

User Guide

Audio Products:
Mixers and Processors

MVC 121 Plus

Three Input Stereo Mixer with DSP



Extron

Safety Instructions

Safety Instructions • English

⚠️ WARNING: This symbol, , when used on the product, is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

ATTENTION: This symbol, , when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

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Sicherheitsanweisungen • Deutsch

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VORSICHT: Dieses Symbol  auf dem Produkt soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

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Instrucciones de seguridad • Español

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Instructions de sécurité • Français

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ATTENTION : Ce pictogramme, , lorsqu'il est utilisé sur le produit, signale à l'utilisateur des instructions d'utilisation ou de maintenance importantes qui se trouvent dans la documentation fournie avec le matériel.

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UWAGI: Ten symbol, , gdy używany na produkcie, jest przeznaczony do ostrzegania użytkownika ważne operacyjne oraz instrukcje konserwacji (obsługi) w literaturze, wyposażone w sprzęt.

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Инструкция по технике безопасности • Русский

©Hér "unháðósséE" "Eea úí HÓEE" "ú" "úí C- HÍðó" "E" óðE" E" "í ódnúðóðeóðEE".
ðúí hÍr ðóceEE "eúí HÓEE" -ééð óð" cí ú- ÓceEí "eñc" / "HÓEE" "í óðóðeóðEE" "í
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eúí HÓEE" -ééð óð" cí ú- ÓceEí "Gzvqap" "í C- "Gzvqap",
www.extron.com"eúHÓI "ú" "í Óðóðu" "í" "8": /4; 2/230

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注意: 产品上的这个标志意在提示用户设备随附的用户手册中有重要的操作和维护(维修)说明。

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VCCI-A

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

ATTENTION:

