MAGNUM-SE
Small Router Control System
User Guide

EVERTZ MICROSYSTEMS LTD.
5292 John Lucas Drive
Burlington, Ontario
Canada L7L 5Z9

Phone:	+1 905-335-3700
Sales Fax:	+1 905-335-3573
Tech Support Phone:	+1 905-335-7570
Tech Support Fax:	+1 905-335-7571

Internet:	Sales:	sales@evertz.com
	Tech Support:	service@evertz.com
	Web Page:	http://www.evertz.com

Version 1.0 August 2015

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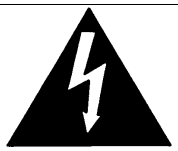
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. 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.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity

EN504192 2005
Waste electrical products should not be disposed of with household waste.
Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

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.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Aug 2015

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1. OVERVIEW

Based on MAGNUM's Router control module, MAGNUM-SE-R32P is a router control system designed for smaller routing systems. Using a web based configuration GUI, MAGNUM-SE-R32P supports real time programming, panel designing, and a host of other features which make system management easier and more powerful than ever before. The web based GUI also provides real time feedback about the system including device status, panel status, etc. MAGNUM-SE-R32P is rack mountable using a hardware bracket that will allow for side by side mount of a redundant control module.

Figure 1-1: MAGNUM-SE Front and Rear View

Benefits

- Compact, rack mountable hardware controller
- Supports all Evertz® Routers (up to 576 sources or destinations)
- Support for up to 32 Ethernet based Evertz® control panels
- Web based configuration with a single user interface
- **Robust:** Linux based operating system, multi node cluster with automatic failover with the addition of a second MAGNUM-SE-R32P
- **Centralized Management:** One interface to manage devices, names, and control panels
- **Seamless Reconfiguration:** Targeted Configuration changes with minimal impact on the operation of the system
- **Web Interface:** No software to install. Configure and manage MAGNUM-SER32P from anywhere using only a web browser from your computer or mobile device

Supported Configuration

- 576 x 576 total sources / destinations or a max of 4 routers contributing to the port total of 576 x 576
- 32 Ethernet based Evertz® control panels
- 7 Profiles
- 3 Name Sets
- 5 levels
- 15 salvos
- 2 Third Party Interfaces (Requires additional 7700R-SC-BRC if protocol translation is required)

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2. SPECIFICATIONS

2.1. CONTROL

Ethernet: Gigabit, 2 x RJ45

2.2. ELECTRICAL

Single Power Supply, Voltage: Auto ranging, 100 ↔ 240 VAC, 50/60 Hz
Power: 60W

2.3. COMPLIANCE

Safety: TUV Listed, complies with EU safety directives
EMI/RFI: Complies with FCC Part 15 Class A regulations
Complies with EU EMC directive

2.4. PHYSICAL

Dimensions: 8.10” W x 5.20” H x 8.70” D

2.5. REAR DESCRIPTION

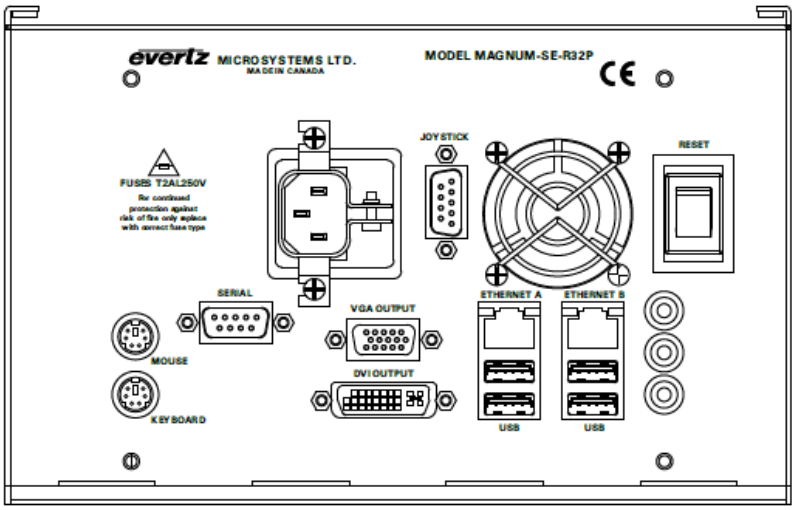

Figure 2-1: MAGNUM-SE Rear Panel

Serial: N/A.
Mouse: PS/2 Mouse Port.
Key Board: PS/2 Keyboard Port.
VGA Output: VGA Port
DVI Output: DVI Port
Joy Stick: N/A
Ethernet A/B: This RJ45 connector is used for Network connecting to the IP Network.
Reset: Switch to reboot the unit

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3. GETTING STARTED

3.1. MAGNUM-SE CONFIGURATION SHELL

The MAGNUM-SE Configuration Shell enables the user to set up the MAGNUM-SE parameters.By accessing the MAGNUM-SE Configuration Shell a number of operations can be performed in order to properly set up your server. Access to the MAGNUM-SE Configuration Shell is available when directly connected with keyboard / display or KVM access to the Server or remotely through a SSH session. To access the login screen, hit ctrl+alt+F2 on an attached keyboard.

Tip: Changes that affect the operation of the MAGNUM or admin level actions will cause an authentication prompt to be displayed

To login to the MAGNUM-SE Configuration Shell, the user will have to enter the following information when prompted. These are the default credentials:

- Enter *admin* as the username and then press *<enter>*
- Enter *admin* as the password and then press *<enter>*

Figure 3-1 displays the main setup menu. Section 3.1.1 to 3.1.5 will guide you through the process of setting up your server and identifying the function of each configuration tool.

You will use the arrow keys, tab, and enter keys to navigate through the MAGNUM-SE Configuration Shell.

