vMX Video Wall Manual Excerpt

STRATUS 3.7.14

vMX Video Wall Guide Excerpt

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Introduction

The vMX, more commonly referred to as Video Wall, is a feature of STRATUS that allows the user to organize and display video feeds on multiple monitors. Like a wall of side-by-side screens, for example, from where the feature gets its name.

From the deployment perspective, vMX consists of the server-side functionality, which gets enabled with proper license installation, and additional computers running a “vMX DS” software package, which turns them into “Display Server Appliances”. These computers are remotely controlled by STRATUS to deliver the Video Wall experience to end-users.

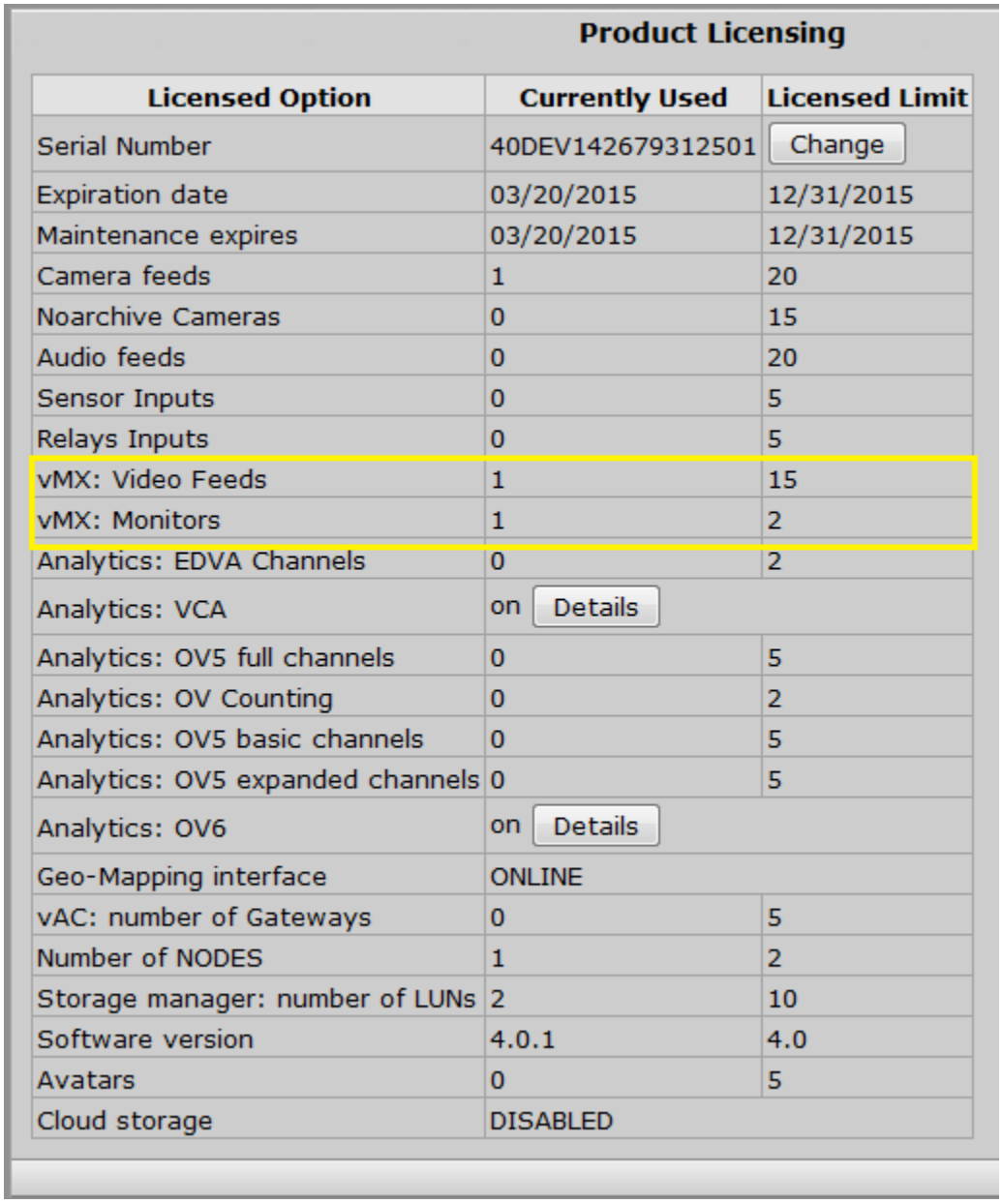
This document will cover the licenses needed for the Video Wall functionality, the configuration process required to enable it, and the steps to properly use it.

Important:
It is assumed that the computers destined to become Monitors are already properly configured to be accessed by the STRATUS system. If that it not the case, please refer to Appendix A for the instructions on how this can be accomplished.

Licenses

There are two licenses that are necessary to use vMX, and the first step towards enabling it is ensuring that you have them. This information can be found in the Control Panel options of the STRATUS system. Log in as the admin User, and select the Control Panel View. Then, in the left hand panel navigate to General > Licensing. Your screen will now look similar to Figure 1.

Figure 1. Licensing Screen



Product Licensing

Licensed Option	Currently Used	Licensed Limit
Serial Number	40DEV142679312501	Change
Expiration date	03/20/2015	12/31/2015
Maintenance expires	03/20/2015	12/31/2015
Camera feeds	1	20
Noarchive Cameras	0	15
Audio feeds	0	20
Sensor Inputs	0	5
Relays Inputs	0	5
vMX: Video Feeds	1	15
vMX: Monitors	1	2
Analytics: EDVA Channels	0	2
Analytics: VCA	on Details	
Analytics: OV5 full channels	0	5
Analytics: OV Counting	0	2
Analytics: OV5 basic channels	0	5
Analytics: OV5 expanded channels	0	5
Analytics: OV6	on Details	
Geo-Mapping interface	ONLINE	
vAC: number of Gateways	0	5
Number of NODES	1	2
Storage manager: number of LUNs	2	10
Software version	4.0.1	4.0
Avatars	0	5
Cloud storage	DISABLED	

In the figure above, the highlighted licenses are the ones that are required for Video Wall. vMX: Monitors refers to the physical number of computer configured to be Monitors that your Wall will use. vMX: Video Feeds refers to the number of camera Feeds that can be added between all the Monitors. Each Monitor has a limitation of twenty Feeds displayed at once, so plan accordingly.

In Figure 1 above, the system is licensed for two vMX Monitors, of which one is already enabled and in use. Additionally, only one of the fifteen licensed Video Feeds is being used.

As long as there is more than one license for each of the two rows, it is time to proceed to the setup of the Video Wall.

Configuring the Video Wall

The first steps necessary to enable vMX are done from the Control Panel of the STRATUS interface. If you are not logged into the system, log in now as the admin account.

There are two devices that must be configured, a Monitor and a Wall. A Monitor corresponds to the physical computer and monitor where the Video Feeds will be displayed. A Wall, on the other hand, is a virtual grouping of the Monitors.

