Stratus ftServer 5200 and 6500 Series: Site Planning Guide

Stratus Technologies
R457-07

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Preface

Purpose of This Manual

The *Stratus ftServer 5200 and 6500 Series: Site Planning Guide* (R457) documents the site requirements and customer responsibilities related to preparing a site for installation of ftServer 5240 and 6500 systems.

Audience

This manual is intended for those responsible for preparing a site for the installation of ftServer 5240 and 6500 systems.

Revision Information

This manual is a revision. This revision incorporates site planning information for the V128 1U flat-panel LCD monitor with integrated keyboard and trackpad.

Notation Conventions

This document uses the notation conventions described in this section.

Warnings, Cautions, and Notes

Warnings, cautions, and notes provide special information and have the following meanings:

WARNING

A warning indicates a situation where failure to take or avoid a specified action could cause bodily harm or loss of life.

CAUTION

A caution indicates a situation where failure to take or avoid a specified action could damage a hardware device, program, system, or data.

NOTE

A note provides important information about the operation of an ftServer system.

Typographical Conventions

The following typographical conventions are used in ftServer documents:

- The bold font emphasizes words in text or indicates text that you type, the name of a screen object, or the name of a programming element. For example:

  Before handling or replacing the clock card, make sure that you are properly grounded by using a grounded wrist strap.

  In the **System Properties** dialog box, click the **Hardware** tab.

  Call the **RegisterDeviceNotification** function.

- The italic font introduces new terms and indicates programming and command-line arguments that the user defines. For example:

  Many hardware components are *customer-replaceable units* (CRUs), which can be replaced on-site by system administrators with minimal training or tools.

  copy *filename1 filename2*

  Pass a pointer for the *NotificationFilter* parameter

- The monospace font indicates sample program code and output, including message text. For example:

```
#include <iostream.h>

The operation completed successfully.
```

Getting Help

If you have a technical question about ftServer system hardware or software, try these online resources first:

- **Online support from Stratus Customer Service.** You can find the latest technical information about an ftServer system through online product support at the Stratus Technical Support Web site:

  http://www.stratus.com/support/technics.htm

- **Online product support for Microsoft® products**. Your primary source for support is the computer manufacturer who provided your software, or an authorized Microsoft Support Provider. You can also find the latest technical

information about Microsoft Windows® and other Microsoft products through online product support at the Microsoft Help and Support Web site:

http://support.microsoft.com/

If you are unable to resolve your questions with the help available at these online sites, and the ftServer system is covered by a service agreement, please contact the Stratus Customer Assistance Center (CAC) or your authorized Stratus service representative. For information about how to contact the CAC, see:

http://www.stratus.com/support/cac/

Your system administrator may have configured a Stratus Support phone number in ftServer Management Console (ftSMC), a snap-in to Microsoft Management Console (MMC). In ftSMC, under **ftServer Configuration**, click **ActiveService Network** to display the node's properties. The properties include a **Stratus Support Phone** item. The value of this property, if configured, is a telephone number you can call for support. For more information about ftSMC, see the *Stratus ftServer 6500, 5240, 3000-Series: System Administrator's Guide* (R001W).

Chapter 1
Site Planning Overview

Careful selection, planning, and preparation of the installation site for your ftServer system are important activities that can contribute directly to the proper operation and reliability of your system. Site planning ensures that you provide:

- A location suitable for the reliable operation of computer equipment
- Adequate space for the system, its servicing, and its associated components, cables, and furniture
- An environment that maintains proper air cleanliness, and required temperature and humidity ranges
- Electrical power sources that meet the system's requirements
- Provisions for network connectivity (as required) and communications over an analog telephone line

Before installing your system, make sure that:

- You are familiar with the information in Chapter 2.
- Your installation site meets the requirements described in this site planning guide.

  Use the checklist in "Site Planning Checklist" on page 1-3 to track your site preparation progress. The checklist provides a step-by-step breakdown of the specific activities involved in site planning.

For a list of additional documentation, see "System Documentation" on page 1-6.

During the site planning and preparation processes, work closely with your facilities group or contractor to determine space, power, and environmental requirements and to provide a suitable location with sufficient electrical power, HVAC capabilities, and network and telephone connections.

After moving the system to the installation site, inform the Stratus Customer Assistance Center (CAC) or your authorized Stratus service representative that the system is ready to be installed. For more information about the CAC, see "Getting Help" in the Preface.

If your system is covered by a service agreement and you need help with site planning, call the CAC or your authorized Stratus service representative.

Site Planning for Fault-Tolerant Systems

In addition to usual site planning task, such as planning sufficient AC power and providing network connections, take into consideration the following specific fault-tolerant features of ftServer systems:

- Lockstep technology in ftServer systems means that the system contains redundant hardware.

  In the event of a component malfunction, the partner component is an active spare that continues normal operation. The failed component can then be removed and replaced without loss of data or service.

  In addition to planning for the duplicated power supplies, fans, and disk drives, often supplied by other servers, you need to plan for replicated core system components including motherboards, processors, memory, I/O buses, and I/O adapters.

  Consequently, site planning includes planning for pairs of:

  – CPU enclosures, PCI console assemblies, and storage enclosures
  – Ethernet network ports
  – PCI adapters
  – Power inlets

- ftServer systems can connect to the Stratus ActiveService Network (ASN).

  Connecting a system to the ASN allows the CAC or your authorized Stratus service representative to remotely diagnose, troubleshoot, and resolve problems online.

  To enable connectivity to the ASN, the ftServer system contains a pair of ftServer Access Adapters.

  These adapters connect to the ASN over an internal modem and provide ASN connectivity even when the operating system is not operational. The adapter also allows internal administrators to remotely service the system over an IP network, regardless of the state of the operating system.

  Consequently, site planning includes planning for network and modem connections for the ftServer Access Adapters.

For more information, see

- Chapter 2, “System Overview for Site Planning” for an overview of the system components and options
- Chapter 3, “Site Requirements” for the specifications of the system components and options

Site Planning Checklist

With the assistance of the information in this document, answer the following questions:

Planning for Optional Components

❏ Does your system include any of the following optional PCI adapters? If so, indicate how many of each.

Adapter	Number of Adapters
U486 Eight-Port Asynchronous PCI Adapter	
U515 One-Port 10/100-Mbps Ethernet PCI Adapter	
U570 One-Port 1000Base-SX Ethernet PCI Adapter	
U571 One-Port 10/100/1000 Base-T Ethernet PCI Adapter	

❏ How many Ultra160 SCSI storage enclosures and U521 Two-Port Ultra160 SCSI PCI Adapters does your system have?

❏ Will you supply your own monitor, keyboard, and mouse, or will you use a monitor and USB keyboard and mouse supplied by Stratus?

Planning AC Power and Cooling

❏ Is the AC power service wired properly? See Appendix A, “Electrical Circuit and Wiring Information” for additional information.

❏ What are the AC power requirements of your system, including all external components? See Table 3-3 to calculate the power requirements for the various system configurations. For user-supplied components, see the manufacturer’s documentation.

❏ Will you provide power to the system through an uninterruptible power supply (UPS)?

❏ What are the length and types of all power cords ordered with your system? See “Power Cord Lengths and Plug Types” on page 3-9 for details. For components you supply, see the manufacturer’s documentation.

- ❏ What are the length and types of all interface and communication cables needed for your system? See "Network and Telephone Line Requirements" on page 3-13 for details. For components you supply, see the manufacturer's documentation.
- ❏ What are the HVAC requirements of your system, including all its external components? See Table 3-1 to calculate the HVAC requirements for the various system configurations. For user-supplied components, see the manufacturer's documentation.

Planning for ActiveService Network Connectivity

- ❏ Do you have a phone line available to connect the ftServer Access Adapters to?
- ❏ Do you have an additional telephone line and telephone near the operator's station for voice communications when calling for support?
- ❏ Will you connect the ftServer Access Adapters to a network so that you can manage the systems from a remote system? Are there maintenance network connections to which you can connect the adapters?

Planning Space for Unpacking and Setting Up Your System

- ❏ Is the system being delivered in a Stratus cabinet, or is it being shipped as a series of components to be mounted in your own rack?
- ❏ What is the size of the rack? See Chapter 2 for the dimensions of Stratus cabinets. If you are supplying your own rack, see "Using Your Own Rack" on page 2-4 for specifications for user-supplied racks.
- ❏ How many of each type of component will be housed in the system cabinet or rack? What components will be located outside the cabinet or rack? See Chapter 2 for descriptions of all components, including external components.
- ❏ What are the sizes of the components? See "Space and HVAC Requirements" on page 3-1 for dimension specifications.
- ❏ Have you created a layout sketch of how the system will be arranged at the installation site? Consider the available cable lengths, the placement of external devices, and the location of network, modem, and voice communication connections. On the sketch, show the location of the system and its external components; its power cords, telephone and interface cables; and the locations of AC power receptacles, phone jacks, Ethernet jacks, switches, and/or hubs. You can use the system component templates and floor grids in "Creating a Floor Plan" on page 3-18 to help you make this site layout sketch.

WARNING

Make sure that all cords and cables are long enough to reach between their respective components and connectors. Also make sure that all cables are routed so they are out of the way of foot traffic.

- ❏ Have you provided your facilities group and/or contractors with copies of the following:
  - A site layout sketch
  - Table 3-1, Worksheet for Calculating HVAC Requirements
  - Table 3-3, Worksheet for Calculating Power Requirements
  - Appendix A, “Electrical Circuit and Wiring Information”
  - Any notes you have taken about site planning
- ❏ Have you made sure that the delivery site provides enough space to unload the system? For the specifications of the shipping container and system, see “Space and HVAC Requirements” on page 3-1.
- ❏ Have you verified that the path from the delivery site to the installation area is clear of obstacles, and that the floor is stable and can support the weight of the system?
- ❏ Have you verified that the dimensions of the doorways between the delivery site and the installation site allows you to use a pallet jack to move the unpacked system to the installation site?
- ❏ Do you know where your system will be unpacked? Make sure that there is enough space to deploy the ramp. The ramp is 4 ft (1.3m) long by 2.7 ft (0.8m) wide.

For more details about moving and unpacking the system, see the *Read Me First: Moving ftServer 5240 and 6500 Systems to the Installation Site* (R525).

If you have any questions about the number and types of components, contact your Stratus account executive or distributor.

System Documentation

Table 1-1 lists the ftServer 5200- and 6500-series documents and the tasks described in each document.

Table 1-1. ftServer 5240 and 6500 Documents

Document	Tasks
Release Notes: Stratus ftServer System Software (R004W)	Learn the contents of the latest ftServer System Software release Learn the latest information about the product Learn about significant known problems and how to work around or avoid the problems
Stratus ftServer 5200 and 6500 Series: Site Planning Guide (R457)	Prepare a site for installation of a system
Read Me First: Moving ftServer 5240 and 6500 Systems to the Installation Site (R525)	How to receive, unpack, and move an ftServer 5240 or 6500 system
Stratus ftServer Software Installation and Configuration Guide (R002W)	Install ftServer System Software and Windows server software on your new ftServer system Upgrade software and BIOS, BMC, and ftServer Access Adapter firmware Configure ftServer System Software Respond to Mini-Setup questions Reinstall ftServer System Software and Windows server software
Stratus ftServer: ActiveService Network Configuration Guide (R013W)	Configure the ftServer system for support by the ASN Configure the ftServer Access Adapters
Stratus ftServer 6500, 5240, 3000-Series: System Administrator's Guide (R001W)	Use tools provided by Windows, Stratus, and other vendors to manage the system Use ftServer Management Console (ftSMC) to administer or troubleshoot an ftServer system
Stratus ftServer Software Availability Manager User's Guide (R007W)	Monitor the performance of critical ftServer system components and the status of user applications

Table 1-1. ftServer 5240 and 6500 Documents *(Continued)*

Document	Tasks
Stratus ftServer 5200 and 6500 Series: Operation and Maintenance Guide (R459)	Start up, shut down, and operate a system Troubleshoot system hardware Remove and replace customer-replaceable units (CRUs)
Stratus ftServer 5240 and 6500: CRU Reference Guide (R460)	Find the part number or marketing ID of a customer-replaceable unit (CRU)
Stratus ftServer: PCI Adapter Guide (R461)	Install, configure, replace, or troubleshoot PCI adapters
Stratus ftServer 5200 and 6500 Series: Storage Components User's Guide (R462)	Install and operate high-capacity floppy drives, CD-ROM drives, disk drives, and tape drives Replace CRUs in these storage devices
Stratus ftStorage Fibre Channel Array Installation Guide (R503)	Install and configure the ftStorage Fibre Channel Array hardware and software

ftServer Online Documentation

The **ftServer Help and Manuals** folder on the ftServer desktop contains links to the Stratus ftServer manuals in Portable Document Format (PDF) and the same documents in HTML Help format.

The **Manuals** folder provides the documentation in PDF; the **Hardware Help** folder is a single HTML Help system that contains the information in the hardware-related manuals; and **Software Help** is another HTML Help system that contains the information in the software-related manuals.

To gain access to the documents on the World Wide Web, point your browser to the ftServer StrataDOC Web site:

Ordering Manuals

To order manuals, customers in North America can call the CAC at (800) 221-6588 or (800) 828-8513, 24 hours a day, 7 days a week. Customers outside North America can contact the nearest Stratus Sales office, CAC office, or distributor. Manual orders will be forwarded to Order Administration.

Commenting on the Documentation

Stratus welcomes any corrections and suggestions for improving its documentation. Send your feedback by email to Comments@stratus.com. If it is possible, please include specific information about the documentation on which you are commenting:

- For a manual, include the book title and page numbers.
- For online Help, include the Help subject and topic title.

This information will assist Stratus Publications in making any needed changes to the ftServer documentation. Your assistance is most appreciated.

Chapter 2
System Overview for Site Planning

To plan for your ftServer system, determine whether the system is shipped in a cabinet supplied by Stratus or you are supplying a rack.

If you order a Stratus cabinet, the system components are mounted and shipped in the cabinet. “Some Typical ftServer System Configurations” on page 2-13 shows some ways in which the components are mounted in 24U and 38U cabinets supplied by Stratus.

If you do not purchase the Stratus cabinet, the rack-mountable components, shelves, cables, and other hardware are shipped in separate packages. You can install the components in a rack you obtain from an independent supplier, provided the rack meets the requirements described in “Using Your Own Rack” on page 2-4.

Determine which components the system contains, and how many of each. The following components can be mounted in the cabinet or rack and obtain power from the power distribution strip in the cabinet or rack:

- CPU enclosures (two or three per system)
- PCI console assembly

  ftServer 5240 systems contain two core I/O enclosures, and optionally two expansion enclosures. ftServer 6500 systems contain two core and two expansion I/O enclosures.

