ARCHITECTURAL ACOUSTICS®

MM™-8802
MEDIAMATRIX®
BREAK-OUT-BOX (BOB)

USER MANUAL

PEAVEY
ARCHITECTURAL ACOUSTICS®

Intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

CAUTION: Risk of electrical shock — DO NOT OPEN!
CAUTION: To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: To prevent electrical shock or fire hazard, do not expose this appliance to rain or moisture. Before using this appliance, read the operating guide for further warnings.

Este símbolo tiene el propósito, de alertar al usuario de la presencia de "(voltaje) peligroso" sin aislamiento dentro de la caja del producto y que puede tener una magnitud suficiente como para constituir riesgo de descarga eléctrica.

Este símbolo tiene el propósito de alertar al usario de la presencia de instruccones importantes sobre la operación y mantenimiento en la información que viene con el producto.

PRECAUCION: Riesgo de descarga eléctrica ¡NO ABRIR!
PRECAUCION: Para disminuír el riesgo de descarga eléctrica, no abra la cubierta. No hay piezas útiles dentro. Deje todo mantenimiento en manos del personal técnico cualificado.

ADVERTENCIA: Para evitar descargas eléctricas o peligro de incendio, no deje expuesto a la lluvia o humedad este aparato Antes de usar este aparato, lea más advertencias en la guía de operación.

Ce symbole est utilisé dans ce manuel pour indiquer à l'utilisateur la présence d'une tension dangereuse pouvant être d'amplitude suffisante pour constituer un risque de choc électrique.

Ce symbole est utilisé dans ce manuel pour indiquer à l'utilisateur qu'il ou qu'elle trouvera d'importantes instructions concernant l'utilisation et l'entretien de l'appareil dans le paragraphe signalé.

ATTENTION: Risques de choc électrique — NE PAS OUVRIR!

ATTENTION: Afin de réduire le risque de choc électrique, ne pas enlever le couvercle. Il ne se trouve à l'intérieur aucune pièce pouvant être reparée par l'utilisateur. Confiez l'entretien et la réparation de l'appareil à un réparateur Peavey agréé.

AVERTISSEMENT: Afin de prévenir les risques de décharge électrique ou de feu, n'exposez pas cet appareil à la pluie ou à l'humidité. Avant d'utiliser cet appareil, lisez attentivement les avertissements supplémentaires de ce manuel.

Dieses Symbol soll den Anwender vor unisolierten gefährlichen Spannungen innerhalb des Gehäuses warnen, die von Ausreichender Stärke sind, um einen elektrischen Schlag verursachen zu können.

Dieses Symbol soll den Benutzer auf wichtige Instruktionen in der Bedienungsanleitung aufmerksam machen, die Handhabung und Wartung des Produkts betreffen.

VORSICHT: Risiko — Elektrischer Schlag! Nicht öffnen!
VORSICHT: Um das Risiko eines elektrischen Schlages zu vermeiden, nicht die Abdeckung enfernen. Es befinden sich keine Teile darin, die vom Anwender repariert werden könnten. Reparaturen nur von qualifiziertem Fachpersonal durchführen lassen.

ACHTUNG: Um einen elektrischen Schlag oder Feuergefahr zu vermeiden, sollte dieses Gerät nicht dem Regen oder Feuchtigkeit ausgesetzt werden. Vor Inbetriebnahme unbedingt die Bedienungsanleitung lesen.

GENERAL CAUTIONS AND WARNINGS!

To prevent electrical shock or potential fire hazards, do not expose the MM™-8802 to moisture or rain. Before using this product, read the user manuals for further warnings and cautions.

The following cautions should be carefully observed when installing, wiring or using this product:

DO NOT use any other power supply or cable other than the one provided with this unit.

DO NOT use solvents or other cleaners to clean the unit. Basic external care requires only a damp cloth. Disconnect the power supply cord before cleaning.

Take care when removing the top cover of the unit. Adjustment of internal components should be performed by qualified technical personnel only! Remove the power cable prior to opening the unit.

Read all safety and installation instructions and retain all documentation for further reference.

The MM-8802 should be installed so that its mounting position does not interfere with proper ventilation.

This product should not be installed or placed near a source of heat.

Power supply cords and associated connectors should be unplugged from the power source when the unit is not used for long periods of time, or will be stored.

If this product is to be mounted in an equipment rack, install rear support if required by the rack manufacturer.

Care should be taken to ensure that the installation is clear of possible sources of contamination. Make sure that the product's ventilation openings are not exposed to possible sources of liquid, gases, or other contaminants.

This product should be inspected by a qualified service technician if the power supply cord or connector has been damaged, if the unit has been dropped, or if a foreign substance has gained access to the interior electronic and electrical components.

The information contained in this manual is subject to change without notice. Peavey Electronics is not liable for improper installation or configuration. The information contained herein is intended only as an aid to qualified personnel in the design, installation and maintenance of engineered audio systems. The installing contractor or end user is ultimately responsible for the successful implementation of these systems.

Manual by WR.

Table of Contents

Illustrations

⚠️ <u>CAUTION!</u>

The MM-8802 is designed to work in conjunction with MediaMatrix® brand products. The digital interface between the MM-8802 and the MediaMatrix product is a crucial link in the successful implementation of your system. Use only high quality Category 5 cables when using the MM-8802 with the MM DSP-RJ DPU card or the X-Frame™ 88 digital processor. If you are using the legacy MM DSP DPU card, you must use the Peavey 9-pin DB-9 legacy cable only. The MM-8802 will not perform properly if other 9-pin cables are used with the legacy products. Installing the MM-8802 with inferior or improper cables could also cause damage to the components in your sound system. Peavey will not be held liable for damage to components or transducers caused by improper use of interface cabling when using MediaMatrix products.

Like other electronic systems, the infrastructure is critical for implementing large systems that transverse large distances. It is important that your conduit systems, wire plants and connector complement are properly designed and installed. The wiring and cabling systems should be thoroughly inspected and each run certified to pass the specified bandwidth prior to the installation of any active electronic component. Failure to implement proper cabling systems may cause your system to perform at inferior levels.

Several associated products are required to complete a working system using the MM-8802. This manual frequently makes reference to these products, but does not provide specific configuration or installation information on them. Please refer to the manuals for these products for information. Every product, both Peavey products and third party devices, must be properly installed for the MM-8802 to operate in accordance with its published specification.

This product is fan-cooled with an exhaust fan on one side of the unit. Air is drawn inward from the other side. Do not block the fan or any vents when installing this product. Proper cooling is essential to maintain proper operation and long-term stability in this product. Install this product in EIA approved equipment racks only.

The information contained in this manual is subject to change without notice. Peavey Electronics is not liable for improper installation or configuration. The information contained herein is intended only as an aid to qualified personnel in the design, installation and maintenance of engineered audio systems. The installing contractor or end user is ultimately responsible for the successful implementation of these systems.

The illustrations, drawings and renderings contained herein are NOT drawn to scale.

Thank You!

Thank you for purchasing the MM™-8802 Break-out-Box or "BoB" for MediaMatrix® digital audio processing systems. The MM-8802 represents the latest in state-of-the-art audio technology for fixed commercial audio installations.

This manual was written to provide as much information as possible for your new Peavey Architectural Acoustics product. It is our sincere desire that you enjoy your purchase.

We feel that the best way to fully enjoy any purchase is to have an in-depth understanding of the product's features, functionality and performance characteristics. We hope that this manual, along with the manuals of our other products, will provide this. If you require additional information that this manual does not provide, please let us know. We are always looking for better ways to provide information about our products, and your input is always appreciated.

If you have a comment about this manual, or would like to make a suggestion, please write to: Peavey Electronics Corp., Architectural Acoustics Division, 711 A St., Meridian, MS 39301. Thank you again for using Peavey!

What's In The Box?

The MM-8802 is packaged in a single container. This container includes the following items:

1- MM-8802 Break-out-Box
1- IEC removable power supply line cord
   (120VAC Domestic, 230VAC Export)
17- 3-screw Euro connectors*
2- 16-screw Euro connectors*
1- User Manual/Literature Package
1- Warranty Card

* These items are shipped installed on the MM-8802

If any of these items are missing, please contact your authorized Peavey Architectural Acoustics contractor/dealer or the factory.

Products

This manual covers the MM-8802 Break-out Box for MediaMatrix brand products. The MM-8802 replaces the following products:

MM-8830 Break-out-Box
MM-8840 Break-out-Box
MM-8848 Break-out-Box

The functionality provided by these legacy products is provided in the new MM-8802, as well as many additional features and improved performance. The MM-8802 is designed to be seamlessly integrated with these products and all MediaMatrix brand products.

Description

Following on the heels of the original MM-8800 Series products, the new MM-8802 represents a significant improvement in audio performance, control functionality, monitoring, installation and cost. New advances in processing and control technology make the MM-8802 the most reliable breakout-box yet. The MM-8802 is designed to work seamlessly with all MediaMatrix® and Architectural Acoustics® products. We are confident that you will find the MM-8802, as well as other Architectural Acoustics products to be of the highest quality available.

The MM-8802 features a new single rack space package with several new and improved features. This 24-bit audio product provides the very best audio performance for MediaMatrix systems and a large array of control features, monitoring and installation benefits. Using state-of-the-art technology and advanced audio converters make the MM-8802 one of best values in the commercial digital audio market.

Designed for high end, fixed-install engineered audio systems, the MM-8802 includes functionality designed for the system designer. These new features make large scale system design, engineering and implementation easier than ever. Among the many features included with the MM-8802 are control logic inputs, logic outputs, fault monitoring, CAT 5 DSP interface and a new single space package featuring front panel metering of audio inputs and outputs. New software control of analog circuitry makes gain management easier and puts control of analog, as well as digital audio, on the desktop.

With a state-of-the-art, studio grade analog section and 24-bit converters, the MM-8802 provides an extremely high performance vs. cost ratio. With integral control ports and support for the legacy MediaMatrix interface, the MM-8802 is a solid, feature-loaded value.

