



MCRX

Multi-Channel Professional Audio Player

User Manual

MCRX User Manual

Version 1.0

Copyright ©2020 PRICOM, Inc.

Table of Contents

1	Product Introduction	1
2	Feature Overview	3
2.1	Front Panel LCD	3
2.2	Headphone Monitor.....	3
2.3	Output Meters.....	3
2.4	USB Port.....	4
2.5	Analog Audio Outputs.....	4
2.6	Digital Audio Outputs	4
2.7	File Playback	4
2.8	Internal Storage	4
2.9	Ethernet Connectivity.....	5
2.10	Trigger Inputs	5
2.11	SMPTE LTC Input	5
2.12	MIDI Input	5
2.13	SMPTE and MIDI Output	5
2.14	Logic Control Outputs.....	6
2.15	PNET Interface.....	6
2.16	Modbus TCP.....	6
2.17	Serial Control	6
2.18	Status LEDs.....	6
2.19	Real Time Clock.....	7
2.20	GPS Receiver	7
3	Connections	8
3.1	Power Input	8
3.2	Ethernet Network Jack	8
3.3	PNET Network Jacks	9
3.4	Analog Audio Output Terminal Strip.....	10
3.5	Analog Audio Input Terminal Strip	11



Table of Contents

3.6	Digital Audio Output Terminal Strip	12
3.7	SMPTE LTC Input-Output Terminal Strip	13
3.8	MIDI Input DIN Connector.....	13
3.9	MIDI Output DIN Connector.....	14
3.10	Trigger Input Terminal Strip	14
3.11	Control Output Terminal Strip	17
3.12	GPS Antenna	19
4	<i>Front Panel Interface</i>	20
4.1	Power Up Screens	21
4.2	Triggering a Slot.....	22
4.3	Monitoring a Slot.....	23
4.4	Deleting a File	23
4.5	Load a File from USB	25
4.6	Display Current Config	27
4.7	Network Setup.....	28
4.8	Display Version Information.....	28
5	<i>Web Interface</i>	29
5.1	Finding the MCRX.....	29
5.2	Launching a Browser.....	29
5.3	Main Menu	30
5.4	Control Menu	31
5.5	Slots Menu.....	32
5.5.1	Slots Detail Panel.....	33
5.5.2	Update Slot Settings.....	33
5.5.3	Write Config File	34
5.5.4	Slot File Selection.....	34
5.5.5	Slot Output Routing	34
5.5.6	Slot Hardware Trigger	35
5.5.7	Slot SMPTE Trigger	35



Table of Contents

5.5.8	Slot MIDI Trigger.....	35
5.5.9	Slot Time Trigger.....	36
5.5.10	Slot Serial Trigger.....	36
5.5.11	Slot Modbus-TCP Trigger	36
5.5.12	Slot HTTP Trigger	36
5.5.13	Slot Control Output.....	37
5.5.14	Slot SMPTE Output	37
5.5.15	Slot MIDI Output.....	37
5.5.16	Slot Serial Output.....	38
5.5.17	Slot Modbus Output.....	38
5.5.18	Slot HTTP Output.....	38
5.6	Files Menu.....	39
5.6.1	Select File to Upload.....	40
5.6.2	File Upload.....	41
5.7	Config Menu.....	43
5.7.1	Config Sample Rate	44
5.7.2	Config Frame Rate.....	45
5.7.3	Config Timecode Loss Timer	46
5.7.4	Config Timecode Loss Action.....	48
5.7.5	Config SMPTE TC Direction	49
5.7.6	Config MIDI TC Direction.....	50
5.7.7	Config Serial Baud Rate	51
5.7.8	Config Display Brightness.....	52
5.7.9	Update Config Settings.....	53
5.7.10	Write Config File	54
5.8	Status Menu.....	55
5.9	Admin Menu.....	56
5.9.1	Admin Select Firmware	57
5.9.2	Admin Firmware Selected	58



Table of Contents

5.9.3	Firmware Update Progress.....	59
6	<i>Example Applications</i>	60
6.1	GPIO Trigger – Timecode Output.....	60
6.2	Timecode Trigger – GPIO Output.....	60
6.3	Timecode Trigger – Timecode Output	61
7	<i>Firmware Updates</i>	62
7.1	Updating Your Firmware	62
7.2	Downloading Firmware Updates.....	62



List of Figures

Figure 1 – MCRX Front Panel Layout	3
Figure 2 – MCRX Rear Panel Layout.....	8
Figure 3 – PNET Jack Pinout.....	9
Figure 4 – Analog Audio Output Terminal Strip.....	10
Figure 5 – Analog Audio Input Terminal Strip	11
Figure 6 – Digital Audio Output Terminal Strip	12
Figure 7 – SMPTE Input-Output Terminal Strip.....	13
Figure 8 – Trigger Input Terminal Strip	14
Figure 9 – Simple Trigger Input Button Connections	15
Figure 10 – Isolated Trigger Input Button Connections	16
Figure 11 – Control Output Terminal Strip Pinout.....	17
Figure 12 – Simple Control Output LED Connections.....	18
Figure 13 – Front Panel LCD and Keypad	20
Figure 14 – Front Panel Starting Screen.....	21
Figure 15 – Front Panel Ready Screen	21
Figure 16 – Front Panel Home Screen.....	21
Figure 17 - Front Panel Slot Trigger Screen.....	22
Figure 18 – Front Panel Monitor Play Screen	23
Figure 19 - Front Panel File List Screen.....	23
Figure 20 - Front Panel Confirm File Delete Screen	24
Figure 21 - Front Panel Deleting File Screen	24
Figure 22 - Front Panel Insert USB Drive Screen	25
Figure 23 - Front Panel Load USB File Screen	25
Figure 24 - Front Panel Load USB File Screen	26
Figure 25 - Front Panel Confirm File Load Screen	26
Figure 26 - Front Panel Loading Progress Screen	26
Figure 27 - Front Panel Eject USB Screen	27
Figure 28 - Front Panel Current Config Screen	27
Figure 29 - Front Panel Network Setup Screen	28



List of Figures

Figure 30 - Front Panel Software Version Screen	28
Figure 31 – Front Panel Network Setup	29
Figure 32 – Slot Output Routing.....	34
Figure 33 – Slot Hardware Trigger.....	35
Figure 34 – Slot Control Output	37
Figure 35 – Sample Rate Selection.....	44
Figure 36 – Frame Rate Selection.....	45
Figure 37 – Timecode Loss Setting	47
Figure 38 – Timecode Loss Action.....	48
Figure 39 – SMPTE Interface Direction.....	49
Figure 40 – MIDI Interface Direction.....	50
Figure 41 – Serial Port Speed Selection	51
Figure 42 – Front Panel Brightness Selection.....	52



1 Product Introduction

The PRICOM MCRX, Multi-Channel Rackmount Audio Player, was designed to bring together multi-channel solid-state audio playback, SMPTE synchronization, MIDI synchronization, logic input, and output control into a space-saving 1RU Rack Mount package with web browser based remote control and configuration.

Playback can be triggered by any combination of digital input triggers, SMPTE timecode, MIDI timecode, or Web control.

Audio files can be triggered, played, and routed to any of the available analog or digital audio outputs.

Output is provided as 8-channels of balanced analog audio in Stereo Pairs on space saving terminal strips.

To simplify operation and ease remote configuration updates, the MCRX is based on the concept of Slots. A Slot is the center building block for configuring triggers, playback, output routing, and generating Timecode. Each of these settings are tied to a specific Slot. A Slot can have its audio file updated without needing to change any of the other configurations for that Slot. In this way, many audio files can exist on the MCRX internal storage, but only the files that are tied to a Slot will ever be played. To change the audio file associated with a Slot, a remote web browser can be used to select a different Audio file for the desired Slot while maintaining all Timecode Triggers and Timecode Outputs.

SMPTE LTC or MIDI Timecode can be generated during playback of any Slot with programmable Timecode offsets. This allows the MCRX to be triggered by one location using SMPTE or MIDI Timecode, then generate a completely independent SMPTE and/or MIDI Timecode output. You can also trigger Slot playback from GPIO or HTTP, then generate SMPTE and/or MIDI Timecode from the MCRX. This enables show control software or a push button to easily start a show and then generate Timecode from the MCRX for any automation that needs to be synchronized to the audio playback.

Audio files, and all configuration information, are stored on an internal micro-SD card. Files can be loaded onto the internal storage using a front panel USB port, or web browser file transfer. Ethernet connectivity enables remote access from anywhere in the world to update configurations or change audio files. System events are stored in the SD card logging system and can be remotely viewed and cleared.

When playing audio files, routing information determines which audio outputs the file is played on. If another source is already present on the specified output(s), the first source is stopped to allow the new triggered Slot to be played.

To ensure the highest quality audio, the native sample rate of the audio file is used. No sample-rate conversion is performed on the signal. All output channels operate at the same sample rate. Professional sample rates of 44.1KHz, 48KHz, 96KHz, and 192KHz are supported.



MCRX – Product Introduction

Configuration and control are provided by a front-panel graphical LCD with back-lit buttons, as well as remote web browser interface.

The MCRX front panel also includes an integrated headphone amplifier. Using the front-panel LCD, you can play an audio file from any Slot through the headphone amplifier without affecting the production output signal.



2 Feature Overview

The following pages describe the features and functions of the MCRX System. Later in the manual we will go into more detail about the connections for each input and output. You can keep your setup simple or make it as elaborate as you wish.

Figure 1 – MCRX Front Panel Layout



2.1 Front Panel LCD

Front panel control is provided by a backlit graphics LCD with 6-key push-button navigation. System settings and file loading operations can be performed from the front panel or from a web-browser. You can view or set the network IP address, copy files from the front panel USB port, trigger a Slot playback, or select a Slot to monitor through the Headphone Monitor. Backlight brightness can be adjusted on the Settings page.

2.2 Headphone Monitor

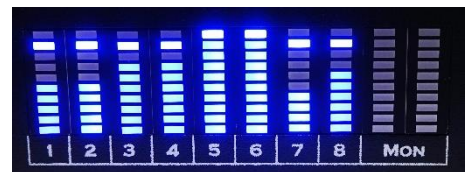
Real-time audio monitoring is provided on a ¼” Stereo Headphone Jack and includes its own precision Burr Brown DAC to allow validation and playback of any audio file without affecting the primary Analog or Digital outputs. The internal headphone amplifier provides low distortion continuous power drive of 200mW into 8Ω headphones, or 85mW into 32Ω headphones with less than .1% THD at 1KHz.



A convenient front-panel control section allows quick volume control of the integrated headphone amp.

2.3 Output Meters

Ten LED bar graph meters are provided to monitor the output levels of the Analog outputs as well as the level on the front-panel Headphone Monitor during playback.



2.4 USB Port

Front panel USB access is provided to allow easy file loading to the internal SD card storage. This USB port can also be used to backup config settings.



2.5 Analog Audio Outputs

The MCRX features 8 channels of Analog Audio playback through high-end Burr-Brown (TI) Precision Digital to Analog Converters (DAC's). The Analog output is electrically balanced and presented on the back panel via 6-pin pluggable terminal strips. To simplify wiring, each pluggable terminal strip includes one pair (2-channels) of balanced audio output.

2.6 Digital Audio Outputs

The MCRX includes 8 channels of Digital Audio output in AES/EBU format in channel pairs. The 4 AES Stereo Outputs are transformer isolated and balanced and presented on the back panel via 6-pin pluggable terminal strips. Each pluggable terminal strip includes two AES outputs (4 channels).

2.7 File Playback

The Analog and Digital outputs can playback Stereo 4-channel, 6-channel, or 8-channel broadcast WAV files. Multiple files can be played simultaneously and routed to the selected output channels. To maintain audio quality, only one source can feed any given output at a time. This removes any mixing or alteration of the source audio material that could degrade the sound quality.

2.8 Internal Storage

Audio files are stored on an internal 64GB micro-SD card which can be accessed by removing the top cover. Files can be loaded into the system by external USB thumb drive, over the Ethernet interface using a Web Browser, or directly to the SD Card. For security, external loading and changing of files can be password protected.



2.9 Ethernet Connectivity

Use built-in Ethernet connectivity for status monitoring, playback operations, file updates, or configuration updates. All actions can be performed by connecting through appropriate network routers and firewalls.

2.10 Trigger Inputs

Playback control can be triggered using any of the MCRX's 8 Optically Isolated Trigger inputs. These trigger inputs are presented on the back panel via a 12-position pluggable terminal strip. A convenient 12V power supply is provided to allow simple pushbutton wiring to the internal Optical Isolators.

2.11 SMPTE LTC Input

Playback control can be triggered using the built-in SMPTE LTC reader input. Configuration can enable playback of any file based on the LTC HH:MM:SS:FF value read from the LTC input. The SMPTE input is transformer isolated and presented on the back panel using a 6-pin pluggable terminal strip which includes both the SMPTE LTC input and SMPTE LTC outputs.

2.12 MIDI Input

The MCRX includes one Optically Isolated MIDI input and one non-isolated MIDI output via standard 5-pin DIN connectors on the back panel. MIDI Time Code (MTC) can trigger any file playback based on HH:MM:SS:FF similar to the SMPTE LTC input.

2.13 SMPTE and MIDI Output

Synchronization output capability is provided by the SMPTE LTC output as well as the MIDI output. Configuration allows the emitted SMPTE LTC or MIDI MTC to be generated based on the file being played and the location inside that file. Timecode generation is calculated based on audio sample playback location and Frame Rate configured in the MCRX.



2.14 Logic Control Outputs

Logic Control Outputs are provided on a 12-pin pluggable terminal strip and enable 8 independent on/off functions to be configured based on application needs. Output Drivers enable directly driving relays or other loads under 500MA each.

2.15 PNET Interface

The MCRX includes a CAN interface using the PRICOM Network protocol (PNET). With PNET, you can expand your trigger input and control output capacities to include PWM LED drivers, Optically Isolated trigger inputs, and Servo control, all utilizing simple low-cost 6-wire Modular wiring.

2.16 Modbus TCP

MCRX control can also be performed using the Ethernet interface and Modbus TCP protocol. With Modbus TCP, specific registers can be configured to trigger any track playback and retrieve playback or system status.

2.17 Serial Control

RS-232 Serial control is provided on the back panel via a standard DB-9 serial port connector. Any Slot can be triggered when a specified String is received over the Serial Port. Similarly, any String of characters can be sent out the Serial Port on Slot playback. Configuration of the received or transmitted String of characters is defined in the Slot Configuration screen.

2.18 Status LEDs

The back panel contains various status LEDs for each interface. Audio output active, SMPTE input signal detect, etc.



2.19 Real Time Clock

The MCRX includes a Real Time Clock (RTC) that is accurate to 3 seconds per month. Using the RTC, file playback can be triggered at specified time of day, or time of day and day of week. To increase the accuracy of the RTC, Network Time Protocol (NTP) can be used from the Internet to sync the RTC to a global time source. If Internet access is not possible, the integrated GPS receiver can be used to maintain accuracy.

The RTC is powered from a super-capacitor that will maintain timekeeping in the event of power loss, or when the MCRX is turned off.

2.20 GPS Receiver

The internal Real Time Clock (RTC) can be used to trigger events at specific time-of-day. To keep the clock accurate, a GPS receiver is included to synchronize the time to GPS satellite sources. Internet NTP can also be used for clock sync, but in applications where the device cannot, or should not, be connected to the internet, GPS can be used as a safe and secure way of maintaining accurate clock synchronization.



3 Connections

The following section provides detailed instructions for connecting your MCRX to external devices. To get started, all you need to do is connect the Power Input, plug in headphones and listen to the pre-loaded test files.

The next step is to load your own files to the internal storage.

When you are ready, you can get more advanced and use the Trigger Inputs and Control Outputs.

Figure 2 – MCRX Rear Panel Layout



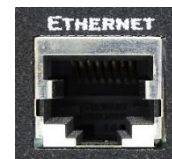
3.1 Power Input

The MCRX is powered from 110-240VAC 50/60Hz using a standard IEC power input module. The power input module contains a 20mm fuse holder for protection against overload situations. A region-specific power cord can be used to provide the necessary power to the MCRX.



3.2 Ethernet Network Jack

Your MCRX leverages the best of Web Technology and utilizes HTML and Javascript for all setup and configuration functions via a Desktop computer, Laptop, Tablet, or Smart Phone. To achieve this connectivity, you need to connect your MCRX to an Ethernet Network. The Ethernet Interface will automatically negotiate a 10Mbit or 100Mbit connection depending on your network router.



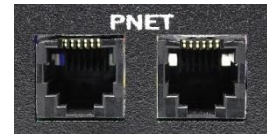
The MCRX can automatically request an “IP Address” (Internet Protocol Address) or be configured for a Static IP address. This is the address that enables your PC/Laptop/Tablet to talk to the MCRX. To automatically request this IP address, we utilize DHCP (Dynamic Host Configuration Protocol). Using the front-panel interface, you can configure the Ethernet network for either a Static IP or DHCP.