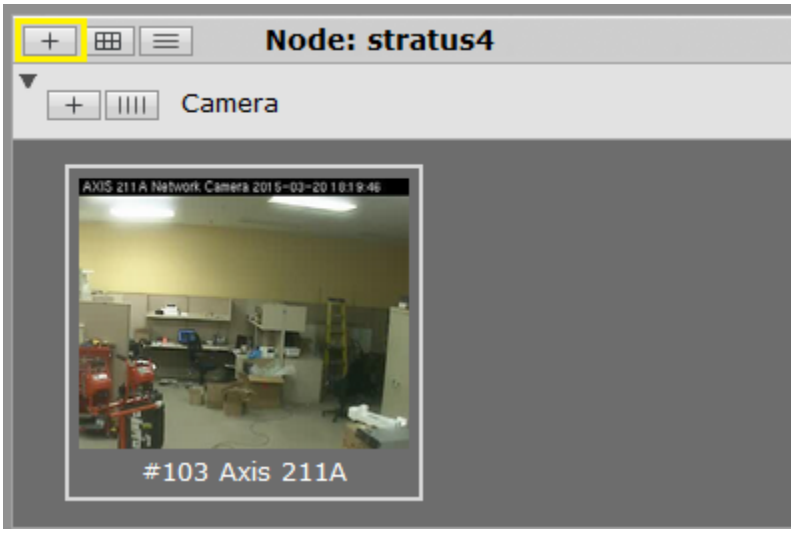
Since the Monitors will be added into the Walls, we will begin their configuration first.

Monitor Configuration

For this step you will need to know the IP address, Username and Password of the computer configured for use as a Monitor with the STRATUS system. If you completed the steps in Appendix A, you should already have these written down. Otherwise, please acquire this information before proceeding any further. Refer to Appendix A for instructions.

In the left hand panel of the Control Panel view, navigate to System Sets > All Cameras. The reason we are going to Cameras despite attempting to set up Monitors, is that unless a Monitor has been previously configured in the system, there will not be a System Set for it. Despite this, we can still add them. Refer to Figure 2.

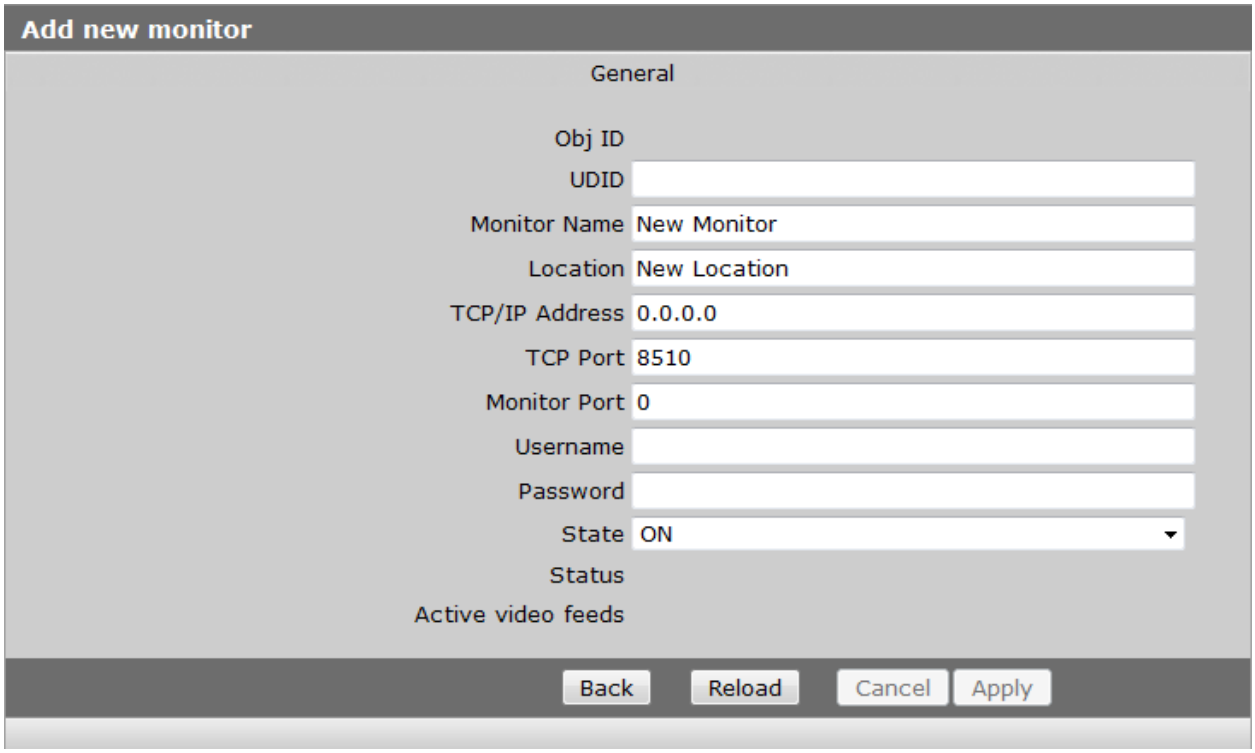
Figure 2. Adding a vMX Monitor



When selecting any of the System lists, there are always two [+] symbols. The one directly above the expanded section, Cameras in this case, is a shortcut to add the same type of device. However, the [+] above that, highlighted in Figure 2, can add any of the supported devices.

Click on it, and select vMX Monitor from the dropdown list. This will take you to the configuration screen for the Monitor.

Figure 3. Adding a Monitor



Fill out the fields on this screen to register the Monitor with the system. Refer to the Table 1 below for instructions about the individual fields.

Table 1. Add Monitor Fields Explained

Obj ID	Unique System Identification for the Monitor. Note this number, as it is needed later. It will not appear until the Monitor is successfully added, and the reload button is pressed. (Read Only)
UDID	User Designated Identifier. If left blank, it will be designated by the system as #Obj ID
Monitor Name	A descriptive name for the Monitor
Location	A descriptive location for the Monitor
TCP/IP Address	The IP Address (or Domain Name) of the vMX client
TCP Port	The TCP port to connect to the vMX with. Recommended to leave on default. Default port is 8510
Monitor Port	Which display attached to the vMX computer to use (0 is first monitor, 1 is second, etc.) Default is 0, if only one display is available
Username	The Username for the monitor. This can be changed with the 'sos' account on the vMX. Default is 'test'

Password	The Password for the monitor. This can be changed with the 'sos' account on the vMX. Default is 'test'
State	[ON/OFF] - Set whether to use this vMX on or off.
Status	The current status of the vMX (connected, disconnect, etc.). Blank until the Monitor is set up. (Read Only)
Active Video Feeds	The number of Video Feeds associated with this Monitor. Blank until the Monitor is set up. (Read Only)

As you may have guessed by the “Monitor Port” field explanation, it is possible to set up a single computer to “drive” multiple displays. However, we suggest using small PCs for each individual Monitor “driving” one display each. This is more economical, more reliable, and has better overall performance. If you still wish to make use of multi-display Monitors, please refer to Appendix B for instructions on proper configuration.