- Risk of property damage.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,0p1 scene 1,1 ^B 51 ^W^C.0  
[01] R000400300004000080000600 [02] 35 [17] [03]  
Esc[X1]*[X17]*[X20]*[X23]*[X21]CE←
```

NOTE: For commands and examples of computer or device responses used in this guide, the character “0” is used for the number zero and “O” is the capital letter “o.”

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 208.132.180.48: bytes=32 times=2ms TTL=32  
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx -t  
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.
Click the **OK** button.

Specifications Availability

Product specifications are available on the Extron website, www.extron.com.

Extron Glossary of Terms

A glossary of terms is available at <http://www.extron.com/technology/glossary.aspx>.



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Introduction

This section describes this manual and the MVC 121 Plus, including:

- [About This Guide](#)
- [MVC 121 Plus Description](#)
- [MVC 121 Plus Features](#)
- [MVC 121 Plus Application Diagram](#)

About This Guide

This guide contains information about the Extron MVC 121 Plus audio mixer and volume controller with DSP. Unless otherwise specified, references in this guide to the “mixer” or “MVC” relate to the features or operation of the MVC 121 Plus.

MVC 121 Plus Description

The MVC 121 Plus is an audio mixer and volume controller that will mix up to two mic/line inputs (mono, balanced or unbalanced) with one line level input (stereo, balanced, or unbalanced). All audio input signals are converted from analog to digital prior to processing or routing. Each mic input and the stereo line level input have their own gain control adjustment screws, and the mixed output also features a volume control knob.

The MVC offers gain, Parametric EQ filter, and tone processing with quick and intuitive configuration using the DSP Configurator software. The DSP built into the MVC provides wide dynamic range and utilizes 24-bit audio converters with 48 kHz sampling to maintain audio signal transparency.

Two sets of outputs include a fixed output that is independent from volume control, and a variable output that is volume adjustable. All inputs and outputs are via 3.5 mm captive screw connectors, and the gain/volume settings are indicated by an eight segment LED ladder.

Rotating the gain adjustment screw clockwise increases gain, rotating the screw counterclockwise decreases gain. Gain values adjust in 1 dB increments.

Volume adjustment interval varies with knob rotation, that is, turning the knob clockwise increases the volume and turning the knob counterclockwise decreases the volume. The volume is increased more rapidly at lower volume settings.

The MVC offers RS-232 control of input gain/attenuation, and control of output volume. The latest firmware can be uploaded using RS-232 or USB and the Extron Firmware Loader program for Windows®.

MVC 121 Plus Features

Emulate and live modes for configuration — The DSP Configurator control program can be used in emulate mode to create an MVC 121 Plus configuration offline. The modifications can be saved and applied to the unit when a connection is established. In live mode, the changes are made directly to the unit.

Two mic/line inputs and one line level input — Two mic/line (mono, balanced or unbalanced) inputs can mix with one line level (stereo, balanced or unbalanced) input.

Fixed and variable outputs — The MVC includes a fixed output and a volume adjustable variable output.

Multi-function LED level indicator — Automatically displays the mix-point gain or output volume setting for the front panel controls, and also functions as an output level meter.

Fixed, low latency DSP processing — Input to output latency within the MVC 121 Plus is fixed regardless of the number of active channels or processes. Fixed, low latency processing keeps audio in sync with video, and prevents distractions to the presenter resulting from delayed live audio.

48-volt phantom power for condenser microphones — 48 VDC phantom power is available for mic inputs 1 and 2.

Soft limits provide optimal adjustment range — The volume range for the variable output and the gain range for the three mix points can be limited using the soft limits to maintain optimal minimum and maximum levels when using external control. This prevents operators from over or under-adjusting levels when using digital I/O or RS-232 control. The DSP Configurator software provides quick drag-and-drop adjustment of soft limits.

SpeedNav™ keyboard navigation — SpeedNav enables user-friendly, keyboard-based navigation of the DSP Configurator software without the need for a mouse or touchpad. Using keyboard navigation keys and shortcuts, the user can access any input or output, mix-points, and all audio DSP tools. Using only the keyboard for software access can help expedite audio system setup and commissioning.

Rear panel RS-232 control port — The MVC 121 Plus can be configured using Extron Simple Instruction Set (SIS™) commands from a PC using an RS-232 cable.

Front panel USB control port — The MVC 121 Plus can be configured by Extron Simple Instruction Set (SIS) commands from a PC using a USB cable.

MVC 121 Plus Application Diagram

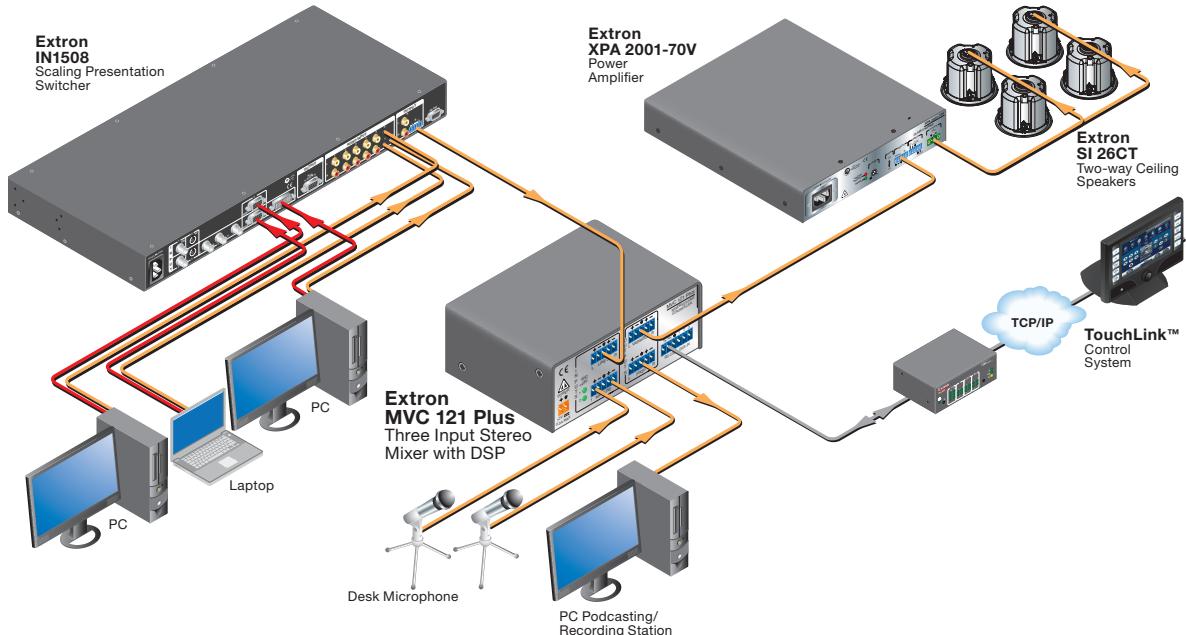


Figure 1. MVC 121 Plus Application Diagram

Installation

This section describes the features and connectors for the MVC 121 Plus:

- **Rear Panel Features**

- **Front Panel Features**

Rear Panel Features

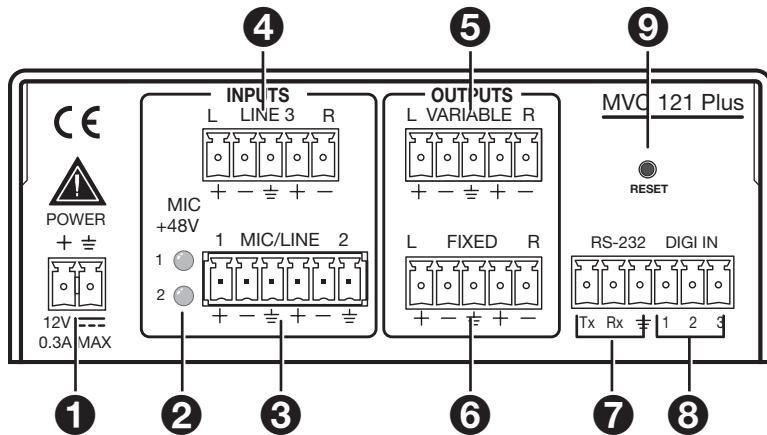


Figure 2. MVC 121 Plus Rear Panel

- 1** **POWER connector** — Connect the two pole, 3.5 mm captive screw connector from the 12 VDC external power supply (provided) to this socket on the rear panel. Ensure the connections have the correct polarity as shown in the illustration below:

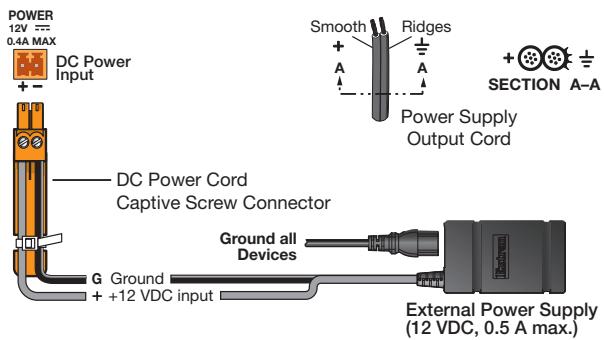


Figure 3. Power Supply Connection

ATTENTION:

- Always use a power supply supplied or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- Utilisez toujours une source d'alimentation fournie ou recommandée par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute certification de conformité réglementaire, et peut endommager la source d'alimentation et l'unité.

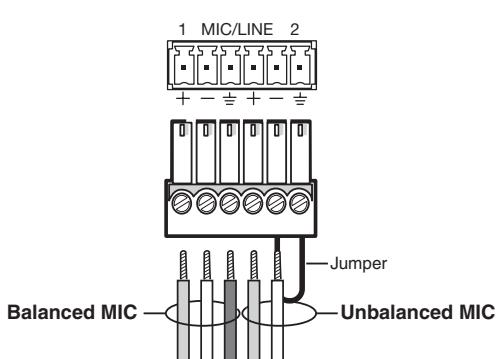
ATTENTION:

- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The power supply is to be located within the same vicinity as the Extron AV processing equipment in an ordinary location, Pollution Degree 2, secured to the equipment rack within the dedicated closet, podium or desk. Power over Ethernet (PoE) is intended for indoors use only. No part of the network that uses PoE can be routed outdoors.
- Sauf mention contraire, les adaptateurs CA/CC ne conviennent pas à une utilisation dans les espaces d'aération ou dans les cavités murales. La source d'alimentation doit être placée à proximité de l'équipement Extron dans un emplacement ordinaire soumis à un degré de pollution de catégorie II, solidement fixé au rack d'équipement d'une baie technique, d'un pupitre, ou d'un bureau. L'alimentation via Ethernet (PoE) est destinée à une utilisation en intérieur uniquement. Elle doit être connectée seulement à des réseaux ou des circuits qui ne sont pas routés au réseau ou au bâtiment extérieur.
- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.
- Cette installation doit toujours être conforme aux dispositions applicables du Code américain de l'électricité (National Electrical Code) ANSI/NFPA 70, article 725, et du Code canadien de l'électricité, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à la structure de bâtiment ou à d'autres structures similaires.

NOTE: The length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inches (5 mm). Any longer and the exposed wires may touch, causing a short circuit between them. Any shorter and the wires can be easily pulled out even if tightly fastened by the captive screws.

Do not tin the wires. Tinned wire does not hold its shape and can become loose over time.

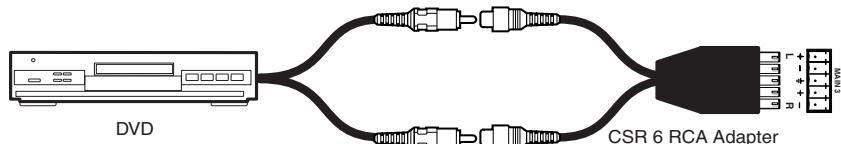
- ② **MIC 1 and 2 +48 V phantom power LED indicators** — The LED lights whenever the corresponding mic phantom power is on and goes off when the phantom power is off.
- ③ **MIC/LINE inputs 1 and 2** — Up to two mono microphones or line level signals, balanced and/or unbalanced, may be connected to the 6-pole 3.5 mm captive screw connector. Inputs provide gain settings to accommodate consumer and pro operating line level sources, with sufficient gain to support mic level audio.



NOTE: Mic inputs will be evenly mixed into both left and right outputs.

Figure 4. MIC/LINE Inputs

- ④ Line input 3, left (L) and right (R)** — A line level audio source, such as a CD player, output from a switcher, DVD player, or other audio device, may be connected to the 5-pole 3.5 mm captive screw connector. Line inputs provide gain settings to accommodate consumer and pro operating line level sources. Balanced or unbalanced stereo connections can be wired to this connector (see the following example diagram).



NOTE: Input devices cabled with two RCA male outputs may be connected to the 5-pole 3.5 mm captive screw connector using the Extron CSR 6 adapter.

Figure 5. Input Devices Cabled with Two RCA Male Outputs

To wire the captive screw connectors to the RCA or 3.5 mm mini phone plugs, see the following illustrations.

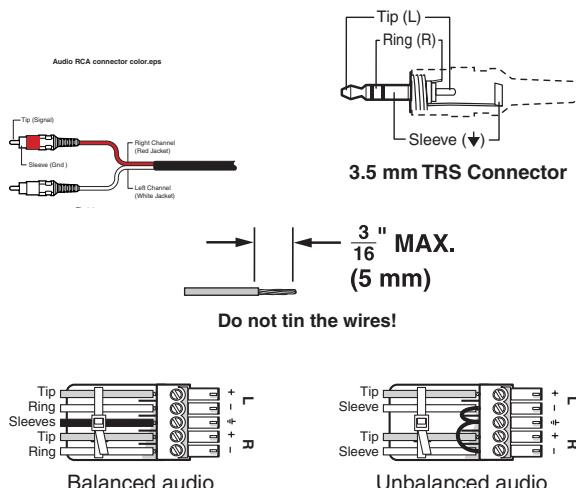
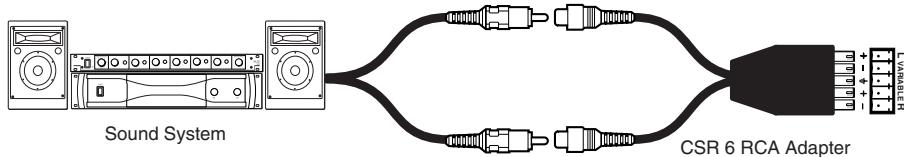


Figure 6. Wiring Captive Screw Connectors

- ⑤ Variable output left (L) and right (R)** — The balanced/unbalanced stereo output to an amplifier from the 5-pole 3.5 mm captive screw connector is controlled by the large main volume control knob on the front panel (see **Front Panel Features** on page 7). Volume range is from 0 to 100%, or -100 to 0 dB. Adjust the speaker volume by using the following sequence:

1. Adjust the volume of the amplifier down to its minimum setting.
2. Adjust the main volume knob of the MVC to its default level of 100% volume, or 0 dB.
3. Adjust the volume of the amplifier to the desired level.
4. Make subsequent volume level adjustments by using the volume knob of the MVC.

NOTE: Output devices cabled with two RCA male outputs may be connected to the 5-pole 3.5 mm captive screw connector using the Extron CSR 6 adapter.



CAUTION

For unbalanced audio, connect the sleeve(s) to the center contact ground. **DO NOT** connect the sleeve(s) to the negative (-) contacts.

ATTENTION:

- Connect the sleeve to ground. Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.
- Connectez le manchon à la borne de terre (Gnd). Connecter le manchon à une borne négative (-) endommagera les circuits de la sortie audio.