- Ultra160 storage enclosure (one or two in each ftServer 5240 or 6500 system)
- 1U monitor unit

You place the following components on a nearby table or desktop and connect them to power sources independent from the cabinet or rack:

- Table-top monitor, or your own monitor, keyboard, and mouse

  You can place the monitor, and a mouse and keyboard on top of a 24U cabinet.

- Tape drives
- An uninterruptible power source (UPS)

Stratus-Supplied Cabinet

Stratus supplies 38U cabinets that are 74 in. (1.88m) high and 24U cabinets that are 50 in. (1.27m) high.

NOTES

1. 1U is equal to 1.75 in. (4.445 cm).
2. For vertical reference, every three screw holes on the EIA universal square-hole pattern vertical rail are equal to 1U.

The cabinets for ftServer 5240 and 6500 systems have the following features:

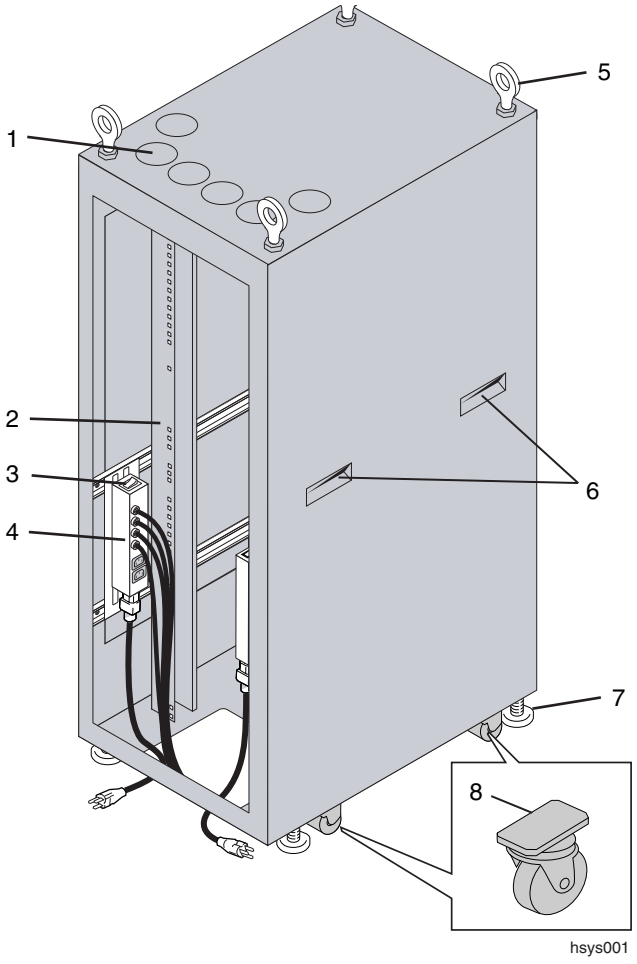
- Vertical mounting rails that are 19-in. Electronic Industries Association (EIA) racks
- Front-to-back rail spacing of 24.5 in. (62.23 cm)
- Rails with the EIA universal square-hole pattern
- Ability to remove major components from either the front or rear
- Openings on the tops and bottoms of the cabinets through which you can route power and interface cables into the cabinet
- Power distribution to the major components through A-side and B-side power strips inside the cabinet
- Airflow from front to back

  Each major component has its own power supplies and fans. The components draw air through the front of the cabinet and expel air through the rear door.

- A rear door and, optionally, a front door
- Decorative bezels covering the fronts of the CPU enclosures and the PCI console assembly
- Filler panels to cover every empty space in the cabinet, including empty component locations, unused PCI slots, unused disk drive slots, and uninstalled expansion I/O enclosure locations
- Four casters (two fixed casters in the rear and two swivel casters in the front), and four adjustable leveling feet
- Removable side panels
- Optional anti-tip brackets
- Optional emplacement brackets
- Optional lifting kits that provide four lifting positions on the top of the system that can support the weight of the fully configured system.

Figure 2-1 shows the major parts of the cabinets supplied by Stratus for ftServer 5240 and 6500 systems.

Figure 2-1. Stratus ftServer 5240 and 6500 38U Cabinet (Rear View)



1	Cable slots	5	Optional lifting brackets
2	Mounting rail	6	Removable side panels
3	Circuit breaker	7	Leveling feet
4	Power strip	8	Casters

Using Your Own Rack

Instead of using one of the Stratus-supplied cabinets, you can provide your own EIA-310-D 19-inch rack, which you obtain from an independent supplier, provided it meets the requirements described in “Rack Requirements for ftServer 5240 and 6500 Systems” on page 2-5

NOTE

Stratus personnel or your authorized Stratus service representative will install the system in the rack.

The rack-mounting components shipped with your ftServer system are shipped as follows:

- For each enclosure, the adjustable mounting-rail components are included in the box containing the enclosure.
- Power strips, and the components necessary to mount the power strips in the rack, are shipped as a kit. Country-specific power cables are also included.

WARNING

Use only the power cords you receive from Stratus.

DO NOT MODIFY THE POWER CORDS you receive from Stratus.

Failure to comply with this warning will void agency certification.

Failure to comply with this warning can cause a fire hazard.

- Filler panels, bezels, and cabinet accessories are included.
- If a 1U LCD monitor unit has been ordered from Stratus, the appropriate rail-mounting components are shipped with the monitor unit.

Rack Requirements for ftServer 5240 and 6500 Systems

The rack must comply with 19 in. EIA-310D standards. If you are using a 24U rack, make sure that the full 24U is free for ftServer components; if you are using a 38U rack, make sure that the full 38U is free for ftServer components.

Make sure that the rack provides adequate ventilation by conforming to the following requirements:

- Air flows through the rack from front to back.
- Air does not recirculate within the cabinet.
- Vents are evenly distributed on front and rear doors and comprise at least 68% of the surface area.

NOTE

If your rack does not have vented front and rear doors, Stratus recommends that you remove the doors from the rack while the ftServer system is operating.

Make sure that the rack meet the following specifications:

- The overall width, including side panels, is at least 23.62 in. (600 mm).

  A width of 27.56 in. (70.00 cm) is recommended for ease in cabling PCI adapters.

- The overall height is at least 24U (42 in., 1.7m).
- The overall depth is at least 40.00 in. (1.016m).
- The front vertical EIA rails are positioned at least 2.5 in. (6.40 cm) from the inside surface of the front door to allow room for the bezels, and are spaced between 24.5 in. and 30 in. (62.23 cm and 76 cm) apart.
- Each of the rear vertical rails have enough room so that you can mount one power strip bracket. A rear door, if present, must be at least 7.00 in. (17.78 cm) from the rear vertical EIA rail and have no locks.

  The clearance allows room for the power-strip mounting bracket and gives the PCI-to-CPU cables the minimum allowable bend radius. Do not mount any equipment in this space between the rear rails and the rear door.

  Without locks on the rear door, you can quickly access the breakers at the power strip.

- Nothing intrudes on the 19-in. EIA-310D standards that would interfere with removing equipment from the front or rear of the cabinet.
- The rack has openings of at least 65 square in. (419.4 square cm) at the top and bottom rear of the cabinets to accommodate cables.

Smaller openings might not accommodate the cables on a fully-loaded rack or cabinet with a system that contains a number of PCI adapters, particularly if the system contains U486 Eight-Port Asynchronous PCI Adapters and a full set of cables.

- Front and rear vertical EIA rails have the EIA universal square-hole pattern (**not** the EIA wide square-hole or round-hole pattern).
- Vertical cabinet mounting rails accept and use 10-32 cage nuts and mounting hardware.
- Vertical cabinet mounting rails are plated or painted with conductive paint to ensure continuity for grounding between installed equipment.
- Cable management brackets are provided to constrain data and power cords so that the cables do not interfere with the air flow out the rear of the enclosures.
- The rack provides enough stability so that the system components pass Telcordia GR-63-CORE Section 5.4.2 regulations for operational vibration.
- To prevent current leakage, all components are grounded together through the vertical mounting rails, to the cabinet frame, and then to ground.

  Make sure that power strips are also grounded through the cabinet to ground.

- 24U racks can support at least 500.00 lb (226.80 kg) to support only allowed configurations and components for a 24U cabinet.

  This payload capacity does not support any upgrades or additions. To ensure the ability to add components, make sure that the rack can support 1,100.00 lb (499.00 kg).

- 38U racks have a minimum payload capacity of 900 lb. (408.2 kg) to support only allowed configurations and components for a 38U cabinet.

  This payload capacity does not support any upgrades or additions. To ensure the ability to add components, make sure that the rack can support 1,500.00 lb (680.4 kg).

Monitor Options

You may use your own monitor, keyboard, and mouse or purchase one of the following:

- A table-top color monitor, which you must place outside of the rack or cabinet

  A keyboard and mouse option is also available for use with the table-top monitor.

- A 1U flat-panel LCD monitor with integrated keyboard and trackpad, which can be rack-mounted

The monitor connects to the VGA port, and the keyboard connects to a USB port. The VGA and USB ports are in the front panel at the front of the system. The mouse that is supplied when you order a table-top monitor connects to the keyboard with a PS/2 cable that is attached to the mouse.

For more information, see:

- Figure 2-2, for an illustration of the ports and their location on the system
- “Space and HVAC Requirements” on page 3-1, for space planning information
- “Interface Cabling Requirements” on page 3-15, for cable specifications

Rack-Mountable 1U Monitor Unit

A typical ftServer system contains a rack-mountable 1U flat-panel LCD monitor with integrated keyboard and trackpad. If you are placing the components in your own rack, make sure that sufficient room exists in the rack for this monitor option.

For more information, see:

- “Space and HVAC Requirements” on page 3-1, for space planning information
- “Interface Cabling Requirements” on page 3-15, for cable specifications

Table-Top Color Monitor

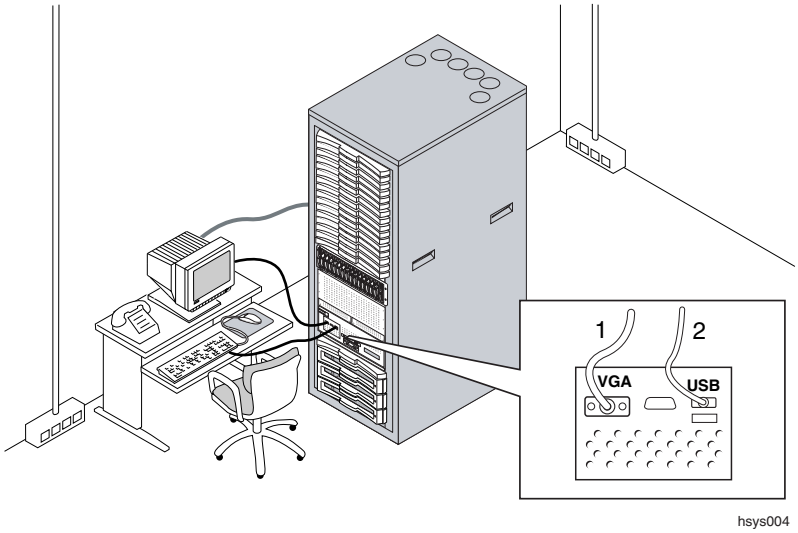
You can place the table-top monitor on top of a 24U system cabinet or on a table or desktop near the cabinet.

If you plan to place the monitor on a table, provide a table that can support the monitor, and make sure that the table is placed close enough to the cabinet or rack to allow the monitor and keyboard cables to connect to the VGA port on the front panel.

A keyboard and mouse option is also available for use with the table-top monitor.

Figure 2-2 shows a 17-inch color monitor desktop installation and the VGA and USB ports for connecting the monitor and keyboard.

Figure 2-2. 17-Inch Color Monitor on Desktop



1 VGA port

2 USB port

Using Your Own Monitor, Keyboard, and Mouse

You can provide your own monitor provided it meets the following requirements:

- The monitor VGA cable is at least 59 in. (1.5m) long and has a 15-pin D-sub connector.
- The monitor accepts universal 100–240 VAC, 50–60 Hz power.
- The monitor power cord is long enough and the plug type is compatible with the external power source at the site.

You can provide your own keyboard and mouse provided it meets the following requirements:

- The keyboard is USB compatible.
- The keyboard has a port for the mouse, or if the mouse has a USB interface, you can connect the mouse to the second USB port.

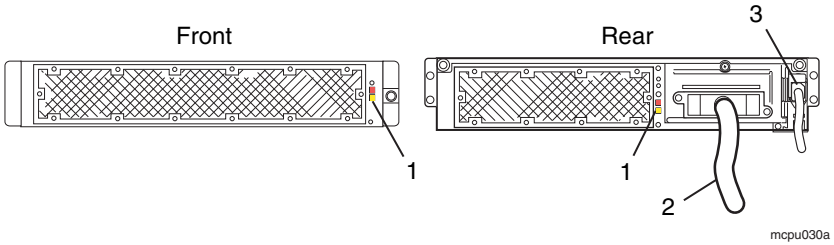
CPU Enclosure

CPU enclosures for ftServer 5240 and 6500 systems contain a motherboard, Intel processors, memory, and the subassemblies shown in Figure 2-3. Table 2-1 summarizes the differences between the CPU enclosures for the two systems.

Table 2-1. ftServer 5240 and 6500 Systems CPU Enclosures

Feature	ftServer 6500	ftServer 5240
Number of Intel Processors	One, two, or four	One or two
Height	2U	2U

Figure 2-3. ftServer 5240 and 6500 CPU Enclosure



1 CPU enclosure LEDs

2 CPU-to-PCI console cable

3 CPU power supply

PCI Console Assembly

The PCI console assembly is the main component of the I/O subsystem. Each PCI console assembly contains the I/O enclosures listed in Table 2-2 and the major subassemblies shown in Figure 2-4.

Table 2-2. ftServer 5240 and 6500 Systems I/O Enclosures

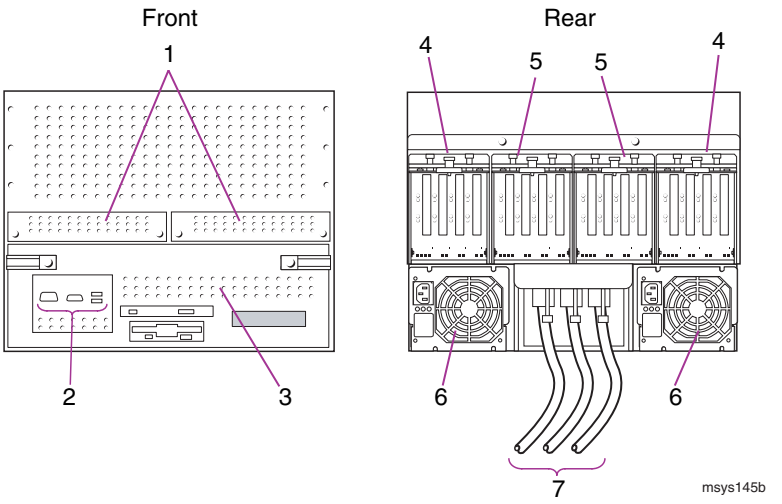
I/O Enclosure	ftServer 6500	ftServer 5240
Core I/O enclosures	2	2
Expansion I/O enclosures	2	Optionally, 2

The front panel of the PCI console assembly contains two USB ports (for connecting keyboard and mouse), one serial port (for debugging), and one VGA port (for

connecting the monitor). For systems requiring more than two USB ports, Stratus references the model U-H1 Wingman USB hub from Logitech, which expands a single USB port to four USB ports.

