

InterChangeVS™ 1000 Series

VS1000 and VS1100

Hardware

Installation and Configuration Guide

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Introduction

Product Overview

The Control InterChangeVS 1000 is a rack-mountable or stackable “network appliance” that connects via Ethernet to a host server and supports from 16 to 64* RS-232 asynchronous serial ports per network address (MAC). All ports are supported at rates up to 230.4K bps.

- * *The base VS1000 has 16 ports. Additional ports can be added by plugging in VS1100 expansion units, to a maximum of three VS1100 expansion units per each VS1000 base unit.*

Operating System Requirements

The InterChangeVS 1000 requires at least one network server running one of the following operating systems:

- Microsoft Windows[®] NT (3.51, 4.0, or higher)
Note: Windows NT 4.0 or higher is required to support Multilink PPP.
Note: RAS or RRAS is required to support Remote Access Service.
- Citrix[®] WinFrame[®] (1.7 or later)
- Novell[®] NetWare[®] (3.12, 4.11, or IntranetWare[™])
Note: Contact Novell for information regarding Multilink PPP support for NetWare.

Your choice of operating system determines the limits of the VS1000/VS1100 configuration. Novell NetWare supports a maximum of 128 ports per server, while Microsoft supports up to 256 RAS ports or 1,000 COM ports per server.

Connectivity Requirements

- An Ethernet connection, either to an Ethernet hub or to a NIC card in the host server. (See the *Installing the Hardware* section.)

Installation Overview

The following outlines summarize the various VS1000/VS1100 installation scenarios. For more information about hardware issues, see the *Installing the Hardware* section. For more information about software issues, see the section for your network operating system.

Initial Installation

A. Hardware Installation

1. Install the VS1000.
2. Install one or more VS1100 units (optional).
3. Install RS-232 serial devices.
4. Connect the VS1000 to the network hub or server.
5. Power-up the new VS1000 and verify that it passes the power-on diagnostics.

B. Software Installation

1. Unzip the VS-Link distribution file.
2. Install the VS-Link software.
3. Configure VS-Link to support the VS1000/VS1100.
4. Configure serial ports to support the RS-232 devices.
5. Shut down and restart the server.

Installing VS-Link Software Updates

A. Hardware Installation (*no changes needed*)

B. Software Installation

1. Remove the existing VS-Link software.
2. Install the new version of the VS-Link software.
3. Configure VS-Link to support the VS1000/VS1100.
4. No port configuration changes are required.
5. Shut down and restart the server.

Adding a VS1000 to an Existing Installation

A. Hardware Installation

1. Install the VS1000.
2. Install any associated VS1100 expansion units.
3. Install RS-232 serial devices.
4. Connect the VS1000 to the network hub or server.
5. Power-up the new VS1000 and verify that it passes the power-on diagnostics.

B. Software Installation

1. Configure VS-Link to support the new VS1000/VS1100.
2. Configure serial ports to support the RS-232 devices.
3. Shut down and restart the server.

Adding a VS1100 to an Existing Installation

A. Hardware Installation

1. Install the VS1100.
2. Power down the VS1000 base unit to which you are attaching the VS1100 expansion unit.
3. Connect the VS1100 cable from the **VS1100** port on the VS1000 base unit to the **Input** port on the VS1100 expansion unit.
4. Install the terminator plug in the **Output** port on the last VS1100 in the chain.
5. Install RS-232 serial devices.
6. Power-up the VS1000 and verify that it passes the power-on diagnostics.

B. Software Installation

1. Change the VS-Link configuration for the VS1000 base unit to support the added serial ports.
2. Configure the serial ports to support the RS-232 devices.
3. Shut down and restart the server.