Figure 7. Output Devices Cabled with Two RCA Male Outputs

- ⑥ Fixed output left (L) and right (R)** — The balanced/unbalanced stereo output from the 5-pole 3.5 mm captive screw connector is output at a fixed volume adjustable gain level for input to a recording device. Level can be adjusted at the recording device, or using output gain control with a range of -24 to +12 dB.

NOTE: The main volume control knob on the front panel operates independently of the fixed output. Both the fixed and variable output connectors will output audio simultaneously.

The fixed output connector is wired the same as the variable output connector. See **⑤**, variable output connector, for an example application diagram with cabling instructions and a caution.

- ⑦ RS-232** — Connect an RS-232 device (control system or PC) to the 6-pole 3.5 mm captive screw connector for two-way RS-232 communication. Software for RS-232 control is included with the MVC. See **SIS Programming and Control** (see page 28) for information on how to install and use the control software and SIS commands.

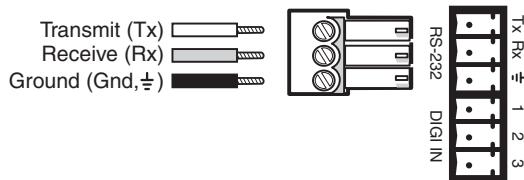


Figure 8. RS-232

- ⑧ Digital input (DIGI IN)** — A 6-pole 3.5 mm captive screw connector provides three configurable ports designed to connect to various devices such as motion detectors, alarms, buttons, photo (light) sensors, temperature sensors, or other devices. This connector shares a common ground with the RS-232 connector (⑦). The wiring diagram is shown below.

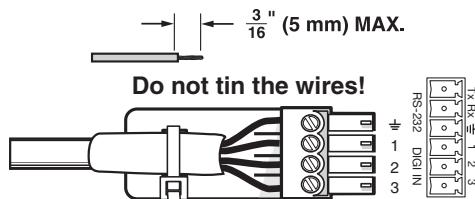
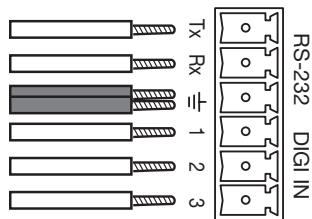


Figure 9. Digital Input Wiring Diagram

Both the RS-232 and the digital input connectors may be used simultaneously by using a 6-pin captive screw connector with two wires sharing the same ground connector (see the diagram below).



- ⑨ **Reset** — The recessed reset button is used to access various modes of resets. The green power LED on the front panel indicates what mode of reset was accessed (see the [MVC 121 Plus Hardware Reset Modes](#) (see page 51) section for additional details).

Front Panel Features

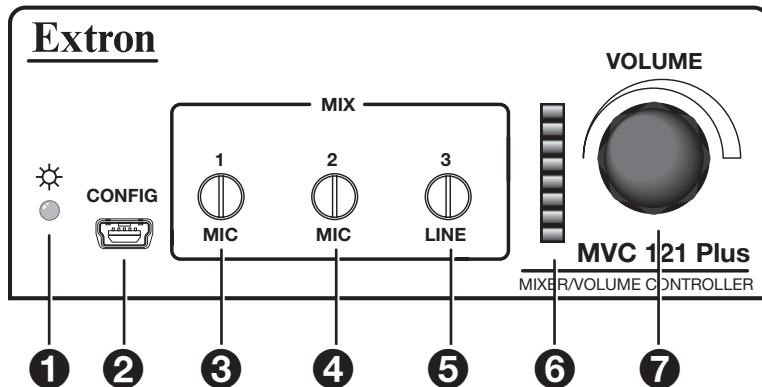


Figure 10. MVC 121 Plus Front Panel

- ① **Power/Reset LED** — Green power indicator lights when the MVC 121 Plus is operational. The LED also blinks per mode reset (see [Reset Actuator and LED](#) on page 12).
- ② **Configuration (Config) port** — Connect a PC to the USB mini B-type connector for configuring the MVC using the DSP Configurator software. The MVC 121 Plus USB driver must be installed prior to using the port.
- ③ **Mic 1 gain control** — Rotating the encoder screw clockwise increases the gain setting, rotating the encoder screw counterclockwise decreases the gain. This adjustment controls the single gain point in the mix matrix that mixes mono mic 1 levels to the stereo output bus.

The gain adjustment is indicated by the LED indicator bar (⑥). When the encoder screw rotation has stopped for three seconds or longer, the LED indicator returns to the output meter indication.

- ④ Mic 2 gain control** (see [figure 10](#) on the previous page)— Rotating the encoder screw clockwise increases the gain setting, rotating the encoder screw counterclockwise decreases the gain setting. This adjustment controls the single gain point in the mix matrix that mixes mono mic 2 levels to the stereo output bus.

The gain adjustment is indicated by the LED indicator bar (⑥). When the encoder screw rotation has stopped for three seconds or longer, the LED indicator returns to the output meter indication.

- ⑤ Line level 3 gain control** — Rotating the encoder screw clockwise increases the gain setting, rotating the encoder screw counterclockwise decreases the gain setting. This adjustment controls the single gain point in the mix matrix that mixes stereo line level input 3 to the stereo output bus.

The gain adjustment is indicated by the LED indicator bar (⑥). When the encoder screw rotation has stopped for three seconds or longer, the LED indicator returns to the output meter indication.

- ⑥ LED ladder indicator bar** — As the mix-point gain or output volume increases or decreases via the front panel controls, the LED indicator bar lights from the bottom to the top to indicate the current mix-point or volume level, as shown in the table below. As the volume is increased or decreased within a volume range, the top LED to be lit flashes once. If the knob is turned past maximum volume, all 8 LEDs flash for as long as the knob continues to be turned.

When the output volume is muted, the individual LEDs scroll from the top to the bottom to indicate a muted state. The LEDs return to being a meter for the output signal when the audio is unmuted. Unmute occurs when the mute process is reversed, or when an encoder screw or the volume knob position is changed. All LEDs blink when the user attempts to adjust the encoder position beyond the maximum gain level.

When no activity is detected for either the mix-point encoder screws or the volume adjust knob, the LED indicator bar will reflect a combined L/R output meter level, where the max level of either left or right meter is always displayed, as shown in the table below.

NOTE: Mix-point or volume level is only displayed on the LED ladder indicator whenever the front panel encoder screws or the volume adjustment knob are being adjusted and not through DSP Configurator software or SIS commands.

LED Level	Meter Display (dB)
8	-6 to 0
7	-12 to -7
6	-18 to -13
5	-24 to -19
4	-30 to -25
3	-36 to -31
2	-42 to -37
1	-60 to -43

7 Volume level adjust knob — Rotating the adjustment knob clockwise increases the output volume, rotating the knob counterclockwise decreases the volume. The LEDs light from bottom up as the volume level increases.

Use the rotary encoder to adjust the output volume from 0 (-100 dB) to 100% (0 dB). The default setting is 100% (0 dB). The knob step adjustments are as follows:

Volume Range (dB)	Knob Step Adjustment (dB)
-100 to -70	+/- 5 dB
-70 to -30	+/- 3 dB
-30 to -20	+/- 2 dB
-20 to -0	+/- 1 dB



The degree to which the volume is incremented or decremented for each step the volume adjust knob is turned, depends on the current volume setting.

As the volume increases or decreases, the LED bar lights to indicate the current volume range, as shown in the table below. As the volume is increased or decreased within a volume range, the top LED to be lit flashes once. If the knob is turned past maximum volume, all 8 LEDs flash, for as long as the knob continues to be turned.

In the table below, turning the volume adjust knob (7) affects the volume range and turning the input gain control screws (3, 4, 5 affects the mix-point range).

LED Level	Volume Range (dB)	Mix-point Range (dB)
8	-4 to -0	+7 to +12
7	-9 to -5	+1 to +6
6	-14 to -10	-3 to +0
5	-19 to -15	-7 to -4
4	-29 to -20	-11 to -8
3	-49 to -30	-15 to -12
2	-69 to -50	-19 to -16
1	-99 to -70	-23 to -20

Operation

This section describes the operation of the MVC 121 Plus, including:

- [MVC 121 Plus Operation](#)
- [Mic/Line Input Signal Chain](#)
- [DSP Processing/Signal Flow](#)
- [Mixer](#)
- [Filter Processor Block](#)
- [Output Channels](#)

MVC 121 Plus Operation

The MVC 121 Plus can be configured using a PC running Windows XP or better and the DSP Configurator software (available on the included disc or at www.extron.com), or the Extron SIS Simple Instruction Set using HyperTerminal or DataViewer.

The MVC 121 Plus is configured for immediate operation, with all inputs mixed to the outputs. However, input gain must be set, especially for the microphone inputs, before the device will function at optimal levels.

The front panel small rotary encoders control level at the mix-points, not at the input gain stage. Mix-points have a gain range of –24 dB to +12 dB. In some instances, the mix-point gain range may be too great, allowing for settings that are too loud or too soft, and in some instances the loudest settings may cause feedback or clipping. Soft limits can be applied to the mix-point gain ranges, limiting the gain range for smoother operation.

Mix-point levels and Variable output levels may be set using the front panel rotary controls. Input gain should be set using the DSP Configurator software, which provides metering in dBFS that will assist you in configuring the device for optimal operation. The MVC 121 Plus is a digital device, therefore optimal operating levels are close to 0 dBFS without ever going over 0 dBFS (0 dB “full scale” on the input or output meters). Levels above 0 dBFS cause clipping, which is always audible on a digital device.

Soft limits may also be applied to the Variable output, which will prevent the volume from becoming too loud or too soft. The Fixed output, while not affected by the front panel Volume control, does include a gain stage that is configured with the DSP Configurator software. The Fixed output gain setting can be used to optimize the level going to, for example, a recording device or ALS system.

Lastly, the input signal chain provides a Filter/EQ block. Use these processors to optimize the tonal quality of your source devices. A high-pass filter applied to a microphone will reduce thumps and pops, while the parametric EQ can be used to give a talker more presence, or to remove frequencies that are likely to cause feedback.

Front Panel Operation

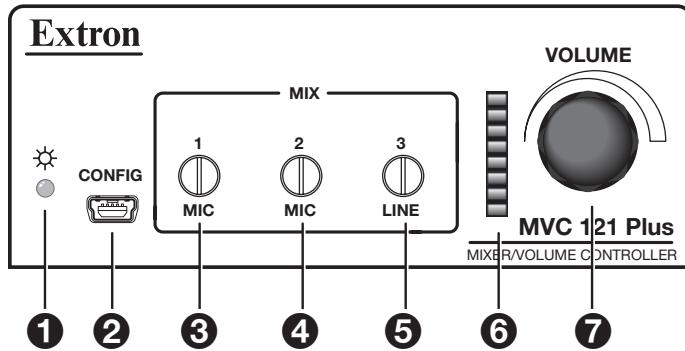


Figure 11. MVC 121 Plus Front Panel

- ❶ **Power/Reset LED** — Green power indicator lights solid when the MVC is operational. The LED will blink when the reset button is pressed.
- ❷ **Configuration connector** — The USB 2.0 port uses a mini type-B connector to connect to a host computer for control. The MVC 121 Plus USB driver must be installed prior to using the port (see the [Install the USB Driver](#) on page 41 for additional information).
The MVC appears as a USB peripheral with bidirectional communication. The USB connection can be used for software operation (see [Windows-based Program Control](#) on page 39), and SIS control (see [Software Control](#) on page 39 for additional information).

Rear Panel Operation

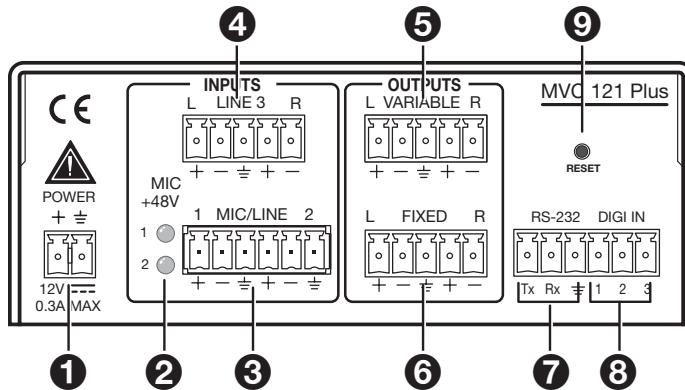


Figure 12. MVC 121 Plus Rear Panel

- ❶ **2 3 4 5 6 7 8** See [Rear Panel Features](#) starting on page 3 section for further details.
- ❹ **Reset** — The reset actuator initiates system resets (see [Reset Actuator and LED](#) on page 12 for additional information).

Power Cycle

Current mixing and audio processor settings, the current state of the device, are saved in nonvolatile memory. When the unit is powered off, all settings are retained. When the unit is powered back on, it recalls settings from the nonvolatile memory. If a configuration was in process during the power down, these saved mix, audio level, and audio DSP processor settings become active.