Each I/O enclosure holds up to four PCI adapters; each core I/O enclosure contains one ftServer Access Adapter and a disk controller. The PCI adapters require interface cables that connect to external devices, phone jacks, or Ethernet connections. For cable specifications, see “Interface Cabling Requirements” on page 3-15.

Figure 2-4. PCI Console Assembly



1	Two clock cards
2	Interface ports
3	Front panel
4	Two expansion I/O enclosures
5	Two core I/O enclosures
6	Two PCI console power supplies with fans
7	Two or three CPU-to-PCI console cables

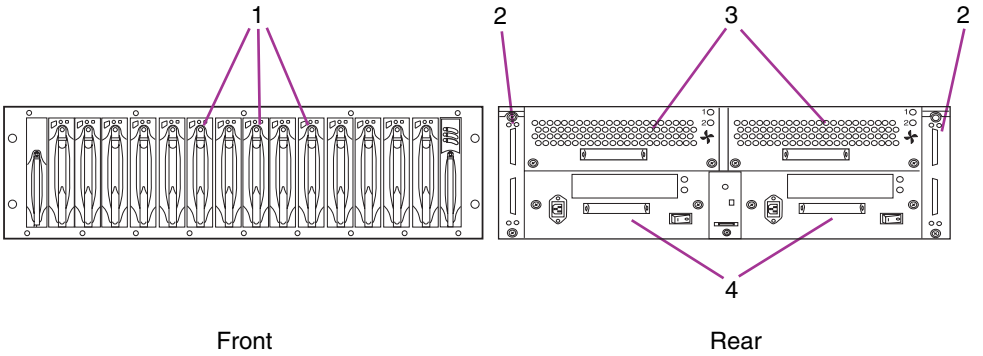
Ultra160 SCSI Storage Enclosure

ftServer 5240 and 6500 systems can contain up to two Ultra160 SCSI enclosures. The Ultra160 SCSI storage enclosure provides up to 14 disks in each enclosure. A single Ultra160 SCSI enclosure can be configured in split-bus mode and provides up to 14 disk drives. Two Ultra160 SCSI enclosures can be configured in joined-bus mode,

providing one logical enclosure with up to 13 logical drives, or as two logical enclosures in split-bus mode, providing up to 14 logical drives.

Figure 2-5 shows an Ultra160 SCSI enclosure in split-bus mode and indicates the subassemblies.

Figure 2-5. Ultra160 SCSI Storage Enclosure



1 Up to 14 physical disks (seven logical drives)

2 Two cluster services module (CSM)

3 Two advanced cooling modules (ACM)

4 Two power supplies

Tape Drives

An ftServer system can contain a maximum of four tape drives, with a maximum of two drives daisy-chained and connected to a U516 PCI adapter. The following lists the tape drive options, which are all desktop units:

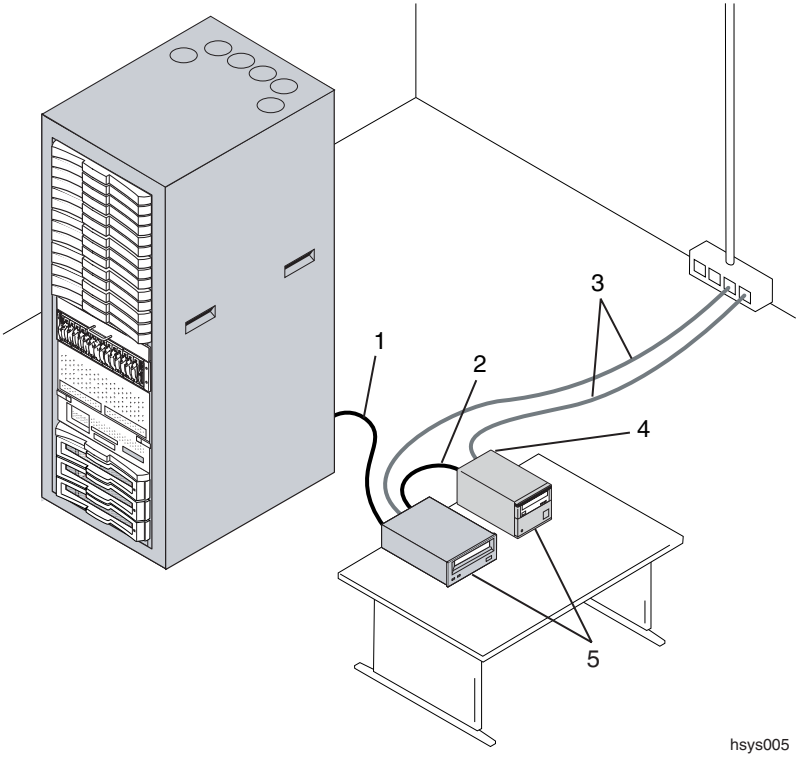
- T511 DDS-4 DAT Tape Drive
- T512 DDS-4 DAT Tape Drive with Autoloader
- T513 DLT 8000 Tape Drive

Each tape drive unit requires its own power source. A SCSI cable connects the first tape drive to the U516 One-Port Ultra2 SCSI PCI Adapter. A shorter SCSI cable connects a first tape drive to a second tape drive.

The T511 tape drive and the T512 autoloader are functionally equivalent except that the autoloader can contain up to six tapes.

Figure 2-6 shows two, daisy-chained, tape drives connected to the system by a single SCSI cable.

Figure 2-6. Tape Drives



1 SCSI cable, 10- or 30-ft (3.1 or 9.2m) long

2 Daisy chain cable, 3-ft (1m) long

3 Power cords, 6-ft (2m) long

4 SCSI terminator

5 Tape drives

Uninterruptible Power Supply (UPS)

Stratus has qualified the American Power Conversion (APC) Matrix-UPS® for use with ftServer 5240 and 6500 systems. Choose the specific model number, Model MX5000, MX5000W, or MX5000J, to match the electrical service in the country where the system is to be installed. For more information about the UPS, see Chapter 4.

Some Typical ftServer System Configurations

Figure 2-7 and Figure 2-8 show some sample ftServer 5240 and 6500 system configurations for Stratus 24U and 38U cabinets. Other configurations are possible, but a maximum of two CPU enclosures are allowed in ftServer 5240 systems.

NOTE

A 1U filler panel between the CPU enclosures and the PCI console assembly provides access to the cables that connect the CPU enclosures to the PCI console assembly.

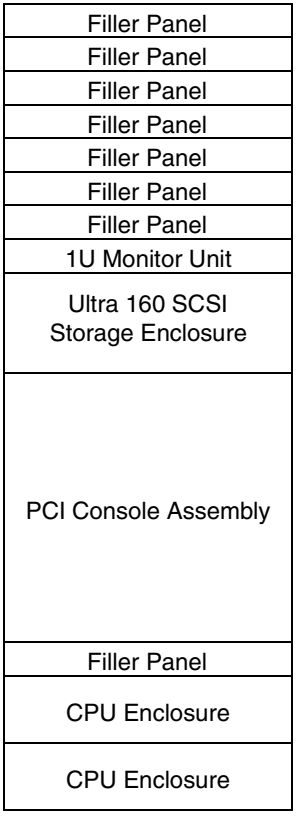
For your reference, Table 2-3 lists the available components and their unit sizes. Refer to "Space and HVAC Requirements" on page 3-1 for detailed specifications.

Table 2-3. Rack Usage by Component

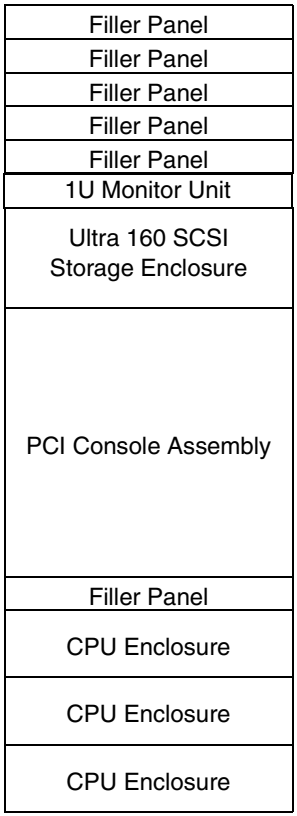
Component	Size
ftServer 5240 or 6500 CPU enclosure	2U
PCI console assembly	8U
Ultra160 SCSI enclosure	3U
1U LCD monitor	1U

If you have any questions about configurations not documented here, see your account representative, or the CAC or your authorized Stratus service representative.

Figure 2-7. 24U ftServer 5240 and 6500 System Cabinet Configurations

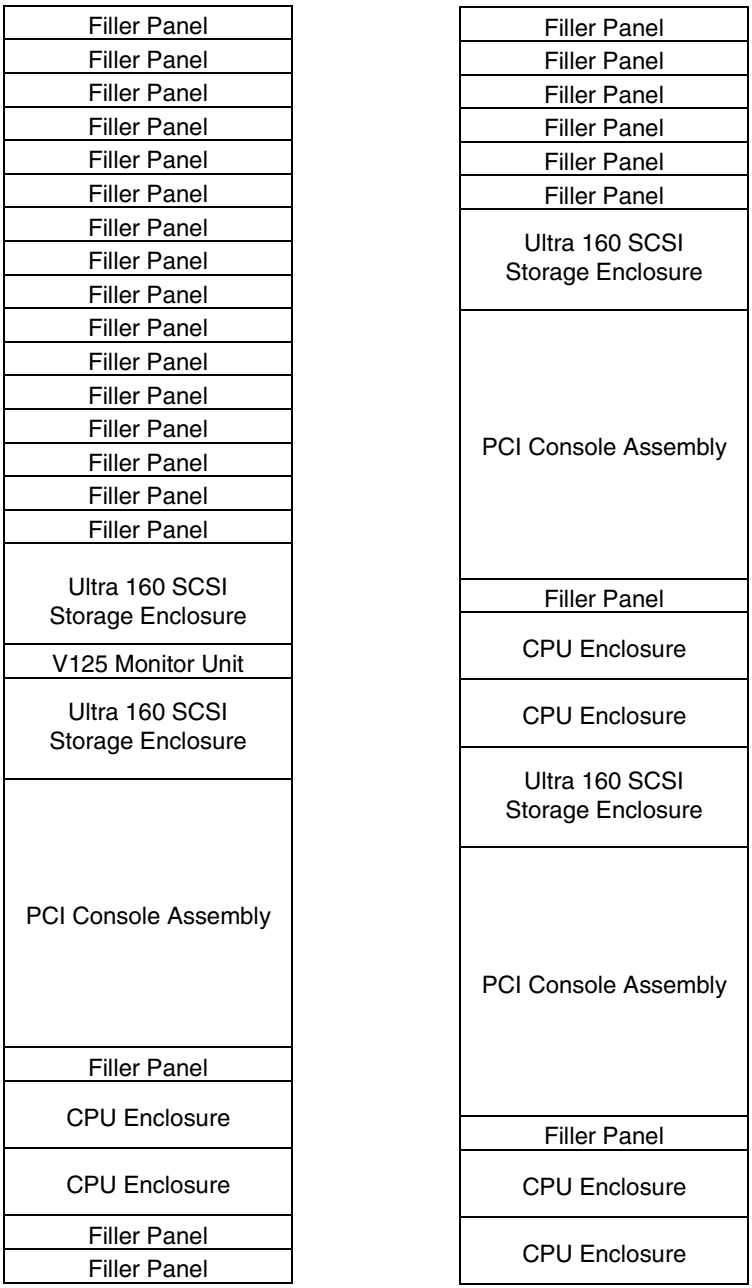


DMR with monitor unit and 1 SCSI enclosure



TMR with monitor unit and 1 SCSI enclosure

Figure 2-8. 38U DMR System Cabinet Configurations



Chapter 3
Site Requirements

The site planning and preparation process ensures that the installation site provides:

- A suitable climate and sufficient space for the system
- Appropriate electrical power

  Take into consideration the number and types of outlets needed and the lengths of the power cords.

- Required network and telephone line connections

  Take into consideration the LAN, WAN, and analog phone line connections needed, and the lengths and types of interface cables. Some of the cables are shipped with the system or optional component, and you must provide some other cables.

When you have documented the requirements for the system you are receiving, you can use the cabinet templates, options and accessories templates, and a site layout grid to help you create a floor plan for your installation.

Space and HVAC Requirements

Select a site for an ftServer system that is suitable for the reliable operation of computer equipment, such as a climate-controlled, dust-free office or computer room.

CAUTION

Do not place the system in an area of high electrostatic discharge. Static electricity may damage components.

Do not locate components near transformers or other electromagnetic devices.

CAUTION

Dust buildup in the system can impede air circulation and heat transfer, causing components to become less reliable as the ambient temperature rises.

To allow sufficient air circulation and space for servicing the system, locate the front and rear of the system at least 2.5 ft (0.76m) away from walls and other obstructions, and 20 in. (50.8 cm) from the top of the cabinet or rack to the ceiling.

If the site has an elevated floor, make sure that the floor has cutouts for routing cables.

Provide a table or desktop for external devices such as a telephone, tape drives, and a monitor, keyboard, and mouse.

Specifications

Use the following information in planning the system installation in your site.

Climate Requirements for Cabinets and Base Components

Operating temperature
0 ft to 2,000 ft (0m to 609.6m). 41°F to 95°F (5°C to 35°C)
Over 2,000 ft to maximum of 10,000 ft (3,048m). The upper temperature limit is lowered 1°C for every 800 ft (243.8m) above 2,000 ft (609.6m).

