MX-100CC Installation & Operations Manual

Software Revision 1.16.6

West Pond Enterprises, LLC

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Revision History

Date	Version	By	Description
7/20/2017	1.0.2	sdh	Created for version 1.0.2 of the software
11/29/2017	1.10.0	sdh	Time to update…. Bring to latest software revision
12/1/2017	1.11.0	sdh	Add discovery, add discovery to quick start
5/17/2018	1.16.5	sdh	
6/3/2018	1.16.6	sdh	Fixed FlexDM port typo (should be 1194)

Related documentation

Date	Version	By	Description
NA	1.15.1	sdh	User Guide, FlexStream MX-GS200, MD-100, RX-WP100
NA	NA	NA	Flexstream U-Tube channel. https://www.youtube.com/channel/UCsZyIiqtSbF18sTyioOjS5Q

Terms and terminology

TS	MPEG2 Transport Stream
MPTS	Multi-program Transport Stream
Inputs	Physical inputs to the MX-100
Sources	TS traffic entering the multiplexor
Outputs	TS traffic exiting the multiplexor
Targets	Output devices receiving TS traffic from the multiplexor
Video Server	Feature of the MX-100 software that creates live program streams (TV channels) from 1 or more TS files via a loop or scheduled event.
Video Wrapper	Feature of the MX-100 software that wraps video Inputs with HTML5 graphical content and then encodes it to make a program stream.
Monitor	Feature of the MX-100 software, included with the RF modulator, which scans the target RF plant for unused frequencies and monitoring used frequencies.

MX-100CC

Thank you for purchasing the MX-100CC shelf top digital video media system. This product was specifically designed to enhance the value of TVs used in restaurants, bars, pubs, small hotels, schools and other institutions that utilize linear TV such as COAX and IPTV. Using the existing coax infrastructure, or traditional IPTV, the MX-100CC enables the capture and encode of high definition video, RTSP security cameras, file playback of prerecorded HD video files. This video can be streamed onto a TV channel or combined with HTML5 multi-media advertisement and notifications to create a custom multimedia channel that delivers both video and your messages. The MX-100CC also supports venue wide display controls over existing coax wiring. This document will help you get the MX-100CC up and running quickly. For your convenience a quick start section is provide at the end of this

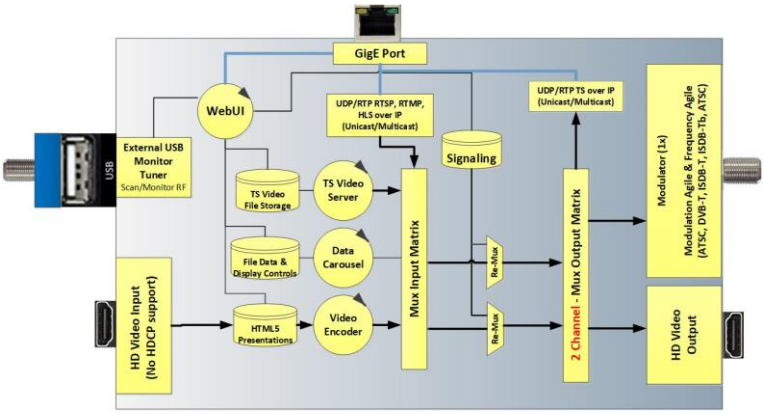
document. See Appendix A – Quick Start Help. For more information please contact West Pond Enterprises sales or support.

The single system provides features that normally require a collection of rack mounted equipment, set top boxes, and media servers. Integrating these components together not only reduces the cost and space required to host the system, it enables advanced features and simplifies overall operation. A single UI allows you to manage the entire system. Here's a list of standard equipment the MX-100CC replaces.

- Video Server / Streamer
    - Load up to 30 hours of video files onto the MX-100CC and create custom TV channels via our built in video server. Create a looping playlist or schedule playback at specific times.
- Video Encoder - HDMI / Component / Composite
    - Capture video and audio from the HD video port and encoded it to broadcast quality standards. This box supports h.264 and MPEG2 video and a variety of audio formats.
- Digital Signage Player
    - The HTML5 video wrapper combines video streams with HTML5 media to create a dynamic multi-media experience on one or more TVs without a digital signage player. This powerful tool is made simple through presentation templates provided by West Pond. See http://www.westpond.com/templates for a list of recent templates.
- Demux – Remux Multichannel Multiplexer
    - Our integrated scalable multiplexer replaces the need for external rack mounted devices.
- Multi-channel modulator
    - 1 multi-channel, frequency and modulation agile modulator.
- RF Monitor (optional)
    - Scanning of broadcast and cable TV channels to discover new channels and identify/resolve issues is now automated. TV no longer required.
- Display controller
    - Every display on your linear TV network can now be controlled via the integrated display control system. Just register the West Pond display control device with the MX-100CC and set its state.

MX-100CC Hardware

Each MX-100CC unit is equipped with one HD video capture module, one monitor tuner (optional), and 1 GigE ports and one modulation and frequency agile DTV modulator. The output can be IPTV or RF via the modulator channels. Inputs, mux sources, can be IPTV, RTSP (cameras), streamed from files, or captured and encoded from the HD video port. Any mux source can be passed through the HTML wrapper to create a multimedia enhanced channel. All mux sources are visible on the front panel and are available via the multiplexor as an output on any IPTV or RF output.



MX-100CC Software

The MX-100CC software package complements existing in-house TV networks by creating channels from traditional and non-traditional sources. All of the MX-100CC software resides on the MX-100CC and is accessible via the internal Web UI. There is no need to install any management software on a PC or other device. The MX-100CC WebUI is accessible via any device with a web browser or remotely via FlexDM.

Setting up the system

Unpacking the unit

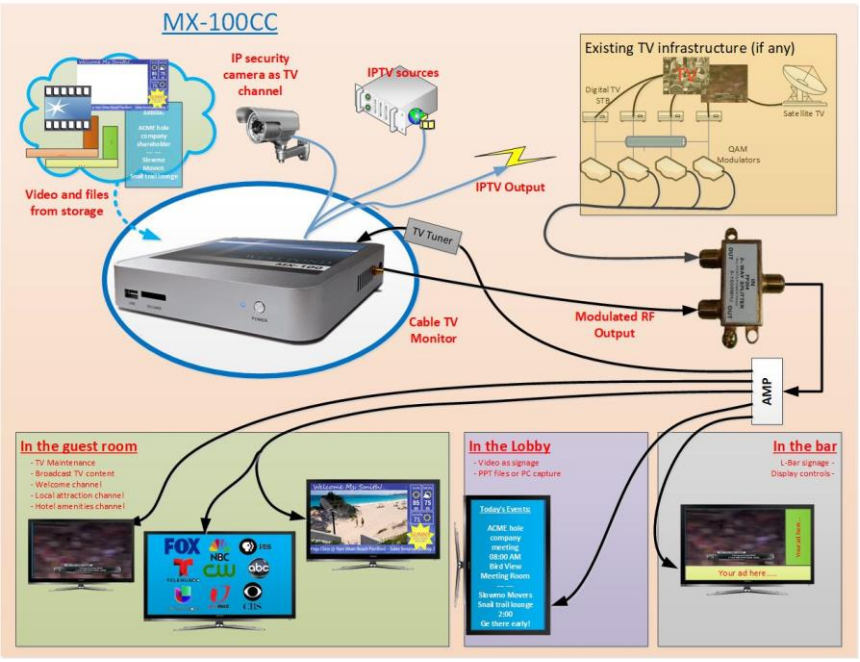
The MX-100CC is a tightly integrated solution. The box is supplied with a power cable, an adapter cable for HD video, and a DTV tuner (optional) for the RF Monitor.