On power up the front power indicator LED lights solid when the unit is available for operation or programming.

Firmware Updates

The firmware of the MVC 121 Plus can be updated through USB or RS-232 connection. The user can obtain new firmware from the Extron website. After obtaining the new firmware, upload it to the unit by launching Firmware Loader from the DSP Configurator program (see **Software Control** on page 39), or using the Extron standalone Firmware Loader software application available on the included disc or at www.extron.com.

Reset Actuator and LED

A recessed button on the rear panel initiates two reset modes. The green front panel LED (**figure 11, ②** on the previous page) blinks to indicate the reset modes as described in the following section. See the previous front and rear panel diagrams.

Hardware Reset Modes:

With power on, when the reset button is held down the front and rear panel LEDs will pulse (blink) every three seconds and put the unit in a different reset mode. The MVC 121 Plus will default back to the base firmware that shipped with the unit from the factory allowing the user to recover a unit that has incorrect code or updated firmware running.

NOTE: Control software may not function correctly if using an earlier firmware version.

MODE 1 – Firmware reset: Disconnect power to the MVC 121 Plus. Press and hold the reset button while applying power to return the firmware to the version shipped with the unit from the factory. This allows recovering a unit with incorrect or corrupt firmware.

All user files and settings are maintained.

MODE 5 – Factory default reset: With power on, press and hold the reset button until the reset LED blinks 3 times (~9 seconds). Each flash will last for 0.25 seconds. Release then momentarily (<1 second) press the reset button to return the MVC to factory default conditions. If the second momentary press does not occur within 1 second, the reset is exited.

The default (reset) state of the device is:

- Inputs 1 – 3 are mixed to fixed and variable outputs (set to 0 dB gain).
- All outputs are active (unmuted, 100% volume or 0 dB gain).
- DSP (Filter) is inactive.
- All audio inputs are active (0 dB gain and unmuted).

Digital Input Port

The three-pin digital input port (Digi In) is used to monitor or drive TTL level digital signals. The port consists of three input pins with the fourth pin being used as a ground providing three inputs total. The DSP Configurator software provides a selection of functions from a list, to be loaded to the MVC 121 Plus.

NOTE: The digital input connectors are used to mute or unmute the input signal using a contact closure device. SIS programming commands cannot mute or unmute the input signal while the digital input ports are connected. The digital input ports are “off” and not configured by default.

1. From the main structure menu, click **Tools > Configure Digital Inputs** to access the **Config** utility.

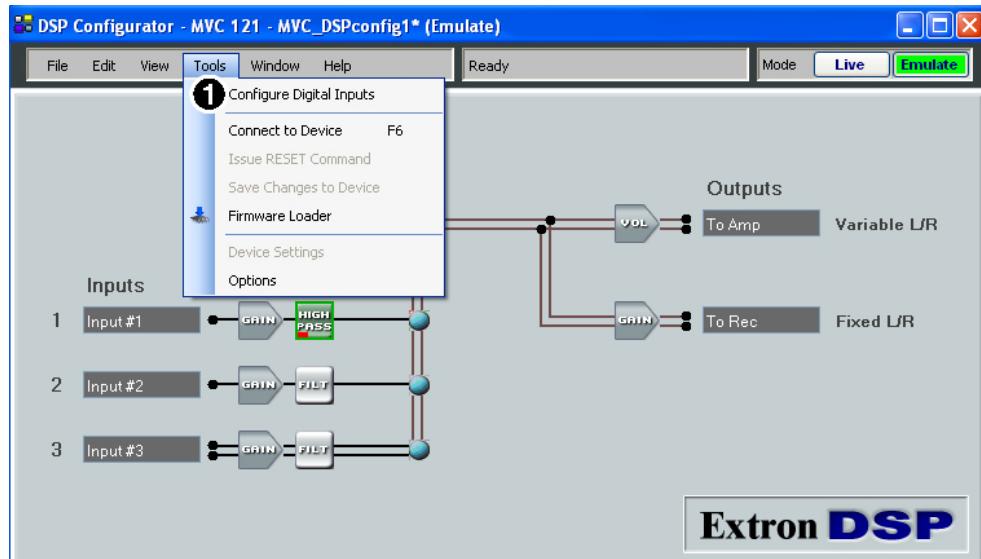


Figure 13. Access to Configure Digital Inputs

2. Select the digital input to configure.

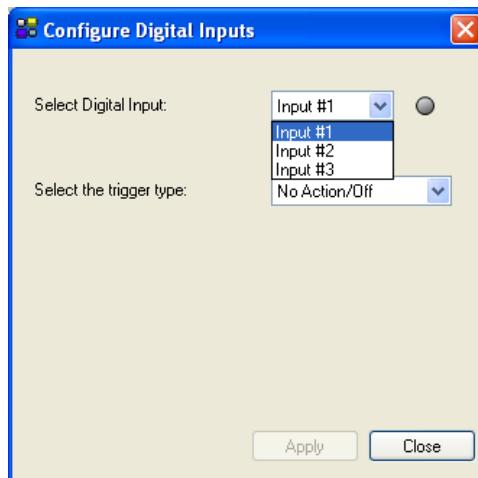


Figure 14. Configure Digital Inputs Dialog Box

3. Select the event or ‘trigger’ to configure the input.

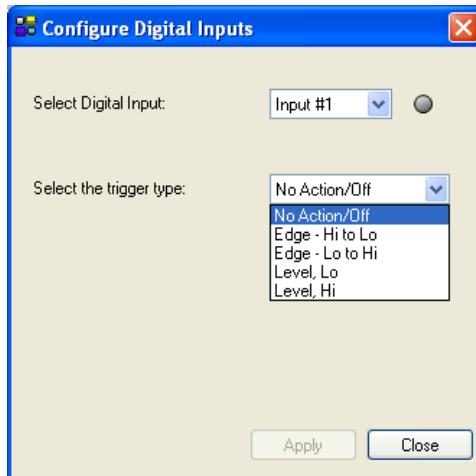


Figure 15. Select Trigger Type

4. The Fixed functionality of the digital input is set to **Mute/Unmute** by default.

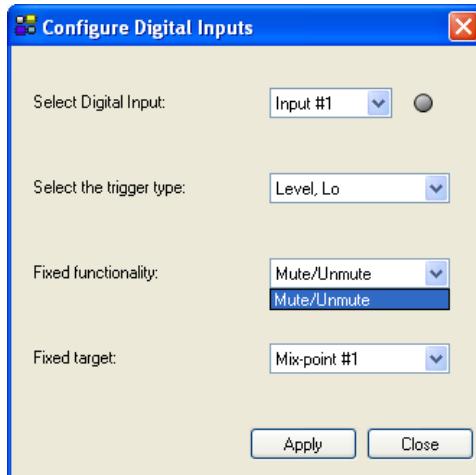


Figure 16. Fixed functionality Option

5. The Fixed target mix-point is set to the selected digital input by default.

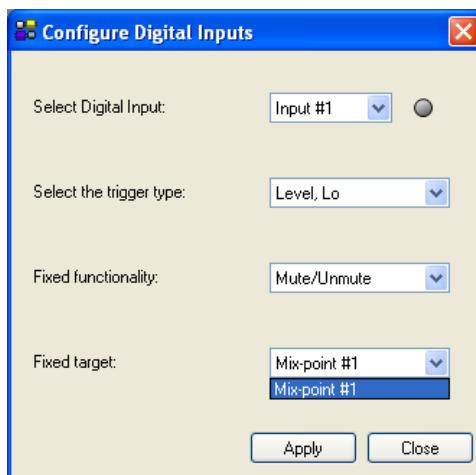


Figure 17. Fixed target Option

6. Click **Apply** to accept the changes.

DSP Processing and Signal Flow

The diagram below shows the input signal flow and DSP processing per signal chain. Signal chains and mix-points are described in the following sections.

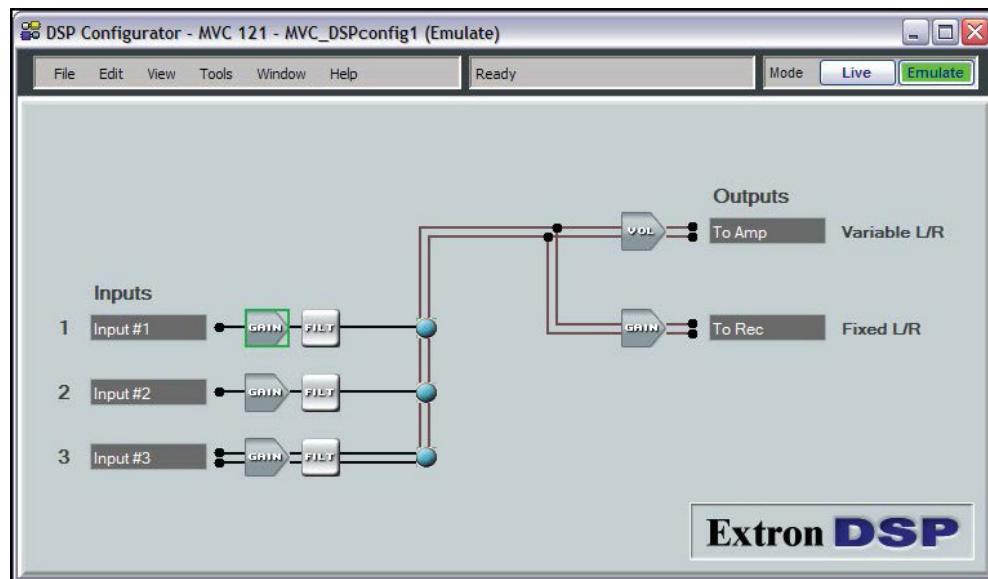


Figure 18. DSP Processing per Signal Chain

All signal routing, processing, and level control (gain/volume), are accomplished using software control from a PC connected to the MVC 121 Plus via the USB configuration port or the RS-232 port. The DSP Configurator program provides complete control while the SIS commands provide more limited control.

This section describes the signal processing including parameter ranges, and how to mix inputs and outputs using the DSP Configurator control program. To install the DSP Configurator program, see **Software Control** on page 39.

Mic/Line Input Signal Chain



Figure 19. Input Signal Chain

Input signal chain GUI elements from left to right are as follows:

Mic/line inputs 1 and 2

- **Gain (GAIN)** — Mono gain control with a range from -18 to +60 dB includes a mute button. Step resolution is 0.1 dB. A polarity switch (+ or -) is provided. Gain control is provided pre-meter and mute control is provided pre-meter.

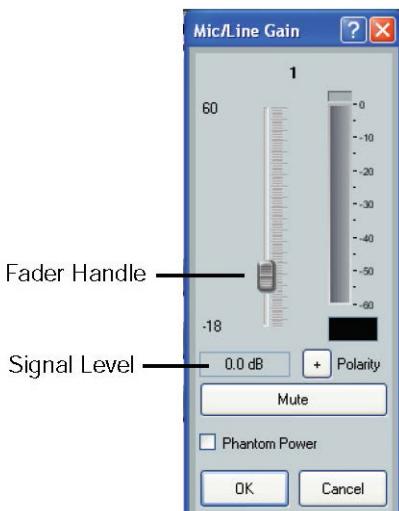


Figure 20. Fader Handle

Clicking the fader handle or clicking within the fader area brings focus to the fader. The input signal level can be adjusted using any of the following methods:

- Direct adjustment. Click and hold the fader handle, then drag it to the desired level in 0.1 dB steps.
- Click or tab to the fader handle, then <up arrow> or <down arrow> to the desired level in 1 dB steps. Page Up and Page Down increases or decreases level in 10 dB steps.
- Click in or tab to the signal level readout field. Type a new value, then press <Enter> or <Tab> to another area.
- **Filter (FILT)** – Up to five filters per input can be inserted in any combination of High Pass, Low Pass, Bass & Treble shelving (tone), or Parametric Equalizer.

Line input 3

- **Gain (GAIN)** — Stereo (left/right) gain control with a range from -18 to +24 dB includes mute buttons. Step resolution is 0.1 dB. Left and right polarity switches (+ or -) are provided. Gain control is provided pre-meter and mute control is provided pre-meter. A Gang switch ties the two input levels together.

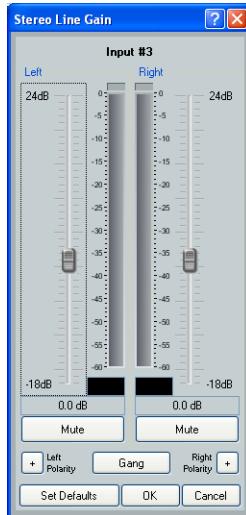


Figure 21. Stereo Line Gain

- **Filter (FILT)** — Up to three filters can be inserted in any combination of High Pass, Low Pass, Bass & Treble shelving (tone), or Parametric Equalizer.

Filter Processor Block

A filter block can be configured for each MVC input. The following functions are available:

- **Insert** — The filter block is inserted and made active by right-clicking on the block and selecting from the context menu or by double-clicking and entering selections.
- **Remove a filter** — An active filter can be removed by right-clicking on the block and selecting **Delete** or by selecting the block and pressing <delete> on the keyboard. This sets the parameters back to default and bypasses the block.
- **Bypass** — When bypass is active, signal flow passes through the filter block without filter processing, regardless of the settings.
When bypass is removed, the signal will be processed according to the filter settings. A red mark appears in the lower left of the block (shown on the right) to indicate it has been inserted, but is currently bypassed.



Filter

Mic/line inputs 1 and 2 allow a total of five filters per input. Line input 3 allows up to three filters.

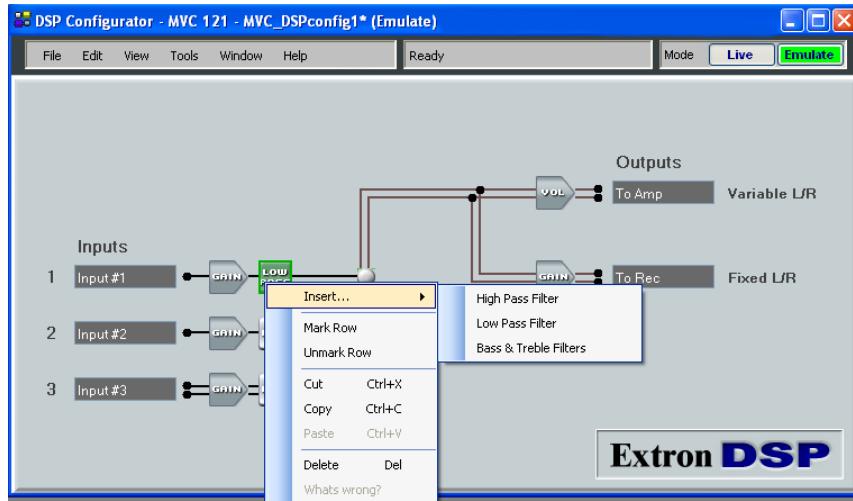


Figure 22. Filter Inputs

The first filter is inserted from a processor list that appears when the block is double-clicked or via a context window/processor list when the block is right-clicked. After the processor is inserted, a double-click opens the setup dialog box.

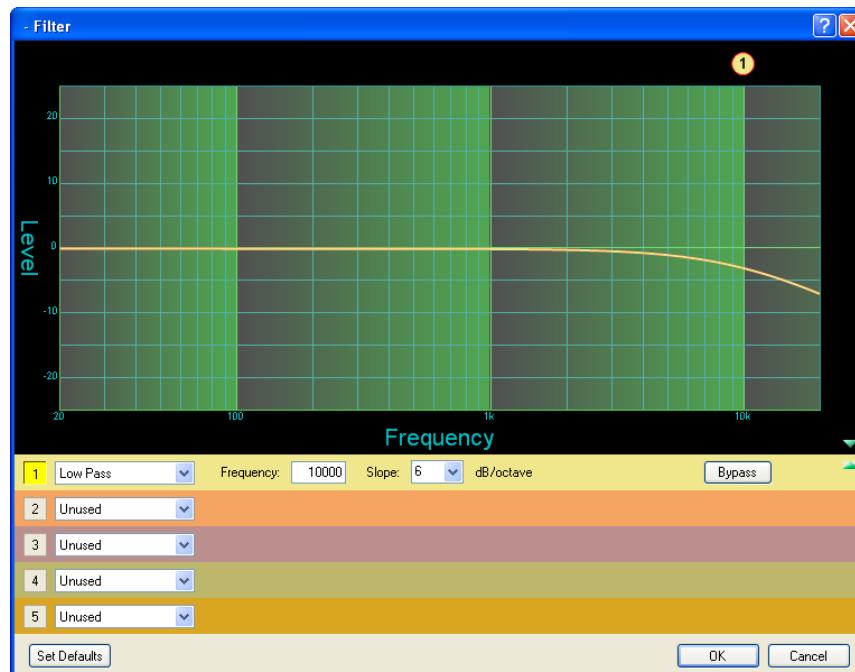


Figure 23. Filter Block Dialog Box

Additional filters are inserted by opening the filter block dialog box, then selecting a filter type from the drop-down filter selection list. All filter parameters are modified via the Filter block dialog box. Each filter loads with all applicable default parameters displayed to the right of each drop-down filter selection list.

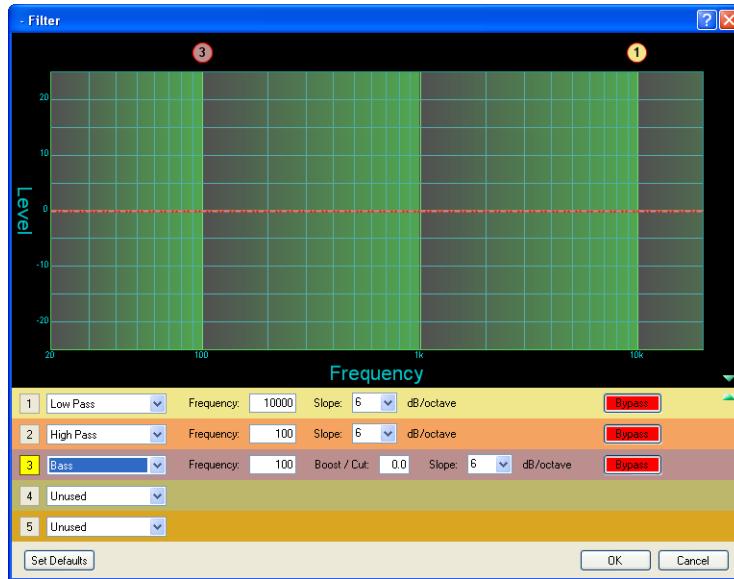


Figure 24. Filter Dialog Box, Filters Added

Within the dialog box, a filter is focused when a filter type is inserted, or is focused by clicking the filter number to the left of the filter selection drop-down list.

Note how filter 3 in the figure below is highlighted in yellow, indicating it is the filter in focus. The results of the filter in focus (independent of other filters) will show in the graph as a dotted line the same color as its filter row when bypassed. When active (not bypassed), the line is solid.

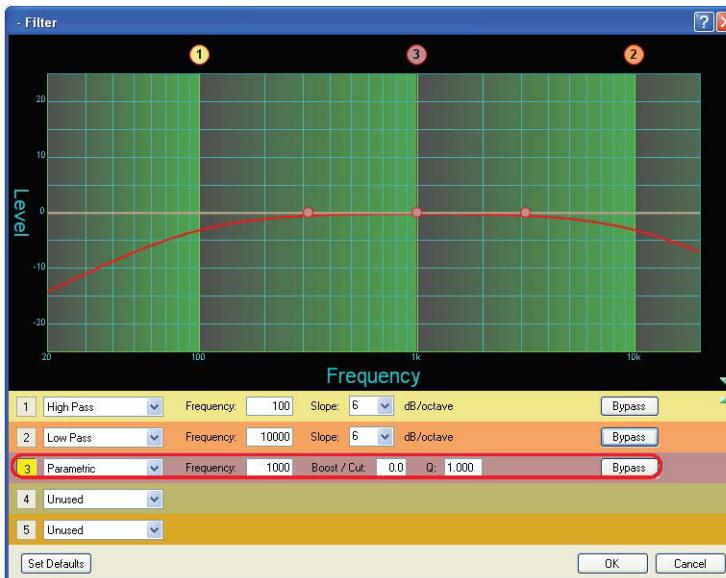


Figure 25. Filter Dialog Box, Filter Not Bypassed

When multiple filters are enabled, the graph indicates the focused filter result (independent of other filters) in the color of the filter row in the type/parameters table. The composite response of all filters is displayed in red.

Above the graph, each filter has a “handle” (circled in red above) placed directly above the cutoff or center frequency whose number corresponds to the filter number (outlined in red). Clicking a handle or clicking the table row brings focus to that filter. Click+hold+dragging the handle horizontally changes the cutoff or center frequency to a new position on the x axis.

Parametric (Equalizer)

Up to three parametric filters can be placed in the filter box at one time. Each may be set to a different frequency creating a 3 band parametric equalizer. The control will boost or cut the center frequency, and by changing the Q value, the range of affected frequencies can be widened or narrowed around the center frequency. In general, the higher the Q, the narrower the affected bandwidth.

To demonstrate how Q affects the filter, see the following filter block below containing three parametric filters centered at different frequencies but with the same Q of 1.0. The filter in focus (②) has a center frequency of 1000 Hz boosting that frequency +12 dB over a Q of 1.0. Note the markers on either side of the peak frequency are at 200 Hz on the left and 5000 Hz on the right, a bandwidth of about 4800 Hz.

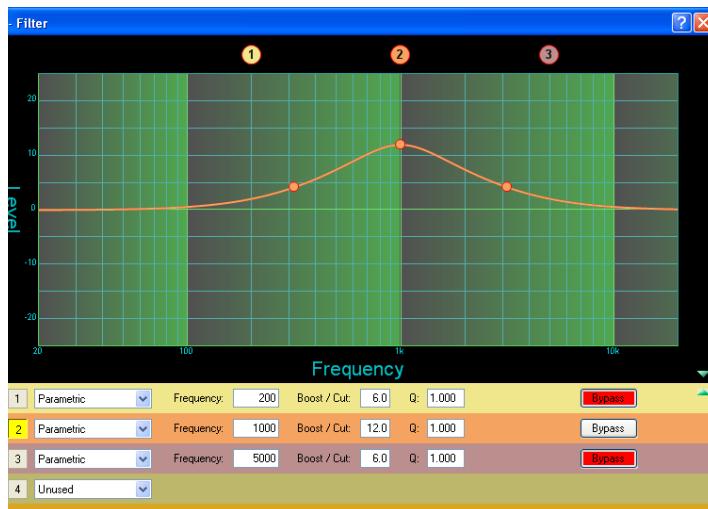


Figure 26. Parametric Filter Dialog Box, 1000 Hz

The above dialog box shows the frequency curve for the single active filter. To add its effect to the overall frequency response, remove the bypass on the other filters.

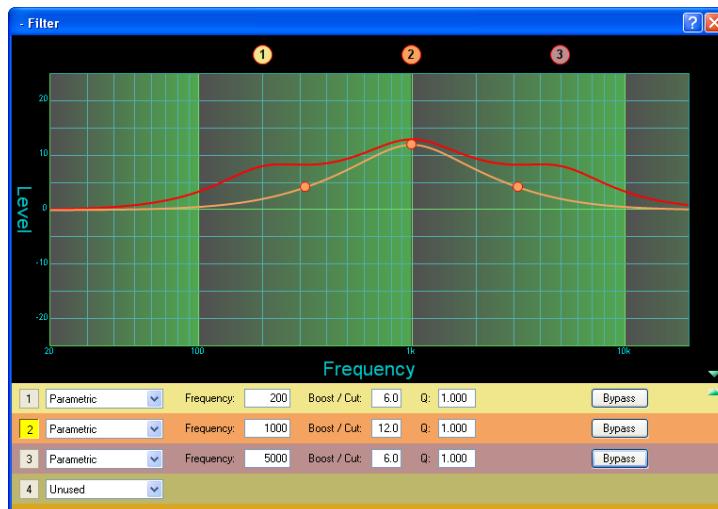


Figure 27. All Parametric Filters Active

The overall frequency response is now shown above as a solid red line with the filter in focus, located in row 2, shown in the color of its table row.