Operating maximum rate of temperature change: 21.6°F/hr (12°C/hr) or 0.36°F/min (0.2°C/min)
Operating relative humidity: 10% to 80% (noncondensing)
Storage temperature (to 40,000 ft) unvented: -40°F to 158°F (-40°C to +70°C)
Storage temperature (to 40,000 ft) vented: -40°F to 141.8°F (-40°C to +60°C)
Storage relative humidity: 10% to 95% (maximum absolute humidity of 0.024 water per lb of dry air)

24U Shipping Container

Height (including pallet): 56 in. (1.42m)
Width: 41 in. (1.04m)
Depth: 53 in. (1.35m)

38U Shipping Container

Height (including pallet): 79.75 in. (2.03m)
Width: 41 in. (1.04m)
Depth: 53 in. (1.35m)

24U Cabinet

Height (including casters): 50 in. (1.257m)
Width: 27.5 in. (70 cm)

Depth: 41 in. (1.04m)
Weight, empty: 275 lb (125 kg)
Weight, empty with pallet and shipping container: 436 lb (197.8 kg)

38U Cabinet

Height (including casters): 74 in. (1.9m)
Width: 27.5 in. (70 cm)
Depth: 41 in. (1.04m)
Weight, empty: 344 lb (156 kg)
Weight, empty with pallet and shipping container: 512 lb (232.2 kg)

CPU Enclosure

Height: 3.5 in. (9 cm) (2U)
Width: 17.5 in. (45 cm)
Depth: 26 in. (66 cm)
Weight: 50 lb (23 kg)

PCI Console Assembly with Power Supplies

Height: 14 in. (35.5 cm) (8U)
Width: 17.5 in. (44.4 cm)
Depth: 24 in. (60.9 cm)
Weight: 30 lb (13.6 kg)

I/O Enclosure with 4 PCI Adapters

Weight: 9.5 lb (4.3 kg)

Ultra160 SCSI Storage Enclosure

Height: 5.22 in. (13.26 cm) (3U)
Width: 17.5 in. (44.45 cm)
Depth: 20 in. (50.80 cm)
Weight, without disks: 33 lb (14.97 kg)
Weight, fully configured: 75 lb (34.02 kg)
Operating temperature: 32°F to 113°F (0°C to 45°C)

NOTE

Drives can operate at this temperature but should not be cold-started below 5°C.

Storage temperature: -40° to 158°F (-40°C to +70°C)
Maximum rate of temperature change: 20°C per hour
Relative humidity during operation: 10% to 80% (noncondensing)
Relative humidity during storage: 10% to 95% (noncondensing)
Operating altitude: -200 to 10,000 ft
Storage altitude: -200 to 40,000 ft

V128 1U Flat-panel LCD Monitor with Integrated Keyboard and Trackpad

Height: 1.75 in. (4.45 cm) (1U)
Width: 19 in. (48.3 cm)
Depth: 24 in. (61 cm)

Operating temperature: 32°F to 104°F (0°C to 40°C)
Storage temperature: -13°F to +140°F (-25°C to +60°C)
Relative humidity during operation: 10% to 80% (noncondensing)
Relative humidity during storage: 5% to 95% (noncondensing)

V125 1U Flat-panel LCD Monitor with Integrated Keyboard and Trackpad

Height: 1.75 in. (4.45 cm) (1U)
Width: 19 in. (48.3 cm)
Depth: 27 in. (68.6 cm)

V122 17-inch Color Monitor

Height: 16 in. (41 cm) (11U)
Width: 16 in. (41 cm)
Depth: 16.5 in. (40.8 cm)
Weight: 35.2 lb (16 kg)

V115 Keyboard

Height: 2.5 in. (6.4 cm) (2U)
Width: 19 in. (48.3 cm)
Depth: 8 in. (20.4 cm)

T511 and T512 Tape Drives without Autoloader

Height: 3.7 in. (9.5 cm)
Width: 4.5 in. (11.6 cm)
Depth: 8.6 in. (22.0 cm)
Weight: 5.7 lb (2.6 kg)
Temperature: 41°F to 104°F (5°C to 40°C)
Relative humidity: 20% to 80% (noncondensing)

T511 and T512 Tape Drives with Autoloader

Height: 5.3 in. (13.5 cm)
Width: 6.5 in. (16.5 cm)
Depth: 10.6 in. (26.9 cm)
Weight: 10.5 lb (4.8 kg)
Temperature: 41°F to 104°F (5°C to 40°C)
Relative humidity: 20% to 80% (noncondensing)

T513 Tape Drive

Height: 6.5 in. (16.5 cm)
Width: 6.9 in. (17.5 cm)
Depth (including tape eject handle): 12.8 in. (32.5 cm)
Weight: 14 lb (6.35 kg)
Temperature: 50°F to 104°F (10°C to 40°C)
Relative humidity: 20% to 80% (noncondensing)

For information about the uninterruptible power source (UPS), see the manufacturer's documentation on the http://www.apc.com Web page.

HVAC Requirements

The selected site must provide a climate-controlled environment that maintains the temperature and humidity requirements of the system.

Work with your facilities people and/or HVAC contractor to ensure that your air conditioning system can maintain the temperature and humidity ranges required by the cabinet, system components, and external tape drives.

The heating, ventilation, and air conditioning (HVAC) requirements for the system depend on the type and number of components.

Table 3-1 provides a worksheet to calculate the thermal dissipation rates for your ftServer system and its components.

NOTES

1. The value for the UPS is provided here for estimation purposes only. Check the manufacturer's documentation for the actual values. See the http://www.apcc.com Web page for details.
2. Make adjustments for any user-supplied components.

To calculate heat dissipation rates

1. In the Quantity column, write the number of each type of component.
2. For each component, multiply the entry in the Quantity column by the number in the Heat Dissipation column, and enter the result in the BTUs/hr Subtotal column.
3. Add all the results in the BTUs/hr Subtotal column, and enter the sum on the bottom line labeled Total BTUs/Hour. This value indicates the power and HVAC requirements for your system.

Table 3-1. Worksheet for Calculating HVAC Requirements

Component	Quantity	Heat Dissipation (BTUs/hr)	BTUs/hr Subtotal
CPU enclosures with twelve 512-MB DIMMs		3071	
Ultra160 SCSI storage enclosure		2296 to 2911	
PCI console assembly with core I/O enclosures only		1400	
PCI console assembly with core and optional expansion I/O enclosures		2300	
V122 17-inch color monitor (optional)		341.2	
V125 1U flat-panel LCD monitor with integrated keyboard and trackpad (optional)		153.5	
V128 1U flat-panel LCD monitor with integrated keyboard and trackpad (optional)		205	
UPS (optional) (online thermal dissipation)†		3070	
Total BTUs/Hour			

† Each system in a rack or cabinet requires its own UPS.

NOTE

The thermal dissipation numbers are calculated values based on maximum system configurations.

Electrical Power Requirements

The power requirements for the system depend on the type and number of components. A minimum of two separate and independent AC power sources are required; Using an UPS for one of the power sources provides the greatest fault tolerance in the event of a power failure. Other power sources are needed for components installed outside the cabinet.

The power service must be properly wired and grounded according to local standards and regulations.

For more information, see:

- Chapter 4 for information about connecting power cords to your system
- Appendix A for important power service information

Table 3-2 describes the power source requirements for the cabinet power strips and for optional components that are installed outside the rack or cabinet, specifying the number of power service sources, and the line voltage (VAC) and frequency (Hz) required at each source.

Table 3-2. AC Power Service Requirements

Component	Number of Power Sources	Power Service Required
1 set of cabinet power strips†	2	200–240 VAC rms, maximum 10% harmonic distortion; 47/63 Hz
Tabletop monitor (optional)	1	100–240 VAC; 50/60 Hz
T511 tape drive and T512 autoloader (optional), or T513 tape drive (optional)	One to four (one for each unit)	110–240 VAC; 50/60 Hz

† A second set of power strips is required on the top of the cabinet to connect a second system (in a 38U cabinet) and an additional SCSI storage enclosure. The second set of power strips requires two more power sources.

Calculating Power Requirements

To calculate the power requirements for your ftServer system, determine the exact configuration and use the worksheet in Table 3-3.

To calculate power requirements

1. In the Quantity column, write the number of each type of component.
2. Multiply the entry in the Quantity column by the number in the Power column, and enter the result in the Watts Subtotal column.
3. Add all the results in the Watts Subtotal column, and enter the sum on the bottom line labeled Total Watts. This value indicates the power and HVAC requirements for your system.

NOTES

1. Make adjustments for any user-supplied components.
2. The power requirement numbers are based on maximum configurations of ftServer 5240 and ftServer 6500 systems.

Table 3-3. Worksheet for Calculating System Power Requirements

Component	Quantity		Power (Watts)		Watts Subtotal
CPU enclosure with twelve 512-MB DIMMs		x	900	=	
Ultra160 SCSI storage enclosure fully loaded with fourteen 36- or 72-GB disk drives		x	400	=	
PCI console assembly with two core I/O enclosures only		x	325	=	
PCI console assembly with two core I/O enclosures and two expansion I/O enclosures		x	475	=	
V128 monitor unit (optional)		x	60	=	
V125 monitor unit (optional)		x	45	=	
UPS (optional) (online power dissipation)		x	900	=	
Total					

Power Cord Lengths and Plug Types

When choosing a location for the system, consider the length of the power cords and the location of power receptacles. The cord lengths determine how close the cabinet or rack must be to the power sources. If the cabinet or rack is located within 5 ft (1.5m) of the power sources, you can connect the shorter cord to the lower power strip and the longer cord to the upper power strip (if your system has an upper power strip). If the cabinet is located from 5 ft to 10 ft (1.5m to 3m) away from the power sources, use the longer power cords instead.

NOTE

The cities of Chicago, Illinois and Los Angeles, California in the United States require that no more than 6 ft of the power cord extend from the cabinet to the power source.

WARNING

Place all power cords out of the way of foot traffic.

APC supplies power cords for the UPS. Stratus supplies power cords for cabinet power strips and external tape drives

WARNING

Use only the power cords you receive from Stratus.

DO NOT MODIFY THE POWER CORDS you receive from Stratus.

Failure to comply with this warning will void agency certification.

Failure to comply with this warning can cause a fire hazard.

The power strips in the cabinets contain four permanently attached power jumpers that you connect to the CPUs, the PCI console assemblies, and the first SCSI storage enclosure. The power strips also contain two power receptacles; you plug the optional 1U rack-mountable monitor unit into one of the receptacles on the A-side power strip. A second set of power strips is required on the top of the cabinet to connect a second system (in a 38U cabinet) and an additional SCSI storage enclosure. Stratus supplies labels you can attach to the power cords to identify A- and B-side jumpers.

Cabinet Power Cords

Table 3-4 lists the specifications and available lengths of power cords to the cabinet by country or region. These cords connect your power source to the power strips mounted inside the cabinet and are available in different lengths.

Table 3-4. Cabinet Power Cord Lengths and Plug Types

Locale	Description	Length	Marketing ID
United States Domestic/Canada	250 VAC/20A; plug type NEMA L6-20P	6 ft	B38008-1
		10 ft	B38009-1
United States Domestic (Chicago)	250 VAC/20A; plug type NEMA L6-20P	3.5m	B38006-1
		4.5m	B38007-1
United States	125/250 VAC/30A; plug type NEMA L6-30P	3.5m	B38026-1
		4.5m	B38027-1
Australia/New Zealand	250 VAC/15A; plug type SAA/3/15 AS/NZS 3112-1993	3.5m	B38018-1
		4.5m	B38019-1
Continental Europe	250 VAC/16A; plug type CEE 7 VII	3.5m	B38010-1
		4.5m	B38011-1
Great Britain	250 VAC/13A; plug type BS13/89/13 or IEC309	3.5m	B38012-1
		4.5m	B38013-1
Israel	250 VAC/16A; plug type SI 32/1971 IL/3g	3.5m	B38022-1
		4.5m	B38023-1
Italy	250 VAC/16A; plug type Type 1/3/16 CEI23-16	3.5m	B38020-1
		4.5m	B38021-1
Japan	250 VAC/30A; plug type NEMA L6-30P	3.5m	B38024-1
		4.5m	B38025-1
India/S. Africa	250 VAC/16A; plug type SABS164-1:1992 ZA/3	3.5m	B38014-1
		4.5m	B38015-1
All	250 VAC/20A; power cable wire, no plug provided	3.5m	B50016-1
		4.5m	B50017-1

External Tape Drive Power Cords

Table 3-5 lists the lengths and plug types of the power cords from the optional tape drives to a separate power source.

Table 3-5. External Tape Drive Power Cord Lengths and Plug Types

Locale	Description	Length	Marketing ID
North America (Chicago)/Japan	120 VAC/15A; plug type NEMA 5-15	7 ft (2.1m)	B501-01
North America/Japan	120 VAC/15A; plug type NEMA 5-15	10 ft (3m)	B501-02
US Domestic Chicago	250 VAC/10A; plug type NEMA 6-15	7 ft (2.1m)	B501-05
US Domestic	250 VAC/10A; plug type NEMA 6-15	10 ft (3m)	B501-06
Continental Europe	250 VAC/10A; plug type CEE 7 VII	8 ft (2.5m)	B501-09
Great Britain	250 VAC/10A BS1363/A	8 ft (2.5m)	B501-13
Australia	250 VAC/10A; plug type AS/NZS 3112-1993	8 ft (2.5m)	B501-21
Israel	250 VAC/10A; plug type S132/1971	8 ft (2.5m)	B501-29
Italy	250 VAC/10A; plug type CEI 23-16	8 ft (2.5m)	B501-33
Switzerland	250 VAC/10A; plug type 1011-S24507	8 ft (2.5m)	B501-37
Denmark	250 VAC/10A; plug type DK2-1A/1992	8 ft (2.5m)	B501-41
South Africa	250 VAC/10A; plug type SABS164/1:1992 ZA/3	8 ft (2.5m)	B501-49

UPS Power Cords

Table 3-6 lists the lengths and plug types of the power cords from the optional UPS to power source.

Table 3-7 lists the power cords that connect the ftServer cabinet with the UPS.

Table 3-6. UPS Power Cord Lengths and Plug Types

Model	Description	Marketing ID
North American model MX5000	One 6-ft (1.8m) cord with NEMA L6-30P plug. UPS provides 6 NEMA 5-15R, 2 NEMA L6-30R, and 1 NEMA L14-30R outlets.	Purchase from APC
World-wide model MX5000W	One hard-wired cord that meets local requirements and regulations. The UPS provides eight IEC-320-C13 outlets.	Purchase from APC
Japanese model MX5000J	One 6-ft (1.8m) cord with NEMA 5-15P plug. UPS provides 6 NEMA 5-15R, 1 NEMA L11-30R, and 1 NEMA L14-30R outlets.	Purchase from APC

Table 3-7. Cables between the Cabinet and a UPS

Description	Plug Type	Length	Marketing ID
UPS APC MX 5000 to ftServer cabinet bottom power strip	NEMA L6-30P	8 ft (2.5m)	B38004
UPS APC MX 5000 to ftServer cabinet top power strip	NEMA L6-30P	11.48 ft (3.5m)	B38005
UPS APC MX 5000W to ftServer cabinet bottom power strip	IEC320-C14	8 ft (2.5m)	B38002
UPS APC MX 5000W to ftServer cabinet top power strip	IEC320-C14	11.48 ft (3.5m)	B38003
UPS APC MX 5000J to ftServer cabinet bottom power strip (Y-style cable)	NEMA L6-30P and two C19s	8 ft (2.5m) and 11.48 ft (3.5m)	B38001

Network and Telephone Line Requirements

ftServer 5240 and ftServer 6500 systems have the following network and telephone communications requirements:

- A minimum of two Ethernet connections for fault-tolerant network connectivity
- Optionally, two more Ethernet connections to connect the ftServer Access Adapters to the network

NOTE

To ensure adequate network performance between the ftServer system and its clients, connect the ftServer Access Adapters to a different network than the network that connects clients to the ftServer system. Avoid a network configuration that lets traffic be routed to the ftServer system through the ftServer Access Adapters.