If using DHCP, it is necessary for you to determine exactly what IP address was given by your network to access the device using your web browser. The configured or assigned IP address can easily be viewed from the Front Panel LCD.



3.3 PNET Network Jacks

The MCRX includes two PNET Jacks for convenient connection of many PNET devices in a daisy-chain bus topology. Both jacks are the same, giving you the flexibility to ‘loop’ through and connect many devices to the PNET network.



The cables are 6-wire Modular cables and can be flat or twisted pairs. PNET cables include 12VDC power that comes in handy for powering smaller PNET devices.

PNET Cables should be wired as “Straight Through” and not “flip” anywhere along the path. Nothing will be damaged if a cable is reversed, but the PNET Communications Data lines would be reversed making the PNET malfunction. PNET cables can be plugged or un-plugged with the power on.

Figure 3 – PNET Jack Pinout

Pin	Name	Description
1	+12VDC	PNET Power Supply
2	GND	PNET Signal Ground
3	PNET	Communications Data
4	PNET	Communications Data
5	GND	PNET Signal Ground
6	+12VDC	PNET Power Supply

ATTENTION:

The PNET Bus Requires Termination!

We have included a PNET terminator inside the MCRX to simplify your installation. If you are connecting multiple MCRX devices to the same PNET, you should remove the internal termination jumper to prevent more than 2 terminators on the PNET bus.

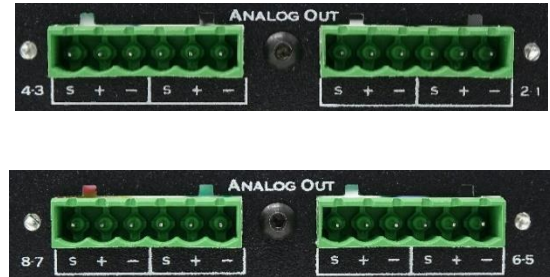


3.4 Analog Audio Output Terminal Strip

Pluggable terminal strips are used for the Analog Audio Outputs to connect balanced audio wiring.

Figure 4 – Analog Audio Output Terminal Strip

Terminal	Name	Description
1	S	Shield/Ground
2	+	Analog Signal +
3	-	Analog Signal -
4	S	Shield/Ground
5	+	Analog Signal +
6	-	Analog Signal -



When viewing from the rear of your chassis, the lower number channel is to the right, and the higher number is to the left, this makes the channel numbers read from Right to Left when viewing from the rear.

The Analog Audio outputs are electronically balanced without an output transformer.

The GND/Shield pins are connected to the chassis ground to give the best performance when running in balanced mode and prevent unwanted RF signals from entering the DAC circuits.

When an unbalanced output is required, connect the — to the **S** terminal as is the usual practice when wiring unbalanced audio equipment. The balanced output cable drivers are designed to operate this way.



3.5 Analog Audio Input Terminal Strip

Pluggable terminal strips are used for the Analog Audio Inputs to connect balanced audio wiring.

Figure 5 – Analog Audio Input Terminal Strip

Terminal	Name	Description
1	S	Shield/Ground
2	+	Analog Signal +
3	-	Analog Signal -
4	S	Shield/Ground
5	+	Analog Signal +
6	-	Analog Signal -



When viewing from the rear of your chassis, the lower number channel is to the right, and the higher number is to the left, this makes the channel numbers read from Right to Left when viewing from the rear. The Analog Audio Inputs are electronically balanced without an input transformer. The GND/Shield pins are connected to the chassis ground to give the best performance when running in balanced mode and prevent unwanted RF signals from entering the ADC input circuits.

When an unbalanced input is required, connect the — to the **S** terminal as is the usual practice when wiring unbalanced audio equipment.

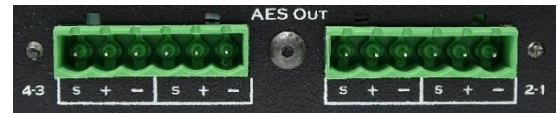


3.6 Digital Audio Output Terminal Strip

Pluggable terminal strips are used for the AES Digital Audio Outputs to connect AES-3 compatible equipment to the MCRX.

Figure 6 – Digital Audio Output Terminal Strip

Terminal	Name	Description
1	S	Shield/Ground
2	+	AES-3 Signal +
3	-	AES-3 Signal -
4	S	Shield/Ground
5	+	AES-3 Signal +
6	-	AES-3 Signal -



When viewing from the rear of your chassis, the lower number channel is to the right, and the higher number is to the left, this makes the channel numbers read from Right to Left when viewing from the rear.

The AES-3 Digital Audio Inputs are transformer balanced using a high-frequency pulse transformer to reject common-mode noise from the digital audio line. The GND/Shield pins are connected to the chassis ground to give the best performance and prevent unwanted RF signals from entering the digital circuits.

When an unbalanced SPDIF input is required, connect the input to the **—** and **+** inputs and leave the **S** terminal disconnected. This will place the SPDIF signal to the coupling transformer and maintain complete isolation.

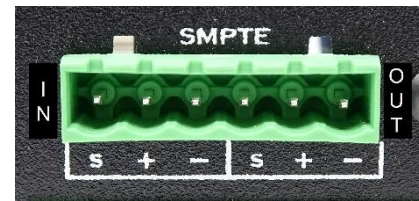


3.7 SMPTE LTC Input-Output Terminal Strip

Pluggable terminal strips are used for the SMPTE LTC input and output. The MCRX has one SMPTE LTC input, and one output. Each input or output is transformer balanced and electrically isolated from other signals.

Figure 7 – SMPTE Input-Output Terminal Strip

Terminal	Name	Description
1	S	Shield/Ground
2	+	LTC Input Signal +
3	-	LTC Input Signal -
4	S	Shield/Ground
5	+	LTC Output Signal +
6	-	LTC Output Signal -



When viewing from the rear, the LTC Input is to the left, and the LTC Output is to the right, this makes the Output and Input read from Right to Left when viewing from the rear.

The SMPTE LTC Input and Output are transformer balanced using audio transformers to reject common-mode noise from the LTC inputs and outputs. The GND/Shield pins are connected to the chassis ground to give the best performance and prevent unwanted RF signals from entering the digital circuits.

When an unbalanced LTC input is required, connect the input to the — and + inputs and leave the **S** terminal disconnected. This will place the LTC signal to the coupling transformer and maintain complete isolation.

3.8 MIDI Input DIN Connector

MIDI Time Code (MTC) input is connected to the 5-pin DIN jack on the back panel. This MIDI input is completely Optically Isolated to prevent any ground-loops, or noise, from entering the MCRX through external equipment.



3.9 MIDI Output DIN Connector

MIDI Time Code (MTC) Output can be generated and sent out the 5-pin DIN jack on the back panel. This MIDI Output is NOT isolated, so care should be given to ensure the attached device is Optically Isolated to prevent any ground-loops, or noise, from entering the MCRX through external equipment.

3.10 Trigger Input Terminal Strip

Local push buttons can be wired to the MCRX to enable direct connection of external event sources. A typical application for this would be a master control push button panel. This section describes the electrical connections for the Trigger Inputs.

To program the trigger inputs to cause actions within sequences and steps, see the section on Programming. As a convenience to your wiring, you simply need to connect buttons between the appropriate trigger input and the ground terminal.

Figure 8 – Trigger Input Terminal Strip

Terminal	Name	Description
1-Left	GND	Convenience Power Ground
2	GND	Convenience Power Ground
3	Trigger-1	Trigger #1 Input
4	Trigger-2	Trigger #2 Input
5	Trigger-3	Trigger #3 Input
6	Trigger-4	Trigger #4 Input
7	Trigger-5	Trigger #5 Input
8	Trigger-6	Trigger #6 Input
9	Trigger-7	Trigger #7 Input
10	Trigger-8	Trigger #8 Input
11	POS	Opto-Isolator Input Power
12-Right	+12VDC	Convenience Output Power



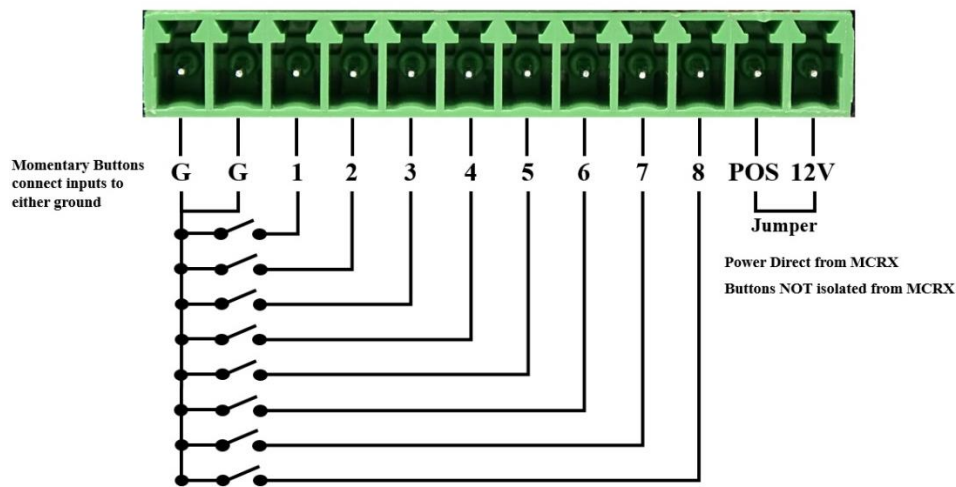
The trigger input terminals (Trigger-1 to Trigger-8) provide connection to the low-side (Cathode) of the LED in each opto-isolator. Current limiting resistors are built-in, so you can connect any Trigger Input to GND to cause the Trigger to occur.

Terminal #11 (POS) is connected to the high-side (Anode) of all 8 opto-isolators. Typically, Terminal #11 is connected to the power source to be used to trigger the inputs. This can be an external power source or Terminal #12 (12VDC). If you do not need to isolate the MCRX ground, the internal current limiting resistors are suitable for voltages from 5VDC up to 24VDC. If higher voltages are required, please contact us to determine suitable added current limiting resistors.

Terminal #1 and Terminal #12 provide a local power source that is not isolated from the MCRX but can be used to simplify wiring if using push buttons, relays, or other inputs that don't require optical isolation.

The following example shows how to connect switches (or relays) directly to the MCRX without utilizing the ground isolation features of the opto-isolators. The convenience 12VDC power supply from the MCRX is jumped to the opto-isolator POS terminal to supply the shared LED Anodes. Each Trigger Input can then be individually connected to the convenience GND pin through any suitable switching device such as a push-button or relay.

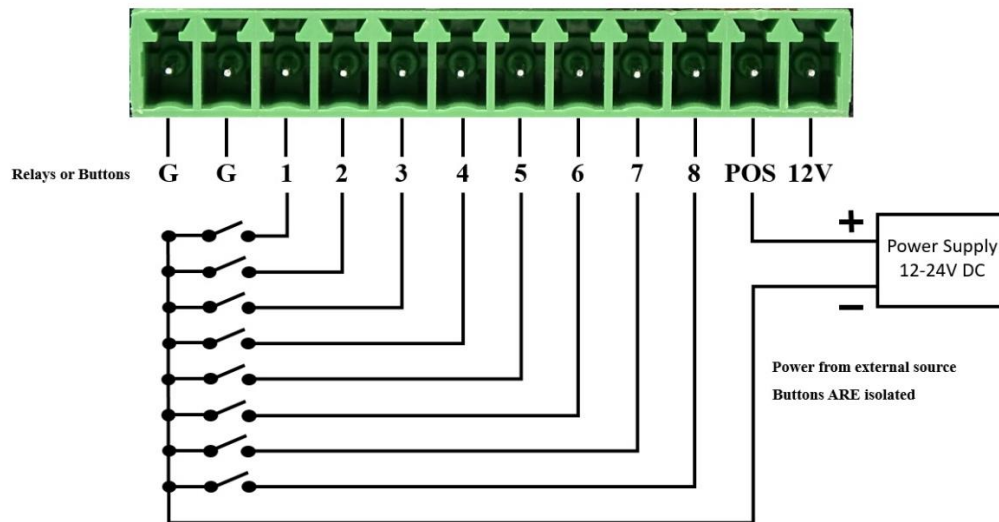
Figure 9 – Simple Trigger Input Button Connections



MCRX – Connections

In this next example, we will use an external power supply to enable the opto-isolators to completely isolate the MCRX Ground from the controlling device. Notice that the POS terminal is used, but not the 12VDC or GND terminals. Opto-isolator power is supplied from the external 4-24VDC Power Supply.

Figure 10 – Isolated Trigger Input Button Connections



By using the Optical Isolators you will maintain complete isolation from Control Ground and Audio Ground for safety and for lower noise playback.



3.11 Control Output Terminal Strip

The MCRX can control many types of devices and loads connected to the Control Outputs. This section describes the electrical connections for the Control Outputs.

The Control Outputs of the MCRX are not isolated in any way from the Ground of the system. If grounding problems become an issue for your application, an external relay can be used to isolate any load from the MCRX.

As a convenience to your wiring, you may use the power supplied on the Control Output Terminal Strip. Doing so will draw power from the internal 12VDC power supply. Use this convenience power for LED's, or small relays. If you intend to power any larger loads, please consider an external power source for the Control Outputs.

Figure 11 – Control Output Terminal Strip Pinout

Terminal	Name	Description
1-Left	GND	Convenience power supply ground
2	GND	Convenience power supply ground
3	Output-1	Control Output #1
4	Output-2	Control Output #2
5	Output-3	Control Output #3
6	Output-4	Control Output #4
7	Output-5	Control Output #5
8	Output-6	Control Output #6
9	Output-7	Control Output #7
10	Output-8	Control Output #8
11	Clamp	Common Clamp Diode Connection
12-Right	12VDC	Convenience Power Supply



MCRX – Connections

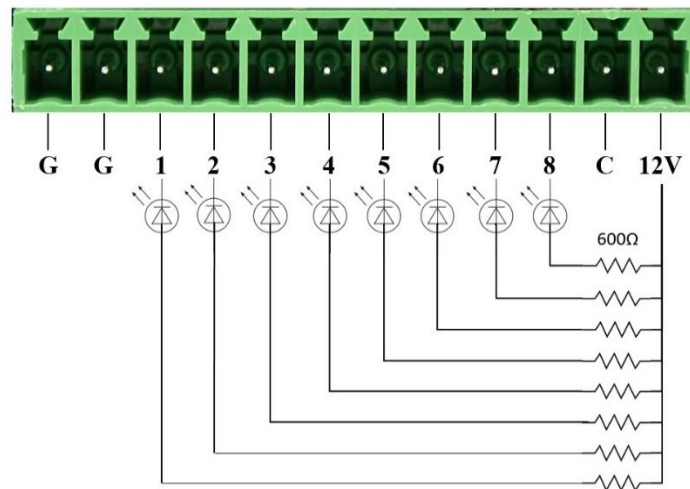
The control output terminals (Output-1 to Output-8) provide connection to a Darlington Transistor Array (Collector) and are used to Sink Power but they cannot Supply Power. Each Output is capable of sinking 500MA using a ULN2803.

The Darlington Array has its Emitters connected to the GND Terminal #1. External or Convenience power can be used to power the load, but the reference and current ground will be using GND Terminal #1. Terminal #11 (Clamp) is connected to the Darlington Array protection diodes (Cathode) for all 8 outputs. If you are driving an inductive load such as a relay, the Clamp terminal should be connected to the power source being used for the load. This Clamp Terminal will prevent the backlash of the relay from destroying the Darlington Array or causing ‘pops’ in the audio. If you are simply driving LEDs this terminal can be left un-connected.

Terminal #12 provides a local power source that is not isolated from the MCRX, but can be used to simplify wiring if just powering LEDs, relays, or other small loads.

The following example shows a simple way to connect status LEDs to the MCRX using the convenience 12VDC power supply. The LEDs will require current-limiting resistors since each Control Output can sink 500MA and would burn-out the LEDs. Since the LEDs do not present an inductive load, the Clamp terminal has been left un-connected.

Figure 12 – Simple Control Output LED Connections



The Control Outputs can also be used to drive conventional DC powered lamps or DC powered relays. However, if you need to control larger DC loads, please consider the PNET DC Power Controller as a High-Current 4-channel controller conveniently connected to PNET. At 8-Amps per channel, you can control some serious loads!



3.12 GPS Antenna

To receive a strong GPS signal, an external antenna is required.

The antenna should be placed outside or near a window that allows the GPS satellite signals to be received. To attach the antenna, screw the SMA connector to the rear panel GPS jack.



4 Front Panel Interface

The following section will review the operation of the Front Panel LCD interface.

The Front Panel allows direct control while mounted in the rack without using a web browser. All the same operations can also be set up using the web browser interface.

Figure 13 – Front Panel LCD and Keypad



To navigate between screens, use the ◀ and ▶ arrows on the front panel keypad.