Features

Single EIA rack space package
Forced air cooling
24-bit converters
Universal sample rate support
Eight line level audio inputs (mic or line capable)
Software selectable input sensitivity
Eight line level audio outputs
Software selectable full-scale output level
Eight Control Voltage (CV) control inputs
Eight TTL logic outputs
Independent fault monitoring dry contacts
Front panel audio metering
Front panel status monitoring
Category 5 cabling interface
New 50' cable distance
Legacy cable support
Universal power supply

The MM™-8802 is a very powerful tool. Ease of use, external control options, and a powerful interface make the MM-8802/MediaMatrix® combination perfect for any application, including:

- Theme Parks
- Presentation Rooms
- Board Rooms
- Houses of Worship
- Courtrooms
- Auditorium/Cafetorium
- Lecture Hall Sound Reinforcement
- Meeting Rooms
- Convention Centers
- Stadiums
- Arenas
- Paging
- Background Music
- Retail Spaces
- Restaurants
- Live Performance Venues

The new features, performance advantages and functionality included in the MM-8802 make this product one of the best audio values available. From simple X-Frame™ systems with basic audio requirements, to full blown, multiple-frame MediaMatrix systems, the MM-8802 is an excellent choice.

Assumptions

The MM-8802 is designed for basic and advanced MediaMatrix systems. It is assumed that you have a working knowledge of MediaMatrix hardware and software, computers and basic Microsoft Windows navigation. If you do not have this knowledge, please refer the configuration and installation of this product to qualified personnel. For in-depth information on MediaMatrix, refer to the online help.

Installation

The MM-8802 is designed to be installed in commercial grade, EIA electronic equipment racks only. Installing this unit in non-EIA racks or in other configurations is not recommended. Failure to install this product in the proper enclosure may void your warranty.

The MM-8802 is forced-air cooled, and care should be taken not to block the air intake or exhaust path. When installed in EIA racks, the MM-8802 can be installed in adjacent rack spaces without additional venting. However, it is recommended that common sense be applied to large installations where multiple units are mounted in a single rack. It is generally accepted that a ratio of one vent for every two MM-8802s is a good rule of thumb that usually provides adequate performance. In installations where adverse conditions exist, and room temperatures are likely to rise, additional vents should be installed.

The MM-8802 can be installed into any EIA rack with an internal depth clearance of 24" or more. This will allow plenty of space for the unit and its associated wiring harness. When dressing off wiring harnesses, take care with CAT 5 cables. Do not tie-wrap bundles of CAT 5 wire too tightly. Leave plenty of room for bends, allowing the cable to progress naturally from the RJ-45 connector. Creating tightly wrapped CAT 5 wire bundles can cause loose crimp joints and defective terminations.

To successfully install your new MM-8802, and perform the testing examples contained in this manual, you will need the following components:

- A MediaMatrix® X-Frame™, X-Frame 88, MiniFrame 108nt or 208nt, MM-760nt, MM-960nt or MM-980nt Mainframe.

- MWare™ 3.1.2, X-Frame 88 2.0 or later software.

- PC monitor, mouse and keyboard. For use with the X-Frame products, a separate personal computer running Windows® 95, 98, ME, NT 4.0 w/SP6 or Windows 2000 Professional is required.

- For frame-based MediaMatrix systems, you will need at least 1 MM DSP-RJ or MM DSP DPU card.

- Two CAT 5 cables are required for each MM-8802.

- An audio source, power amplifier and loudspeaker.

In MediaMatrix, the minimum configuration consists of a single DPU processing engine (X-Frame or frame/DSP card combination), and I/O. Depending on your system, this may consist of several products. When using the MM-8802, at least one unit is required to configure the minimum system. Of course, most systems will include more DPU products and multiple MM-8802s, but this is the most basic configuration.

The use of high quality, network grade CAT 5 cables is required to successfully implement the MM-8802 with new MediaMatrix products. Please refer to the section on CAT 5 cabling later in this manual.

Signal Flow

Signal flow is the basis for all audio system design. You cannot design and implement integrated audio systems without understanding the basics of signal flow, and how audio is transported between components. It is essential to all aspects of installation and maintenance. With the MM™-8802, it is equally important. You should understand the various stages of signal flow within the MediaMatrix® system to accurately and efficiently configure, adjust, control and maintain the system.

As with all MediaMatrix systems, audio is separated into several fundamental processes. First, there is analog audio, real-world waveforms that are a part of our everyday lives. This is what we hear and speak. Then there is digital audio. Code that represents "samples" of actual analog audio signals. This we cannot hear. And there is the conversion process. Audio must be converted from analog waveforms to digital code and then converted again, back to analog for use in our acoustic world. Look carefully at the illustration below.
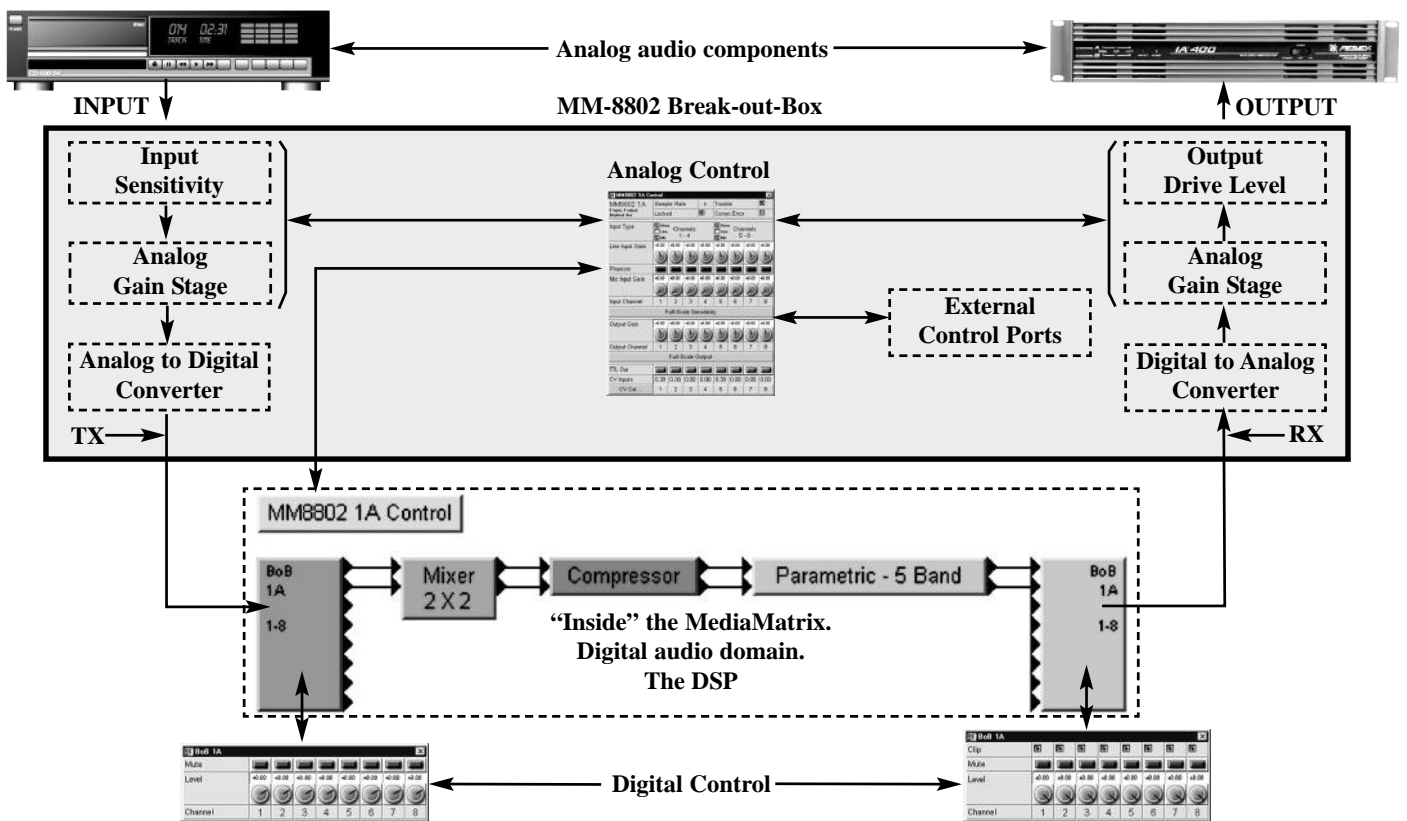
In the above example, stereo audio from the CD player gets into and out of the MediaMatrix system via the MM-8802. First, your CD player's output is connected to the MM-8802's input. The signal then passes the MM-8802's analog gain stage and gets converted to digital audio via the analog to digital converter (A/D). When the signal is past, or "after" the A/D converter, it is in the digital domain. After the converter, it exits the MM-8802 via the TX side of the CAT 5 digital interface cable and enters the MediaMatrix DSP. The two audio channels, left and right from the CD player are then "inside" the MediaMatrix digital processing engine or DPU. You use "wire" and audio "devices" to create any signal flow you desire for your CD audio signal. You can split it, process it, mix it, switch it, squash it, loop it, delay it...whatever you need to do, you can do with MediaMatrix. In this example, we have a stereo mixer, stereo compressor and stereo parametric EQ. The signal exits the DPU at the BoB output block. After the signal is processed, it exits the MediaMatrix system and returns to the MM-8802 via the RX side of the CAT 5 interface cable. It then hits another conversion stage, this time a digital to analog converter (D/A) where the digital signal data is returned to analog waveforms. It then goes through a final analog gain stage then shows up at the output terminal of the MM-8802. It is this terminal that gets connected to the next component in your audio system, most often, the power amplifier. (NOTE: When using the 9-pin legacy cable for interfacing the MM-8802, the TX and RX circuits are contained within a single cable.) Notice that the MM-8802 has several software control panels attached to it. There is the master control panel that includes all of the analog audio and external control interface functionality for the MM-8802. There are also control panels attached to the input and output block within the MediaMatrix DPU. Understanding these control panels is vital to good MediaMatrix implementation.

Hardware vs. Software Devices

The MM-8802 is an integration of physical hardware and software. In software, the MM-8802 is represented by several "devices" within the MediaMatrix® MWare™ application. These devices include the Control Block, the Input Block and the Output Block. For proper operation of this product, a thorough understanding of these devices is required.

