

Dell™ Console Switch

# Console Switch Installer/User's Guide

Model: Console Switch

# Notes and Cautions

## Notes, Notices, and Cautions



**NOTE:** A NOTE indicates important information that helps you make better use of your computer.



**NOTICE:** A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.



**CAUTION:** A CAUTION indicates a potential for property damage, personal injury, or death.

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**Model Console Switch**

**October 2004**

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# Product Overview

## Features and Benefits

The 8-Port and 16-port Dell™ Console Switches integrate keyboard, video, and mouse (KVM) switching technology with advanced cable management, flexible access for up to two simultaneous users, and an intuitive user interface. The Console Switch features powerful on-screen management for easy system configuration and server selection.

**NOTE:** The 8-Port Console Switch enables a single local user to access any attached servers whereas the 16-port switch allows two simultaneous users to access attached servers.

A unique benefit of the Console Switch is the Server Interface Pod (SIP) intelligent module. By utilizing CAT 5 cabling the SIP dramatically reduces cable clutter, while providing optimal resolution and video settings. The built-in memory of the SIP simplifies configuration by assigning and retaining unique server names and Electronic ID (EID) numbers for each attached server. The SIP is powered directly from the server and provides Keep Alive functionality even if the Console Switch is not powered.

**Figure 1-1. Console Switch**



## SIP Intelligent Module

SIPs allow direct KVM connectivity to servers in your Console Switch. Each Console Switch has either 8 or 16 Analog Rack Interface (ARI) ports for connecting SIPs.

Utilizing a SIP, you can attach additional switches to expand your Console Switch system. This flexibility allows you to add capacity as your data center grows.

## Multiplatform Support

The SIPs available with your Console Switch support PS/2 and USB server environments. PS/2, USB, Sun, and serial cabling options are also available using Avocent™ AVRIQ intelligent cables. Using the On-Screen Configuration and Activity Reporting (OSCAR®) graphical user interface in conjunction with these modules allows you to switch easily across platforms.

## OSCAR Graphical User Interface

The Console Switch uses the OSCAR interface, which features intuitive menus to configure your switch system and select computers. Computers can be identified by unique name, EID or port number, allowing you to assign unique server names.

## Security

The OSCAR interface allows you to protect your system with a screen saver password. After a user-defined time, the screen saver mode engages, and access is prohibited until the appropriate password is entered to reactivate the system.

## Video

The Console Switch provides optimal resolution for analog VGA, SVGA, and XGA video. Achieve resolutions of up to 1600 x 1200 with a 10-foot cable and up to 800 x 600 with a 100-foot cable. Resolutions will vary depending upon the length of cable separating your switch and servers.

**Table 1-1. SIP Resolution and Refresh Rates**

Maximum Resolution	Refresh Rate	Video Type
720 x 400	70 Hz	VGA
640 x 480	60 Hz	VGA
640 x 480	72 Hz	VESA
640 x 480	75 Hz	VESA
800 x 600	56 Hz	VESA
800 x 600	60 Hz	VESA
800 x 600	72 Hz	VESA
800 x 600	75 Hz	VESA
1024 x 768	60 Hz	VESA
1024 x 768	70 Hz	VESA
1024 x 768	75 Hz	VESA

## Plug and Play

The Console Switch also supports Display Data Channel (DDC) Plug and Play, which automates configuration of the monitor and is compliant with the VESA DDC2B standard.



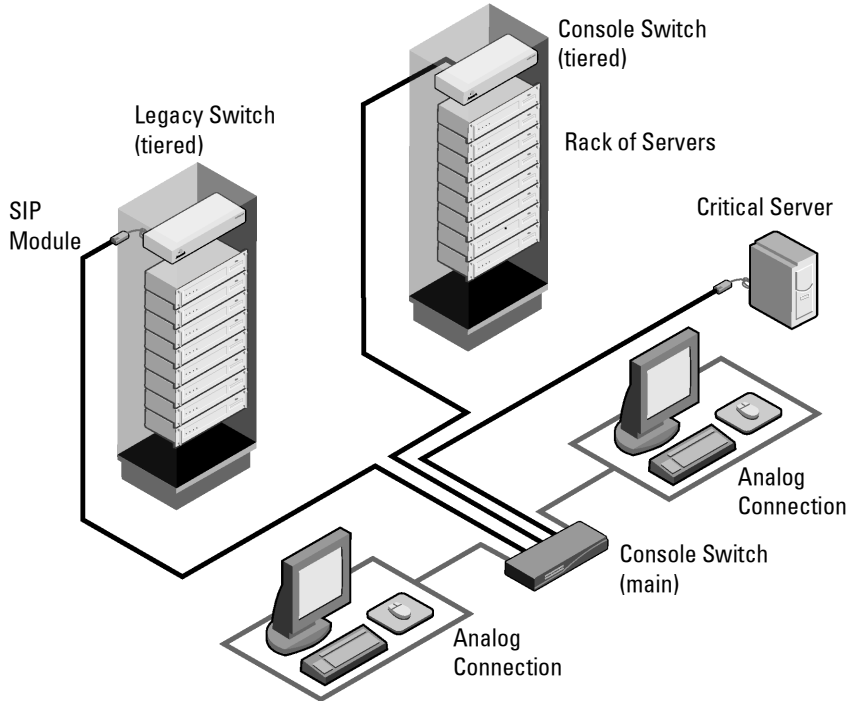
## FLASH Upgradable

You can upgrade your firmware at any time through a simple update utility to ensure that your Console Switch system is always running the most current version available. Both the Console Switch and the SIPs are FLASH upgradable. See "Appendix A: Flash Upgrades" for more information.

## Tiering Expansion


Each Console Switch supports up to 16 directly attached servers and can conveniently scale to support more. You can expand your system by tiering with Console Switches and legacy analog Console Switches. This extra "tier" of units allows you to attach up to 256 servers in one system. See "Tiering Console Switches" for more information.

**Figure 1-2. Example of a Console Switch Configuration**




## Safety Precautions

Use the following safety guidelines to help ensure your own personal safety and to help protect your system and working environment from potential damage.

 **CAUTION:** The power supplies in your system may produce high voltages and energy hazards, which can cause bodily harm. Only trained service technicians are authorized to remove the covers and access any of the components inside the system.

This document pertains only to the Dell Console Switch.

## General

- Observe and follow service markings:
  - Do not service any product except as explained in your system documentation.
  - Opening or removing covers that are marked with the triangular symbol with a lightning bolt may expose you to electrical shock.
  - Components inside these compartments should be serviced only by a trained service technician.
    - This product contains no serviceable components. Do not attempt to open.
  - If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:
    - The power cable, extension cable, or plug is damaged.
    - An object has fallen into the product.
    - The product has been exposed to water.
    - The product has been dropped or damaged.
    - The product does not operate correctly when you follow the operating instructions.
  - Keep your system away from radiators and heat sources. Also, do not block cooling vents.
  - Do not spill food or liquids on your system components, and never operate the product in a wet environment. If the system gets wet, see the appropriate section in your troubleshooting guide or contact your trained service provider.
  - Use the product only with approved equipment.
  - Allow the product to cool before removing covers or touching internal components.
  - Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
-  **NOTICE:** To help avoid damaging your system, be sure the voltage selection switch (if provided) on the power supply is set for the voltage that most closely matches the AC power available in your location.
- Be sure that your monitor and attached devices are electrically rated to operate with the power available in your location.
  - Use only power cables provided with this product.

- To help prevent electric shock, plug the system and peripheral power cables into properly grounded electrical outlets. These cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable.
- Observe extension cable and power strip ratings. Make sure that the total ampere rating of all products plugged into the power strip does not exceed 80 percent of the ampere ratings limit for the power strip.
- To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position system cables and power cables carefully. Route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local/national wiring rules.

### **Rack Mounting of Systems**

- Refer to the rack installation documentation accompanying the rack for specific caution statements and procedures.
- System rack kits are intended to be installed in a rack by trained service technicians. If a non-Dell rack is utilized, be sure that the rack meets the specifications of a Dell rack.
- Elevated Ambient Temperature: If installed in a closed rack assembly, the operation temperature of the rack environment may be greater than room ambient. Use care not to exceed the rated maximum ambient temperature of the unit.
- Reduced Air Flow: Installation of the equipment in a rack should be such that the amount of airflow 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 circuits might have on overcurrent protection and supply wiring. Consider equipment nameplate ratings for maximum current.
- Reliable Earthing: Reliable earthing of rack mounted equipment should be maintained. Pay particular attention to supply connections other than direct connections to the branch circuit (for example, use of power strips).



# Installation

## Getting Started

Before installing your Console Switch, refer to the following list to ensure you have all items that shipped with the appliance as well as other items necessary for proper installation.