“Hot-Swapping” a VS1000

Replacing a VS1000 with an identical VS1000

A. Hardware Installation

1. Power-down the VS1000 to be removed from service.
2. Install the new VS1000.
3. Transfer *all* cabling from the old VS1000 to the new VS1000. This includes the VS1100 cable, if used.
4. *Do not* add or remove VS1100 expansion units. The new VS1000 must be connected to the same number of VS1100 units as the VS1000 that is being removed from service.
5. Connect the new VS1000 to the network hub or server.
6. Power-up the new VS1000 and verify that it passes the power-on diagnostics.

B. Software Installation

1. Change the VS1000 VS-Link configuration to reflect the network address (MAC) of new VS1000 base unit.
2. No port reconfiguration is needed.
3. *Do not* shut down and restart the server.

“Hot-Swapping” a VS1100

A. Hardware Installation

1. Power-down the VS1000 base unit.
2. Install the new VS1100 expansion unit.
3. Transfer *all* cabling from the old VS1100 to the new VS1100.
4. Power-up the VS1000 base unit and verify that it passes the power-on diagnostics.

B. Software Installation

1. No software changes required.
2. *Do not* shut down and restart the server.

Obtaining Software or Document Updates

For information that is not in this *Guide*, see the **README** and/or **Help** files on the installation media. In particular, the Windows NT version of VS-Link includes significant online help.

Control manuals and other documents are available in electronic form on the Control web site. Driver software updates can be downloaded at no charge from the Control ftp site. Always check the web and ftp sites to make sure that you have the current driver and documentation.

The current released version of the software is stored in the **VS1000** directory. If a newer version has reached the beta testing stage, it can be found in the **BETA** directory. Beta software is made available on an “**as-is**” basis and users of beta software assume all risks and liabilities relating thereto.

Note: *Downloadable driver software files are stored in either zipped (filename.zip) or self-extracting zip (filename.exe) format. You must extract the zipped files before installing a downloaded file. For more information, see the appropriate section for your server operating system.*

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Technical Support

Control has a staff of support technicians available to help you. U.S. telephone support is available from 8 AM to 6 PM Central time, Monday through Friday (holidays excluded), at the phone number(s) listed on the previous page. Before you call Control technical support, please have the following information available.

Table 1. Support Call Information

Item	Information
Hardware Type	VS1000 VS1100
Hardware Serial Number*	
Network Address*	00 C0 4E ____ ____ ____
Operating system type and release	
SPACK revision number (Novell only)	
VS-Link version number	
Server computer make, model, and speed	
Serial devices connected to the VS1000/VS1100 ports	
Other serial port adapters installed in the server and their COM port numbers	
Other network adapter devices installed in the server and their network (MAC) addresses	

* *The hardware serial number and network address can be found on printed tags on the back panel of the unit. VS1100 expansion units have serial numbers only.*

Control supplies a self-adhesive label with each InterChangeVS unit, which you can use to record the serial number and network address. If the VS1000/VS1100 unit is not in a readily accessible location, check to see if this label has been filled out and posted elsewhere (for example, near the server console).

Installing the Hardware

Hardware Installation Overview

Perform the following steps to install your virtual server:

- Install the VS1000/VS1100 hardware and the devices that you are connecting to the serial ports.
- Install the VS-Link software (as described in the section for your operating system).
- Configure your operating system to work with the serial devices connected to the VS1000/VS1100 ports.

This section covers installing the VS1000/VS1100 hardware, understanding the power-on diagnostics, and connecting serial devices. For information regarding serial port pinouts and cabling, see the section titled *Building Cables*.

Installing the VS1000 Hardware

Follow this procedure to connect the VS1000 to your network.

1. Write down the serial number and Network (MAC) address of the VS1000 in the event that you need to call technical support.

Table 2. VS1000 Model and Serial Numbers

Serial Number*	Network Address*
	00 C0 4E ____ ____ ____

The identification tag is located on the back panel of the unit. The VS1100 has a serial number only. If the VS1000/VS1100 is to be mounted in a remote location, you can also write this information on the blank sticker shipped with the VS1000/VS1100 and place the sticker in a more accessible location.

