Stratus ftServer T Series:
Site Planning Guide

Stratus Technologies
R001L-02

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Preface

Purpose of This Manual

The *Stratus ftServer T Series: Site Planning Guide* (R001L) documents the site requirements and customer responsibilities related to preparing a site for the installation of ftServer T 30 and T 60 systems.

Audience

This manual is intended for those responsible for preparing a site for the installation of ftServer T 30 and T 60 systems.

Revision Information

This manual is a revision. This revision incorporates the following changes:

- It documents information about the AA-P86600 DC-to-AC power inverter.
- It documents the D548 storage enclosure and the U532 Fibre Channel PCI Adapter.
- It documents new tape-drive options.

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.

- 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*

Getting Help

If you have a technical question, you can find the latest technical information at the Stratus Technical Support Web site:

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

If you are unable to resolve your questions with the help available at this online site and the ftServer T Series system is covered by a service agreement, you can contact the Stratus Customer Assistance Center (CAC) or your authorized Stratus service representative. For information about how to contact the CAC, see the following Web address:

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

Regulatory Notice

All regulatory notices are provided in Appendix C, ‘‘Standards Compliance.”

Chapter 1
Site Planning for ftServer T Series Systems

ftServer T Series systems are fault-tolerant systems designed specifically for telecommunications service providers. In addition to its fault-tolerant system architecture, Stratus provides fault-hardened device drivers, which enhance application reliability and availability.

For an overview of the information you need to know and the tasks you need to perform to prepare a site for ftServer T Series systems, see:

- "Site Planning Overview"
- "Site Planning for Fault-Tolerant Systems"
- "Site Planning Checklist"
- "System Documentation"

For detailed site planning information, see:

- Chapter 2, "Cabinet and Monitor Requirements"
- Chapter 3, "Space Planning"
- Chapter 4, "Electrical Power Planning"
- Chapter 5, "Network and Telephone Line Planning"
- Chapter 6, "ftServer T Series Rack Configuration Planning"
- Appendix A, "System Specifications"
- Appendix B, "Electrical Circuit and Wiring Information"
- Appendix C, "Standards Compliance"

Site Planning Overview

Site planning for fault-tolerant systems includes:

- Space planning

  Provide adequate space for the system or cabinet and for a desk or table to accommodate components outside a cabinet. Also provide enough space for servicing the systems and components.

- Purchasing an appropriate cabinet and monitor

  If you do not purchase a cabinet from Stratus, ensure that the cabinet you plan to use meets the system's requirements. If you do not purchase a monitor from Stratus, make sure that the monitor you plan to use meets ftServer T Series system requirements.

- Electrical (DC) power planning

  For DC-powered ftServer T 30 CO systems, provide a nominal input voltage of 48 VDC. The input voltage should be at least 42.75 VDC and no more than 56.7 VDC.

- Electrical (AC) power planning

  For AC-powered ftServer T 30 AC and T 60 AC systems, determine AC power requirements as shown in ''AC-Powered Systems'' on page 4-7. Stratus does not supply or support uninterruptible power supplies (UPS) for ftServer T Series systems.

- Network and telephone line planning

  Provide sufficient network and analog telephone lines.

Use the ''Site Planning Checklist'' on page 1-4 to ensure that you prepare your site properly for your ftServer T Series system and to track your site-preparation progress.

For a list of other documents related to your ftServer T Series system, see ''System Documentation'' on page 1-7.

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

If your system is covered by a service agreement and you need help with site planning, contact the Customer Assistance Center. If you have contracted with the CAC for installation of the system, contact them after you have prepared the installation site and moved the system to the site. For more information about the CAC, see Getting Help in the Preface or the CAC web site at:

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

Refer to Appendix A, ‘‘System Specifications,” for ftServer T Series system specifications and to the *Stratus ftServer Systems Peripherals Site Planning Guide* (R582) for specifications of other components.

Site Planning for Fault-Tolerant Systems

In addition to the usual site planning tasks, such as planning sufficient DC electrical power and providing network connections, consider the following specific fault-tolerant features of ftServer T Series systems:

- Lockstep technology in ftServer T Series systems means that the systems contain 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, plan for replicated core system components including motherboards, processors, memory, I/O buses, and PCI adapters.

  Consequently, site planning includes planning for two CPU enclosures and for pairs of:

  – I/O enclosures
  – Ethernet network ports
  – PCI adapters
  – DC power inverters
  – Power receptacles

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

  Connecting a system to the ASN allows the CAC to remotely diagnose, troubleshoot, and resolve problems online.

To enable connectivity to the ASN, which allows the CAC to remotely manage the system, the system contains an external modem. With an external modem, ASN connectivity is only possible if the operating system is operational.

Site Planning Checklist

Referring to the information in this document, answer the questions in the following sections.

Planning for ActiveService Network Connectivity

❏ Do you have an external analog telephone line available for the external modem to connect to the Stratus ASN?

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 due to disconnections. If you must use a PBX, do not route the telephone extension through a switchboard; instead, provide a direct-dial analog number.

❏ Do you have an additional telephone line and telephone near the operator's station for voice communications when calling for support?

Planning for Optional Components

❏ Does your system include any of the following optional PCI adapters for network communications or external storage connectivity? If so, indicate how many of each and plan network connections accordingly.

Adapter	Number of Adapters
U574 Dual-Port Fiber Gigabit Ethernet Adapter	
U575 Dual-Port Copper Gigabit Ethernet Adapter	
U918 Four-Port T1/E1 PCI Adapter	
U532 Fibre Channel PCI Adapter	

❏ Will you supply your own monitor, or will you use a monitor supplied by Stratus? Is the monitor rack-mountable, or do you need to provide a table or desk?

❏ Do you require a keyboard and mouse?

NOTE

Use only the USB keyboard and mouse supplied by Stratus.

- ❏ Does your system include any D548 storage enclosures?
- ❏ Does your system include any external tape drives? Do you need to provide a table or desk?

  Each core I/O enclosure in an ftServer T Series system contains an external SCSI port that you can use to connect the system to tape drives. The system supports up to three tape drives per core I/O enclosure.

Planning Power for ftServer T 30 CO Systems

For ftServer T 30 CO systems, provide a nominal input voltage of 48 VDC. The input voltage should be at least 42.75 VDC and no more than 56.7 VDC. If you have an optional tape drive, you must provide an external AC power source for it at the site.

- ❏ What are the lengths and types of the power cables provided with your system?
- ❏ What are the lengths and types of the ground cables provided with your system?
- ❏ Will you use a tape drive, D548 storage enclosures, or other optional, AC-powered components?

Planning Power for ftServer T 30 AC and T 60 AC Systems

- ❏ What optional, AC-powered components will you use?
- ❏ What are the AC power requirements of your system?
- ❏ Is the AC power service wired properly?
- ❏ What are the lengths and types of the power cords provided with your system?

Planning Space for Your System

- ❏ Will your system and its external components fit where you plan to place them?
- ❏ What is the height of the cabinet you will use, and what is the total height of the systems and components that will be installed in the cabinet?
- ❏ How many systems and optional components will be housed in the cabinet? What components will be located outside the cabinet?
- ❏ What are the lengths and types of all interface and communication cables provided with your system?
- ❏ Have you created a 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 and voice communication connections.

On the sketch, show the following:

- Location of the system and its external components
- Power cords, and telephone and interface cables
- Locations of DC and AC power receptacles, phone jacks, Ethernet jacks, switches, and/or hubs

NOTE

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

Working with Other Groups

❏ Have you provided your facilities group and/or contractors with the sketch and copies of the following?

- "DC Operation Power Service Requirements" on page 4-5 or "AC Operation Power-Service Requirements" on page 4-7
- Table 4-6 through Table 4-8, which provide worksheets for determining AC power requirements
- Table 4-9 and Table 4-10, which provide worksheets for determining power outlet requirements
- Appendix B, "Electrical Circuit and Wiring Information"
- Any notes you have taken about site planning

❏ Have you reviewed and discussed the requirements with the facilities personnel and/or contractors to ensure that all site modifications are understood and implemented?

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

System Documentation

When you receive your system, you will receive the following printed documents:

- Either a *Stratus ftServer T 60 Systems: Installation Guide* (R011L) or a *Stratus ftServer T 30 Systems: Installation Guide* (R002L)
- The warranty for your system

You will also receive a system documentation CD-ROM containing the documents in Table 1-1. The documents are in Adobe® Acrobat® PDF format.

Table 1-1. ftServer T Series Documents *(Page 1 of 2)*

Document	Task
Stratus ftServer T Series: Site Planning Guide (R001L)	Prepare a site for installation of a system
Stratus ftServer T 30 Systems: Installation Guide (R002L) or *Stratus ftServer T 60 Systems: Installation Guide* (R011L)	Install a system, including mounting the system in a cabinet Find the part number of a customer-replaceable unit (CRU) Start the system for the first time
Stratus ftServer System Administrator's Guide for the Linux Operating System (R003L)	Install, update, and restore Linux operating system software and ftServer System Software for the Linux Operating System (ftSSS) Update firmware and hardware Install, replace, and extend system hardware Manage data storage, SCSI, and serial devices Set up and administer a system Install and maintain Linux packages Install and configure simple network management Troubleshoot ftServer T Series systems

Table 1-1. ftServer T Series Documents *(Page 2 of 2)*

Document	Task
Stratus ftServer T 30 Systems: Operation and Maintenance Guide (R004L) or *Stratus ftServer T 60 Systems: Operation and Maintenance Guide* (R012L)	Start up, shut down, and operate a system Troubleshoot system hardware Remove and replace CRUs
Release Notes: Stratus ftServer System Software for the Linux Operating System (R005L)	Learn the contents of the latest ftSSS release Learn the latest information about the product Learn about significant known problems and how to work around or avoid the problems
Read Me First: Unpacking an ftServer T 30 System (R006L) or *Read Me First: Unpacking an ftServer T 60 System* (R010L)	Inspect and unpack ftServer T Series hardware
Stratus D540 and D548 Storage Enclosure Connection Guide (R554)	Connect a D548 storage enclosure to an ftServer T Series system Learn how to use a D548 storage enclosure with an ftServer T Series system
Stratus ActiveService Network Configuration Guide (R013W)	Use the ActiveService™ Manager (ASM) to create an ASN configuration file for your ftServer T Series system
Stratus ftServer Systems Peripherals Site Planning Guide (R582)	Prepare a site for the installation of system peripherals.

Ordering Additional Printed Documentation

To order additional copies of the ftServer T Series system documentation, 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. 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 the book title and page numbers.

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

Chapter 2
Cabinet and Monitor Requirements

If you are supplying your own cabinet and monitor for use with ftServer T Series systems, see the following requirements:

- "Cabinet Requirements"
- "Monitor Requirements"

If you are not supplying your own cabinet and monitor go to Chapter 3.

Cabinet Requirements

If you are providing your own cabinet for the ftServer system, make sure the cabinet contains a 19-in. wide rack that meets the Electronic Industries Association (EIA) 310-D standard.

For system cabinet requirements, refer to one of the following sections:

- "Cabinet Requirements for All ftServer T Series Systems"
- "Additional Cabinet Requirements for ftServer T 60 AC Systems"
- "Additional Cabinet Requirements for ftServer T 30 Systems"

The following considerations apply to systems in cabinets.

- Elevated Operating Ambient Temperature- If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might

have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Cabinet Requirements for All ftServer T Series Systems

Use a cabinet that is either 24U or 38U high. One U equals 1.75 inches (4.45 cm). A cabinet depth of 1000 mm ensures that you can close the rear door.

Make sure that:

- The cabinet contains two front and two rear vertical EIA rails, one in each corner of the cabinet, that have the EIA universal square-hole pattern as defined in the EIA 310-D specification.

  NOTE

  ftServer T Series systems do not support the EIA wide square hole pattern.

- The front vertical rails extend at least 0.5 in. (1.27 cm) beyond the inside edge of the accessory leg, if present, to allow the mounting rails to be fitted. See Figure 2-1.
- The distance between the front vertical rails and the inside of the front door is at least 3.0 in. (7.62 cm).
- The distance between the rear of the system chassis and the inside of the rear door is at least 6.0 in. (15.24 cm).
- The vertical mounting rails are plated, or some other method is used to ensure continuity for grounding between installed equipment.
- Cable-management brackets are provided to support and constrain data and power cords so that the cables do not interfere with air flow out of the rear of the enclosures, and so that the connectors do not disconnect or break.
- The cabinet provides enough stability so that system components pass Telcordia GR-63-CORE Section 4.4 regulations for earthquake vibration (Zone 4), operation vibration, and transport vibration.
- To prevent stray voltages, all components are grounded together through the vertical mounting rails to the cabinet frame, and then to ground and also to local building ground. To ensure signal quality, use a grounding cable provided by Stratus for local building ground.
- There is a plan for maintaining cables and wires to the cabinet by either running them under the floor or placing them overhead in a power bus.
- Air flows through the cabinet from front to back.
- Air does not recirculate within the cabinet.
- Filler panels cover any unused rack space to prevent air recirculation.

- Blockers are installed between the vertical mounting rails and the side panels at the rear of the cabinet.
- Vents are evenly distributed on the front and rear doors and comprise at least 63% of the surface area. Door frame width must be kept to a minimum to maximize the available open area.