### Supplied with the Console Switch

The following are supplied with the Console Switch:

- Console Switch appliance
- Power cord
- CAT 5 cable
- Rack mounting kit
- 0U mounting bracket
- One serial cable
- Console Switch Installer/User's Guide
- Console Switch Quick Installation Guide

### Additional Items Needed

The following are additional items you may need to install your Console Switch:

- One Server Interface Pod (SIP) module and UTP cabling per attached server or switch
- 1U mounting (optional)

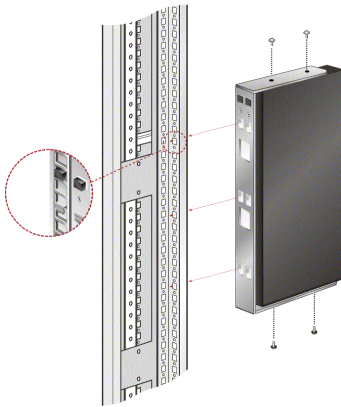
## Rack Mounting Your Console Switch Unit

Obtain a Switch Mounting Bracket Kit (0U or 1U) to rack-mount your Console Switch unit. Before installing the Console Switch and other components in the rack, stabilize the rack in a permanent location. Start rack mounting your equipment at the bottom of the rack, then work to the top. Avoid uneven loading or overloading of racks.

**⚠ CAUTION:** Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizer(s) before installing components in the rack. To install the OU switch mounting bracket (shipped as default):

- 1 Line up the holes of the mounting brackets with the screw holes in the switch.
- 2 Fasten the mounting bracket to the switch using the button head socket cap screws on each side.
- 3 Mount the switch assembly to the rack by inserting the three mounting hooks on one side of the bracket into square holes in the vertical rack.
- 4 Press down until the blue push button pops out and clicks.

**Figure 2-1. OU Mounting Bracket Installation**

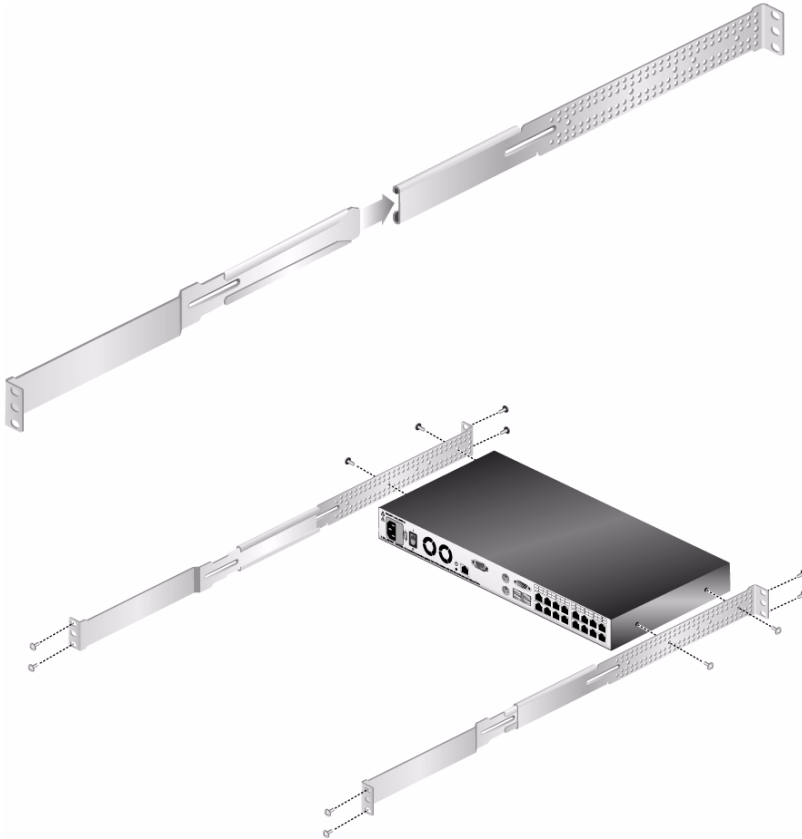


**⚠ CAUTION:** Rack Loading - Overloading or uneven loading of racks may result in shelf or rack failure, causing damage to equipment and possible personal injury. Stabilize racks in a permanent location before loading begins. Mount components beginning at the bottom of the rack, then work to the top. Do not exceed your rack load rating.

#### To install the 1U four point switch mounting bracket:

- 1 Remove the screws on each side of the 1U four-point switch and set them aside to attach to the front 1U bracket pieces later.
- 2 Line up the vent holes in the “long side” of the kit’s front brackets with the vent holes in the switch.

- 3** Line up the screw holes in the bracket with the screw holes in the switch.
- 4** With a Phillips screwdriver, fasten the front mounting brackets to the switch using two screws on each side.
- 5** Attach four cage nuts or clip nuts to the rack mounting flange of the rack cabinet's front so that the nut is positioned on the inside of the rack.
- 6** Mount the switch assembly to the rack cabinet by matching the holes in the "short side" of each bracket to an appropriate set of matching holes on your rack cabinet. Next, insert the combination hex head screws through the slots in the bracket, then the holes in the mounting rail, and then into the cage nuts or clip nuts.
- 7** Attach four cage nuts or clip nuts to the rack mounting flange of the rack cabinet back so that the nut is positioned on the inside of the rack.
- 8** Slide the rear brackets into the channel of the front brackets adjusting them to fit the rack depth.
- 9** Mount the rear bracket to the rack cabinet by matching the holes in the "short side" of each bracket to an appropriate set of matching holes on your rack cabinet, ensuring the switch is level within the rack.
- 10** Insert the combination hex head screws through the slots in the bracket and the holes in the mounting rail, then into the cage nuts or clip nuts.

**Figure 2-2. 1U Installation**

## Installing the Console Switch

Plug the supplied power cord into the back of the appliance and then into an appropriate power source. Figure 2-3 illustrates one possible configuration for your Console Switch. See the following detailed set of procedures to successfully install your appliance.

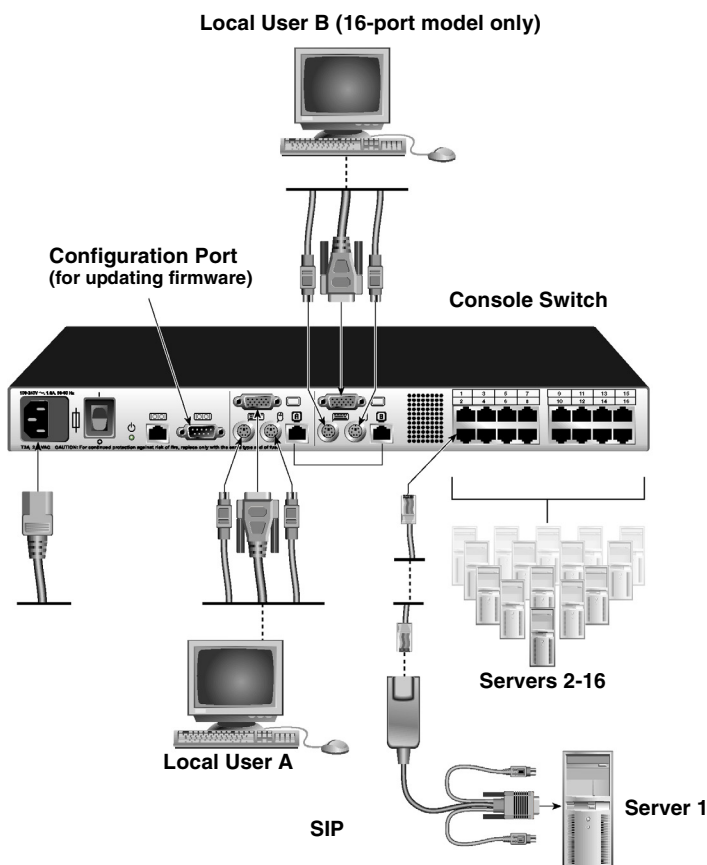


**CAUTION:** To reduce the risk of electric shock or damage to your equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) outlet that is easily accessible at all times.
- Power down the unit by unplugging the power cord from the electrical outlet or the unit.




**Figure 2-3. Basic Console Switch Configuration**




To connect a SIP to each server:

- 1 Locate the SIPs for your Console Switch.
- 2 Attach the appropriately cable ends to the keyboard, monitor and mouse ports on the first server you will be connecting to the appliance.
- 3 Attach one end of the CAT 5 cabling that will run between your SIP and Console Switch to the RJ-45 connector on the SIP.
- 4 Connect the other end of the CAT 5 cable to the desired ARI port on the back of your Console Switch.
- 5 Repeat steps 2 to 4 for all servers you wish to attach.

 **NOTE:** When connecting a Sun AVRIQ module, you must use a multi-sync monitor to accommodate Sun computers that support both VGA and sync-on-green or composite sync.

To connect local peripherals:

- 1 Select the keyboard, monitor and mouse to be connected to local user A.
- 2 Locate the port set labeled A on the back of the appliance. Connect these peripherals to their respective ports.

 **NOTE:** For the multiuser, 16-port Console Switch, repeat these steps for the local user analog port set labeled B.

- 3 Bundle and label the cables for easy identification.


