Tera2 host card (V54xx-series and above) after:

- shutting down the operating system, and
- one of the following:
  - removing the blade's peer zero client from the network and then attempting to connect from a different zero client, or
  - moving the Blade PC to another network.

When shutting down a Blade PC from the operating system, the PCoIP host card enters a state (shown as Asleep in the Administrative Web Interface) that enables the host card to reconnect to the peer zero client after power on. When the Blade PC is powered on again, the host card attempts to reconnect to the peer zero client up to 20 times. If the peer zero client is unavailable (for example, is powered off or is moved to a different network), no other zero client can connect to the host during the connection attempts. Once the host card has completed 20 connection attempts, the host card resets and is available for connection from any zero client.
There are several workarounds for this issue:

- Wait approximately five minutes for the host card to reset and then connect to the host card.
- If a user must connect to the host card before the connection attempts are complete (typically around five minutes), users can perform a direct connection to the host card by disabling Discovery on the zero client and specifying the host card's IP address from the zero client Administrative Web Interface.
- Reconnect the previously-peered zero client to the same network.

5.1.2 Blade (Host Card) Will Not Wake up

This issue is restricted to blades that:

- contain a host card, and
- are on a different subnet than the zero client that is trying to wake the blade.

When a computer containing a host card is shut down (S5) or is in hibernate (S4), the host card transitions to receive a Wake-on-Lan (WOL) packet. Because the host is no longer powered (or in low power mode depending on architecture), the TCP/IP stack is no longer maintained. The host card will now only respond to a WOL packet and will not respond to an ARP WHOHAS message from the local gateway/router.

After the host card has been powered down for a short amount of time (typically 5 to 10 minutes), the entry for the host card in the gateway/router's ARP table will decay. The gateway/router will now send an ARP WHOHAS message to determine how to route the WOL packet. Because the host card cannot respond to the APR WHOHAS message, a WOL packet will be lost.

The issue is seen under the following conditions

- The host card and zero client are not on the same subnet
- The host card has been in a sleep state for greater than approximately 5 to 10 minutes (gateway/router dependent)

The following list details multiple workarounds for this issue.
- Manually power on or power cycle the host.
- If you have a ClearCube Sentral server in your environment that is on the same subnet as the host, use Sentral to wake up the host.
- Connect host card and zero clients in your environment using direct connections.
• Use a single subnet for host cards and zero clients in your environment. If you use multiple subnets, ensure that connected zero clients and hosts cards are on the same subnet.

• Use static IPs and permanent ARP table entries for each host card.

5.1.3 Teradici Host Driver Software Does Not Install

When installing any operating system image that includes the Host Driver, the Host Driver can fail to install on a blade or VM.

To resolve this issue, disable and then enable the Host Driver function from the host card Administrative Web Interface (AWI). A host system restart is required after disabling and enabling the Host Driver.

1. Ensure that Teradici Host Driver Software is installed on the remote device (blade or VM). Host Driver Software is available in ClearCube blade driver downloads.

2. Log in to the remote host card's AWI.

3. From the AWI, click Configuration > Host Driver Function to display the Host Driver Function page.

4. Clear the Enable Host Driver Function option and click Apply. A success message is displayed.

5. Click Reset to reset the host card PCoIP processor. Firefox® and Internet Explorer® browsers display a message indicating that the host system (blade or VM) will apply the changes only after the system is restarted.

6. Restart the remote host system. Wait for several moments for the host to restart.

7. After the system restarts, log in to the host card's AWI and click Configuration > Host Driver Function to display the Host Driver Function page again.

8. Select Enable Host Driver Function and click Apply. A success message is displayed.

9. Click Reset to reset the host card PCoIP processor, then restart the host system. The Host Driver is now enabled.
5.2 Power Issues

5.2.1 No Power to Blade PC
- Check the power button on the front of the Blade PC.
- Verify that the power circuit to the chassis is operational.
- Check all power strips, UPS, and extension cords to make sure they are in working order.

5.2.2 No Video or Link Lights at Desktops and No Power to Blades
R4300: Have a qualified service technician check the fuse.