There is a very basic relationship between the MM-8802 physical product and its accompanying software devices. Of these three devices, one is the "control panel" for the hardware. There are no physical controls on the MM-8802 itself, so all functions for it are accessible only from its software based control panel (except for legacy mode DIP switches, see page 19). This control panel can be found under the Input/Output section of the Device Menu. The figure below illustrates the relationship between the MM-8802 and its software control device.
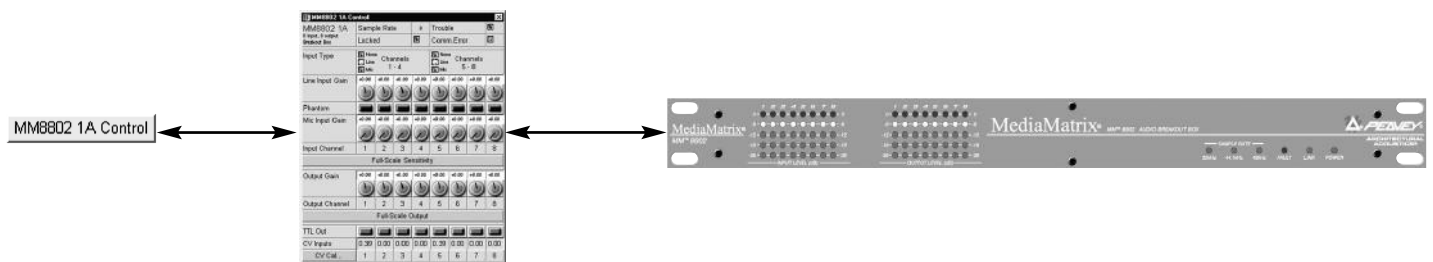

Fig. 1, The MM-8802 control block components and the physical hardware.

The second half to this equation is the audio transport. The concept of audio I/O is an extremely important part of configuring MediaMatrix systems. It is the "wire" that gets audio into, through and out of the system. Within MediaMatrix, this process is represented by two I/O blocks with "nodes" on them. These represent the actual input and output points for the system. In the figure below, you can see the two audio blocks. The one with the nodes on the right of the block is an audio "input" block. In other words, audio from the outside of the system enters the DSP at these nodes. The one with the nodes on the left side of the block is an audio "output". It is at this point where digital audio exits the system. Each of these blocks also has its own control panel. These control panels include level controls and mute buttons for the each audio channel in the digital domain.
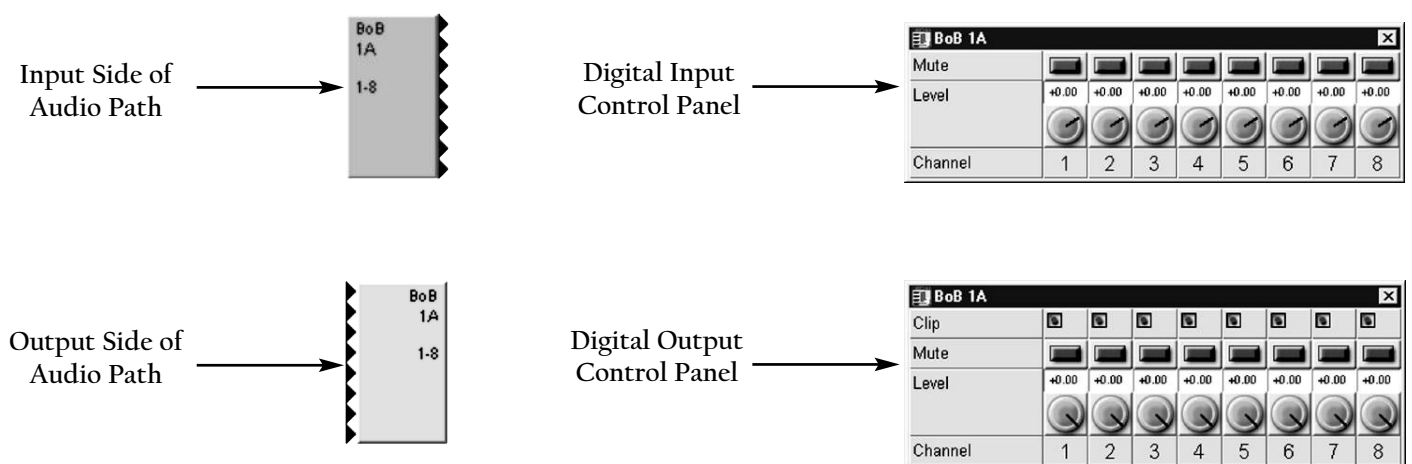

Fig. 2, The digital audio transport devices and their control panels.

The Test View

In order to properly use this manual, it is recommended that a basic MediaMatrix® view file be configured. This view file should have a minimum number of components and should be configured to install and test a single MM™-8802. Eventually however, your view will include many units, and should match exactly your specific system requirements. The following figure is a good example of such a "test" file.
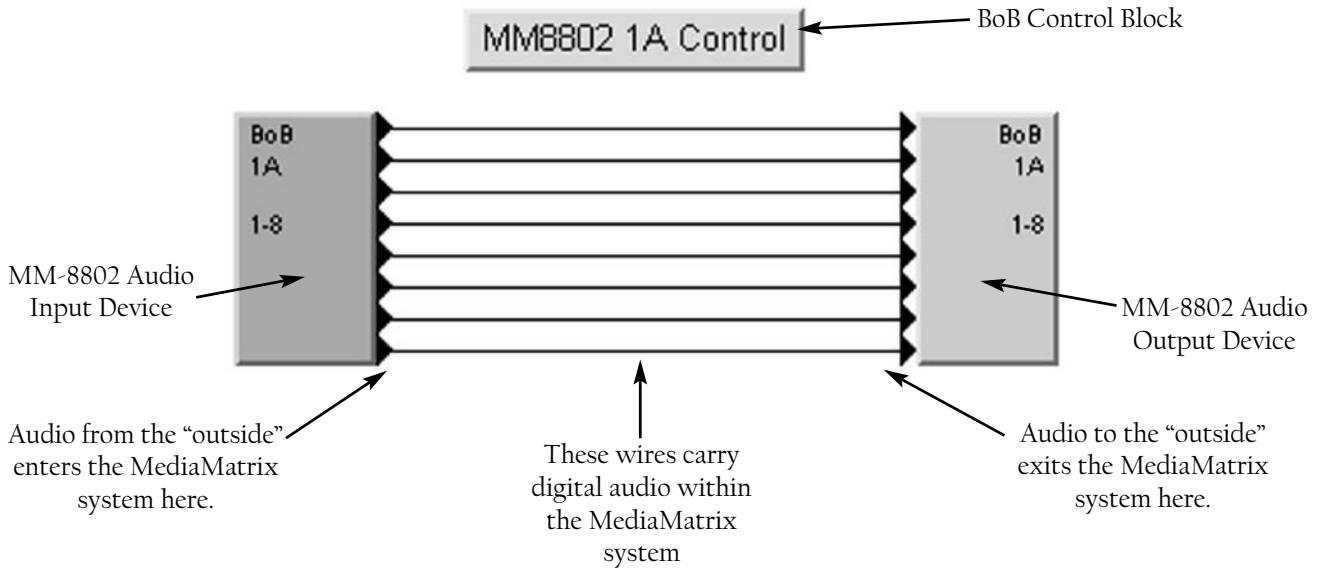

Fig. 3, Recommended Test View Configuration

Again, it is very important to understand the relationship between the MM-8802 hardware, the outside audio path and the digital audio path within MediaMatrix. Audio enters and exits the MediaMatrix system at the wire blocks and travels within the MediaMatrix system digitally. The wires represent this audio path within the MediaMatrix system.

Remember, the BoB Control Block includes only the analog audio controls for the MM-8802, while the wiring blocks include the digital audio controls. Both of these control sets are critical to the proper operation of your sound system. Refer to the signal flow block diagram on page 11 for details on this signal flow.

Audio Inputs

The MM-8802 includes functionality that supports a new modular input architecture. This architecture provides the ability to configure the MM-8802's analog inputs for either microphone or line-level operation. Two internal module bays provide connection to factory installed input modules. These modules consist of the MM-Line 4, which provides four analog line level inputs and the MM-Mic 4, which provides four analog microphone level inputs. A total of two modules are installed at the factory on the MM-8802. Which modules are installed is up to you!

MM-Line 4

The MM-Line 4 input card includes four line level inputs and installs into slot 1 or slot 2 of the MM-8802 input section. The MM-Line 4 includes full software control of input sensitivity and analog gain. It is possible to install one or two MM-Line 4 modules into the MM-8802.

MM-Mic 4

The MM-Mic 4 input card includes four mic or line level inputs and installs into slot 1 or slot 2 of the MM-8802 input section. The MM-Mic 4 features studio grade microphone preamplifiers, complete with software controllable phantom power and gain controls for each channel. It is possible to install one or two MM-Mic 4 modules into the MM-8802.

With these new modules, the MM-8802 can be configured in a variety of different ways.

- 8 line inputs, 8 line outputs
- 8 mic inputs, 8 line outputs
- 4 mic inputs, 4 line inputs, 8 line outputs

By making the inputs modular, the MM-8802 provides even greater flexibility and makes for much more cost-effective system design.

Input Devices

When looking at the rear panel of the MM™-8802, you can see which module is installed by noting the color of the input con-nector header. The header for the MM-Line 4 is black, while the header for the MM-Mic 4 is green. The MM-8802's software control module will indicate which card is installed by illuminating either a "Mic" or "Line" LED on the software control device in the MediaMatrix software. (See page 20). If the "None" LED on the software control module is illuminated, it means that there is no input module present. At the time of this printing, there is no option for using an MM-8802 without any input modules installed. If this LED is illuminated, it may indicate an unsuccessful installation of the input module.