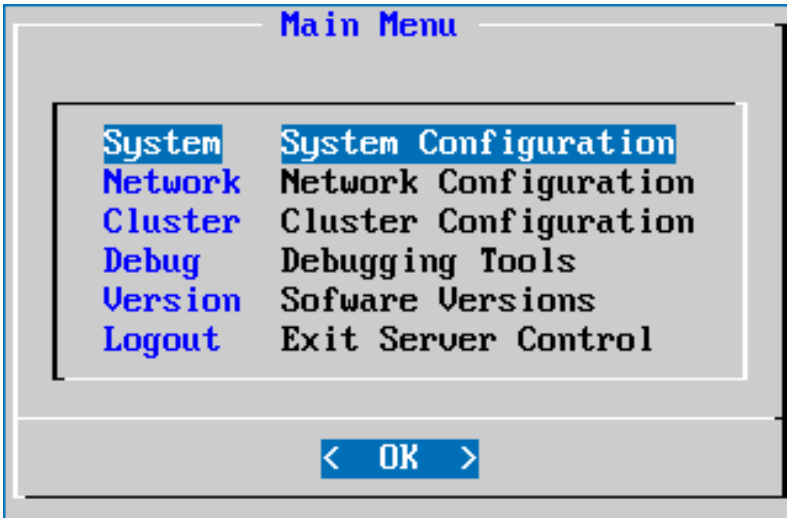

Figure 3-1: Main Server Control Menu

3.1.1. System Configuration

Selecting the **System Configuration** option will reveal the screen displayed in Figure 3-2. The main function of the system configuration menu is to complete the set up of the server configuration. The System Configuration Menu allows the user to verify or change system level configuration, such as Date/Time, Hostname, etc; or to perform system level operations such as changing the admin password, upgrading, rebooting, etc.

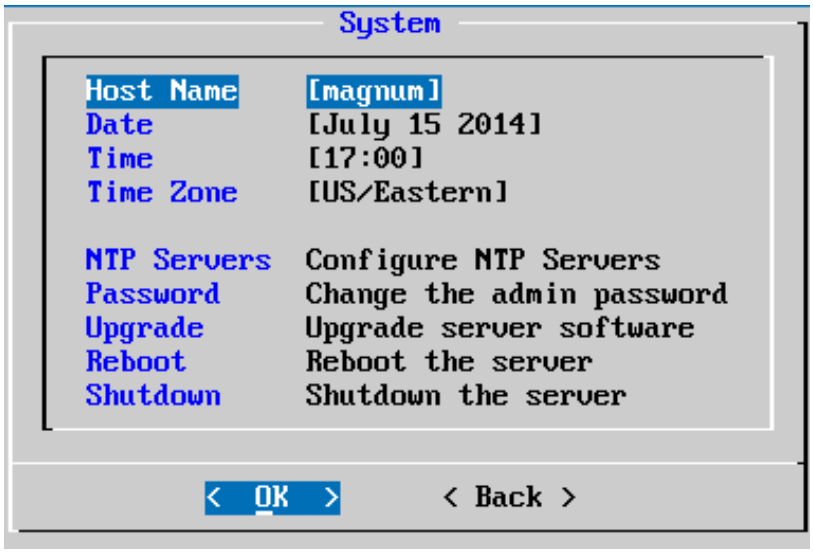

Figure 3-2: System Configuration Menu

3.1.1.1. Setting the Host Name

Selecting the **Hostname** option from the System Configuration menu will enable the user to set the host name for the server. The dialog box in Figure 3-3 will appear when this option is selected. The user will be prompted to enter the desired name for the host into the "*Host name:*" field. This name was set during initial installation but can be changed using this menu option. The host name must be unique within the system.

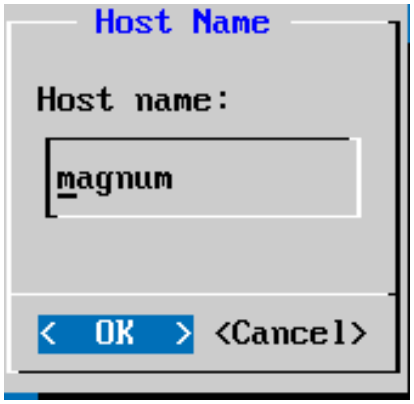

Figure 3-3: Change Host Name

3.1.1.2. Setting the Server Date

Selecting **Date** from the System Configuration menu will enable the user to set the date for which the server will reference. Select the current day, month and year from the calendar identified in Figure 3-4.

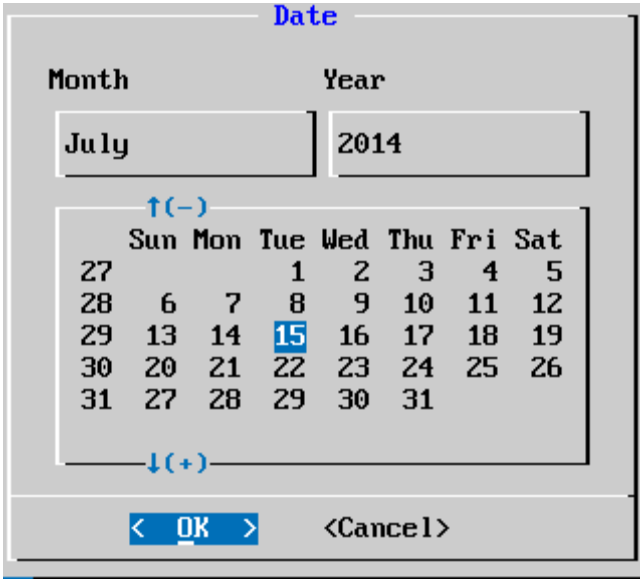

Figure 3-4: Change Date

3.1.1.3. Setting the Server Time

Selecting **Time** from the System Configuration menu will enable the user to set the current time for which the server will reference. Select the hour, minute and second identified in the **Change Time** dialog box as shown in Figure 3-5. Use the up and down arrow keys to set the values and tab to switch boxes.

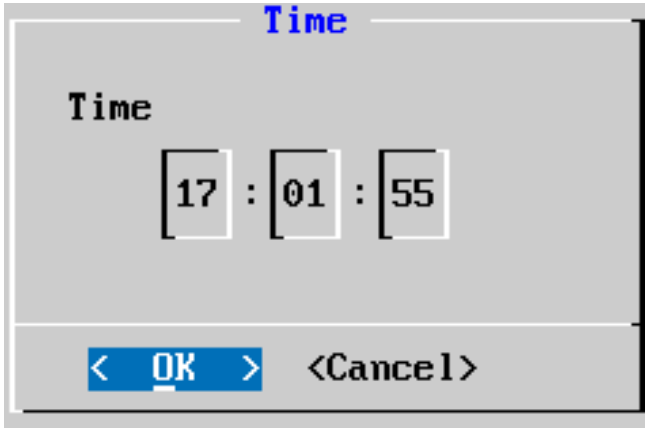

Figure 3-5: Change Time

3.1.1.4. Setting the Server Time Zone

Selecting **Time Zone** from the System Configuration menu will enable you to set the current time zone for the region you are in. Toggle through the list of countries and zones to select your region. Refer to Figure 3-6.