- One telephone line connected to a telephone to call the CAC or your authorized Stratus service representative for help
- One of the following to connect the system to the ActiveService Network (ASN):
  - One analog telephone line for each system
  - One analog telephone line for each *ftGateway group*

    An ftGateway group requires that one ftServer system be set up as a *gateway* for ASN connectivity. Each ftGateway group is limited to a maximum of 20 ftServer systems. All ftServer Access Adapters in each system in a group must connect to the same physical Ethernet subnetwork.

    See "ftGateway Phone Line Requirements" on page 3-14 for more information about the site requirements for implementing a gateway for SSN connectivity.

    You use the supplied two-way (Y-style) connector to connect the PCMCIA modems on the ftServer Access Adapters to this analog telephone line.

NOTE

A dedicated phone line provides the most reliable service. SSN calls routed through a PBX might be slow due to load on the PBX, or might not complete successfully because the calls can become disconnected. If you must use a PBX, do not route the telephone extension through a switchboard; instead, provide a direct-dial analog number.

You may need to arrange for other network connections, depending on how the system will be used and what networks the system will connect to. Stratus has qualified asynchronous adapters to connect the ftServer system to various types of networks. If you have a unique network requirement, Stratus Professional Services can work with you to meet that requirement.

ftGateway Phone Line Requirements

Multiple ftServer systems at a single site can share a single telephone connection to the SSN by implementing an *ftGateway group*. The systems in the group must be connected to a **single** physical Ethernet subnetwork. One system acts as a *gateway* for SSN connectivity; this system requires an analog telephone line that connects to the PCMCIA modem. Other systems in the *gateway group*, *gateway slaves,* connect to the gateway system over the network. In this case, Ethernet connections are required for each ftServer Access Adapter, but only two analog telephone lines are required for each site.

ftGateway Network Requirements

The option of one analog telephone line for each *ftGateway group* requires that one ftServer system be set up as a *gateway* for ASN connectivity. Each ftGateway group is limited to a maximum of 20 ftServer systems. All systems in a group must connect to the same subnetwork over the system Ethernet port, over Ethernet adapter cards, or through ftServer Access Adapters. Make sure that only layer 1 and layer 2 devices separate the gateway and slave systems. During a connection, the gateway system assigns the slave system a temporary IP address from an IP address range reserved by Stratus and uses that address for all traffic. Using ftServer Access Adapter cards provides the highest level of manageability by allowing the system to be serviced even when the operating system is not operational.

For more information, see, “ftGateway Phone Line Requirements” on page 3-14.

NOTE

A dedicated phone line provides the most reliable service. ASN calls routed through a PBX might be slow due to load on the PBX, or might not complete successfully because the calls can become disconnected. If you must use a PBX, do not route the telephone extension through a switchboard; instead, provide a direct-dial analog number.

Interface Cabling Requirements

When choosing a location for the system, consider the available cable lengths, the placement of external devices, and the location of computer network, telephone modem data, and voice communication connections.

Plan the placement of the system and its external components so that the distance between them does not exceed the lengths of the cables. If you have chosen to supply your own monitor, make sure that it meets the system's requirements, described in "Using Your Own Monitor, Keyboard, and Mouse" on page 2-8, and that the cable you provide is of the correct type and of sufficient length.

VGA, USB, and serial cables for the monitor, keyboard, and UPS connect to the front panel on the front of the PCI console assembly. Cables connected to the Ethernet ports or to other PCI adapter ports connect to those ports at the back of the system.

WARNING

Place all interface cables out of the way of foot traffic.

Interface Cables You Supply

Table 3-8 describes the interface cables you supply. Be sure to provide a cable of sufficient length for the distance between a component and a wall jack or hub.

Table 3-8. Customer-Supplied Interface Cables

Component	Cable
U515 One-Port 10/100-Mbps Ethernet PCI Adapters ftServer Access Adapters U571 One-Port 10/100/1000 Base-T Ethernet PCI Adapter	A minimum of two Ethernet cables for the required pair of U515 PCI adapters Two Ethernet cables for the pair of ftServer Access Adapters, which are required for systems to operate in an ftGateway environment, but optional otherwise Two Ethernet cables for each optional pair of U515 PCI adapters or U571 PCI adapters Provide 24 AWG, 4-pair, Unshielded Twisted Pair (UTP) EIA/TIA-Verified, Category-3 or Category-5 wire, with RJ-45 modular connectors terminated with pair-wiring adhering to the EIA/TIA 568-A or EIA/TIA 568-B standard. For connections to an Ethernet hub or switch, provide a straight-through cable. For 100-Mbps (fast Ethernet) operation, provide full-duplex, or Category 5 Ethernet cables. To operate the U571 PCI adapter at 1 gigabit per second, provide a minimum of Category 5 UTP Ethernet cable with RJ-45 connectors. The maximum allowable distance from an Ethernet port to a switch or a hub is 100 meters.
U570 One-Port 1000Base-SX Ethernet PCI Adapter	Two multimode, 62-5 micron, DUAL fiber cables with two SC-type connectors, and two connectors that are compatible with the network switch, for each pair of U570 PCI adapters
ftServer Access Adapters (not required if the system is connected to an ftGateway system)	One serial cable to connect the dual modem (Y-style) extension cable to the phone jack
UPS	One serial cable and USB-serial converter

Interface Cables Stratus Supplies

Stratus supplies cables to connect the monitor and keyboard to the system, and except for Ethernet cables, cables for the cards you purchase from Stratus.

Table 3-9 describes the interface cables you purchase from Stratus or that Stratus supplies when you purchase a system or component. Table 3-9 lists the lengths of each cable so that you can plan for proximity between components.

Table 3-9. Interface Cables Available from Stratus

Component	Cable Description	Length	Marketing ID
V128 monitor, keyboard, and trackpad	One VGA cable attached to the monitor and which connects to the VGA port in the I/O panel	59 in. (1.5m)	N/A
	One USB cable attached to the monitor and which connects to another USB cable, which is connected to the USB port in the front panel	59 in. (1.5m)	N/A
V122 monitor and V	One VGA cable attached to the monitor and which plugs into the VGA port in the I/O panel	59 in. (1.5m)	N/A
V115 keyboard and mouse	One USB cable attached to the keyboard and which plugs into the front panel	59 in. (1.5m)	N/A
	One PS/2 cable attached to the mouse and which plugs into the keyboard	59 in. (1.5m)	N/A
V125 monitor unit	One VGA cable attached to the monitor	6 ft (1.8m)	B20240
	One USB cable attached to the monitor	6 ft (1.8m)	B51100
ftServer Access Adapters	One Y-style modem cable that connects two modem cables to a phone jack.	10 ft (3m)	B50600-10
	One modem extension cable Global Adapters are provided in the localization kit.	7 ft (2.1m)	AW-B20245
Ultra160 SCSI storage enclosure	Two or four SCSI-3 high density cables, with a 0.8 mm VHDCI connector at each end. Two cables connect to each U521 PCI adapters.	5.5 ft (1.7m)	B1080-01

Table 3-9. Interface Cables Available from Stratus *(Continued)*

Component	Cable Description	Length	Marketing ID
First external tape drive (all models) (optional)	One SCSI-3 high-density cable with one 0.8 mm VHDC connector and 68-pin SCSI-3 connector	9.84 ft (3m)	B1046-01
		29.53 ft (9m)	B1046-02
Second external tape drive (optional)	One SCSI-3 high-density daisy-chain cable with one 0.8 mm VHDC connector and one 68-pin SCSI-3 connector	3.28 ft (1m)	B1072
U486 Eight-Port Asynchronous PCI Adapter (optional)	One eight-port fan-out cable with DB-25 connectors	6 ft (1.8m)	B1122
		32.5 ft (10m) Ordered separately	B50900

Creating a Floor Plan

Use the cabinet templates in Figure 3-1, the component templates in Figure 3-2, and the site layout grids in Figure 3-3 (nonmetric) or Figure 3-4 (metric) to lay out your ftServer system installation site.

On the layout grid, outline the room where the system will be installed, and then photocopy the templates in Figure 3-1, cut them out, and arrange them so that they represent your system configuration. The shading on the templates indicates the required access and servicing area. Use the site layout grid to plan and document space, power plug location and type, cable length, and cable routing requirements.

When determining the placement of the system and its external components, consider the available power cord and interface cable lengths, and the locations of power outlets, phone jacks, and Ethernet jacks, switches, and/or hubs. Include the cabinet or rack, any external components, and all receptacles and jacks in the sketch.

NOTE

Make sure that all cords and cables are long enough to reach between their respective components and connectors.

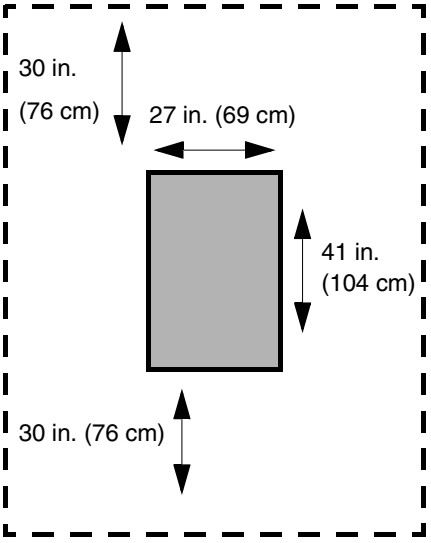
WARNING

Make sure that all cables are routed so they are out of the way of foot traffic.

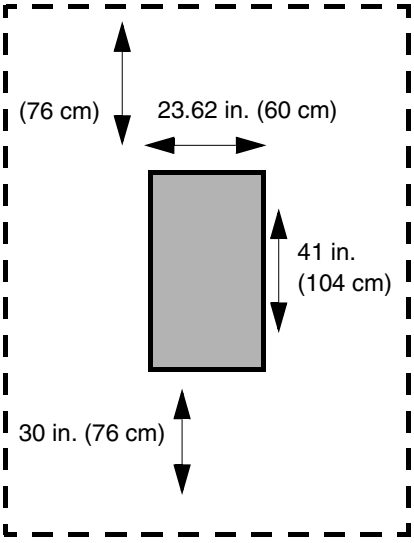
Templates

Figure 3-1 and Figure 3-2 contain templates of ftServer cabinets and ftServer options and accessories. The templates (both metric and nonmetric) are drawn to the same scale as the layout grids.

Figure 3-1. Cabinet Templates



ftServer 5240 and 6500
System Cabinet



ftServer 5240 and 6500
Customer-Supplied 600 mm Rack

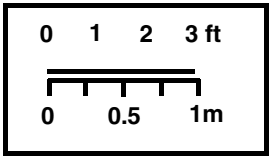
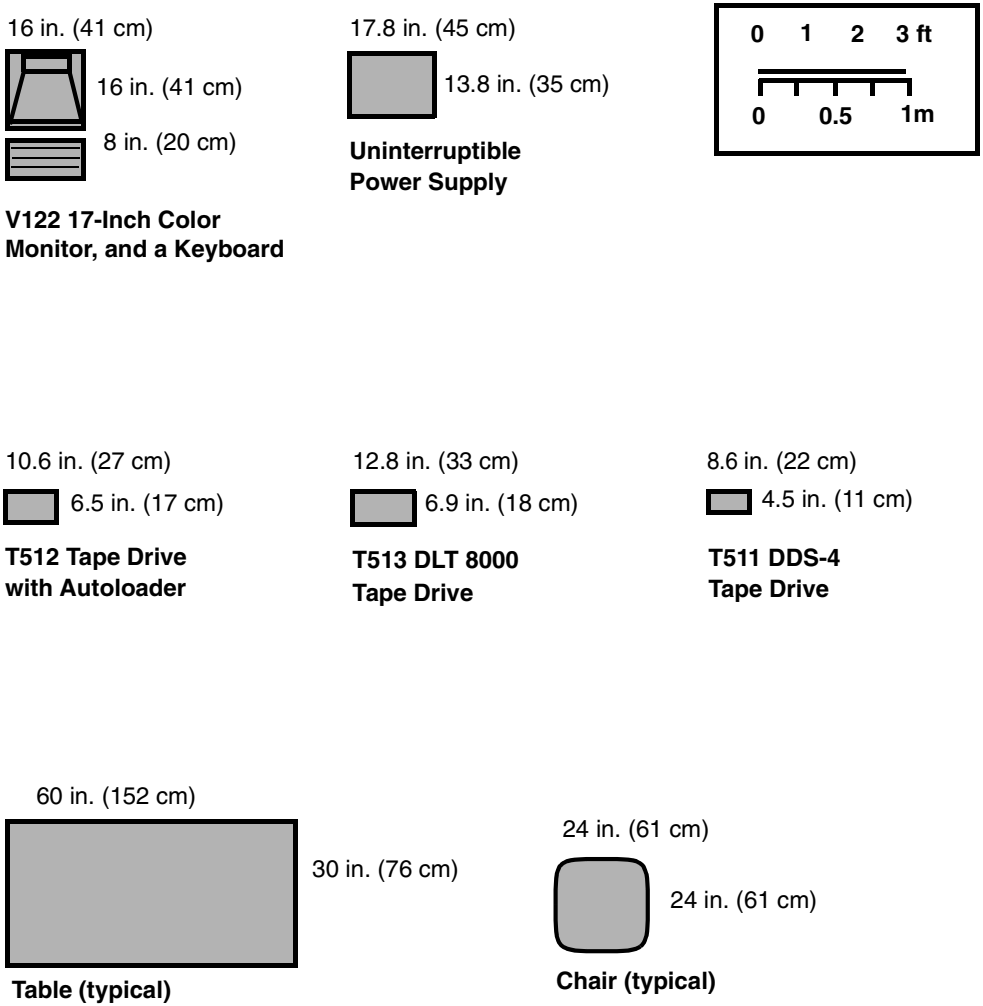