2. Optionally, mount the VS1000 into the rack using the enclosed mounting brackets or mount the rubber feet.

Warning: *If mounting the VS1000 into a rack mount unit, make sure that the rack is not top heavy.*

- a. Attach the L brackets to the VS1000 using the screws supplied with the unit.



- b. Attach the L brackets into your rack.

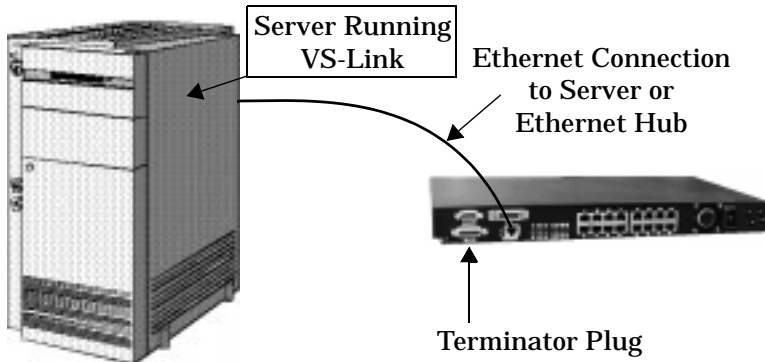


OR

- Attach the adhesive feet to the depressions in the bottom of the VS1000 and place the unit on a stable surface.

Note: You can mount the VS1000 facing either forward or to the rear. Make sure the cooling fan is unobstructed.

3. Connect an Ethernet cable from the appropriate Ethernet connection (10Base-T or AUI) on the VS1000 to your server or Ethernet hub.



Notes:

- Do not connect two VS1000 base units directly to each other.
 - If connecting the VS1000 directly to the server, an Ethernet adapter (NIC card) is required. This is not supplied by Control.
 - If connecting the VS1000 directly to the server, an Ethernet crossover cable is required. See Building Cables for specifications.
4. If not connecting VS1100 expansion units, put the terminator plug in the VS1100 connector on the VS1000 base unit.

5. Make sure the power switch is set to Off (0).
6. Connect the power cord to the unit and plug it into an outlet.

Note: All VS1000 units include autoswitching power supplies. You may need to select the appropriate power cable for your location, but the VS1000 automatically senses and switches to the correct line voltage and cycle frequency.
7. If you are installing VS1100 expansion units, continue with the *Installing VS1100 Hardware* discussion, below.

If you are not installing VS1100 expansion units, go to the *Power-On Diagnostics* discussion which follows the subsection below.

Installing VS1100 Hardware

Use the following procedure to attach InterChangeVS 1100 expansion units to the VS1000 base unit.

1. Record the serial numbers of the VS1100 units.

Table 3. VS1100 Model and Serial Numbers

VS1100	Serial Number*
1	
2	
3	

* The identification tag is located on the back of the unit.

2. Optionally, mount the VS1000 into the rack using the enclosed mounting brackets or mount the rubber feet.

Warning: If mounting the VS1100 into a rack mount unit, make sure that the rack is not top heavy.

- a. Attach the L brackets to the VS1100 using the screws supplied with the unit.



- b. Attach the L brackets into your rack.