## Tiering Console Switches

You can tier multiple Console Switches to enable one or two users to connect to up to 256 servers. In a tiered system, each Analog Rack Interface (ARI) port on the main Console Switch will connect to the Analog Console Interface (ACI) port on each tiered Console Switch. Each tiered switch can then be connected to a server with a SIP. The example in Figure 2-1 shows one Console Switch tiered under the main switch, enabling the connection of up to 15 primary servers and 16 secondary servers. Using this configuration, you can tier 16 Console Switches under the main switch, enabling the connection of up to 256 servers. Only one level of tiering is supported in this type of configuration, which means that you cannot tier additional legacy switches or another Console Switch. In this configuration, the local port On-Screen Configuration and Activity Reporting (OSCAR®) interface of the tiered Console Switch is disabled. All functions are performed through the main Console Switch OSCAR.

 **NOTE:** As shown in Figure 2-1, only local user A's ACI port may be used for the tiered connection.

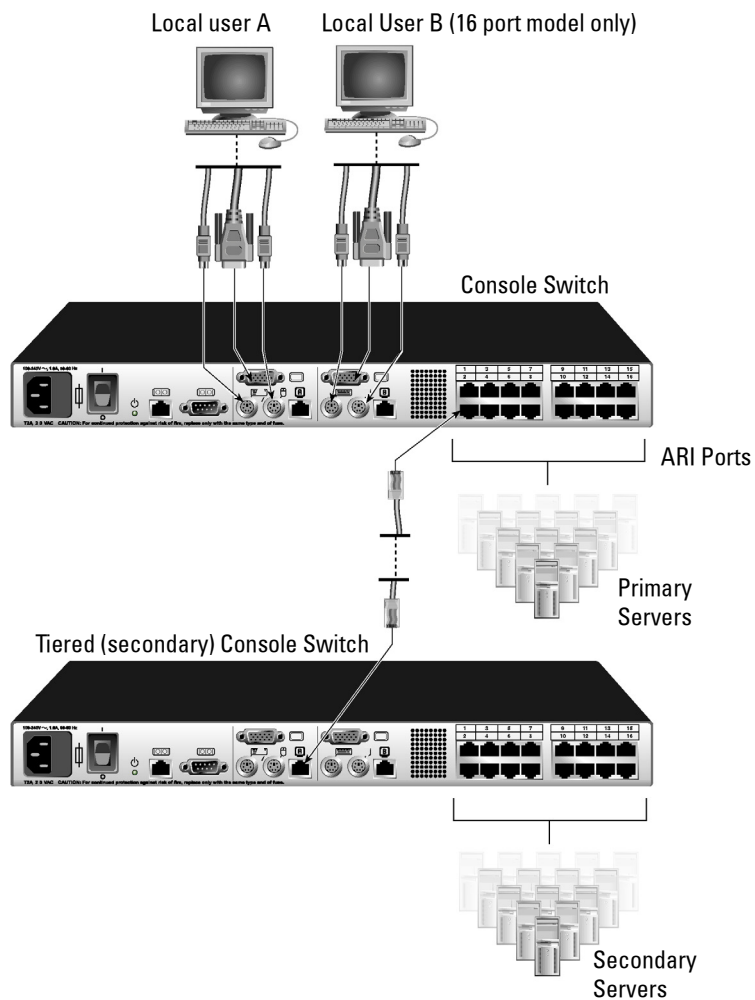
To tier multiple Console Switches:

- 1 Connect the Console Switch (tiered) to each server as described in the previous "Installing the Console Switch" section.
- 2 Connect the local peripherals to local user A of the main switch as described in "Installing the Console Switch" .
- 3 Attach one end of the CAT 5 cabling that will run between your main and tiered Console Switch to the RJ-45 (ACI) connector of local user A on the tiered Console Switch.
- 4 Attach the other end of the CAT 5 cable to one of the 16 RJ-45 (ARI) ports on the main Console Switch.

 **NOTE:** The system will automatically tier the two switches together as one. All servers connected to the tiered Console Switch will display on the main Console Switch server list in the OSCAR interface.

- 5 Repeat steps 3 and 4 for all additional tiered (secondary) Console Switches you wish to attach.

**Figure 2-4. Console Switch Configuration with a Tiered Switch**



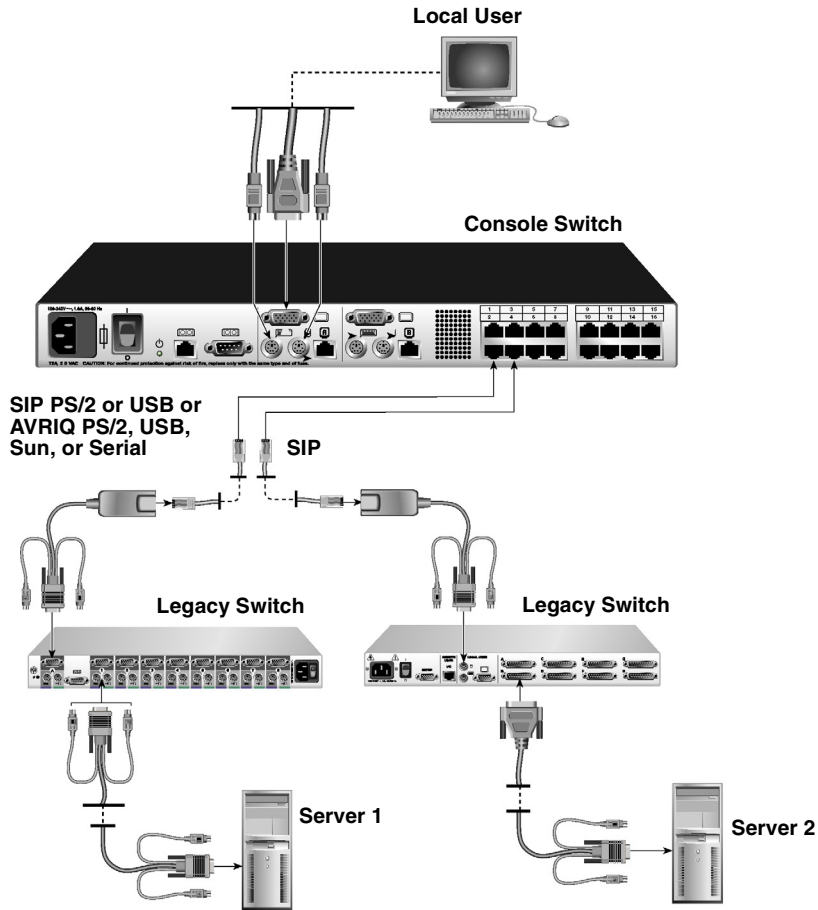
## Adding Legacy Switches

You can add legacy switches to the Console Switch system for easy integration into your existing configuration. In a tiered system, each ARI port will accommodate up to 24 servers. See the following table for legacy switches compatible with the Console Switch system.

**Table 2-1. Legacy Switch Support**

<b>Legacy Product</b>	<b>Model Numbers</b>
Avocent switches	AV200, AV400, AV2000, 180ES, 2160ES
Dell switches	Dell 180ES, 2160ES

**Figure 2-5. Console Switch Configuration with a Legacy KVM Switch**




To add a legacy KVM switch:

- 1 Mount the KVM switch into your rack cabinet. Locate a length of CAT 5 cabling to connect between your Console Switch and the SIP for your switch.
- 2 Attach the keyboard, monitor and mouse connectors of the SIP to a user port on your tiered switch.
- 3 Attach one end of the CAT 5 cabling to the RJ-45 connector on the SIP.
- 4 Connect the other end of the CAT 5 cable to an available port on the back of your Console Switch.
- 5 Connect the servers to your tiered switch according to the instructions included with the device.
- 6 Power cycle the tiered switch to enable the switch's local user port recognize the SIP.

- 7 Repeat steps 2 to 5 for all tiered switches you wish to attach to your system.

To connect local peripherals:

- 1 Select the keyboard, monitor and mouse to be connected to local user A.
  - 2 Locate the port set labeled **A** on the back of the appliance. Connect these peripherals to their respective ports.
-  **NOTE:** For the multiuser, 16-port Console Switch, repeat these steps for the local analog port set labeled **B**.
- 3 Bundle and label the cables for easy identification.

## Setting Up Your Console Switch System

With the Console Switch system, you can auto detect and configure each port on your appliance. "Basic Operation" provides detailed instructions on naming, customization, and OSCAR interface setup and configuration.

# Basic Operation

## Controlling Your System at the Local User Ports

The Console Switch features up to two local user port sets on the back of the unit that allow you to connect a monitor and a PS/2 keyboard and mouse for direct access. The 8-port Console Switch allows you to connect a single user, whereas the 16-port Console Switch allows you to connect two local users. The appliance uses the On-Screen Configuration and Activity Reporting (OSCAR®) interface, which utilizes intuitive menus to configure your system and select computers.