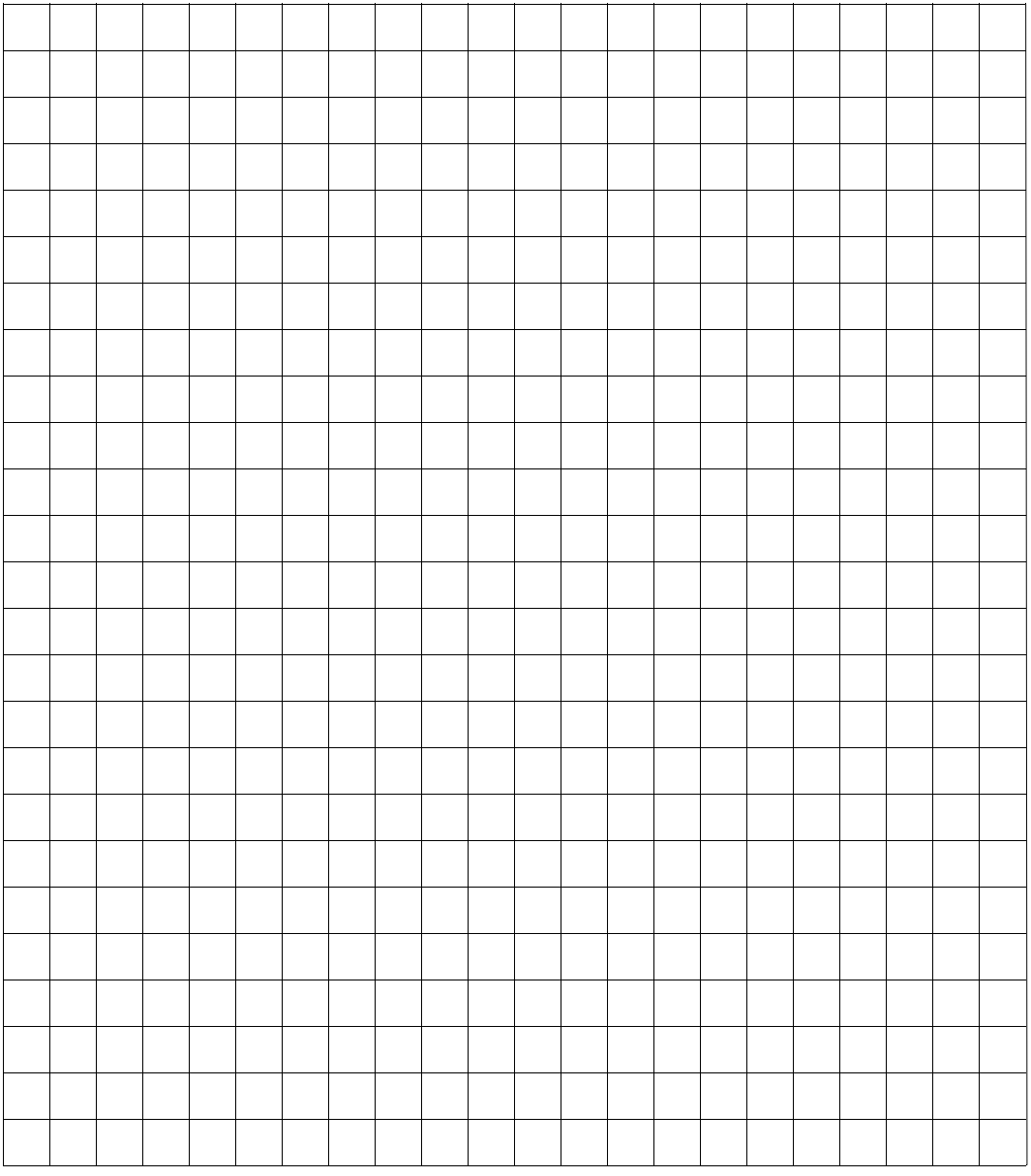
Figure 3-2. Options and Accessories Templates



Site Layout Grid, Inches and Feet

Figure 3-3 represent a room measuring approximately 20 ft by 25 ft. Each 1/4-inch block represents a 1-ft square of floor space.

Figure 3-3. Site Layout Grid (Scale: 1/4 in. = 1 ft)



Site Layout Grid, Meters

Figure 3-3 represents a room measuring approximately 6.5m by 7.5m. Each 1-cm block represents a 0.5m square of floor space.

Figure 3-4. Site Layout Grid (Scale: 1 cm = 0.5m)

Chapter 4
Power Connections

Power is distributed to the ftServer system by power strips mounted inside the Stratus-supplied cabinet or your rack. You can connect power to the power strips using a UPS or without using an uninterruptible power supply (UPS).

For fault tolerance, the ftServer system must be powered by two independent AC power sources: one source connected to one (A-side) power strip, and the other source connected to a second (B-side) power strip. Stratus recommends, for system reliability, that you use a UPS as one of the sources. If the rack or cabinet contains a second pair of CPU enclosures, you must provide a separate UPS for each A-side power strip.

Stratus has qualified the American Power Conversion Corporation (APC) Matrix 5000 UPS model for use with ftServer 5200- and 6500-series systems. Site planning information for the customer-supplied UPS is of a general nature only. For detailed information about the UPS, see the manufacturer's documentation.

See Appendix A for site wiring information and Chapter 3 for system power requirements.

ftServer Power Distribution

Power strips mounted inside the cabinet or rack distribute power to the ftServer system. Each power strip is connected to external power sources by external power cords supplied by Stratus. These power cords are available in a variety of country-specific ratings and plug types. For a list of external power cords, see "Power Cord Lengths and Plug Types" on page 3-9.

Power strips for ftServer 5240 and 6500 systems are rated for 16A.

Cabinets or racks require a solid ground wire. The ground wire (AW-001075) is shipped with the system and should be installed at the installation site by an electrician.

WARNING

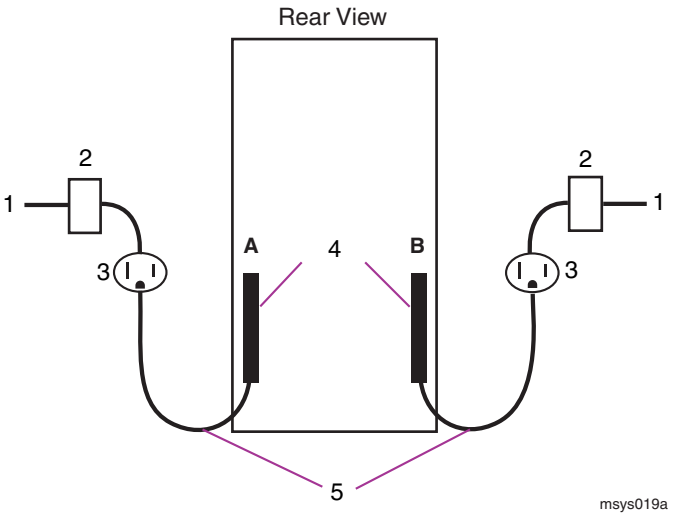
Current leakages can occur if a ground is not established on systems that use four 10A power strips connected to power sources over 200 VAC.

Connecting Power to a System without a UPS

For a minimally configured ftServer system, the rack or cabinet has two power strips (A and B), each with its own power cord. For fault tolerance, the two power cords must be plugged into two separate branch circuits from two independent power sources (see Figure 4-1).

The two power sources should be as electrically independent of each other as the installation site allows. The two power sources must at least be powered by separate distribution transformers, and if possible, be independent of each other beyond that level. The more electrical separation between the two power sources, the less likely they will both fail at the same time. Due to redundancy in the ftServer system, power to either side of the cabinet or rack will keep the system in operation.

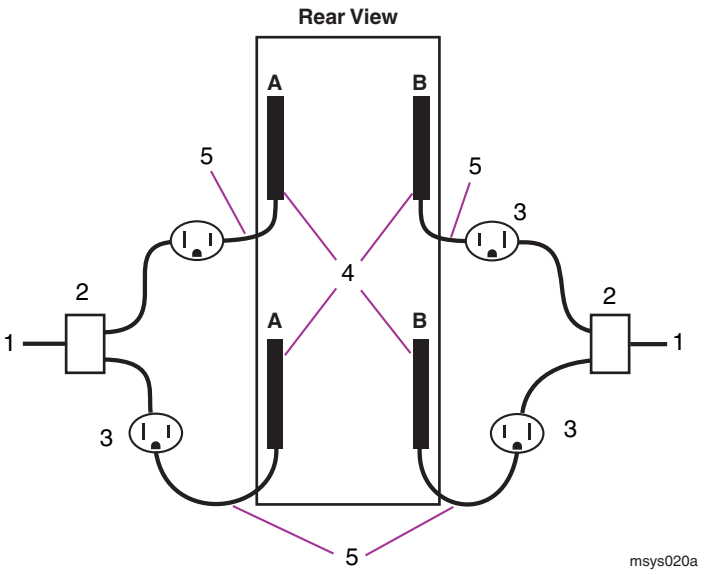
Figure 4-1. Power Connections for Minimal ftServer Configuration



1	To power distribution	4	Power strips
2	Distribution transformers	5	Power cords
3	Power outlets		

Expanded systems, for example, systems with two DMRs or with additional storage enclosures, require four power strips (two on each side) and four power cords. As shown in Figure 4-2, the two power cords from side A connect to one of the power sources through two exclusive branch circuits. The two power cords from side B connect to the other power source through two other exclusive branch circuits.

Figure 4-2. Power Connections for Expanded ftServer Configurations



1	To power distribution	4	Power strips
2	Distribution transformers	5	Power cords
3	Power outlets		

Connecting a System to Power with a UPS

If power at a site fails, a UPS temporarily supplies the ftServer system with the required voltage. In addition to providing uninterrupted power, the UPS also maintains a communications link with the ftServer system to alert the system of imminent power outages and other power problems.

Stratus has qualified the APC Matrix 5000 UPS for ftServer 5200- and 6500-series systems. Choose one of the following models to match the electrical power service in the country where the system is to be installed:

- The MX5000 UPS is for use in North America, parts of Latin America, and Saudi Arabia.
- The MX5000J UPS is for use in Japan.
- The MX5000W UPS is for use in most other locations worldwide, including Eastern and Western Europe, the Middle East, China, India, Asia, Australia, the South Pacific, and parts of Latin America.

For systems that require only two power strips, connect one power cord to the UPS, and a second power cord to another power source.

Expanded systems, for example, systems containing additional storage, require four power strips; connect two power cords from side A to the UPS, and the two power cords from side B to another power source.

Two systems in a single rack or cabinet require four power strips. Each system requires its own UPS. Connect each power cord from side A to a separate UPS, and connect the two power cords from side B to another power source.

Connect the UPS and the branch circuits for side B to independent power sources.

The UPS communicates with the system through a serial port on its rear panel.

To connect the UPS serial port to one of the system's front panel USB ports, use a serial extension cable and a serial-to-USB converter that you can purchase from American Power Conversion (APC). Use the following information to order the serial extension cable:

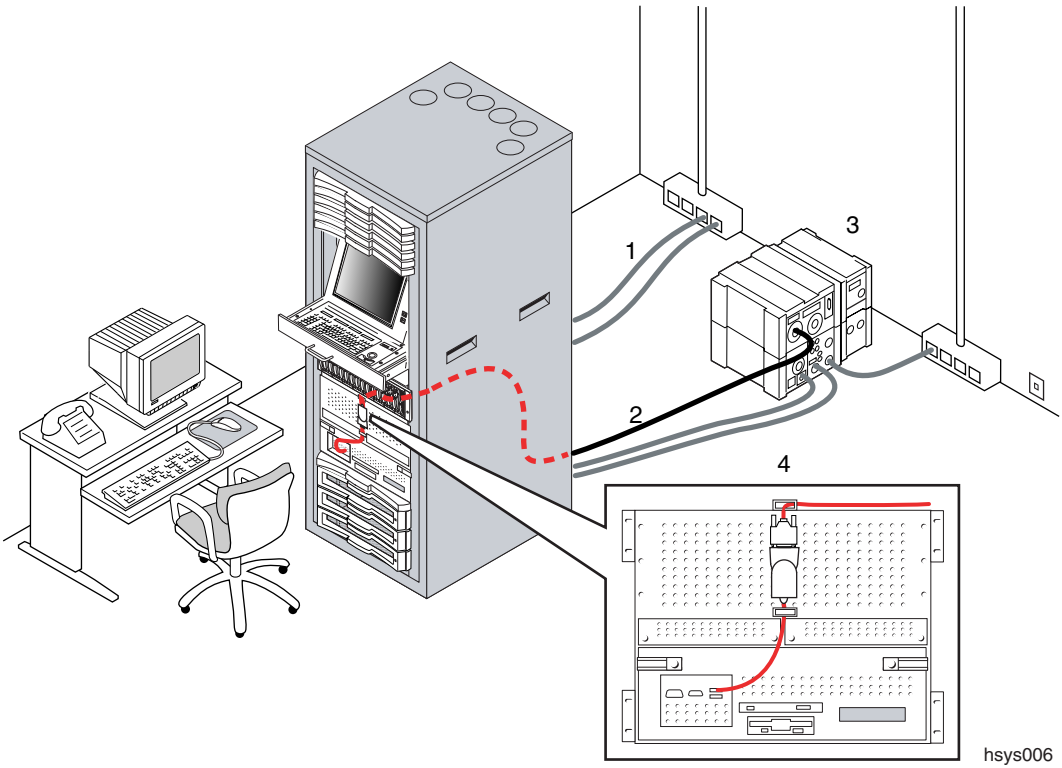
- The serial extension cable is 15-ft (4.6m) long and is APC part number 940-1500A.
- The USB-serial converter is APC part number AP9585.

APC can be reached at the following mailing or Internet addresses:

American Power Conversion
132 Fairgrounds Rd.
West Kingston, RI 02892 USA
(401) 789-5735
apctech@apcc.com
http://www.apcc.com

Figure 4-3 shows how this cable and converter are typically routed from an APC Matrix 5000 UPS to an ftServer 5240 or ftServer 6500 system.

Figure 4-3. Typical UPS Connections to ftServer 5240 and ftServer 6500 Systems

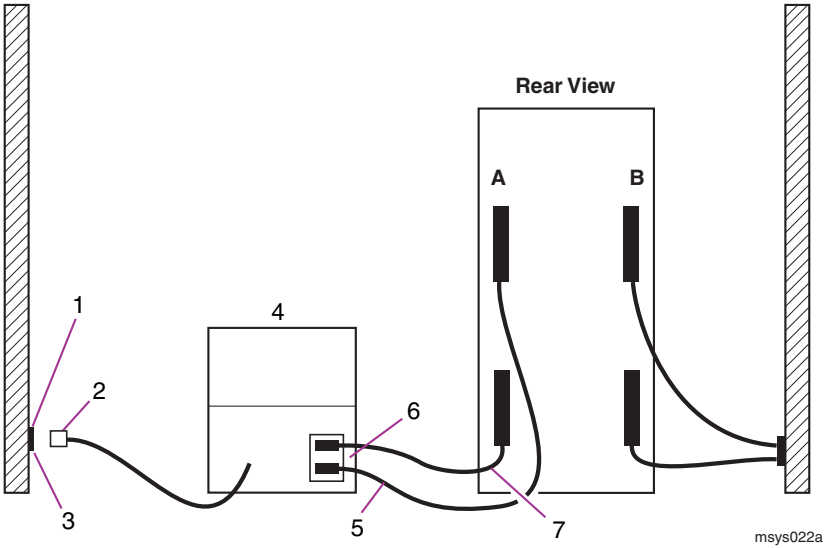


1	Side B
2	USB cable
3	UPS
4	Side A

MX5000 North American Power Configuration (120-VAC UPS Output)

The MX5000 UPS provides NEMA 5-15R 120-VAC outlet receptacles for power cords to the ftServer system. Input voltage to the UPS is 208/240 VAC. This configuration requires a NEMA L6-30R receptacle at the wall to accommodate the NEMA L6-30P input power plug to the MX5000 UPS. Figure 4-4 shows the power connections, and Table 4-1 lists UPS-to-rack power cords available from Stratus for a North American UPS configuration.