Now that all the fields have been filled out, click on the Apply button to save the changes. Then click on the Reload button to update the window and ensure that the Monitor has come online. This process may take a minute or two, so please be patient.

Note: A monitor can only be used by a single STRATUS system at once. If you are adding the same Monitor into a second STRATUS system, please be sure to turn the Monitor “off” in the settings of the first system, before enabling it in the second one.

Once the Monitor Status is showing “on”, the configuration is successful. You may proceed to set up other Monitors as needed, or move on to the next section to create the first Wall.

Wall Configuration

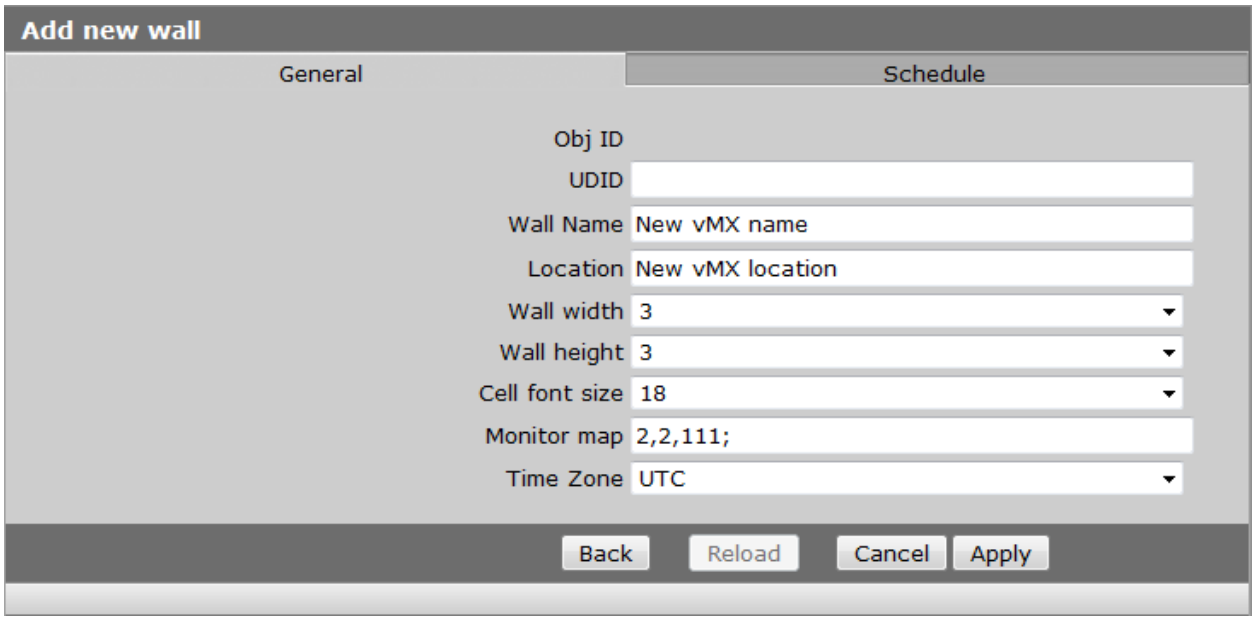
Walls are sets of Monitors arranged into a rectangular matrix by assigning previously created Monitors into cells. This arrangement is what will be visible in the Matrix view to the Operator, and so should be set up as close as possible to the positioning of the physical displays for easy identification.

The Wall matrix may have empty cells, which accommodates for non-rectangular physical Wall layouts (for example the Wall may have rectangular 3x4 center and “wings” of two monitors on each side mounted around the top, which would be a 3x6 with 4 empty cells).

Different vMX Walls may be installed in separate rooms and even be geographically dispersed, as long as a sufficient network infrastructure is provided. In general, however, you will want to define a new wall for each logical separation (one wall per each room, or one wall for each operator group in charge of the wall).

To add a vMX Wall, we will follow the same steps as those with the Monitor. In the left-hand panel of the Control Panel navigate to System Sets > All Cameras. Click on the top [+] icon and select vMX Wall from the dropdown this time.

Figure 4. Adding a Wall



You should now see this on your screen. Using Table 2 as a guide, fill out each of the fields to complete the configuration.

Please pay close attention to the “Monitor map” attribute, as it defines a mapping of vMX monitor IDs into the matrix of monitors representing the video-wall. This "Monitor Map" is a set of triplets defining the position of each monitor. Cell numbering is done starting from 0 (zero), and the triplet format is: row, column, v-MX Monitor ID. Each cell entry is separated by a semi-colon, ";". So, in this case, we have a Wall that is 3x3 cells. And the Monitor with Obj ID 111 is being placed into the bottom right hand corner of the matrix.

Table 2. Add Wall Fields Explained

Obj ID	Unique System Identification for the Monitor. Note this number, as it is needed later. It will not appear until the Monitor is successfully added, and the reload button is pressed. (Read Only)
UDID	User Designated Identifier. If left blank, it will be designated by the system as #Obj ID
Wall name	A descriptive name for the Wall
Location	A descriptive location for the Wall
Wall Width	The width of the Wall in cells. Each cell can contain a Monitor
Wall Height	The height of the Wall in cells. Each cell can contain a Monitor

Cell Font Size	The font size for the Camera information(Name, UDID) that is visible on the Monitor's Display.
Monitor Map	It is not necessary to fill out the entire grid. Just write the information for the slots where the Monitors are present
Time Zone	The time zone that the Wall will function in.

Once all the fields have been filled out, hit the Apply button. This saves the settings, and creates the Video Wall. Hitting the Refresh button now should update the previously blank Obj ID to a system generated number.

An important concept of combining multiple Monitors into Walls is the ability to re-combine essentially the same subsets of Monitors into independent walls. It allows sections of the same physical Video Wall to hold different STRATUS Roles through the Credential Manager. So if you wish to create multiple Walls at this point, go ahead and repeat the above steps as many times as needed. If not, then it's time for the final part of the Control Panel configuration, Assigning the freshly created Wall(s) to various Users.