When you scroll down on a list using the ▲ ▼ arrow keys, the ◀ ▶ arrow keys will always move between the available screens. Each screen will remember where you were, so if you scroll far down on the file list, don't worry, you will go back to the exact same place if you move away and come back to that screen.

To Select between the options from a list on each screen use the ▲ and ▼ arrow keys. The Slots List, Files List, and other screens allow you to scroll up and down to reach many items on the list.

To change an option, select an option, select a File, delete a File...etc...press the ✓ key in the center of your keypad.

To exit any screen, exit from a Confirm message, or eject the USB Thumb Drive, press the Red ✖ key.



4.1 Power Up Screens

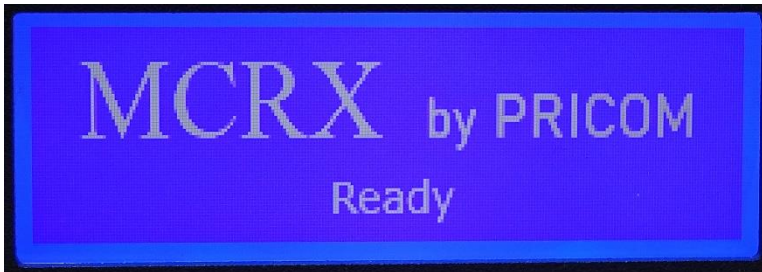
When power is applied, the MCRX will display the Startup Screen, with the text “Starting”. While this screen is showing, the MCRX is initializing internal hardware.

Figure 14 – Front Panel Starting Screen



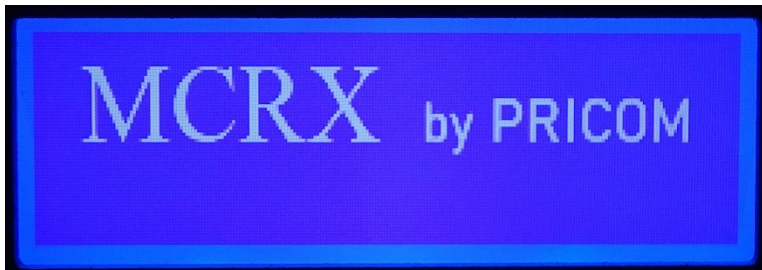
Once the MCRX is ready for navigation, the display will change to the “Ready” Screen. At this point, you can navigate to any page using the ◀ and ▶ arrow keys.

Figure 15 – Front Panel Ready Screen



When any screen is left on for more than 2 minutes, the MCRX will automatically take you back to the home screen.

Figure 16 – Front Panel Home Screen

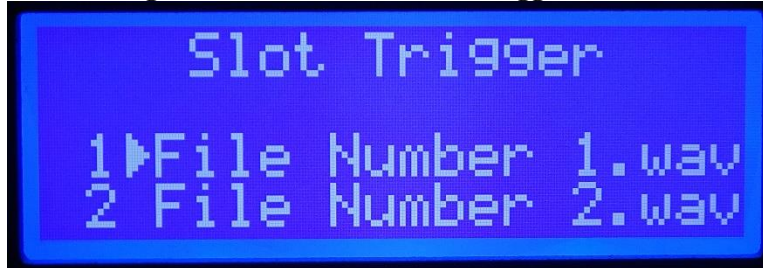


4.2 Triggering a Slot

When testing, or when manual playback is desired, it is possible to start any Slot from the front panel. Each slot has configured audio routing, SMPTE output, MIDI output, GPIO outputs, and more. Those configurations are done through a standard web browser.

Using the ◀ and ▶ arrow keys, select the Slot Trigger menu.

Figure 17 - Front Panel Slot Trigger Screen



Use the ▲ and ▼ arrow keys to select the desired Slot. For your convenience, the Slot Trigger screen lists the Slot by number, and includes the File Name you will trigger.

To Trigger the Slot simply press the ✓ key.

The selected Slot will start with all the configured features for that Slot.

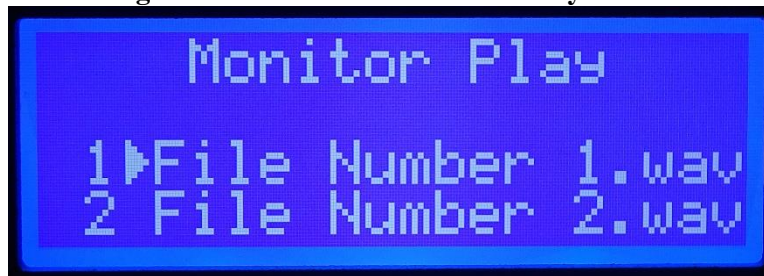


4.3 Monitoring a Slot

Any Slot can be played through the front-panel headphones using the Monitor Play screen. Playing a Slot through the Monitor Play function will not change any playbacks currently in progress and will not generate any SMPTE, MIDI or other outputs. This feature is intended to validate an audio file associated with a slot without affecting any of the other parts of the environment.

Using the ◀ and ▶ arrow keys, select the Monitor Play menu.

Figure 18 – Front Panel Monitor Play Screen



To play a file through the Front Panel, simply use the ▲ and ▼ keys to select the desired Slot. Once the Slot is selected, press the ✓ key to start the playback.

Pressing ✓ on the same Slot, or any other slot will stop any current Monitor Playbacks.

4.4 Deleting a File

Files can be easily deleted from the front panel LCD. Care should be used when deleting files as a Slot could reference the file you are going to delete.

To delete a file from the internal storage, use the ◀ and ▶ arrow keys, select the File List menu.

Figure 19 - Front Panel File List Screen



Then use the ▲ and ▼ arrow keys to select the file you wish to delete.

Once you have selected the desired file, press the ✓ key to bring up the delete menu.

Figure 20 - Front Panel Confirm File Delete Screen

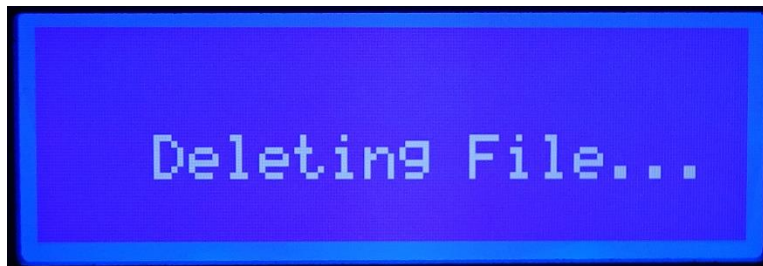


While in the confirm menu, pressing any key but the ✓ key will cancel the operation.

Pressing the ✓ key will confirm that you want to delete the file.

Once the file delete is confirmed, you will get the Deleting File screen while the file is being deleted.

Figure 21 - Front Panel Deleting File Screen



Once the file is deleted, the File List will refresh with the new list of files.



4.5 Load a File from USB

New audio files can be loaded from the Front Panel USB jack using the Load USB File menu.

Using the ◀ and ▶ arrow keys, you can select the Load USB File menu. You can also insert a USB storage drive at any time. The MCRX will automatically move to the Load USB File Menu a few seconds after the USB drive is inserted.

Figure 22 - Front Panel Insert USB Drive Screen



Once the USB drive is inserted, you will see a list of the files and folders in the root menu of the USB storage device.

Files will display a single Arrow ▶, while a double Arrow ▶▶ indicates a Folder which can also be selected and opened.

Figure 23 - Front Panel Load USB File Screen



Using the ▲ and ▼ arrow keys, files can be highlighted and then the chosen file can be Selected for loading using the ✓ key.

If you want to go back one level in the folder structure of the USB device, press the ✖ cancel key. This will take you back up one level in the USB drive.



In the example below, we selected the folder called “Folder Test” and pressed the ✓ key. This opened the folder and displayed the files inside that folder.

Figure 24 - Front Panel Load USB File Screen



When a file is selected by pressing the ✓ key, the Confirm Load screen will appear to confirm that you would like to load the selected file to the MCRX internal storage. Pressing the ✓ key will confirm that you wish to load the highlighted file to the internal storage. Pressing any other key will cancel the operation.

Figure 25 - Front Panel Confirm File Load Screen



Once the file loading is confirmed, a Loading Progress bar will appear to show the progress of the file as it loads. This will progress until file loading is complete.

Figure 26 - Front Panel Loading Progress Screen



Once all the files you wish to load have been loaded, you need to Eject the USB drive. Press the **✘** key to back out one level, when you get to the top level, you will be asked to Confirm Eject of the USB drive. Press the **✔** key to eject the USB drive.

Figure 27 - Front Panel Eject USB Screen



Once you eject the USB drive, you will be returned to the “Insert USB Drive” menu.

4.6 Display Current Config

The MCRX chassis has some configurations that apply to all slots, such as audio Sample Rate. This can be displayed on the Current Config screen. Using the **◀** and **▶** arrow keys, you can select the Current Config screen.

Using the **▲** and **▼** arrow keys, you can scroll through the available options to display.

Figure 28 - Front Panel Current Config Screen

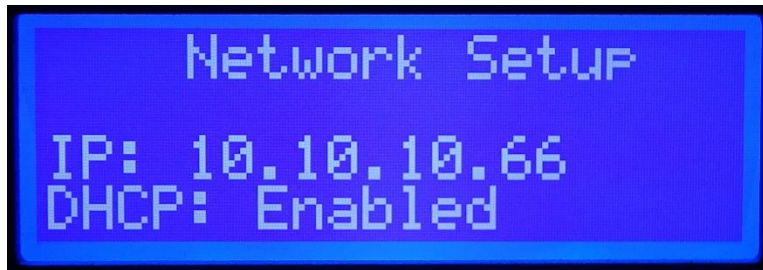


4.7 Network Setup

The Ethernet network allows static IP address and DHCP dynamic IP address assignment. These options can be viewed and changed on the Network Setup screen.

Using the ▲ and ▼ arrow keys, you can scroll through the available options to display.

Figure 29 - Front Panel Network Setup Screen



On the top of the Network Setup screen is the IP address assigned when in DHCP mode. This IP address is needed for your browser to access the Web Interface of the MCRX.

4.8 Display Version Information

Software Version information can be viewed on the Software Version screen.

Using the ◀ and ▶ arrow keys, you can select the Software Version screen.

Additional software versions are also accessible through the Web Interface.

Figure 30 - Front Panel Software Version Screen



5 Web Interface

The Web interface can be used for fast access to configuration settings. Any web browser should work, but the following pictures are taken using Google Chrome as the web browser. See the previous section on how to determine the IP address of the MCRX as that address will be needed to access the Web Interface.

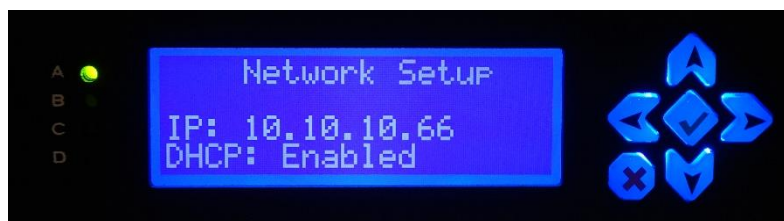
5.1 Finding the MCRX

With the Ethernet cable connected to your network, apply power and switch on the MCRX.

When power is applied, the MCRX will request an IP address from your gateway router using DHCP. You can also manually configure a Static IP address using the front-panel LCD panel. In any case, we need to know what IP address is being used to access the MCRX from a PC or Tablet. This information can be found in your gateway router or on the front panel LCD.

Many home routers we have seen default to “192.168.1.x” and will give out addresses starting between 2 and 5. So your IP address might be “192.168.1.6” or something similar. Check the front panel LCD Network Setup page for the IP address being used.

Figure 31 – Front Panel Network Setup



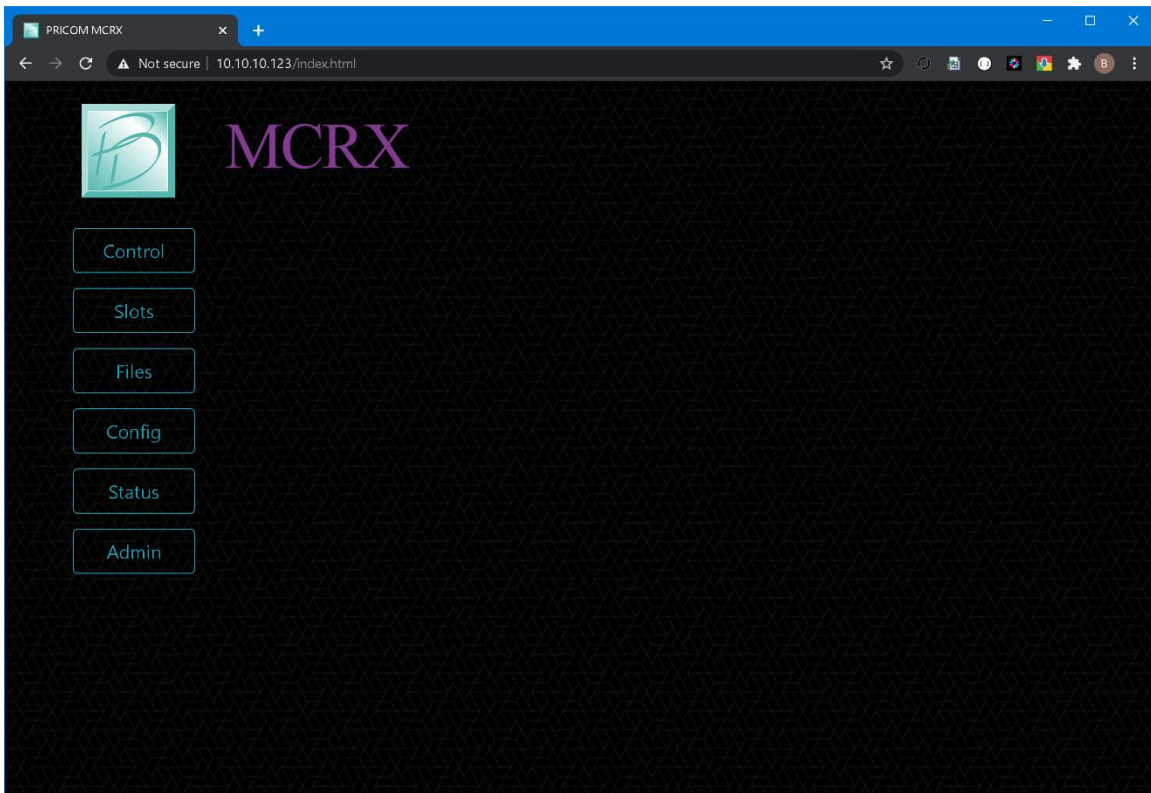
5.2 Launching a Browser

Now that we know the IP address of the MCRX, we can launch a web browser to access the setup and configuration pages. In these images, we used Google Chrome, which we recommend. However, any standard web browser should work.



5.3 Main Menu

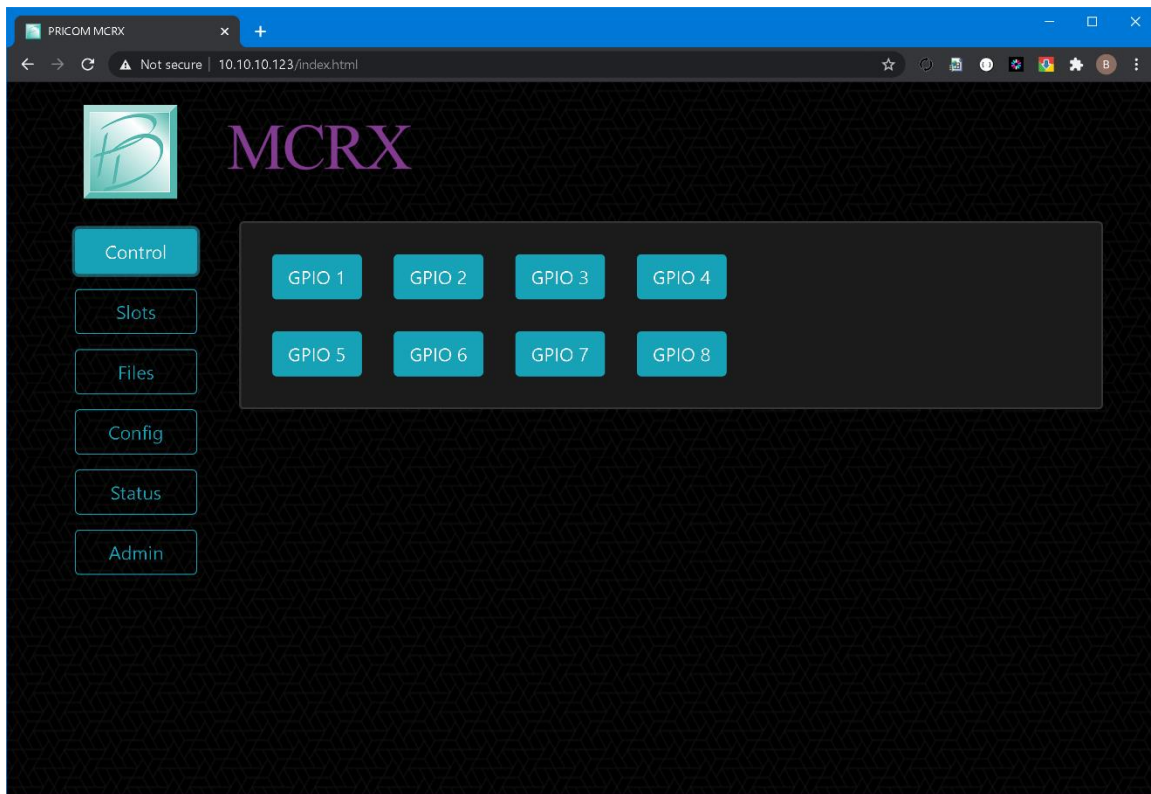
Type the IP address of the MCRX into the web browser address bar. You should receive a page like this.