5.2.3 Chassis Does Not Power on
Have a qualified service technician check the R4300 fuse.

5.3 Video Issues

5.3.1 R3161D BIOS Video and Host Card Setting
R3161D Blade PC users can view POST screen video, but are unable to view video showing BIOS setup screens. This issue can occur when a blade boots quickly and a timing issue occurs around the delivery of EDID-related information.

To resolve this issue, enable the Accelerated monitor emulation option in the PCoIP host card’s Web interface. The steps below show how to resolve this issue.
1. From a computer on the same network at the R3161D, navigate to the R3161D host card’s Web interface.

2. Log in to the host card’s Web interface. (The default Web interface password is blank.)
   
   **Result:** The browser displays the PCoIP® Host Card status page.

3. From the host card Web interface, click **Configuration > Monitor Emulation**.
   
   **Result:** The interface displays the Monitor Emulation page.

4. From the Monitor Emulation Options area, select **Enable Accelerated Monitor Emulation**. Click **Apply**.
   
   **Result:** The interface displays a success message. Click **Reset**, click **OK**, and then click **Continue**.

5. Connect a USB keyboard to the front of the blade. Power cycle the blade. From the locally-connected keyboard, press **F2** for about 15 seconds during reboot.

6. Connect to the blade from a zero client. You can now view pre-OS video and BIOS setup screens.

---

### 5.4 Fiber Optic Troubleshooting

#### 5.4.1 No Video and/or Digital Link

- Check all the client and fiber optic cables and their associated jacks for signs of damage or wear. Replace any suspicious cables with new, commercially manufactured cables and test the remaining cables with a quality tester.

- Poor-quality cables are frequently the culprits when equipment fails to work properly. For this reason, ClearCube strongly discourages the use of poor-quality cables.

#### 5.4.2 Monitor Auto-Adjust Does not Provide a Clear, Sharp Image

- Monitor auto-adjust routines do not always optimally adjust the image. Using the auto-adjust routine a second or even third time may provide a better result. Because all monitor manufactures have unique adjustment settings and auto-adjust algorithms, customers should contact the monitor manufacturer directly for assistance in achieving the optimal image quality.

- Use the monitor’s manual functions to adjust picture size, position, brightness, and contrast.
5.5 Boot Issues

Depending on network-related settings in your environment, the R3161D BIOS might display a message indicating that boot media cannot be found after you power on the blade. This issue can occur when a hard drive is installed.

To resolve this issue, display the Boot Options menu and select the hard drive. Alternatively, you can change the default boot order in the BIOS settings. Before you begin, be sure to have:

- USB keyboard and mouse
- a zero client on the same network as the blade you are configuring
- a monitor, and
- the MAC address of the blade's host card (shown on the V-series video configuration label on the side of the blade)

The sections below show how to perform each procedure.

**Selecting Hard Drive from the Boot Menu**

1. Connect a USB keyboard and USB mouse to the front of the R3161D Blade PC.

2. Press the **power button** on the front of the blade to power it on.

3. Repeatedly press the keyboard's **F10** key for about 10 seconds.

4. From a zero client, click the **Connect** button to connect to the blade.

   **Result:** The Connect screen displays discovered hosts.

5. Select the blade you are configuring (note that the PCoIP Host Card MAC address is shown on a label on the side of the blade). Click **OK**.

   **Result:** The displays are blank for a moment while the PCoIP session is established.

6. The BIOS displays the BOOT options menu. Use the mouse or keyboard connected to the front of the blade to select the hard drive.

7. Press **Enter**.

   **Result:** The blade boots to the hard drive.

You can change the default boot order in the R3161D Blade PC BIOS to boot to the hard drive by default. See the steps below to configure the blade’s boot order.
**Changing Default Boot Options**

This section shows how to change the boot options so an R3161D Blade PC boots to the hard drive before attempting to boot from the network. The steps below assume that the blade is installed in a chassis and contains a hard drive.

1. Connect a USB keyboard and USB mouse to the front of the R3161D Blade PC.
2. Press the **power button** on the front of the blade to power it on.
3. Repeatedly press the keyboard’s **F2** button for about 10 seconds.
4. From a zero client, click the **Connect** button to connect to the blade.