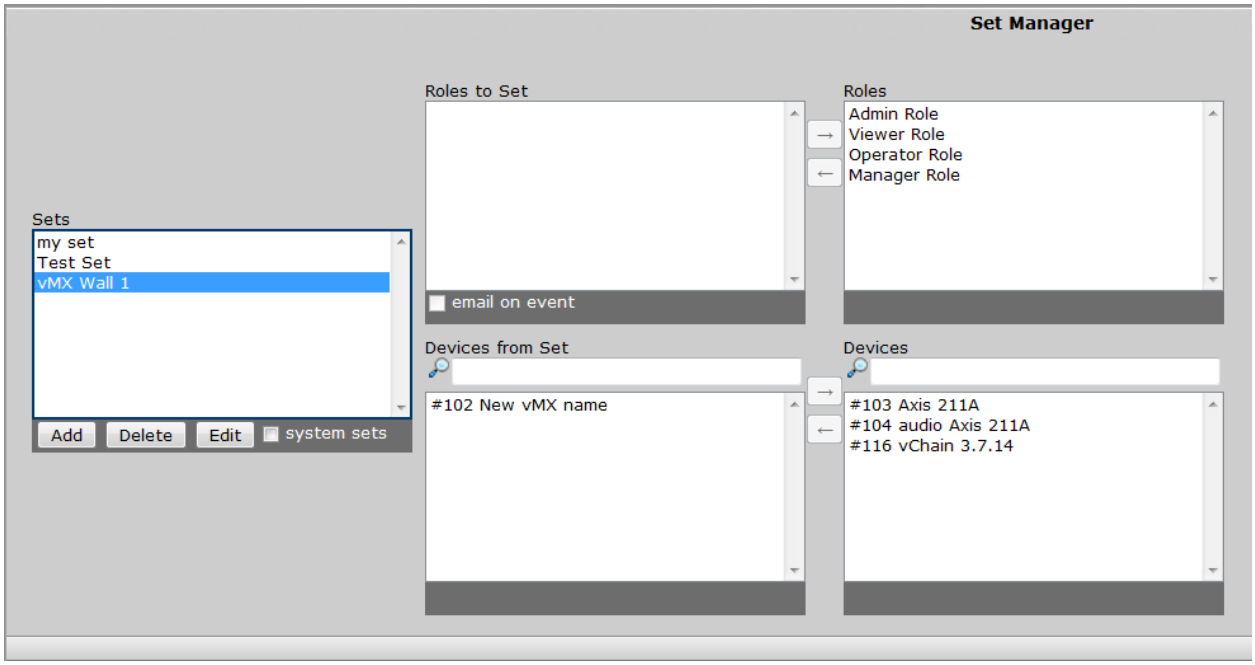
Adding the Wall Permissions for Users

Video Walls obey the same rules as the other devices. Before they can be seen by a specific User, they must be added into a Set, and the Role in questions must be given permissions to the Set. By default, the admin account gains permissions to view every device in the system through the use of System Sets which are unique to the admin role. In other words, for other Roles to be able to see the newly created Video Wall, they must first be granted permission to do so.

As this step is exactly the same as adding other devices into the system, this manual will briefly go over the steps necessary to accomplish the task. If you require a more in-depth information, please refer to the User, Role, and Set Manager sections in the Administration manual.

In the left-hand panel of the Control Panel, navigate to Settings > Credentials > Set Manager. At this point, your screen should look similar to Figure 5.

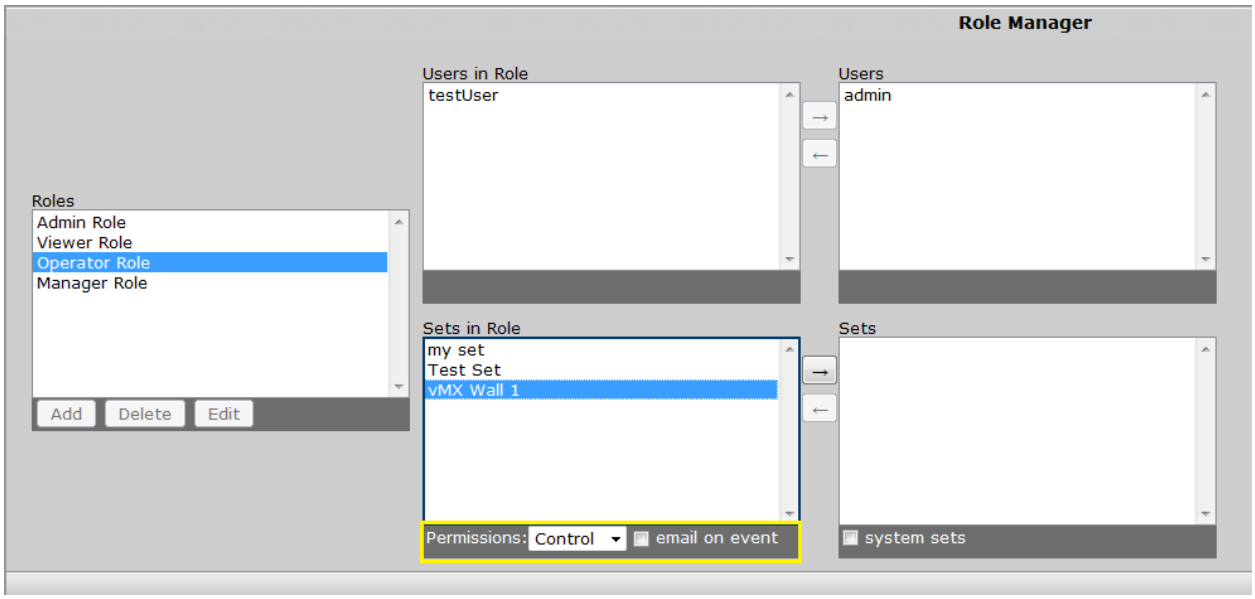
Figure 5. Set Manager View



From here, the Wall that was created in the above steps needs to be added into a Set. Since Walls differ from other devices in functionality, we decided to create a brand new Set to contain them, “vMX Wall 1”. This is not necessary, and will differ based on your requirements and configuration preferences. Regardless, ensure that the Wall is now part of one or more Sets before leaving this screen. Doing so will enable you to modify permissions for individual Roles in the next step.

Now that the Wall is part of a set, we are able to dictate to the system who has permissions to interact with it. Navigate to the Role Manager. It is located directly above the Set Manager in the left panel of the Control Panel. Your screen should now be similar to Figure 6.

Figure 6. Role Manager View



Select the Role you want to grant permissions to. In the example, we chose to go with the Operator Role. Next, ensure that the Set which contains the Wall is added to the list “Sets in Role”. As soon as a Set appears in that box, it means the selected Role has gained the permission to “View” every device within that Set. Here’s how the permission levels break down specifically for vMX:

View - Does not give any credentials to manipulate Video Wall.

Control - Allows the recollection of pre-created layouts and manipulation of the monitors (but not to modify saved layouts).

Manage - Adds the ability to create/edit/delete saved layouts and share them as needed.

Selecting a Set from the “Sets in Role” list allows you to change the permission level for that Set. The highlighted area in Figure 6 is where the permission control is located. Simply clicking on the dropdown and choosing an option automatically saves the new settings. In the example displayed in Figure 6, the Operator Role is given the permissions to Control the vMX Wall.

With this, the configuration part of the vMX Video Wall is over. The Video Wall is now fully functional and is ready to have cameras to the individual Monitors. This part will be accomplished from the Matrix view of the STRATUS system, and does not inherently require the use of the admin account. Any user with the “Manage” permissions for the Video Wall can complete the following section.

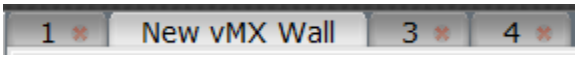
Using the Video Wall

This section will cover the Video Wall specific view, how to add camera feeds to the Monitors, and the added features in the Layout tab.
Since the available interactions with the vMX Video Wall are dictated by the permissions set during the configuration stage, this document will discuss the functions at the “Manage” permission level and make note when a feature is not available to the lower permission levels.