Along the left edge are the buttons to select each individual page on the MCRX. The page is scalable for desktop computer, tablet, or mobile phone browsers. The interface is also touch screen compatible, for use with any touch device.



5.4 Control Menu

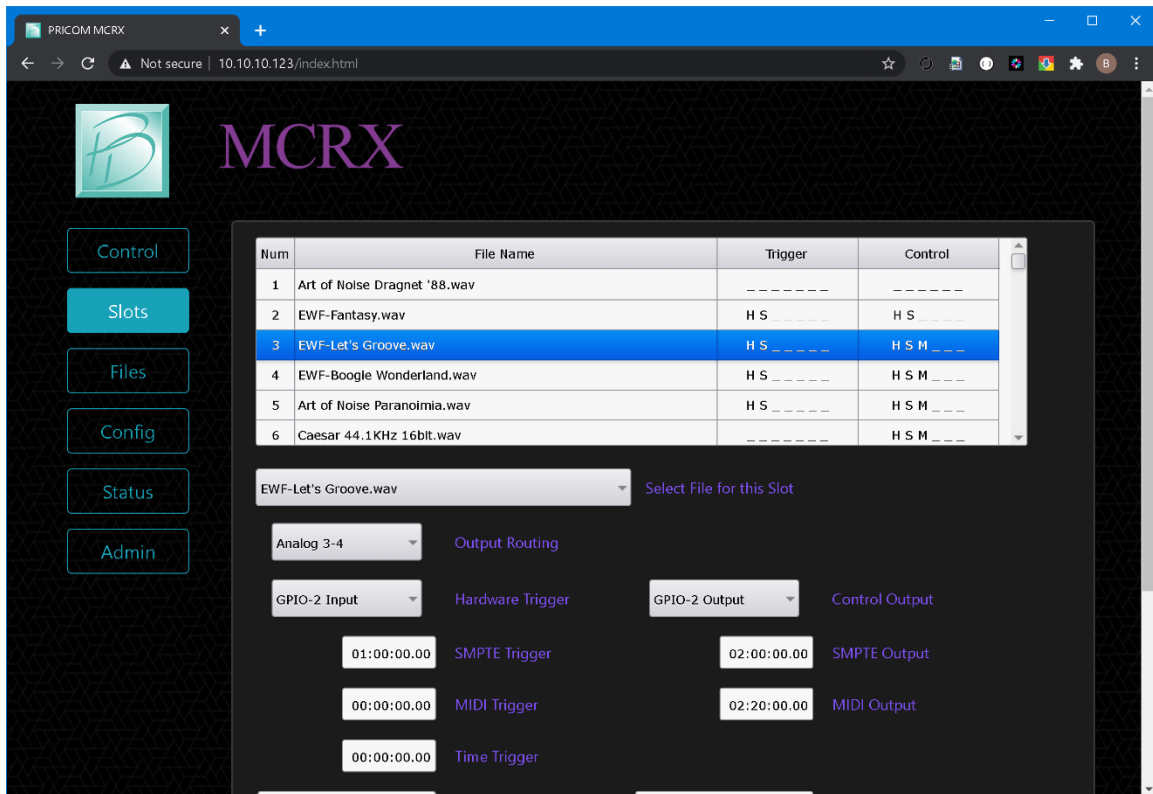


Clicking on the Control Button on the menu will display the Control Page as shown above.

The Control Page is used to manually send Trigger Events to the MCRX via the web interface. These triggers will emulate the function of the GPIO trigger settings in each slot. Of course, you can use the GPIO inputs to trigger any Slot Playback, but this web page also allows manual triggering of Slot Playbacks when configured for GPIO triggering.



5.5 Slots Menu



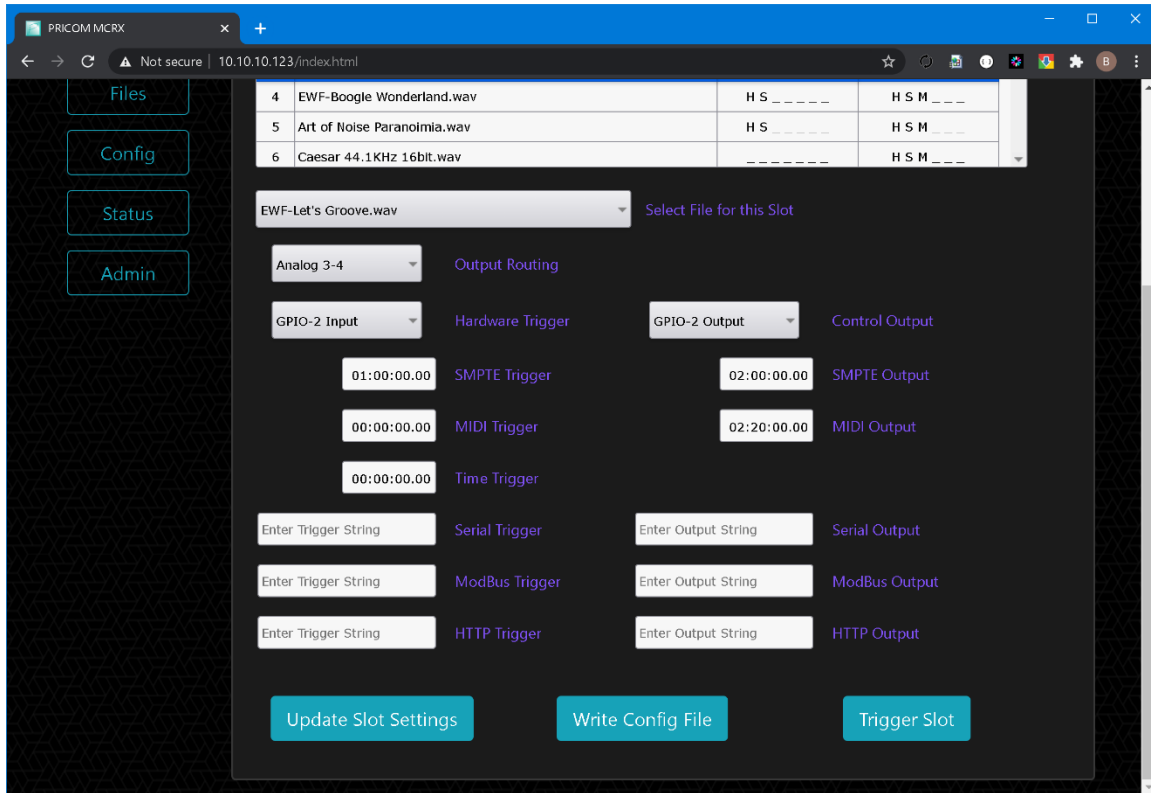
Clicking on the Slots Button on the menu will display the Slots Page as shown above.

Selecting a line in the Slots List will show the details of that specific Slot Configuration in the fields below the list.

You can scroll through the slots list to select the slot you want to configure.



5.5.1 Slots Detail Panel



Once a slot has been selected, each Slot Configuration value can be adjusted in the fields as show above.

Now we will explain each of the settings available for each Slot. Starting with the three important buttons on the bottom of many of these pages.

5.5.2 Update Slot Settings

Pressing **Update Slot Settings** will write any changes made on this screen for the selected Slot to the MCRX chassis. If you do not press **Update Slot Settings**, and you move to select a different Slot, then the changes are not saved. To make all changes persistent after changes are applied and before power cycling your MCRX, make sure to **Write Config File** as described in the next section.



5.5.3 Write Config File

Once all changes are finished, press the **Write Config File** to save the Slots settings. If you do not press **Write Config File**, then the Slot Settings changes will only persist until the chassis is rebooted.

This can be helpful for testing new settings or configurations without affecting the persistent or “known good” settings of the chassis.

5.5.4 Slot File Selection

Select the file to be played for this slot. Any available file can be selected to play for this slot. The list is filtered to only show the Files that are compatible with the output Sample Rate configured for the MCRX chassis. This prevents unwanted loss of audio or playing a file at the wrong sample rate.

5.5.5 Slot Output Routing

Select which Output this slot will play to.

Figure 32 – Slot Output Routing

Setting	Description
Analog 1-2	Route the Audio Playback to Analog 1-2 Output
Analog 3-4	Route the Audio Playback to Analog 3-4 Output
Analog 5-6	Route the Audio Playback to Analog 5-6 Output
Analog 7-8	Route the Audio Playback to Analog 7-8 Output



5.5.6 Slot Hardware Trigger

If you want to trigger this slot using the external GPIO, select the GPIO input using this selector.

Figure 33 – Slot Hardware Trigger

Setting	Description
NO GPIO Trigger	This Slot will not be triggered from any GPIO Input
GPIO-1 Input	Trigger Slot Playback when GPIO-1 goes active
GPIO-2 Input	Trigger Slot Playback when GPIO-2 goes active
GPIO-3 Input	Trigger Slot Playback when GPIO-3 goes active
GPIO-4 Input	Trigger Slot Playback when GPIO-4 goes active
GPIO-5 Input	Trigger Slot Playback when GPIO-5 goes active
GPIO-6 Input	Trigger Slot Playback when GPIO-6 goes active
GPIO-7 Input	Trigger Slot Playback when GPIO-7 goes active
GPIO-8 Input	Trigger Slot Playback when GPIO-8 goes active

5.5.7 Slot SMPTE Trigger

If you want to trigger this Slot from SMPTE LTC, enter the HH:MM:SS:FF in this field. If no SMPTE LTC trigger is desired, enter 00:00:00:00 as the Time, and the trigger will be ignored.

5.5.8 Slot MIDI Trigger

If you want to trigger this Slot from MIDI Time Code (MTC), enter the HH:MM:SS:FF in this field. If no MIDI Time Code (MTC) trigger is desired, enter 00:00:00:00 as the Time, and this trigger source will be ignored.



5.5.9 Slot Time Trigger

If you want to trigger this Slot from Real Time Clock (RTC), enter the HH:MM:SS:FF in this field. If no Real Time Clock trigger is desired, enter 00:00:00:00 as the Time, and the trigger will be ignored.

5.5.10 Slot Serial Trigger

Slots can be triggered from a Serial Control Input string. If you wish to trigger from a Serial Input, enter the String to Match in this field. When the MCRX receives the specified Text String over the Serial port, the slot will be triggered.

5.5.11 Slot Modbus-TCP Trigger

Slots can be triggered from a Modbus-TCP message. If you wish to trigger from a Modbus-TCP Input, enter the String to Match in this field. When the MCRX receives the specified command over Modbus-TCP, the slot will be triggered.

5.5.12 Slot HTTP Trigger

Slots can be triggered from an HTTP message to the IP Address of the MCRX. If you wish to trigger from an HTTP Input, enter the String to Match in this field. When the MCRX receives the specified URL (IP Address/Text String) (e.g. <http://10.10.10.184/TriggerSlot1>) over the http interface, the slot will be triggered.



5.5.13 Slot Control Output

Slots can send External GPIO outputs when active. To set the desired GPIO when the selected Slot is Playing, select the desired output using this field.

Figure 34 – Slot Control Output

Setting	Description
NO GPIO Output	This Slot will not send any GPIO Output
GPIO-1 Output	During Slot Playback GPIO-1 goes active
GPIO-2 Output	During Slot Playback GPIO-2 goes active
GPIO-3 Output	During Slot Playback GPIO-3 goes active
GPIO-4 Output	During Slot Playback GPIO-4 goes active
GPIO-5 Output	During Slot Playback GPIO-5 goes active
GPIO-6 Output	During Slot Playback GPIO-6 goes active
GPIO-7 Output	During Slot Playback GPIO-7 goes active
GPIO-8 Output	During Slot Playback GPIO-8 goes active

5.5.14 Slot SMPTE Output

If you want this Slot to send SMPTE LTC output when the slot is Playing, you can set the starting time in this field using the format HH:MM:SS:FF. If no SMPTE LTC is desired during Slot Playback, set this entry to 00:00:00:00 and no SMPTE LTC will be sent for the selected Slot.

5.5.15 Slot MIDI Output

If you want this Slot to send MIDI Time Code (MTC) output when the slot is Playing, you can set the starting time in this field using the format HH:MM:SS:FF. If no MTC is desired during Slot Playback, set this entry to 00:00:00:00 and no MIDI Time Code will be sent for the selected Slot.



5.5.16 Slot Serial Output

If you want this Slot to send a Serial Output when the Slot is Playing, you can set the value in this field. When the Slot Plays, the specified value will be sent out the Serial Port.

5.5.17 Slot Modbus Output

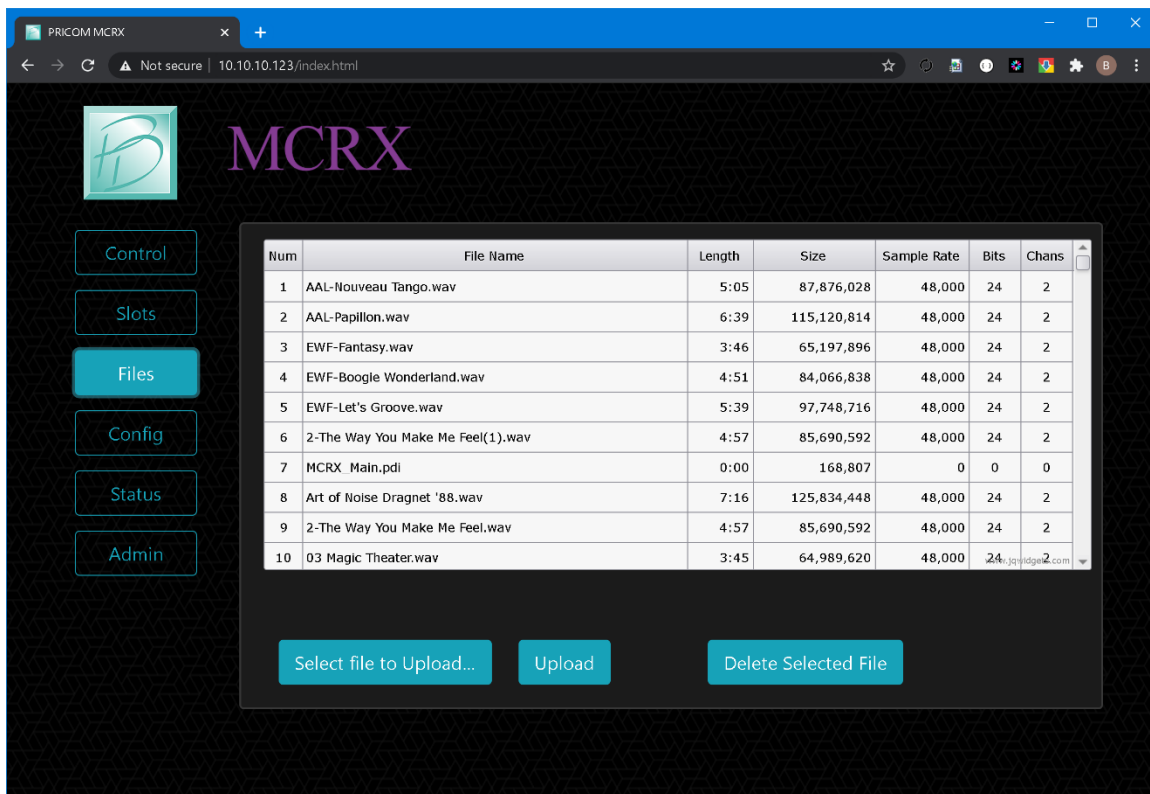
If you want this Slot to send a Modbus-TCP Message when the Slot is Playing, you can set the value in this field. When the Slot Plays, the specified value will be sent out the Modbus-TCP interface.

5.5.18 Slot HTTP Output

Slots can send an HTTP message to any IP Address. If you wish to send an HTTP Message, enter the String to send in this field. When the MCRX plays this Slot, the specified message (IP Address/Text String) (e.g. `http://10.10.10.190/OutputMessage1`) over the IP interface.