Installing

The MX-100 is a compact, low power, shelf top device. It should be installed in a clean dry area at room temperature or cooler. The unit has mechanical air flow assistance as a precaution against improper installation. Under proper conditions the device will operate correctly with or without the internal fan.

Making the connections

The MX-100 has a single gigabit Ethernet port on the back of the chassis. It is set by default set to DHCP. Connect the MX-100 to a DHCP enabled LAN for initial configuration. The Web UI can be used to override this configuration later. Even though the video capture port is hot pluggable, this would be a good time to connect the AV source to the HD video connection. If the optional external USB tuner was provided, connect the tuner USB to the MX-100 and the tuner F connector to your in-house cable RF just as you would a TV. This input will be used by the MX-100 to detect unused frequencies on the in-house cable TV network. It need not remain connected after the installation is complete. The modulator output is marked RF Output. To merge the MX-100 channels with existing in-house cable TV channels, connect the RF output to an RF combiner or distribution network that feeds your in-house cable TV system. See the diagram above for more information.



Power On

The MX-100 will boot on when the DC power is connected. The blue LED next to the POWER button will be illuminated when the power is on.

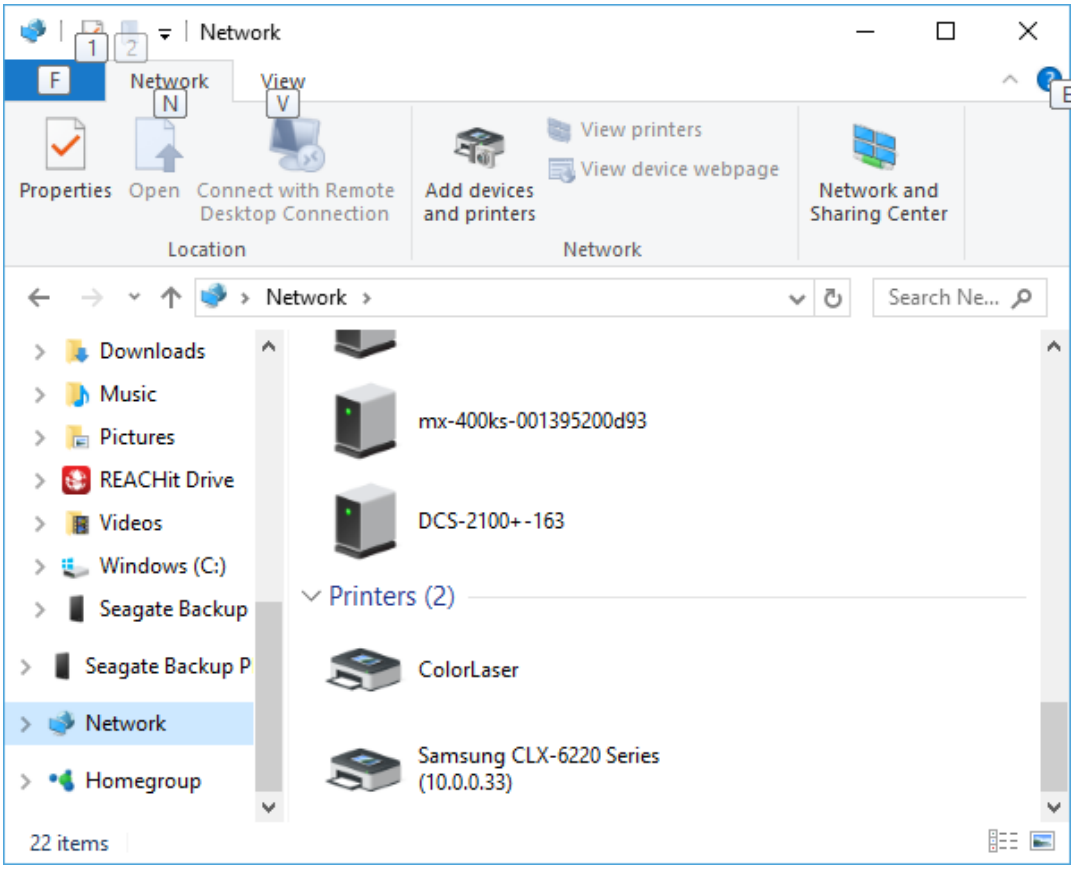
Configuring the system

Software features are configured using the MX-100 Web UI.