If you are not logged into the STRATUS system, go ahead and do so now. Be sure that the account you use has the permissions to see the Video Wall, and enter the Matrix View.

Right away, you should notice that a new tab has been added to the list running along the top of the Workspace. Click on it to enter the vMX Video Wall view.

Figure 7. vMX Video Wall

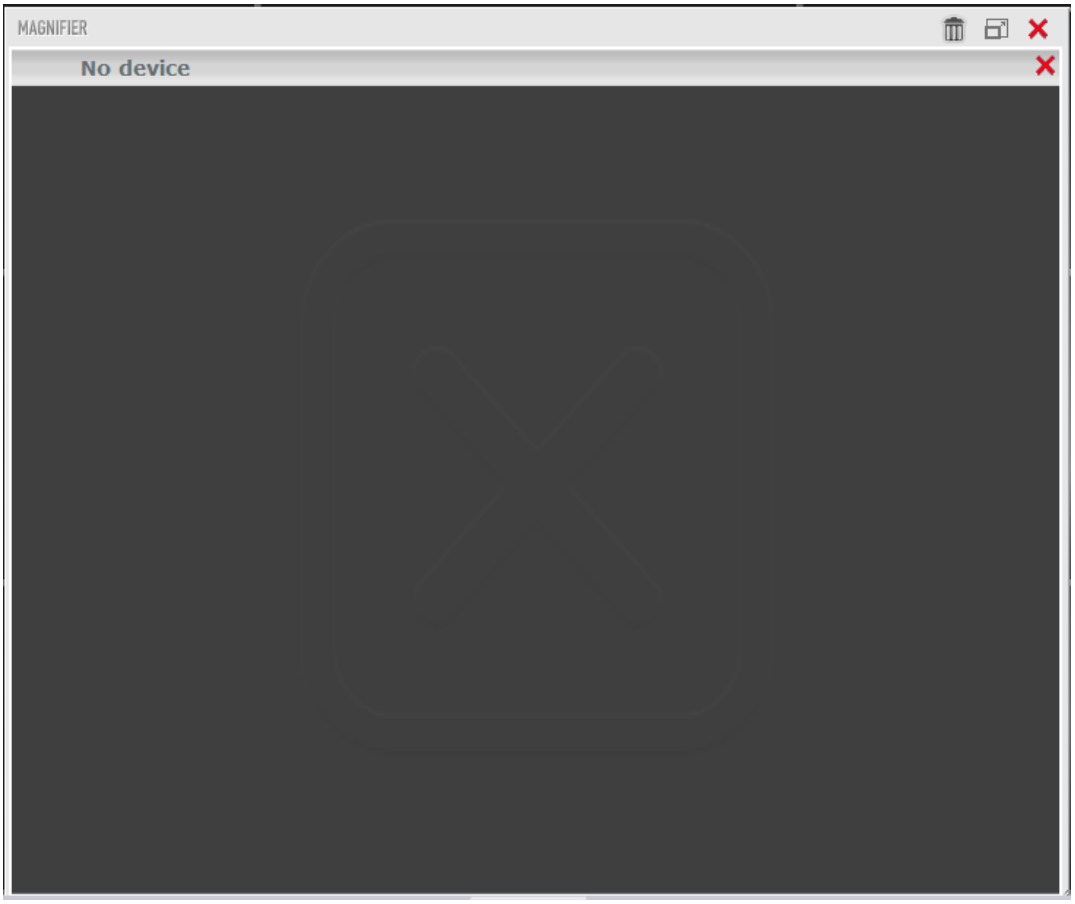


The screen will be divided into cells much like those you see in Figure 7. These divisions correspond to the borders of various Monitors, and empty spaces for Monitors, that were placed in the Wall. In the case of Figure 7, the Wall was configured to be a 3x3 square with a Monitor in the bottom left corner. Although it is difficult to see which cells are occupied by Monitors in the

Figure 7 view, as soon as you click and drag on a device, the unavailable cells become whitened out allowing for easy identification.

Video Wall view has a new functionality that is not available in the regular tabs. Double clicking on a Wall cell that contains a Monitor brings up the Magnifier view.

Figure 8. Magnifier View



The Magnifier zooms into a single Monitor to allow for easier layout and camera placement. Although this may seem unnecessary with only a few Monitors per Wall, a Wall can support up to 64 Monitors, which in turn have a limit of 20 camera feeds each. At such density, it is impractical to attempt to set up each Monitor without the Magnifier.

The Magnifier also has additional options located at the right corner of the top bar.

Figure 9. Magnifier Options

 *Clear Cells* - Removes any Layout formatting and returns the Monitor to the default view shown in Figure 8.

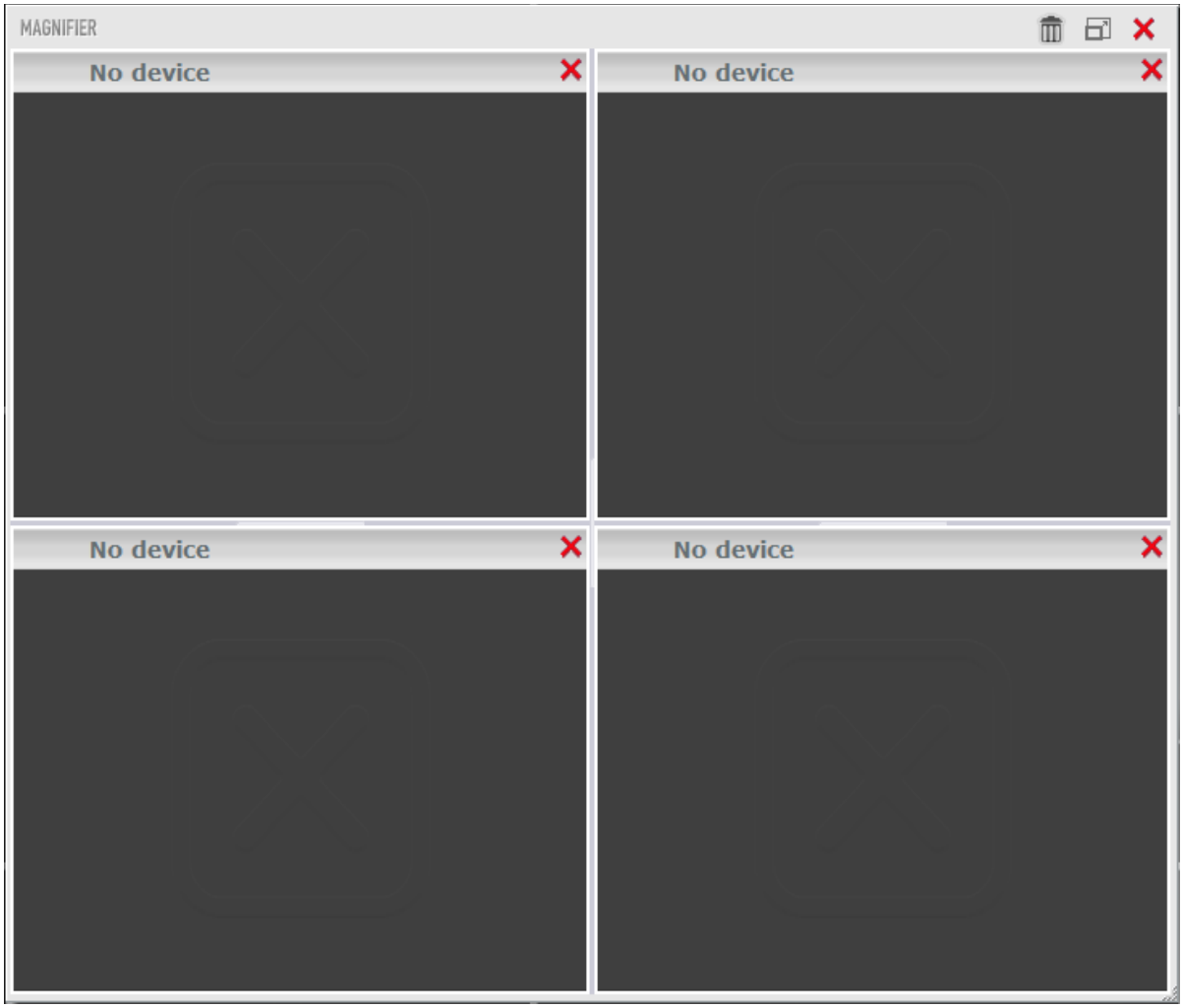
Maximize/Restore - Clicking on this makes the Magnifier take up the entire Workstation. Clicking on it again returns it to normal