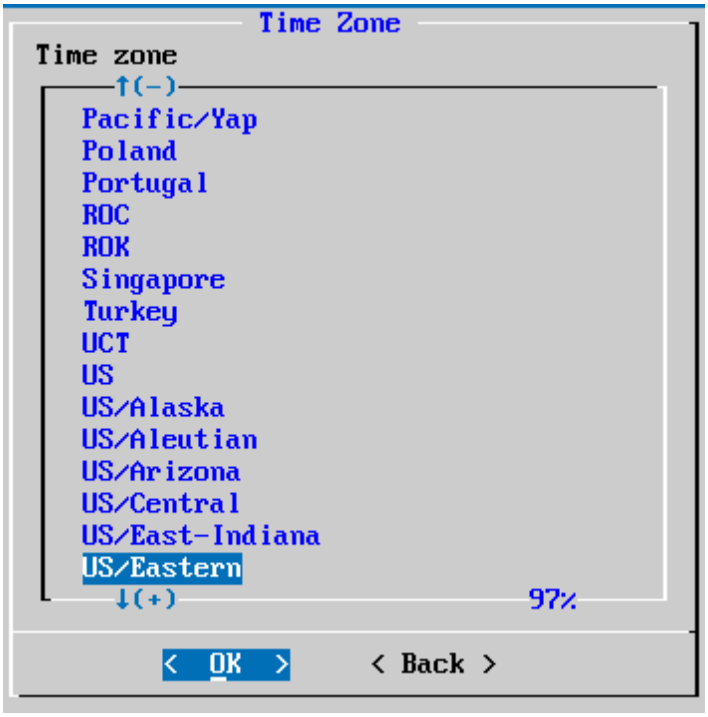

Figure 3-6: Change Time Zone

3.1.1.5. Setting the IP Address of the NTP Server

Selecting **NTP Server** from the System Configuration menu will enable you to set the IP address for the NTP Server. The dialog box in **Error! Reference source not found.** will appear when this option is selected. The user will be prompted to enter the IP address of the NTP Server into the empty field.

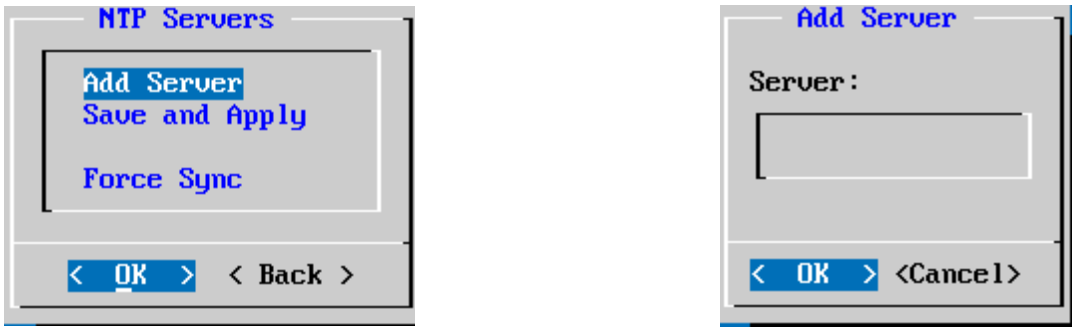

Figure 3-7: Change NTP Server

3.1.1.6. Changing the Server Password

Selecting the **Password** option from the System Configuration menu will enable you to change the *admin* password and set a new password for the "admin" account used to access the Server Configuration Shell. The dialog box in Figure 3-8 will appear when this option is selected. The user will be prompted to enter the current password into the "*enter password to change*" field.

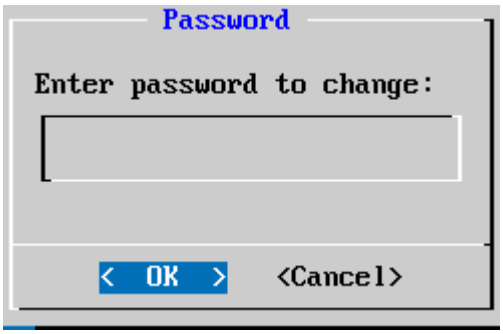

Figure 3-8: Change Password

Once the current password is entered, a new dialog box will appear as shown in Figure 3-9. This dialog box will prompt the user to enter the new password for the server. Type the new password into the empty field and select **OK** to set the password.

Figure 3-9: Enter New Password Dialog Box

3.1.1.7. Rebooting the Server

Selecting the **Reboot** option from the System Configuration menu will enable the user to reboot the server. The dialog box in Figure 3-10 will appear when this option is selected. Enter the current password into the "Enter password to reboot the server:" field and press **OK**. The server will reboot.

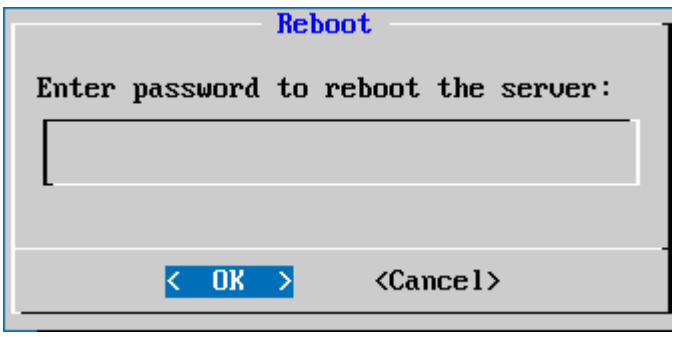

Figure 3-10: Enter Password to Reboot Server

3.1.1.8. Shutting Down the Server

Selecting the **Shutdown** option from the System Configuration menu will enable the user to shutdown the server. The dialog box in Figure 3-11 will appear when this option is selected. The user will be prompted to enter the current password into the "Enter password to shutdown the server" field. Once the password is entered, press the **OK** button.

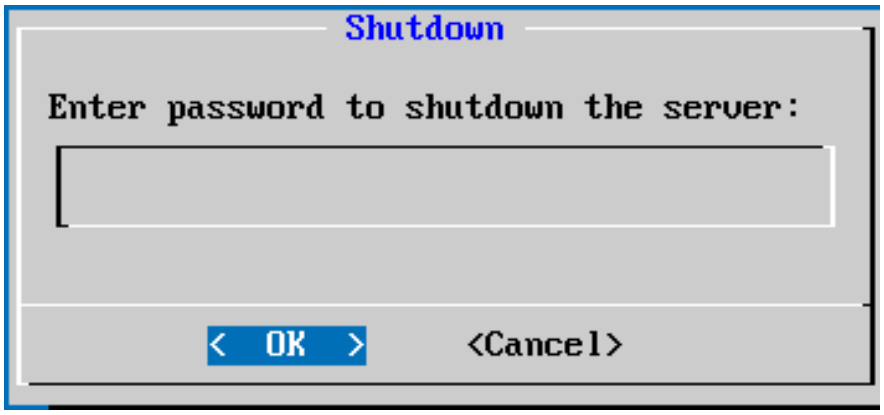

Figure 3-11: Enter Password to Shutdown Server

3.1.2. Networking Configuration

The **Networking Configuration** menu will enable the user to set the network information (IP, Netmask, Gateway, and Broadcast) for multiple network adapters.