The parametric filter allows frequency selection accurate to 0.1 Hz and either 6 or 12 dB of slope. Notice at the specified frequency (100 Hz) the signal is 3 dB down, typical operation for high pass filters. The 3 dB down point will remain constant regardless of the slope setting. Only the steepness of the frequency attenuation curve will change.

Low Pass

The low pass filter is the opposite of the High Pass filter. All frequencies above the specified frequency are attenuated allowing lower frequencies to pass.

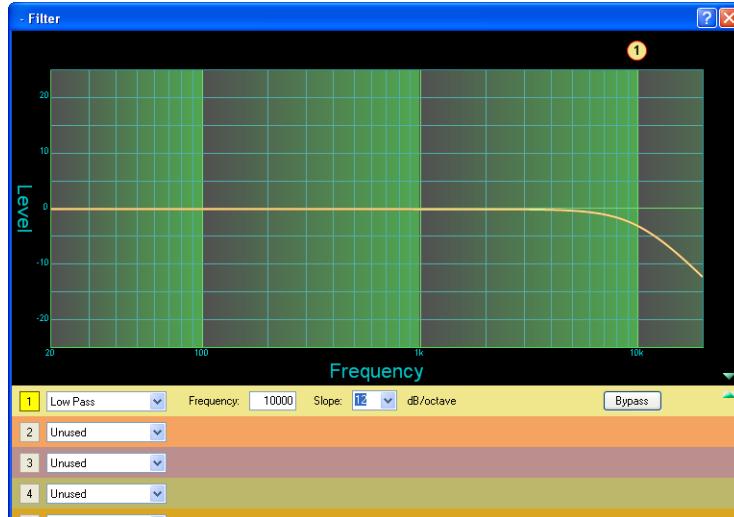


Figure 28. Low Pass Filter Response Curve

Here, the frequencies higher than the specified frequency, 10 kHz, are attenuated leaving the lower frequency response flat.

Bass and Treble Shelving

Bass and treble shelving may be added to the filter. Adding this filter automatically inserts both a bass and treble control row in the dialog box. If only a bass or only a treble filter is required, either bypass the unneeded control or set it to “**unused**” in the selection box.

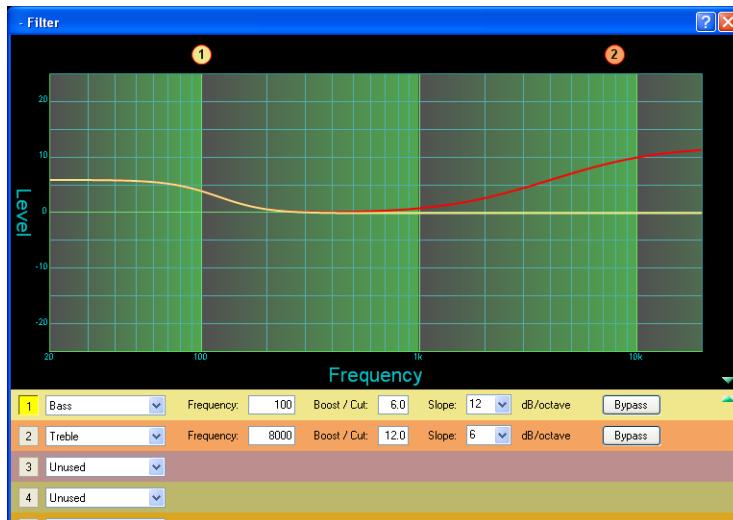


Figure 29. Bass and Treble Shelving

The corner frequency of the controls may be selected to 0.1 Hz accuracy. Two slopes, 6 and 12 dB/octave are available along with the ability to boost or cut the signal up to 24 dB.

Mixer

The DSP architecture contains a mixer that connects the mic/line and line inputs to the line outputs. The DSP Configurator GUI provides control of the mixer, used to set mix levels from the post processing inputs to the stereo line output bus. Each of the inputs is connected to a mix-point and output to the stereo output bus. In general, mix levels are set relative to each other, achieving a desired blend of input signals at an optimal output level, close to, but not exceeding 0 dBFS at the line output Volume block level meter.

Shown below is a view of the MVC 121 Plus represented in DSP Configurator, with a red box indicating the mixer.

From the mixer, any or all three inputs may be routed to the output bus.

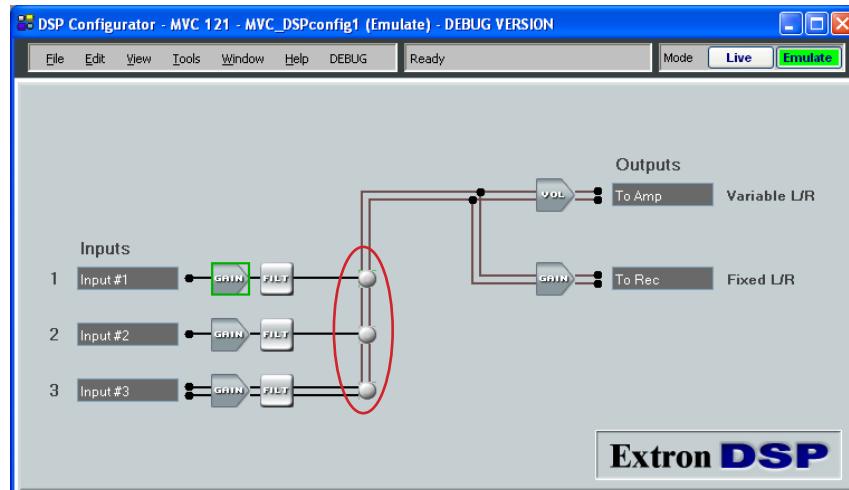


Figure 30. Mixer (outlined in red)

Clicking a mix-point brings focus to that mix-point. Double-clicking a mix-point opens a configuration dialog window with the following components:

- **Mono Fader** – Sets mix level to the output bus. Gain range is -24 dB to +12 dB. Fader behavior is identical to the input channel gain block described in the mic/line input section with the exception that coarse adjustment (<Page Up> or <Page Down>) increases/decreases in 5 dB increments.
- **Mute** – Two buttons mute and unmute the left or right signal to the output bus.
- **Gang** – Ties the two output bus signals together so that pressing either **Mute** button mutes or unmutes both outputs.
- **OK/Cancel** – Click **OK** to accept changes and close the window. **Cancel** ignores changes and closes the window.

The title above the fader reflects the output channel name for the mix-point.

Mix-point GUI behavior

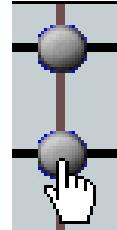
No mix information – A faint gray ball behind the mix-point indicates it is muted (contains no mix information).



Mix information – A solid teal-colored “bubble” indicates the mix-point is unmuted.



Mouse-over – The cursor changes to a hand when a mouse-over occurs at a mix-point whether the mix-point contains mix information or not.



Single-click – A single click brings focus, indicated by a dark green circle around either the ball or bubble, depending on mix status.



Double-click – Double-click to open the mix-point dialog box. The focus circle turns light green in color to indicate the open dialog box. If the mix-point is muted, the mix-point bubble will be gray. If unmuted, the bubble will be teal.

Mute – Muting or unmuting the left or right mute boxes of the mix-point dialog box will mute or unmute the corresponding output channel (L or R) as shown below. The corresponding half of the teal mix point ball will either be shaded (unmuted) or unshaded (muted).

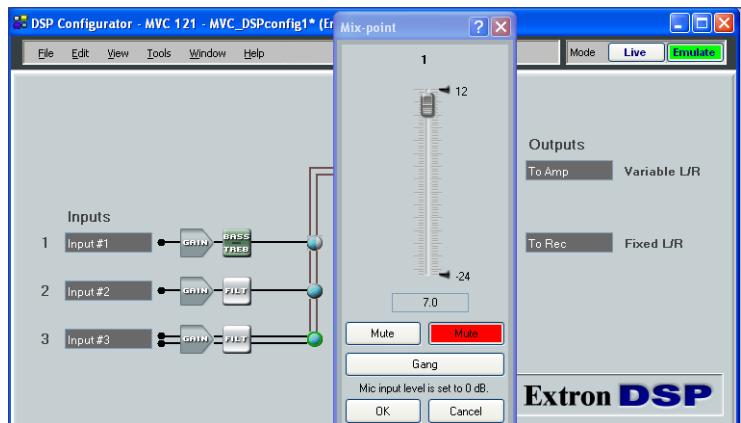


Figure 31. Mute Setting

Multiple open dialog boxes – When multiple mix-point dialog boxes are open (see the diagram below), the mix-point for the most recently opened dialog box receives the light green focus circle, while previously opened dialog boxes relinquish their focus. Focus can be returned by either clicking on a previously opened dialog box, or by double-clicking on a mix-point.

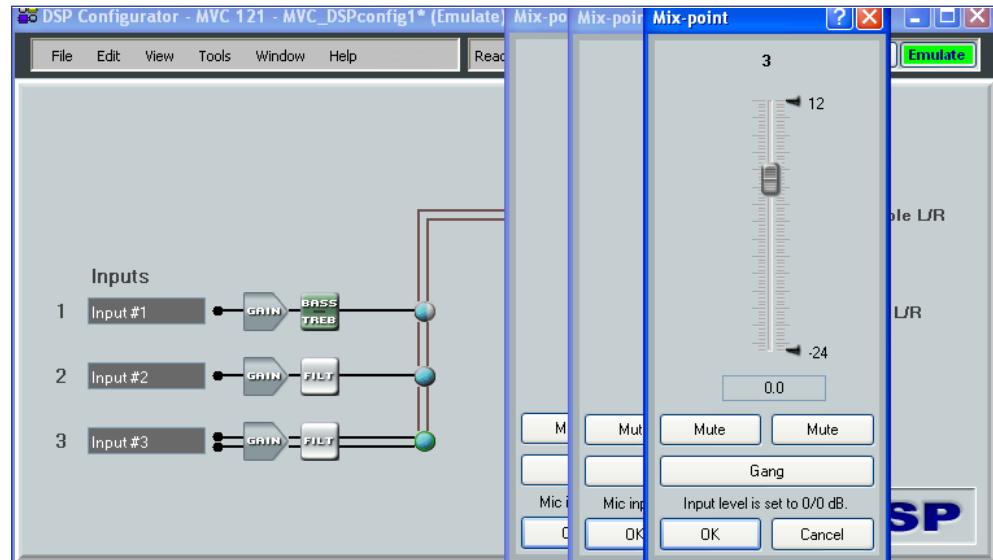


Figure 32. Multiple Opened Dialog Boxes

In the example below, input audio from Mic/Line Input #1 is processed then arrives at the mix-point and is routed to the stereo output bus.

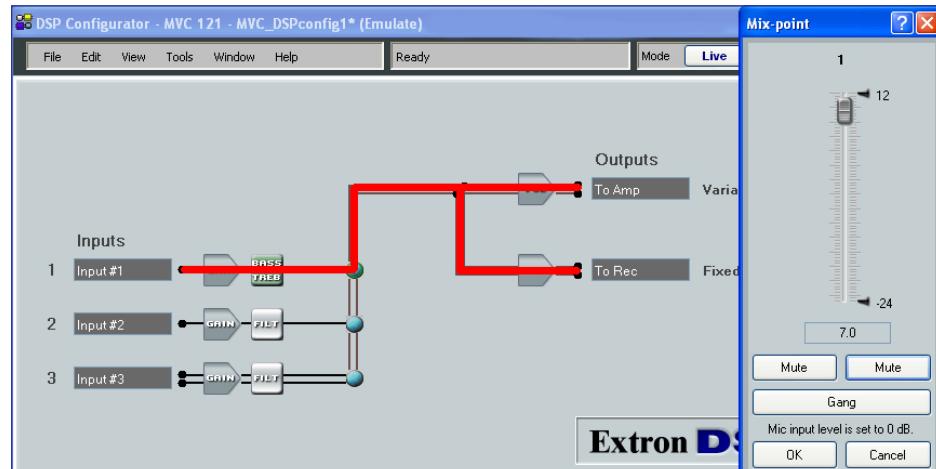


Figure 33. Input 1 to Mix-point

A double-click on the mix-point opens the dialog box, as shown on the right of the above diagram. When the mute button is released on Input #1 of the mix-point (shown above), the mix junction turns teal with a light green circle to indicate the open mix-point dialog box is the focus, and the signal is routed to Outputs, both variable and fixed.

Double-click on the **Volume** control block to adjust the variable output from 0 dB to -100 dB with a step resolution of 1 dB (see the following volume control) dialog box.

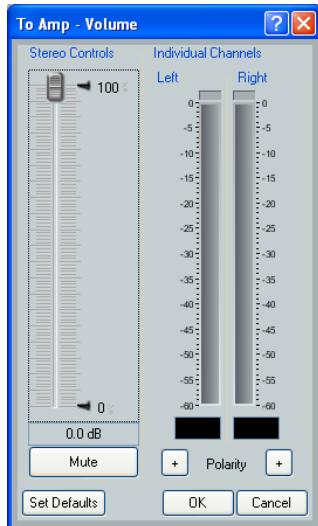


Figure 34. To Amp - Volume Dialog Box

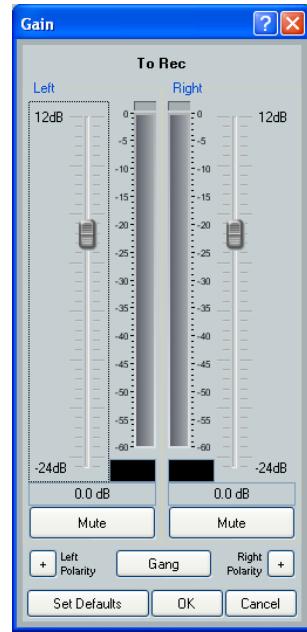


Figure 35. Gain Dialog Box

Double-click on the Gain control block to adjust the fixed output from -24 dB to +12 dB with a step resolution of 0.1 dB (see figure 35).

In the following example, audio from the three inputs is processed individually and arrive at their separate mix-points. When the individual mix-point mute buttons are released, the mix-point junctions turn teal to indicate the routing, and all three signals are routed to the Output, both variable and fixed. Open the individual mix-point dialog boxes to adjust signal levels to the output.

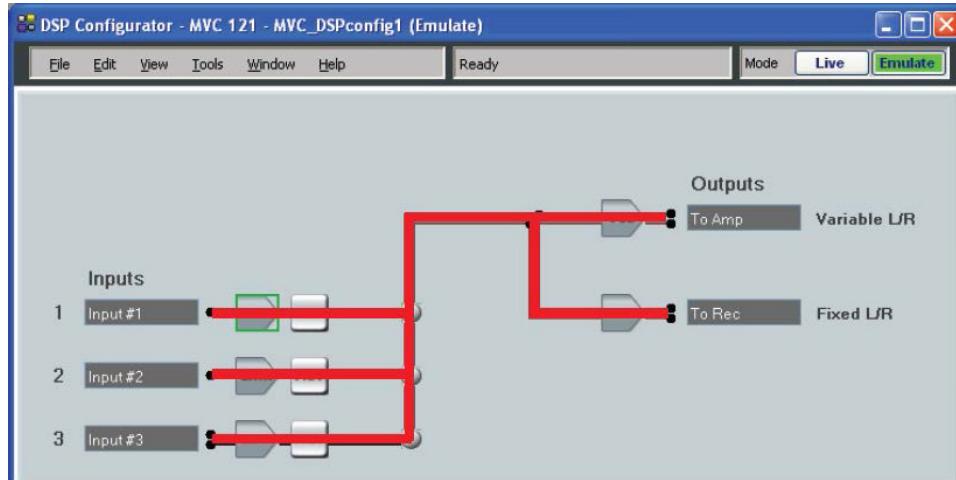


Figure 36. All Inputs to Output

Output Channels

There are two stereo Outputs, as shown below. A Volume control block adjusts the Variable L/R output and a gain control block adjusts the fixed L/R outputs.

Double-click on the Volume control block to adjust the variable output. Double-click on the Gain control block to adjust the fixed output.

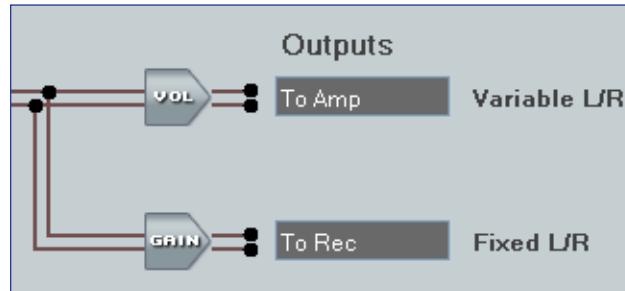


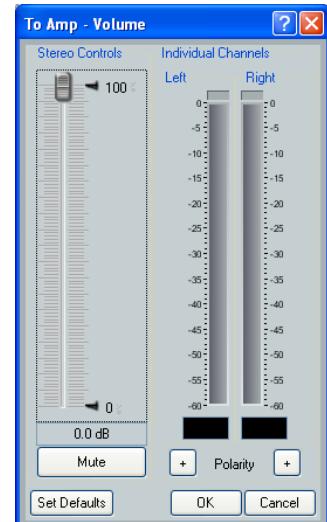
Figure 37. Output Channels

Volume

The Volume control block monitors and adjusts the variable output from 0 dB to -100 dB with a step resolution of 1 dB. The meters monitor the output level. The single level control adjusts both the Left and Right output channels.

The **Polarity** buttons reverse the polarity of the respective left and right output signal.

The **OK** button accepts settings and closes the dialog with a single click, while the **Cancel** button ignores changes and closes the dialog.



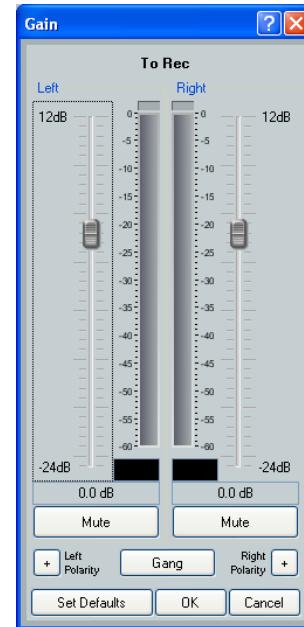
Gain

The Gain control block monitors and adjusts the fixed output. The channels can be adjusted from -24 dB to +12 dB with a step resolution of 0.1 dB.

The L/R channels can be adjusted and muted individually unless they are ganged. When the **Gang** button is active (red), the level controls track each other and pressing either **Mute** button mutes or unmutes both channels.

The **Polarity** buttons reverse the polarity of the respective left and right output signal.

The **OK** button accepts settings and closes the dialog with a single click, while the **Cancel** button ignores changes and closes the dialog.



SIS Programming and Control

This section describes SIS programming and control of the MVC 121 Plus, including:

- [Connection Options](#)
- [Command/Response Table for Basic SIS Commands](#)
- [Command/Response Table for MVC 121 Plus DSP SIS Commands](#)

Connection Options

The MVC 121 Plus can be remotely connected via a host computer or other device (such as a control system) attached to the rear panel RS-232 port, or the front panel USB Config port.

The MVC can be set up and controlled using the Extron SIS (Simple Instruction Set commands, or DSP Configurator software (see [Rear Panel Features](#) on page 4 for RS-232 pin assignments and details on the configuration and control port connections). For information on DSP Configurator see [Software Control](#) on page 39).

SIS commands may be executed using the Extron Electronics DataViewer program, which may be found on the Software Products DVD included with the product.

MVC 121 Plus RS-232 protocol:

- 38400 baud
- no parity
- 8 data bits
- no flow control
- 1 stop bit

NOTE: The RS-232 configuration port requires 38400 baud communication. This is a higher speed than many other Extron Electronics products use.

The DSP Configurator automatically sets the connection for the appropriate speed. If using HyperTerminal or a similar application, make sure the PC or control system connected to these ports is set for 38400 baud.

See [Rear Panel Features](#), for additional details on connecting the RS-232 port.

USB Port Details:

The Extron USB driver must be installed before use. See [Install the USB Driver](#) on page 41 for driver installation instructions.

RS-232 Port

The MVC 121 Plus has a rear panel serial port that can be connected to a host device such as a computer running the HyperTerminal utility, or the DataViewer utility. The port makes serial control of the mixer possible. Use the protocol information mentioned previously to make the connection. Once the connection is made, see [Using the Command/Response Tables](#) on the next page for SIS programming details.

USB Port (Front Panel)

The MVC 121 Plus has a front panel USB port that can be connected to a host device such as a computer running the HyperTerminal utility, or the DataViewer utility. The port makes serial control of the switcher possible. Once the connection is established, see [Using the Command/Response Tables](#) below for SIS programming details.

MVC 121 Plus-initiated Messages

The MVC initiates messages under specific conditions. No response is required from the host. The MVC 121 Plus-initiated messages are listed here (underlined).

© Copyright 2011, Extron Electronics, MVC 121 Plus, Vn.nn,
60-1096-01

Vn.nn is the firmware version number.

The MVC sends the boot and copyright messages under the following circumstances:
If the MVC is off and an RS-232 connection is already set up (the PC is cabled to the MVC and a serial communication program such as HyperTerminal is open), the connected unit sends these messages via RS-232 when first powered on.

Using the Command/Response Tables