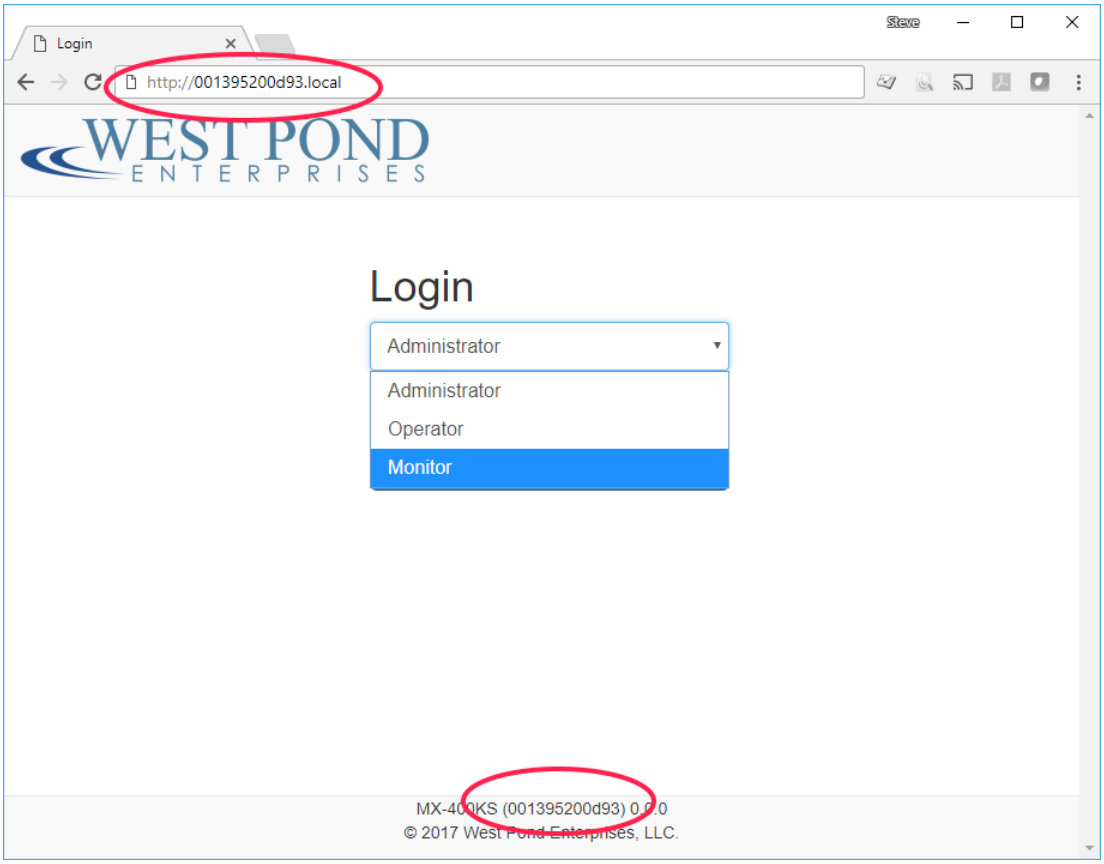
Accessing the WebUI

The MX-100 supports LLMNR, mDNS, and uPnP for LAN based system discovery. The network settings are by default DHCP. Plug this system into a typical LAN and it will automatically be assigned an IP configuration. Use your computer file browser to open the network devices. For example, on Windows

the screen below shows the windows file explorer. The “Other Devices” categories includes a device called mx-100 or mx-400*serialNumberHere*. Double click on this device to access the MX-100 web UI.



Alternatively you may use the serial number as the URL in your web browser. To access the MX-100 point a web browser at the URL http://*yourUnitsSerialNumber*.local where *yourUnitsSerialNumber* is taken from the label on the MX-100. Note: System discovery requires mac OSX, Windows Vista or greater, IOS, or Android device. For example the serial number of the unit accessed in the image below is 001395200d93.



Once connected, you will be prompted to login. Use the administrator credentials

User: Administrator
Password: admin

Note: Firefox and Chrome preferred.

There are three built-in users. The passwords for these users can be set by the administrator.

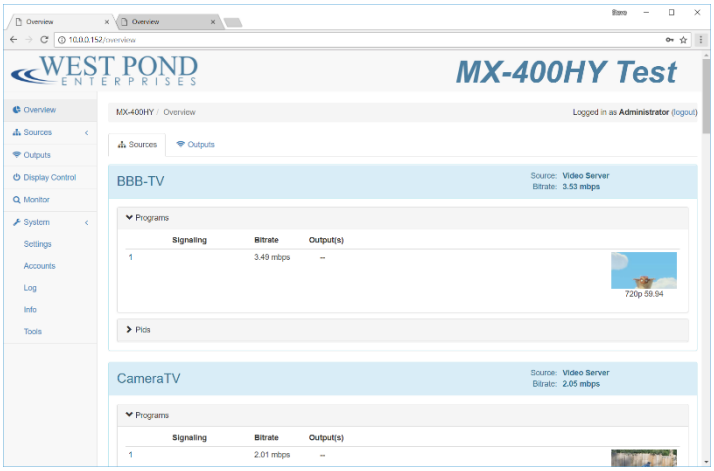
- Administrator: Used by installer to configure and manage the system. This user has access to all controls and settings.
- Operator: Used by less technical personal to access and change the video wrapper content. This user can view nearly all settings but can only control those features that need to be changed during a game or event.
- Monitor: Read only access. Used by anyone who has an interest in the technology but should not be making any configuration changes to the system.

Getting familiar with the MX-100

The West Pond product team may preconfigure your device to provide a head start for your particular application. This may include the installation of template presentations, test videos, and the configuration of input and output streams. The IP addresses used for IP inputs and outputs are likely

inappropriate for your installation and may need reconfiguring. In this section we will review how to make small changes to these settings to get your system running as quickly as possible.

Overview

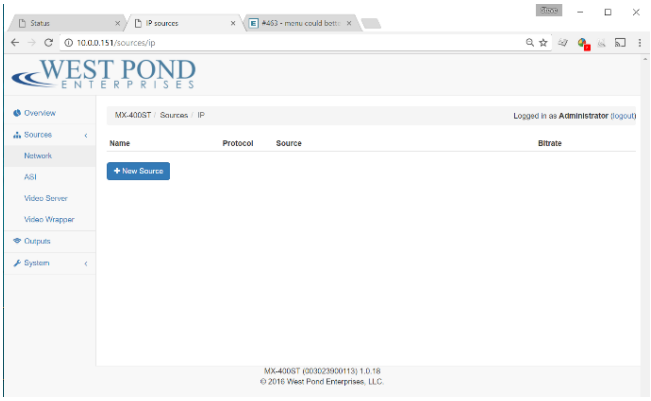


The top level page of the WebUI provides an overview of the MX-100 scalable multiplexor. The multiplexor combines digital AV streams from a variety of sources into groups and transmits them with the correct signaling and timing to the appropriate output. Outputs may have constraints, such as bitrate and signaling, that must be configured to operate correctly. To preserve resources, inputs are only processed if enabled. A mapping between inputs and outputs is shown in the overview menu of the MX-400 WebUI. The sources (aka enabled inputs) are shown on the left, outputs are shown on the right. The sources tab groups the source transports by the input while the output tab shows this mapping grouped by destination (output). There is a variety of information on these pages that can be valuable when trying to diagnose a problem. Error indicators are shown when a problem has been detected with a particular input or output stream. On the screen image above there is an error showing that the output transport is oversubscribed. i.e. Utilization is over 100%. This should be rectified to avoid video artifacts.

Fingernail images captured from the video are periodically updated next to each input/output. This helps to provide context when configuring your system. These update slowly so as to ensure they do not steal any computational resources from the system.

Sources

The Sources page shows how devices and IP streams are enabled as inputs to the multiplexor. Sources may include



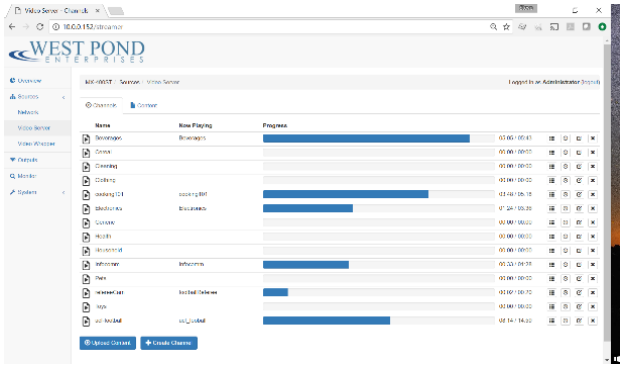
- network streams such as IPTV or an RTSP feed from a security camera
- the MX-100 internal video server
- and the HD capture device via the Video Wrapper.