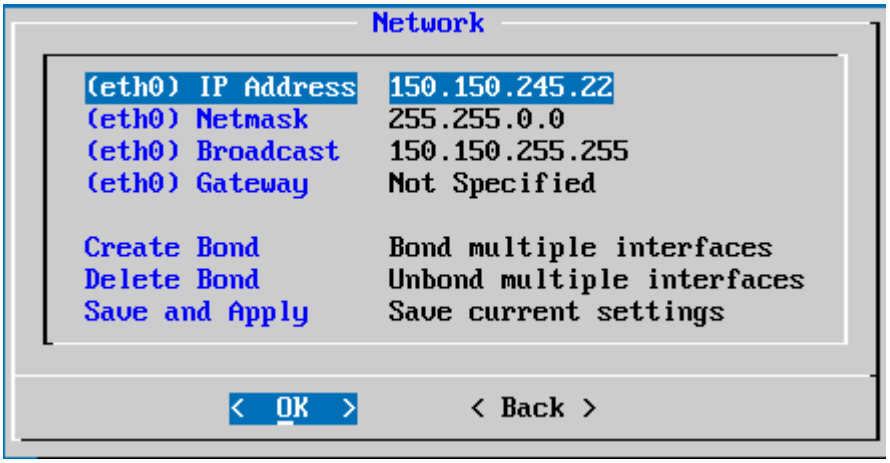

Figure 3-12: Network Configuration Menu

3.1.2.1. Assigning an IP Address for eth0

To assign an IP Address, select the **(eth0) IP Address** option from the Networking Configuration menu. The dialog box in Figure 3-13 will appear when this option is selected. The user will be prompted to enter the desired IP address into the "IP address for eth0" field and then select the **OK** button. Please note that the settings must be saved using the **Save and Apply** option from the Networking Configuration menu. Please note that DHCP is NOT recommended at any time. Repeat these steps for each network adapter that requires configuration.

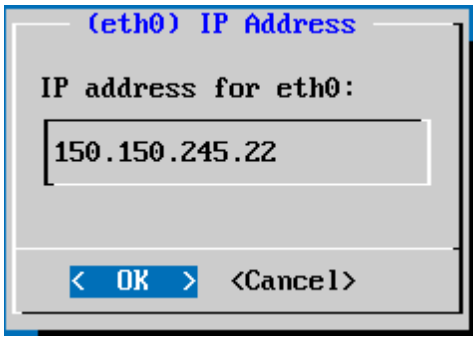

Figure 3-13: Enter IP Address for eth0

3.1.2.2. Assigning a Subnet Mask for eth0

To assign a subnet mask for eth0, select the **(eth0) Netmask** option from the Networking Configuration menu. The dialog box in Figure 3-14 will appear when this option is selected. The user will be prompted to enter the desired subnet mask into the "Netmask for eth0" field and then select the **OK** button. Please note that the settings must be saved using the **Save and Apply** option from the Networking Configuration menu. Repeat these steps for each network adapter that requires configuration.

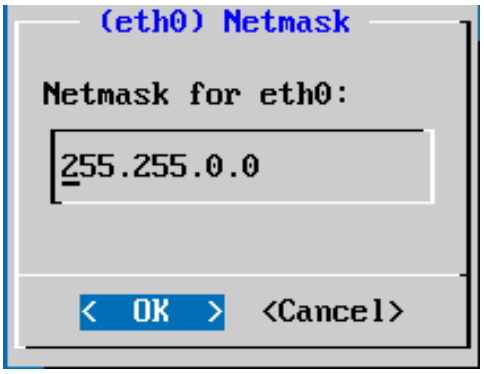

Figure 3-14: Enter Netmask for eth0

3.1.2.3. Assigning a Gateway Address for eth0

To assign a gateway for eth0, select the **(eth0) Gateway** option from the Networking Configuration menu. The dialog box in Figure 3-15 will appear when this option is selected. The user will be prompted to enter the desired gateway into the "Gateway address for eth0" field and then select the **OK** button. Please note that the settings must be saved using the **Save and Apply** option from the Networking Configuration menu. Repeat these steps for each network adapter that requires configuration.

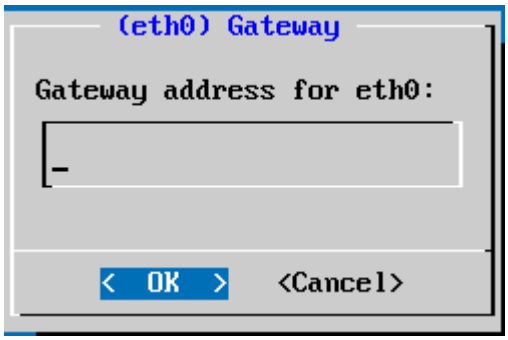

Figure 3-15: Enter Gateway Address for eth1

3.1.2.4. Assigning a Broadcast Address for eth0

To assign a broadcast address for eth0, select the **(eth0) Broadcast** option from the Networking Configuration menu. The dialog box in Figure 3-16 will appear when this option is selected. The user will be prompted to enter the desired subnet mask into the "Broadcast address for eth0" field and then select the **OK** button. Please note that the settings must be saved using the **Save and Apply** option from the Networking Configuration menu. Repeat these steps for each network adapter that requires configuration.

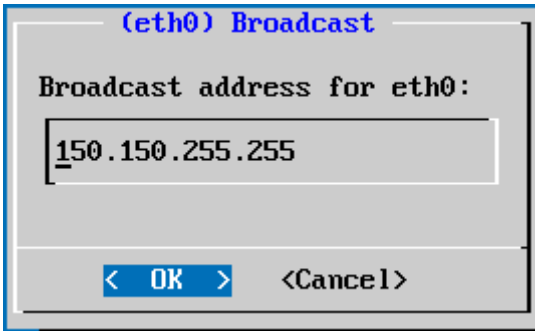

Figure 3-16: Enter Broadcast Address for eth0

3.1.3. Bonding Multiple Interfaces

The **Create Bond** option enables the user to create an active/backup network configuration using two network ports on the MAGNUM Server. This feature allows the user to bond two adapters together to function as one. For example, if one of the adapters of the bond were to fail (link loss as result of cable failure, NIC failure, switch port failure, switch failure etc) the second adapter would automatically continue network connectivity. To create a bond, toggle to the **Create Bond** menu item as shown in Figure 3-17 and use this command to bond multiple interfaces.