Input Connector Header
Input Channels 1-4
Shown installed with
MM-Line 4 input module
(Black header)

Input Connector Header
Input Channels 5-8
Shown installed with
MM-Mic 4 input module
(Green header)
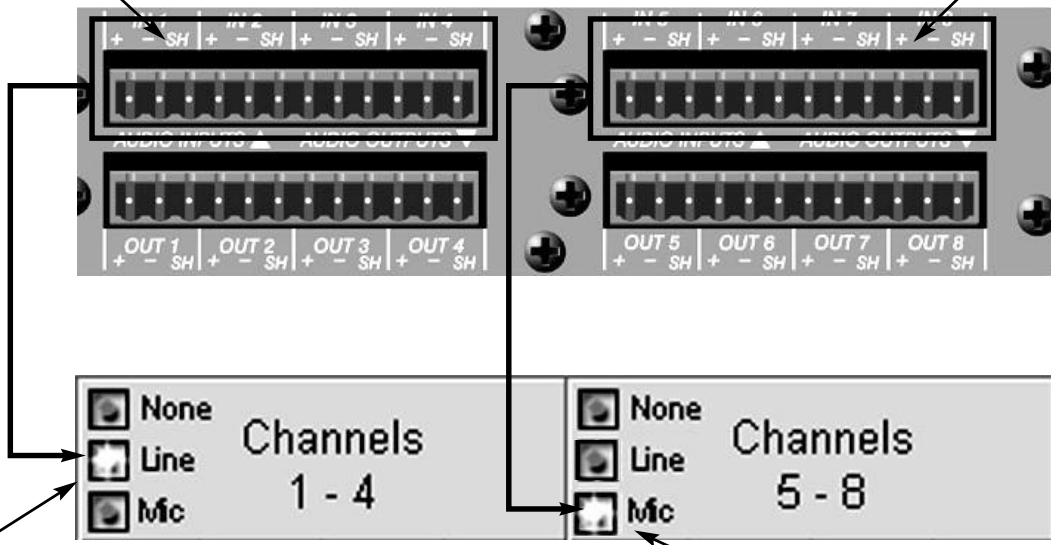
Software control panel showing a suc-cessful installation of an MM-Line 4 in the input bay for channels 1-4.

Software control panel showing a suc-cessful installation of an MM-Mic 4 in the input bay for channels 5-8.

Software control panel showing an unsuccessful installation OR absence of any input module for channels 5-8.

Gain Structure

Gain structure is among the most important, often debated and misunderstood topics in the audio industry. For years, engineers have disagreed with each other about proper levels, gain I/O, meters and other issues that affect the way we work. When digital audio came into the mainstream, the topic's confusion was only compounded, and today, few fully understand the inner workings of gain structure. This is true within MediaMatrix® as well.

Although this manual does not present an exhaustive discussion on the topic, it is important to understand the basics of gain structure, and how it relates specifically to the MM-8802.

When the MM-8802 was designed, several important issues regarding the gain structure of its input and output sections were carefully considered. There were performance issues, interface, ease of use and compatibility issues that played a big part in how the product was eventually designed.

In order to provide support for the thousands of MediaMatrix systems already installed, the MM-8802 was designed with a unique contrast of old and new. Essentially, the MM-8802 operates in one of two modes, "New" or "Legacy" mode. These modes of operation extend to many facets of the MM-8802's functionality, but most significantly to the management of its gain structure.

When running in New mode, the MM-8802 includes functionality that supports software control of all analog settings when using current (MWare™ V3.1.2 or X-Frame™ 88 V2.0, or higher) software. When running in Legacy mode, that is, systems that are running older software, the adjustments of Full-Scale Input Sensitivity and Full-Scale Output Drive levels are adjustable from internal DIP switches. In this mode, the MM-8802 acts just like a legacy BoB.

The legacy BoB models (MM-8830, MM-8840, MM-8848) did not include support for software-based analog gain control. The only adjustments that could be made were by internal jumpers for Full-Scale Input Sensitivity and Full-Scale Output Drive level. And, because real-world conditions prevent a universal standard, it was possible that the factory settings would not be appropriate for many projects. The likelihood was that, sooner or later, a contractor would have to open the unit to adjust the analog settings.

It is very important to understand that it is the software that determines what mode the MM-8802 is operating in, NOT the interface connector. The new software includes support for control of the Full-Scale Input Sensitivity and Full-Scale Output Drive settings directly from the control panel as well as input and output analog gain (trim). When these software controls are available, all internal hardware switches are bypassed.

The software controls are explained on page 21. For legacy operation, you will need to use the MM-8802's internal DIP switches to adjust analog Full-Scale Input Sensitivity and Full-Scale Output Drive levels.

Setting Full-Scale Input Sensitivity

To fully understand how MediaMatrix® gain structure works, you should have a clear, high level view of how the Full-Scale Input Sensitivity and Full-Scale Output Drive settings relate to the front panel and software-based audio meters.

First and foremost, it is important to understand what the levels mean. The Full-Scale Input Sensitivity and Full-Scale Output Drive settings refer to separate analog circuits within the MM™-8802. These circuits are in addition to the fully adjustable analog input and output gain stages. Both the Full-Scale Input Sensitivity and Full-Scale Output feature four user-definable settings. These settings represent MAXIMUM (Full-Scale) levels, NOT nominal settings. Keep this in mind as we progress.

In a digital system, 0 dB indicates the "top" of the useable dynamic range, just below full-scale. For the inputs, full-scale indicates the maximum level BEFORE converter clipping. On the front panel input meter, 0 dB has been calibrated to be ‹1 dB below full-scale. Anything over this level is clipping, or in digital parlance, an "OVER". Remember that the front panel input meter is in the digital domain, just after the analog to digital (A/D) converter. The position of the Full-Scale Input Sensitivity switch determines how much analog input signal is required to get the front panel input meter to read 0 dB. Or, in other words, to get the A/D converter to full-scale maximum input level.

The MM-8802 typically provides greater than 105 dB of dynamic range. This is the range of 100%, clean audio above the published noise floor, and below the threshold of converter clipping (Full-Scale). The adjustable sensitivity switches simply "shift" this dynamic range upwards or downwards before the signal gets into the MediaMatrix DPU. This is done primarily to accommodate the connection of third party components and to match source output levels. The setting of the Full-Scale Input Sensitivity will determine what level is required to drive the A/D converter to full-scale and illuminate the 0 dB front panel input meter. For example, if +18 dBu is selected, then it will take +18 dBu of level to get to a 0 dB reading (full-scale A/D) on the front panel input meter.

Front Panel Input Meter

Analog Input +18 dBu = Full Scale
Full Scale = 0 dBu Meter

Full-Scale Input Sensitivity set at +18 dBu
(Maximum level at A/D converter)

The setting in the Full-Scale Input Sensitivity dialog box will determine how the front panel input meters display audio levels coming into the MM-8802. It is very important that these switches be set correctly. For example, if you know that the nominal levels of your system are going to be around 0 dBu, and you want to monitor peak levels 12 dB above that, then you will want to use the +18 dBu setting for the Full-Scale Input Sensitivity. This will allow the front panel meter to display +18 dBu at the 0 dB LED. Your 12 dB headroom level in this case would show up at approximately -6 dB on the meter. In order to get the maximum performance from the analog input stage of the MM-8802, it is recommended that your Full-Scale Input Sensitivity settings be properly matched to the audio source and your headroom requirements.

What we are looking at so far is front panel metering. Remember this.....the setting of the Full-Scale Input Sensitivity switch will always equal the 0 dB LED on the front panel input meter. This is the full-scale (maximum) level before A/D converter clipping. So, how does this relate to the meters inside of MediaMatrix? Read on.....

MediaMatrix®, Meters & the MM-8802

Inside the DPU audio levels are represented by software based meters that can be placed into the signal flow at any stage. They can also be found within certain devices and can be configured as input or output meters. These meters include a bar-graph display for quick visual reference. However, the more accurate way to monitor levels is by using the small text display included with each meter. This display will give you exact readings with much finer resolution than the bar-graph display.

It is very important to understand that the software meters display actual levels inside the digital domain (DPU). Even though the front panel meters are in the digital domain, they can only display the digital signal immediately after the A/D and before the D/A converters. In the view file, this same signal shows up at the BoB input and output blocks. Once the signal is processed, split or distributed by other audio devices, the only way to accurately meter the signal is by placing software meters within the view file signal flow. The relationship of the hardware and software meters is shown in the following illustration. (See pages 20-21 for details on software controls.)
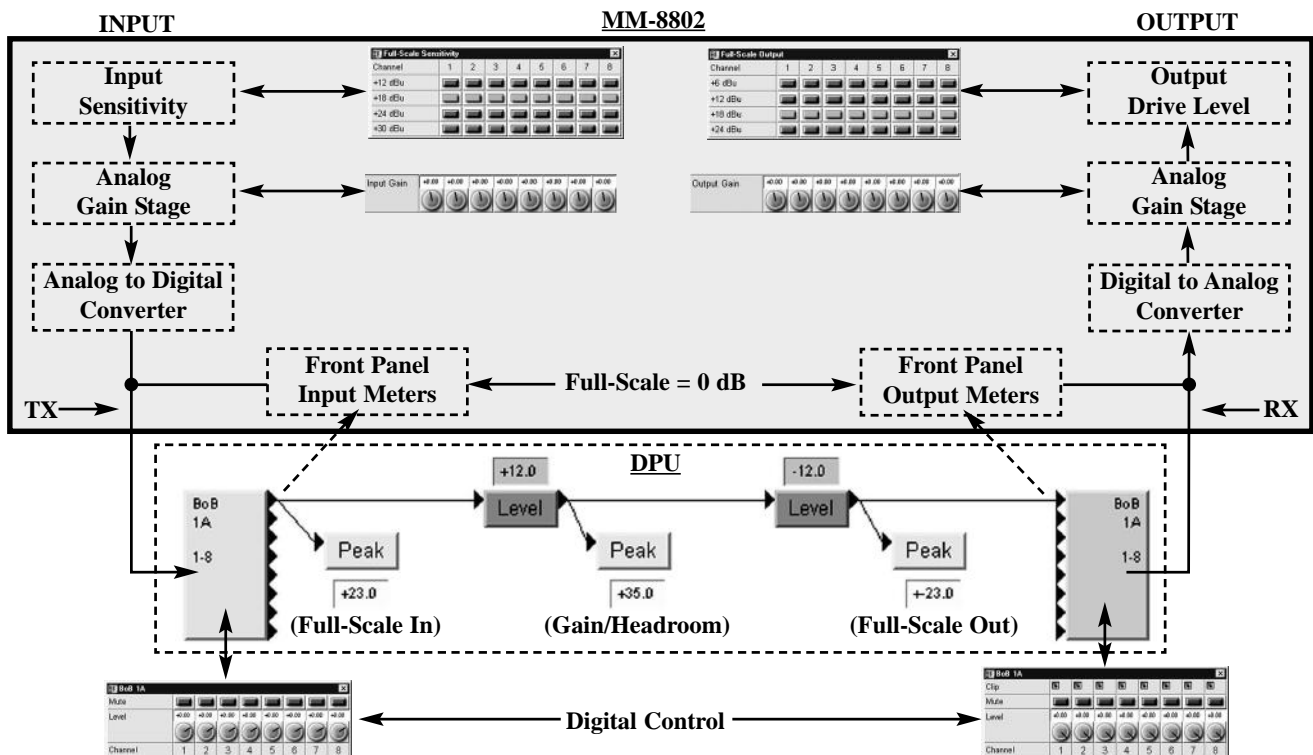
The key to understanding how the front panel and software meters relate is in the signal flow. The levels at the BoB inputs and outputs of the view file are the same levels displayed on the front panel meters, although they are calibrated differently. Once the signal is processed, digital audio levels inside the DPU should be monitored exclusively within the view file using software meters. This is because there is an additional 12 dB of headroom, or gain, available exclusively within the DPU. This additional gain cannot be displayed on the front panel meters. Before the signal leaves the DPU at the BoB output block, it should be attenuated back to full-scale converter level, or lower, to avoid clipping the D/A converter.