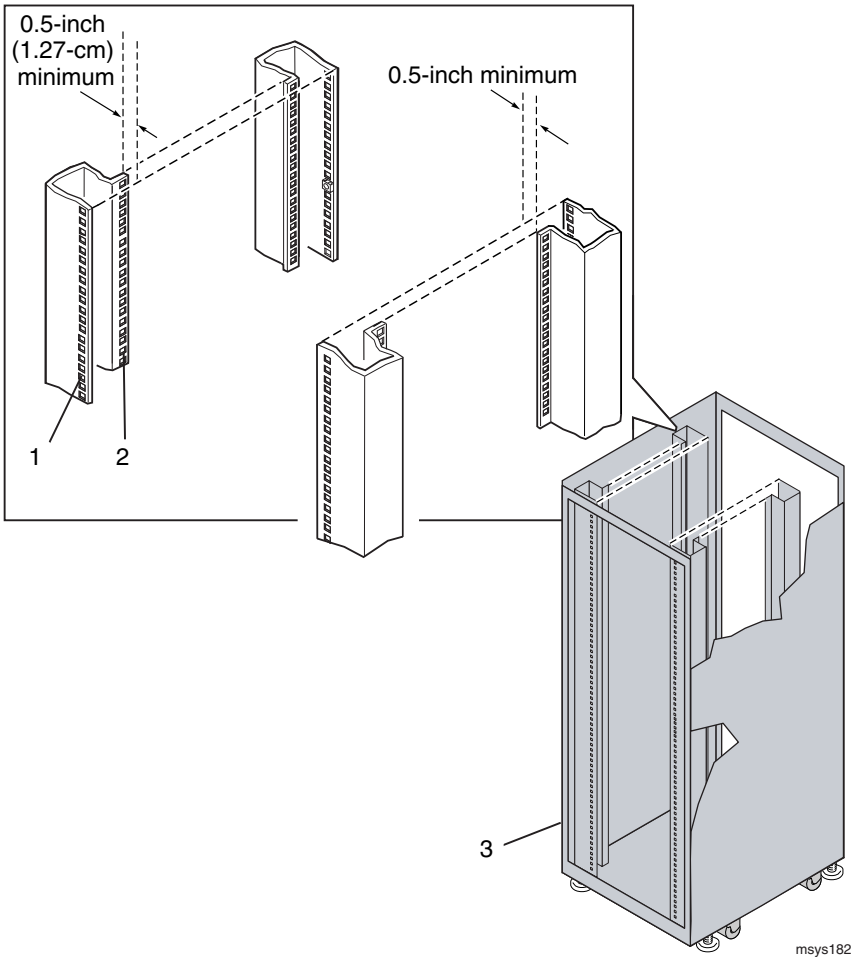
NOTE

If your cabinet does not have vented front and rear doors, remove the doors from the cabinet while the ftServer system is operating.

- The final installation conforms to all emission, immunity, safety, and other applicable regulations.

Figure 2-1 shows the required rail clearance between the front vertical rails and the inside edge of an accessory leg.

Figure 2-1. Rail Clearance



1 Front vertical EIA rail

2 Accessory leg

3 Front of cabinet

Additional Cabinet Requirements for ftServer T 60 AC Systems

The ftServer T 60 AC system consists of a 10U system, rack mountable in a customer-supplied cabinet.

Make sure that:

- A 24U cabinet can support at least 900 lb (410 kg) to support allowed configurations and components for a 24U cabinet.
- A 38U cabinet can support at least 1100 lb (500 kg) to support allowed configurations and components for a 38U cabinet.
- The distance between the front and rear vertical rails is 27 in. (68.58 cm).
- The vertical mounting rails accept 10/32 screws.

Additional Cabinet Requirements for ftServer T 30 Systems

The ftServer T 30 system consists of a 6U system, rack mountable in a customer-supplied cabinet.

Make sure that:

- The distance between the front and rear vertical rails is between 24.5 in. and 30 in. (62.23 cm and 76.20 cm).
- The vertical mounting rails accept M-5 cage nuts and mounting hardware.

Monitor Requirements

If you are using a monitor that is not supplied by Stratus, make sure that:

- The monitor accepts universal 100–240 VAC, 50–60 Hz power.
- The VGA-compatible SVGA connector has a 15-pin D-sub connector at the cable end.
- The power cord for the monitor is long enough to reach the power source.
- The plug type on the power cord is compatible with the external power source at the site.

NOTE

Use the keyboard and mouse provided by Stratus.

Chapter 3
Space Planning

For information about planning sufficient space for your ftServer T Series system, see:

- "Room Requirements"
- "Planning for Cables"

Room Requirements

To ensure that the installation site provides a properly equipped, cooled, and sized environment, make sure that the site:

- Provides clearances for air circulation and servicing the system

  Locate the front and rear of the system at least 2.5 ft. (0.76m) away from walls and other obstructions.

- Maintains reasonable temperature and humidity levels and has a thermometer and humidistat to monitor room temperature and humidity
- Is as free of dust as possible

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

- Provides a table or desktop for external devices such as a telephone, tape drives, and an external monitor or LCD display, keyboard, and mouse
- Provides cutouts in the floor for routing cables, if the site has an elevated floor

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.

Planning for Cables

To accommodate cables from the ftServer T Series system, make sure to provide:

- Two telephone lines:
  - One telephone line for use when calling for service
  - One telephone line for the ASN connection to the modem
- Modem placement within 39 in. (1m) of the ftServer T Series system, unless you provide your own AC power and signal cables
- Ethernet jacks, switches, or hubs as needed
- For DC-powered ftServer T 30 CO systems, provide a nominal input voltage of 48 VDC. The input voltage should be at least 42.75 VDC and no more than 56.7 VDC

  NOTE

  DC power cables generally have a wider diameter than AC cables. Be sure to leave enough space for the wider curves these cables require.

- For AC power: sources as required

  NOTE

  Stratus does not provide uninterruptible power supply (UPS) units for ftServer T Series systems.

- For optional components: AC wall outlets within reach of the power cords from the components, or use PDUs

Make sure that any cables you plan to connect to the system are long enough to reach between the system and external components or connections. Table 3-1 lists the cables Stratus supplies and, for space planning, specifies the lengths of each cable.

Table 3-1. Cables Supplied by Stratus

Component	Cable Description	Length
1U LCD display	One VGA cable attached to the LCD display and that connects to the VGA port in the I/O panel	72 in. (183 cm)
	One USB cable attached to the LCD display and that connects to another USB cable, which is connected to the system	72 in. (183 cm)
Table-top LCD display, keyboard, and mouse	One VGA cable attached to the LCD display and that plugs into the VGA port in the I/O panel	72 in. (183 cm)
	One USB cable attached to the keyboard and that plugs into a USB port in the I/O panel	72 in. (183 cm)
	One USB cable attached to the mouse and that plugs into the keyboard USB hub	72 in. (183 cm)
BHFCA-EY, T521, or T522 rack-mounted tape-drive enclosure	One SCSI-3 high-density cable with one 0.8 mm VHDC connector and 68-pin SCSI-3 connector, which connects to the SCSI port on the back of the I/O enclosure	10 ft. (305 cm)
		30 ft. (915 cm)
Second tape drive in a BHFGA-EY or T522 tape-drive enclosure	One SCSI-3 daisy-chain cable with a 68-pin SCSI-3 connector at each end	3 ft. (91.5 cm)
ER-SL1AA-YF or ER-SL2AA-YF SuperLoader™ 3 tape-drive enclosure	One SCSI-3 high-density cable with one 0.8 mm VHDC connector and 68-pin SCSI-3 connector, which connects to the SCSI port on the back of the I/O enclosure	10 ft. (305 cm)
		30 ft. (915 cm)
D548 storage enclosure	Two Fibre Channel optical cables	6.5 ft. (2m)
External modem	One modem extension cable Global adapters are provided in the localization kit.	39 in. (1m)
Cabinet ground-leakage cable	10AWG ground-leakage cable with 1/4 in. (6.35 mm) and M8 ring lugs	15 ft. (4.6m)

Chapter 4
Electrical Power Planning

Stratus ftServer T 30 central office (CO) systems connect to DC power sources. ftServer T 30 AC and ftServer T 60 AC systems connect to AC power sources. For information about planning appropriate electrical power for your ftServer T Series systems, see:

- "Redundant Power Sources"
- "Grounding Requirements"
- "DC-Powered Systems"
- "AC-Powered Systems"
- "AC Power Cords Supplied by Stratus"

Redundant Power Sources

All ftServer T Series systems require at least two separate and independent electrical power sources. Think of them as the *A-side* power source and the *B-side* power source. Either side must be capable of continuing to provide power if power to the other side is lost. DC-powered systems require two DC power sources, and AC-powered systems require two AC power sources.

Grounding Requirements

The ftServer T Series system obtains an earth reference ground via independent ground connections to the cabinet frame. Ensure that a high-integrity safety-ground conductor is installed as part of the wiring system (in accordance with Bellcore standards).

WARNING

Incorrect grounding can cause severe personal injury and extensive equipment damage.

See "Grounding Considerations" in Appendix B for a more complete discussion of ftServer T Series grounding.

DC-Powered Systems

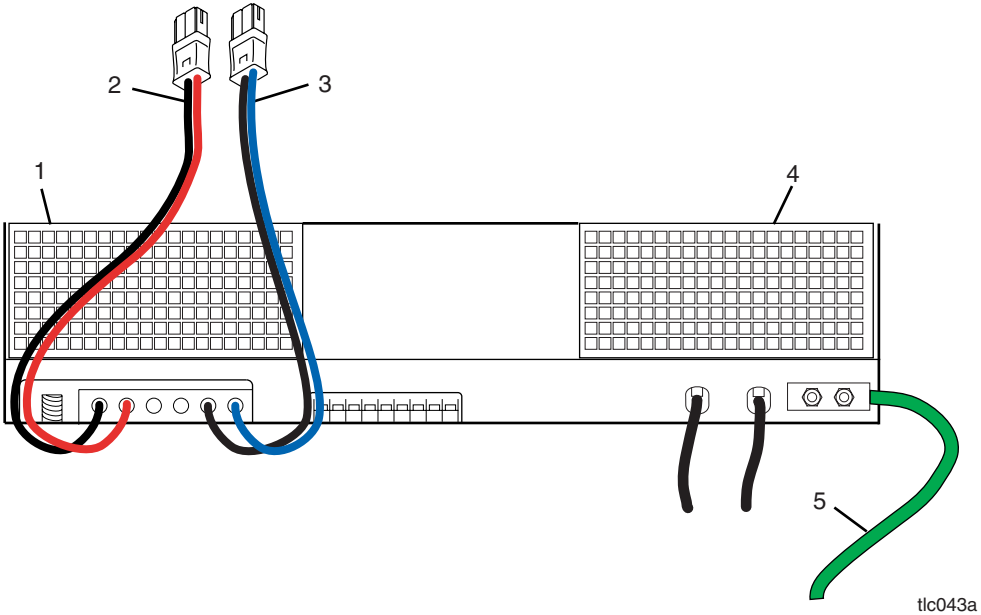
You must provide two separate DC power sources to supply power to two DC-to-AC power inverters. Both inverters supply AC power to the ftServer T 30 CO systems. One of the sources must also provide power for the ASN modem and a V128 monitor unit, if purchased. The inverter units contain no user serviceable parts. This section includes the following topics:

- "DC Power Connection Information"
- "DC Operation Power Service Requirements"
- "AC Power Service Requirements"
- "DC Power and Ground Cables"

DC Power Connection Information

Stratus supplies power cables to connect each inverter's DC input cable to the CO power supply. Figure 4-1 shows the DC input and ground cables on the rear of the DC inverter assemblies.

Figure 4-1. AA-P86600 Inverter DC Input Cabling Diagram



1	B-side DC inverter	4	A-side DC inverter
2	A-side DC input cable	5	Chassis ground cable
3	B-side DC input cable		

NOTE

User-supplied DC power cables that connect directly from the CO supply to the DC inverter's DC input cable must use an Anderson Power Products® connector (Anderson part number SBS50BLU#6-BK) and two contacts (Anderson part number 1339G2-BK) at the inverter end.

User-supplied DC power cables that connect directly from the CO supply to the rear of the DC inverter must use a FCI- Burndy® ring lug connector (Burndy part number YAV6CL2TC14FX) at the inverter end.

Each inverter provides AC power to the system components through AC output "Y" cords. One end of each "Y" cord provides AC power to one side of the system. The other end provides AC power to external components. One cord has a T-plug adapter to provide one additional AC outlet.

Figure 4-2 shows how the AC output cables and splitters are connected to an ftServer T 30 CO system.

NOTE

The AC output cord T-plug adapter can be connected to either the A-side AC output cord or the B-side AC output cord.

The DC power inverters support only the ftServer T 30 CO system's CPU, I/O, monitor, and modem units. Only attach monitors supplied by Stratus to the DC inverters.