5.6 Files Menu



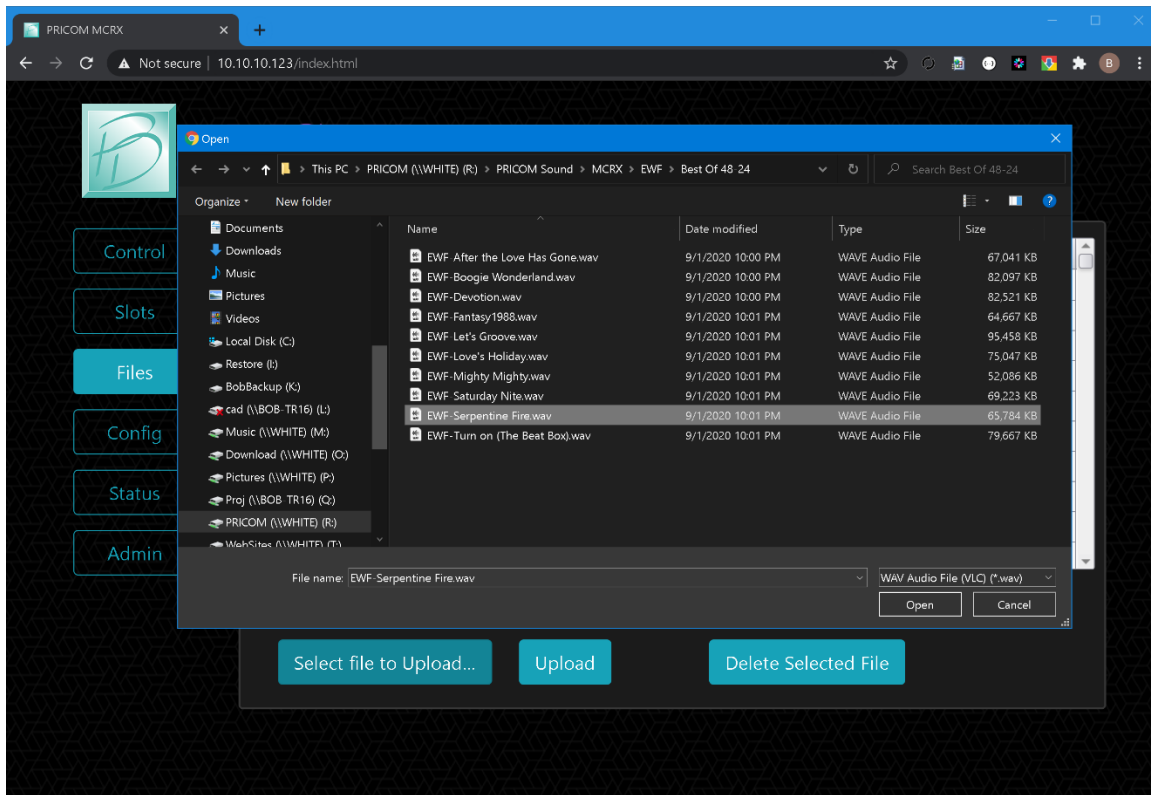
The screenshot shows the MCRX web interface. On the left is a navigation menu with buttons for Control, Slots, Files, Config, Status, and Admin. The main area displays a table of files on the SD card. Below the table are three buttons: 'Select file to Upload...', 'Upload', and 'Delete Selected File'.

Num	File Name	Length	Size	Sample Rate	Bits	Chans
1	AAL-Nouveau Tango.wav	5:05	87,876,028	48,000	24	2
2	AAL-Papillon.wav	6:39	115,120,814	48,000	24	2
3	EWf-Fantasy.wav	3:46	65,197,896	48,000	24	2
4	EWf-Boogie Wonderland.wav	4:51	84,066,838	48,000	24	2
5	EWf-Let's Groove.wav	5:39	97,748,716	48,000	24	2
6	2-The Way You Make Me Feel(1).wav	4:57	85,690,592	48,000	24	2
7	MCRX_Main.pdl	0:00	168,807	0	0	0
8	Art of Noise Dagnet '88.wav	7:16	125,834,448	48,000	24	2
9	2-The Way You Make Me Feel.wav	4:57	85,690,592	48,000	24	2
10	03 Magic Theater.wav	3:45	64,989,620	48,000	24	2

The Files Menu allows you to see All the files on the SD card. This also allows you to Upload a new file onto the internal SD card of the MCRX as well as Delete unwanted files..



5.6.1 Select File to Upload

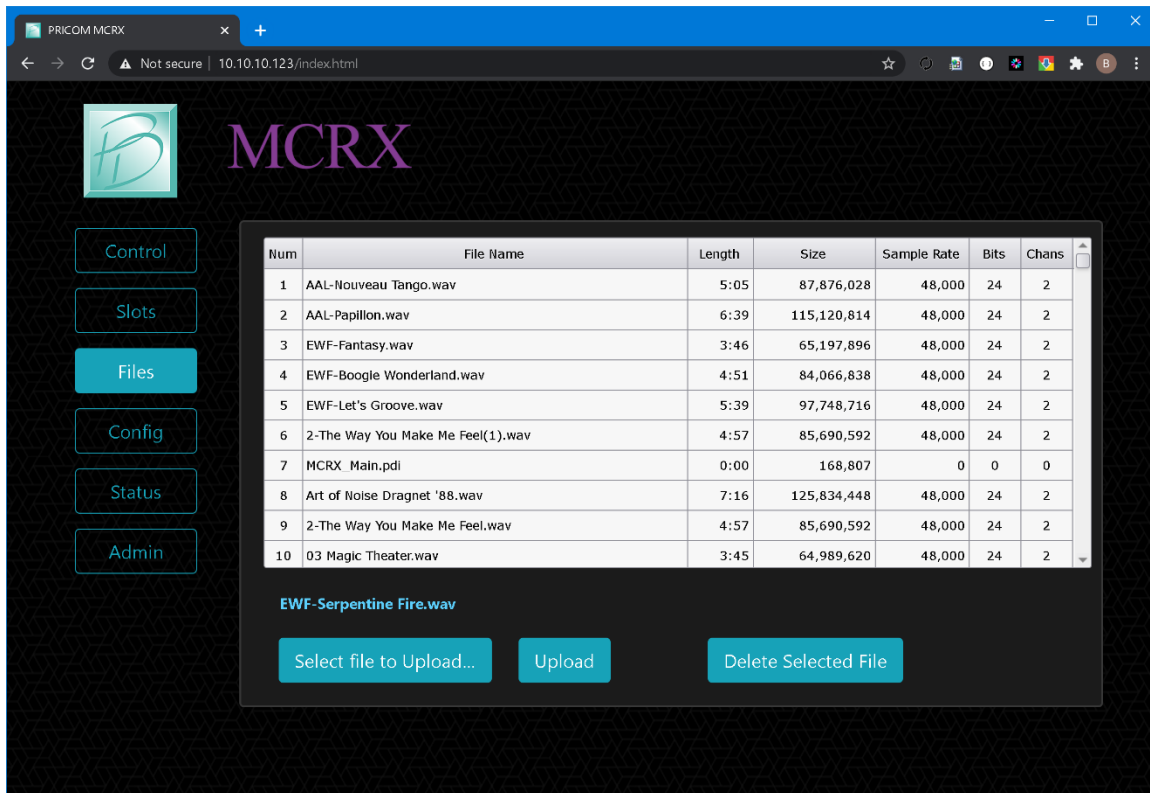


To Select a new file to upload to the MCRX SD Card, click the **Select File to Upload** button.

A File Selection box will appear, select the desired file from your local filesystem, then Click Open. The Selected filename will appear below the file list as your selected file to upload.



5.6.2 File Upload



The screenshot shows the MCRX web interface in a browser window. The browser address bar shows "10.10.10.123/index.html". The interface features a navigation menu on the left with buttons for "Control", "Slots", "Files", "Config", "Status", and "Admin". The main content area displays a table of files and an upload section for a selected file.

Num	File Name	Length	Size	Sample Rate	Bits	Chans
1	AAL-Nouveau Tango.wav	5:05	87,876,028	48,000	24	2
2	AAL-Papillon.wav	6:39	115,120,814	48,000	24	2
3	EWf-Fantasy.wav	3:46	65,197,896	48,000	24	2
4	EWf-Boogle Wonderland.wav	4:51	84,066,838	48,000	24	2
5	EWf-Let's Groove.wav	5:39	97,748,716	48,000	24	2
6	2-The Way You Make Me Feel(1).wav	4:57	85,690,592	48,000	24	2
7	MCRX_Main.pdl	0:00	168,807	0	0	0
8	Art of Noise Dagnet '88.wav	7:16	125,834,448	48,000	24	2
9	2-The Way You Make Me Feel.wav	4:57	85,690,592	48,000	24	2
10	03 Magic Theater.wav	3:45	64,989,620	48,000	24	2

Below the table, the file "EWf-Serpentine Fire.wav" is selected. The upload section includes three buttons: "Select file to Upload...", "Upload", and "Delete Selected File".

Once the file is selected, you can click on the **Upload** button which will initiate the Upload to the MCRX onboard SD card.



MCRX – Web Interface

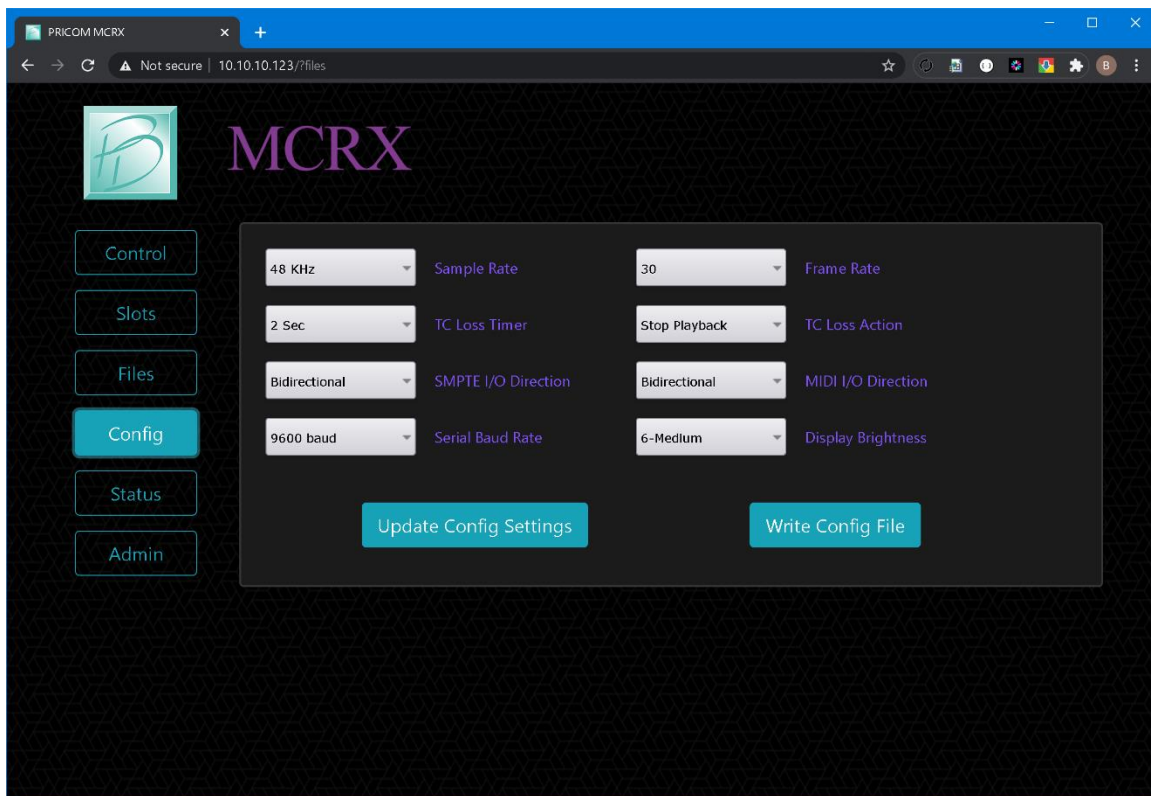
The screenshot shows a web browser window with the URL `10.10.10.123/?files`. The page features a dark background with a teal logo on the left and a navigation menu with buttons for Control, Slots, Files, Config, Status, and Admin. The main content is a table listing files with the following data:

Num	File Name	Length	Size	Sample Rate	Bits	Chans
1	AAL-Nouveau Tango.wav	5:05	87,876,028	48,000	24	2
2	AAL-Papillon.wav	6:39	115,120,814	48,000	24	2
3	EWf-Fantasy.wav	3:46	65,197,896	48,000	24	2
4	EWf-Boogle Wonderland.wav	4:51	84,066,838	48,000	24	2
5	EWf-Let's Groove.wav	5:39	97,748,716	48,000	24	2
6	2-The Way You Make Me Feel(1).wav	4:57	85,690,592	48,000	24	2
7	MCRX_Main.pdi	0:00	168,807	0	0	0
8	Art of Noise Dagnet '88.wav	7:16	125,834,448	48,000	24	2
9	2-The Way You Make Me Feel.wav	4:57	85,690,592	48,000	24	2
10	03 Magic Theater.wav	3:45	64,989,620	48,000	24	2

Below the table, the selected file `2-The Way You Make Me Feel(1).wav` is highlighted in red. At the bottom of the interface, there are three buttons: `Select file to Upload...`, `Upload`, and `Delete Selected File`.



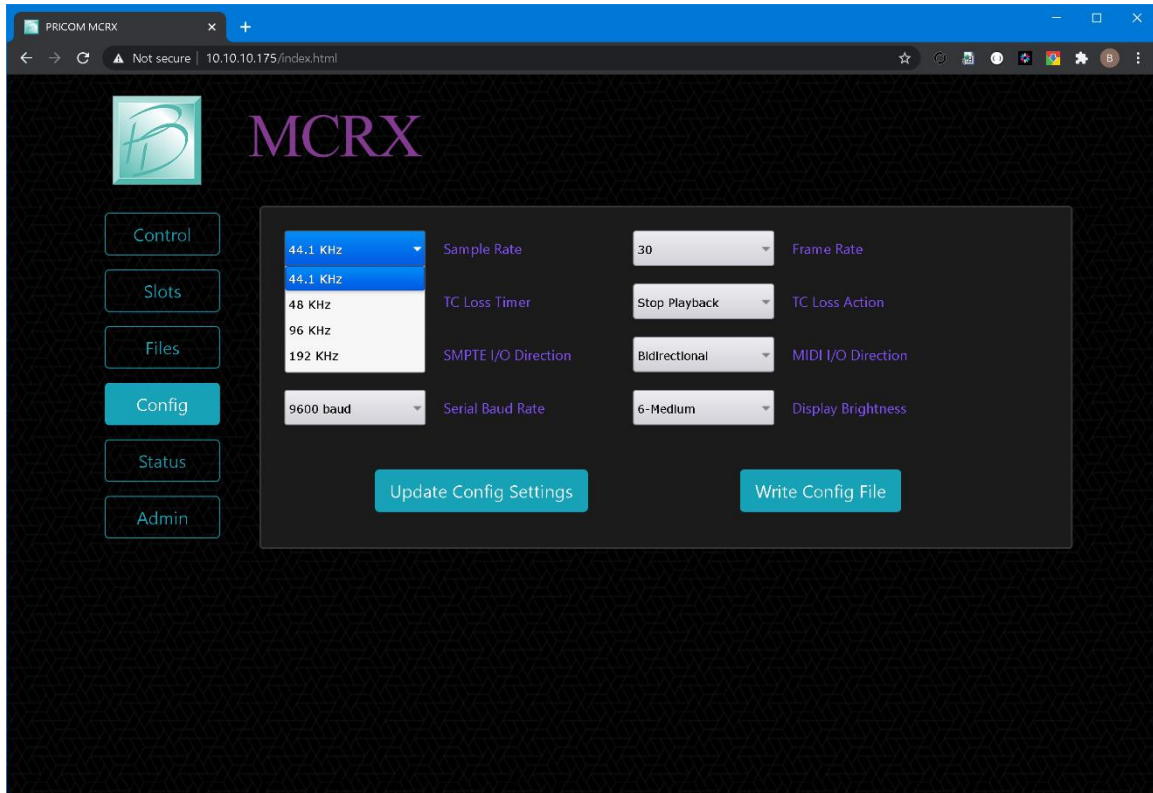
5.7 Config Menu



The Config Menu is used to set Chassis Settings that will apply to all the Slots and Interfaces of the MCRX.