Refer to the above example. The Full-Scale Input Sensitivity switch is set for +18 dBu and a +18 dBu signal is coming into the MM-8802 (0 dB, or full-scale, on the front panel input meter). The first software meter, placed at the view file input block, will indicate this level as +23.0 dB peak. The +23.0 dB represents the full-scale peak level, measured inside the DPU. Inside the DPU, there is an additional 12 dB of headroom available for EQ, summing, etc. This headroom level is represented by a 12 dB boost at the first Level control and the peak meter connected to it indicating +35.0 dB (max DPU level). The signal is then attenuated by the second Level control to avoid clipping the MM-8802 and its peak meter again shows +23.0 dB. This signal level will be output via the BoB output block, and returned to the MM-8802 at full-scale. The front panel output meter will display 0 dB, regardless of the position of the Full-Scale Output Drive switches.

This +23.0 dBu level represents 0 dB on the front panel meters. Remember, the +23.0 dB DPU level is always the maximum full-scale level that can be received by, or sent to the MM-8802. Anything above +23.0 dB (DPU level) that is sent to the BoB output block, and thus, to the MM-8802's D/A will be clipped. The additional 12 dB of headroom is only available within the DPU.

Full-Scale Output Drive

What about the outputs? The outputs are easy....just set the drive level you want. The full-scale DPU levels will be available at the output of the MM™-8802 at your choice of analog levels, so you don't take a performance loss if you need a lower output level to match the input sensitivity of your power amplifier. Likewise, if you use the MM-8802 to drive line-level audio over long distances and need to use a higher drive level, you still get the same, full-scale performance. Also, the setting of the Full-Scale Output Drive level does not affect the levels coming into the MM-8802 or the levels inside the DPU.

In our previous example, we would be getting +23.0 dB at the input to the MM-8802's digital to analog (D/A) converter. This is full-scale, as determined by the input, and the DPU processing. The actual analog audio level at the MM-8802's output is determined by the position of the Full-Scale Output switch. Remember, it doesn't matter which output setting you choose, you still get full-scale performance. Just like the input side, these switches allow you to "shift" your dynamic range upward or downward to match your application. If you choose a +6 dBu setting, then the full-scale analog output level will be + 6.0 dBu. As in our example, a +18.0 dBu setting would give you unity gain and the output level of the MM-8802 would be exactly the same as the input level of +18.0 dBu.

Adjusting Full-Scale Input Sensitivity and Output Drive Settings in Legacy Mode

⚠ W A R N I N G ! !

Adjustment of the DIP switches requires access to the inside of the MM-8802. It is highly recommended that this procedure be performed ONLY by qualified service personnel. Remove the power cable prior to removing the cover. There are dangerous voltages present inside the unit, as well as static sensitive components. Damage to the MM-8802's internal components caused by unqualified persons performing this procedure will void the warranty.

If the MM-8802 is operating with current software, (MWare™ V3.1.2 or X-Frame™ 88 V2.0) these settings are adjustable from the software controls. If the MM-8802 is connected to a MediaMatrix system of an earlier vintage, then these software controls, as well as all other analog controls, are disabled. In this case, the MM-8802 operates in "legacy" mode, and acts just like an older BoB. In legacy mode, you must adjust the analog Full-Scale Input Sensitivity and Full-Scale Output Drive level with the DIP switches. The illustration below shows the layout of the MM-8802's internal DIP switches. These switches perform the same function as the software based Full-Scale Input Sensitivity and Full-Scale Output Drive controls shown on page 21. The range of adjustment is the same, and there is a switch for each input and output channel.

The default settings provide for a 12 dB loss through the MM-8802. This is done intentionally to maintain compatibility with older BoBs. The illustration below shows the DIP switches as they appear on the circuit board at the factory default settings.

NOTE: If you are running new software and can see the Full-Scale Input Sensitivity and Full-Scale Output Drive controls, as shown on page 21, then the DIP switches are NOT active. Software control will override these switches.
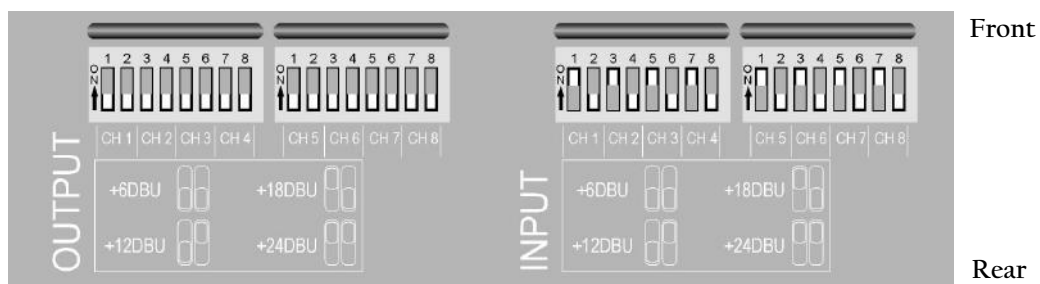
The DIP switches are located on the main circuit board inside the MM-8802. To gain access, remove only the top cover of the unit. The switches are located on the center of the circuit board, adjacent to the input boards. It will be obvious, since these DIP switches are the only DIP switches used on the MM-8802's main board. There are four 8-position DIP assemblies. Each channel is controlled by two switches, each with an "up" and "down" position. If the switch is located in the center of its travel, it is not adjusted correctly. Just below the switches is a printed key of the switch positions and their relative levels. The key applies to all channels.

MM-8802 Control Device Features

MM8802 1A Control
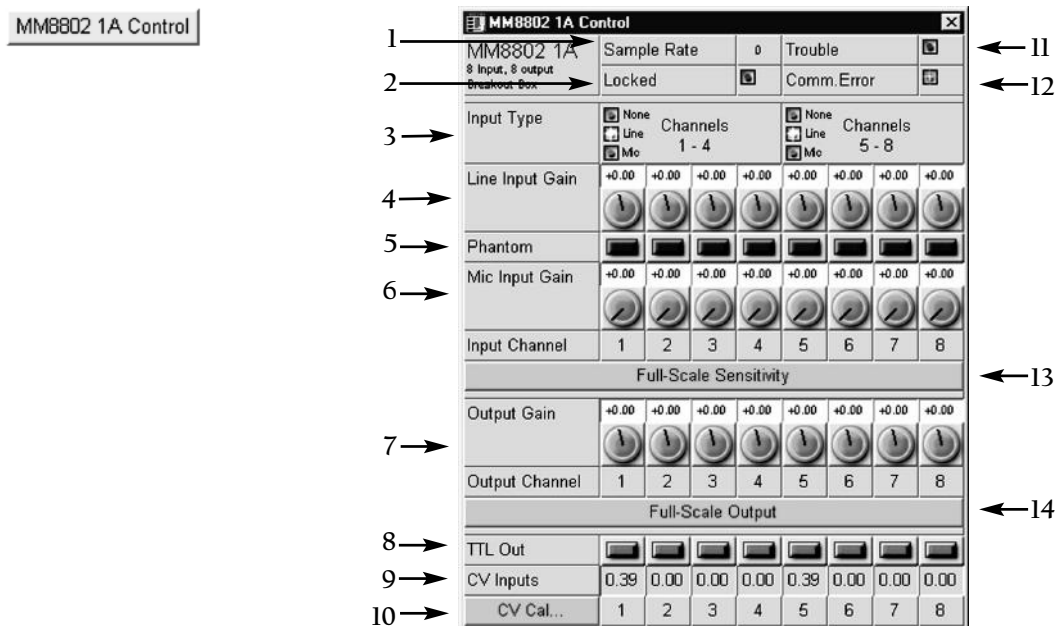
1. **SAMPLE RATE** This control indicates the active compiled sample rate as determined by the view file. The options are 32k, 44.1k or 48 kHz.

2. **LOCKED LED** This LED will illuminate when the MM-8802 has been successfully locked with the MM DSP (RJ) DPU card.

3. **INPUT TYPE** LEDs indicate the type of input card present. "Line" indicates the presence of the MM-Line 4. "Mic" indicates the presence of the MM-Mic 4. "None" indicates that no input card is installed, or there is an error.

4. **LINE INPUT GAIN** This control includes the rotary knob and the corresponding indicator above it. This controls the MM-Line 4's analog line level input gain stage, before the A/D converter. The range is -95.5 to +30.5 dB, (+/- 0.5 dB).

5. **PHANTOM** This switch toggles +48 Volts DC of phantom power at the input terminals of the MM-Mic 4 input module.

6. **MIC INPUT GAIN** This control includes the rotary knob and the corresponding indicator above it. This controls the MM-Mic 4's analog mic level input gain stage, before the A/D converter. The range is 0 to +63 dB, (+/- 3 dB).