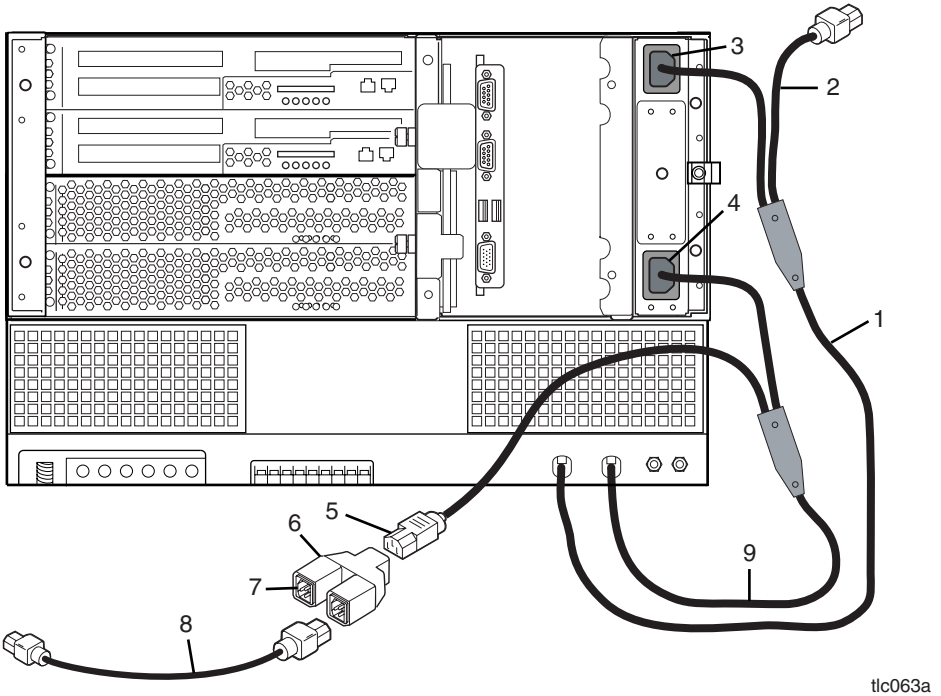
CAUTION

Do not connect tape drives, D548 storage enclosures, customer-supplied monitors, or other AC-powered components to the DC power inverters. Doing so may damage the inverters and the attached components.

Connect the tape drive directly to an AC wall outlet.

The D548 storage enclosure requires two separate power sources. Connect the two power cords from the storage enclosure directly to two electrically separate AC wall outlets.

Figure 4-2. AC Output Cabling Diagram



1 B-side AC output Y cord
2 Extra AC output connector (not for tape drive)
3 System backplane B-side receptacle
4 System backplane A-side receptacle
5 AC output connector
6 AC output cord T-plug adapter
7 Monitor receptacle
8 Modem jumper cord
9 A-side AC output Y cord

WARNING

Wiring must meet ftServer T 30 system needs and comply with local safety codes and requirements.

DC Operation Power Service Requirements

For DC-powered ftServer T 30 CO systems, provide a nominal input voltage of 48 VDC. The input voltage should be at least 42.75 VDC and no more than 56.7 VDC. The DC inverters provide AC power to the backplane, monitor, and modem. See Appendix B, ‘‘Electrical Circuit and Wiring Information” for electrical circuit and wiring information.

WARNING

Wiring must comply with local safety codes and requirements.

AC Power Service Requirements

The D548 storage enclosure and tape-drive units cannot be connected to any of the AC outputs from the DC inverters. For the tape drives, provide one external AC power source. For the D548 storage enclosure, provide two electrically separate external AC power sources. In Table 4-1, determine the external AC power requirements, in watts, for your tape drive and D548 storage enclosures. Ensure your site power planning supplies sufficient wattage. See Table 4-5 for the AC power-service requirements for these components.

Table 4-1. Tape Drive: External AC Power Requirements

System Component	Quantity		@ Power (Watts)		AC Power (Extended)
T521 or T522 tape-drive enclosure		x	500	=	
BHFCA-EY or BHGCA-EY tape-drive enclosure		x	85	=	
ER-SL1AA-YF or ER-SL2AA-YF tape-drive enclosure			80		
D548 storage enclosure			300		
TOTAL A-SIDE EXTERNAL POWER REQUIREMENTS					
D548 storage enclosure			300		
TOTAL B-SIDE EXTERNAL POWER REQUIREMENTS					

DC Power and Ground Cables

Stratus supplies tested and approved cables for the ftServer T 30 CO system. Table 4-2 lists these cables, their descriptions, and part numbers.

WARNING

User-supplied power or ground cables must meet ftServer T 30 system needs and comply with local safety codes and requirements.

Table 4-2. DC Power and Ground Cables

Ground Cables		
B52100-06	Inverter protective ground (Green/6AWG)	6 ft. (1.82m)
DC Input Cables - A side		
B52200-25	Inverter DC input cable (Red/Black/6AWG)	25 ft. (7.62m)
DC Input Cables - B side		
B52500-25	Inverter DC input cable (Blue/Black/6AWG)	25 ft. (7.62m)
DC Input Cable Pigtail		
B52300-20	Inverter DC extension cable (Red/Black/6AWG)	1.67 ft. (0.51m)
AC Output Y Cord		
B001157	Inverter AC output Y cord	
T-Plug Adapter		
AW-B52600	IEC-C14 to 2 IEC-C13 connectors (for optional and external components)	
AC Jumper Cord		
B50200-01M	Black (2 per T-plug adapter)	3.28 ft. (1m)

AC-Powered Systems

You must provide two separate AC power sources for ftServer T 30 AC and T 60 AC systems and for any D548 storage enclosures. This section includes the following topics:

- "AC Operation Power-Service Requirements"
- "AC Power-Outlet Requirements"
- "Connecting a System Directly to Two Separate AC Power Sources"

AC Operation Power-Service Requirements

You can connect the power sources to two PDUS in the rack or directly to the AC power receptacles on the system backplane and other system components. Stratus does not supply or support a UPS for the ftServer T 30 AC and T 60 AC systems.

NOTE

Each cabinet supports a maximum of six AC power cords, including cords for monitors, tape drives, and the modem. Use a PDU to minimize the number of power cords exiting from the cabinet.

Tables 4-3 and 4-4 describe the AC power nominal input line voltage (volts AC) and frequency (Hz) requirements for ftServer T 30 AC and T 60 AC systems, respectively.

Table 4-3. ftServer T 30 AC Systems: AC Power-Service Requirements

Component	Nominal Input Voltage; Frequency Range	Receptacle
Rack-mountable system	100–127 volts AC; 50–60 Hz	See Table 4-12.
Rack-mountable system	200–240 volts AC; 50 Hz	For Japan, NEMA 5-15. For other countries, see Table 4-13.
Rack-mountable system	200–240 volts AC; 50–60 Hz; high leakage current	See Table 4-13 or Table 4-14.

Table 4-4. ftServer T 60 AC Systems: AC Power-Service Requirements

Component	Nominal Input Voltage; Frequency Range	Receptacle
System	200-240 volts AC; 50–60 Hz	Locking receptacle. See Table 4-11.

Table 4-5 describes the AC power nominal input line voltage (volts AC) and frequency (Hz) requirements for optional components.

Table 4-5. Optional Components: AC Power-Service Requirements

Component	Nominal Input Voltage; Frequency Range	Receptacle
V128 LCD display	90-265 volts AC; 47–63 Hz	See Table 4-17.
T521 or T522 tape-drive enclosure	100-250 volts AC; 47–60 Hz	See Table 4-17.
BHFCA-EY or BHGCA-EY tape-drive enclosure	100-250 volts AC; 47–60 Hz	See Table 4-17.
ER-SL1AA-YF or ER-SL2AA-YF tape-drive enclosure	110-220 volts AC; 47–60 Hz	See Table 4-17.
D548 storage enclosure	100–240 volts AC; 50–60 Hz	See Table 4-17.
External modem power transformer	100–240 volts AC; 50–60 Hz	See Table 4-18.

WARNING

When ftServer T Series AC systems operate at voltages greater than 120 volts AC, the systems have high leakage current (greater than 3.5 mA). Stratus ships power cords with locking connectors for voltages higher than 120V. Use these locking connectors to ensure that the excess current is safely conducted to ground.

Use the following worksheets to determine AC power requirements for the site.

- In Table 4-6, determine the power requirements at the A-side power source.

  The A-side power source provides power to one side of each system and D548 storage enclosure, as well as to components that do not require two sources of power: rack-mounted tape-drive enclosures, a modem, and an LCD monitor unit.

- In Table 4-7, determine the power requirements at the B-side power source.

  The B-side power source provides power to the other side of each system and D548 storage enclosure.

- In Table 4-8, determine the power requirements for components outside of the cabinet. These components can share a power source with the A-side or B-side components.

WARNING

Wiring must meet ftServer T Series system AC system needs and comply with local safety codes and requirements.

See Appendix B, ‘‘Electrical Circuit and Wiring Information” for electrical circuit and wiring information.

To determine AC 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 (Watts) column, and enter the result in the AC Power (Extended) column.
3. Add the values in the AC Power (Extended) column, and enter the sum on the bottom line. This value indicates the maximum power requirement for each power source.

Table 4-6. Worksheet: Determining A-Side Power Requirements *(Page 1 of 2)*

System Component	Quantity		@ Power (Watts)		AC Power (Extended)
ftServer T 60 AC system		x	1300	=	
ftServer T 30 AC system		x	500	=	
V128 1U LCD unit		x	21	=	
D548 storage enclosure			300		
T521 or T522 tape-drive enclosure		x	500	=	
BHFCA-EY or BHGCA-EY tape-drive enclosure		x	85	=	
ER-SL1AA-YF or ER-SL2AA-YF tape-drive enclosure		x	80	=	
D548 storage enclosure		x	300	=	

Table 4-6. Worksheet: Determining A-Side Power Requirements *(Page 2 of 2)*

System Component	Quantity		@ Power (Watts)		AC Power (Extended)
TOTAL A-SIDE POWER REQUIREMENTS					

Table 4-7. Worksheet: Determining B-Side Power Requirements

System Component	Quantity		@ Power (Watts)		AC Power (Extended)
ftServer T 60 AC system		x	900	=	
ftServer T 30 AC system		x	500	=	
D548 storage enclosure		x	300	=	
TOTAL B-SIDE POWER REQUIREMENTS					

Table 4-8. Worksheet: Determining External Component Power Requirements

System Component	Quantity		@ Power (Watts)		AC Power (Extended)
External modem power transformer		x	5	=	
User-supplied components					
TOTAL EXTERNAL POWER REQUIREMENTS					

The following sections provide additional information about AC operation requirements:

- "AC Power-Outlet Requirements"
- "Connecting a System Directly to Two Separate AC Power Sources"

AC Power-Outlet Requirements

Use Table 4-9 and Table 4-10 to determine the number of power outlets to provide from A-side and B-side power sources.

To determine the number of power outlets required

1. In the Quantity column, write the number of each type of component.
2. Multiply the value in the Quantity column by the value in the A-Side Outlets or B-Side Outlets column, and enter the total in the Subtotal column.

3. Add the values in the Subtotal column, and enter the sum on the bottom line.

Table 4-9. Worksheet: Determining A-Side Power-Outlet Requirements

Component	Quantity		A-Side Outlets	Subtotal
ftServer T 30 AC or T 60 AC system		x	1	
Monitor		x	1	
ER-SL1AA-YF, ER-SL2AA-YF, BHFCA-EY or BHGCA-EY, T521, T522 tape-drive enclosure		x	1	
D548 storage enclosure			1	
TOTAL NUMBER OF A-SIDE POWER OUTLETS				

Table 4-10. Worksheet: Determining B-Side Power-Outlet Requirements

Component	Quantity		B-Side Outlets	Subtotal
Modem		x	1	
ftServer T 30 AC or T 60 AC system		x	1	
D548 storage enclosure			1	
TOTAL NUMBER OF B-SIDE POWER OUTLETS				

Connecting a System Directly to Two Separate AC Power Sources

Provide two AC power sources that are as electrically independent of each other as the installation site allows. The two power sources must at least be powered by separate AC power distribution circuit breakers and, if possible, be independent of each other beyond that level. The more electrical separation between the two power sources, the less likely that they will both fail at the same time. Due to redundancy in ftServer systems, power to either side of the system keeps duplexed components of the system operational.

NOTE

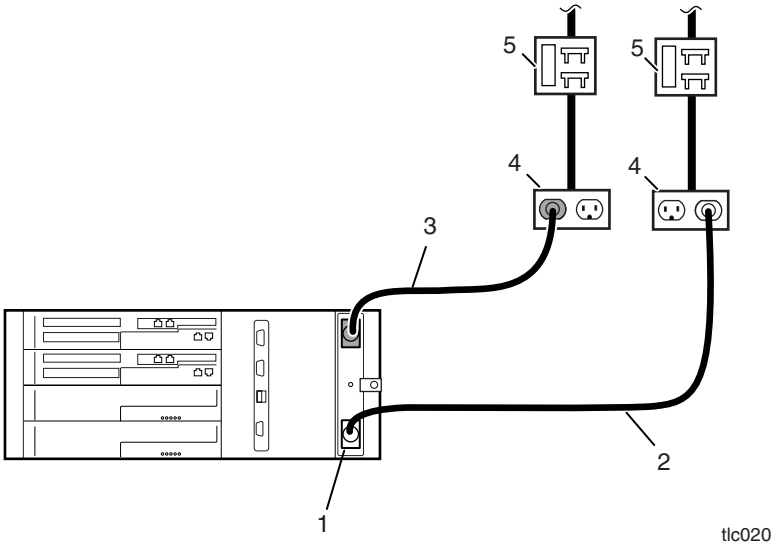
Stratus does not supply or support UPS equipment for ftServer T 30 or T 60 systems.

The A-side power source provides power to each system as well as to optional components such as a V128 1U LCD monitor unit or tape drive.

The B-side power source also provides power to each system, in stand-by mode (the B-side power source is used if power to the A-side source is interrupted). The wattage that the A-side power source must supply is always equal to or greater than the wattage the B-side power source must supply.