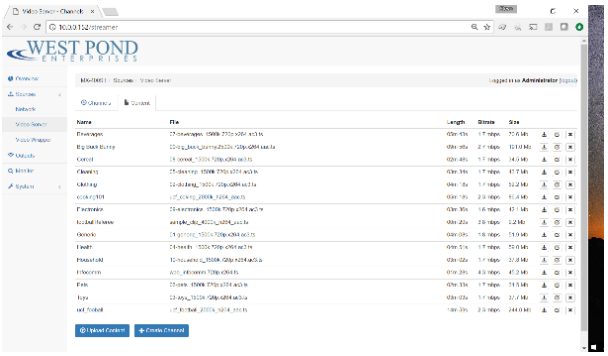
Network Sources

Network sources are shown on the Sources>Network tab. To add a network source, click “New Source”. Specify a friendly name for the new source, this will be used on other pages of this webUI. Specify the IP address (multicast is accepted), the port, and which interface the source is available on. If the source supports SMPTE2022, then select this option. When everything is complete, click create. If the networked source is RTSP, such as an RTSP security camera, click on the RTSP tab and enter the name and URL of the camera. i.e. rtsp://username:password@192.168.X.XXX/stream1

Video Server

The Video Server creates TS streams from files uploaded to the MX-100 storage. The MX-100 does not transcode these files dynamically, as such the TS files used by the video sever must be



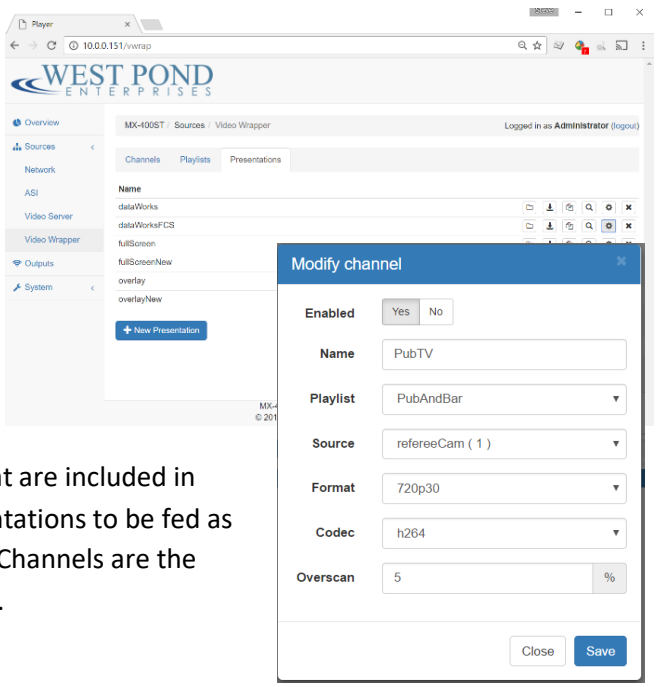


compatible with both the target receiver and transport output. For example, if you were to create a stream for a US CableTV QAM modulated output, you need to ensure that the encoding is MPEG2 (not h.264) so that it is compatible with that standard and can be displayed by TVs on that network. West Pond provides a transcoding web service, FlexDM, which simplifies the process of creating the appropriate files. For more information on this service contact West Pond sales.

The “Content” tab shows the files that have been uploaded and may be used in any channel playlist. The Channels tab shows the channels created and the status of their playback. Create channels and upload content using the appropriate buttons at the bottom of the screen. Once created TS files are

assigned to a channel using the button for looping playlists and the icon for scheduled content.

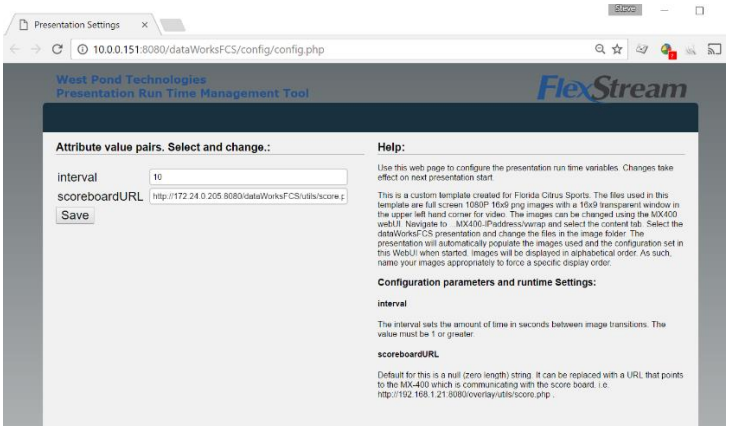
Video Wrapper



The Video Wrapper is a multiplexer input created by combining captured (HDMI or HD-SDI) video with HTML5 graphics. This resulting video is prepared for cable TV broadcast or IPTV distribution using mpeg2 or h.264 encoding. Video Wrapper "Sources", usually two, are automatically created by the MX-100. However, the configuration for these sources may still need to be tweaked to meet the needs of your output. More on this topic later. There are three tabs on the Video Wrapper page: Channels, Playlists, and Presentations. Presentations are HTML5 sources that are included in playlists. Playlist are a sequence of 0 or more presentations to be fed as content input to the HTML5 browser for rendering. Channels are the result of a playlist applied to a capture module input.

Presentations

Video Wrapper presentations are java script animated HTML5 web pages that define how the resulting TV channel screen is partitioned into video, advertisements, score, social media photos, date/time, temperature, menu boards, logos, and any other media you might want to present in the TV channel. Choose from West Pond's collection of Presentation Templates or modify one to create your own. Templates can be very simple, for example overlaying a logo on the video, or complex such as a score board with dynamic advertisements, logos, game score and clock. Most templates can be used without making any HTML or java script changes. This is done by replacing the presentation template sample images with your own, or using the presentation configuration page to select a new image. Clicking on launches the presentation configuration web page specific to that presentation. Use these web pages to change the characteristics of the presentation. A help system is included. The MX-100CC system will be preloaded with a few useful templates. More are available at http://www.westpond.com/templates



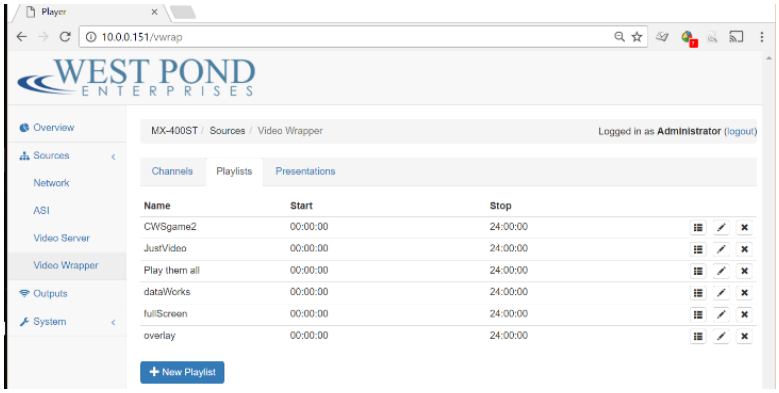
The best way to learn about this is to click on a few and see what can be done.