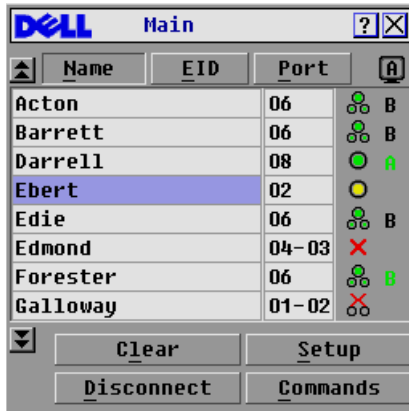
## Viewing and Selecting Ports and Servers


Use the OSCAR **Main** dialog box to view, configure and control servers in the Console Switch system. View your servers by name, port or the unique Electronic ID (EID) number embedded in each Server Interface Pod (SIP). You will see an OSCAR interface-generated port list by default when you first launch the OSCAR interface.

The **Port** column indicates the Analog Rack Interface (ARI) port to which a server is connected. If you connect a legacy keyboard, video, and mouse (KVM) switch to the appliance or a tiered switch, the port numbering displays the ARI port first, then the switch port to which the server is connected. For example, in Figure 3-1, servers 04-03 and 01-02 are connected to switches.

To access the **Main** dialog box:

- 1 Press <Print Screen> to launch the OSCAR interface. The **Main** dialog box appears.






**Figure 3-1. Main Dialog Box**

 **NOTE:** You can also press the <ctrl> key twice within one second to launch the OSCAR interface. You can use this key sequence in any place you see <Print Screen> throughout this installer/user's guide.

### Viewing the Status of Your Switch



The status of the servers in your system is indicated in the right columns of the **Main** dialog box. The following table describes the status symbols.

**Table 3-1. OSCAR Interface Status Symbols**

Symbol	Description
	Server Interface Pod (SIP) is online (green circle).
	SIP is offline or is not operating properly.
	Connected switch is online.
	Connected switch is offline or is not operating properly.
	SIP is being upgraded (yellow circle).



**Table 3-1. OSCAR Interface Status Symbols (continued)**

Symbol	Description
	SIP is being accessed by the indicated user channel (green channel letter).
	SIP is blocked by the indicated user channel (black channel letter).

## Selecting Servers

Use the **Main** dialog box to select servers. When you select a server, the appliance reconfigures the keyboard and mouse to the correct settings for that server.

To select servers:

Double-click the server name, EID or port number.

-or-

If the display order of your server list is by port (**Port** button is depressed), type the port number and press <Enter>.

-or-

If the display order of your server list is by name or EID number (**Name** or **EID** button is depressed), type the first few characters of the name of the server or the EID number to establish it as unique and press <Enter>.

To select the previous server:

Press <Print Screen> and then <Backspace>. This key combination toggles you between the previous and current connections.

To disconnect the user from a server:

Press <Print Screen> to access OSCAR and then click **Disconnect**.

-or-

Press <Print Screen> and then <Alt><0>. This leaves the user in a free state, with no server selected. The status flag on your desktop displays **Free**.



**NOTE:** To clear all offline Server Interface Pods (SIPs) from the list, click **Clear**.

## Soft Switching

Soft switching is the ability to switch servers using a hotkey sequence. You can soft switch to a server by pressing <Print Screen> and then typing the first few characters of its name or number. If you have set a **Screen Delay Time** and you press the key sequences before that time has elapsed, the OSCAR interface will not display.

To configure servers for soft switching:

- 1 Press <Print Screen> to launch the OSCAR interface. The **Main** dialog box appears.

- 2 Click **Setup - Menu**. The **Menu** dialog box appears.
- 3 Set a **Screen Delay Time** by typing the number of seconds of delay you want between <Print Screen> being pressed and the **Main** dialog box displaying.
- 4 Click **OK**.

To soft switch to a server:

- 1 To select a server, press <Print Screen>. If the display order of your server list is by port (**Port** button is depressed), type the port number and press <Enter>.
 

-or-

 If the display order of your server list is by name or EID number (**Name** or **EID** button is depressed), type the first few characters of the name of the server or the EID number to establish it as unique and press <Enter>.
- 2 To switch back to the previous server, press <Print Screen> then <Backspace>.

## Navigating the OSCAR Interface

This table describes how to navigate the OSCAR interface using the keyboard and mouse.

**Table 3-2. OSCAR Interface Navigation Basics**

This Keystroke	Does This
Print Screen	Press <Print Screen> twice to send the <Print Screen> keystroke to the currently selected device.
F1	Opens the <b>Help</b> screen for the current dialog box.
Escape	Closes the current dialog box without saving changes and returns to the previous one. In the <b>Main</b> dialog box, it closes the OSCAR interface and returns to the flag. In a message box, it closes the pop-up box and returns to the current dialog box.
Alt (Hotkey)	Opens dialog boxes, selects or checks options and executes actions when used with underlined or other designated letters.
Alt+X	Closes the current dialog box and returns to the previous one.
Alt+O	Selects the <b>OK</b> button, then returns to the previous dialog box.
Single-click, Enter	In a text box, selects the text for editing and enables the Left and Right Arrow keys to move the cursor. Press <Enter> again to quit the edit mode.

**Table 3-2. OSCAR Interface Navigation Basics (continued)**

<b>This Keystroke</b>	<b>Does This</b>
Enter	Completes a switch in the <b>Main</b> dialog box and exits the OSCAR interface. Performs the same function as the <b>OK button</b> .
Print Screen, Backspace	Toggles back to previous selection.
Print Screen, Alt+0	Immediately disengages user from a server; no server is selected. Status flag displays Free. (This only applies to the <0> on the keyboard and not the keypad.)
Print Screen, Pause	Immediately turns on screen saver mode, and prevents access to that specific console if it is password protected.
Up/Down Arrows	Moves the cursor from line to line in lists.
Right/Left Arrows	Moves the cursor between columns. When editing a text box, these keys move the cursor within the column.
Page Up/Page Down	Pages up and down through lists and Help pages.
Home/End	Moves the cursor to the top or bottom of a list.
Delete	Deletes characters in a text box.
Numbers	Type from the keyboard or keypad.

## Configuring OSCAR Interface Menus

You can configure your Console Switch from the **Setup** dialog box in OSCAR. Click the **Names** button when initially setting up your appliance to identify servers by unique names. Select the other setup features to manage routine tasks for your servers from the OSCAR menu.

**Table 3-3. Setup Features to Manage Routine Tasks for Your Servers**

<b>Feature</b>	<b>Purpose</b>
Menu	Change the server listing between numerically by port or EID number and alphabetically by name.  Change the <b>Screen Delay Time</b> before the OSCAR interface displays after pressing <Print Screen>.
Flag	Change display, timing, color or location of the status flag.
Broadcast	Set up to simultaneously control multiple servers through keyboard and mouse actions.

**Table 3-3. Setup Features to Manage Routine Tasks for Your Servers (continued)**

Feature	Purpose
Scan	Set up a custom scan pattern for up to 16 servers.
Security	Set passwords to restrict server access. Enable the screen saver.
Devices	Identify the appropriate number of ports on an attached legacy switch.
Names	Identify servers by unique names.
Switch	Choose the switch mode and the share mode time-out.


To access the **Setup** dialog box:

- 1 Press <Print Screen> to launch the OSCAR interface. The **Main** dialog box appears.
- 2 Click **Setup**. The **Setup** dialog box displays.

**Figure 3-2. Setup Dialog Box**

### Assigning Server Names

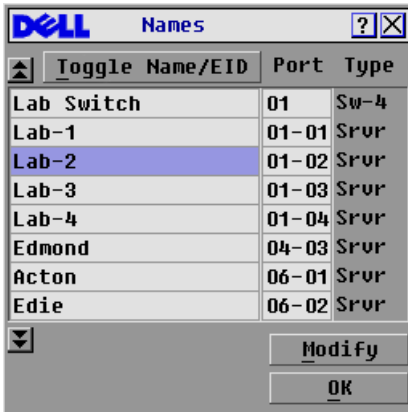
Use the **Names** dialog box to identify individual servers by name rather than by port number. The **Names** list is always sorted by port order. Names are stored in the SIP, so even if you move the cable/server to another ARI port, the name and configuration will be recognized by the appliance.

 **NOTE:** If a server is turned off, the SIP will not appear in the **Names** list.

To access the **Names** dialog box:

- 1 Press <Print Screen> to launch OSCAR. The **Main** dialog box appears.
- 2 Click **Setup - Names**. The **Names** dialog box appears.

Figure 3-3. Names Dialog Box

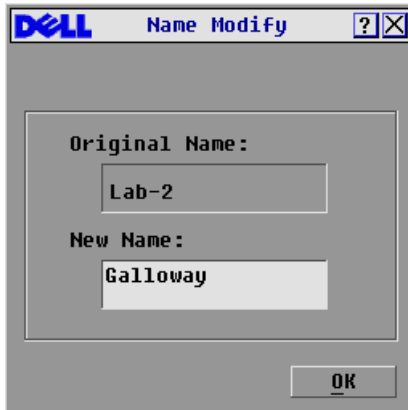


**NOTE:** If the server list changes, the mouse cursor turns into an hourglass as the list is automatically updated. No mouse or keyboard input is accepted until the list update is complete.