SIS commands consist of a string (one or more characters per command field). No special characters are required to begin or end a command sequence. When the MVC 121 Plus determines a command is valid, it executes the command and sends a response to the host device. All responses end with a carriage return and a line feed (CR/LF = ↵), signaling the end of the response character string.

When programming, certain characters are more conveniently represented by their hexadecimal rather than ASCII values. The following table shows the hexadecimal equivalent of each ASCII character:

ASCII to Hex Conversion Table											
Space →	20	!	21	"	22	#	23	\$	24	%	25
(28)	29	*	2A	+	2B	,	2C	-	2D
0	30	1	31	2	32	3	33	4	34	5	35
8	38	9	39	:	3A	;	3B	<	3C	=	3D
@	40	A	41	B	42	C	43	D	44	E	45
H	48	I	49	J	4A	K	4B	L	4C	M	4D
P	50	Q	51	R	52	S	53	T	54	U	55
X	58	Y	59	Z	5A	[5B	\	5C]	5D
'	60	a	61	b	62	c	63	d	64	e	65
h	68	i	69	j	6A	k	6B	l	6C	m	6D
p	70	q	71	r	72	s	73	t	74	u	75
x	78	y	79	z	7A	{	7B		7C	}	7D
											~
											DEL
											7F

Figure 38. ASCII to Hex Conversion Table

Error Responses

When the MVC 121 Plus is unable to execute the command, it returns an error response to the host. The error response codes and their descriptions are as follows:

Code	Description
E01	Invalid input number
E10	Invalid command
E13	Invalid value (out of range)
E14	Not valid for this configuration
E23	Firmware update failure

Although the MVC uses the same structure for SIS commands, there are two variations. One is the global command structure documented in the [Command/Response Table for Basic SIS Commands](#) that follows.

The second set of tables for DSP SIS commands uses the command structure outline beginning with [Command/Response Tables for DSP SIS Commands](#) on page 35. While using the same structure of basic SIS commands, they differ in how the software addresses the individual processor blocks within the MVC 121 Plus.

Generally the basic SIS commands are used for global configuration such as setting a unit name, while the Audio SIS commands provide gain, volume, and mute control in the audio signal chain.

Command/Response Table for Basic SIS Commands

Symbol Definitions

←	=	CR/LF (carriage return/line feed) (hex 0D 0A)
←	=	Carriage return (no line feed, hex 0D)
•	=	Space character
 	=	Pipe (vertical bar) character
Esc	=	Escape key (hex 1B)
∞	=	Future capability (not currently available)
X1	=	Mix-point Input selection 1 = Mic 1 Mix-point 2 = Mic 2 Mix-point 3 = Line 3 Mix-point
X2	=	Output Volume (variable) 0 (mute) to 100 (max volume) in 1% steps
X3	=	On/Off 0 = off/mute 1 = on/unmute
X4	=	Mix-point gain values increment/decrement -24 to +12 dB in 1 dB steps
X6	=	Dirty status 0 = RAM has been saved to Flash (OK to power off/reset) 1 = RAM needs to be saved to Flash
X7	=	Output Volume Adjustment Range 0 (no output) to 100 (full output) in 1% steps
X8	=	Soft Limit (Hi) Value must be higher than low soft limit or device responds with E13 error.
X9	=	Soft Limit (Low) Value must be lower than high soft limit or device responds with E13 error.
X10	=	Executive Mode 0 = Disabled / Full control 1 = Enabled / no front panel control 2 = Enabled / volume control only
X11	=	Input selection 1 = Mic 1 2 = Mic 2 3 = Line 3
X12	=	Output selection 1 = Variable 2 = Fixed
X13	=	Version number Listed to two decimal places (for example, x.xx)
X14	=	Version and Build number The least significant bits is the build number (for example, x.xx.xxxx)
X22	=	Internal temperature Degrees Celsius
X24	=	Verbose/Response mode 0 = Tag OFF, Broadcast OFF (no tag in GET command response, always tag in SET command response) 1 = Tag OFF, Broadcast ON (<i>not tagged, broadcast</i>) 2 = Tag ON, Broadcast OFF 3 = Tag ON, Broadcast ON Default = 1
NOTE: If 'tagged responses' is enabled, all read commands will return the constant string + the data, similar to setting the value, for example, command: EscCN← response: Ipn•X12←		
X34	=	Baud rate 0 = 9600 1 = 19200 2 = 38400 (default) 3 = 115200

Command/Response Table for Basic MVC 121 Plus SIS Commands

Command	ASCII Command (Host to Tuner)	Response (Tuner to Host)	Additional Description		
NOTE: Commands can be entered back-to-back in a string, with no spaces. Example: TvrprS25*11•3 Upper and lower case may be used interchangeably.					
General Commands					
Firmware Version, Part Number, and Model Information					
Query firmware version	Q	X13 ↵	Show the current firmware version.		
Query firmware and build version	*Q	X14 ↵	Show the current firmware and build version.		
Query part number	N	60-1096-01 ↵	Show the unit part number.		
Query model name	1I	MVC•121•Plus ↵	Show the model name.		
Query model description	2I	Mixer•Volume•Controller ↵			
Setup Commands					
Set verbose mode	[Esc] X24 CV ↵	Vrb X24 ↵	Set verbose/response mode.		
View verbose mode	[Esc] CV ↵	X3 ↵	View verbose mode		
Key:					
X3	= On/Off	0 = off/mute 1 = on/unmute			
X13	= Version number	Listed to two decimal places (for example, x.xx)			
X14	= Version and Build number	The least significant bits is the build number (for example, x.xx.xxxx)			
X24	Verbose/Response mode	0 = Tag OFF, Broadcast OFF (no tag in GET command response, always tag in SET command response) 1 = Tag OFF, Broadcast ON (not tagged, broadcast) 2 = Tag ON, Broadcast OFF 3 = Tag ON, Broadcast ON Default = 1			
		NOTE: If 'tagged responses' is enabled, all read commands will return the constant string + the data, similar to setting the value, for example, command: [Esc]CN ↵ response: lpn•X12 ↵			
Bi-directional Serial Data Port					
NOTE: CP and CV commands apply to both RS-232 and USB ports.					
Configure parameters	[Esc] X34 CP ↵	Ccp X34 ↵	Set baud rate: 0 = 9600 1 = 19200 2 = 38400 (default) 3 = 115200		
View parameters	[Esc] CP ↵	Ccp X34 ↵	View baud rate.		
ZAP Commands (Factory Defaults) and RAM Commands					
System reset (factory default)	[Esc] ZXXX ↵	Zpx ↵	Reset system to factory default except for the baud rate.		
Absolute system reset	[Esc] ZQQQ ↵	Zpq ↵	Similar to system reset , plus sets the baud rate to factory default.		
View internal temperature status in degrees Celsius	20S	Sts20* X22 ↵	View internal temperature in degrees Celsius.		
Key:					
X22	= Internal temperature	Degrees Celsius			
X34	= Baud rate	0 = 9600 1 = 19200 2 = 38400 (default) 3 = 115200			

Command	ASCII Command (Host to Tuner)	Response (Tuner to Host)	Additional Description
Commit only RAM to Flash	[Esc] 2FF ←	Nvr[X6] ← (responds when done)	0 = RAM has been saved to Flash (OK to power off/reset) 1 = RAM needs to be saved to Flash
Query whether RAM needs to be saved to Flash	[Esc] FF ←	X6 ←	
Name Commands			
Write input name	[Esc] X11, name NI ←	Nmi[X11], name ←	name = maximum 12 characters. Invalid characters: = ~ , @ ' [] { } < > " ; : \ ?
Read input name	[Esc] X11 NI ←	Vrb mode Ø/1:name ← Vrb mode 2/3: Nmi[X11], name ←	Read input name.
Write output name	[Esc] X12, name NO ←	Nmo[X12], name ←	name = maximum 12 characters. Invalid characters: = ~ , @ ' [] { } < > " ; : \ ?
Read output name	[Esc] X12 NO ←	Vrb mode Ø/1:name ← Vrb mode 2/3: Nmo[X12], name ←	Read output name.
Key:			
[X6]	=	Dirty status	0 = RAM has been saved to Flash (OK to power off/reset) 1 = RAM needs to be saved to Flash
[X11]	=	Input selection	1 = Mic 1 2 = Mic 2 3 = Line 3
[X12]	=	Output selection	1 = Variable 2 = Fixed
Gain Stage Commands			
Variable Output Mute			
Mute output	1Z	Amt 1 ←	Mute output
Unmute output	0Z	Amt 0 ←	Unmute output
View output mute status	Z	Amt[X3] ←	0 = off/mute 1 = on/unmute
Setting Mix Mic/Line Gain or Attenuation Level			
Set gain level	[X1]*[X4]G	In[X1]•Aud[X4] ←	Input gain level
Increment (1 dB)	[X1]+G	In[X1]•Aud[X4] ←	Increment gain
Decrement (1 dB)	[X1]-G	In[X1]•Aud[X4] ←	Decrement gain
View gain level	[X1]G	Vrb mode 0/1: Aud[X4] ← Vrb mode 2/3: In[X1]•Aud[X4] ←	View gain level
Output Volume Adjustment (Variable Outputs only)			
Set output volume	[X7]V	Vol[X7] ←	Set output volume
Increment (1 dB)	+V	Vol[X7] ←	Increment output volume
Decrement (1 dB)	-V	Vol[X7] ←	Decrement output volume
View output volume	V	Vol[X7] ←	View output volume
Key:			
[X1]	=	Mix-point Input selection	1 = Mic 1 Mix-point 2 = Mic 2 Mix-point 3 = Line 3 Mix-point
[X3]	=	On/Off	0 = off/mute 1 = on/unmute
[X4]	=	Mix-point gain values increment/decrement	-24 to +12 dB in 1 dB steps
[X7]	=	Output Volume Adjustment Range	0 (no output) to 100 (full output) in 1% steps

Command	ASCII Command (Host to Tuner)	Response (Tuner to Host)	Additional Description
Set Soft Limits			
Set G limits (Mix-points)	[Esc] G [X1]*[X8]*[X9] ARNG ←	Vrb mode 0 / 1 : [X1]*[X8]*[X9] ←	
Set V limits (volume)	[Esc] V [X2]*[X8]*[X9] ARNG ←	Vrb mode 0 / 1 : [X2]*[X8]*[X9] ←	
View G limits	[Esc] G [X1] ARNG ←	Vrb mode 0 / 1 : [X8]*[X9] ←	
		Vrb mode 2 / 3 : ArngG [X1]*[X8]*[X9] ←	
View V limits	[Esc] V [X2] ARNG ←	Vrb mode 0 / 1 : [X8]*[X9] ←	
		Vrb mode 2 / 3 : ArngV [X2]*[X8]*[X9] ←	
Executive Mode (Front Panel Lockout)			
Disable	0X	[Esc] 0 ←	Full front panel control
Enable (complete lockout)	1X	[Esc] 1 ←	No front panel control
Enable (lockout except volume)	2X	[Esc] 2 ←	No front panel control except for volume
Lock status	X	[Esc] X10 ←	0 = Disabled / Full control 1 = Enabled / no front panel control 2 = Enabled / volume control only
Digital Input Commands			
Configure digital input	[Esc] [X1]*[X2] GPIT ←	Gpit [X1]*[X2] ←	Tagged response
View digital input	[Esc] [X1] GPIT ← (Vrb mode 2 / 3 :)	[X2]* ← Gpit [X1]*[X2] ←	Tagged response
View I/O state	[X1] ← Vrb mode 2 / 3 :	[X5] ← Sio [X1]*[X5] ←	Tagged response
Key:			
[X1]	= Mix-point Input selection	1 = Mic 1 Mix-point	2 = Mic 2 Mix-point
			3 = Line 3 Mix-point
[X2]	= Output Volume (variable)	0 (mute) to 100 (max volume) in 1% steps	
[X5]	= State	0 = Logic Hi (inactive)	1 = Logic Lo (active)
[X8]	= Soft Limit (Hi)	Value must be higher than low soft limit or device responds with E13 error.	
[X9]	= Soft Limit (Low)	Value must be lower than high soft limit or device responds with E13 error.	

Command/Response Tables for DSP SIS Commands

Digital signal processor (DSP) functions, gain and mute, can be controlled using SIS commands. These commands follow the same general rules as basic SIS commands, but the variables (Xn) tend to be more complex. Also, a comprehensive understanding of the audio signal flow is helpful to understanding the commands. The following diagram shows the specific DSP processors available for SIS commands.

NOTE: The entire signal flow is described in more detail in the section, (see [DSP Processing and Signal Flow](#) on page 15).

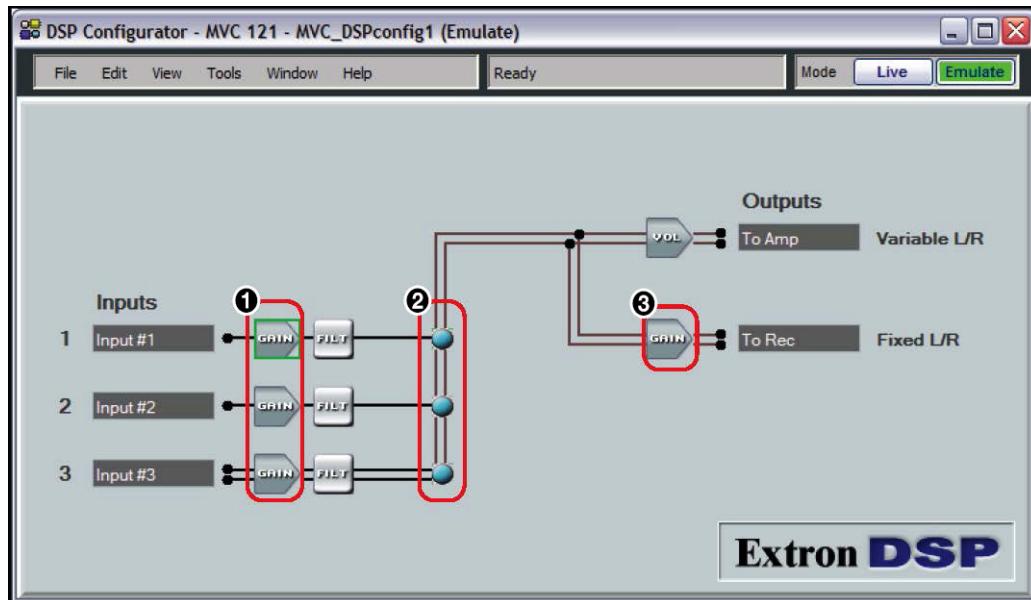


Figure 39. DSP Processors Addressable via SIS Commands

The DSP Configurator program window addressable commands consist of an input signal gain control, the mixer matrix, and output volume and gain controls.

- ① **Mic/Line input gain control** — Provides level adjustment, mute, polarity, and phantom power selection.