The presentations tab also allows you to:

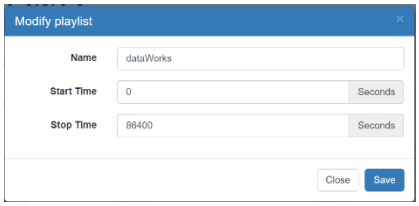
	Delete a presentation
	Browse and modify files within a presentation (drag and drop)
	Create a new presentation by copying an existing presentation
	Download a presentation to your PC to edit it. (Zip file)
	Preview a presentation in your browser (sans video)
	Configure a presentation using the presentation specific configuration tool
	Create a new presentation by uploading a Zip file with the appropriate files

The presentation preview launches the presentation in a browser window. This is a good way to test your presentation changes. Run time errors, if there are any with your content as it is run in a playlist, will be reported in the system log. This is also available in the webUI.

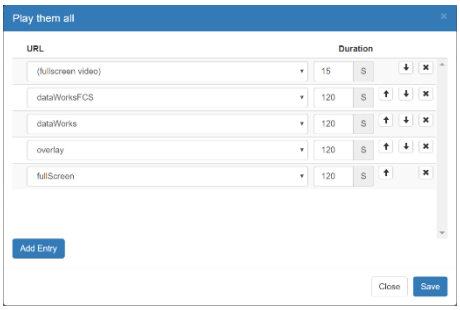
Playlists



While presentations themselves can control the HTML content on the screen, a second layer of control is provided via Playlists. Playlist provide the MX-100CC administrator with a mechanism for changing presentations over time. For example, perhaps the morning presentation contains breakfast and lunch offering while and afternoon and evening presentation shows dinner and after hours dining information. It is also possible to use the playlist to switch off the HTML and use full screen video for a period of time during the day. Playlist can be scheduled to wall clock time, but are typically run continuously (default). If you make a change to a playlist, or the content of a presentation that is actively in use by the playlist, you may need to refresh the channel. See “Channels” below. On the playlist tab playlists can be created “New Playlist”, modified (properties) , deleted , and edited (content) . Modifying a playlist allows the user to change the playlist name, start time (in seconds where 0 is midnight) and stop time. The default settings, 0 and 86400 Seconds, will allow the playlist to be active continuously.

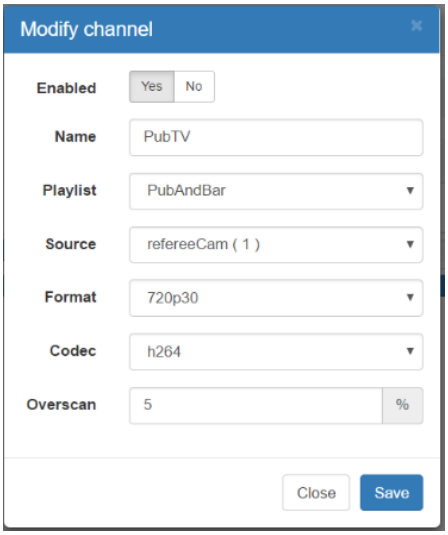


When you edit the playlist content a dialog box is presented. This dialog box allows you to add and delete entries to the playlist, specify how long each presentation will be active in the playlist, create presentation gaps (full screen video) in the playlist, and change the sequence in which the playlists are active. When using this tool, keep in mind that each playlist may have a timeline of its own or an infinite loop in which the java script is sequencing images. For example, if you set the "Duration" of a playlist to 600 seconds (10 minutes) and your playlist javascript doesn't complete the presentation in 10 minutes, the playlist will force a transition to the next presentation before the current has fully completed.



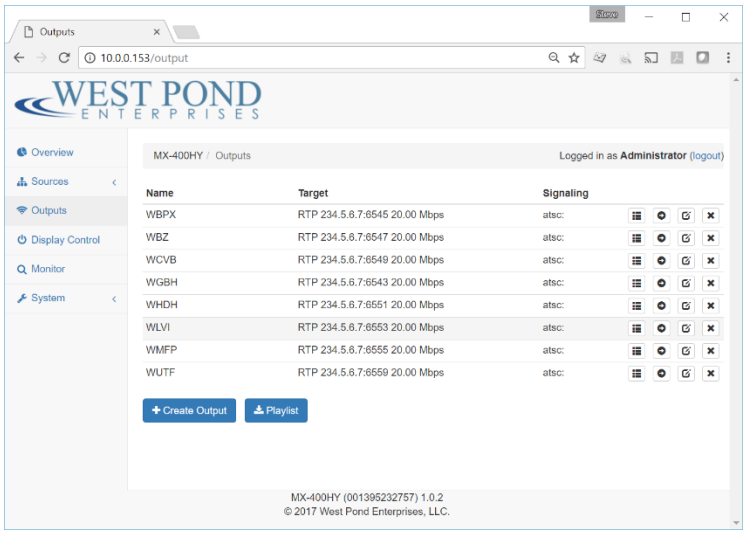
Channels

Use the edit icon to open the "Modify channel" dialog box. There are six fields. The first, Enable/Disable, is a handy way to free up system resources. If you are not using the Video Wrapper, set Enabled to "No". The Name is used on other menus, such as the Overview page, to identify this source. Select a name that is appropriate for your use. The Playlist field can be changed at any time. The playlist selected becomes active immediately after saving. The Source field specifies the video source to be wrapped by the HTML. This list is populated with a list of all sources currently enabled and active in the system. These include Video Server sources, Tuner Sources, Network Sources, and Captured sources. The Format and Codec specify the encoding parameters for the Video Wrapper output. These should be chosen to match the needs of your output transport and displays. A typical and recommended setting for US cable TV installations is a resolution of 720p30 and the MPEG2 codec. The last parameter is the Overscan field. This is a scaling factor applied so as to adjust for TVs that overscan the content. Overscanning, which is very common for TVs, clips the outer edges of the TV picture. The default is 3%. If you are using monitors rather than TVs, you can lower this value. If your TVs are still clipping the HTML content, increase this value.

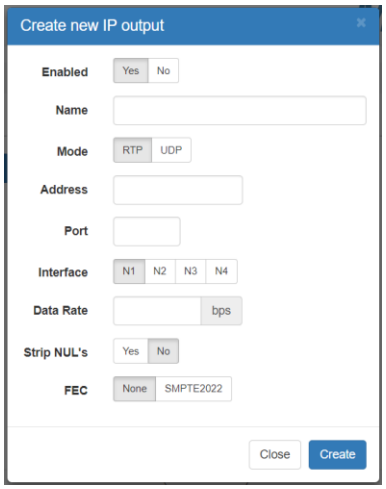


The icon is used to restart the active presentation and presentation list. This is very useful while testing new content. Changes to the HTML are not reflected in the active presentation until its next slot in the playlist. The refresh button will flush the pipeline and display the latest content.