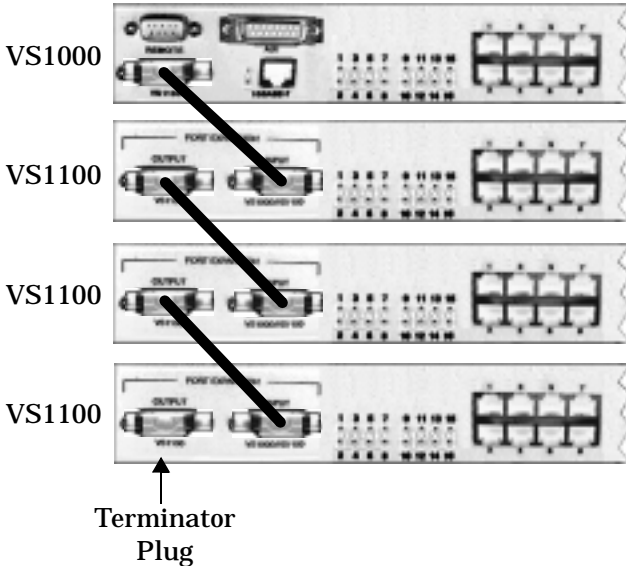
OR

- Attach the adhesive feet to the depressions in the bottom of the VS1100 and place the unit on a stable surface.

Note: You can mount the VS1100 facing in either direction. The VS1100 does not contain a power supply or cooling fan.

3. Connect the VS1100 device or devices to the VS1000 virtual server, as shown in the following illustration:
 - Connect the cable (shipped with the VS1100) from the connector labeled **VS1100** on the VS1000 to the connector labeled **INPUT** on the first VS1100.
 - To connect additional VS1100 units, connect the cable from the **OUTPUT** of one VS1100 to the **INPUT** of the next VS1100.

Note: You can connect a maximum of three VS1100 expansion units to each VS1000 base unit.



Note: The VS1100 expansion unit cannot be connected directly to the LAN. Remember, the RJ45 jacks on the VS1100 are RS-232 ports, not 10Base-T ports.

4. Install the terminator plug in the **OUTPUT** connector of the last VS1100 in the installation.
5. Continue with the *Power-On Diagnostics* discussion on the following pages.

Power-On Diagnostics

When you switch a VS1000 base unit on, it performs a self-diagnostic. The results are displayed via the LED lights on the back panel. If the unit is working correctly, the following events should take place:

1. All LEDs should light up briefly, to show that they are working.
2. Both 10Base-T lights should remain lit after the port LEDs go out, while the unit establishes the Ethernet connection and polarity.
3. If using 10Base-T cabling, the lower LED remains lit to indicate that the Ethernet connection is established and polarity is correct.
4. The Port 1 LED begins flashing, to indicate that the VS1000 is waiting for the server to initiate VS-Link communications.
5. The upper 10Base-T LED flashes briefly, as the server acquires control of the VS1000.
6. The port LEDs begin flashing in a “sweeping” sequence, to indicate that the unit is operating normally.

The following figures and tables illustrate LED patterns for diagnosing hardware problems.

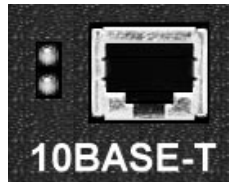


Table 4. 10Base-T LED Descriptions

LED	Indicator	Description
Upper	Flashes Briefly	During the power-on cycle (first few seconds after the power is turned on), this flashes briefly to display link polarity on the 10Base-T connection.
Upper	Flashing	The LED flashes briefly during data transmission as a general indicator of activity.
Lower	On Steadily	The VS1000 is attached to the LAN by the RJ45 10Base-T connector.
Lower	Off	The VS1000 is not connected to the LAN properly or it is connected by the AUI port.

Note: *If using an AUI connection to the server, you can determine proper polarity by using an AUI to 10Base-T converter box.*

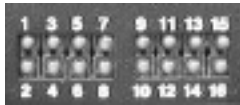


Table 5. Ports 1 Through 16 LED Descriptions

Indicator	Description
Flash Briefly	All LEDs light briefly during the power-on sequence and then turn off.
1 LED Lit*	A RAM self-test failure or other mainboard error.
2 LEDs Lit*	Ethernet hardware initialization failure.
3 LEDs Lit*	A hardware self-test failure.
4 LEDs Lit*	A flash memory configuration error.