Figure 4-3 shows the power connections for an ftServer T 30 AC system connected directly to two separate power mains.

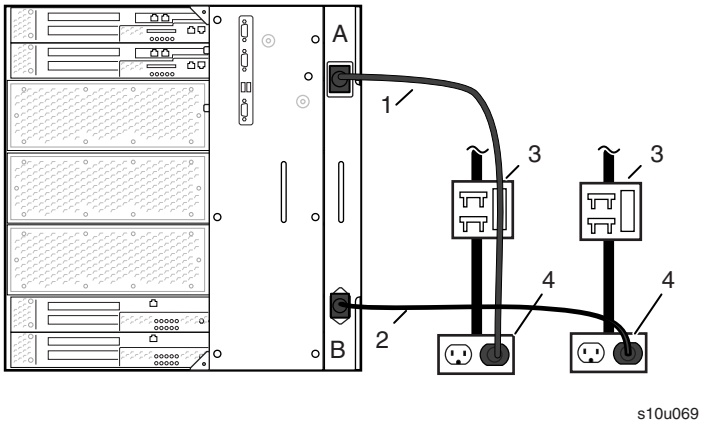
Figure 4-3. ftServer T 30 AC System Connected Directly to AC Power



1 System power receptacles
2 A-side system power cords
3 B-side system power cords
4 AC power outlet
5 AC mains distribution circuit breaker

Figure 4-4 shows the power connections for an ftServer T 60 AC system directly connected to two separate AC power sources.

Figure 4-4. ftServer T 60 AC System Connected Directly to AC Power



1	A-side system power cord	3	AC power distribution circuit breaker
2	B-side system power cord	4	AC power outlet

AC Power Cords Supplied by Stratus

Stratus supplies tested and approved AC power cords for:

- "ftServer T 60 AC System-Power Cords"
- "ftServer T 30 AC System-Power Cords"
- "Monitor, Tape-Drive, and Storage Enclosure AC Power Cords"
- "External Modem Power Cords"

WARNING

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

WARNING

User-supplied power cords must meet ftServer T Series system needs and must comply with local safety codes and requirements.

ftServer T 60 AC System-Power Cords

Table 4-11 lists the power cords that connect ftServer T 60 AC systems, which are rated at 200-240V and 50-60 Hz, directly to AC power. The first marketing ID in each pair is the power cord for the A-side; the second marketing ID is the power cord for the B-side.

Table 4-11. ftServer T 60 AC System-Power Cords: 200-240 Volts AC and 50–60 Hz

Locale	Voltage Rating	Current Rating	Plug Type	Length	Marketing ID
North America and Japan	250V	20A	NEMA L6-20	15 ft. (4.5m)	B50171-45M
					B50170-45M
International locking power cord	250V	16A	IEC 60309 (formerly IEC 309)	4.5m	B50154-45M
					B50153-45M

ftServer T 30 AC System-Power Cords

Tables 4-12, 4-13, and 4-14 list the power cords that connect ftServer T 30 AC systems directly to an AC power source (not to a PDU or to a UPS).

Table 4-12. ftServer T 30 AC System-Power Cords: 100–127 Volts AC and 50–60 Hz

Locale	Plug Type	Current Rating	Length	Marketing ID
Japan	NEMA 5-15	15	15 ft. (4.6m)	B50160-15
North America (Chicago)	NEMA 5-15	15	7 ft.	B50101-07
North America Domestic	NEMA 5-15	15	15 ft.	B50104-15

Table 4-13. ftServer T 30 AC System-Power Cords: 200–240 Volts AC and 50 Hz *(Page 1 of 2)*

Locale	Plug Type	Current Rating	Length	Marketing ID
Australia	AS/NZS 3112:1993	10	4.5m	B50124-45M
China	GB1002-1996	10	4.5m	B50162-45M
Continental Europe	CEE 7 VII	16	4.5m	B50112-45M

Table 4-13. ftServer T 30 AC System-Power Cords: 200–240 Volts AC and 50 Hz *(Page 2 of 2)*

Great Britain	BS 1363/A	13	4.5m	B50116-45M
Israel	SI 32:1971	16	4.5m	B50132-45M
Italy	CEI23-16	10	4.5m	B50136-45M
Switzerland	1011-S24507	10	4.5m	B50140-45M
South Africa and India	SABS164-1:1992 ZA/3	13	4.5m	B50152-45M

Table 4-14. ftServer T 30 AC System Power Cords: 200–240 Volts AC and 50–60 Hz

Locale	Plug Type	Current Rating	Length	Marketing ID
International	NEMA L6-20	20 A	4.5m	B50161-45M
International, locking power cord	IEC 60309 (formerly IEC 309) single-phase, 2-pole, 3-wire pin and sleeve connector	16 A	4.5m	B50153-45M

PDU Power Cords

The AA-P41104 PDU supplies power to ftServer systems. Table 4-15 lists the available power cords to connect PDUs directly to an AC power source.

Table 4-16 describes the gray and black power (*jumper*) cables that are provided to connect ftServer systems to PDUs.

Table 4-15. PDU Power Cords to AC Power

Locale	Plug Type	Rating	Length	Marketing ID
North America and Japan†	IEC 60320 (formerly 320) C19 to NEMA L6-20P	20A/250V 50–60 Hz	15 ft (4.5m)	B50155
North America	IEC 60320 C19 to NEMA L6-30P (Receptacle must be fused at no more than 20A)	30A/250V 50–60 Hz	15 ft	B50156
International †	IEC 60320 C19 to IEC 60309	20A/250V 50–60 Hz	15 ft (4.5m)	B50154

† Use this power cord to connect the PDU directly to the AC power mains.

Table 4-16. System Power (*Jumper*) Cables to a PDU

Length	Rating	Plug Type to System	Plug Type to PDU	Marketing ID
2.0m	10A/250V	IEC 320 C13	IEC 60320 (formerly IEC 320) C14	B50502

Monitor, Tape-Drive, and Storage Enclosure AC Power Cords

Table 4-17 lists the specifications of the power cords that connect monitors, tape drives, and storage enclosures directly to external AC power sources.

Table 4-17. Power Cords for Monitors and Tape Drives *(Page 1 of 2)*

Locale	Voltage Rating	Plug Type	Current Rating	Length	Marketing ID
Australia	250 volts AC	AS/NZS 3112:1993	10A	2.5m	B50121-25M
Australia and New Zealand	250 volts AC	AS/NZS 3112:1993; SAA/3	10A	4.5m	B50124-45M
China	250 volts AC	GB1002-1996	10A	2.5m	B50162-8F
Continental Europe	250 volts AC	CEE 7 VII	10A	2.5m	B50109-25M
Continental Europe	250 volts AC	CEE 7 VII	10A	4.5m	B50112-45M
Great Britain	250 volts AC	BS 1363/A	10A	2.5m	B50113-25M
India and South Africa	250 volts AC	SABS164-1:1992; ZA/3	10A	4.5m	B50152-45M
Israel	250 volts AC	SI 32:1971	10A	2.5m	B50129-25M

Table 4-17. Power Cords for Monitors and Tape Drives *(Page 2 of 2)*

Locale	Voltage Rating	Plug Type	Current Rating	Length	Marketing ID
Israel	250 volts AC	SI 32:1971; IL3/G	10A	4.5m	B50132-45M
Italy	250 volts AC	CEI23-16	10A	2.5m	B50133-25M
Italy	250 volts AC	CEI23-16; I3/G	10A	4.5m	B50136-45M
Japan	120 volts AC	NEMA 5-15	15A	10 ft. (3.05m)	B50102-10
Japan	100 volts AC	NEMA 5-15	15A	15 ft. (4.5m)	B50160-15M
North America (Chicago)	120 volts AC	NEMA 5-15	15A	7 ft. (2.1m)	B50101-07
North America, (domestic)	120 volts AC	NEMA 5-15	15A	10 ft. (3.05m)	B50106-10
South Africa	250 volts AC	SABS164-1:1992 ZA/3	10A	2.5m	B50149-25M
Switzerland	250 volts AC	1011-S24507	10A	2.5m	B50137-25M
Switzerland	250 volts AC	1011-S24507; 12G	10A	4.5m	B50140-45M
United Kingdom	250 volts AC	BS1363; A:BS89	10A	4.5m	B50116-45M
United States	120 volts AC	NEMA 5-15	15A	15 ft. (4.5m)	B50104-15

External Modem Power Cords

Table 4-18 lists the specifications of the power cords that connect the external modem to an external AC power source.

Table 4-18. External Modem Power Cords *(Page 1 of 2)*

Locale	Description	Length	Marketing ID
Argentina, Bahrain, Chile, China, Cyprus, Czech Republic, Egypt, Estonia, Greece, Hong Kong, Hungary, Indonesia, Israel, Ivory Coast, Jordan, Korea, Kuwait, Liechtenstein, Luxembourg, Malaysia, Oman, Pakistan, Paraguay, Peru, Poland, Portugal, Qatar, Russia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Thailand, Turkey, Ukraine, United Arab Emirates, Uruguay, Yemen	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000370
Australia	250 volts AC/10A, plug type AS/NZS 3112:1993	6.5 ft. (2.0m)	AK-000371
Austria	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000372
Belgium	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000373
Bolivia, Brazil, Canada, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Japan, Mexico, Panama, Philippines, Saudi Arabia, Taiwan, United States, Venezuela	120 volts AC/15A, plug type NEMA 5-15	6 ft. (1.83m)	AK-000369
Denmark	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000374
Finland, Norway	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000375
France, Morocco	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000376

Table 4-18. External Modem Power Cords *(Page 2 of 2)*

Locale	Description	Length	Marketing ID
Germany	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000377
Iceland, Sweden	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000378
India	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000379
Italy	250 volts AC/10A, plug type CEI 23-16	6.5 ft. (2.0m)	AK-000381
Netherlands	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000382
New Zealand	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000383
Switzerland	250 volts AC/10A, plug type CEE 7 VII (10A)	6.5 ft. (2.0m)	AK-000384
United Kingdom, Ireland	250 volts AC/10A, plug type BS1363/A (10)	6.5 ft. (2.0m)	AK-000380

Chapter 5
Network and Telephone Line Planning

For information about planning network and telephone lines for your ftServer T Series systems, see:

- "Network Cable Requirements"
- "Telephone Line Requirements"

Network Cable Requirements

Ethernet PCI adapters are typically supplied in pairs and teamed in software for fault tolerance. A cable for each member of the pair is required.

WARNING

Make sure Ethernet cables can be routed out of the way of foot traffic.

Table 5-1 describes the Ethernet cables you must supply. Be sure to provide a cable of sufficient length for the distance between the system and a wall jack or hub.

Table 5-1. Customer-Supplied Ethernet Cables

Component	Quantity	Cable
10/100-Mbps system Ethernet ports	Two	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- or 1000-Mbps (fast Ethernet) operation, provide full-duplex, or Category-5 Ethernet cables. The maximum allowable distance from an Ethernet port to a switch or a hub is 100 meters.
10/100/1000-Mbps system Ethernet ports	Two	
10/100/1000Base-T Ethernet PCI Adapters (gigabit copper adapters for servers)	Two for each pair of 10/100/1000Base-T Ethernet PCI adapters	
1000Base-SX Ethernet PCI Adapters (gigabit fiber-optic adapters for servers)	Two for each pair of 1000Base-SX Ethernet PCI adapters	Multi-mode, 62.5-micron, dual fiber cable with two SC-type connectors, and two connectors compatible with the network switch.

If you have a unique network requirement, Stratus Professional Services can work with you to meet that requirement.

Telephone Line Requirements

Generally, an ftServer T Series system requires two telephone lines:

- One telephone line for use when calling for service
- One analog telephone connection point for the external modem

A dedicated phone line provides the most reliable service. ASN calls routed through a PBX might be slow due to the 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.

Chapter 6
ftServer T Series Rack Configuration Planning

Determining Rack Space Usage

Make sure that the ftServer T Series systems, DC inverters, and V128 LCD units fit into the vertical space available in the rack.

To determine the vertical space used

1. In the Quantity column of Table 6-1, enter the number of each component.
2. In each row, multiply the value in the Component Height column by the Quantity, and enter the subtotal in the Cumulative Height column.
3. Add the values in the Cumulative Height column together and write the resulting value in the bottom row. Compare this value to the height of your rack as measured in rack units (U).