Outputs

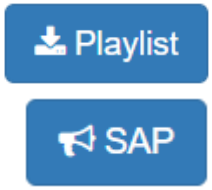


An Output is the output feed of the multiplexor. As this is a software multiplexor, there is no specified limit to the number of outputs. From a practical perspective, it's best to limit the bandwidth consumed by the sum total of all outputs to less than 500 Mb/s. The multiplexor outputs are MPEG2 transport streams. Each MPEG TS output must be specified and is shown on this page. New outputs are created by clicking on the "Create Output" icon. Existing outputs can be deleted , modified (properties) , and mapped through the multiplexor (program mapping). The "create" and "modify" dialog boxes are very similar.



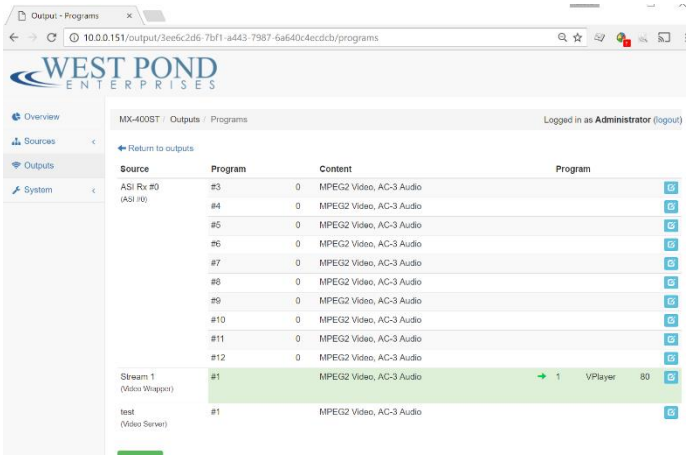
Give the output a friendly name. Keep in mind that this name will be used as the description if/when you generate an m3u playlist. Next select UDP vs. RTP. UDP is raw UDP. The RTP protocol, which is also transmitted using UDP, is more robust because the packets are numbered. Additional robustness can be added using SMPTE2022 FEC, but this is only beneficial if the receiving device can utilize the FEC data. The IP addresses and port fields are self-explanatory. Multicast addresses are supported. The Data Rate used must be sufficient to contain the multiplex transport that is being assigned to this output. If insufficient, clipping will occur and an error will be shown on the Overview page. Nul stripping reduces the network traffic and is recommended for non CBR applications. MPEG transport streams require signaling that is compatible with the transport and targeting receiving devices. For example, if the IP output is feeding an edge QAM modulator for the US market, select US Cable for signaling.

A playlist.m3u file that describes all of the multicast outputs can be downloaded by clicking on the playlist icon. For IPTV networks, session announcement protocol (SAP RFC 2974) is supported and included in the stream when enabled.



MDx00

This tab is used for configuring modulator outputs. The modulator hardware is automatically detected and the "Modulator" list (0,1,2,3) of this dialog box is populated accordingly. All modulators are expected to transmit over the same cable network, as such it is not necessary to identify how a modulator maps to a particular F connector. Select the Channel from the list. It's best to be sure that the channel selected is not in use. If the Channel/Frequency you wish to use is not on the list, you may need a new channel map. Contact West Pond support if this is required. Select the Modulator, the modulation standard, and the modulation type. The power level should be set to 5. Attenuators or amplifiers should be used to achieve optimal power within the cable distribution network. Use this field post install to make minor power level adjustments if required.

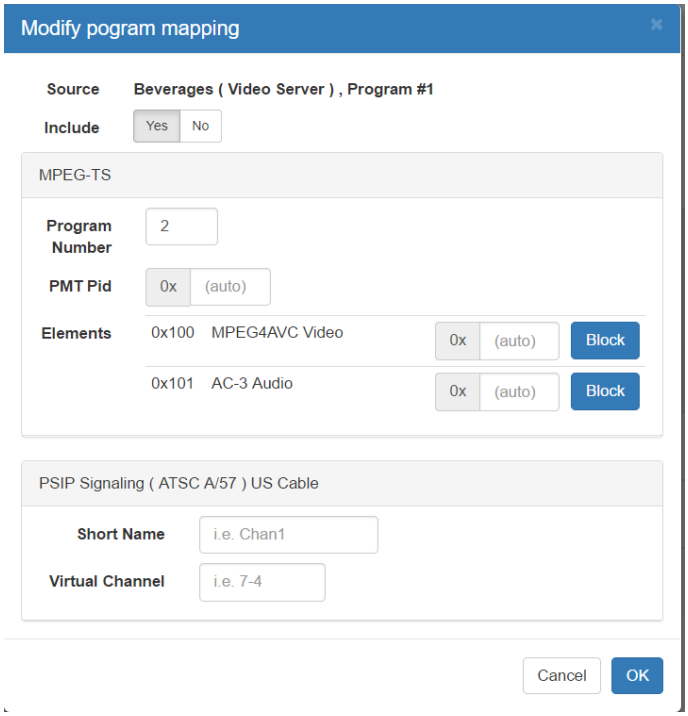


Program Mapping

Program Mapping is the heart of the multiplexor. Clicking on the icon for a specific output will switch the Outputs page to a program mapping view for that output. Mapping an input to an output can be done at the program level, or at the PID level. If you are not intimately familiar with transport stream anatomy, stick with the program level and use the default setting whenever they are provided.

Once in the Program Mapping view, all of the available multiplexor sources are listed on the left, each with a mapping icon to the right. Click on the mapping icon and edit the mapping appropriately for each program you would like included in this output. Programs included in the transport are highlighted with a green background and a green arrow. On the "Modify program mapping" dialog box, select "Yes" if you wish this source to be included in the output. Be mindful of the bandwidth limitations of your chosen output transport. If you oversubscribe, artifacts may occur on any program in that transport. More on this topic below. The Program Number field is used when you wish

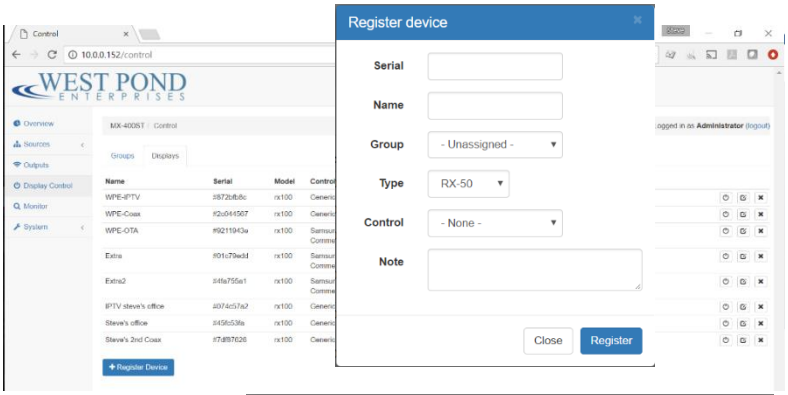
to manually set the program number for this program use this field. If not using the “auto” selection for this field, be sure to choose the program number carefully, there cannot be any duplicate program numbers in a given transport. The PMT pid and Elements are for expert use only and should almost always be “auto”. If the output is configured for US Cable or ATSC, there are additional fields for PSIP information. These fields contain data that is often displayed on the TV when the channel is first tuned. The Short Name can be up to 7 characters. i.e. WXYZ-12. The Virtual Channel information will typically override the Physical Channel information when displayed on a TV. The Virtual Channel can be a single digit integer or hyphenated if supplying both a major and minor channel number. You can return to this dialog later and modify these fields at any time. All changes will take effect immediately. You may need to retune the TV to see the results.