7. **OUTPUT GAIN** This control includes the rotary knob and the corresponding indicator above it. This controls the analog output stage, after the D/A converter. The range is -95.5 to +30.5 dB, (+/- 0.5 dB).

8. **TTL OUT** This is a "maintained" ON/OFF button. In the down (ON) position, a positive control voltage is output on the corresponding TTL logic output port.

9. **CV INPUTS** Displays the value of the control voltage input when an external device is connected to the corresponding CV port. This is a control and may be gestured manually to simulate the action of an external control (only when there is no external connection). The range is 0-100.

10. **CV CAL DIALOG BLOCK** Double clicking (Edit Mode) or single clicking (Control Mode) on this box will open the CV Calibration Dialog Box. (See opposite page.) This box is closed by clicking on the "X" in the upper right hand corner in any mode.

11. **TROUBLE LED** This LED will illuminate when any type of fault is present in the MM-8802 or its communications link.

12. **COMM ERROR LED** This LED will illuminate when there is a communications error between the MM-8802 and the MM DSP (RJ) DPU card.

13. **FULL-SCALE SENSITIVITY BLOCK** When clicked upon, this block opens an additional window for input sensitivity. See opposite page.

14. **FULL-SCALE OUTPUT BLOCK** When clicked upon, this block opens an additional window for analog output gain control. See opposite page.

MM™-8802 Control Device Features, continued

MM8802 1A Control
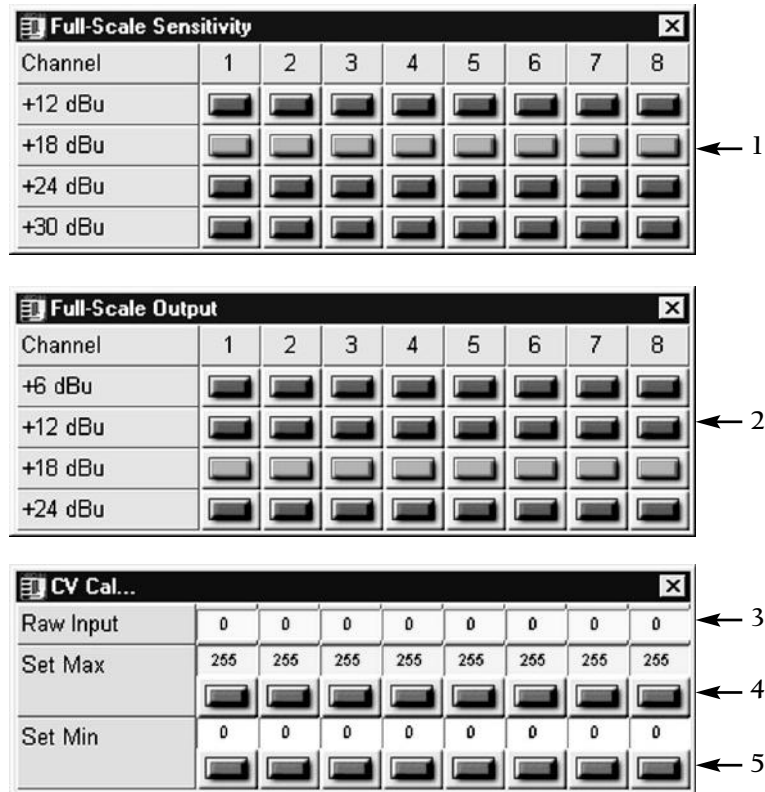
1. **FULL-SCALE INPUT SENSITIVITY DIALOG BOX** (Active for MM-Line 4 Only.) These buttons toggle the analog input sensitivity between +12, +18, +24 and +30 dBu for each channel. These buttons are mutually exclusive. Only one button can be active at a time per channel. (Functional only with MWare™ 3.1.2 or X-Frame™ 88 Version 2, see pages 16-19.)

2. **FULL-SCALE OUTPUT DIALOG BOX** These buttons toggle the full-scale analog output level between +6, +12, +18 and +24 dBu for each channel. These buttons are mutually exclusive. Only one button can be active at a time per channel. (Functional only with MWare 3.1.2 or X-Frame 88 Version 2, see pages 16-19.)

3. **RAW INPUT (CV CAL... DIALOG BOX)** This control indicates the actual value as determined by an external control. Use this indicator to see exact performance of external devices. The range is 0-255. There is an indicator for each channel. (See page 37.)

4. **SET MAX BUTTON (CV CAL...DIALOG BOX)** This is a momentary button used to set the minimum, or lowest value of an external control's range. The indicator above displays SET MIN value. The range of display is 0-255. There is a button for each channel. (See page 37.)

5. **SET MIN BUTTON (CV CAL...DIALOG BOX)** This is a momentary button used to set the maximum, or highest value of an external control's range. The indicator above displays SET MAX value. The range of display is 0-255. There is a button for each channel. (See page 37.)

Input Wiring Block Device Features
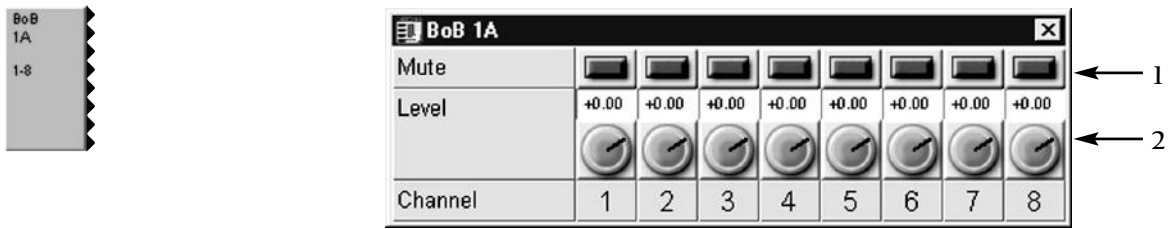
1. **MUTE BUTTON** (Typ. each channel) This is a "maintained" ON/OFF button. When in the down (ON or MUTE) position, the incoming digital audio is muted. The mute stage is in the DPU, after the MM-8802's A/D converter.

2. **LEVEL** (Typ. each channel) This control and its associated numeric indicator adjusts the amount of digital input level. This control is in the DPU, after the MM-8802's A/D converter. The range is -100 dB to +12 dB.

Output Wiring Block Device Features
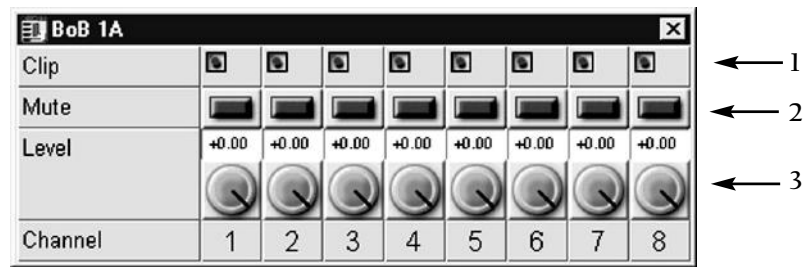
1. **CLIP** (Typ. each channel) This LED indicates audio clipping in the digital domain. The LED will illuminate when the DPU digital audio peak level at the output block exceeds +23 dB.

2. **MUTE** (Typ. each channel) This is a "maintained" ON/OFF button. When in the down (ON or MUTE) position, the outgoing digital audio is muted. The mute stage is in the DPU, before the MM-8802's D/A converter.

3. **LEVEL** (Typ. each channel) This control and its associated numeric indicator adjusts the amount of digital output level. This control is in the DPU, before the MM-8802's D/A converter. The range is -100 dB to 0 dB.

Front Panel Features

1. **INPUT LEVEL** Eight 5-segment LED ladder displays indicate audio input levels in the digital domain just after the analog to digital (A/D) converter. The range of the meter is based on full-scale performance of the A/D converter. The analog input level required to Drive the converter to full-scale will vary based on the setting of the Full-Scale Input Sensitivity switches (see pages 16-19 & 21). 0 dB will illuminate at approximately 1 dB below the full-scale level.

2. **OUTPUT LEVEL** Eight 5-segment LED ladder displays indicate audio output levels in the digital domain just before the digital to analog (D/A) converter. The range of the meter is based on digital signal level at the MediaMatrix BoB output device. This meter does not indicate analog levels at the output of the MM-8802. Actual analog audio levels will vary based on the setting of the Full-Scale Output switches (see pages 16-19 & 21).

3. **SAMPLE RATE LEDS** Indicates the current operating sample frequency. The sample rate is determined by the compiled configuration in the connected MediaMatrix® system. The MM-8802 can operate at 32, 44.1 or 48 kHz.

4. **FAULT LED** When this LED is on, a fault has occurred within the MM-8802 hardware. This LED should be off during normal operation. The function of this LED is duplicated by the rear panel Fault Contact connector. See next page.

5. **LINK LED** When this LED is on, the MM-8802 has successfully connected to the associated MediaMatrix system. This LED should be on during normal operation.

6. **POWER LED** This LED indicates the presence of mains AC power as determined by the position of the rear panel power switch.

Rear Panel Features
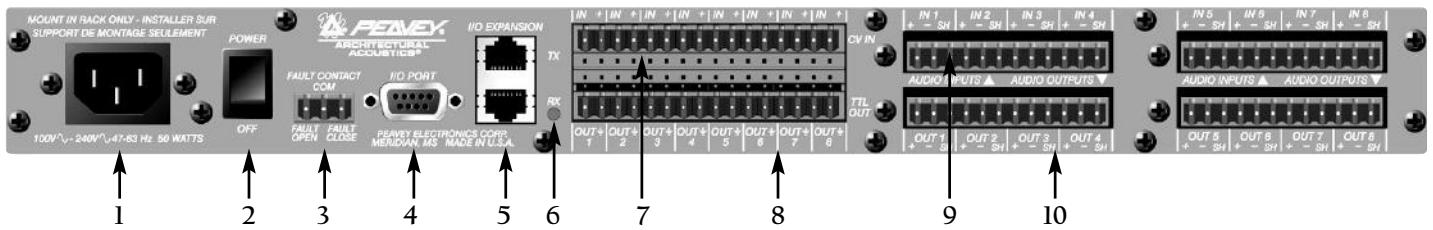
Shown without the Euro connectors attached

1. **MAINS POWER RECEPTACLE** IEC power receptacle for connecting factory supplied AC cable. Only the supplied cable should be used.