   **Result:** The Connect screen displays discovered hosts.

5. Select the blade you are configuring (note that the PCoIP Host Card MAC address is shown on a label on the side of the blade). Click **OK**.

   **Result:** The displays are blank for a moment while the PCoIP session is established.

6. The blade displays the Intel® VisualBIOS menu. Using the mouse or keyboard connected to the front of the blade, click the **Boot** tab to display the Boot menu.

7. Select the **Boot Priority** tab on the left side of the screen. From the **Legacy Boot Priority** area on the right side of the screen, click and drag the **SATA** item to the top of the list of boot devices.

   ![Figure 76. Changing the boot order of the SATA device](image)

8. Press **F10** to save your changes and exit.

   **Result:** BIOS displays a confirmation message.

9. Click **Yes (Y)**.

   **Result:** The blade boots to the hard drive.

After saving these changes, the blade boots to the hard drive by default.
Appendix A. Specifications

A.1 R-Series Blade PCs

Table 1. Blade PC specifications

<table>
<thead>
<tr>
<th></th>
<th>R3082D</th>
<th>R3161D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>• Intel Xeon Processor E3-1275 v2</td>
<td>• 5th generation Intel® Core™ i5-5300U vPro™ processor</td>
</tr>
<tr>
<td></td>
<td>• Intel Core i7-3770</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Intel Core i5-3550S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Intel Core i3-3220</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Intel Pentium® Processor G2120</td>
<td></td>
</tr>
<tr>
<td>Chipset</td>
<td>• Intel Q77 Express Chipset</td>
<td>• NA</td>
</tr>
<tr>
<td>Memory</td>
<td>• DDR3-1333, non-ECC SDRAM</td>
<td>• DDR3L-1333, SO-DIMM</td>
</tr>
<tr>
<td></td>
<td>• DDR3-1600, non-ECC SDRAM</td>
<td>• DDR3L-1600, SO-DIMM</td>
</tr>
<tr>
<td>Video</td>
<td>• V5420 host card</td>
<td>• Intel HD Graphics 5500</td>
</tr>
<tr>
<td></td>
<td>• V5430 host card</td>
<td>• V5422 host card</td>
</tr>
<tr>
<td>Audio</td>
<td>• AC97 compliant via USB</td>
<td>• Intel HD Audio</td>
</tr>
<tr>
<td>Networking</td>
<td>• Two Gigabit Ethernet controllers</td>
<td>• Two Gigabit Ethernet controllers</td>
</tr>
<tr>
<td>Manageability</td>
<td>• ACPI</td>
<td>• Intel vPro technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intel AMT 10.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ACPI</td>
</tr>
<tr>
<td>Hard Drive</td>
<td>• SSD MLC SATA 6.0 Gb/s</td>
<td>• HDD 320 GB SATA 3.0</td>
</tr>
<tr>
<td></td>
<td>• HDD SED SATA 3 Gb/s</td>
<td>• SSD 256 GB SATA 6.0</td>
</tr>
<tr>
<td></td>
<td>• Hybrid HDD SATA 3 Gb/s</td>
<td>• Hybrid SSHD 500 GB SATA 6.0</td>
</tr>
<tr>
<td>Operating System Support</td>
<td>• Windows 7 Professional 32-bit and 64-bit</td>
<td>• Windows 10 Pro 64-bit</td>
</tr>
<tr>
<td></td>
<td>• Without operating system</td>
<td>• Without operating system</td>
</tr>
<tr>
<td>Front Panel USB Port</td>
<td>• USB 3.0/2.0</td>
<td>• USB 3.0</td>
</tr>
<tr>
<td>BIOS</td>
<td>• AMI® BIOS</td>
<td>• Intel Visual BIOS</td>
</tr>
<tr>
<td></td>
<td>• Supports PXE</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>• 4.7&quot; H x 1.9&quot; W x 23.5&quot; (L)</td>
<td>• 4.7&quot; H x 1.9&quot; W x 23.5&quot; (L)</td>
</tr>
<tr>
<td>Environmental</td>
<td>• Stationary office, 0–35° C</td>
<td>• Stationary office, 0–35° C</td>
</tr>
</tbody>
</table>
### A.2 R4300 Chassis