Close - Closes the Magnifier view.

Clicking and dragging by the lower right corner of the Magnifier screen will allow you to resize it, while clicking and dragging it by the top options bar will move the screen around the Workspace.

At the moment, this Monitor can only show a single camera feed at a time. So it's time to use the Layout options to divide up the screen. Click and drag the desired selection into the Magnifier view. In Figure 10 below, we decided to split the Monitor into quarters.

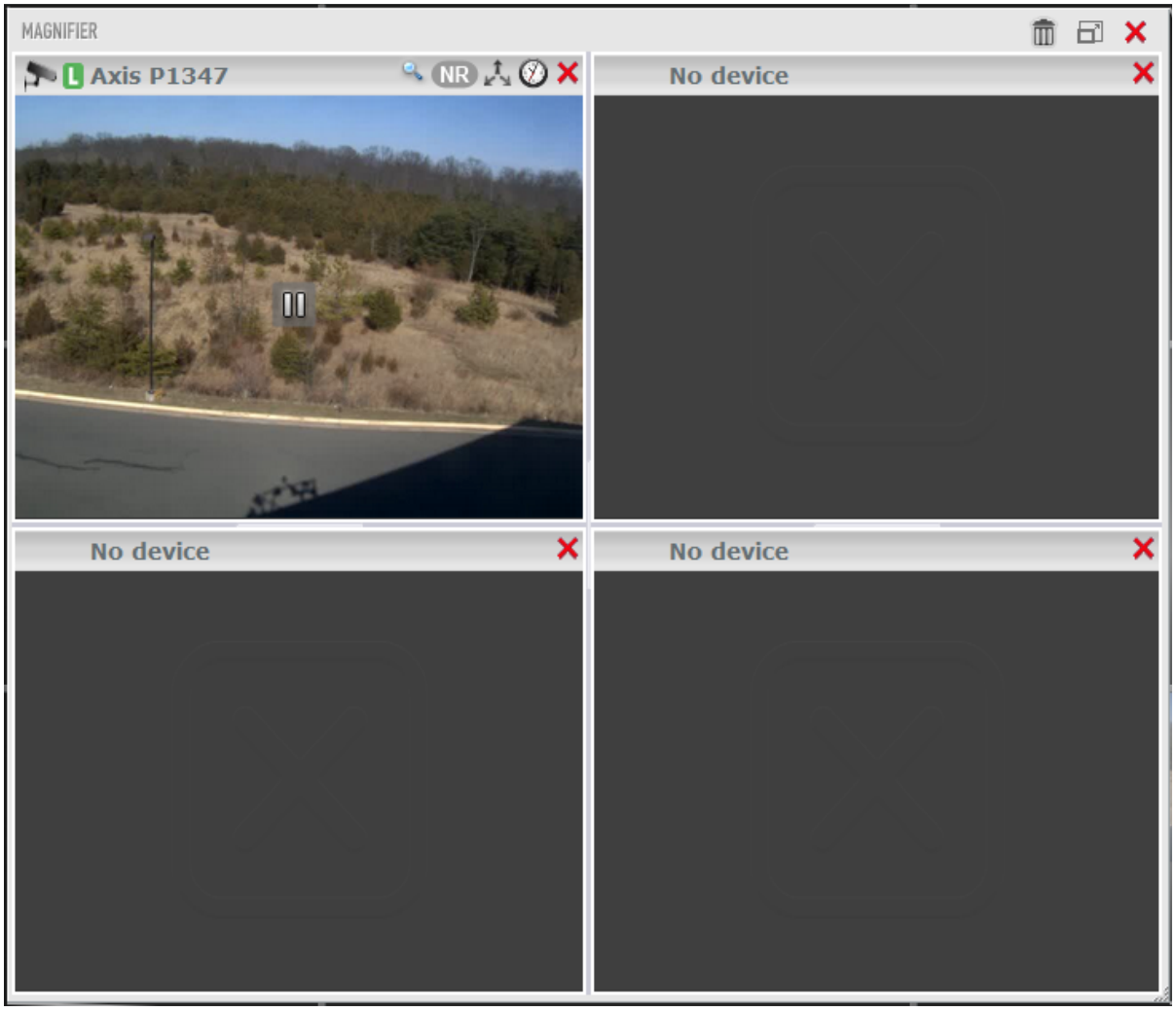
Figure 10. Split Magnifier View



Once the Monitor has been split into individual cells, it is possible to manually adjust them outside of the Layout formatting. Simply click and drag on one of the divisions to resize it. Doing this will allow you to fine tune your dual-screen set up, or create a custom layout not achievable through the standard layout options.

It is now time to add camera feeds to the Monitor. From the Resources Panel, select a device from one of the Sets available to you, and drag-and-drop it into a slot in the Magnifier view. The result should look similar to Figure 11.

Figure 11. Add a Camera into a Monitor



As you can see in Figure 11, the options available for each camera have changed from those available in the regular tabs. The list below details each icon and explains what it does.