2. **MAINS POWER SWITCH** Two-position rocker switch toggles mains AC power on or off. When this switch is in the up position, power is on.

3. **FAULT CONTACT** Three-position, removable Euro connector for interfacing external alarm indicators. The connector provides N.O. and N.C dry contacts. The Fault condition is a duplicate of the front panel Fault LED.

4. **LEGACY DIGITAL INTERFACE CONNECTOR** One 9-pin DB-9 female connector for interfacing the legacy MM™ DSP DPU card. Requires the Peavey legacy cable for proper interface.

5. **DIGITAL INTERFACE CONNECTORS** Two RJ-45 connectors for connecting the TX (transmit) and RX (receive) CAT cables to MM DSP-RJ or X-Frame™ 88 digital audio processor products.

6. **RX LED** This LED will illuminate when audio data is successfully received by the transmitting DPU product.

7. **CONTROL VOLTAGE (CV) INPUTS** Eight 2-wire, 0-10 V DC control voltage ports for connecting external analog controls. Positive voltage is supplied across all even numbered pins, referenced to ground. The control input is on the odd numbered pins.

8. **LOGIC OUTPUTS** Eight 2-wire TTL logic output ports. Positive voltage on odd numbered pins indicates a logic high state. The logic voltage is referenced to ground, wired across the even numbered pins.

9. **AUDIO INPUT CONNECTORS** Eight balanced mic (MM-Mic 4) or line (MM-Line 4) level analog audio inputs on removable Euro connectors. Inputs are configurable, either mic or line, in groups of four.

10. **AUDIO OUTPUT CONNECTORS** Eight balanced line-level analog audio outputs on removable Euro connectors.

Basic MediaMatrix® Connections

The MM-8802 includes several different connection types. First and foremost is the connection to the MediaMatrix processing product that you will be using for your system. The following illustrations show the various connections to MediaMatrix products and their cable types. Also, please refer to the section on CAT 5 cables on pages 38-39. There are two options for connecting the digital audio interface on the MM-8802. Which option you use depends on what MediaMatrix DPU product you are using. This configuration requires the MM DSP or MM DSP-RJ DPU card within the MediaMatrix system.

The first example shows typical connections when using MediaMatrix frame-based systems. Using the MM-8802 with the MM DSP-RJ provides the maximum performance and I/O efficiency. With this configuration, cable lengths of 50 feet are possible between the DPU card and the MM-8802. This configuration uses two CAT 5 cables (not included) for each MM-8802. The design of the MM-8802 and the MM DSP-RJ DPU card includes separate conductors for transmit (TX) and receive (RX) audio data.

The MM DSP DPU card is the original MediaMatrix audio processing card, also known as the "legacy" DPU card. The MM DSP uses a proprietary 9-pin DB-9 connector for the digital audio interface with MM-8800 Series break-out-boxes. This custom cable, available only from Peavey, is designed to carry the high speed data between the MM DSP and MM-8800 Series Break-out-Boxes in a single cable. Both TX and RX conductors are housed in the same cable. It is very important to note that this cable has a distance limit of six feet. Under no circumstances can this distance be exceeded. The MM DSP DPU card will not perform to specifications without the factory supplied cable.

MediaMatrix Frame with (1) MM DSP-RJ DPU Card   MediaMatrix Frame with (1) MM DSP DPU Card
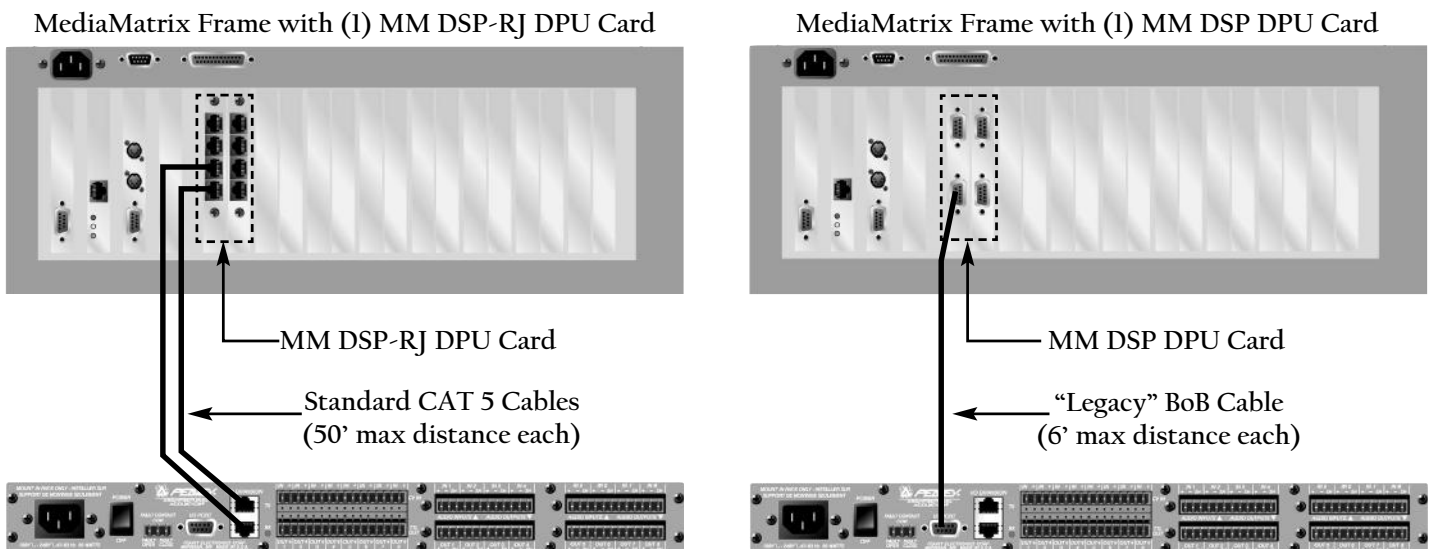
Fig. 4, Typical MediaMatrix Frame Connections

Using the X-Frame™ 88 with the MM-8802 affords the same type of interconnect as the MM DSP-RJ DPU card. Although the X-Frame 88 is a stand alone product, it provides connectivity for two MM-8802 break out boxes, extending its total I/O to 24x24. As with the MM DSP-RJ, the X-Frame 88 uses two CAT 5 cables, one for TX, one for RX for each MM-8802. For more information on these configurations, please refer to the X-Frame 88 User Manual.

MediaMatrix X-Frame 88
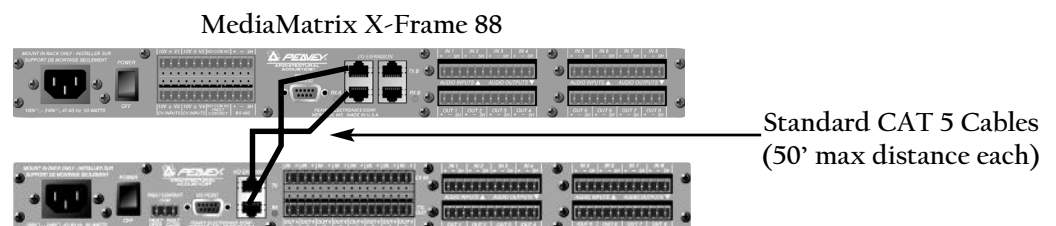
Fig. 5, Typical X-Frame 88 Connections

Audio Connections

Each audio connection on the MM™-8802 is a single three-wire, balanced analog circuit. The MM-8802 is supplied with a three-screw removable Euro block that plugs into a mating connector header on the MM-8802 for each audio channel. The pre-ferred method for making audio connections consists of four steps as shown in the illustration. The audio connections are iden-tical, except one is an input, the other an output. As with any electronic connection, care should be taken to ensure that the termination is solid. There should be no stray wire strands, kinks or nicks in the wire jacket for a proper termination. And as always, audio connections should be made with high quality stranded, shielded wire.

STEP 1. Carefully strip the cable jacket and the conduc-tor insulation so that your wire looks something like this. The distance between the end of the jacket and the tips of the conductors should be approximately .0750". The strip length of the conductor wire should be .310" for prop-er termination into the Euro connector.

STEP 2. Carefully insert each conductor into the opening of the Euro connec-tor. Take care to ensure that polarity is observed and that the shield is properly twisted to make a solid connection. Ideally, the shield should be isolated by installing heat shrink insulation. The cor-rect termination for all audio connections on the MM-8802 is Positive (+), Negative (-) and Shield (SH) as shown on the rear panel label.

STEP 3. While holding the cable so each conductor is firmly seated in the connec-tor, carefully tighten down each screw of the connector. While turning each screw, look closely at the wire and make sure that the action of the screw does not "push" the wire out of the connec-tor. Verify the integrity of your connection by gently pulling on each conductor to ensure that it is terminated properly.

STEP 4. Take the completed wire/connector assembly and carefully plug it into the matching connector header on the MM-8802's rear panel. Take care that you are plugging the connector into the proper set of pins on the header. There is no barrier between adjacent audio channels, so it is possible to connect to pins of an adjacent channel. If you are not careful, instead of connecting to Positive, Negative and Shield, you may end up connecting Negative, Shield & Positive or Shield, Positive & Negative! Your finished connection should look like this.....