Table 2. R4300 Chassis specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connections</strong></td>
<td>• 8-slot chassis&lt;br&gt;• Hot-swappable modules provide Ethernet, Admin C/Port, and USB&lt;br&gt;• Backwards compatible with Direct Connect BackPack or Blade Switching BackPack&lt;br&gt;• Fit 14 chassis (112 Blade PCs) in a single 42 U rack or cabinet&lt;br&gt;• Four variable-speed exhaust fans located in rear&lt;br&gt;• Rear power connection</td>
</tr>
<tr>
<td><strong>Dimension</strong></td>
<td>• 3U (5.25&quot;-high, standard 19-inch rack width)&lt;br&gt;• 5.25&quot; (H) x 17.0&quot; (W) x 29.8&quot; (L)</td>
</tr>
<tr>
<td><strong>Power Input</strong></td>
<td>• Dual AC input&lt;br&gt;• 100–240 VAC, 50/60 Hz, dual redundant PSUs&lt;br&gt;• Power supplied to each individual Blade PC slot&lt;br&gt;• 1440 W power required per full chassis (max.)&lt;br&gt;• 12 Amp current required per full chassis (at 120 VAC) (max.)</td>
</tr>
</tbody>
</table>
| **AC Input Fuse** | ![T15 A. 250 V (5 x 20 mm slow-acting 15 Amp fuse)](image)

R4300 CAUTION
DOUBLE POLE/NEUTRAL FUSING

| **Weight** | 42 pounds empty, 85 pounds with 8 Blade PCs |
| **Environmental** | Rack mounted, 0–35º Celsius (C) |
## A.3 F6150–160 Fiber Transceiver

### Table 3. Fiber transceiver specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector I/O</td>
<td>• 16 RJ-45 copper inputs and 16 MT-RJ dual fiber outputs</td>
</tr>
<tr>
<td>Fiber Type</td>
<td>• 62.5 micron, multi-mode, straight-through connection fiber</td>
</tr>
<tr>
<td>Max. Distance</td>
<td>• 60/62.5 micron: 2000 meters (6562 feet) for each Admin C/Port connection</td>
</tr>
<tr>
<td>Fiber Signal Loss</td>
<td>• Maximum signal attenuation through all fiber runs, patch panels and connectors must meet the following specification: 50/62.5 micron fiber: ≤4.5 dB</td>
</tr>
<tr>
<td>Max. Jumper Length</td>
<td>• R4300 to Transceiver jumper max. length = 100 meters (333 feet)</td>
</tr>
<tr>
<td>Rack Height</td>
<td>• 1U (1.75”) Rack mount kit included</td>
</tr>
<tr>
<td>Power Adapter</td>
<td>• Dual internal, fully redundant, universal—I EC standard connector</td>
</tr>
<tr>
<td></td>
<td>• Input 100–240 VAC, 50/60 Hz</td>
</tr>
<tr>
<td>Environmental</td>
<td>• Stationary installation, 0–35° C ambient temperature</td>
</tr>
</tbody>
</table>
Appendix B. Technical Support

B.1 Contact Information

If any problems arise with your ClearCube hardware or software, check the support Web site for any relevant technical bulletins and updates for your product(s) before calling your authorized reseller or ClearCube Support. If your system is serviced by a local ClearCube service partner (such as an authorized reseller), see the contact information provided by the service partner or see the ClearCube Web site for partner contact information. Use any of the methods shown below to contact ClearCube Support.

support@clearcube.com ClearCube Support email address
www.clearcube.com/support/ ClearCube Support Web site
www.clearcube.com/support/ Service request and RMA form
+1-866-652-3400 ClearCube Support from outside US
+1-512-652-3400 ClearCube Support in the US

B.2 Return Merchandise Authorization (RMA)

ClearCube’s policy for products under warranty is to ship replacement parts to the customer within 24-48 hours after the replacement has been approved by the ClearCube Support.