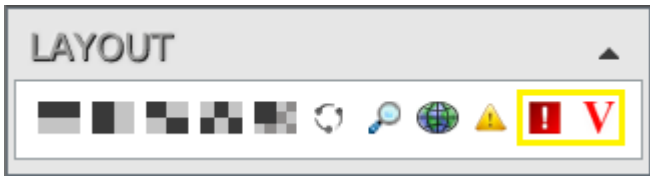
Table 3. Camera Options

Device Type	An icon representing the type of device. Click and drag to reposition the camera within the Monitor
Feed Type	Unclickable. The Video Wall functions only in Live Mode, and the icon is here to serve as a reminder
Device Name	The name of the device. This is set during the initial configuration of the device

Expanded View	Clicking this causes the feed from this camera to be full screened on the display linked to the Monitor. The same effect does not occur in the Matrix view, though the icon is highlighted to show that it is selected
Resolution Setting	High, Normal, Low, allows the user to control the quality of the camera feed
PTZ Controls	Opens PTZ controls for any PTZ enabled camera
Switch to Camera Timezone	Changes the time displayed by the Controls Panel to the camera's timezone.
Cell Close	Returns the cell to its starting empty state. The division itself is not deleted.

In addition to the changed camera options, the Layout panel has also gained two new elements.

Figure 12. New Layout Options



Going from left to right, they are Alert/Pop up cell and VNC cell. Both of them are unique to the Video Wall tab.

Alert/Pop Up Cell - Allows the user to define the areas of the Video Wall where the cameras with the popup video option enabled will appear on the screen. Simply drag and drop the icon into an available slot on the screen to designate it as an Alert/Pop Up Cell. Doing so restricts you from adding any other devices or features into that slot until it is cleared.

VNC Cell - Allows to add VNC functionality directly into the Video Wall. Click and drag into an available slot on the screen to designate it as a VNC Cell. This opens a VNC client in that slot.

Figure 13. VNC Cell Options Expanded

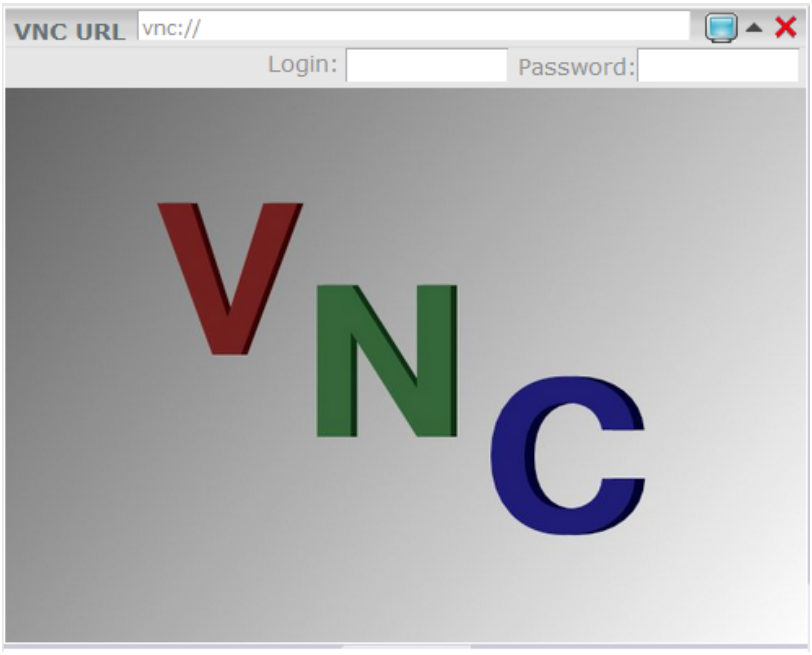


Table 4. VNC Options Explained

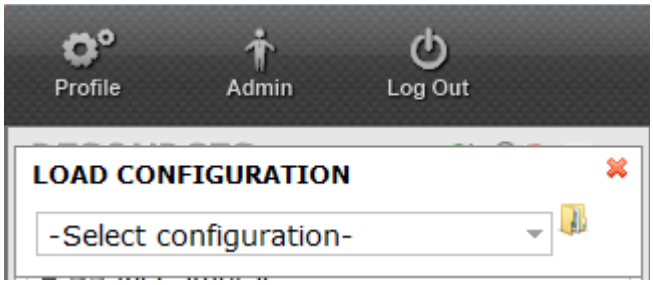
VNC URL	The IP address of the VNC server to which you are trying to connect
Start Sharing [icon]	Clicking this attempts to connect to the server using the IP address and credentials you have entered
Show/Hide VNC Config	Expands or hides the Login and Password fields
Login	The username for the VNC server
Password	Password for the VNC server
Cell Close	Returns the cell to its starting empty state. The division itself is not deleted.

Saving, Loading, and Managing Profiles

Much like with the regular tabs, a Profile is simply a predetermined configuration of the screen. A user is required to have the Control Permission in order to load configurations created by others, and make temporary changes to them. Only Users with the Manage Permission, or admin status, can save new Profiles, and permanently edit the already existing ones. Below are the steps necessary to Load, Save, and Manage Profiles.

Loading Profiles

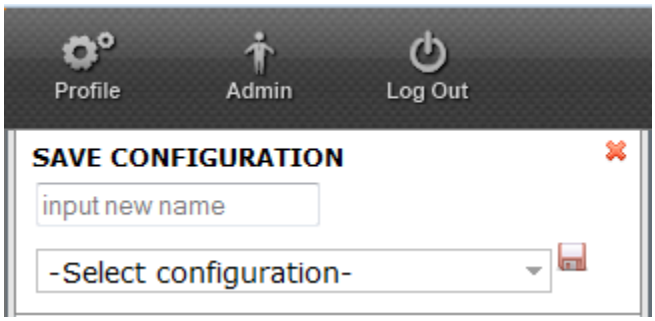
Figure 14. Load Profile



Available to any User with Control or higher permissions level. Click on the Profiles button located at the top left corner of the Workspace, and select the configuration you need. Then click on the folder icon. Refer to Figure 14.

Saving Profiles

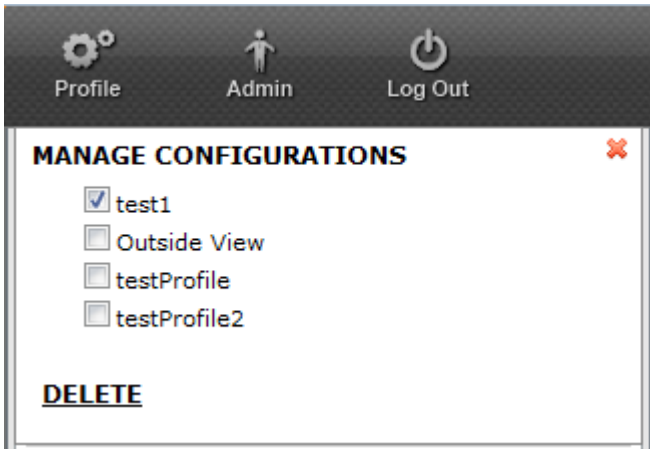
Figure 15. Saving Profiles



Available to Users with Manage or higher permissions level. Make sure the Video Wall configuration you wish to save is visible in the Workspace. Click on the Profiles button located at the top left corner of the Workspace, and give the configuration a descriptive name. Alternatively, it is possible to override already existing configurations. In this case, either enter the same name as that of an already existing configuration, or simply select it from the drop down menu. Then click on the save icon to complete the saving process.