To assign names to servers:


- 1 In the Names dialog box, select a server name or port number and click **Modify**. The Name Modify dialog box displays.

Figure 3-4. Name Modify Dialog Box




- 2 Type a name in the New Name box. Names of servers may be up to 15 characters long. Legal characters include: A to Z, a to z, 0 to 9, space and hyphen.
- 3 Click **OK** to transfer the new name to the Names dialog box. Your selection is not saved until you click **OK** in the Names dialog box.
- 4 Repeat steps 1 to 3 for each server in the system.

- 5 Click **OK** in the Names dialog box to save your changes.
- or-
- Click **X** or press <Escape> to exit the dialog box without saving changes.

 **NOTE:** If a SIP has not been assigned a name, the EID is used as the default name.

### Assigning Device Types

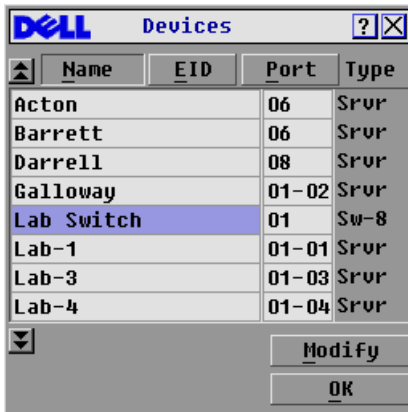
While the appliance automatically discovers legacy KVM switches, you will need to specify the number of ports on the legacy switch in the **Devices** dialog box. You will see an indication of the switch type such as Sw-8 or Sw-24 appear in the **Type** category for the tiered switch. Select the switch from the list. The **Modify** button displays, allowing you to assign it the appropriate number of ports.

 **NOTE:** The **Modify** button will only be available if a configurable switch is selected.

To access the **Devices** dialog box:

- 1 Press <Print Screen> to launch OSCAR. The **Main** dialog box appears.
- 2 Click **Setup - Devices**. The **Devices** dialog box appears.

**Figure 3-5. Devices Dialog Box**

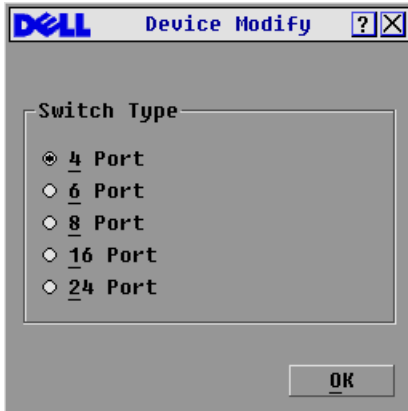


When the Console Switch discovers a legacy switch, the port numbering changes to accommodate each server under that switch. For example, if the switch is connected to ARI port 6, the switch port is listed as 06 and each server under it is numbered sequentially 06-01, 06-02 and so on.

To assign a device type:

- 1 In the **Devices** dialog box, select the desired port number.
- 2 Click **Modify**. The **Device Modify** dialog box appears.

**Figure 3-6. Device Modify Dialog Box**



- 3 Choose the number of ports supported by your legacy switch and click **OK**.
- 4 Repeat steps 1 to 3 for each port requiring a device type to be assigned.
- 5 Click **OK** in the **Devices** dialog box to save settings.

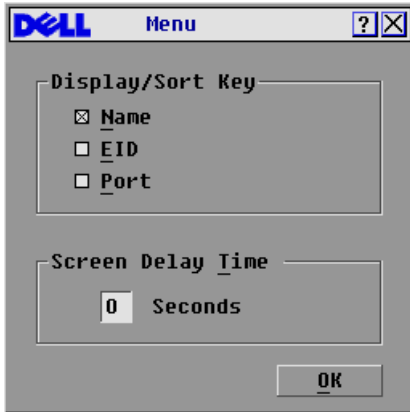
 **NOTE:** Changes made in the **Device Modify** dialog box are not saved until you click **OK** in the **Devices** dialog box.

### **Changing the Display Behavior**

Use the **Menu** dialog box to change the display order of servers and set a **Screen Delay Time** for the OSCAR interface. The display order setting alters how servers will display in several screens including the **Main**, **Devices** and **Broadcast** dialog boxes.

To access the **Menu** dialog box:

- 1 Press <Print Screen> to launch the OSCAR interface. The **Main** dialog box appears.
- 2 Click **Setup - Menu** in the **Main** dialog box. The **Menu** dialog box appears.

**Figure 3-7. Menu Dialog Box**

To choose the default display order of servers:

- 1 Select **Name** to display servers alphabetically by name.  
-or-  
Select **EID** to display servers numerically by EID number.  
-or-  
Select **Port to display** servers numerically by port number.
- 2 Click **OK**.

To set a **Screen Delay Time** for the OSCAR interface:

- 1 Type in the number of seconds (0 to 9) to delay the OSCAR interface display after you press <Print Screen>. Entering <0> launches the OSCAR interface with no delay.
- 2 Click **OK**.

Setting a **Screen Delay Time** allows you to complete a soft switch without the OSCAR interface displaying. To perform a soft switch, see "Soft Switching".

### Controlling the Status Flag

The status flag displays on your desktop and shows the name or EID number of the selected server or the status of the selected port. Use the **Flag** dialog box to configure the flag to display by server name or EID number, or to change the flag color, opacity, display time and location on the desktop.

**Table 3-4. OSCAR Status Flags**

Flag	Description
Darre11	Flag type by name
520255-73F344	Flag type by EID number



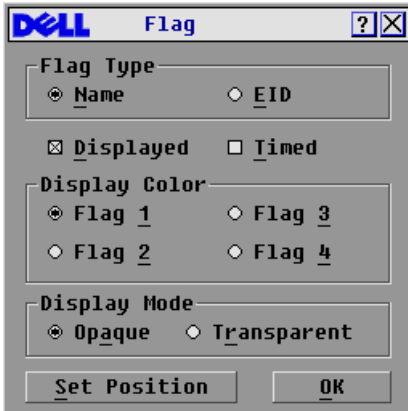
**Table 3-4. OSCAR Status Flags (continued)**

Flag	Description
Free	Flag indicating that the user has been disconnected from all systems
Darrell →	Flag indicating that Broadcast mode is enabled

To access the Flag dialog box:

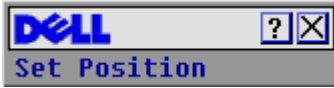
- 1 Press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Setup - Flag**. The **Flag** dialog box appears.


**Figure 3-8. Flag Dialog Box**



To determine how the status flag is displayed:

- 1 Select **Name** or **EID** to determine what information will be displayed.
- 2 Select **Displayed** to show the flag all the time or select **Timed** to display the flag for only five seconds after switching.
- 3 Select a flag color in **Display Color**.
- 4 In **Display mode**, select **Opaque** for a solid color flag or select **Transparent** to see the desktop through the flag.
- 5 To position the status flag on the desktop:
  - a Click **Set Position** to gain access to the **Set Position Flag** screen.
  - b Left-click on the title bar and drag to the desired location.
  - c Right-click to return to the **Flag** dialog box.

**Figure 3-9. Set Position Flag**


 **NOTE:** Changes made to the flag position are not saved until you click **OK** in the **Flag** dialog box.

- 6 Click **OK** to save settings.
- or-
- Click **X** to exit without saving changes.

### Setting Console Security

The OSCAR interface enables you to set security on your local user port console. You can establish a screen saver mode that engages after your console remains unused for a specified **Inactivity Time**. Once engaged, your console will remain locked until you press any key or move the mouse. You will then need to type in your password to continue.

Use the **Security** dialog box to lock your console with password protection, set or change your password and enable the screen saver.

 **NOTE:** If a password has been previously set, you will have to enter the password before you can access the **Security** dialog box.

To access the **Security** dialog box:

- 1 Press <Print Screen> to launch the OSCAR interface. The **Main** dialog box appears.
- 2 Click **Setup - Security**. The **Security** dialog box appears.

**Figure 3-10. Security Dialog Box**

To set or change the password:

- 1 Single-click and press <Enter> or double-click in the **New** text box.

- 2 Type the new password in the **New text** box and press <Enter>. Passwords must contain both alpha and numeric characters, are case sensitive and may be up to 12 characters long. Legal characters are: A to Z, a to z, 0 to 9, space and hyphen.
- 3 In the **Repeat** box, type the password again and press <Enter>.
- 4 Click **OK** to change only your password, and then close the dialog box.