Figure 4-4. MX 5000 UPS Power Connections (North American)



1	208/240 VAC outlet	5	B50102-10
2	NEMA L6-30P	6	120 VAC
3	NEMA L6-30R	7	B50101-07
4	APC MX5000 UPS		

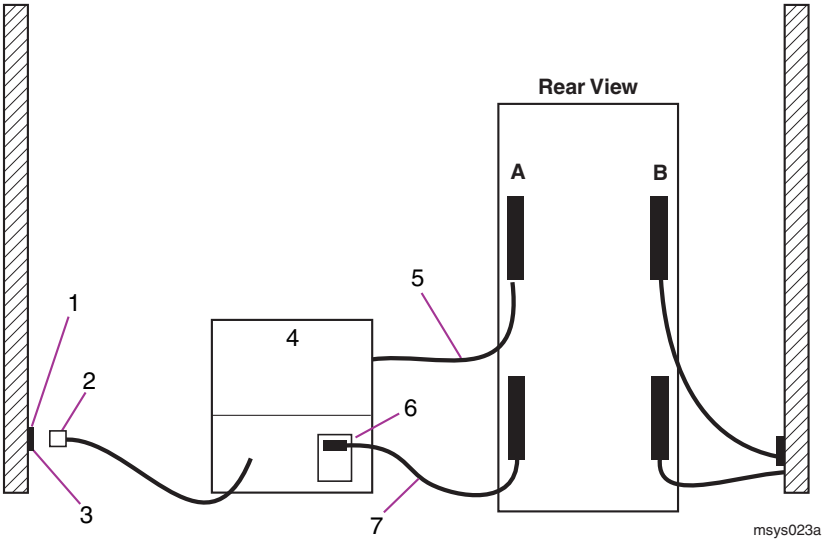
Table 4-1. Power Cord Information for MX5000

Item	Description	Marketing ID
APC UPS MX 5000 to ftServer 5240 and 6500 cabinet bottom power strip	250 VAC; NEMA L6-30P; 8.2 ft (2.5m)	B38004
APC UPS MX 5000 to ftServer 5240 and 6500 cabinet upper power strip	250 VAC; NEMA L6-30P; 11.5 ft (3.5m)	B38005

MX5000J Japanese Power Configuration (100-VAC UPS Output)

The M5000J UPS provides NEMA 5-15R 100-VAC outlet receptacles for power cords to the ftServer system. Input voltage to the M5000J UPS is 200/208 VAC. This configuration requires a NEMA L6-30R receptacle at the wall to accommodate the NEMA L6-30P input power plug from the MX5000J UPS. Figure 4-5 shows the power connections, and Table 4-2 lists UPS-to-rack power cords available from Stratus for a Japanese power configuration.

Figure 4-5. UPS Power Connections (Japan)



1	200 VAC outlet	5	B50102-10
2	NEMA L6-30P	6	100 VAC
3	NEMA L6-30R	7	B50101-07
4	APC MX5000J UPS		

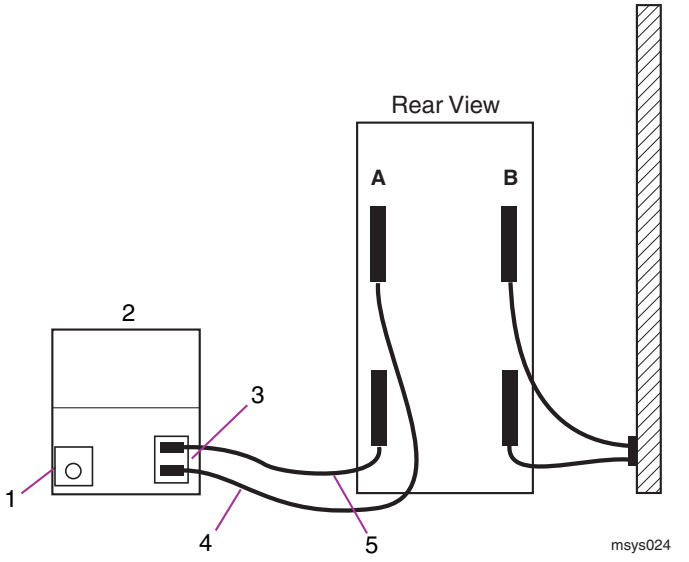
Table 4-2. Power Cord Information for MX5000J

Item	Description	Marketing ID
APC UPS MX 5000J to ftServer 5240 and 6500 cabinet (Y-cord)	250 VAC; NEMA L6-30P; 3.5m	B38001

MX5000W Worldwide Power Configuration (220/240-VAC UPS Output)

For use in European, Asian, Middle Eastern, and African countries, the M5000W UPS provides IEC-320-C13 220/240-VAC outlet receptacles for power cords to the ftServer system. Input voltage to the M5000W UPS is 220/240. A user-supplied, 3-wire, input power cord must be hard-wired to an input junction box on the MX5000W UPS. Power connections must meet local electrical requirements and regulations. Figure 4-6 shows the power connections, and Table 4-3 lists UPS-to-rack power cords available from Stratus for a worldwide configuration.

Figure 4-6. UPS Power Connections (Worldwide)



1	Input junction box	4	AW-B50301-35M
2	APC MX5000W UPS	5	AW-B50300-25M
3	220/240 VAC		

Table 4-3. Power Cord Information for MX5000W

Item	Description	Marketing ID
APC UPS MX 5000W to ftServer 5240 and 6500 cabinet bottom power strip	220/240 VAC; IEC320-2-2/E; C14 to C19; 2.5m	B50300-25M
APC UPS MX 5000W to ftServer 5240 and 6500 cabinet upper power strip	220/240 VAC; IEC320-2-2/E; C14 to C19; 3.5m	B50300-35M

Appendix A
Electrical Circuit and Wiring Information

You should provide electrical circuit and wiring information to the contractor or facilities personnel responsible for wiring the power at the system installation site. The information you need to provide includes:

- The site's fault protection requirements
- Important grounding considerations
- Circuit wiring diagrams for different types of AC service
- Electrical power connector types

Fault Protection Requirements

Each customer-replaceable unit (CRU) in the ftServer system contains fault/overload current protection. However, the system relies on the power distribution system at your site for protection against potential faults in the power cords and the wiring in the system base. You must use circuit breakers in each power distribution branch feeding the system.

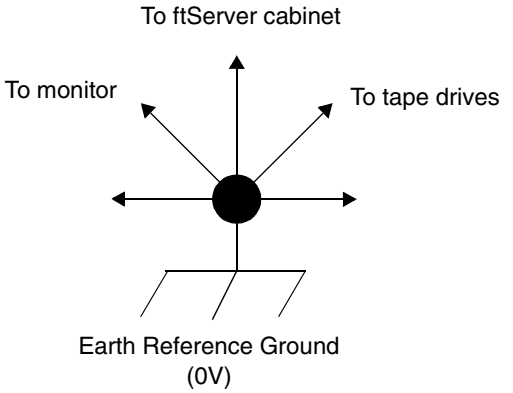
Grounding Considerations

The system obtains an earth reference ground through the power cords attached to the system. Similarly, each peripheral device connected to the system obtains ground through its power cord. For each peripheral device, you **must** ensure that a high-integrity safety-ground conductor is installed as part of the wiring system (in accordance with U.S. national electric code NFPA 70, or the equivalent). The international safety standard (EN60-950) for electronic data processing (EDP) equipment also requires a ground conductor, but calls it a potential earth (PE) ground.

Depending upon local conditions, ground potentials may differ between the system base and any peripheral devices connected to the system base. All grounds in the system **must** return to the same reference point in the power distribution system, as close as possible to **zero (0) volt potential** relative to earth reference ground. Earth reference ground is typically a metal stake in the ground to which the ground conductors from one or more buildings are attached.

As shown in Figure A-1, a *star ground* is often used to obtain the same earth reference ground. Each earth reference ground such as the system base ground is returned separately to a common point where a zero volt (0V) earth ground exists. The star ground ensures that all equipment is at the same potential and that no noise or safety problems associated with an unpredictable or uncharacterized grounding system will occur.

Figure A-1. Star Ground Example



Circuit Wiring Diagrams

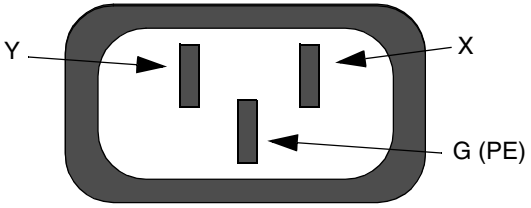
This section contains the following circuit connection diagrams:

- Figure A-3 illustrates a single-phase 110-VAC circuit connection.
- Figure A-4 illustrates a single-phase 220-VAC circuit connection.
- Figure A-5 illustrates a three-phase 208-VAC, Y-, or Δ-source circuit connection, phase-to-neutral.
- Figure A-6 illustrates a three-phase 208-VAC, Y-, or Δ-source circuit connection, phase-to-phase.
- Figure A-7 illustrates a three-phase 380-VAC, Y-, or Δ-source circuit connection, phase-to-neutral.

NOTE

As shown in Figure A-2, the power inputs for the ftServer system are labeled X and Y in the diagrams in this appendix to eliminate any ambiguities in the nomenclature. For single-phase applications, the X input is connected to the L (Line) “hot” input, and the Y input is connected to the N (Neutral) input. However, for three-phase applications, the X and Y inputs are connected to L1, L2, or L3 (but to separate lines). Therefore, for three-phase applications, both X and Y can be electrically “hot” with respect to the system base (earth reference ground). Figure A-2 shows the physical locations of the X and Y inputs on the system base.

Figure A-2. Power Input Labeling



Power Input A or B (Face View)

Figure A-3 shows a single-phase 110-VAC circuit connection. Note that this application requires a single-pole circuit breaker.

Figure A-3. Single-Phase 110-VAC Circuit Connection

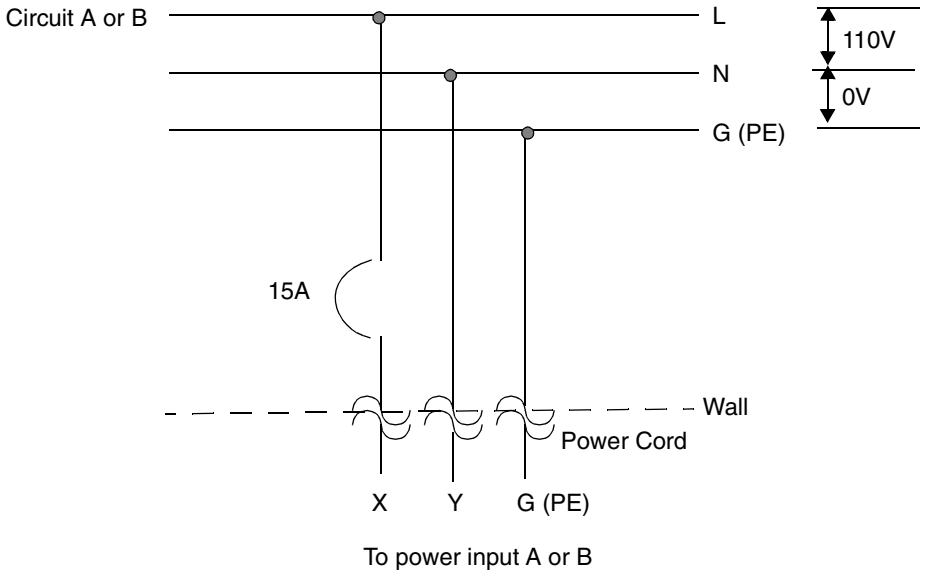


Figure A-4 shows a single-phase 220-VAC circuit connection. Note that this application requires a double-pole circuit breaker.

Figure A-4. Single-Phase 220-VAC Circuit Connection

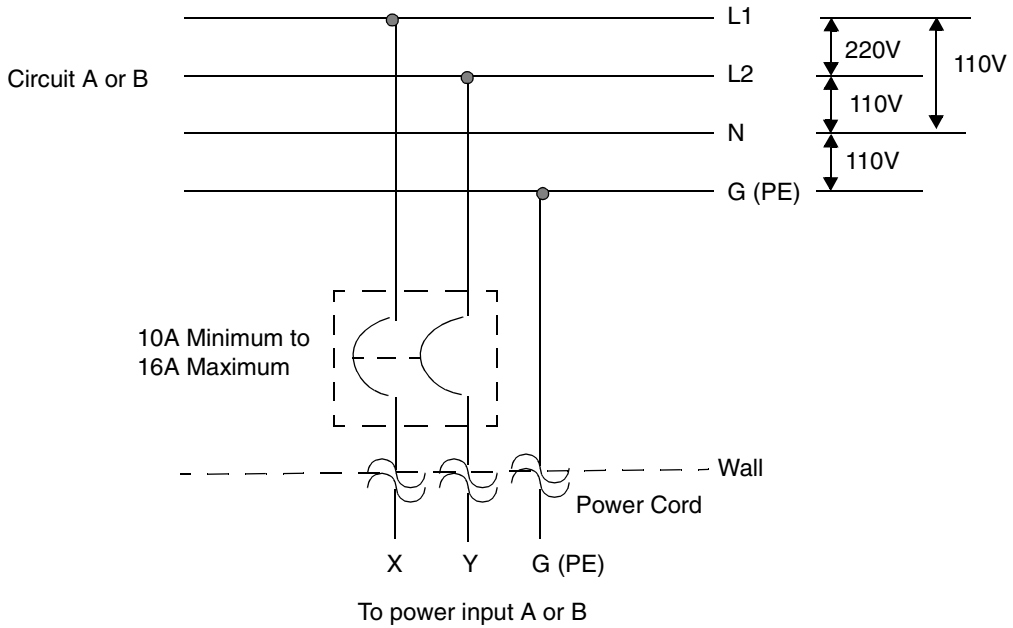


Figure A-5 shows a three-phase 208-VAC, Y-, or Δ-source circuit connection, which is a phase-to-neutral source connection. Note that the ftServer X input may be connected from L1, L2, or L3. This application requires a single-pole circuit breaker.