If you are instructed to return any hardware, you must obtain a Return Merchandise Authorization (RMA) number from ClearCube and clearly mark the RMA number on the outside of all shipments to ensure proper and prompt handling. Do not return any equipment without the appropriate ClearCube packaging materials. If you no longer have ClearCube shipping containers, contact Support for replacements.

If an issue arises that requires a warranty replacement part:

• Call Support (+1-512-652-3400 or +1-866-652-3400)
• e-mail support@clearcube.com, or

• use the RMA form on the Support Web site (www.clearcube.com/support/) to report the product issue.

Provide the following information for all product RMAs:

• Name and address

• Product serial number(s)

• Product configuration information

• A brief description of the issue.

Once submitted, Support opens a ticket and provides a case number to the customer. Support then gathers information about the issue and performs troubleshooting processes to determine if a replacement part is required.

If the product is covered under warranty, Support ships a replacement to the customer.

If the product is not under warranty, Support advises the customer about replacement options, or provides information about the manufacturer’s warranty for non-ClearCube-branded products.

Customers who choose to purchase replacement products should contact their Account Executive to confirm and coordinate the replacement purchase.

---

B.3 Fuse and Power Cord Replacement

ClearCube A–Series equipment is designed with a three-conductor IEC 60320 appliance inlet that—with the proper power cord—connects a building’s external protective earthing conductor to all accessible metal parts of the enclosure. To minimize shock hazard, make sure your electrical power outlet has an appropriate earth safety ground that is connected each time you power on equipment.

Only use the AC power cords packaged and supplied with your product or power cords and adapters obtained from ClearCube. See B.1 “Contact Information” on page 131 for information about contacting ClearCube Support for replacement power cords and adapters. See “Safety Guidelines” on page xii for more safety-related information.
Appendix C. Warranty

The ClearCube warranty is available on the Support site:

http://www.clearcube.com/support/

From the Support site, click the ClearCube Warranty Overview link to view the ClearCube warranty.

See B.1 “Contact Information” on page 131 for information about how to contact ClearCube Support.
Appendix D. Regulatory Compliance

The products described in this document meet the following:

- Electromagnetic Compatibility (EMC)
- Various safety compliance standards
- CE compliance
- Various environmental standards, including RoHS and REACH

Appendix E. WEEE Information

E.1 WEEE Information

The products described in this document are subject to regulation under the European Union Directive 2002/96/EC, that mandates separate waste collection, treatment, and recycling of electronic products. This directive is commonly known as WEEE, for Waste from Electrical and Electronic Equipment, and its intent is to promote the safe and sensible disposal of products that have outlived their usefulness.

The “crossed-out” trash bin symbol, shown to the left, identifies products that should be recycled, not simply discarded. ClearCube Technology supports the reuse, recycling, recovery, and responsible disposal of all products, not just our systems.

ClearCube Technology is committed to meeting the requirements of the European Union WEEE Directive and is currently developing country-specific implementation plans that comply with the WEEE legislation. The goal of the directive is to reduce the environmental impact due to the disposal of electrical and electronic equipment that has reached the end of its useful service life. This directive goes into enforcement on August 13, 2005.

ClearCube products are sold exclusively to commercial and industrial customers and not to private households. Under the WEEE legislation terms, commercial and industrial customers have the responsibility to ensure that all electrical and electronic equipment is disposed of properly and in accordance with all applicable laws and local regulations. For more information, visit the ClearCube Technology web site at www.clearcube.com, email at recycle@clearcube.com, or call at (866) 652-3400 or at +1 (512) 652-3400.

Materials used in this product, if not disposed of properly, could have adverse effects on the environment and human health. Do not dispose of these products in unsorted municipal waste containers. Deliver electronic waste only to an approved recycling, and/or treatment facility. If one is not available, contact ClearCube for assistance.

E.2 Informations sur la DEEE

Les produits décrits dans ce document sont soumis à la directive 2002/96/EC de l’Union Européenne qui requiert la collecte, le traitement et le recyclage séparés des déchets issus d’équipements électroniques. Cette directive est connue sous le nom de DEEE
(Déchets d'Équipements Électriques et Électroniques), ou WEEE en anglais (Waste from Electrical and Electronic Equipment) et son but est de promouvoir le traitement sûr et approprié des produits en fin de vie.