* *The LEDs light up for a about a minute and then the hardware resets and the same cycle repeats.*

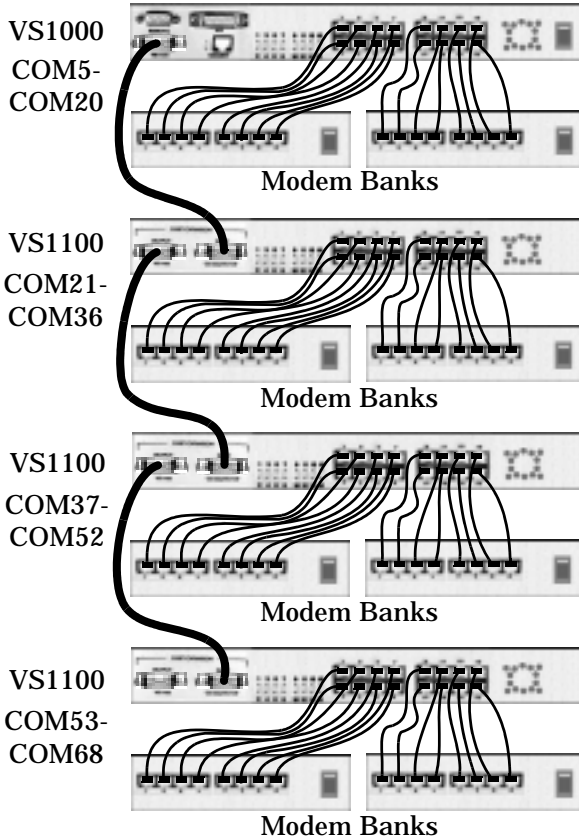
Note: *The first port LED on the VS1000 blinks while it is waiting for the server to connect with it. Once the server software connects with the device, the LEDs display port activity and at regular intervals perform a quick light pattern “sweeping” sequence, starting with the first port and moving to the last.*

If 1—5 LEDs stay on longer than 6 seconds, this indicates a hardware fault condition. Cycle the power on the VS1000 (turn the unit off and on). If the problem persists, contact Control technical support.

Connecting Devices

Use the following procedure to connect RS-232 asynchronous devices to the VS1000/1100 ports. The following figure illustrates a modem bank environment.

1. Connect your RS-232 devices to Ports 1 through 16, for each VS1000/1100. RJ45 to DB25 cables are available from Control.



Note: Use the modem manufacturer's hardware installation documentation if you need help with modem pinouts. If you need information about VS1000/VS1100 connectors, see the section titled Building Cables.

2. Install or reconfigure VS-Link using the instructions for your operating system.

Replacing Units in Service (“Hot-Swapping”)

In the event that a VS1000 needs to be removed from service, it is possible to replace it with another VS1000 without taking down the network server. The procedure for doing so varies depending on your network operating system.

Under Windows NT, this is done through the Setup program. See the *Windows NT* section of this guide for more information.

Under Novell NetWare, this is done through the vs1man program. See the *Novell NetWare* section of this guide for more information.

Note: *Do not use “hot-swapping” to add or remove VS1100 expansion units. The VS1000/VS1100 combination being swapped in must have the same total number of ports as the VS1000/VS1100 combination being taken out of service.*

Provided the number of ports remains the same, VS1100 expansion units may be “hot-swapped” without further configuration changes. However, be sure to power down the VS1000 base unit before disconnecting or reconnecting VS1100 expansion units.

Building Cables

This section contains information on how to build your own cables.

Serial Cable Specifications

If building your own serial cables, use shielded cable.

Serial (RJ45) Connector Pinouts

Use the following tables and figures for pinout information for the RJ45 connectors on the VS1000 and VS1100.