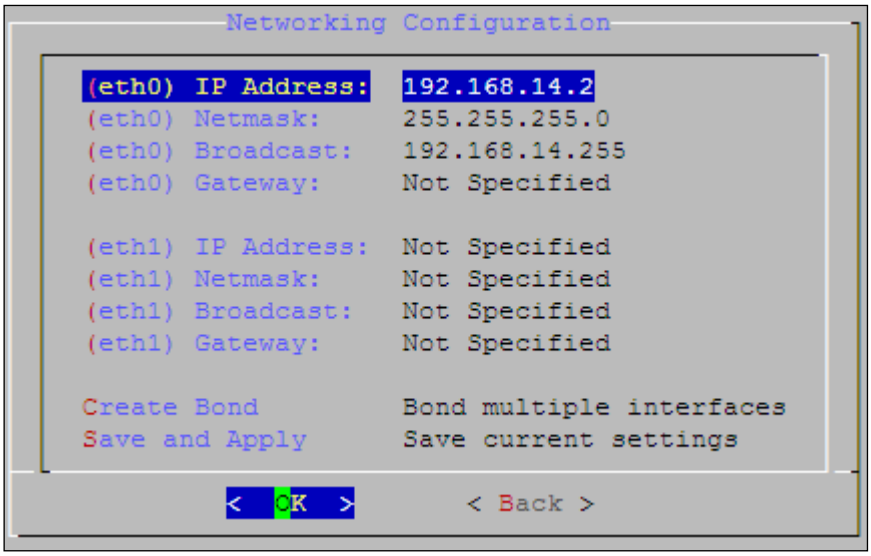

Figure 3-17: Creating a Bond

Once the network ports are bonded, the user can specify an IP address, Netmask, and Gateway for the bonded adapters. The network ports that are bonded together will be identified in the **Slaves** field. For example, *eth0* and *eth1* would be listed under the *Slaves* item as shown in Figure 3-18.

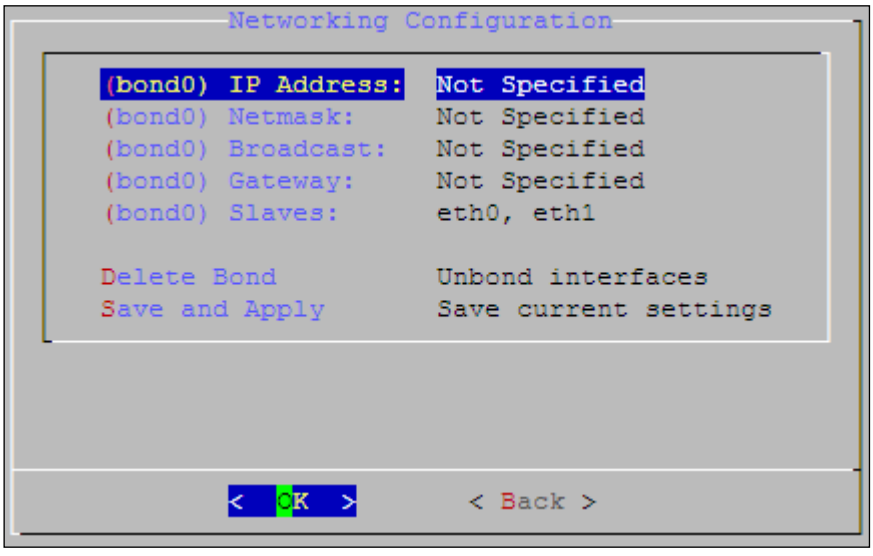

Figure 3-18: Bonded Network Ports

The bond between the interfaces can be removed by selecting the **Delete Bond** function.

3.1.4. Cluster Configuration

The **Cluster Configuration** menu will enable the user to define the cluster information for the MAGNUM-SE System when paired with a second MAGNUM-SE for redundancy . These settings will need to match on each server within the cluster.

Once the network has been configured, the next step is to define the cluster setup. This information is required whether there is only a single MAGNUM-SE or Main and Redundant MAGNUM-SE. The cluster is configured by connecting to the MAGNUM-SE IP address using a SSH session or directly to the unit through a keyboard and monitor. A common program that can establish a SSH session is called Putty, other terminal programs can be used as well. Once a SSH connection has been established to the MAGNUM-SE, login using the account “admin” and the password “admin”. After a successful login, the MAGNUM Server Control Console will be displayed. This console presents the user with a number of operations that can be performed in order to properly set up your server. The **Cluster Configuration** menu, as illustrated in Figure 3-19, enables the user to set the cluster information for primary and/or redundant MAGNUM-SE. (Host names and IP addresses, preferred hosts and cluster IP addresses).

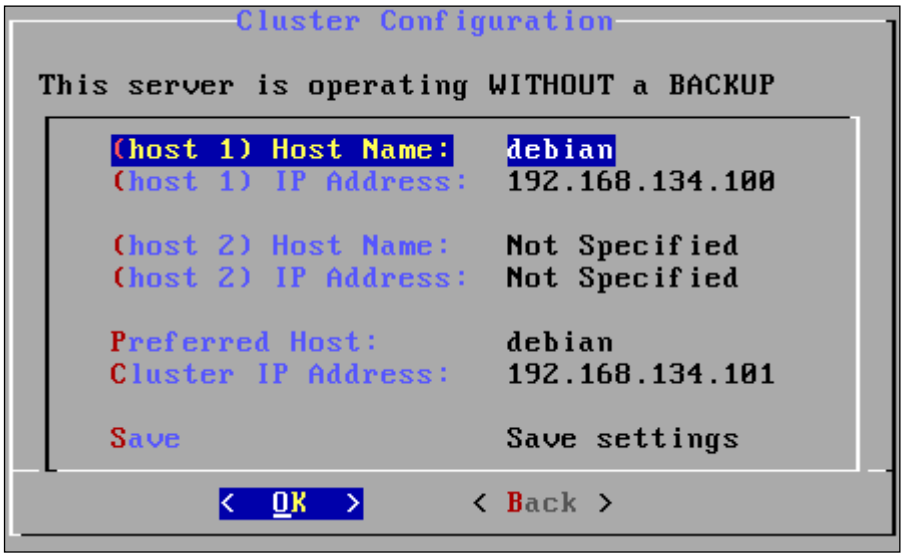

Figure 3-19: Cluster Configuration

3.2. (HOST X) HOST NAME

To assign a host name to the primary host (Host 1), select the (host 1) Host Name option from the **Cluster Configuration** menu. The dialog box in Figure 3-20 will appear when this option is selected. Enter the primary host name into the "Enter host name" field and then select the **OK** button.