Le symbole de la poubelle barrée, illustré ci-contre, identifie les équipements qui devraient être recyclés et non pas simplement jetés. ClearCube Technology approuve la réutilisation, le recyclage et la collecte de déchets de tous les équipements, y compris les siens.

ClearCube Technology s'engage à être conforme aux exigences de la directive européenne DEEE et prépare actuellement des plans de mise en œuvre de cette législation DEEE dans chaque pays. Le but de la directive est de réduire l'impact sur l'environnement des déchets des équipements électriques et électroniques en fin de vie. Cette directive entre en vigueur le 13 août 2005.

Les produits ClearCube sont vendus exclusivement à des professionnels du commerce et de l'industrie et non à des particuliers. Selon les termes de la loi DEEE les clients commerciaux et industriels sont responsables de l'enlèvement approprié des équipements électriques et électroniques, en conformité avec les lois actuelles et les réglementations locales. Pour de plus amples renseignements, veuillez consulter le site internet de ClearCube Technology à www.clearcube.com, envoyer un courriel à recycle@clearcube.com, ou appeler au (866) 652-3400 pour les clients en Amérique du Nord ou au +1 (512) 652-3400 pour les autres pays.

Les matériaux utilisés pour la fabrication de ce produit peuvent avoir des conséquences graves sur l'environnement et la santé s'ils ne sont pas collectés correctement lors de leur mise au rebut. Ne pas jeter ces produits dans les poubelles municipales s'ils ne sont pas triés. Les déchets électroniques doivent être apportés aux services de recyclage et de traitement agréés. Si de tels services ne sont pas disponibles, contacter ClearCube pour assistance.

**E.3 Informationen über WEEE**


ClearCube-Produkte werden ausschließlich an kommerzielle und industrielle Kunden, jedoch nicht an Privathaushalte verkauft. Unter den Bedingungen der
Los productos descritos en este documento son conforme a las regulaciones con sujeción debajo de a Parlamento Europeo y Consejo, la Directiva 2002/96/EC, esos mandatos separan la colección del desecho, el tratamiento de lo mismo, y el reciclaje de productos electrónicos. Esta directiva se conoce comúnmente como REEE, para los residuos del equipo eléctrico y electrónico, y su intención deberá promover la disposición sensata y segura de los productos que han sobrevivido su utilidad.

El símbolo "contenedor te basura tachado" del compartimiento de la basura, mostrado a la izquierda, identifica los productos que deben ser reciclados, desechados no simplemente. La Tecnología ClearCube apoya el volver a emplear, reciclar, la recuperación, y la disposición responsable de todos los productos semejantes, no solamente nuestros sistemas.

La Tecnología ClearCube esta cometida a cumplir con los requisitos de la directiva de la Unión Europea WEEE, y al corriente fomenta la implementación de planes país-específico que conforman con la legislación de REEE. La meta de la directiva es reducir el impacto ecologista debido a la disposición del equipo eléctrico y electrónico que ha alcanzado el fin de su vida útil. Esta directiva se aplica de hecho en el 13 de agosto de 2005.

Los productos de ClearCube se venden exclusivamente a los clientes de comercio y industria y no a hogares privados. Bajo los términos de la legislación de WEEE, los clientes comerciales y industriales tienen la responsabilidad de asegurar que todo equipo eléctrico y electrónico se descarten apropiadamente y de acuerdo con todas leyes aplicables y las regulaciones locales. Para más información, visite nuestra página Web (en Internet) de Tecnología ClearCube en www.clearcube.com, o enviar correo electrónico (email) a la tecnología de ClearCube en www.clearcube.com, el email en recycle@clearcube.com, también puede llamar a (866) 652-3400 o +1 (512) 652-3400.

Los materiales usados en este producto, si no se descartan apropiadamente, podría tener efectos adversos en el ambiente y la salud humana. No descarte estos productos en
contenedores municipales de desecho que no son surtidos. Entregue el desecho electrónico sólo a una facilidad aprobada de reciclaje, y/o de tratamiento. Si no hay uno disponible, contacte a ClearCube para asistencia.
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