**NOTE:** If you should lose or forget your password, you must return your switch for service or technical support.

To password protect your console:

- 1 Set your password as described in the previous procedure.
- 2 Select **Enable Screen Saver**.
- 3 Type the number of minutes for **Inactivity Time (from 1 to 99)** to delay activation of password protection and the screen saver feature.
- 4 For Mode, select **Energy** if your monitor is ENERGY STAR<sup>®</sup> compliant; otherwise select **Screen**.



**CAUTION: Monitor damage can result from the use of Energy mode with monitors not compliant with ENERGY STAR<sup>®</sup>.**

- 5 (Optional) Click **Test** to activate the screen saver test, which lasts 10 seconds then returns you to the **Security** dialog box.
- 6 Click **OK**.

To log in to your console:

- 1 Press any key or move the mouse.
- 2 The **Password** dialog box appears. Type your password, then click **OK**.
- 3 The **Main** dialog box appears if the password was entered properly.

To remove password protection from your console:

- 1 From the **Main** dialog box, click **Setup - Security**; the **Authorize** dialog box appears. Type your password, then click **OK**.
- 2 In the **Security** dialog box, single-click and press <Enter> or double-click in the **New** box. Leave the box blank. Press <Enter>.
- 3 Single-click and press <Enter> or double-click in the **Repeat** box. Leave the box blank. Press <Enter>.
- 4 Click **OK** to eliminate your password.

To enable the screen saver mode with no password protection:

- 1 If your console does not require a password to gain access to the **Security** dialog box, proceed to step 2.  
-or-  
If your console is password protected, see the previous procedure, then go to step 2.

2 Select **Enable Screen Saver**.

3 Type the number of minutes for **Inactivity Time (from 1 to 99)** to delay activation of the screen saver.

4 Choose **Energy** if your monitor is ENERGY STAR<sup>®</sup> compliant; otherwise select **Screen**.



**CAUTION: Monitor damage can result from the use of Energy mode with monitors not compliant with ENERGY STAR<sup>®</sup>.**

5 (Optional) Click **Test** to activate the screen saver test, which lasts 10 seconds then returns you to the **Security** dialog box.

6 Click **OK**.



**NOTE:** Activation of the screen saver mode disconnects the user from a server; no server is selected. The status flag displays **Free**.

To exit the screen saver mode:

Press any key or move your mouse. The **Main** dialog box appears and any previous server connection will be restored.

To turn off the screen saver:

1 In the **Security** dialog box, clear **Enable Screen Saver**.

2 Click **OK**.

To immediately turn on the screen saver:

Press <Print Screen>, then press <Pause>.

## Displaying Version Information

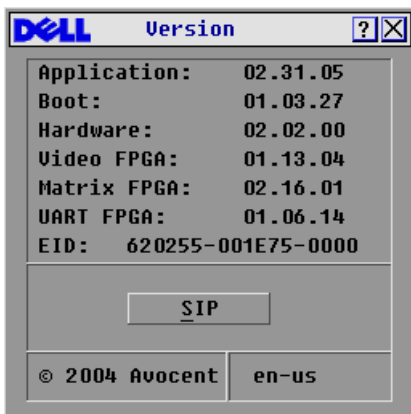
The OSCAR interface enables you to display the versions of the Console Switch and the SIP firmware. For optimum performance, keep your firmware current. For more information, see "Appendix A: Flash Upgrades".

To display version information:

1 Press <Print Screen>. The **Main** dialog box appears.

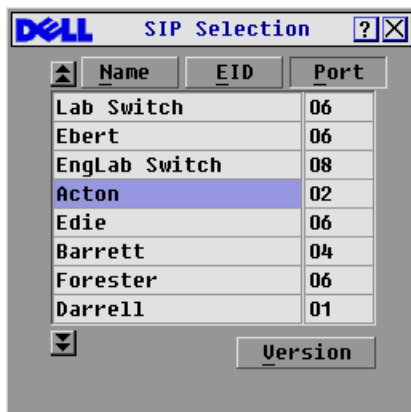
2 Click **Commands - Display Versions**. The **Version** dialog box appears. The top half of the box lists the subsystem versions in the appliance.

Figure 3-11. Version Dialog Box

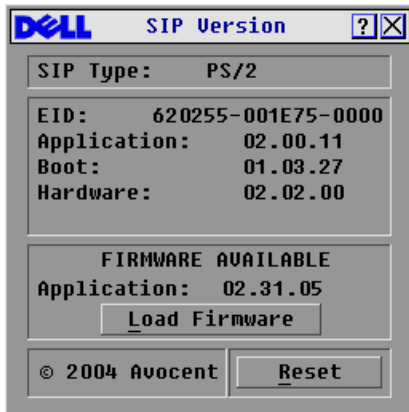


- 3 Click **SIP** to view individual SIP version information. The **SIP Selection** dialog box appears.

Figure 3-12. SIP Selection Dialog Box




- 4 Select a SIP to view and click the **Version** button. The **SIP Version** dialog box appears. For more information on loading firmware, see "Appendix A: Flash Upgrades".


**Figure 3-13. SIP Version Dialog Box**

- 5 Click **X** to close the **SIP Version** dialog box.

## Resetting a SIP

PS/2 SIPs can be reset using the **Reset** button in the **SIP Version** dialog box.

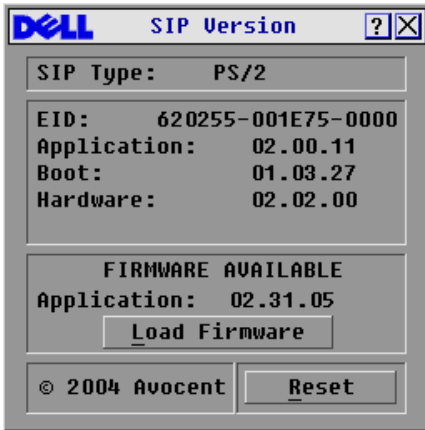
 **NOTE:** This procedure is only relevant where your Console Switch system involves a PS/2 SIP attached to a tiered switch. On these occasions, it may be necessary to reset the SIP when the tiered switch is not recognized.

 **NOTE:** If a reset is performed when a Console Switch is connected directly to a server and not a tiered switch, the mouse/keyboard may fail to respond. When this occurs, the target server requires a reboot.

To reset a SIP:

- 1 Press <Print Screen>. The **Main** dialog box will appear.
- 2 Click **Commands - Display Versions**. The **Version** dialog box appears.
- 3 Click **SIP**. The **SIP Selection** dialog box appears.
- 4 Select the PS/2 SIP that you wish to view and click **Version**. The **SIP Version** dialog box appears.

**Figure 3-14. SIP Version Dialog Box**



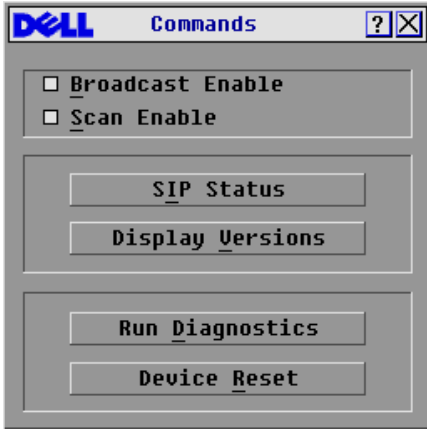
- 5 Click **Reset**. A warning message appears, warning that the function is for tiered switches only and that resetting the SIP could result in the need to reboot the target server.
- 6 Click **OK** to proceed with the reset.  
or
- 7 Press <ESC> to exit.

## Resetting Your Keyboard and Mouse

If a keyboard or mouse locks up, you may be able to re-establish operation of these peripherals by issuing a reset command.

To reset the mouse and keyboard values:

- 1 Press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Commands - Device Reset**. A message box displays requesting that you confirm the reset.
- 3 Click **OK**. A message appears indicating that the mouse and keyboard have been reset.
- 4 Click **X** to close the message box.

**Figure 3-15. Commands Dialog Box**

## Scanning Your System

In scan mode, the appliance automatically scans from port to port (server to server). You can scan up to 16 servers, specifying which servers to scan and the number of seconds that each server will display. The scanning order is determined by the order in which the servers are added to the **Scan** list. The list is always shown in scanning order. You can, however, choose to display the server's name or EID number by pressing the appropriate button.

To add servers to the scan list:

- 1 If the OSCAR interface is not open, press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Setup - Scan**. The Scan dialog box appears.



Figure 3-16. Scan Dialog Box



- 3 The dialog box contains a listing of all servers attached to your appliance. Click the check box next to the servers you wish to scan.  
-or-  
Double-click on a server's name or port.  
-or-  
Press <Alt > and the number of the server you wish to scan. You can select up to 16 servers from the entire list.
- 4 In the **Scan Time** box, type the number of seconds (from 3 to 99) of desired time before the scan moves to the next server in the sequence.
- 5 Click **OK**.