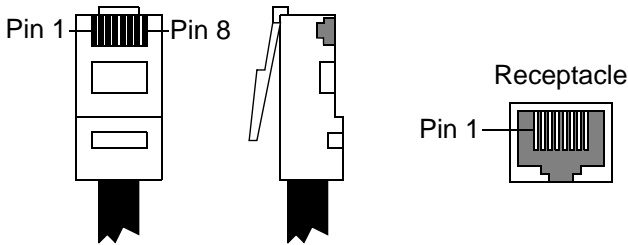


Table 6. RJ45 Connector Pinouts for RS-232

Pin	RS-232 Signals
1	RTS
2	DTR
3	GND
4	TxD
5	RxD
6	DCD
7	DSR
8	CTS

Building an RJ45 to DB25 Cable

Use the following figures if you need information about building a general-purpose DTE-to-DTE null modem cable or a DTE-to-DCE modem cable.



Modem Cable

DTE-to-DCE Modem Cable*

RJ45		DB25	
<u>Signal</u>	<u>Pin</u>	<u>Pin</u>	<u>Signal</u>
RTS	1	4	RTS
DTR	2	20	DTR
GND	3	7	GND
TxD	4	2	TxD
RxD	5	3	RxD
DCD	6	8	DCD
DSR	7	6	DSR
CTS	8	5	CTS

* Can be ordered from Control.

General-Purpose DTE-to-DTE Null Modem Cable

RJ45		DB25	
<u>Signal</u>	<u>Pin</u>	<u>Pin</u>	<u>Signal</u>
TxD	4	2	TxD
RxD	5	3	RxD
RTS	1	4	RTS
CTS	8	5	CTS
DSR	7	20	DTR
DCD	6	8	DCD
DTR	2	6	DSR
GND	3	7	GND

Ethernet Cable Specifications

For Ethernet, use an unshielded twisted-pair (UTP) cable with a maximum length of 100 meters or approximately 328 feet. The following table illustrates UTP cable specifications.

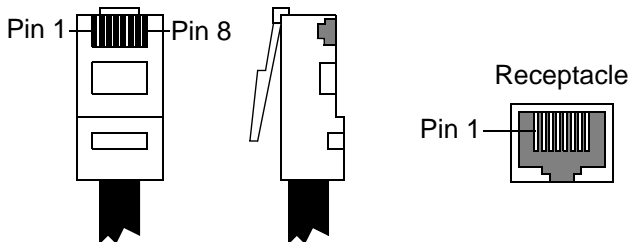
Table 7. Ethernet Cabling Specifications

Cable	Specification
Type	100 $\frac{3}{4}$ UTP with two pairs
Maximum length	100 meters or 328 feet
Minimum length	0.6 meters or 23 feet

Ethernet 10Base-T Connector Pinout

Table 8. Ethernet Port RJ45 Connector Pinouts

Pins	VS3000 10Base-T
1	TxD+
2	TxD-
3	RxD+
4 and 5	Not Used
6	RxD-
7 and 8	Not Used

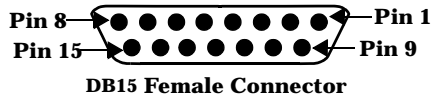


Ethernet AUI Connector Pinout (VS1000 Only)

This section shows an illustration of the female, high-density DB15 connector and a listing of its different signals.

Table 9. Ethernet Port DB15 Connector Pinouts

Pin	Signals
1	GND
2	CI1+
3	DO+
4	DGND
5	DI+
6	DGND
7	Not Connected
8	DGND
9	CI-
10	DO-
11	DGND
12	DI-
13	+12V
14	DGND
15	Not Connected



Ethernet Crossover Cable

If you are connecting from the VS1000 / VS2000 10Base-T connector directly to the NIC card in the server, you need a crossover cable, wired as follows:

Table 10. Ethernet Crossover Cable

Pin	Connects to Pin
1	3
2	6
3	1
6	2

Remote Connector

The DB9 port labeled “Remote” is reserved for Control Corporation repair and maintenance use. No user-accessible signals are present on this port.