5.7.1 Config Sample Rate



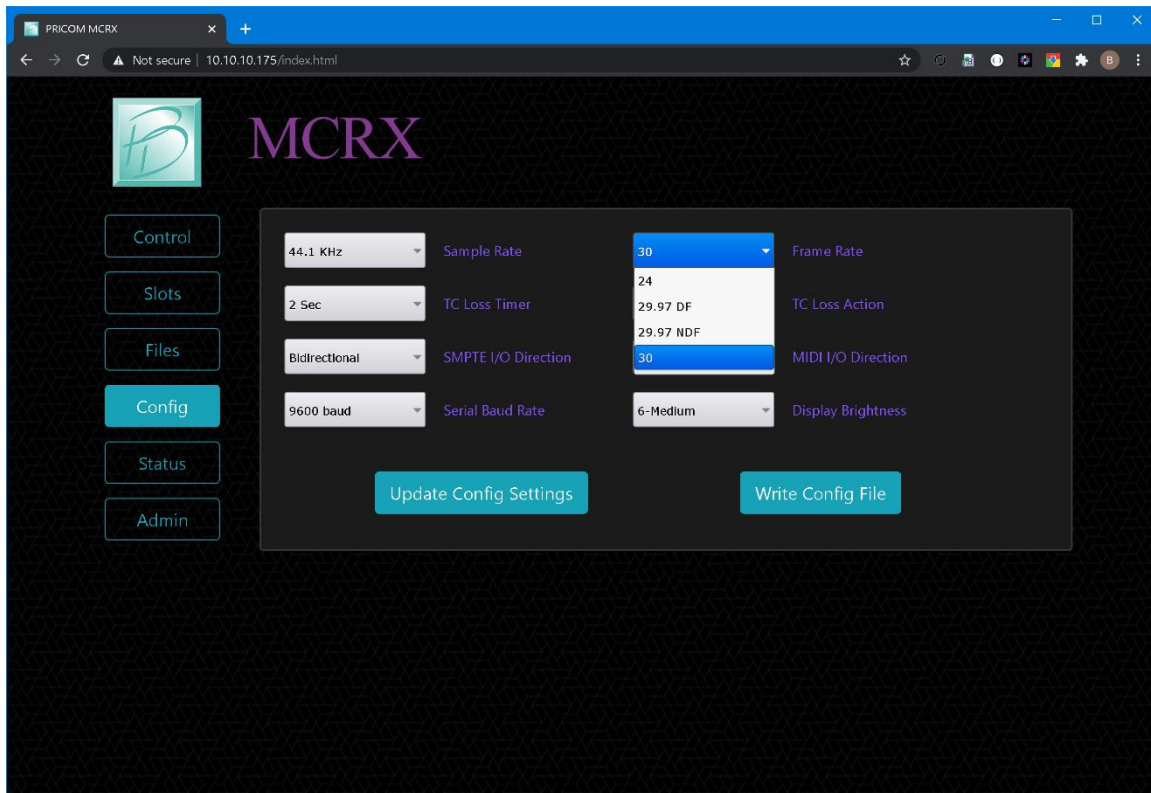
The **Sample Rate** pull down allows you to set the Chassis Audio Sample Rate.

Figure 35 – Sample Rate Selection

Setting	Description
44.1 KHz	Chassis Sample Rate of 44,100 Hz
48 KHz	Chassis Sample Rate of 48,000 Hz
96 KHz	Chassis Sample Rate of 96,000 Hz
192 KHz	Chassis Sample Rate of 192,000 Hz



5.7.2 Config Frame Rate



The **Frame Rate** pull down allows you to set the SMPTE LTC and MIDI TC frame rate. This rate is used for time calculations when converting Audio Samples to Timecode.

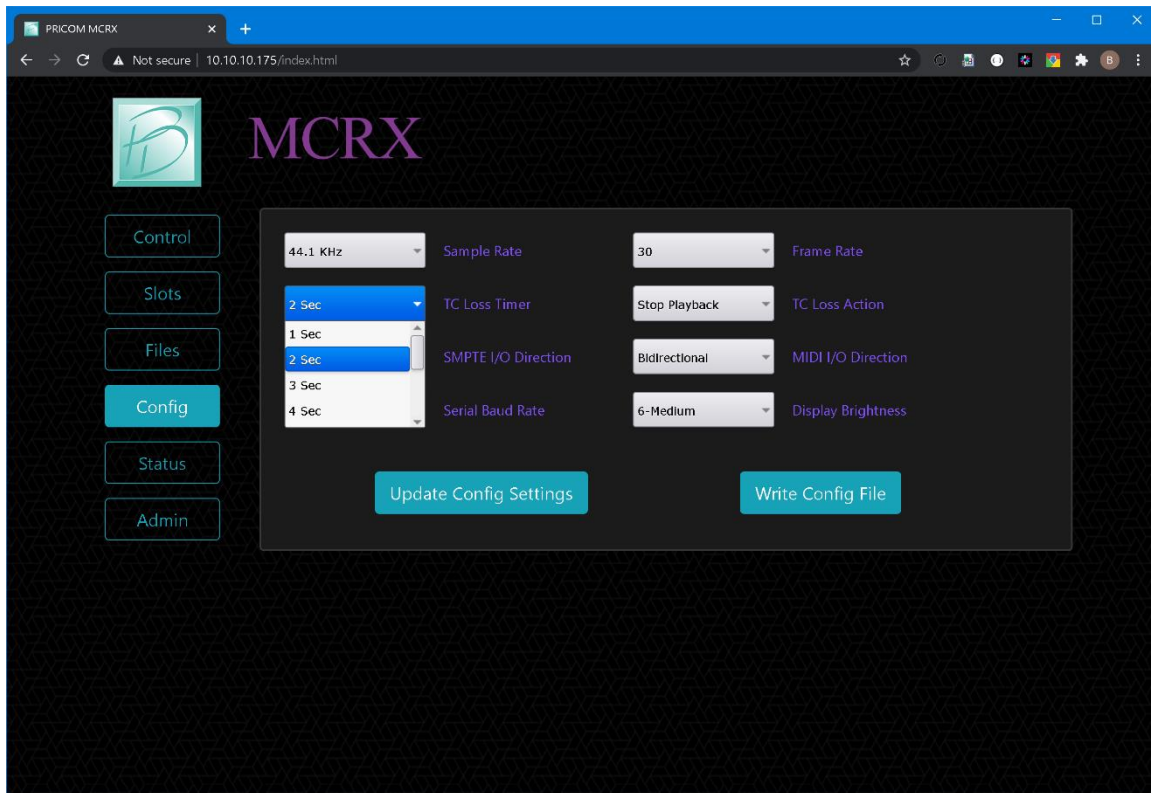
If the wrong frame rate is set, the incoming SMPTE or MIDI TC will not lock sync, and mid-file playback start could have time errors due to the miscalculation of the time offsets.

Figure 36 – Frame Rate Selection

Setting	Description
24	Timecode Frame rate of 24 Frames per Second
29.97 DF	Frame rate of 29.97 Frames per Second (Drop Frame)
29.97 NDF	Frame rate of 29.97 Frames per Second (Non-Drop Frame)
30	Frame rate of 30 Frames per Second



5.7.3 Config Timecode Loss Timer



TC Loss Timer, and **TC Loss Action**, select the behavior of loss of timecode.

Consider a case where you want Timecode Loss to stop audio playback. In this situation, we recommend a 1-3 second Loss Timer, and Stop Playback as the Loss Action.

The **TC Loss Timer** selects how long can we tolerate Timecode missing before taking some action. Generally, 3-5 Seconds is a good number, but if you want the Slot Playback to stop sooner when Timecode is lost, you might want to set this number lower.

However, if Timecode is unstable, a shorter **TC Loss Timer** may stop the Slot Playback before you want it to.

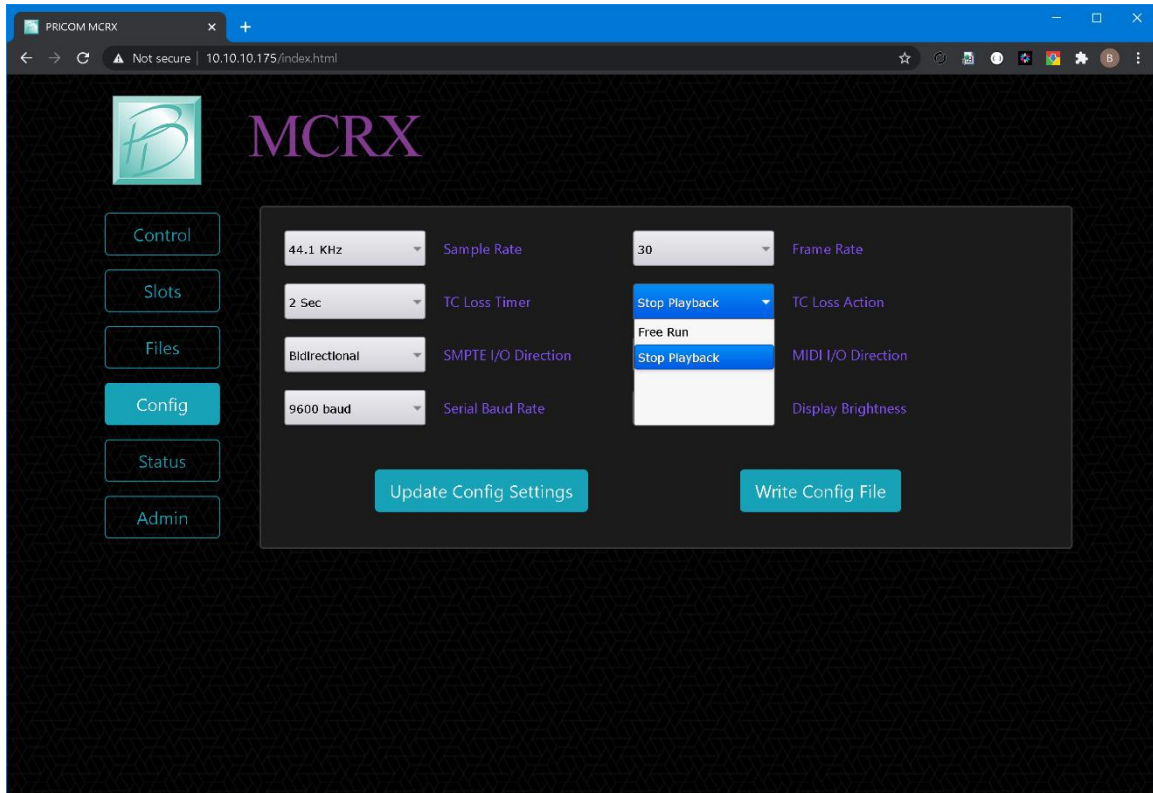


Figure 37 – Timecode Loss Setting

Setting	Description
1 Sec	Timecode Loss timer of 1 Second
2 Sec	Timecode Loss timer of 2 Seconds
3 Sec	Timecode Loss timer of 3 Seconds
4 Sec	Timecode Loss timer of 4 Seconds
5 Sec	Timecode Loss timer of 5 Seconds
6 Sec	Timecode Loss timer of 6 Seconds
7 Sec	Timecode Loss timer of 7 Seconds
8 Sec	Timecode Loss timer of 8 Seconds



5.7.4 Config Timecode Loss Action



TC Loss Action determines what the MCRX should do when Timecode has been lost.

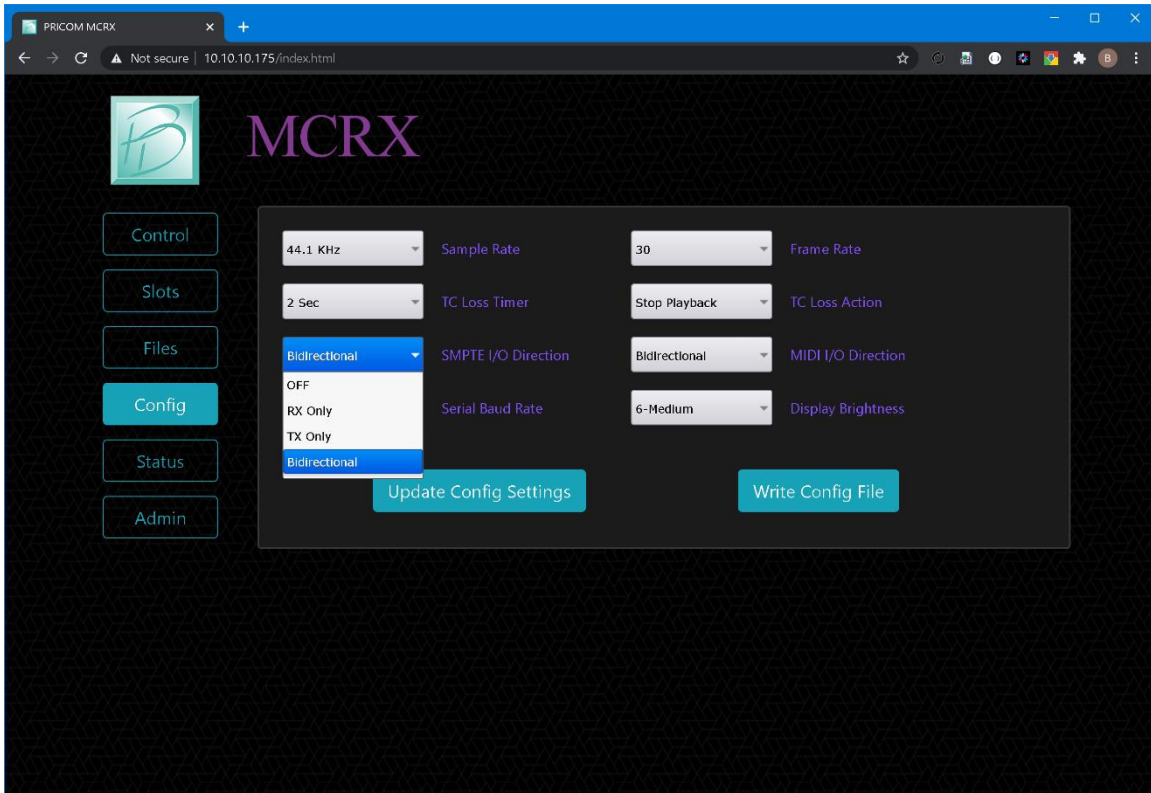
If Slot Audio playback is triggered by an external Timecode source, then when the external timecode source stops, you can choose to either **Stop Playback** or keep it running with **Free Run**.

Figure 38 – Timecode Loss Action

Setting	Description
Free Run	Audio continues when timecode is lost
Stop Playback	Audio Stops when timecode is lost



5.7.5 Config SMPTE TC Direction



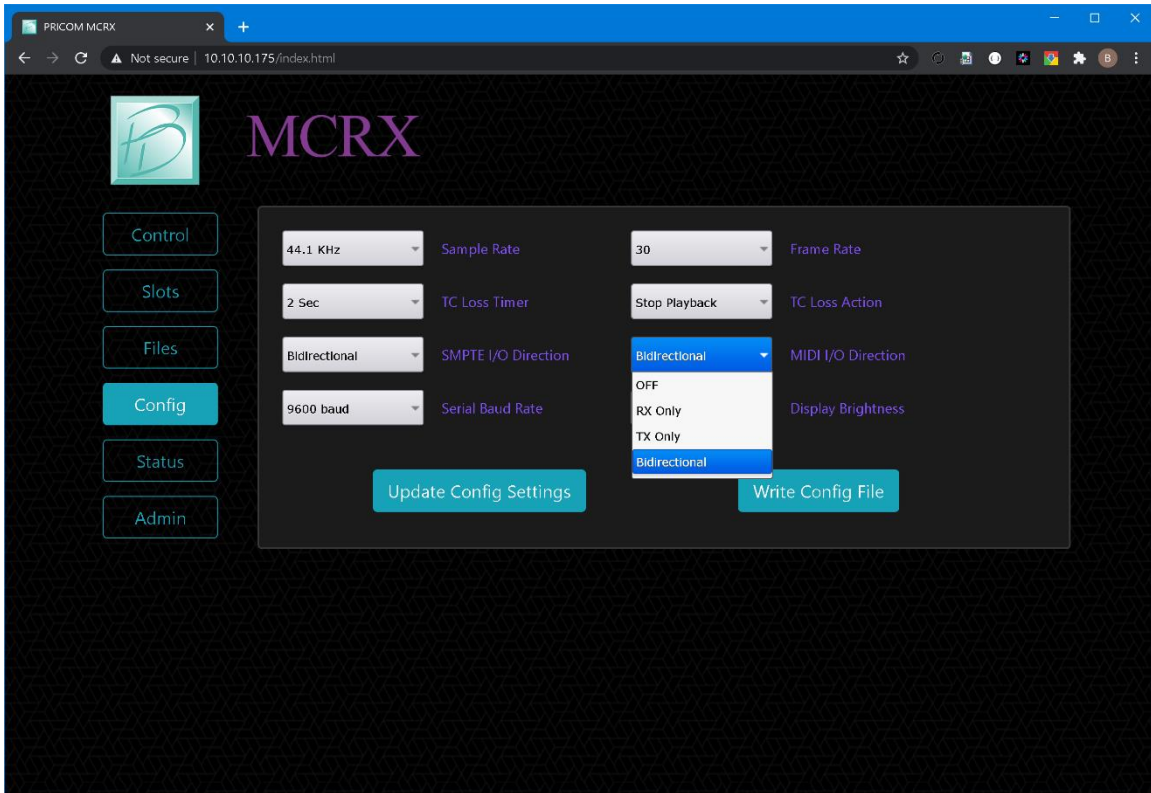
The MCRX can read SMPTE TC input, and can also generate SMPTE TC output simultaneously. The SMPTE TC Receiver/Generator can be configured in the following modes:

Figure 39 – SMPTE Interface Direction

Setting	Description
OFF	Disable SMPTE LTC Reader and Generator
RX Only	Only Receive SMPTE LTC
TX Only	Only Generate SMPTE LTC
Bidirectional	Receive AND Generate SMPTE LTC



5.7.6 Config MIDI TC Direction



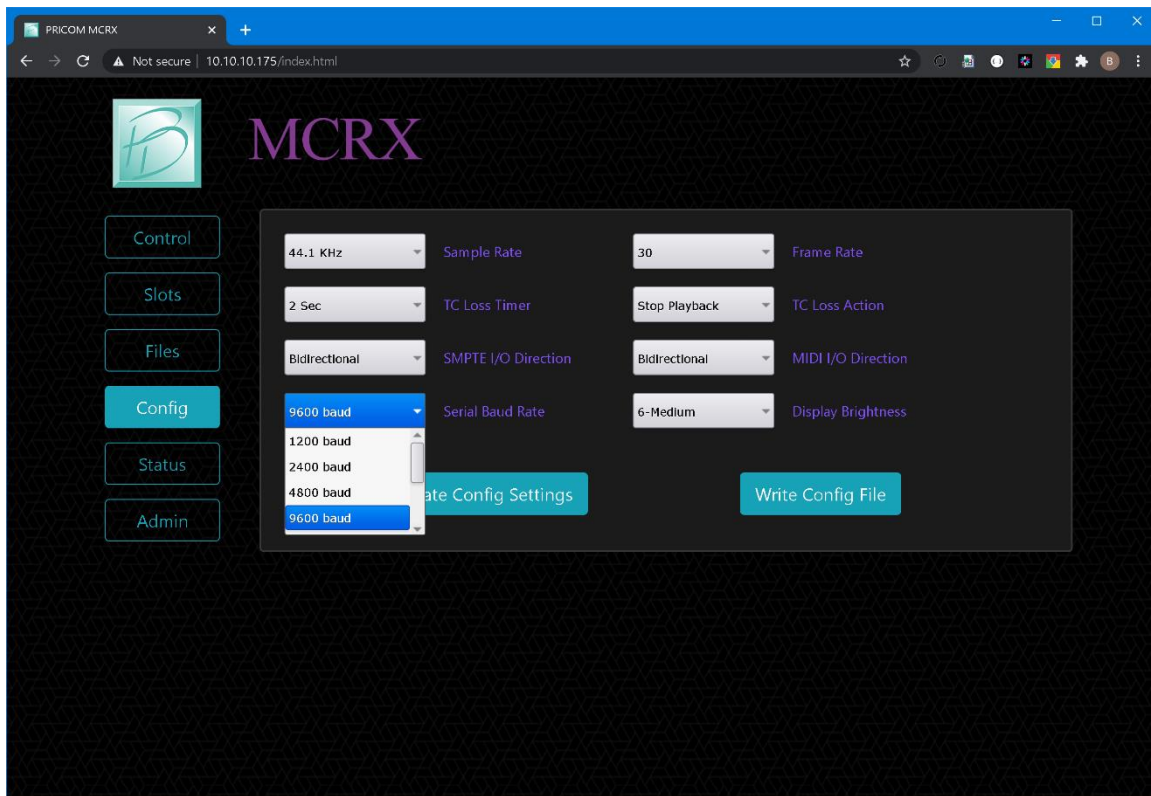
The MCRX can read MIDI Time Code (MTC) input and can also generate MIDI Time Code output simultaneously. The MIDI TC Receiver/Generator can be configured in the following modes:

Figure 40 – MIDI Interface Direction

Setting	Description
OFF	Disable MIDI Time Code Reader and Generator
RX Only	Only Receive MIDI Time Code
TX Only	Only Generate MIDI Time Code
Bidirectional	Receive AND Generate MIDI Time Code



5.7.7 Config Serial Baud Rate



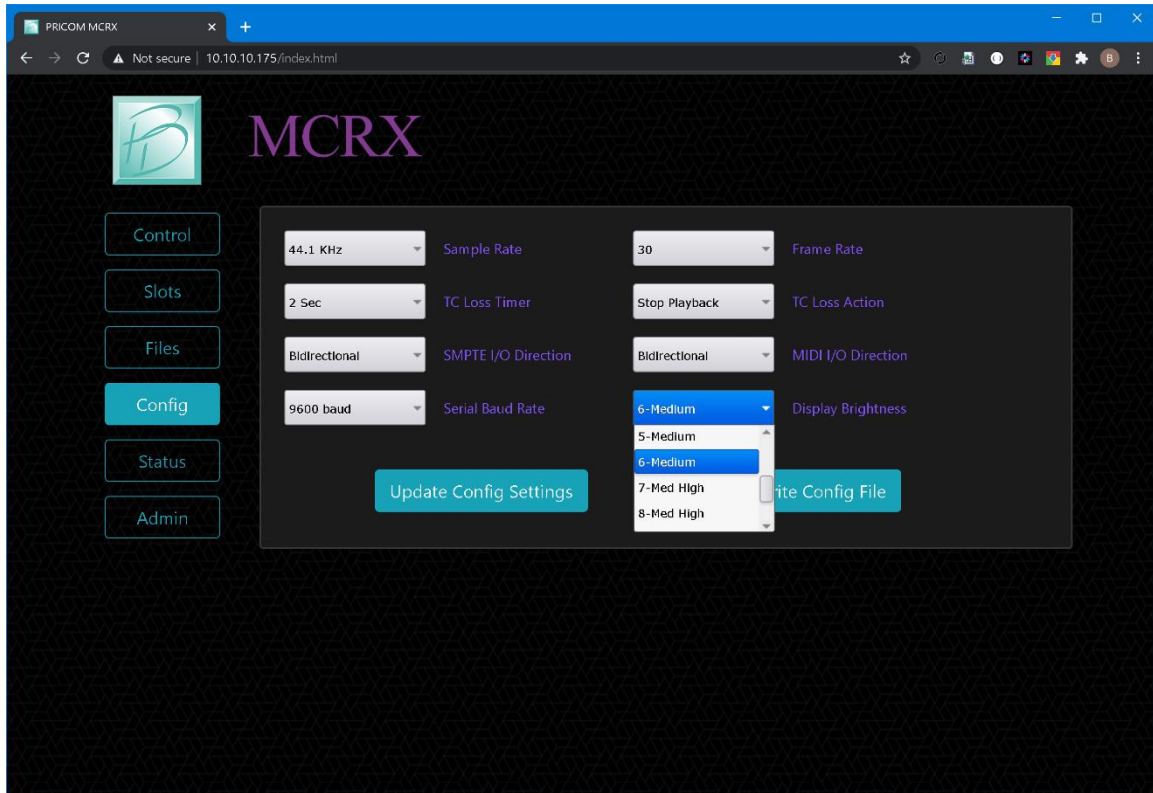
The MCRX can receive and generate Serial Commands using the built-in RS232 compliant Serial Port. Both Serial Receive and Transmit must use the same baud rate on the port. The Serial Port can be configured for different baud rates as shown below. Any settings change will not take effect until **Update Config Setting** is pressed.

Figure 41 – Serial Port Speed Selection

Setting	Description
1200 baud	Serial Port set for 1200 Baud (bits per second)
2400 baud	Serial Port set for 2400 Baud (bits per second)
4800 baud	Serial Port set for 4800 Baud (bits per second)
9600 baud	Serial Port set for 9600 Baud (bits per second)
19200 baud	Serial Port set for 19.2K Baud (bits per second)
38400 baud	Serial Port set for 38.4K Baud (bits per second)
115200 baud	Serial Port set for 115.2K Baud (bits per second)



5.7.8 Config Display Brightness



Front Panel brightness of the LED Meters and LCD Screen can be adjusted as needed for the operating environment of the MCRX.

Brightness can be set from 1 to 10 as shown in the list below. Any setting change will not take effect until the Update Config Setting button is pressed.

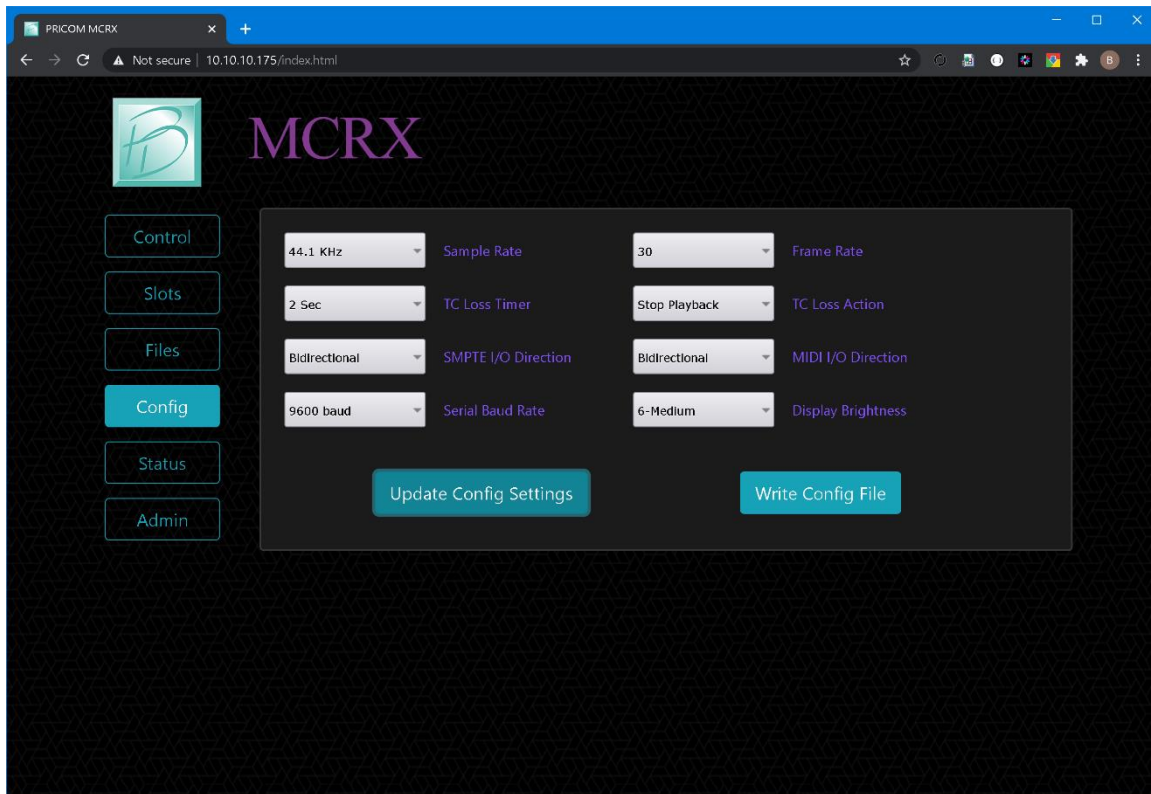
Figure 42 – Front Panel Brightness Selection

Setting	Description
1-Low	Lowest brightness setting for Front Panel
2-Low	Low brightness setting for Front Panel
3-Low	Low brightness setting for Front Panel
4-Medium	Medium brightness setting for Front Panel



5-Medium	Medium brightness setting for Front Panel
6-Medium	Medium brightness setting for Front Panel
7-Med High	Medium High brightness setting for Front Panel
8-Med High	Medium High brightness setting for Front Panel
9-Med High	Medium High brightness setting for Front Panel
10-High	Highest brightness setting for Front Panel

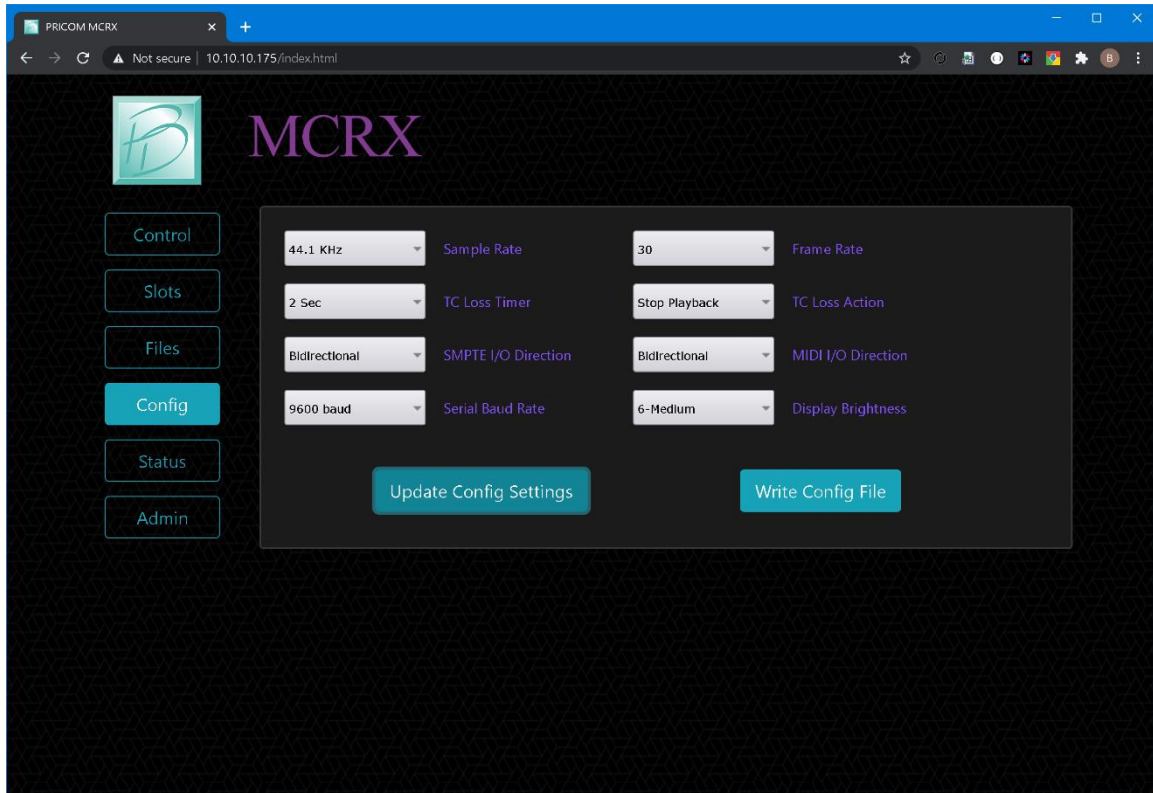
5.7.9 Update Config Settings



Pressing **Update Config Settings** will write any changes made on this screen to the MCRX chassis. If you do not press **Update Config Settings**, no changes made on the Config Screen will be updated to the chassis. To make these changes persistent after and power cycling the MCRX, make sure to **Write Config File** described below.



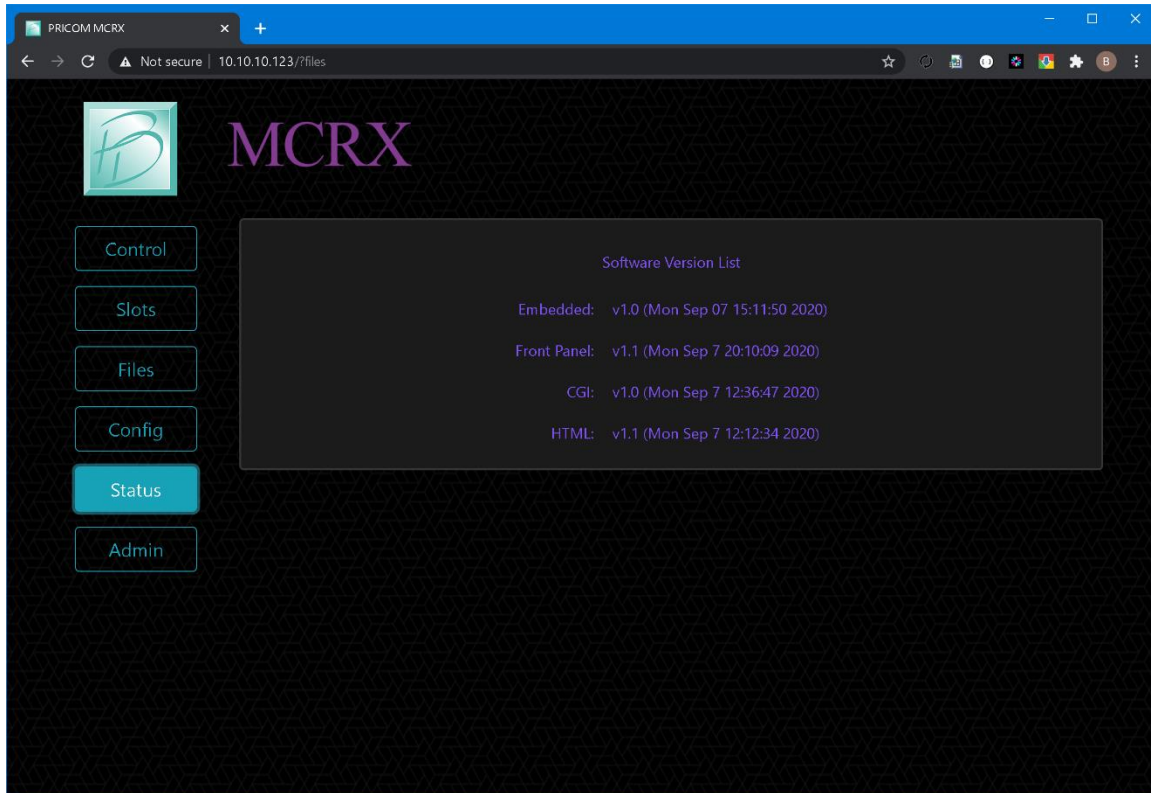
5.7.10 Write Config File



Once all changes have been made, and you have pressed **Update Config Settings**, press **Write Config File** to persistently save the Config settings. If you don't **Write Config File**, then the changes will persist until the chassis is rebooted. This can be helpful for testing new settings or configurations without affecting the persistent or "known good" settings of the chassis.