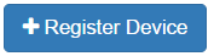
Oversubscribing the Transport

If the sum total bit rate for all the programs included the output multiplex is more than the specified maximum bitrate for that transport, clipping will occur to ensure the output does not exceed the maximum bitrate. Clipping means some packets are not transmitted. Missing packets will cause audio and video artifacts in one or more of the programs included in that output transport. After selecting and saving the programs that will be included in your output transport it is best to return to the Outputs tab of the Overview page to see if the “Utilization” for that output is more than 100%. If it is, then the number or mix of programs in that multiplex should be trimmed. At times, since video encoding is a variable bitrate, these errors will be intermittent. To be save, it’s best not to exceed 90% of the available bandwidth (“utilization”).

Display Controls

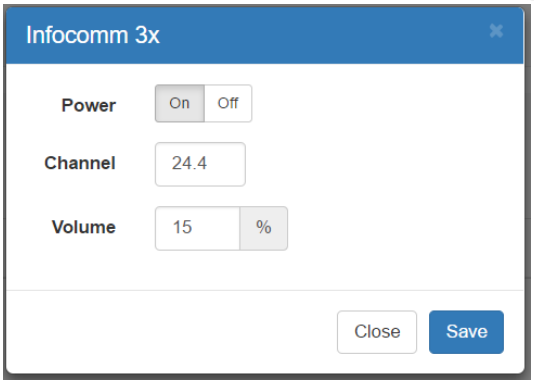


Display controls set the channel and display state of a display that has been provisioned with a West Pond RX device such as the RX-WP100. Each receiver must first be registered with the MX-100CC before it can receive commands. Select the "Displays" tab and click on



to start. Type in the Serial number located on the bottom of the RX device or via the on screen display. Give the unit a friendly Name such as "Suite 202 hall". Assign the device to a group, or leave this for later if the group has not been created. Select the receiver Type and the Control mechanism. Add notes if more information is necessary to identify the device. Click Register to complete the registration. If a group was not assigned, select the Groups tab, create a group, and then use the "Edit Device"

icon to include the receiver in a group. Install the device at the display and return to this menu item to exercise control.



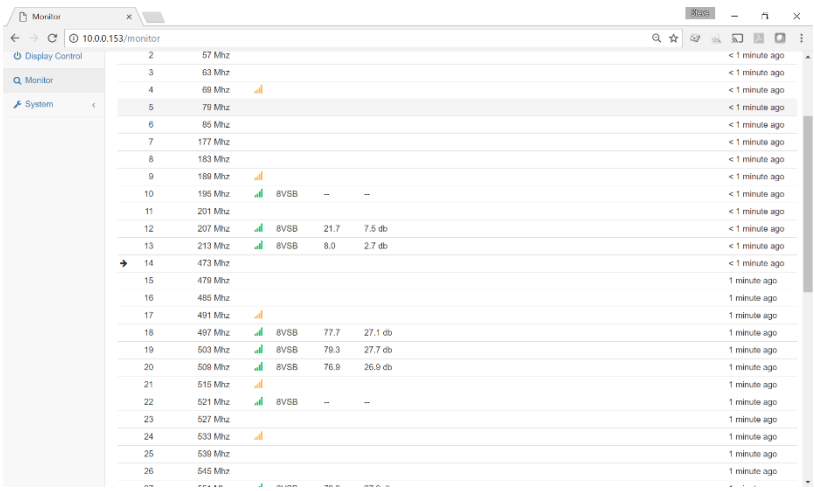
Devices are typically controlled in groups. To control a device click on the "device state"

icon. The controls you see may vary depending upon the control capabilities of the connected device. When controlling a group of devices, only the control states that are common to all devices in the group are displayed in the control group dialog. As shown to the right, the power, channel, and volume can be changed in this group. Select the new values and click save. The changes take immediate effect.

Monitor

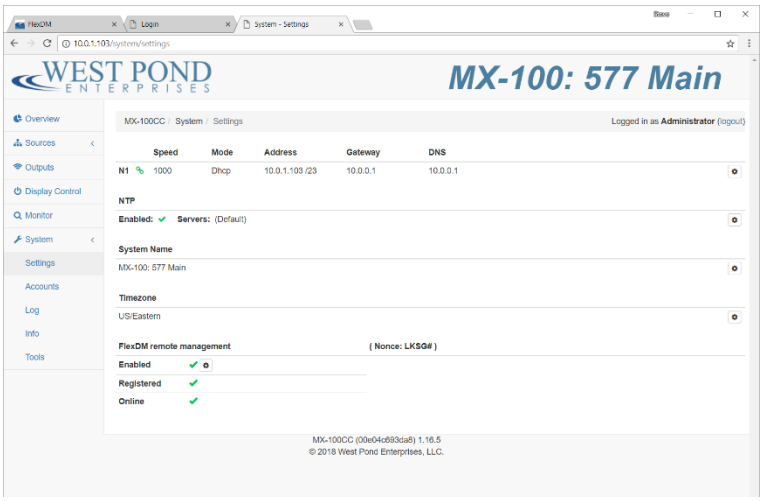
The monitor page is used during installation to detect unused frequencies that the modulator output can be configured to use, and post install to visualize the coax network usage and health. The only

configuration setting is the channel map chosen. The default is US Cable TV. The monitor will tune to each of the frequencies in the chosen channel map and report the status. An empty row indicates an unused frequency. The caution icon indicates the presence of some signal, perhaps noise or an unknown modulation. A used frequency band will have a green signal icon. Frequency bands that are in use may also have additional information if such information is available on the frequency. When selecting a frequency band for the output modulator you will achieve the best results if you choose one that has no signal at all. If none are available, one of the caution bands may be acceptable.



System

The System page is used for configuring and monitoring system level features of the MX-100 system.



Settings

This page provides a more comprehensive view into the system configuration of the MX-100.