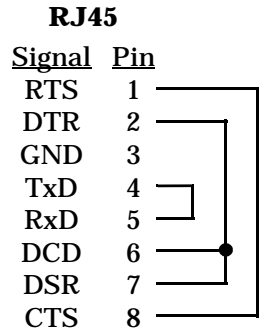
Building Loopback Plugs

Loopback connectors are RJ45 serial port plugs, with pins wired together as shown, that are used in conjunction with the diagnostic software to test serial ports. The VS1000 and VS1100 are shipped with a loopback plug. This information can help you build additional plugs or replace a missing loopback.

Use the following information to build loopback plugs.

- Pins 4 to 5
- Pins 1 to 8
- Pins 2 to 6 to 7

Note: Do not insert the serial port loopback plug into the 10Base-T Ethernet connector.



InterChangeVS Specifications

Hardware Conditions

The following table lists the InterChangeVS unit conditions.

Table 11. Operating Conditions

Condition	Value
Heat output: InterChangeVS 1000 InterChangeVS 1100	51.2 BTU/Hr 34.1 BTU/Hr
Air temperature: System on System off	0 to 40°C -20 to 85°C
Altitude	0 to 10,000 feet
Mean Time between Failures: InterChangeVS 1000 InterChangeVS 1100	7.8 years 20.9 years
Humidity (non-condensing): System on System off	8% to 80% 20% to 80%

Hardware Specifications

The following table lists the InterChangeVS unit specifications.

Table 12. Specifications

Topic	Specification
Maximum base units per server	Dependent on operating system
Maximum VS1100 port extenders per VS1000 base unit	3
Maximum number of serial ports per VS1000/VS1100 combined system	64
Maximum Baud Rate VS1000/VS1100	230.4K bps

Table 12. Specifications

Topic	Specification
Device Driver Control: Data bits Parity Stop bits	7 or 8 Odd, Even, None 1 or 2
VS1000 Current Consumption	125 mA (at 120 VAC)
VS1100 Current Consumption	$\frac{+5V}{1,250 \text{ mA}}$ $\frac{+12V}{300 \text{ mA}}$ $\frac{-12V}{300 \text{ mA}}$
Power Consumption: VS1000 VS1100	15.0 W 10.0 W
Line Voltage	100 - 240 VAC
Ethernet Host Interface	AUI or 10Base-T (10 mbs)
Weight VS1000 VS1100	8.0 lbs 6.75 lbs
Dimensions (without feet)	16.75" x 11" x 1.75"

Electromagnetic Compliance

The following table illustrates electromagnetic Compliance for the VS1000 and VS1100.

Table 13. VS1000/1100 Electromagnetic Compliance

Topic	Specification
Canadian EMC requirements	Yes
FCC Class A certification	Yes
UL Listed	Yes
Surge protection	Extended ESD surge protection exceeding 20 KV.
CISPR-22/EN55022 Class A	Yes
EN60950	Yes
EN50082 (801-2 ESD, 801-3 RF, and 801-4 FT)	Yes

Power Supply Requirements

All VS1000 units include an auto-switching power supply that automatically senses the line voltage and cycle rate and sets itself accordingly. No manual switching is required. However, depending on the model you purchase you may receive one or more AC power cords, and it may be necessary to determine and select the appropriate power cord for use in your area.

Notices

Radio Frequency Interference (RFI) (FCC 15.105)

The InterChangeVS1000 virtual server has been tested and found to comply with the limits for Class A digital devices pursuant to Part 15 of the FCC Rules.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Labeling Requirements (FCC 15.19)

The virtual servers comply with part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Control Corporation may void the user's authority to operate this equipment.

Serial Cables (FCC 15.27)

This equipment is certified for Class A operation when used with unshielded cables.

Underwriters Laboratory

This equipment is Underwriters Laboratory “UL” listed.

Important Safety Information

To avoid contact with electrical current:

- Never install electrical wiring during an electrical storm.
- Never install the power plug in wet locations.
- Use a screwdriver and other tools with insulated handles.

Warning: *If mounting the unit into a rack mount configuration, make sure that the rack mount is not top-heavy.*

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