Table 6-1. Rack Space Usage Calculation

Component	Component Height		Quantity	Cumulative Height
ftServer T 60 system	10U	x		
ftServer T 30 system	4U	x		
AA-P86600 DC inverter	3U	x		
D548 storage enclosure	2U	x		
V128 1U LCD unit (optional)	1U	x		
Total Height				

Appendix A
System Specifications

For specifications of the ftServer T Series systems and their DC inverters, see:

- "ftServer T 60 AC System Specifications"
- "ftServer T 30 AC System Specifications"
- "ftServer T 30 CO System Specifications"
- "DC-to-AC Inverter Specifications"
- "Peripheral and Storage Components"

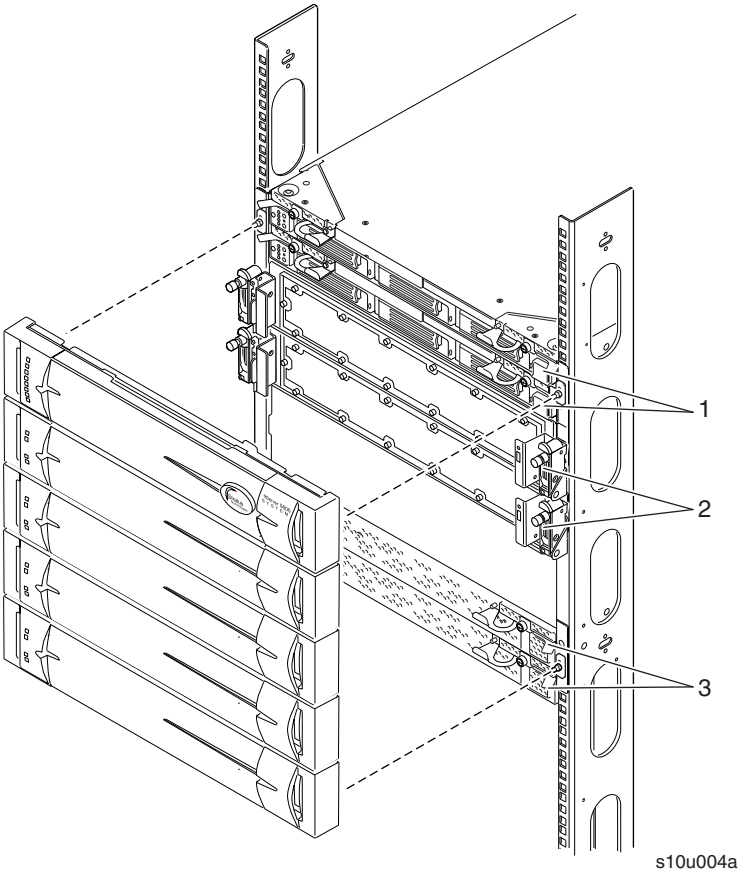
NOTE

The system temperature and humidity requirements defined in Tables A-2, A-3, and A-4 are the **minimum** requirements the site must provide.

ftServer T 60 AC System Specifications

Figure A-1 shows the front of the ftServer T 60 AC system mounted in a rack, its bezel pulled forward. Figure A-2 shows the rear of an ftServer T 60 AC system, specifying the locations of the connectors at the back of the system. Table A-1 lists the dimensions of the 24U and 38U shipping container and of the unpacked 24U and 38U cabinets. Table A-2 lists specifications for the ftServer T 60 AC system.

Figure A-1. ftServer T 60 AC System - Front View

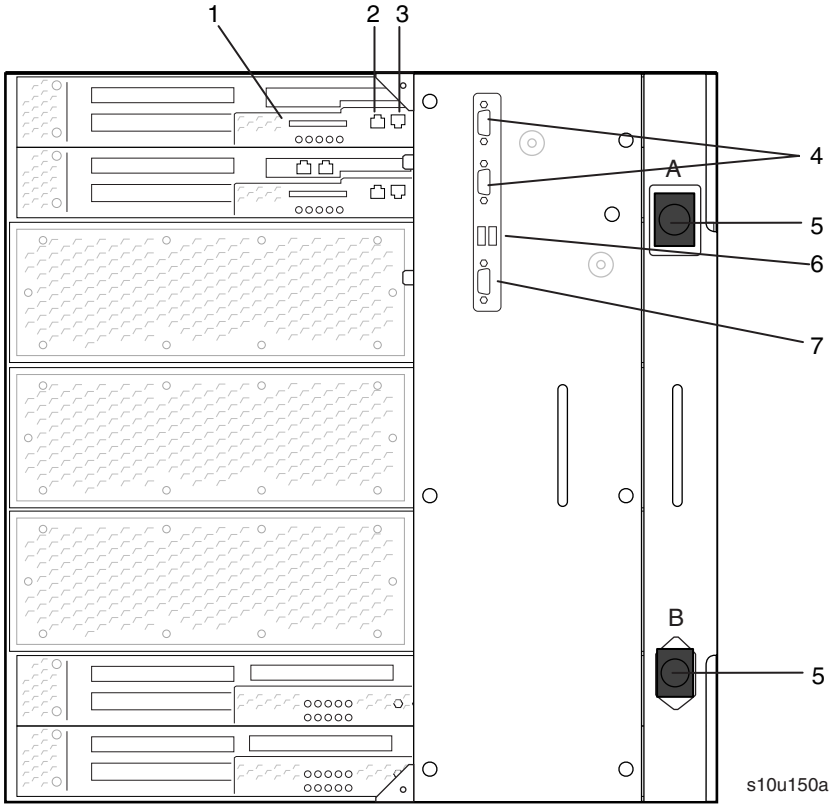


1 Core I/O enclosures

2 CPU enclosures

3 Expansion I/O enclosures

Figure A-2. ftServer T 60 AC System - Rear View



1 SCSI port

2 10/100/1000-Mbps Ethernet port

3 10/100-Mbps Ethernet port

4 Serial ports

5 Power receptacles

6 USB ports

7 VGA (monitor) port

Table A-1. ftServer T 60 AC Cabinet Dimensions

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. (1.27m)
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)

Table A-2. ftServer T 60 AC System Specifications *(Page 1 of 2)*

Power	
Output wattage	A-side power: 1300W (AC) B-side power: 900W (AC)
Nominal input voltage; Frequency range	200–240 volts AC; 50-60 Hz

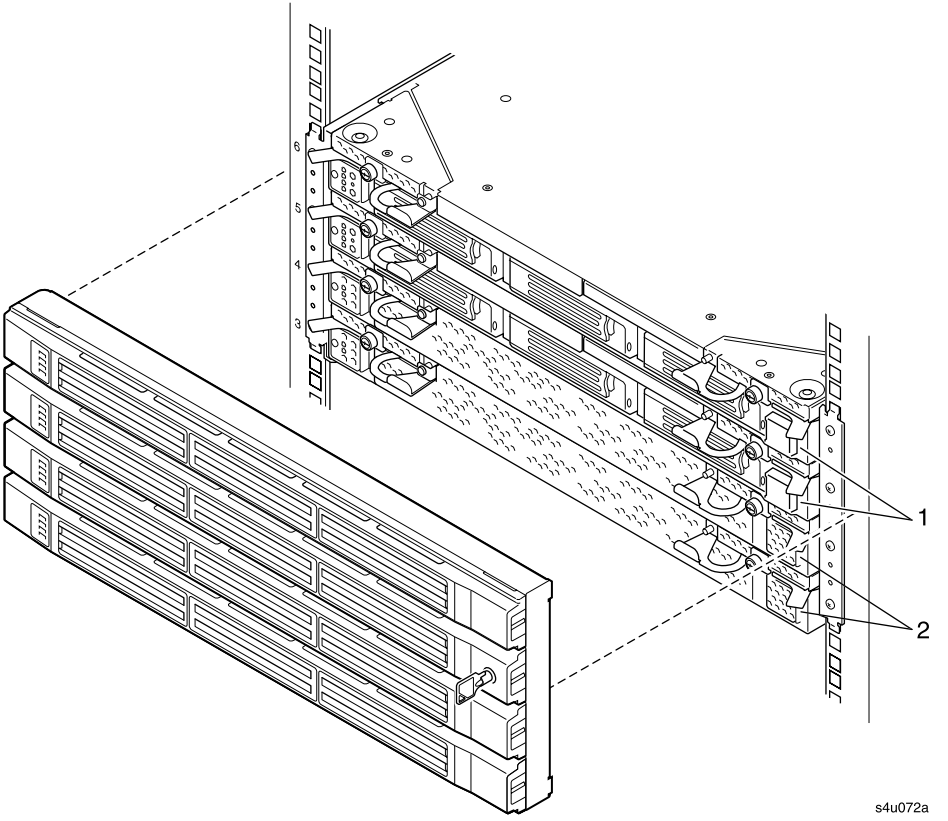
Table A-2. ftServer T 60 AC System Specifications *(Page 2 of 2)*

Physical Dimensions	
Height	17.75 in. (45 cm; 10U)
Width	19 in. (48.26 cm)
Depth (including ejectors)	30.9 in. (78.5 cm)
Weight	310 lb (141 kg)
Environmental Requirements	
Operating temperature	41° F to 95° F (5° C to 35° C) For every 800 ft. (243.8m) above 2,000 ft. (609.6m), lower the maximum operating temperature (35°C) by 1°C.
Storage temperature	-38° F to 140° F (-39° C to 60° C)
Operating altitude	0 ft. to 10,000 ft. (0m to 3,048m)
Maximum rate of temperature change during operation	53.6° F/hr (12° C/hr)
Relative humidity during operation	10% to 80% (noncondensing)
Relative humidity during storage	5% to 95% (noncondensing)
Heat dissipation	7500 BTUs per hour
Features	
Processors	Two or four Intel® Xeon™ processors in each CPU enclosure
Memory	Twelve dual data rate (DDR) inline memory module (DIMM) slots in each CPU enclosure
Ports	One 10/100-Mbps Ethernet port, one 10/100/1000-Mbps Ethernet port, and one external SCSI port on each core I/O enclosure Two AC power connectors, one VGA port, two serial ports, and two USB ports
PCI slots	One 32-bit 66MHz PCI slot reserved for a video adapter in each core I/O enclosure Ten user-configurable PCI adapter slots: two in each core I/O enclosure operating at 64-bits and 33 MHz; three in each expansion I/O enclosure operating at 64-bits and 66 MHz

ftServer T 30 AC System Specifications

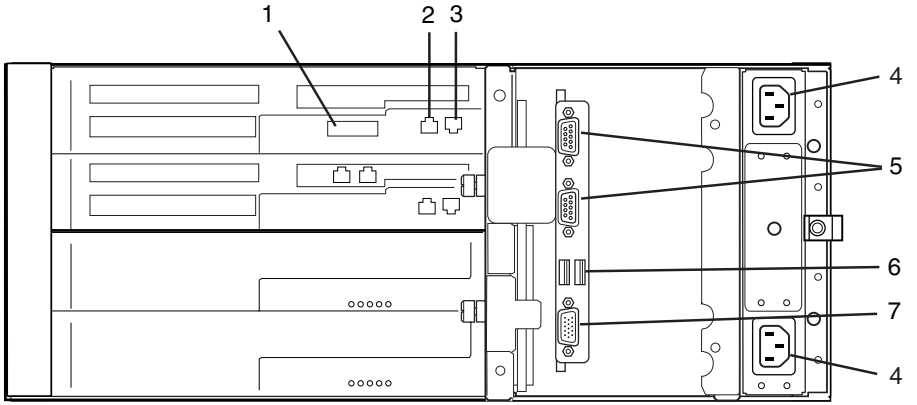
Figure A-3 shows the front of an ftServer T 30 AC system, mounted in a rack with its bezel pulled forward. Figure A-4 shows the rear of an ftServer T 30 AC system, specifying the locations of the connectors at the back of the system. Table A-3 lists the specifications for the ftServer T 30 AC system.

Figure A-3. ftServer T 30 AC System - Front View (Bezel Removed)



1 Core I/O enclosures 2 CPU enclosures

Figure A-4. ftServer T 30 AC System - Rear View



1 SCSI port
2 10/100/1000-Mbps Ethernet port
3 10/100-Mbps Ethernet port
4 Power receptacles
5 Serial ports
6 USB ports
7 VGA (monitor) port

Table A-3. ftServer T 30 AC System Specifications

Power	
Output wattage	A-side: 500W (AC) B-side: 500W (AC)
Nominal input voltage	
Model dependent	100–127 volts AC; 50–60 Hz
Model dependent	100–127, 200–240 volts AC; 50 Hz
Model dependent	200–240 volts AC; 50–60 Hz
Physical Dimensions	
Height	7 in. (17.78 cm; 4U)
Width	17.75 in. (45 cm)

Table A-3. ftServer T 30 AC System Specifications *(Continued)*

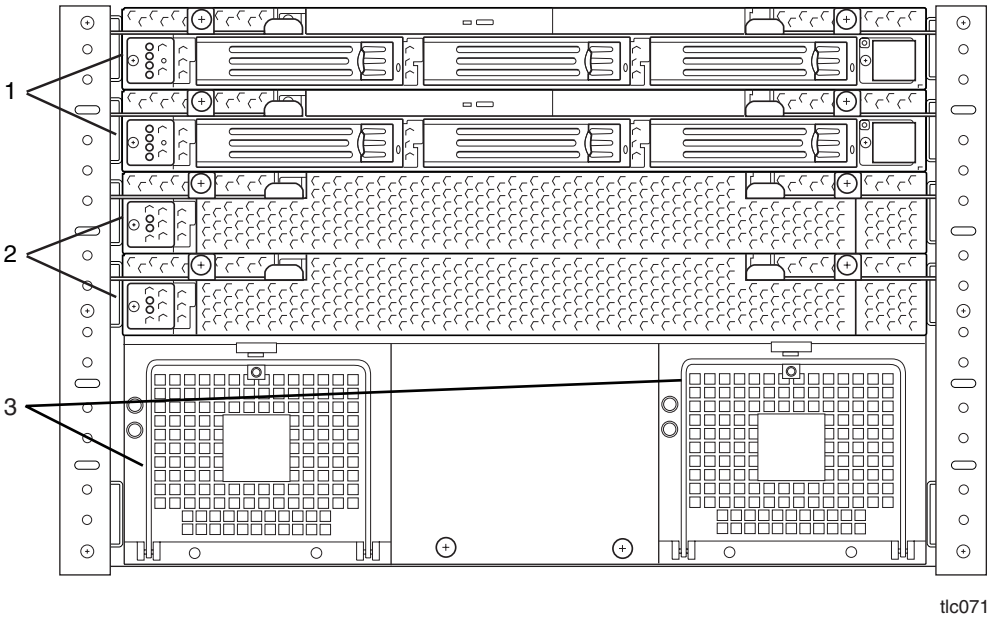
Depth	29.23 in. (75 cm)
System weight	124 lb (56.25 kg) to 137 lb (62 kg)
Environmental	
Operating temperature	41° F to 95° F (5° C to 35° C) For every 800 ft (243.8 m) above 2000 ft (609.6 m), lower the maximum operating temperature (35°C) by 1°C.
Maximum rate of temperature change during operation	18° F/hr (10° C/hr) or 0.30° F/min (0.17° C/min)
Relative humidity during operation	20% to 80% (noncondensing)
Relative humidity during storage	8% to 80%
Heat dissipation	3500 BTUs per hour
Features	
Processors	One or two Intel Xeon processors in each CPU enclosure
Memory	Six dual data rate (DDR) inline memory module (DIMM) slots in each CPU enclosure
Ports	One 10/100-Mbps Ethernet port, one 10/100/1000-Mbps Ethernet port, and one external SCSI port on each core I/O enclosure Two AC power connectors, one VGA port, two serial ports, and two USB ports
PCI slots	One 32-bit 66MHz PCI slot for a video adapter or ftServer Access Adapter in each I/O enclosure Two user-configurable PCI adapter slots in each core I/O enclosure operating at 64-bits and 33 MHz

ftServer T 30 CO System Specifications

Figure A-5 shows the front of an ftServer T 30 CO system, mounted in a rack and with its bezel removed. Figure A-6 shows the location and placement of the front bezel filter. Figure A-7 shows the rear of an ftServer T 30 system, specifying the locations of the connectors at the back of the system.