To remove a server from the scan list:

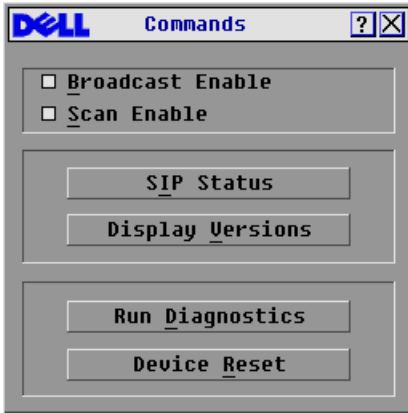
- 1 In the **Scan** dialog box, deselect the check box next to the server to be removed.  
-or-  
Double-click on the server's name or port.  
-or-  
Click the **Clear** button to remove all servers from the scan list.
- 2 Click **OK**.

To set the Scan duration:


- 1 Type a value in the **Scan Time** box. The duration you type must be a minimum of 3 seconds and a maximum of 255 seconds.

To start the scan mode:

- 1 If the OSCAR interface is not open, press <Print Screen>. The **Main** dialog box will appear.
- 2 Click **Commands**. The **Commands** dialog box appears.

**Figure 3-17. Commands Dialog Box**

- 3 Select **Scan Enable** in the **Commands** dialog box.
- 4 Click **X** to close the **Commands** dialog box.

 **NOTE:** Scanning will begin when the **Main** dialog box or flag is displayed. Scanning is inhibited in any other **OSCAR** dialog box.

To cancel scan mode:

- 1 Select a server if the **OSCAR** interface is open.  
-or-  
Move the mouse or press any key on the keyboard if the **OSCAR** interface is not open.  
Scanning will stop at the currently selected server.  
-or-  
Press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Commands**. The **Commands** dialog box appears.
- 3 Clear **Scan Enable**.

## Running System Diagnostics

You can validate the integrity of your system through the **Run Diagnostics** command. This command checks the main board functional sub-systems (memory, communications, switch control and the video channels) for each system controller. When you select the **Run Diagnostics** option, you will receive a warning indicating that all users (remote and local) will be disconnected. Click **OK** to confirm and begin the test.

The **Diagnostics** dialog box displays. The top section of the dialog box displays the hardware tests. The bottom portion divides the tested SIPs into three categories: **On-line**, **Offline** or **Suspect**.

**Figure 3-18. Diagnostics Dialog Box**



**NOTE:** A SIP may appear to be offline while it is being upgraded.

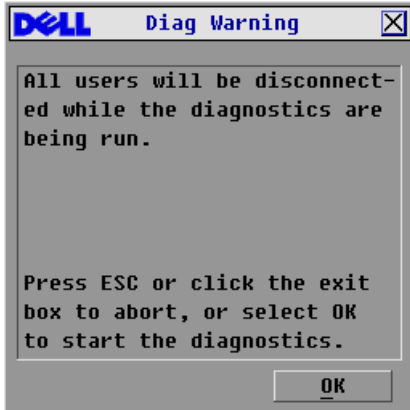
Next to each item to be tested, you will see a pass (green circle) or fail (red x) symbol display to the left of each item as that test finishes. The following table details each of the tests.

**Table 3-5. Diagnostic Test Details**

Test	Description
Memory Tests	Reports on the condition of the main board RAM
Firmware CRCs	Validates the current firmware images stored in the system's FLASH
Comm Interfaces	Validates internal communication pathways
Switch Controller test	Verifies the switch matrix controller is accessible and functional
On-line SIPs	Indicates the total number of currently connected and powered SIPs
Offline SIPs	Indicates the number of SIPs that have been connected successfully in the past and are apparently powered down
Suspect SIPs	Indicates the number of SIPs that have been detected, but are either unavailable for connection or have dropped packets during the ping tests

To run diagnostic tests:


- 1 If the OSCAR interface is not open, press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Commands - Run Diagnostics**. A warning message appears indicating that all users will be disconnected.

**Figure 3-19. Diagnostics Warning Message Box**

- 3 Click **OK** to begin diagnostics.  
-or-  
Click **X** or press <Escape> to exit the dialog box without running a diagnostic test.
- 4 All users are disconnected and the **Diagnostics** dialog box displays.
- 5 As each test is finished, a pass (green circle) or fail (red x) symbol appears. The test is complete when the last test's symbol displays.

## Broadcasting to Servers

The user can simultaneously control more than one server in a system to ensure that all selected servers receive identical input. You can choose to broadcast keystrokes and/or mouse movements independently.

 **NOTE:** You can broadcast to up to 16 servers at a time, one server per ARI port.

To access the Broadcast dialog box:

- 1 Press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Setup - Broadcast**. The **Broadcast** dialog box appears.

Figure 3-20. Broadcast Dialog Box

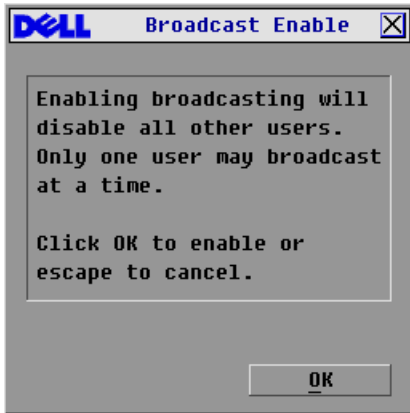


**NOTE:** Broadcasting Keystrokes - The keyboard state must be identical for all servers receiving a broadcast to interpret keystrokes identically. Specifically, the <Caps Lock> and <Num Lock> modes must be the same on all keyboards. While the appliance attempts to send keystrokes to the selected servers simultaneously, some servers may inhibit and thereby delay the transmission.


**NOTE:** Broadcasting Mouse Movements - For the mouse to work accurately, all systems must have identical mouse drivers, desktops (such as identically placed icons) and video resolutions. In addition, the mouse must be in exactly the same place on all screens. Because these conditions are extremely difficult to achieve, broadcasting mouse movements to multiple systems may have unpredictable results.

To broadcast to selected servers:

- 1 From the **Broadcast** dialog box, click to enable the mouse and/or keyboard check boxes for the servers that are to receive the broadcast commands.  
-or-  
Press the <Up> or <Down> arrow keys to move the cursor to the target server. Then press <Alt> <K> to select the keyboard check box and/or <Alt> <M> to select the mouse check box. Repeat for additional servers.
- 2 Click **OK** to save the settings and return to the **Setup** dialog box. Click **X** or press <Escape> to return to the **Main** dialog box.
- 3 Click **Commands**. The **Commands** dialog box appears.
- 4 Click the **Broadcast Enable** check box to activate broadcasting. The **Broadcast Enable** dialog box appears.

**Figure 3-21. Broadcast Enable Dialog Box**

- 5 Click **OK** to enable the broadcast. Click **X** or press **Escape** to cancel and return to the Commands dialog box.
- 6 If broadcasting is enabled, type the information and/or perform the mouse movements you want to broadcast from the user station. Only servers in the list are accessible.

 **NOTE:** The other user (16-port switch only) is disabled when broadcast mode is enabled.

To turn broadcasting off:

From the Commands dialog box, disable the **Broadcast Enable** check box.

## Changing Your Switch Mode (16-port Console Switch Only)

Your Console Switch allows you to connect to attached servers using two methods: **Preemptive** and **Cooperative**.

Select **Preemptive** (default setting) to allow any user to select any server at any time; a request from another user disconnects the current user without warning.

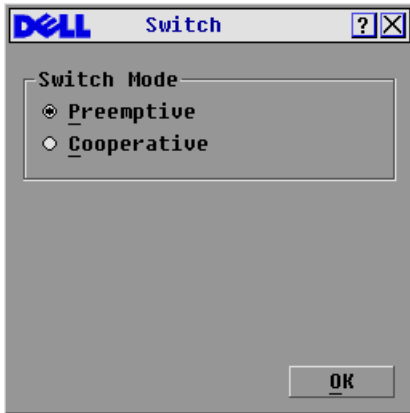
-or-

Select **Cooperative** to maintain the current user connection; the current user won't be disconnected if another user requests connection.

To access the Switch dialog box:

- 1 Press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Setup - Switch**. The **Switch** dialog box appears.

Figure 3-22. Switch Dialog Box



- 3 Select either **Preemptive** or **Cooperative** as your switch mode.





# Appendices

## Appendix A: Flash Upgrades

### Upgrading the Console Switch

You can upgrade the firmware of your Console Switch by using a special update utility provided by Dell. This utility automatically configures the port communications settings to allow direct downloading from the connected server.

### Items Needed for the Upgrade

The following items are required to upgrade your Console Switch firmware:

- Server running Microsoft® Windows NT®, Windows® 95, Windows 98 or Windows 2000
- Available serial port (COM port) on the server
- Standard serial cable that connects the switch and the server
- Firmware update

### Upgrading Firmware

To upgrade firmware:

- 1 Connect the standard serial cable to a COM port on the server and to the serial connector on the back panel of the switch. Make a note of which COM port you have chosen, then turn on the switch.
- 2 Go to <http://www.dell.com/support> and click on **Downloads** to access the firmware upgrade file. Once the download is complete, navigate to the drive where you have saved the firmware update and unzip the file.
- 3 Double-click to run the file **WUpDateDELL.exe**.
- 4 In the dialog box that displays, select the desired language and COM port.
- 5 Click **Load**. The update begins.
- 6 Once the firmware is updated, the following message displays: **Download complete**. Click **Done** to exit the dialog box.
- 7 The switch automatically reboots after the upgrade is completed.