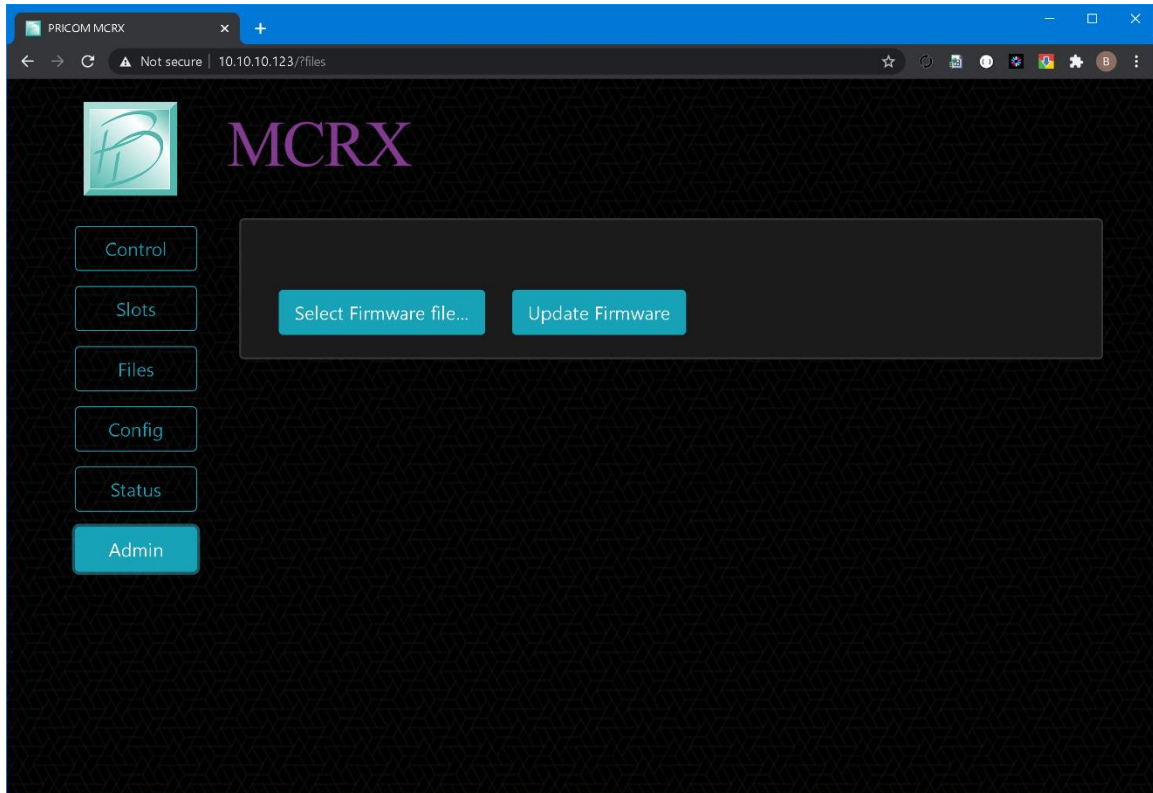
5.8 Status Menu



The Status Menu is used to display the current software version from all the subsystems in the MCRX.



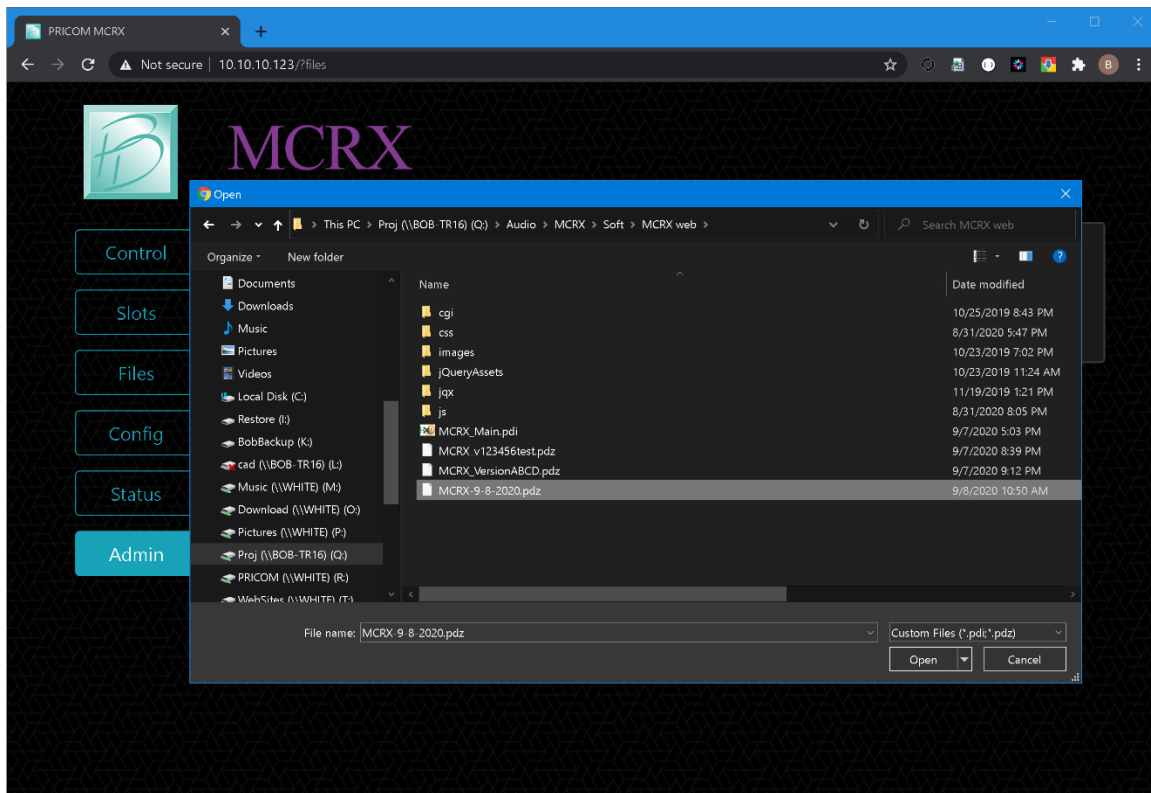
5.9 Admin Menu



The Admin menu allows you to update all the MCRX software and firmware in one easy place. First Click the Select Firmware File button.



5.9.1 Admin Select Firmware

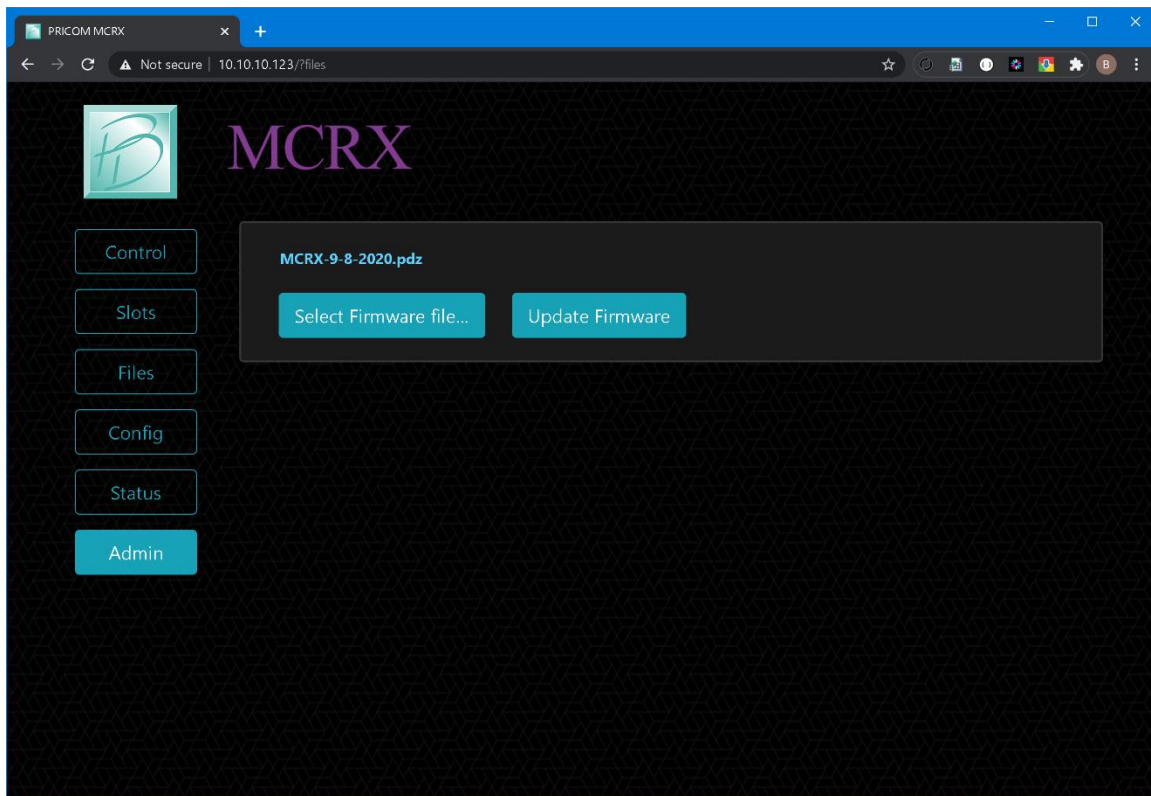


Browse to the appropriate location on your computer. The file you are looking for has the extension PDZ which includes all software files in one convenient file.

Select the desired file and press Open.



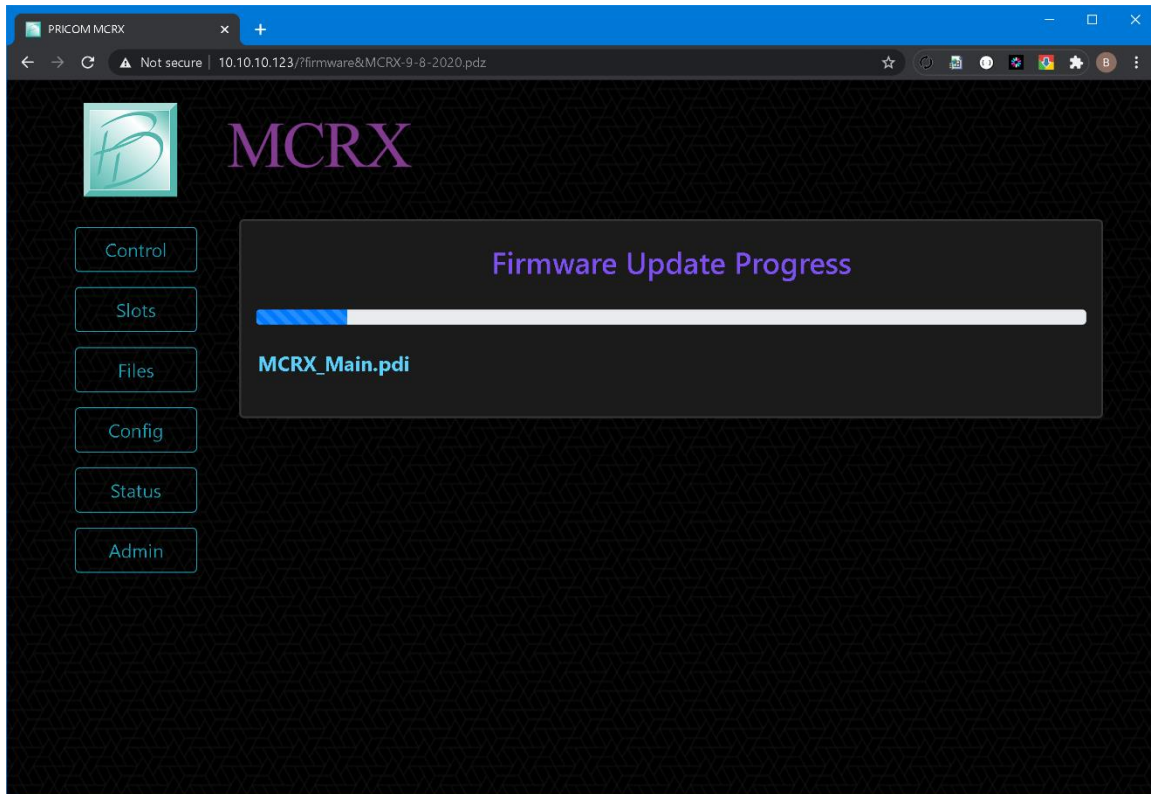
5.9.2 Admin Firmware Selected



With the file selected, the name will now appear on the Admin page as shown above. To start the firmware update process, press the Update Firmware button.



5.9.3 Firmware Update Progress



A progress bar will be shown as above. Once the firmware is done loading, the screen will refresh, and the progress bar will go away.



6 Example Applications

The MCRX was designed to be highly flexible to suit many applications. We have outlined a few examples below to help you get started.

6.1 GPIO Trigger – Timecode Output

In this use-case we will use 4 buttons connected to GPIO Inputs to start 4 Slots that each play a file on the 4 Stereo Outputs. Each Slot will generate both SMPTE and MIDI Time Code when each file plays.

Since there is only a single SMPTE Time Code and a single MIDI Time Code output, only one slot can emit Timecode at once. To help minimize the impact of this, if multiple Slots try to send Timecode, whichever Slot was triggered last will be the one sending the Timecode. If you trigger Slot-1, then Slot-2, then Slot-4, and they are all configured for Timecode output, then Slot-1 will send Timecode until Slot-2 is triggered, then Slot-2 will begin sending the Timecode and so on. Remember, last Slot triggered owns the Timecode output. However, if a new Slot is triggered, and it does not have Timecode output configured, then the active Timecode source will stay in effect.

6.2 Timecode Trigger – GPIO Output

In this use-case we will configure 4 Slots for triggering from SMPTE Timecode. Each of these 4 Slots will also turn on a GPIO output when the Slot is playing.

Keep in mind that multiple Slots could be configured to send the same GPIO output.

Care should be given to ensure any external equipment will not be confused by a GPIO signal that could come from multiple Slots. Of course, this could also be an advantage, a single GPIO could be used for an external “ducker” or relay to insert the signal whenever ANY slot is played. To do this, simply set all Slots to the same GPIO output function.



6.3 Timecode Trigger – Timecode Output

The MCRX can be triggered by one Timecode value (SMPTE or MIDI) and then generate a completely different Timecode value on the output side.

For example, we could trigger different Slots from different Timecode values, say Slot-1 from 01:00:00:00, and Slot-2 from 02:00:00:00, and Slot-3 from 03:00:00:00, but all 3 slots could send the same Timecode value starting with say 01:00:00:00.

There are no restrictions on input to output Timecode offsets, just that only one Slot can emit Timecode at any given time. The last Slot triggered (that has Timecode output configured) is always the generator of the Timecode output.

MIDI Timecode and SMPTE Timecode are independent, so you could also trigger based on SMPTE Timecode, but generate MIDI Timecode on playback.



7 Firmware Updates

7.1 Updating Your Firmware

One very special feature of the MCRX is the convenience of updating firmware via Ethernet. Firmware updates can be loaded through a web browser onto the internal micro SD Card. This allows you to load any firmware updates without having to physically access the MCRX.

7.2 Downloading Firmware Updates

When firmware updates become available, we will announce it on our website www.pricom.com. On the downloads page, find the updated version of firmware and click the download link.

The firmware updates are a special PRICOM Design file called *.PDZ, which means your machine will most likely not recognize the format and so you will be prompted with a box asking if you want to Find, Save, or Cancel.

Select SAVE and save to a folder that makes sense to you and can be found when necessary, “PRICOM Downloads” would be a good example.

Once you have the MCRX****.pdz file on your machine, please see the Admin Menu in the Web Interface Section of this manual for instruction on how to load the file into the MCRX.





MCRX User Manual

Copyright ©2020 PRICOM, Inc.