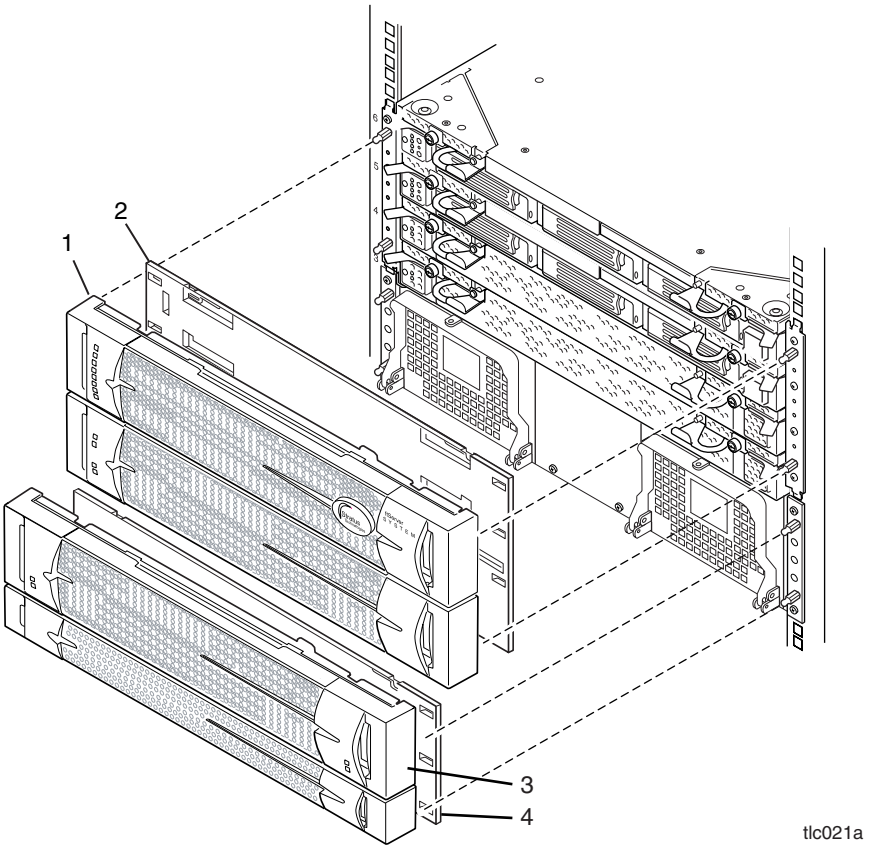
Table A-4 lists the specifications for the ftServer T 30 system.

Figure A-5. ftServer T 30 CO System - Front View (Bezel Removed)



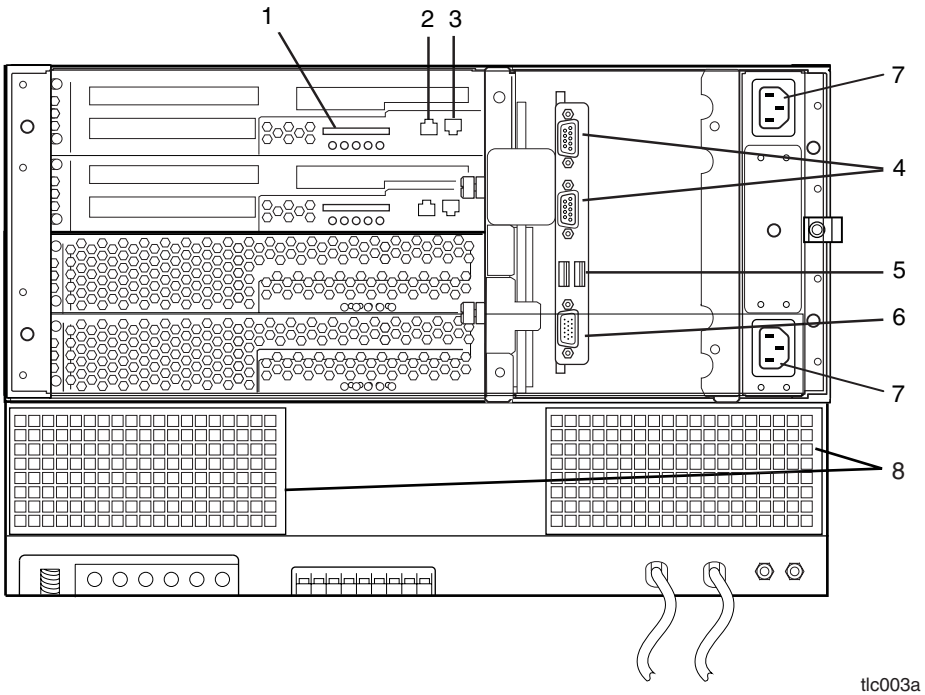
1	Core I/O enclosures	2	CPU enclosures	3	DC-to-AC power inverters

Figure A-6. ftServer T 30 CO System - Front View with Bezel Filter



1	System bezel	3	DC-to-AC power inverter bezel
2	System air filter	4	DC-to-AC power inverters air filter

Figure A-7. ftServer T 30 CO System - Rear View



1 SCSI port

2 10/100/1000-Mbps Ethernet port

3 10/100-Mbps Ethernet port

4 Serial ports

5 USB ports

6 VGA (monitor) port

7 Power receptacles

8 DC-to-AC power inverters

Table A-4. ftServer T 30 CO System Specifications *(Page 1 of 3)*

Power	
Input wattage	A-side: 1415W (DC) B-side: 1415W (DC)
Nominal input voltage	48
Minimum (VDC)	42.75

Table A-4. ftServer T 30 CO System Specifications *(Page 2 of 3)*

Maximum (VDC)	56.7
Physical Dimensions	
Height	7 in. (17.78 cm; 4U)
Width	17.75 in. (45 cm)
Depth	29.23 in. (75 cm)
System weight	124 lb (56.25 kg) to 137 lb (62 kg)
Environmental	
Operating temperature	Meets NEBS GR-63-Core Level 3 Equipment requirements
Maximum rate of temperature change during operation	Meets NEBS GR-63-Core Level 3 Equipment requirements
Relative humidity during operation	Meets NEBS GR-63-Core Level 3 Equipment requirements
Relative humidity during storage	Meets NEBS GR-63-Core Level 3 Equipment requirements
Operating altitude	Meets NEBS GR-63-Core Level 3 Equipment requirements
Operating vibration	Meets NEBS GR-63-Core Level 3 Equipment requirements
Transportation vibration	Meets NEBS GR-63-Core Level 3 Equipment requirements
Earthquake vibration	Meets NEBS GR-63-Core Level 3 Zone 4 requirements
Acoustics	Meets NEBS GR-63-Core Level 3 Equipment requirements
Heat dissipation	4830 BTUs per hour
Features	
Processors	Two Intel Xeon processors in each CPU enclosure
Memory	Up to six dual data rate (DDR) inline memory module (DIMM) slots in each CPU enclosure. DIMM chips must be mounted in pairs. Maximum memory is 3 GB (6 X 512 MB DIMMs).
Ports	One 10/100-Mbps Ethernet port, one 10/100/1000-Mbps Ethernet port, and one external SCSI port on each core I/O enclosure Two AC power connectors, one VGA port, two serial ports, and two USB ports

Table A-4. ftServer T 30 CO System Specifications *(Page 3 of 3)*

PCI slots	One 32-bit 33 MHz PCI slot for a video adapter in each core I/O enclosure Two user-configurable PCI adapter slots in each core I/O enclosure, operating at 64-bits and 33 MHz

DC-to-AC Inverter Specifications

Tables A-5, A-6, A-7, and A-8 list the specifications for the AA-P86600 DC-to-AC inverter.

Table A-5. AA-P86600 Environmental Specifications

Operating ambient temperature	-20°C (-4°F) to +55°C (131°F)
Storage temperature range	-50° (-58°F) to +85°C (185°F)
Humidity range	Max 95% non-condensing

Table A-6. AA-P86600 Mechanical Specifications

Ventilation air	Internal fan
Mounting	3U rack height in rack mount frame, no additional clearance required top or bottom
Weight	12 lb (5.44kg)

Table A-7. AA-P86600 Input Voltage, Current, and Power

Nominal input voltage	48
Minimum (VDC)	42.75
Maximum (VDC)	56.7
Maximum input current	50 Amps DC
Protection	Input undervoltage and overvoltage protection. Output overload and short-circuit protection.
Inrush current controlled	Less than 50 Amps

Table A-8. AA-P86600 AC Output Specifications

Waveform	Sinusoidal
THD	< 1% typical
Output voltage	120 VAC/60 Hz
Voltage regulation	Better than 2%
Frequency stability	Controlled better than 0.01% stability
Isolatation	Fully isolated input to output
Power rating	1.5 kVA maximum, over full temperature range
Peak output current into nonlinear load	36 Amps peak maximum for 120VAC
DC content	10mV maximum
Power factor	Linear – powers all loads with 0 leading to 0 lagging PF Non-linear – Rectified loads with up to 2.8 crest factor at full load
Motor starting	4 kVA output for 10 seconds minimum

Peripheral and Storage Components

You can find specifications for the following peripheral and storage components in the *Stratus ftServer Systems Peripherals Site Planning Guide* (R582).

- Supported tape drive enclosures
- D548 storage enclosure
- V128 LCD display
- V115 keyboard
- C719 external modem
- AK438 USB floppy disk drive

Appendix B
Electrical Circuit and Wiring Information

For the electrical circuit and wiring information that you need to provide to the contractor and/or facilities personnel responsible for wiring the power at the system installation site, see:

- "DC-Powered ftServer T 30 CO Systems"
- "AC-Powered ftServer T 60 AC and T 30 AC Systems"

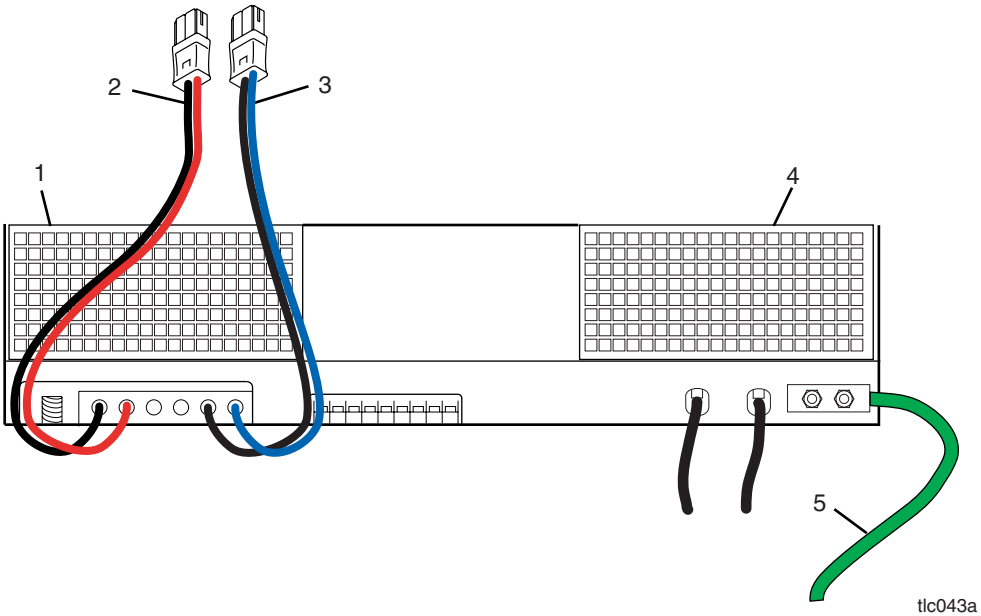
DC-Powered ftServer T 30 CO Systems

The ftServer T 30 is designed to run on DC power. A DC power inverter provides AC power to the system and its components. Figure B-1 shows the rear of the inverter.