**Possible Error Conditions**

If the download does not execute properly, verify the following:

- Verify that the COM port is correct.
- Verify that no other program is currently using the COM port, or that a previous DOS window/shell is open that had used the desired COM port.
- Verify that no other copies of the WUpdate utility are currently running.
- Verify that a serial cable is used.
- Verify in the selected COM port's Advanced Port settings that the FIFO buffers are selected and that the receive buffer is set to High.



**CAUTION: While upgrading, do not use your computer for anything else or switch between windows. Close all other windows if necessary. If the upgrade was unsuccessful (such as during a power outage), repeat the procedure.**

## Upgrading the SIP

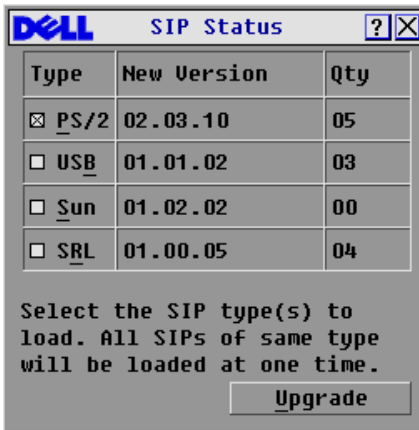
The Server Interface Pods (SIPs) can be upgraded individually or simultaneously.

- NOTICE:** Do not cycle power to the server or disconnect the SIP during this process. A loss of power will render the SIP inoperable and require the unit be returned to the factory for repair.

To simultaneously upgrade multiple SIPs:

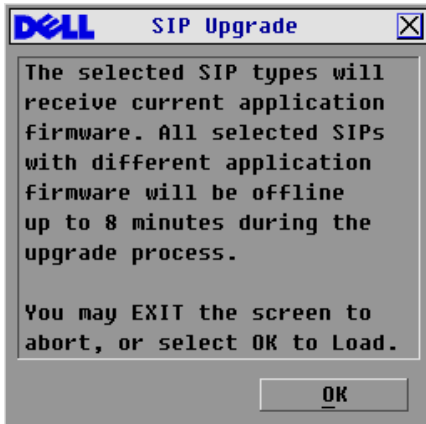
- 1 Press <Print Screen>. The Main dialog box appears.
- 2 Click **Commands-SIP Status**. The SIP Status dialog box appears.

**Figure 4-1. SIP Status Dialog Box.**



- 3 Click one or more types of SIPs you wish to upgrade. Click **Upgrade**. The SIP Upgrade dialog box appears.

**Figure 4-2. SIP Upgrade Dialog Box**

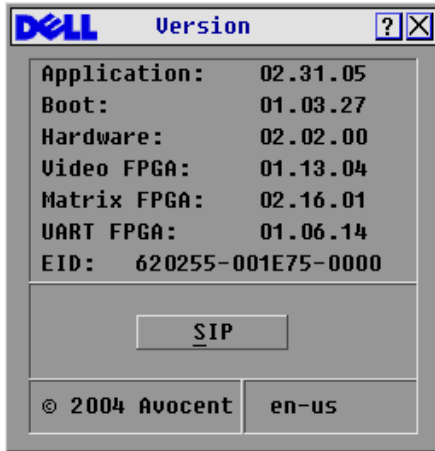


- 4 Click **OK** to initiate the upgrade and return to the SIP Status dialog box.

To upgrade SIP firmware individually:

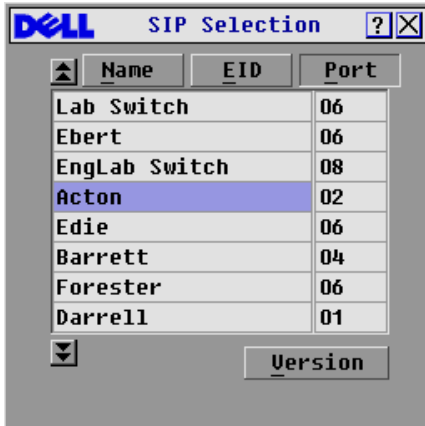
- 1 Press <Print Screen>. The **Main** dialog box appears.
- 2 Click **Commands-Display Versions**. The **Version** dialog box appears.

**Figure 4-3. Version Dialog Box**



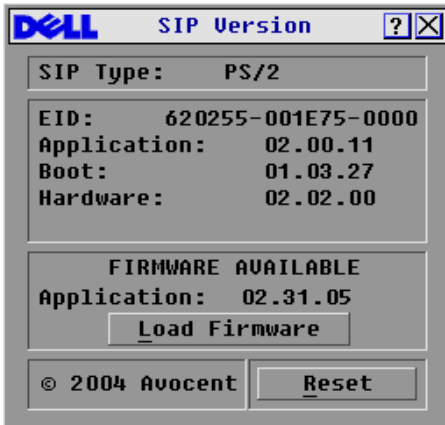
- 3 Click **SIP** to view individual SIP version information.

**Figure 4-4. SIP Selection Dialog Box**



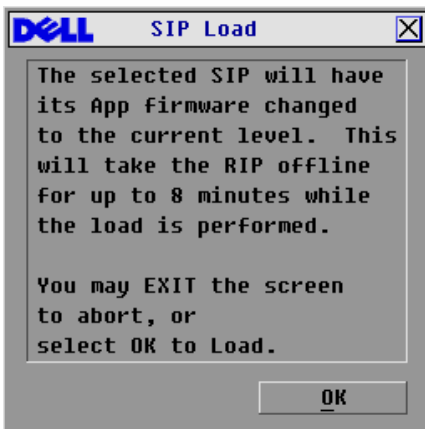
- 4 Select the SIP that you wish to upgrade and click the **Version** button. The **SIP Version** dialog box appears.

Figure 4-5. SIP Version Dialog Box



- 5 Click the Load Firmware button. The SIP Load dialog box appears.

Figure 4-6. SIP Load Dialog Box



- 6 Click OK to initiate the upgrade and return to the SIP Status dialog box.

**NOTE:** During an upgrade, the SIP status indicator in the Main dialog box will be yellow. The SIP is unavailable while an upgrade is in progress. When an upgrade is initiated, any current connection to the server via the SIP will be terminated.

## Appendix B: Technical Specifications

**Table 4-1. Technical Specifications**

<b>Server Ports</b>	
Number	8 or 16
SIP Types	PS/2 and USB Avocent™ AVRIQ PS/2, USB, Sun, Serial
Connectors	RJ-45
Sync Types	Separate horizontal and vertical
Plug and Play	DDC2B
Video Resolution	Analog Port Maximum 1600x1280@ 75 Hz
<b>Update Port</b>	
Number	1
Type	Serial RS232
<b>Analog Port</b>	
Number	1 (8-port Console Switch), 2 (16-port Console Switch)
Type	PS/2, VGA, and ACI
Connectors	PS/2 MiniDIN, 15 Pin D, RJ-45
<b>Dimensions</b>	
Dimensions (H x W x D)	4.36 x 42.9 x 16.56 cm 1U form factor (1.72 x 16.9 x 6.52 inches)
Weight	3.6 kg (8 lb) without cables
Heat Dissipation	92 BTU/Hr
Power Consumption	12.5 W
AC-input power	40 W maximum
AC-input voltage rating	100 to 240 VAC Autosensing
AC-input current rating	0.5 A
AC-input cable	18 AWG three-wire cable, with a three-lead IEC-320 receptacle on the power supply end and a country or region dependent plug on the power resource end
AC-frequency	50/60 Hz
Temperature	10° to 50° Celsius (50° to 122° Fahrenheit) operating -20° to 60° Celsius (-4° to 140° Fahrenheit) nonoperating

**Table 4-1. Technical Specifications (continued)**

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Humidity	20 to 80% noncondensing operating 5 to 95% noncondensing nonoperating
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## Appendix C: Notifications

### USA Notification



**CAUTION:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### Canadian Notification

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

### Japanese Approvals

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

### Taiwanese Approvals

**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的對策。



## **Agency Approvals**

UL/cUL (UL 60950/CSA 22.2 No. 60950:2000)

ICES-003

NOM-019-SCFI-1993

IRAM S Mark (Resolution 92/98)

ACA AS/NZS 55022, class A

CNS 13438

FCC Class A, EN60950:2000, EN55022:1998, EN55024:1998, EN61000-3-3:1995 +A1,A2.

GS

GOST-R

VCCI

CCC

SASO

MIC/RRL, Republic of Korea EMI Standard Certificate Number: E-F900-01-2012 (A)



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