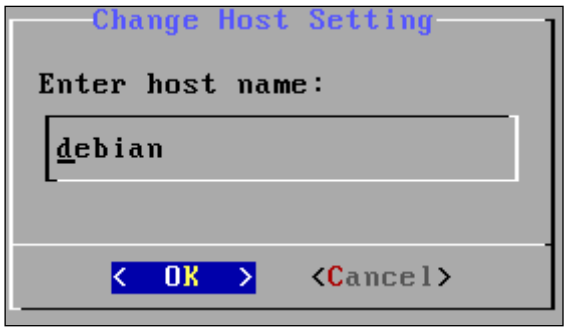

Figure 3-20: Change Host Setting

To assign a host name to the redundant server if applicable, select the (host 2) Host Name option and enter the desired redundant server name into the "Enter host name" field and then select the **OK** button.

3.3. (HOST X) IP ADDRESS

To assign a host IP address to the primary server, select the (host 1) IP Address option from the **Cluster Configuration** menu. The dialog box in Figure 3-21 will appear when this option is selected. Enter the desired host IP address into the "Enter (host name)'s IP address" field and then select the **OK** button. This IP address should be the IP that was assigned in Section 1.

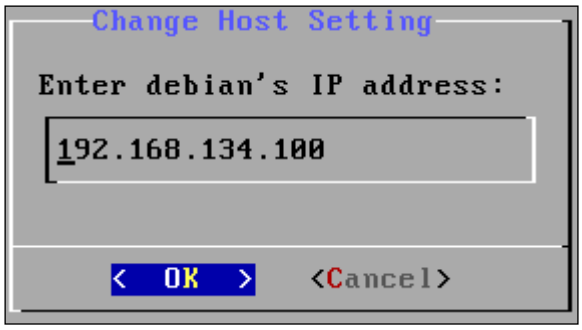

Figure 3-21: Host IP Address

If you wish to assign an IP address to the redundant server, select the (host 2) IP Address option and enter the desired redundant server IP into the "Enter (host name)'s IP address" field and then select the **OK** button.

3.4. PREFERRED HOST

The **Preferred Host** field will display the name of the primary server. If there is more than one server available, the user can select the server that they wish to assign as the preferred, primary server.

A **Preferred Host** dialog will appear (as shown in Figure 3-22) enabling the user to select a preferred host from the list of servers available. Toggle to the host in the list that you wish to make the primary server and select it by pressing space key; then select the **OK** button while done. The selected server will be set as the primary server. A preferred host is the server that will be made active if both primary and secondary servers are brought online at the same time. This requires the cluster is configured correctly and communication links between both servers are functioning correctly.

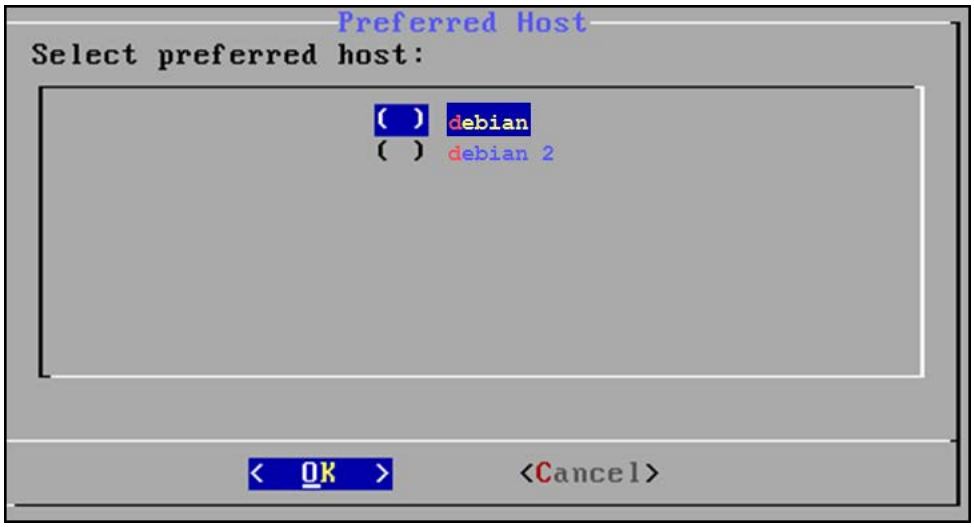

Figure 3-22: Select Preferred Host

3.5. CHANGE CLUSTER IP ADDRESS

To change the cluster IP address, select the **Cluster IP Address** option from the **Cluster Configuration** menu. The dialog box in Figure 3-23 will appear when this option is selected. If the user wishes to change the cluster IP address, enter a new IP address into the “Enter the Cluster IP address” field and then select the **OK** button. The cluster IP address is the IP address assigned to the Active MAGNUM server so that all clients have a single address connected to them regardless of which MAGNUM Server is Active. This is the IP address you will use to access the WEB Configuration Tool, and which will be manually programmed into any advanced panels for MAGNUM-SE connectivity.

Figure 3-23: Change Cluster IP Address

3.5.1. Monitored Interfaces

The **Monitored Interfaces** field, as shown in Figure 3-24, displays the network interface that will be monitored for Loss of Network Link. When this option is enabled the active server will automatically force a cluster fail-over if it detects a network link loss on the monitored interface. To select a network interface, toggle to the **Monitored Interfaces** option and select the **OK** button.