Figure A-5. Three-Phase 208-VAC, Y-, or Δ-Source Circuit Connection, Phase-to-Neutral

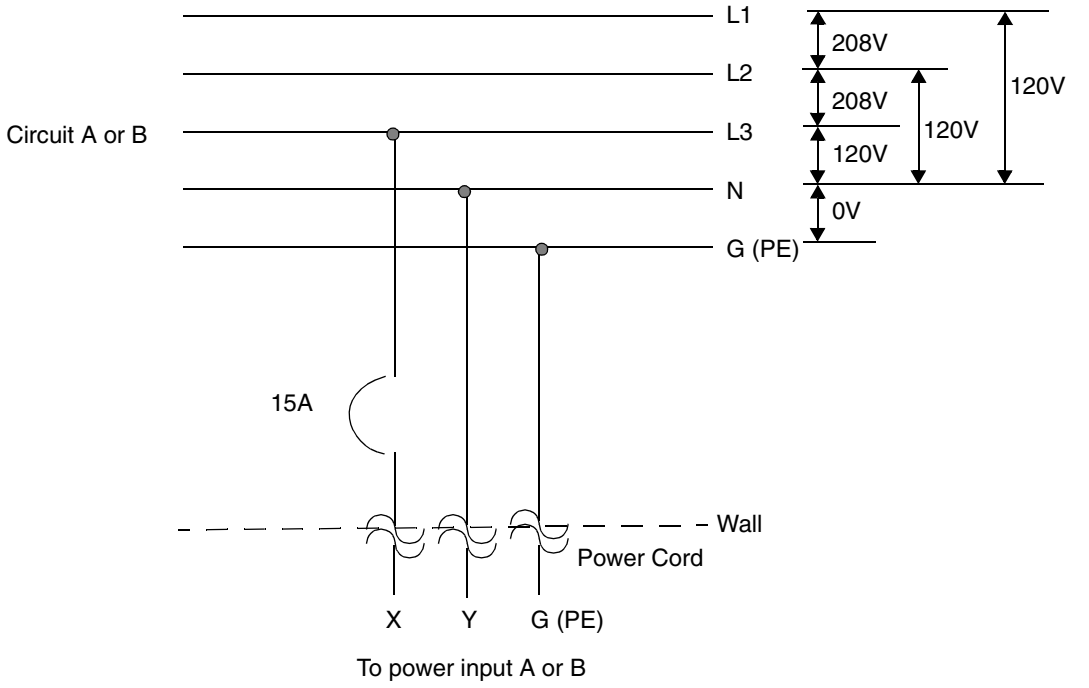


Figure A-6 shows a three-phase 208-VAC, Y-, or Δ-source circuit connection, which is a phase-to-phase source connection. Note that the ftServer X and Y inputs may be connected from L1 and L2, L2 and L3, or L1 and L3. This application requires a double-pole circuit breaker.

Figure A-6. Three-Phase 208-VAC, Y-, or Δ-Source Circuit Connection, Phase-to-Phase

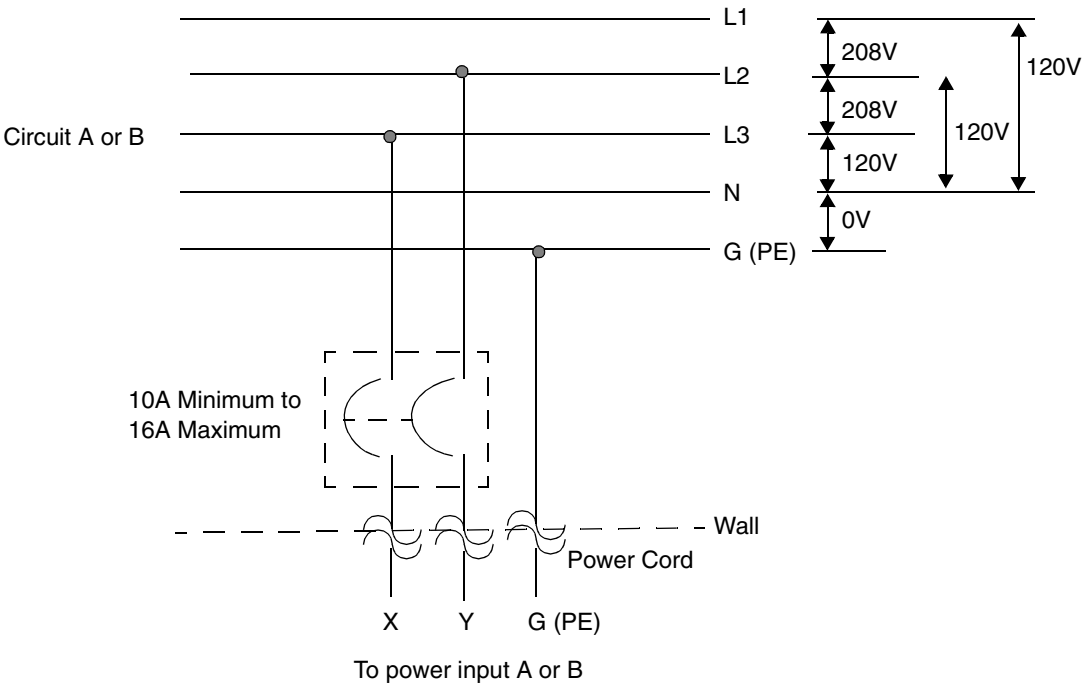
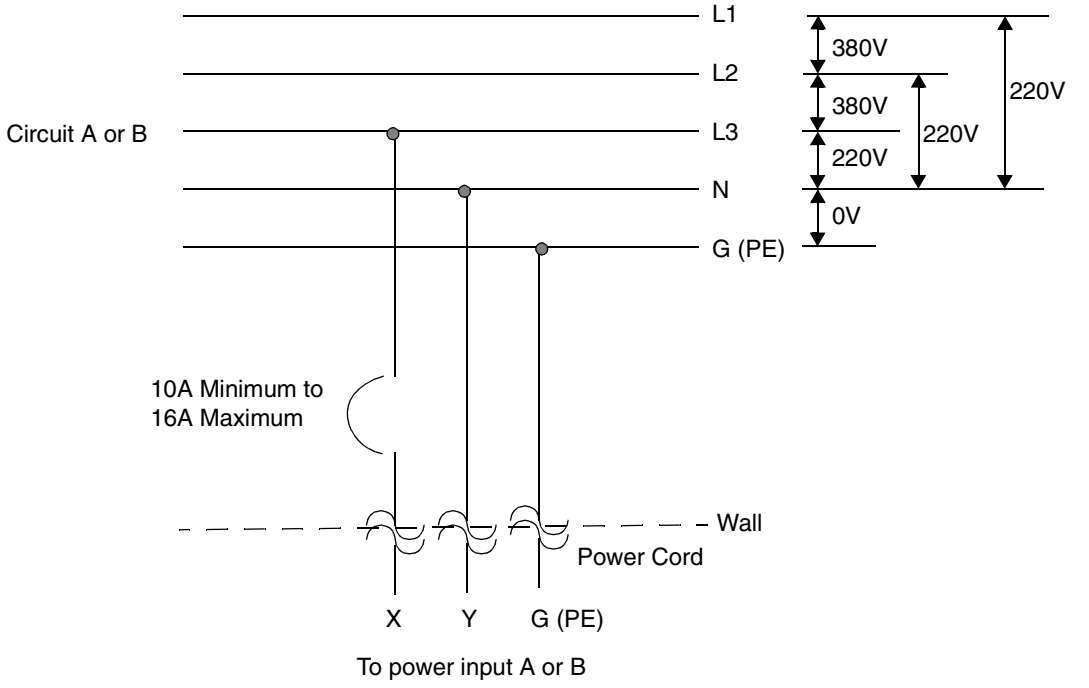


Figure A-7 shows a three-phase 380-VAC, Y-, or Δ-source circuit connection, which is a phase-to-neutral source connection. Note that the ftServer X input may be connected to L1, L2, or L3. This application requires a single-pole circuit breaker.

Figure A-7. Three-Phase 380-VAC, Y-, or Δ-Source Circuit Connection, Phase-to-Neutral



Electrical Power Connectors

The tables in this section describe the power receptacles that support power cords that Stratus provides for the cabinet power supply, tape drives, and the UPS.

Make sure that the site provides at least one of the power receptacles listed in Table A-1 or Table A-2. If you are not using a UPS, make sure the site provides a second receptacle of the same type.

If you are using a UPS, make sure the site provides an appropriate receptacle for the UPS power cord. For more information, refer to Table A-3 and Table 3-7 or to the UPS manufacturer's Web site.

WARNING

Use only the power cords you receive from Stratus.

DO NOT MODIFY THE POWER CORDS you receive from Stratus.

Failure to comply with this warning will void agency certification.

Failure to comply with this warning can cause a fire hazard.

To determine which power receptacle you need, see one of the following tables:

- Table A-1 illustrates and describes the power receptacles that accommodate the straight-blade NEMA plugs on power cords that Stratus provides.
- Table A-2 illustrates and describes the power receptacles that accommodate the plugs on power cords that Stratus provides.
- Table A-3 illustrates and describes the power receptacles that accommodate the twist-lock NEMA plugs on power cords that Stratus provides.

Table A-1. Power Receptacles for Straight-Blade NEMA Plugs

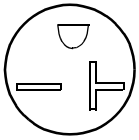
Connector	Configuration	Rating	Description
NEMA 6-20		20A, 250V	2-pole, 3-wire

Table A-2. Power Receptacles for International Connectors

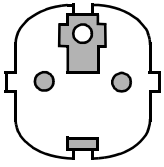
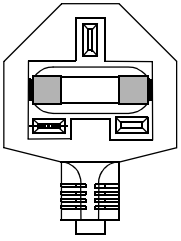
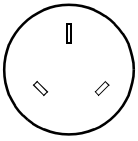
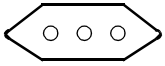
Connector	Configuration	Rating	Description
Type VII G (CEE7) Europe		20A, 250V	2-pole, 3-wire
BS 1363/A Great Britain and India		13A, 250V	2-pole, 3-wire
Type SAA/3/15 AS/NZS 3112-1993 Australia and New Zealand		15A, 250V	2-pole, 3-wire
Type I/3/16 (CEI-23-16) Italy		16A, 250V	2-pole, 3-wire

Table A-2. Power Receptacles for International Connectors *(Continued)*

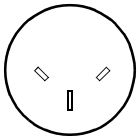
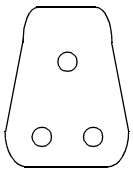
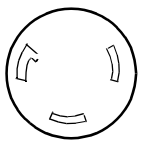
Connector	Configuration	Rating	Description
SI 32/1971 Israel		16A, 250V	2-pole, 3-wire
SABS 164-1 BS546 South Africa		16A, 250V	2-pole, 3-wire

Table A-3. Power Receptacles for Twist-Lock Connectors

Connector	Configuration	Rating	Description
NEMA L6-30		30A, 125/250V	2-pole, 3-wire

Appendix B
Standards Compliance

ftServer 5240 and 6500 systems comply with the electromagnetic interference (EMI), immunity, safety, and noise regulations listed in Table B-1 through Table B-4. All necessary agency labels are on the system.

NOTES

1. **This system must be configured with the components listed and described in the product configuration specifications. Deviations from this list of components will void agency certification.**
2. You must install all wiring, including power and communications cables, in compliance with local and national electrical code (in the United States, national electrical code NFPA 70). In addition, you must use shielded communications cables to remain in compliance with Federal Communications Commission (FCC) and other international EMC regulations.
3. All EMC emissions compliance tests are performed at a third-party certified test laboratory. You can obtain compliance reports for these tests from your Stratus account representative, who will contact the Product Compliance Group in the Stratus engineering organization.

Table B-1. EMI Standards

Standard	Description	Country/Region
FCC Part 15 Class A	Code of Federal Regulations 47 (1998) Class A	North America
EN 55022	Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment	European Union

Table B-1. EMI Standards *(Continued)*

Standard	Description	Country/Region
AS/NZS 3548	Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment	Australia/New Zealand
CNS13438	Chinese National Standard 13438	Taiwan
VCCI Class A	Voluntary Control Council for Interference by Information Technology Equipment	Japan

Table B-2. Immunity Standards

Standard	Description	Country/Region
EN 50082-1	Generic Immunity Standard, Electromagnetic Compatibility, Residential, Commercial, and Light Industrial	European Union
EN 55024	Limits and methods of measurement of immunity characteristics of Information Technology Equipment	European Union

Table B-3. Safety Standards

Standard	Description	Country/Region
UL 60950	Safety of Information Technology Equipment	North America
EN 60950	Safety of Information Technology Equipment	European Union

Table B-4. Noise Standards

Standard	Description	Country/Region
ISO 9614-2	Acoustics. Determination of Sound Power Levels of Noise Source using Sound Intensity	European Union
ISO 7779	Measurements of Airborne Noise emitted by Computers and Business Equipment	European Union

VCCI Note

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI Note

警告使用者
這是甲類的資訊產品、在居住的環境中使用時、可能會造成射頻干擾、在這種情況下、使用者會被要求採取某些適當適對策

Appendix C
Hardware Replacement and System Support

Hardware replacement and system support services require a service agreement and are handled through the CAC or an authorized Stratus service representative. Support services are facilitated by the Stratus ActiveService Network (ASN), a worldwide network with secure dial-back capabilities.

If the system is covered by a service agreement, you can receive advanced parts exchange and support services as outlined in your agreement. Support coverage can include remote system support and monitoring, telephone support, electronic support services, and hardware remedial services.

The Stratus service model enables you to replace *customer-replaceable units* (CRUs) in accordance with the procedures explained in the documentation provided with your system. All *field-replaceable units* (FRUs) require replacement by authorized service personnel. All *distributor-replaceable units* (DRUs) must be returned to your distributor for repair or replacement. If you are unsure whether the part needing replacement is a CRU, FRU, or DRU, contact the CAC or your authorized Stratus service representative, or see the following Stratus Web page:

http://www.stratus.com/support/ftserver/parts.htm

This Web page provides links to illustrations of the CRUs, FRUs, and DRUs in Stratus systems.

If you suspect that a CRU has failed, and the system is not covered by a service agreement but is still under warranty, contact the party from whom you purchased your system for return instructions. You may also obtain return instructions from your local Stratus sales offices; from the Stratus ftServer Service Warranty Parts Replacement Process and Return Instructions Web page http://www.stratus.com/support/ftserver/partreturn.htm; or from your local authorized Stratus service representative. These sources can also provide you with information about the customer service assistance options available to you.

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