The following sections provide electrical and wiring information for ftServer T 30 CO systems:

- "Fault Protection"
- "Grounding Considerations"
- "Circuit Wiring Diagrams"
- "DC Power Cables and Connectors"

Figure B-1. AA-P86600 DC-to-AC Inverter - Rear View



1	B-side DC inverter	4	A-side DC inverter
2	A-side DC input cable	5	Chassis ground cable
3	B-side DC input cable		

Fault Protection

Each customer replaceable unit (CRU) in the ftServer T30 system contains fault/overload current protection. The two DC inputs to each DC inverter CRU are protected by fuses for protection against internal faults. However, the system relies on the power distribution system at your site for protection against potential faults in the power cords. You must use circuit breakers in each power distribution branch feeding the system.

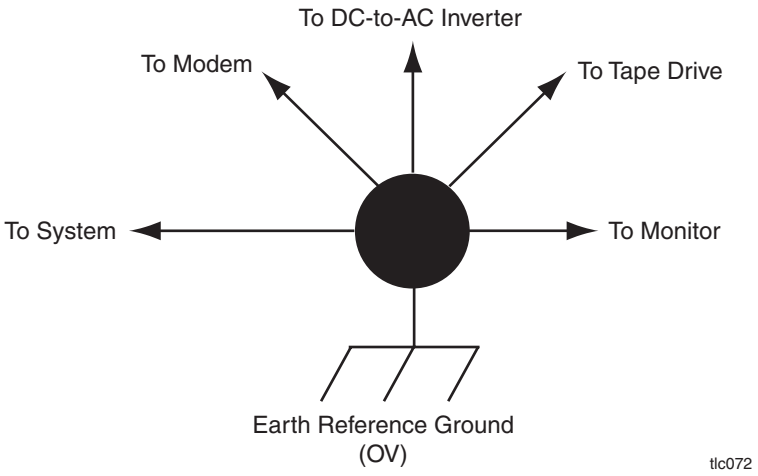
Grounding Considerations

The ftServer T 30 system obtains an earth reference ground via independent ground connections to the cabinet frame. Ensure that a high-integrity safety-ground conductor is installed as part of the wiring system (in accordance with Bellcore standards). The international safety standard (EN-60950) 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 cabinet and any peripheral devices connected to the system cabinet.

The ftServer T 30 CO system cabinets must connect to a common ground point (ground window) to ensure signal integrity and the safety-ground connection. To meet this requirement, an ftServer T 30 CO cabinet is connected to the ground window by one or two green-wire safety-ground conductor leads (#4 gauge wire), each of which can handle 60A fault current.

A star ground, shown in Figure B-2, is often used to obtain the same earth reference ground. Each earth reference ground, such as the system cabinet ground, is returned separately to a common point where a 0-volt 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.

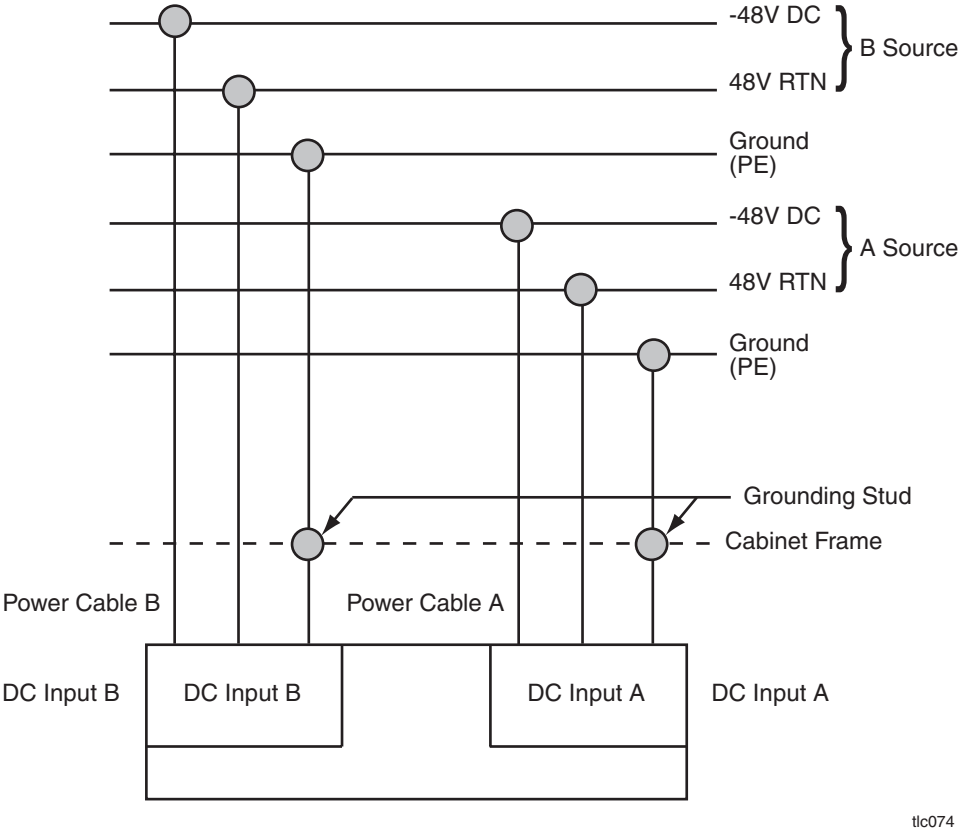
Figure B-2. Star Ground Example



Circuit Wiring Diagrams

Figure B-3 shows a schematic diagram of DC power for the ftServer T 30 CO system.

Figure B-3. DC System Wiring



DC Power Cables and Connectors

Stratus supplies tested and approved cables and connectors for the ftServer T 30 CO system. Table 4-2 provides descriptions and part numbers.

NOTE

User-supplied DC power cables that connect directly from the CO supply to the DC inverter's DC input cable must use an Anderson Power Products® connector (Anderson part number SBS50BLU#6-BK) and two contacts (Anderson part number 1339G2-BK) at the inverter end.

User-supplied DC power cables that connect directly from the CO supply to the rear of the DC inverter must use a FCI- Burndy® ring lug connector (Burndy part number YAV6CL2TC14FX) at the inverter end.

WARNING

User-supplied power or ground cables must meet ftServer T 30 system needs and must comply with local safety codes and requirements.

AC-Powered ftServer T 60 AC and T 30 AC Systems

The following sections provide electrical and wiring information for ftServer T 60 AC and T 30 AC systems:

- "Grounding Considerations"
- "Circuit Wiring Diagrams"
- "Electrical Power Connectors"

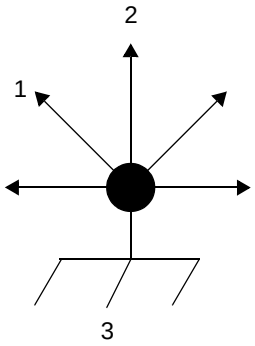
Grounding Considerations

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 (EN60950) for electronic data processing (EDP) equipment also requires a ground conductor, but calls it a protective 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 B-4, 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 B-4. Star Ground Example



1 To monitor

2 To ftServer system

3 Earth reference ground (0V)

Circuit Wiring Diagrams

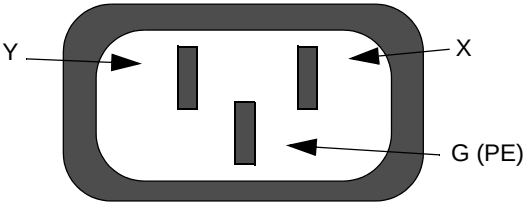
The following circuit wiring diagrams show how the hot, ground, and/or neutral AC signals should be connected to the system's power input plug:

- Figure B-6 illustrates a single-phase, 120-volts AC circuit connection (for ftServer T 30 AC only).
- Figure B-7 illustrates a single-phase, 240-volts AC circuit connection.
- Figure B-8 illustrates a split-phase, 120/240-volts AC circuit connection.
- Figure B-9 illustrates a three-phase, 208-volts AC, Y-, or Δ-source circuit connection, phase-to-neutral.

- Figure B-10 illustrates a three-phase 208-volts AC, Y-, or Δ-source circuit connection, phase-to-phase.
- Figure B-11 illustrates a three-phase 380-volts AC, Y-, or Δ-source circuit connection, phase-to-neutral.

The figures in this appendix, label the power inputs for the ftServer system as X and Y (as shown in Figure B-5) 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 split-phase or three-phase applications, the X and Y inputs are connected to L1, L2, or L3 (separate lines). Therefore, for split-phase or three-phase applications, both X and Y can be electrically hot with respect to the system base (earth reference ground). Figure B-5 shows the physical locations of the X and Y inputs on the system base.

Figure B-5. Power Input Labeling



Power input A or B (Face View)

Figure B-6 shows a single-phase, 120-volts AC circuit connection. Note that this application requires a single-pole circuit breaker.

Figure B-6. Single-Phase, 120-Volts AC Circuit Connection

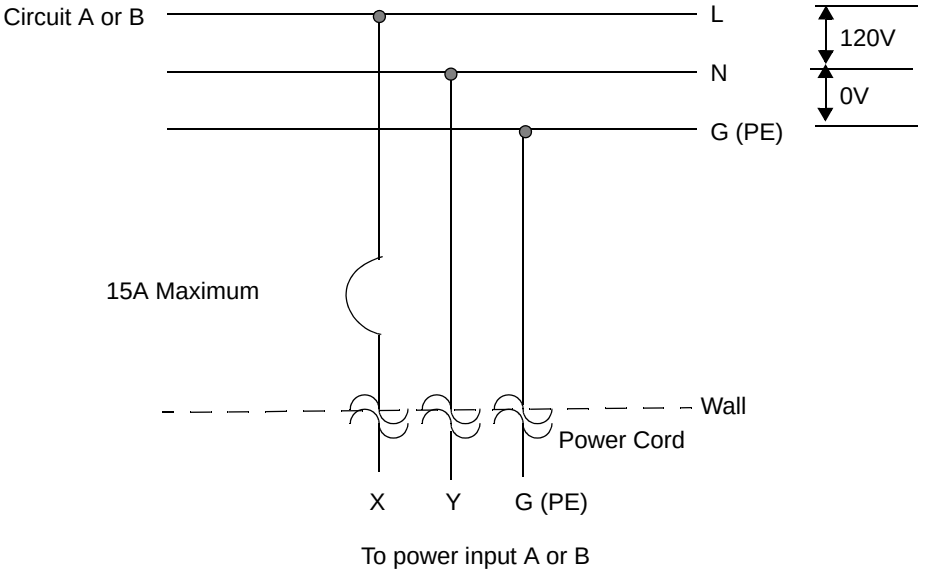


Figure B-7 shows a single-phase, 240-volts AC circuit connection. Note that this application requires a single-pole circuit breaker.

Figure B-7. Single-Phase, 240-Volts AC Circuit Connection

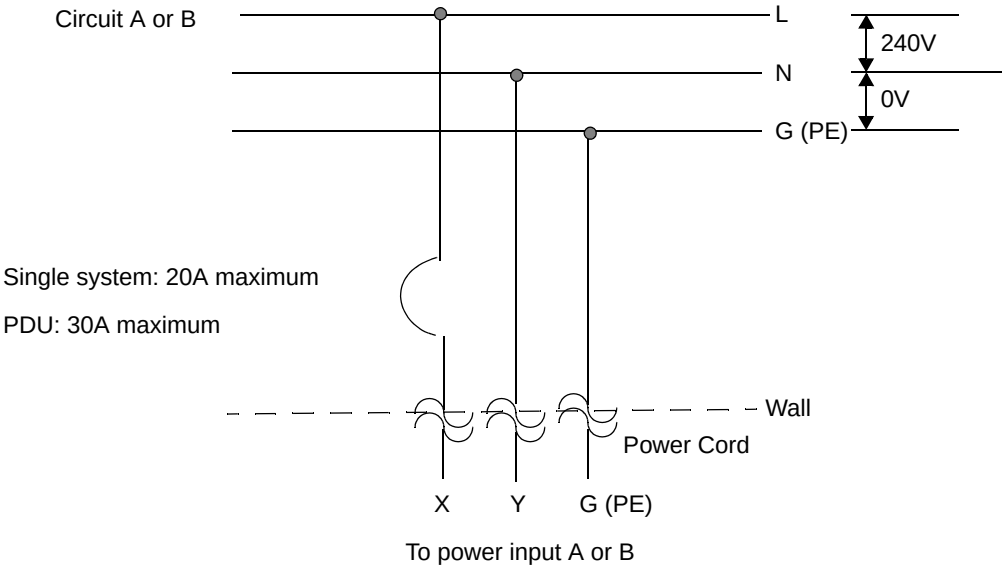


Figure B-8 shows a split-phase, 120/240-volts AC circuit connection. Note that this application requires a double-pole circuit breaker.