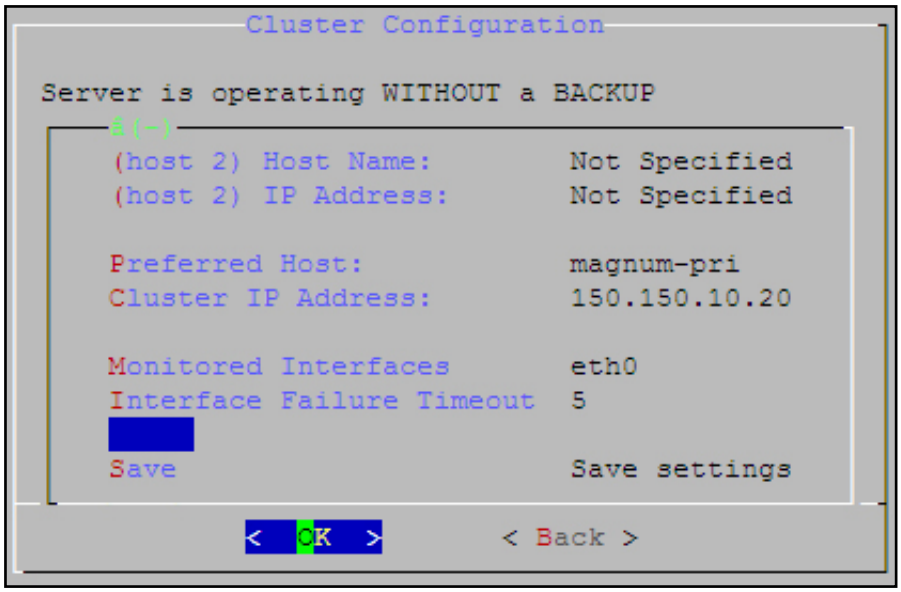

Figure 3-24: Monitored Interfaces

The **Monitored Interfaces** dialog will appear, as shown in Figure 3-25, enabling the user to select network interfaces to be monitored. Toggle to the network interface in the list that you wish to make as the monitored interface and select the **OK** button. The selected interface will now be monitored once the settings are saved and the system is rebooted.

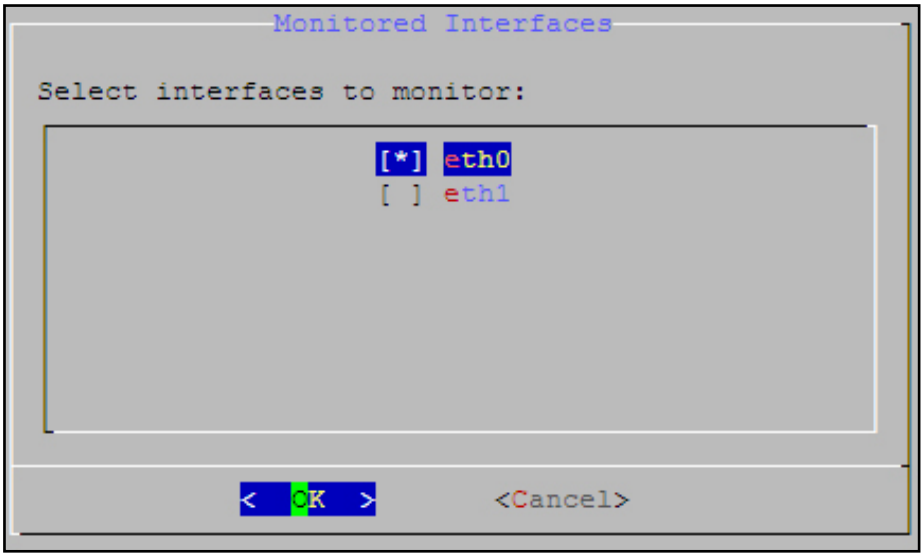

Figure 3-25: Select Interfaces to Monitor

3.5.2. Interface Failure Timeout

The **Interface Failure Timeout** field, as shown in Figure 3-26, will display the time in seconds before a network interface monitored for Loss of Network Link is in a loss state. When this option is enabled the active server will automatically force a cluster fail-over if it detects a network link loss for the amount of time defined for the monitored interface. To specify a time, toggle to the **Interface Failure Timeout** option and select the **OK** button.

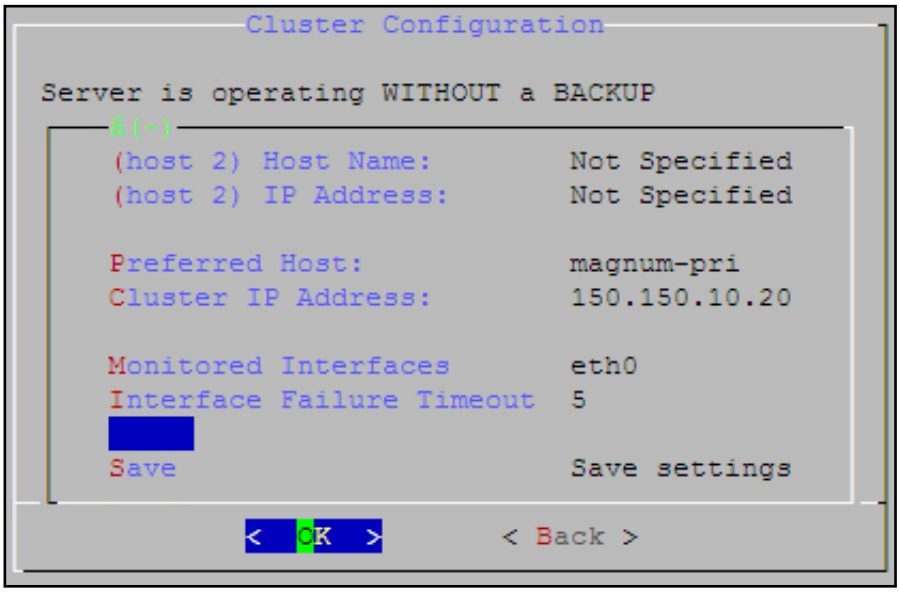

Figure 3-26: Interface Failure Timeout

The **Interface Failure Timeout** dialog will appear, as shown in Figure 3-27, enabling the user to enter a time in seconds before a cluster fail-over is triggered based on Loss of Network Link on the monitored network interfaces. Enter a value in seconds to define the amount of time a link must be lost for the monitored interface before causing a cluster fail-over and then select the **OK** button. The selected interface will now be monitored once the settings are saved and the system is rebooted.

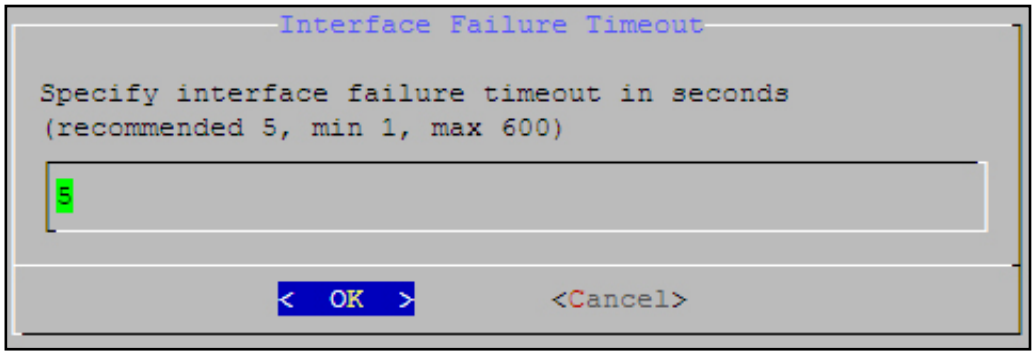

Figure 3-27: Specify Interface Failure Timeout

4. UPGRADING

The user can manually upload code onto the MAGNUM-SE unit using **ConfigurationShell**. The following procedure outlines how to manually update the device. This practice is not recommended for typical users and should only be implemented when directed by Evertz personnel.