Managing Profiles

Figure 16. Manage Profiles



Available to Users with Manage permissions level or higher, as the name implies. This option is actually meant to be used to delete existing configurations. If what you seek to do is change an already existing one, refer to the Saving Profiles paragraph above.

Appendix A: DS Monitor Installation Instructions

In order to install a DS Monitor, you will require the latest version of software. This can be acquired directly from videoNext. Please contact sales at sales@videonext.com for more information.

The installation process itself is very simple:

1. If the software is not already on a disk, burn the DVD from the image *.iso file.
2. Insert DVD into DVD drive, and allow it to load.
3. When the installation prompts for an input, type “ds” to install the DS monitor software.
4. On the next screen disable IPv6.
5. After the installation is complete, remove the DVD and restart the system.

Important Note: In order to configure the DS Monitor with the STRATUS system, you will need three key pieces of information. The IP address of the Monitor, as well as the log in credentials. Read on to learn where to find them.

The default log in to DS is: sos
The default password to DS is: s.o.s.

Once the system has restarted, it should reboot into a white screen. Press Ctrl + Alt + F3 to be taken to the log in screen. If you do not see a log in prompt, cycle through the available screens by pressing Ctrl + Alt + F(1-7) until it appears. Enter the default log in information listed above. Once you are authenticated by the system, you will be presented with a text menu similar to that outlined below.

```
================ Network ================
eth0: 267.267.161.79/255.255.255.0
nameserver 267.267.160.1 : OK
nameserver 267.267.160.2 : OK
------------------------------ NTP Server ---------------------------------
     remote           refid                st  t when  poll  reach   delay      offset    jitter
+84.245.64.190    194.160.23.2      2   u  124  1024  377     119.941  0.144     0.156
+69.50.219.51     216.171.120.36    2   u  217  1024  377     69.244   1.449     0.244
*173.255.219.242  220.183.68.66     2   u  432  1024  377     74.988   -0.300    0.190
-174.36.71.205    184.173.173.205   3   u  364  1024  377     68.746   19.894    11.345
----------- Software version  ----------
3.3.0-28
----------- Application status ----------
Loaded: loaded (/lib/systemd/system/ds.service; enabled)
Active: active (running) since Sat, 07 Sep 2013 07:16:00 +0000; 3 days ago
=========================================

Select an option:
```

```
1. Show status                    5. Restart server
2. Network/DNS configuration      6. Change SOS password
3. Configure NTP source           7. Change DS login and password
4. Restart application services   99. ============ EXIT ==============
?
```

The IP address of this DS Monitor is listed at the very top of this menu under the Network header. It is the first 11 digits on the “eth0” line. Write this down, as you will need it later during the configuration of the xMX Video Wall in STRATUS.

Finally, you should take this time to change the default username and password to ensure that your system is secure. You may set these to anything you like, but be sure to remember them for the Monitor configuration part in STRATUS, as well as accessing the system at a later date.

Once these steps are complete, the DS Monitor is set up and ready for use with the STRATUS system. If you need to set up multiple displays to work with a single Monitor, read on to Appendix B.

Appendix B: Dual Screen Setup for Monitors

In order to set up the Dual Screen option we will first need some information about the screens. On the computer that is the DS Monitor, press Ctrl + Alt + F3 to return to the menu view you saw during the installation. If the system prompts you to log in, go ahead and do so. Once you see the menu appear, type 99 and hit enter. This will exit the menu, and the screen will become a regular terminal.
To execute the following commands, you need to be the root user. Type:

```
su -
```

The system will prompt for the password to the root account. If this is the first time you are accessing the system in this way, the default is 123456.
Now that you are logged in as the root user, execute the following command:

```
xrandr -q
```

This will give you the name of every connected display, as well as their current and possible resolutions. In the system used for this example, the screens are “HDMI1” and “HDMI2”. If instead of information you are receiving an error message, ensure that you’ve exported the DISPLAY environment variable:

```
export DISPLAY=:0
```

We will need the name/connection ports of the monitors further on in the set up. However, it is possible that when a new monitor is plugged into the system it will not show up in the list generated by the first xrandr command. In this case look to see where the display is physically connected into the computer, and use the name of that port as shown in the xrandr generated list.

The next step is to ensure that you have the latest version of rpm installed. To check which version is currently installed enter the following command:

```
rpm -q ds-vmx
```

It is strongly advised that you have ds-vmx-3.3.0-31.fc16.i686.rpm or later installed. If that is not the case, please contact Support or Sales to receive the download link to the latest versions.

Once you have the file, place it into an easily accessible directory, such as the home sos directory. From here, the next step is to uninstall the old rpm file and install the new one. Type in the following line:

```
rpm -e ds-vmx
```

This will remove the old version, and we can now install the new one. Type in the following line, replacing the “location-of-new-file/file-name” with the directory where it was placed and the name of the file itself:

```
rpm -i location-of-new-file/file-name
```

The system will think for a moment, and then allow you to enter a new line. That's it, the new rpm was successfully installed. You can run the rpm -q command to double check the version number. You can also restart the system at this point, though it is not strictly necessary.

Now it is finally time to set up the displays themselves. We will need to edit the DS.xinit script using the information gathered about the monitors to set up their resolutions and relative positions. Type in the following:

```
vi /opt/DS/bin/DS.xinit
```

This command will bring up a screen with some writing at the top, and a lot of empty lines at the bottom. Find the line exec compiz& from among the code. We will need to add two lines above it, one for each monitor. Type in the following, replacing HDMI1 with the name of your first display:

```
xrandr --auto --output HDMI1 --mode 1152x864
```

Note that this line refers to the first display, and that the resolution is set to 1152x864. It is strongly advised to use two screens that support the same resolution or even identical screens to simplify the later part of the set up. However, the system is perfectly able to support two displays using different resolutions for each.

Now add another line for the second monitor. Again, replace the name of the monitor to fit the data you received from xrandr in the first step.

```
xrandr --auto --output HDMI2 --mode 800x600 --right-of HDMI1
```

The additional input here dictates to the system that the second screen is to be the one on the right. If you're not sure which monitor corresponds to which name to properly assign the relative positions, you can always set it up and come back to change it later.

To exit this screen, type in the colon symbol “:”. This will move the typing cursor to the bottom of the screen. Type:

```
wq
```

It is short for write quit, and will save the changes you have made before exiting the screen. If you have made changes you do not want saved, the command q! will exit without saving.

The final step is to restart the system one more time for the changes to take effect. Type in the following command :

```
systemctl restart ds.service
```

That's it, the set up of dual monitors is complete. To switch to the view that will display the video streams press Ctrl + Alt + F2. Again, this is the default positioning of that screen, and it may shift to any function key, 1-6.

Once the Monitor is connected to STRATUS, it will be possible to check if the screens have proper relative positions, and to adjust the individual feeds so that they fit perfectly onto the screens. For reassigning the left and right positioning refer to the above instructions, while the adjustment of the video feeds' sizes is discussed in this document under the **Using the Video Wall** section.

This concludes Appendix B.