Figure B-8. Split-Phase, 120/240 Volts AC Circuit Connection

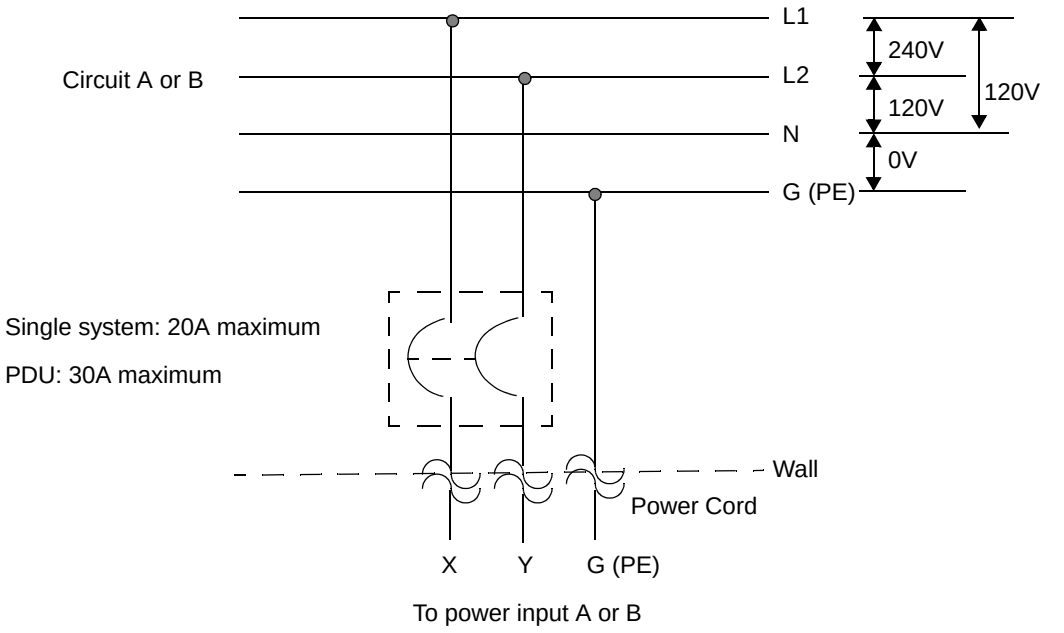


Figure B-9 shows a three-phase, 208-volts AC, Y-, or Δ-source circuit connection, which is a phase-to-neutral source connection. Note that the ftServer X input can be connected from L1, L2, or L3. This application requires a single-pole circuit breaker.

Figure B-9. Three-Phase, 208-Volts AC, Y-, or Δ-Source Circuit Connection, Phase-to-Neutral

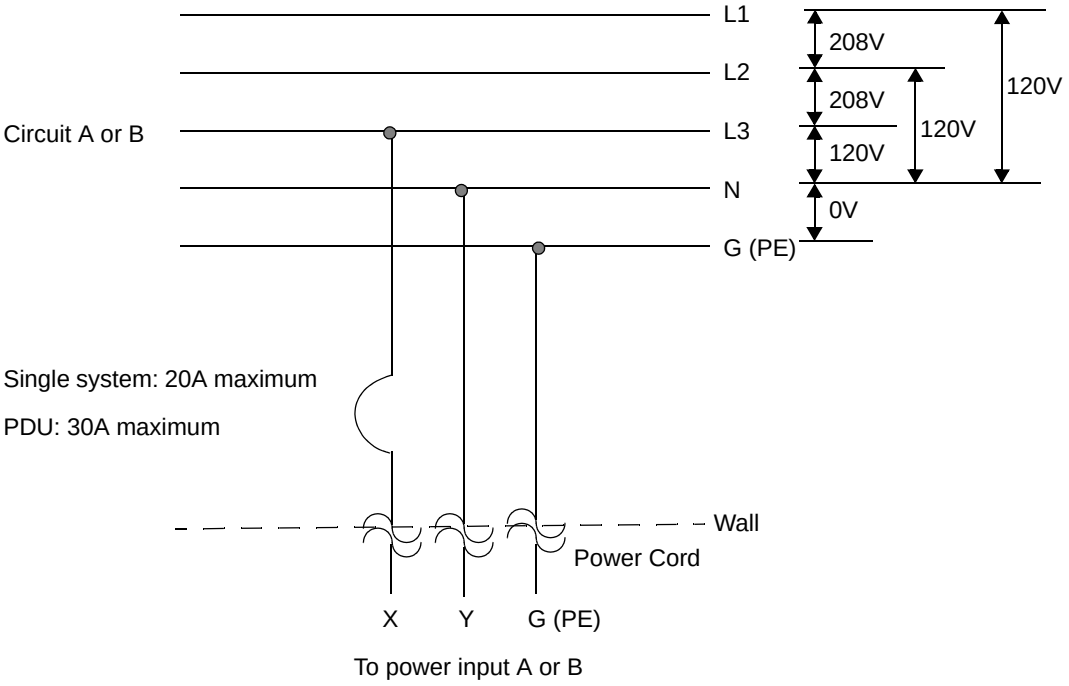


Figure B-10 shows a three-phase, 208-volts AC, Y-, or Δ-source circuit connection, which is a phase-to-phase source connection. Note that the ftServer X and Y inputs can be connected from L1 and L2, L2 and L3, or L1 and L3. This application requires a double-pole circuit breaker.

Figure B-10. Three-Phase, 208-Volts AC, Y-, or Δ-Source Circuit Connection, Phase-to-Phase

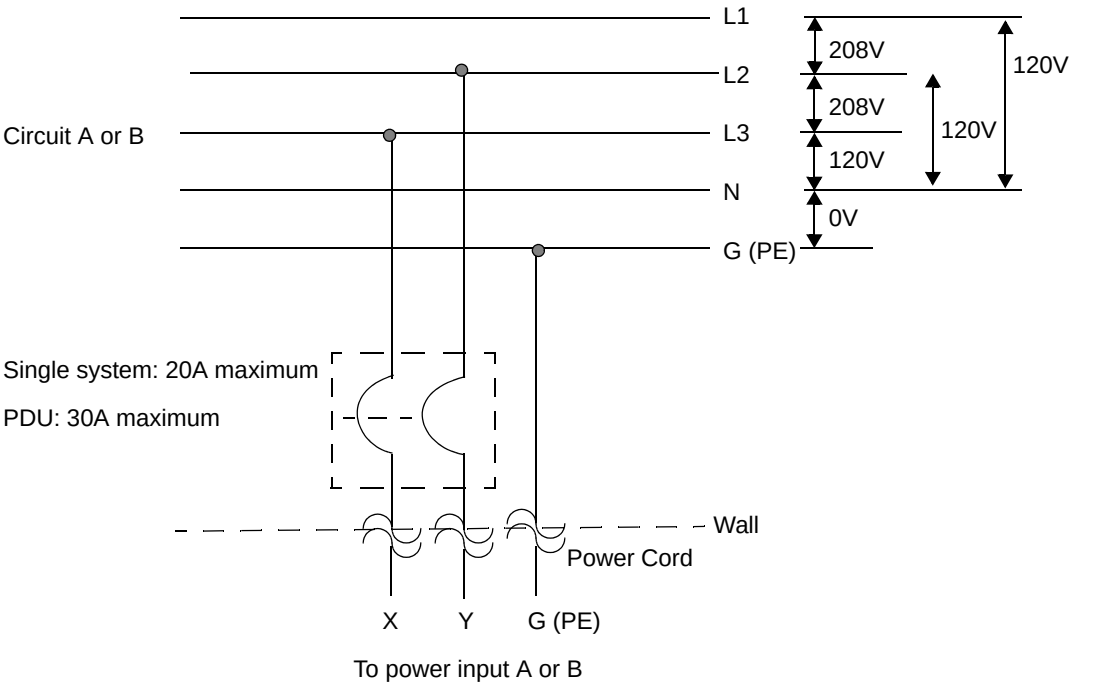
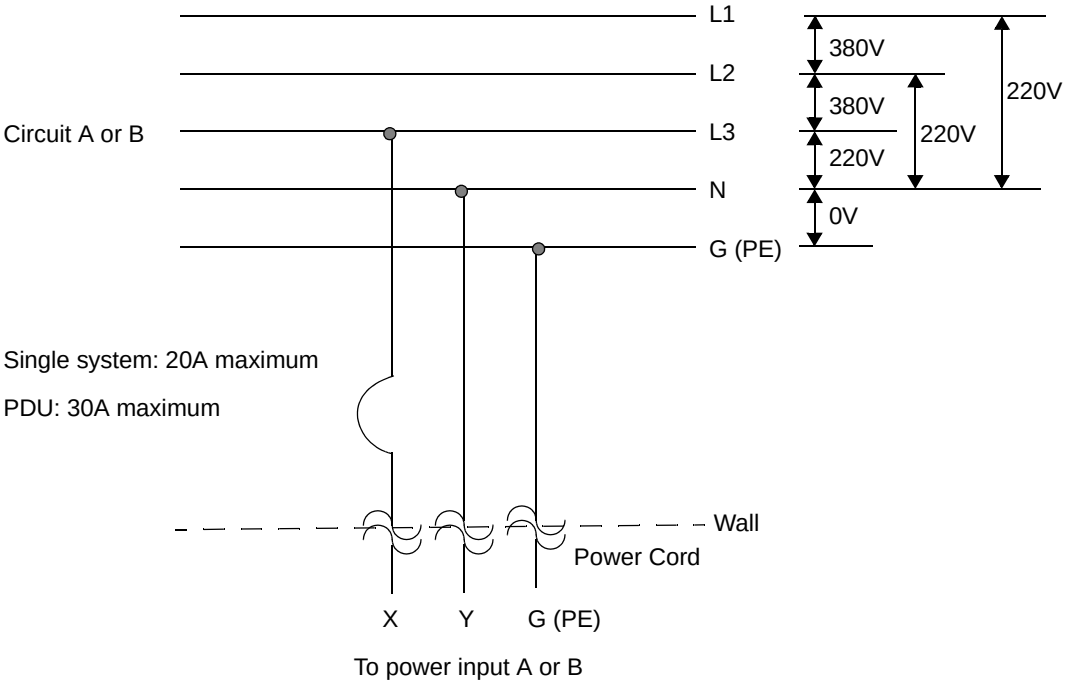


Figure B-11 shows a three-phase, 380-volts AC, Y-, or Δ-source circuit connection, which is a phase-to-neutral source connection. Note that the ftServer X input can be connected to L1, L2, or L3. This application requires a single-pole circuit breaker.

Figure B-11. Three-Phase, 380-Volts AC, Y-, or Δ-Source Circuit Connection, Phase-to-Neutral



Electrical Power Connectors

Table B-1 describes the connectors that Stratus uses to connect ftServer systems and their peripheral devices, such as tape drives, to AC power outlets.

Table B-1. Connectors for AC Power Outlets *(Page 1 of 3)*

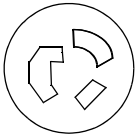
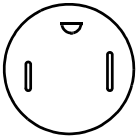
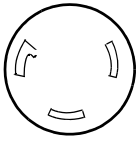
Connector	Configuration	Rating	Description
NEMA 6-15†		15A, 25 volts AC	2-pole, 3-wire
NEMA L6-20		20A, 208/24 volts AC	2-pole, 3-wire
NEMA 5-15		15A, 125 volts AC	2-pole, 3-wire
NEMA L6-30		30A, 125/25 volts AC	2-pole, 3-wire

Table B-1. Connectors for AC Power Outlets *(Page 2 of 3)*

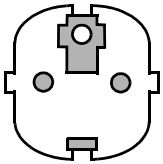
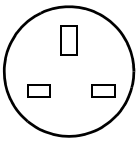
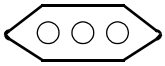
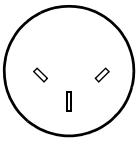
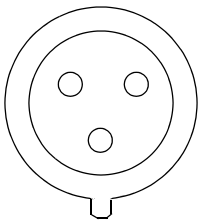
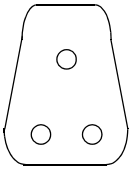
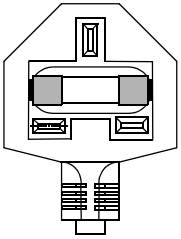
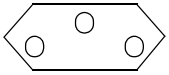
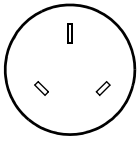
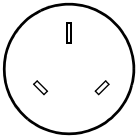
Connector	Configuration	Rating	Description
CEE (7) VII		20A, 25 volts AC	2-pole, 3-wire
BS 89 3†		13A or 10A, 25 volts AC	2-pole, 3-wire
CEI-23-16		16A, 25 volts AC	2-pole, 3-wire
SI 32/1971		16A, 25 volts AC	2-pole, 3-wire
IEC-309		16-20A, 200-24 volts AC	2-pole, 3-wire

Table B-1. Connectors for AC Power Outlets *(Page 3 of 3)*

Connector	Configuration	Rating	Description
SABS 164-1:1992		16A, 25 volts AC	2-pole, 3-wire
BS 1363/A‡		13A, 250 volts AC	2-pole, 3-wire
1011-S24507‡		10A, 250 volts AC	2-pole, 3-wire
AS/NZS 3112-1993‡		15A, 250 volts AC	2-pole, 3-wire
SAA/3/15 AS/NZS ‡		15A, 250 volts AC	2-pole, 3-wire

† ftServer T 60 AC only
‡ ftServer T 30 AC only

Appendix C
Standards Compliance

ftServer T Series systems comply with the electromagnetic interference (EMI), immunity, safety, and noise regulations listed in Tables C-1 through C-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 electromagnetic compatibility (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 C-1. EMI Standards *(Page 1 of 2)*

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 C-1. EMI Standards *(Page 2 of 2)*

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 C-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 C-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 C-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

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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

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