Selecting the **Upgrade** option from the System Configuration menu will enable you to upgrade the server. The dialog box in Figure 4-1 will appear when this option is selected. Enter the current "*admin"* password into the "Enter password to upgrade server:" field and press **OK**.

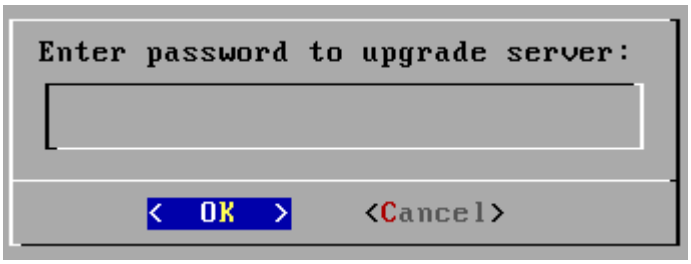

Figure 4-1: Enter Password to Upgrade Server

Once the correct password is entered, the user should connect the USB device containing the correct upgrade files. When the USB device is recognized, the dialog box in Figure 4-2 will disappear. If you do not wish to upgrade the server, select the **Cancel** button.

Figure 4-2: Waiting for USB Device

4.1. REQUIREMENTS FOR USING THE WEB CONFIG TOOL

1. Ensure the MAGNUM Server is installed and operational, and the IP Address is set correctly.

2. Ensure the computer is attached to the same network as the MAGNUM Server.
   a. Since the MAGNUM Web Config Tool (WCT) uses standard HTML, XHTML, CSS, etc any web browser on any platform that complies with these formats can be used.
      i. Currently the most adopted browser that is completely compliant is Mozilla Foundations Firefox. We recommend that you use this browser, if available to you, for the best performance of the WCT. For a free download of the current Mozilla Firefox browser navigate to the following website:
         http://www.mozilla.com/en-US/firefox/

3. It is not required, but it is an asset to have a solid general understanding of routing systems. Knowing how your system is wired in terms of inputs, outputs, tielines to terminal equipment and other routers and names for resources makes moving through the process of configuring your router control system far easier.

4.2. GETTING STARTED: SETTING UP YOUR ROUTER SYSTEM

1. Launch the firefox web browser and enter the numeric address chosen as the system IP address (also called the virtual or CLUSTER IP address which was entered into the Cluster configuration page during initial setup) into the address bar followed by "/magnum" or /eqx (for example: 192.168.1.4/magnum or 192.168.1.4/eqx) and then press the <enter> key; you should see the login page for the MAGNUM server web configuration tool.

2. Click the **Login** link button and enter the username and password. The default administrator username and password (as set during MAGNUM server install) is:
   USERNAME: admin
   PASSWORD: admin

3. Once the username and password is filled in, click the **Login** button. A Home screen / Dashboard will appear as shown in Figure 4-3.

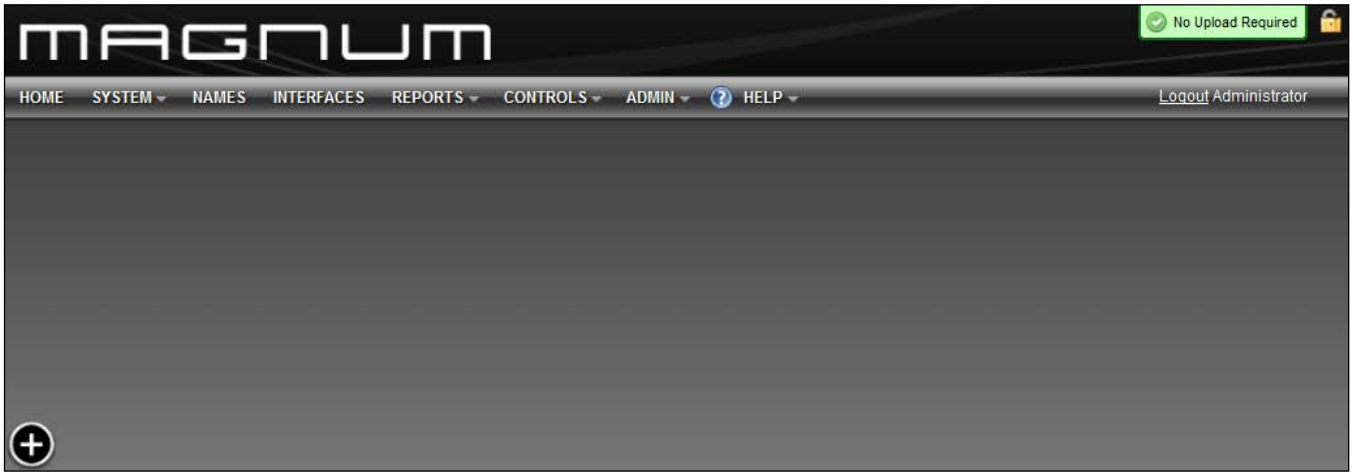

Figure 4-3 : MAGNUM Home screen

5. MAGNUM-SE LIMITS

Please refer to the MAGNUM Manual for information regarding the configuration of the MAGNUM-SE control system via the Web Configuration interface.

The limits for the MAGNUM-SE are outlined in Table 5-1. Please note that these limits are enforced when configuring an MAGNUM-SE.

Total of any Combinations of Panels	32
3rd Party Interfaces (Quartz/Symphony)	2
Levels (in Virtual Ports Page)	5
Max Physical Srcs/Dsts	576x576
Max Virtual Srcs/Dsts	576x576
Embedded Audio Routing with MAGNUM AVIPs & AVOPs	No
Subscriptions, Mirror Groups, Virtual Routers	No
Namesets	3
Users	No (1 login only)
Reports	Yes
Salvos	15
Profiles (Not Including Profiles for Single-Profile Interfaces)	7

Table 5-1: MAGNUM-SE Limits

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