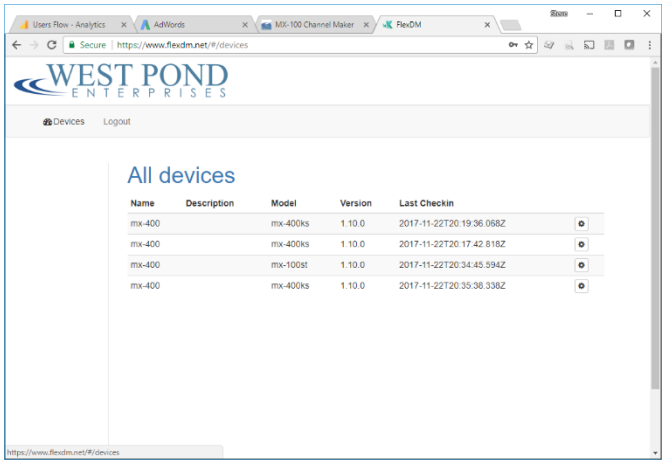
Network: The network configuration is shown both here and on the front panel. Changes may be made on either UI. Click on the gear icon to configure any one of the four network ports. Ports configured and linked will have a green icon. Red icons indicate an error. No icon indicates the port is disabled.

NTP: Use the icon to configure the network time server.

System Name: Use the icon to set the system name. This name will be displayed on the front panel and on the webUI.

Timezone: Use the icon to set the timezone in which the server is being used. This is very important when scheduling playback and other time critical WebUI features.

FlexDM remote management: West Pond's remote management allows authorized personel to access the web UI of this, and other West Pond devices, via a cloud hosted web service. If authorized, West Pond can also used this for support. Communications for this feature utilize UDP port 1194 and TCP/IP port 443 for communication. All communications are between the device and the flexdm.net subnet. If the MX-100 has internet access and this feature is enabled, green check marks should exist on the Web UI next to Enabled, Registered, and Online. If you wish to disable this feature, click on the gear and select Enabled/No. The "Nonce" value is used during provisioning to identify this device and validate that it is in the hands of the owner. For more information on creating a FlexDM remote management contact West Pond sales or technical support.



Accounts

There are three preconfigured accounts for managing the MX-100. This page allows the administrator to set the passwords for these three accounts. Use the User pulldown to select the user and then enter the new passwords. If you have lost your password, contact West Pond technical support for assistance in accessing the device WebUI.

Log

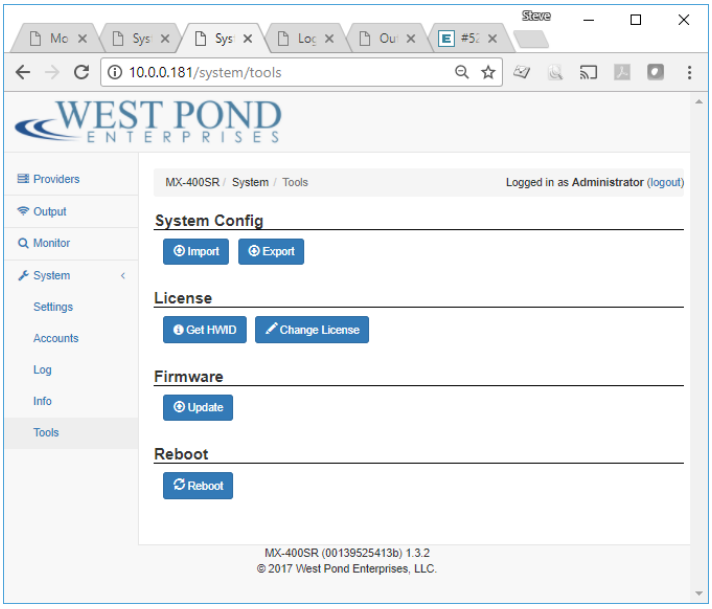
The Log page provide insight into status changes and errors that may occur at both the system and software level in the MX-100. This is most useful when presentations are not functioning as expected. Check this log for clues. Note: Some warnings and errors may exist in the log during normal operation.

Info

Make, model, serial number, etc.

Tools

These are tools that are used to maintain the system state.



System Config: You may export or import the system configuration at any time. This includes account information, the output configuration, and network settings. It does not currently export the provider settings. Use this feature to archive your settings and to clone devices for distribution. Note: Configuration settings are tied to software revision. You must import a configuration file that was exported from a system with the same software revision.

License: The MX-100 software is keyed to the hardware. This tool is used to upgrade or otherwise change the features provided with your MX-100 software.

Firmware: Use this tool to update the firmware of the MX-400. A software update will reboot the system which can cause temporary anomalies in the output TS. Software updates are posted to the West Pond ftp side. ftp://ftp.westpond.com Login: support, PW: flexstream

Reboot: If you wish to reboot the system. Rebooting the system can cause temporary anomalies in the output TS.

Appendix A – Quick Start Help

This section is provided to enable installers with a check list of things to do when installing the system.

1) Mount the device and make all the required connections. Power the system on. For more information follow the instruction above in the section: Setting up the system.
2) Using Window File explorer, or equivalent, and select Network to find the MX-100. There will be a device in "other devices" that has the same name as the model number. Double click on the icon to access the WebUI. See Accessing the WebUI for more information on this topic
3) Enable and configure Sources to the multiplexer. You need not configure them all at this point. You can easily add more later.
    a. Sources may include Tuners, IPTV, RTSP cameras, Video Capture, or the Video Server
    b. Details for each are provide in the Sources section of the main document.
    c. When configuring a tuner source you will need information about the broadcast before configuring.
        i. *Cheat: Attach the antenna wire to the M1 monitor input and watch the monitor results to find tunable frequencies. This will likely require a channel map change in the monitor configuration. Remember to reconfigure M1 to monitor your outputs before completing the setup of your system.*
    d. When configuring the Video Server, be sure that your TS files are compatible with the devices receiving the output of the MX-100CC. For example, if using and ATSC modulated output you must use MPEG2 encoded files. ATSC devices will not decode h.264 video.
    e. If enabling the Video Server source, try one of the preloaded MPEG2 or h.264 files before loading your own.
    f. If enabling the Video Wrapper source, try one of the preloaded presentations and playlists before testing your own.
    g. All of the enabled multiplexer inputs can be viewed on the front panel. Use this to verify you have correctly configured your inputs.
4) Enable and configure Outputs of the multiplexer.
    a. Outputs may include IPTV or RF.
    b. Create Outputs first, then select the "Program Mapping" icon to configure their contents.
    c. When creating an RF output, utilize the Monitor page to find unused carrier frequencies.
    d. When selecting the "Program Mapping" be sure of the following:
        i. All of the sources selected are compatible with the receiving device. i.e. If ATSC, all of the included program streams should be MPEG2 encoded video.
        ii. The sum of all enabled sources should not exceed the maximum bitrate of the Output transport. i.e. If ATSC 8-VSB do not exceed 19.39 Mb/s. Check the outputs tab of the overview page to see signs of over subscription.
5) Check the results
    a. All multiplexer video sources should be visible on the front panel.
    b. Have a receiving device ready to test the results.