 - ② **Mix-points** — Mutes input signals to outputs.
 - ③ **Output gain control** — The stereo fixed output provides level adjustment and mute.
- DSP control commands are an extension to SIS commands. They differ only in their data string and the requirement to send each command with an “AU” suffix.

OID

The OID number consists of five characters and identifies the specific gain processor type or the mix-point. See [table 1 X60 – Level Control and Mix-point Selection Tables](#) <OID> [page 38](#) for a complete list.

Error Responses

When the MVC 121 Plus is unable to execute the command, it returns an error response to the host. The error response codes and their descriptions are as follows:

Error Code	Description
E10	Invalid command
E11	Invalid preset
E12	Invalid port number
E13	Invalid parameter (number is out of range)
E14	Not valid for this configuration
E17	System timed out
E22	Busy
E25	Device is not present

Symbol Definitions

↙	= CR/LF (carriage return/line feed) (hex 0D 0A)	
←	= Carriage return (no line feed, hex 0D) (use the pipe character, , for Web browser commands))	
•	= Space character	
	= Pipe (vertical bar) character	
Esc	= Escape key (hex 1B) (use W instead of Esc for Web browsers)	
X60	= Gain and trim control or mix-point select See table 1 on page 38	
X61	= Level value: line output fixed gain	-24.0 to +12.0 dB (-240 to 120) in 0.1 dB increments
X62	= Line input gain level value Mic input gain level value	Line: -18.0 dB to +24.0 dB (-180 to 240) in 0.1 dB increments. Mic: -18.0 dB to +60.0 dB, (-180 to 600) in 0.1 dB increments
X63	= Output volume (variable)	-100.0 dB to 0.0 dB, (-1000 to 0) in 0.1 dB increments.
X64	= Mute status	0 = unmute 1 = mute

Command/Response Table for MVC 121 Plus DSP SIS Commands

Command	ASCII Command (Host to Tuner)	Response (Tuner to Host)	Additional Description
NOTE: The command format is the same regardless of the control or mix-point selection. The acceptable adjustment range varies depending on the control or mix-point:			
<ul style="list-style-type: none"> • The mic/line input gain range is -18 dB to +60 dB (-180 to 600), in 0.1 dB increments. • The line input gain range is -18 dB to +24 dB (-180 to 240), in 0.1 dB increments. • The fixed output gain range is -24 dB to +12 dB (-240 to 120), in 0.1 dB increments. <p>All responses are shown with the MVC 121 Plus in Verbose mode 2 or 3.</p>			
Input Audio Selection and Control			
Set line 3 input levels	[Esc] G[X60]*[X62]AU←	DsG[X60]*[X62]←	Set line 3 gain control [X60] to a value of [X62] dB.
Example 1: Set line input 3 right to +4.0 dB	[Esc] G30001*40AU←	DsG30001*40←	Line input 3 right channel gain set to +4.0 dB.
Example 2: Set line input 3 left to -8.0 dB	[Esc] G30000*−80AU←	DsG30000*−80←	Line input 3 left channel gain set to -8.0 dB.
Set a mic/line input level	[Esc] G[X60]*[X62]AU←	DsG[X60]*[X62]←	Set mic gain control [X60] to a value of [X62] dB.
Example 1: Set mic input 1 to +40.0 dB	[Esc] G40000*400AU←	DsG40000*400←	Mic input 1 gain set to +40.0 dB.
Example 2: Set mic input 2 to -12.5 dB	[Esc] G40001*−125AU←	DsG40001*−125←	Mic input 2 gain set to -12.5 dB.
Read a line input level	[Esc] G[X60]AU←	X62←	Read input [X60] value of [X62] dB.
Example: Read line input 3 left channel level	[Esc] G30000AU←	40←	Line input 1 left channel gain set to +4.0 dB.
Read a mic/line input level	[Esc] G[X60]AU←	X62←	Read mic input [X60] value of [X62] dB.
Example: Read mic input 1	[Esc] G40000AU←	400←	Mic input 1 gain set to +40.0 dB.
Output Audio Selection and Control			
Set Output Gain (fixed) Levels	[Esc] G[X60]*[X62]AU←	DsG[X60]*[X62]←	Set output level gain control [X60] to a value of [X62] dB.
Example 1: Set fixed output left channel to +10.5 dB	[Esc] G60002*105AU←	DsG60002*105←	Fixed output L gain set to +10.5 dB.
Example 2: Set fixed output right channel to -14.0 dB	[Esc] G60003*−140AU←	DsG60003*−140←	Fixed output R gain set to -14.0 dB.
Audio Mute			
Mute any input, mix-point or fixed output.	[Esc] M[X60]*1AU←	DsM[X60]*1←	Mute audio processor [X60].
Example:	[Esc] M20001*1AU←	DsM20001*1←	Mute mix-point input 1 to output 2.
Unmute any input, mix-point, or fixed output.	[Esc] M[X60]*0AU←	DsM[X60]*0←	Unmute audio point [X60].
Read audio mute status of any input, mix-point, or fixed output.	[Esc] M[X60]AU←	DsM[X60][X64]←	[X64]: 0 = mute off, 1 = mute on
NOTE: Mixpoint DSP commands are for mute only. The gain control uses standard SIS "G" commands.			
Key:			
[X60]	=	Gain and trim control or mix-point select	See table 1 on page 38
[X62]	=	Line input gain level value Mic input gain level value	Line: -18.0 dB to +24.0 dB (-180 to 240) in 0.1 dB increments. Mic: -18.0 dB to +60.0 dB, (-180 to 600) in 0.1 dB increments

① Input Selection	X60
Mic/Line Input 1	40000
Mic/Line Input 2	40001
Line input 3 left	30000
Line input 3 right	30001
② Main Mix-point to Fixed Outputs	X60
Input 1 to left output	20000
Input 2 to left output	20100
Input 3 to left output	20200
Input 1 to right output	20001
Input 2 to right output	20101
Input 3 to right output	20201
③ Fixed Output Gain	X60
Left channel output	60002
Right channel output	60003

Table 1. **X60** – Level Control and Mix-point Selection Tables <OID>

Software Control

This section describes the control software for the MVC 121 Plus, including:

- **Software Control**
- **Windows-based Program Control**
- **DSP Configurator Program**

Software Control

The MVC 121 Plus can be controlled using the DSP Configurator software, SIS commands through HyperTerminal or DataViewer.

The MVC has the following connection options:

- **RS-232** — One single stack 6-pole, 3.5 mm captive screw connector is used for bidirectional RS-232 (± 5 V) serial control.
See **Rear Panel Features** on page 4, for additional details on connecting the RS-232 port.
- **USB 2.0** — A Mini B-type USB connector located on the front panel provides high-speed USB 2.0 connectivity to a host computer, backward compatible to 1.0.

Windows-based Program Control

The DSP Configurator control program is compatible with Windows 2000 and later Windows versions, and provides remote control of the input gain and attenuation, output volume output adjustment, and other features.

DSP Configurator can control the MVC 121 Plus via any of the two control ports, RS-232 or USB.

Download DSP Configuration from the Extron website at www.extron.com.

1. Click **DOWNLOAD** to view the drop-down menu.
2. Select **Software**.
3. Select the letter **D** from the alphabetical list.
4. Scroll to **DSP Configurator**.
5. Click **Download**.

Installing the DSP Configurator Program

To download DSP Configurator, at www.extron.com:

1. Enter DSP Configurator Software in the search text box (see figure 40, 1). When you enter part of the name, you are able to select it from the drop-down menu.

The DSP Configurator Software page opens (2).

2. Click the Downloads button (3) to access the software application.
3. Click DSP Configurator (4) and follow the on-screen instructions.

By default, the Windows installation creates a
:\Program Files\Extron\DSP_Configurator folder for the DSP Configurator program files..

4. Click the Release Notes link (5) to see important information relating to the DSP Configurator.

The screenshot shows the Extron website with a search bar containing 'DSP Config'. The main content area displays the 'DSP Configurator Software' product page. Key features listed include a powerful PC-based tool for managing audio setup and operations, enabling complete setup and configuration of digital audio processing tools, an intuitive Graphical User Environment, SpeedNav keyboard navigation, copy and paste for processing blocks, and DSP Configurator Presets. Below the features is a 'See All Features >' link. To the right, there's a sidebar with links for 'Save to Favorites List', 'Featured Videos', 'DSP Configurator Help', 'DSP Templates', and 'DSP How-To Videos'. A 'SIMILAR PRODUCTS' section shows the 'Dante Controller' with a preview image and a 'RELATED PRODUCTS' section with a preview image of a device. At the bottom, there's a 'Send Feedback' button. The top navigation bar includes links for PRODUCTS, TRAINING, RESOURCES, COMPANY, DOWNLOAD, and a search icon.

DSP Configurator Software
DSP Application Software

Key Features

- Powerful yet user-friendly PC-based software tool for managing audio setup and operations of an Extron DSP product
- Enables complete setup and configuration of digital audio processing tools
- Intuitive Graphical User Environment
- SpeedNav™ keyboard navigation
- Copy and paste for processing blocks
- DSP Configurator Presets

[See All Features >](#)

Downloads

Please consult Release Notes for important compatibility information and history.

SOFTWARE	DESCRIPTION	VERSION	SIZE	FORMAT
4 DSP Configurator	The DSP Configurator™ Software is the user interface to ProDSP™ for full control and management of a ProDSP-capable product.	2.20.0.19	53.5 MB	EXE
5 Release Notes				
USB Driver Package for	USB Driver Package for Windows 8	1.0.1	9.7 MB	EXE

SIMILAR PRODUCTS

Dante Controller
Configuration Software for Dante-Enabled Audio Products

RELATED PRODUCTS

[Send Feedback](#)

Figure 40. DSP Configurator Software Access

5. When the DSP Configurator installation is complete, the USB Installer starts automatically. It is recommended to install the USB drivers whether they are used immediately or not.

Install the USB Driver

To install the USB driver, follow these instructions.



Figure 41. USB Installer Splash Screen

1. After the DSP Configurator program installation is complete, click **Next** to proceed.



Figure 42. USB Installation

2. The USB driver installer is launched. When the installer has completed the installation of the USB drivers, the following screen appears:

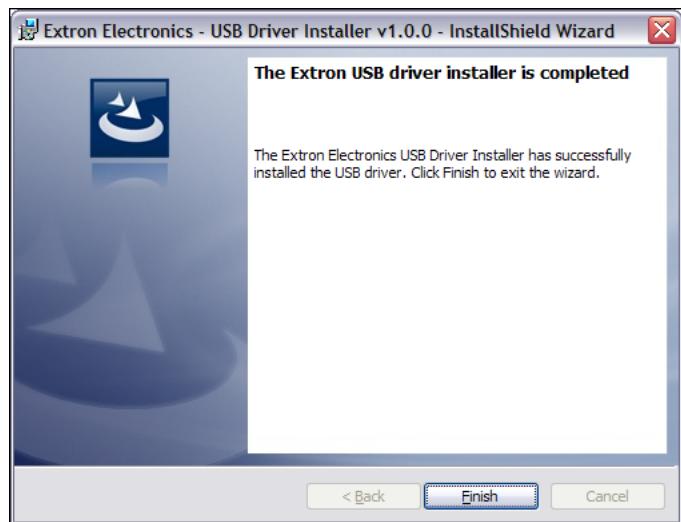


Figure 43. Successful USB Driver Installation

3. Click **Finish**.

USB driver installation is complete.

DSP Configurator Program

Starting the Program

1. To run the DSP Configurator Program, click **Start > Programs > Extron Electronics > DSP Configurator > DSP Configurator**.

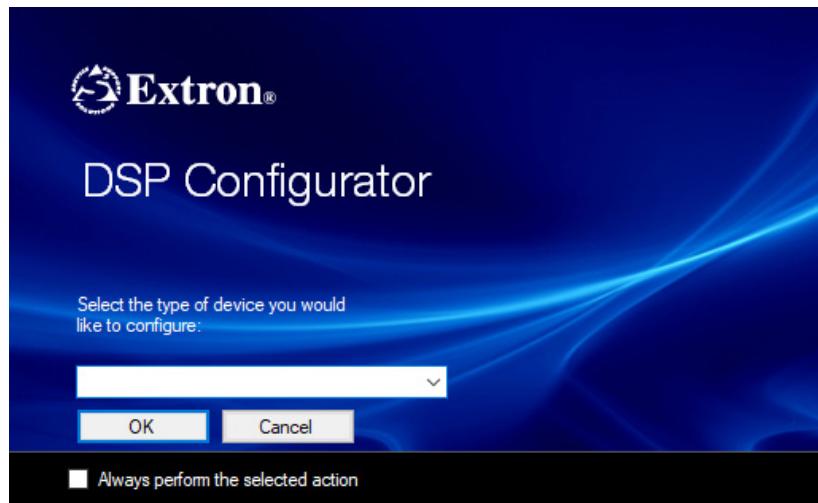


Figure 44. DSP Configurator Start Dialog Box

The DSP Configurator program starts in **Emulate** mode (see [Emulate Mode vs. Live Mode](#) on page 44).

2. Select the device to be configured (MVC 121 Plus).
3. Click **OK**.

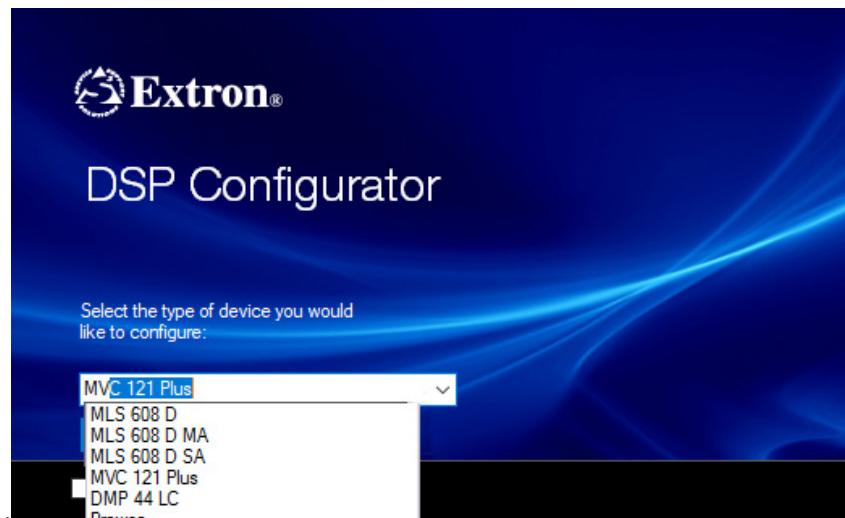


Figure 45. Select Device (MVC 121 Plus)

4. The program displays the following screen.

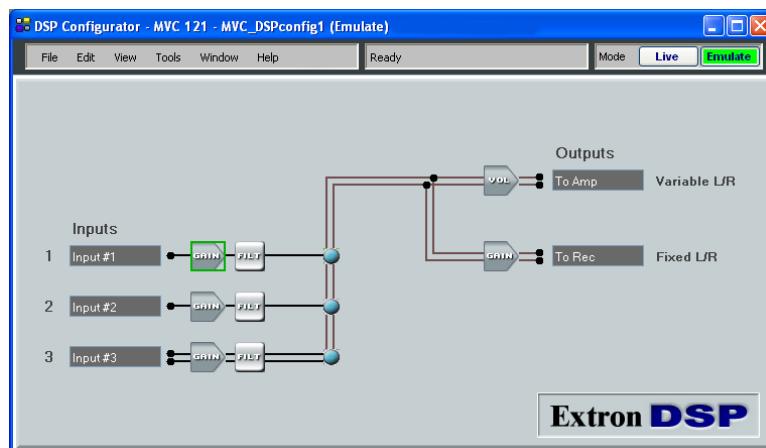


Figure 46. MVC 121 DSPConfig (Emulate) Dialog Box

Using the Program

In the DSP Configurator window Emulate mode, audio parameters may be selected, then transferred to the MVC by going to Live mode (while connected to the MVC 121 Plus). Audio settings can also be tailored while connected to the MVC which allows real-time auditioning of the audio output as adjustments are made.

Help

Select the **Help** tab for further information about the DSP Configurator program features and functions.

Emulate Mode vs. Live Mode

The DSP Configurator program has two operational modes: Live and Emulate. In live mode, the program has established a connection and is synced with the MVC 121. Changes affect the device in real-time and changes in the current state of the device are reflected in the DSP Configurator. In contrast, emulate mode allows the user to work offline, creating or editing configurations that do not immediately affect MVC 121 operation.

The DSP Configurator program always starts in Emulate mode. In emulate mode, the program provides access to all functions of the MVC 121 without connecting to it. The user can build a configuration from the blank screen, or open an existing file that contains the last configuration displayed. Settings and adjustments are saved to a configuration file on the PC. When the saved file is opened in the DSP Configurator program, the program restores all settings as the current configuration (emulated if in Emulate mode or live if in **Live** mode).

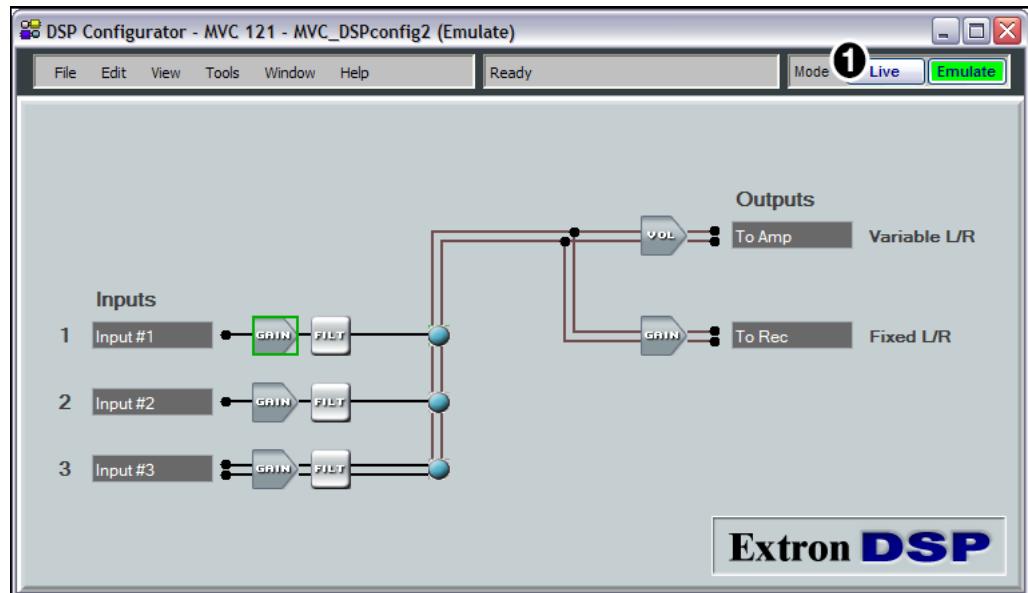


Figure 47. Main DSP Configuration Screen at Startup

Live mode can be entered at any time after program launch, either with a blank configuration, after creating a configuration, or after loading a previously saved configuration file.

Synchronizing: Pull vs. Push

When switching to live mode after making changes to the current configuration in emulate mode, either:

- **Pull** data from the device and update the DSP Configurator program configuration. This option downloads device settings from the MVC 121 and synchronizes it with the DSP Configurator program overwriting the current DSP Configurator settings, or
- **Push** data from the DSP Configurator program to the device, overwriting settings in the MVC 121.

Live mode can also be used to tailor audio settings in real-time while listening to the audio output.

Selecting Live Mode and Pushing or Pulling a Configuration

To switch from emulate mode to live mode:

1. Click the Mode **Live** button (see **figure 47**, ① on the previous page). The **Connect to device** dialog box opens.

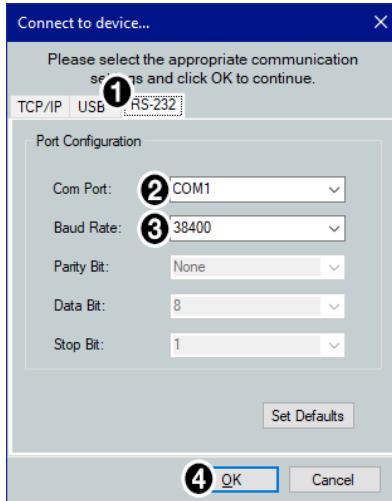


Figure 48. Connecting to device — RS-232

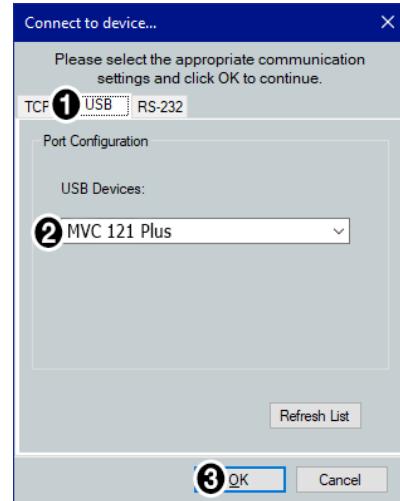


Figure 49. Connecting to device — USB

2. If necessary and as desired, click either the:

RS-232 tab (figure 48, ①) — To connect to the rear panel RS-232 ports, proceed to step 3).

USB tab (figure 49, ①) — To connection via the front panel configuration port, proceed to step 4).

3. If RS-232 was selected in step 2 (see figure 48):

- a. Click the **Com Port** drop-down menu (2) and select the PC comm port connected to the rear panel RS-232 port.
- b. Check the **Baud Rate** displayed in the comm port selection window (2). If the baud rate does not match the device rate, click the Baud Rate drop-down menu and select the desired baud rate. The default is 38400.
- c. Click **OK** (4).

The **Synchronize with Device** dialog box (see figure 26) appears. Proceed to step 5.

4. If USB was selected in step 2 (see figure 49):

- a. Click the **USB Device** drop-down menu and select **MVC 121** (or **Extron USB device**, if MVC 121 is not available),
- b. Click **OK**.

The **Synchronize with Device** dialog box (see figure 51 on the next page) appears. Proceed to step 5.

5. Click either the:

- **Pull** radio button to configure the DSP Configurator program to match the device — proceed to step 6,
- or-
- **Push** radio button to configure the device to match the DSP Configurator program — proceed to step 6

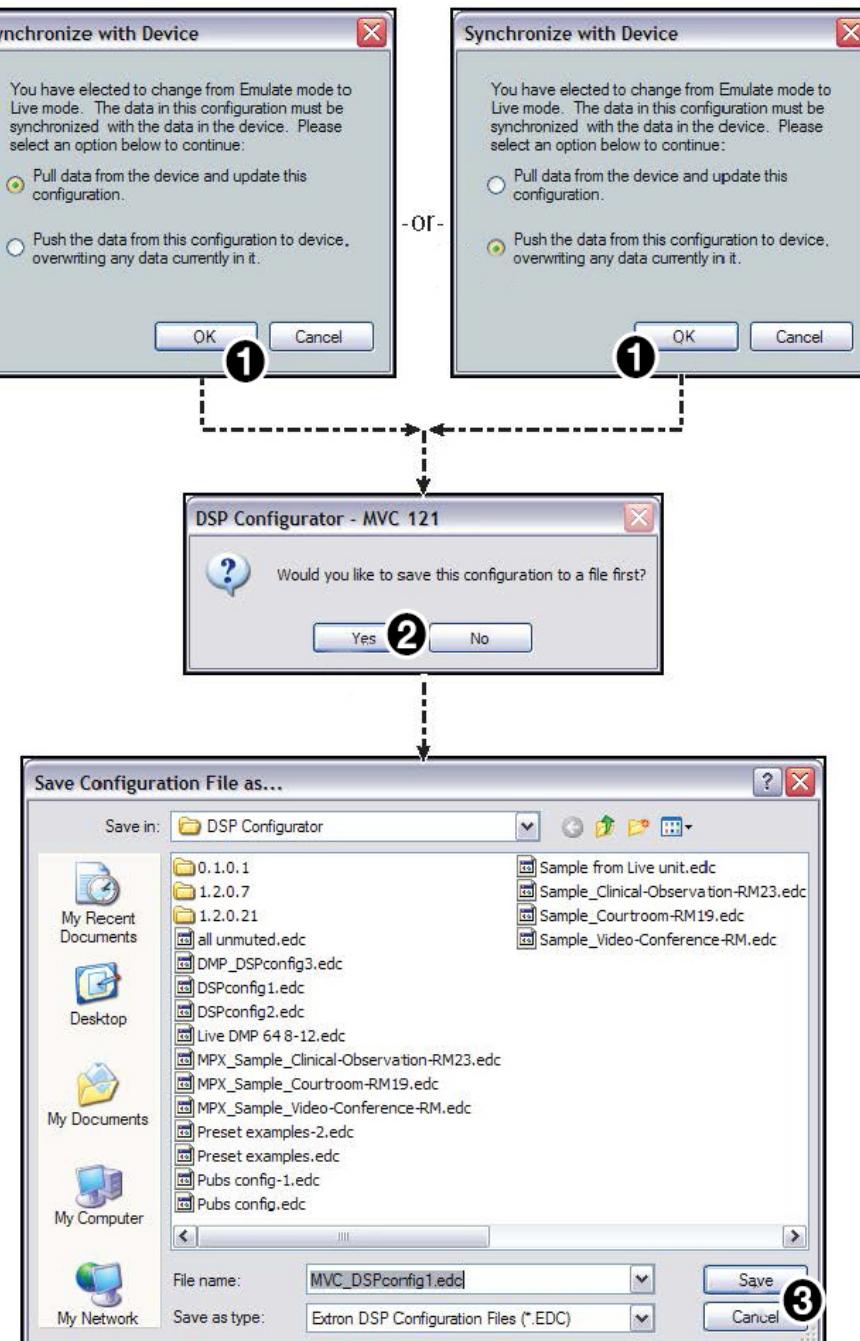


Figure 50. Selecting Live Mode

6. Click **OK** (see figure 50, ①). The program prompts to save the current configuration.
 - If **Pull is selected**, the program updates the currently open file with the configuration from the device. Proceed to step **7**.
 - If **Push** is selected, the program overwrites the device configuration with the currently open file. Proceed to step **8**.

NOTE: In either case, the program and device configuration will now reflect DSP Configurator changes in real-time.

7. Click **OK** (②).

The DSP Configurator program updates the current configuration with the configuration from the MVC 121 and is now connected live. Changes to the configuration will be reflected immediately in the device operation.

8. Click **OK** (see **figure 50, ③**).

The DSP Configurator program uploads the current file created or opened in Emulate mode to the MVC 121. The file overwrites the configuration of the device, and DSP Configurator is now connected live. Changes to the configuration will be reflected immediately in the device operation.

NOTE: When changes are made to the configuration using DSP Configurator, the changes are immediately made to the MVC 121. However, if the program is disconnected from the mixer or shut down before the new configuration is saved, the mixer will revert back to the previously saved configuration.

Reference

This section contains reference information for the MVC 121 Plus, including:

- [Mounting](#)
- [Firmware Loader](#)
- [MVC 121 Plus Hardware Reset Modes](#)

Mounting

The 1U high, quarter rack width, 3-inch deep MVC 121 Plus stereo mixer can be:

- Set on a table
- Mounted on a rack shelf
- Mounted under a desk or tabletop
- Mounted on a projector bracket

Tabletop Use

Each MVC 121 Plus comes with rubber feet (not installed). For tabletop use, attach a self-adhesive rubber foot to each corner of the bottom of the unit.

UL Rack Mounting Guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the MVC 121 Plus in a rack.

1. **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the unit in an environment compatible with the maximum ambient temperature ($T_{ma} = +122^{\circ}\text{F}, +50^{\circ}\text{C}$) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Rack Mounting

For optional rack mounting, do not install the rubber feet. Mount the MVC 121 Plus on a 19" Universal 1U or Basic rack shelf.

To rack mount the MVC 121 Plus:

1. If rubber feet were previously installed on the bottom of the MVC 121 Plus, remove them.
2. Mount the MVC on the rack shelf, using two 4-40 x 3/16 inch screws in opposite (diagonal) corners to secure the unit to the shelf.

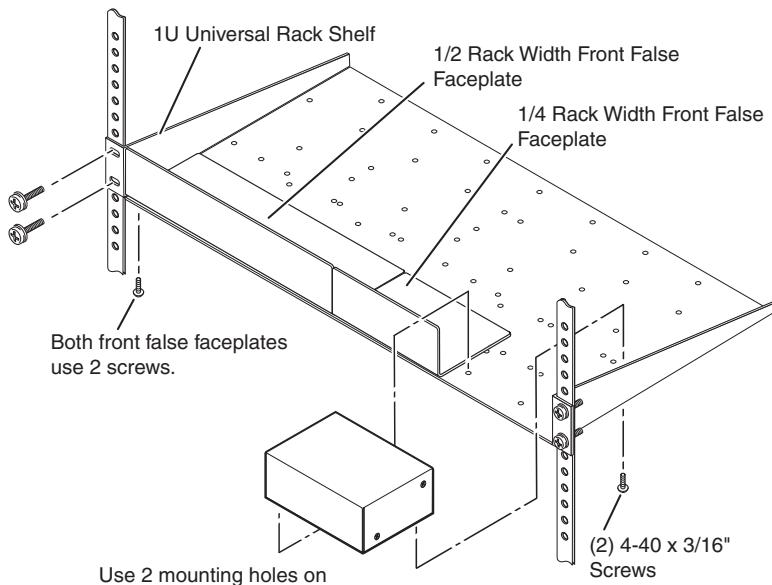


Figure 51. Mounting the MVC 121 Plus on a Universal Rack Shelf

3. Install blank panels or other units on the rack shelf.

Furniture Mounting

Furniture mount the MVC (see the following diagram) using the optional mounting kit (Extron MBU 123, as follows:

1. Attach the selected mounting brackets with the machine screws provided.
2. If feet were previously installed on the bottom of the cabinet, remove them.
3. Hold the unit with the attached brackets against the underside of the table or other furniture, or against the wall. Mark the location of the screw holes of the bracket on the mounting surface.
4. Drill 3/32 inch (2 mm) diameter pilot holes, 1/4 inch (6.4 mm) deep in the mounting surface at the marked screw locations.
5. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4 inch of the head of the screw protrudes.
6. Align the mounting screws with the slots in the brackets and place the unit against the surface, with the screws through the bracket slots.
7. Slide the unit slightly forward or back, then tighten all four screws to secure it in place.

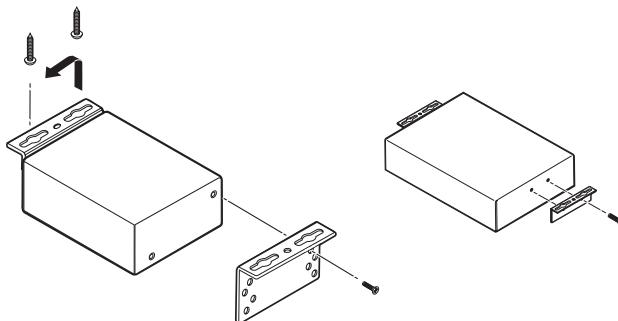


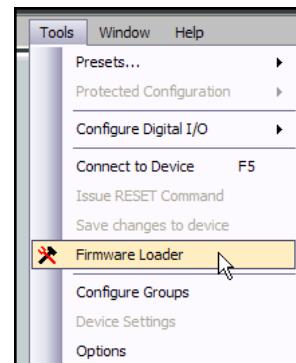
Figure 52. MBU 123, Under-Desk Mounting

Firmware Loader

The DSP Configurator program includes a firmware loader program which allows replacing the firmware without taking the MVC out of service. Download the desired firmware file from the Extron website, (see [Firmware Updates](#) on page 12 for instructions).

To access the firmware uploader:

1. Select **Tools**, then **Firmware Loader**.
The Add Device dialog box appears.
2. Enter the IP address of the MVC.
3. Click **OK**.



NOTE: If the IP has not been changed, the default IP address is: 192.168.255.255

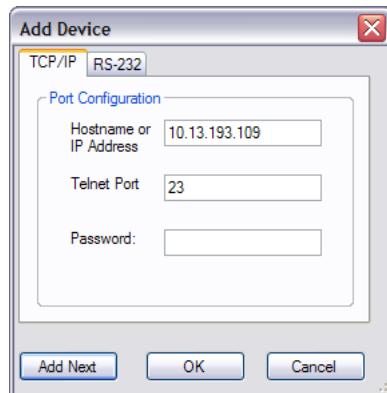


Figure 53. Add Device Dialog Box

The Firmware Loader screen appears.

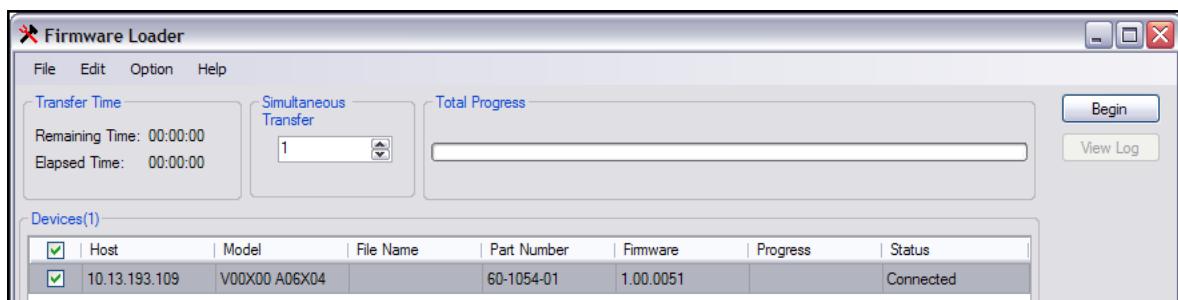
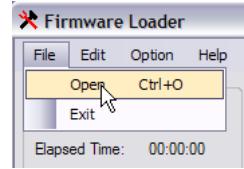


Figure 54. Firmware Loader Dialog Box

4. From the toolbar, select **File > Open**.
5. Locate the downloaded firmware file and click on it.
6. Click **Begin** on the main screen. The total progress bar tracks the loading progress.
7. When the upload is finished, exit the program by selecting **File > Exit**.

The firmware upload is complete.



MVC 121 Plus Hardware Reset Modes

MVC 121 Plus Reset Mode Summary				
	Mode	Mode Activation	Result	Purpose/Notes
Use Factory Firmware	1	Hold the Reset button while applying power. NOTE: After a mode 1 reset, update the MVC 121 Plus firmware to the latest version. DO NOT operate the firmware version that results from this mode reset.	The MVC 121 Plus reverts to the factory default firmware. Event scripting does not start if the MVC 121 Plus is powered on in this mode. All user files and settings (drivers, adjustments, IP settings, etc.) are maintained. NOTE: If you do not want to update the firmware, or perform a mode 1 reset by mistake, cycle power to the MVC 121 Plus to return to the firmware version running prior to the reset.	This mode reverts to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
Reset to Factory Defaults	5	Press and hold the Reset button for about 9 sec. until the Power LED blinks three times (once at 3 sec., again at 6 sec., again at 9 sec.), then release and within 1 second press Reset momentarily (< 1 sec.). NOTE: The reset procedure is aborted if the second momentary press does not occur within 1 second.	Mode 5 performs a complete reset to factory defaults, except for firmware: <ul style="list-style-type: none"> • All mix-points set muted and set to 0 dB. • All outputs unmuted and set to 0 dB. • DSP Processing returned to defaults and bypassed. • All inputs muted and set to 0 dB. • All presets and group master memory cleared. 	Useful to start over with configuration or uploading, and to replace events.

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Europe and Africa:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

Asia:

Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:

Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: 714.491.1500 or 800.633.9876
Asia: 65.6383.4400

Europe: 31.33.453.4040
Japan: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.