Euro connector headers

Removable Euro Connector Block terminated to standard shielded audio wire.
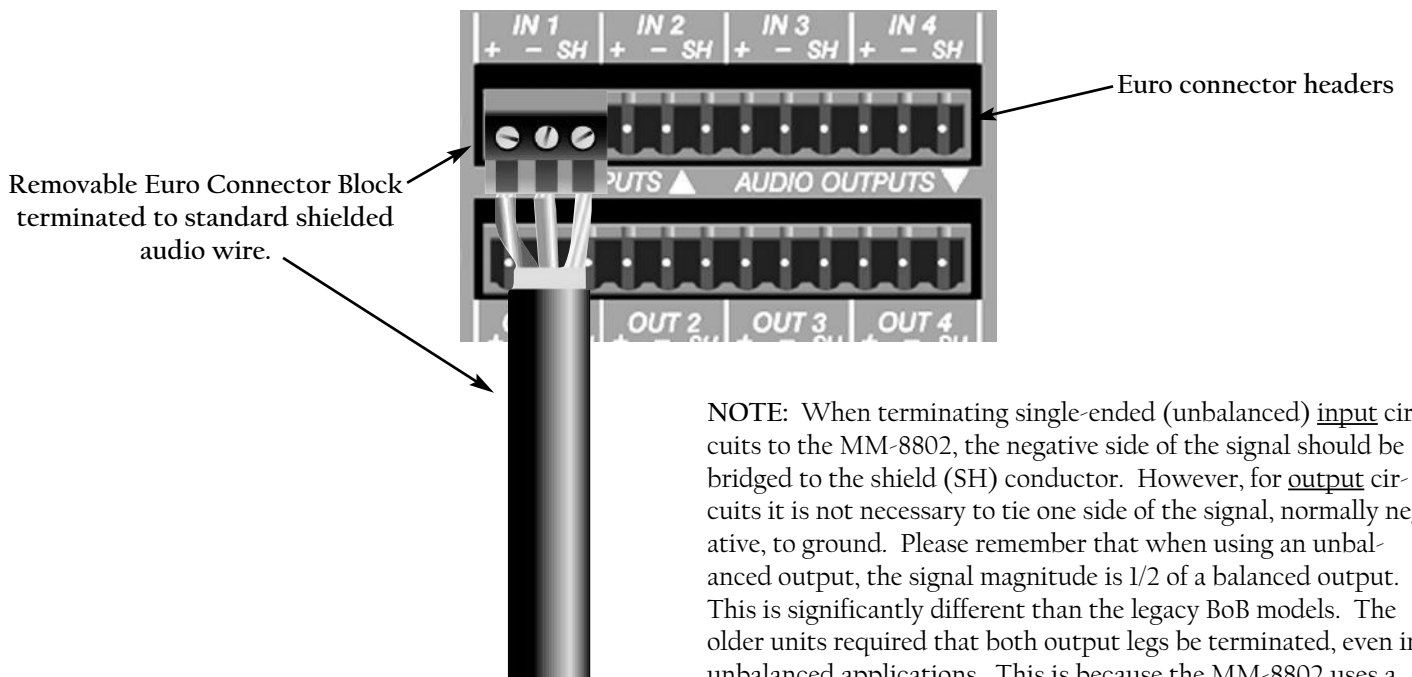
NOTE: When terminating single-ended (unbalanced) input cir-cuits to the MM-8802, the negative side of the signal should be bridged to the shield (SH) conductor. However, for output cir-cuits it is not necessary to tie one side of the signal, normally neg-ative, to ground. Please remember that when using an unbal-anced output, the signal magnitude is 1/2 of a balanced output. This is significantly different than the legacy BoB models. The older units required that both output legs be terminated, even in unbalanced applications. This is because the MM-8802 uses a push-pull output configuration, while the older units were designed with a cross-coupled output topology.

Fig. 6, Analog Audio Connections

External Control Connections

The MM-8802 includes powerful functionality for connecting external analog controls and indicators. These external devices can be completely configured for various functions with the MWare™ software. With the frame-based MediaMatrix® systems, virtually any control can be assigned to these external devices, providing a powerful method for creating intuitive user interfaces. With the X-Frame™ 88, these controls can also be assigned to many functions, using specific control devices that provide a virtual connection to the external device.

The connecting interface for the External Control ports is distributed on two additional sets of Euro connectors. These connectors are arranged in two 16-screw Euro connector blocks instead of the multiple three-screw arrangement used for the audio connections. These connectors provide termination to the MM-8802's Control Voltage (CV) and Logic Output ports. There are separate connectors for the eight CV ports and the eight Logic Output ports. The method for terminating these connectors is the same as for the audio connectors (See page 27), however, there are only two conductors for each port instead of three.

The use of these ports is integrated with software controls contained within the MediaMatrix system. In order to properly configure and operate external controls using these ports, a thorough understanding of the associated software controls is required. Also, the configuration of the software controls for External Control ports is different for frame-based MediaMatrix systems and for the X-Frame 88.

Please refer to the online help for MWare 3.1.2 or X-Frame 88 2.0 software. There is detailed explanation of how to configure and operate these controls within the software.

The following illustrations will show how these ports are connected in some popular configurations.

Control Voltage (CV) Input Ports

There are eight CV (control voltage) inputs on the MM™-8802. Each is identical in function and wiring, and each is represented individually within the MediaMatrix software. These ports are 2-wire ports referenced to an internal ground. These connections are often the source of confusion to system designers, so please take note at the following information.

Refer to Fig. 4, Control Voltage Input Connections. The figure shows the row of eight 2-wire connectors and their associated nomenclature. Each port has two pins. There is an even numbered pin and an odd numbered pin per port. Each even numbered pin (2,4,6, etc.) is internally wired to a positive DC voltage bus. This voltage is the basis for how the external analog controls work with the software. The odd numbered pins (1,3,5, etc.) are "return" ports and each is independent of the other. There are a total of eight return ports. To enable an external control, the supplied voltage must be returned to the odd numbered pins, referenced to the MM-8802's internal ground.
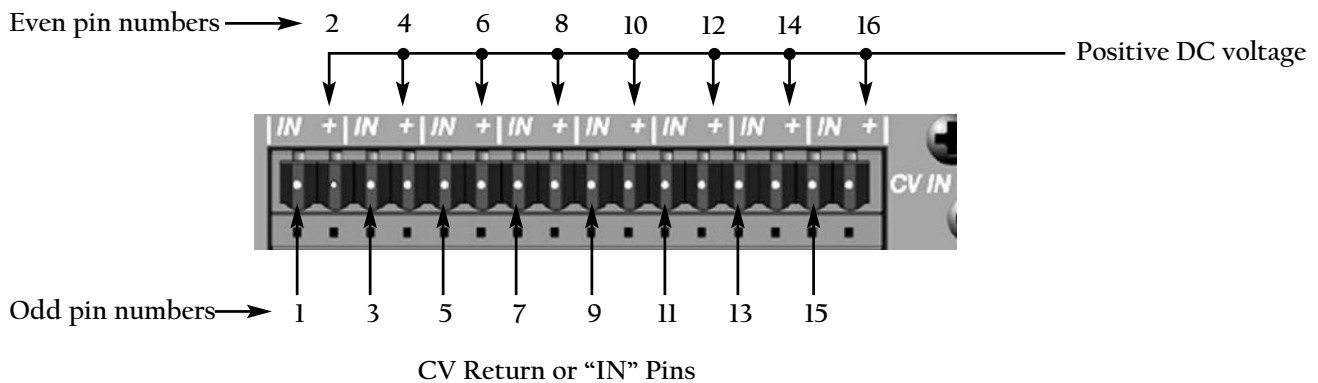
Fig. 4, Control Voltage (CV) Input Connections

What is very important to understand about the CV input port, is that this is NOT a dry contact configuration. It is not a Form A closure where the contacts are expecting a change from an N.O. or N.C. state. With the CV ports on the MM-8802, the fundamental operation is the return of a DC voltage to the port's IN pin. The MM-8802 provides this voltage on every "+" pin, allowing you to interconnect many different types of analog controls between the pins as active controls. The action of the corresponding software control is dependent on a return voltage on the IN pin. The following illustration shows the basic electrical circuit for each of the MM-8802's CV input ports. This illustration shows a single port, typical of all eight ports.
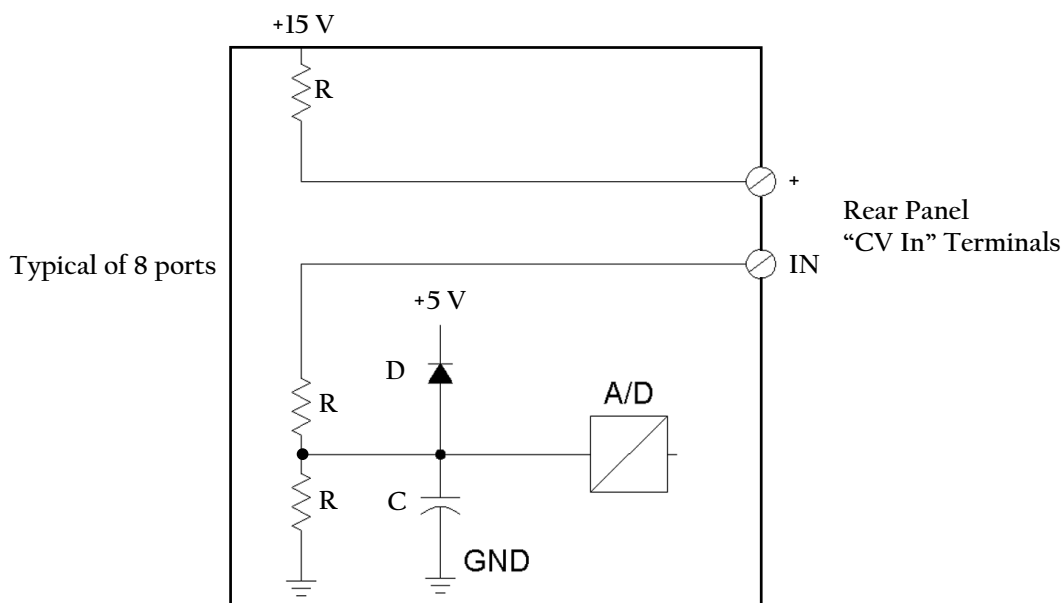
Fig. 5, Control Voltage (CV) Circuit

CV Input Switch Interface

In this illustration, we have a simple SPST panel-mount rocker switch connected to CV Port 1 on the rear panel of the MM-8802. Pin 2 of Port 1 is wired to one side of the switch and carries the MM-8802's DC voltage (referenced to internal ground). The voltage is switched and returned to Pin 1 of Port 1 as the return voltage. This is the equivalent of shorting Pin 1 and Pin 2 of the CV connector. It is important to note that what is happening here is a switching of the DC voltage. The ground is not necessary for the switching action, as it is internally referenced.

Euro connector block

Two-wire termination
at connector block

Rear panel

CV IN

TTL OUT

Euro connector header

Side view of two-wire
connection soldered to
SPST rocker switch

Supplied DC voltage at "+" terminal

Voltage return at "IN" terminal

Equivalent DC Circuit
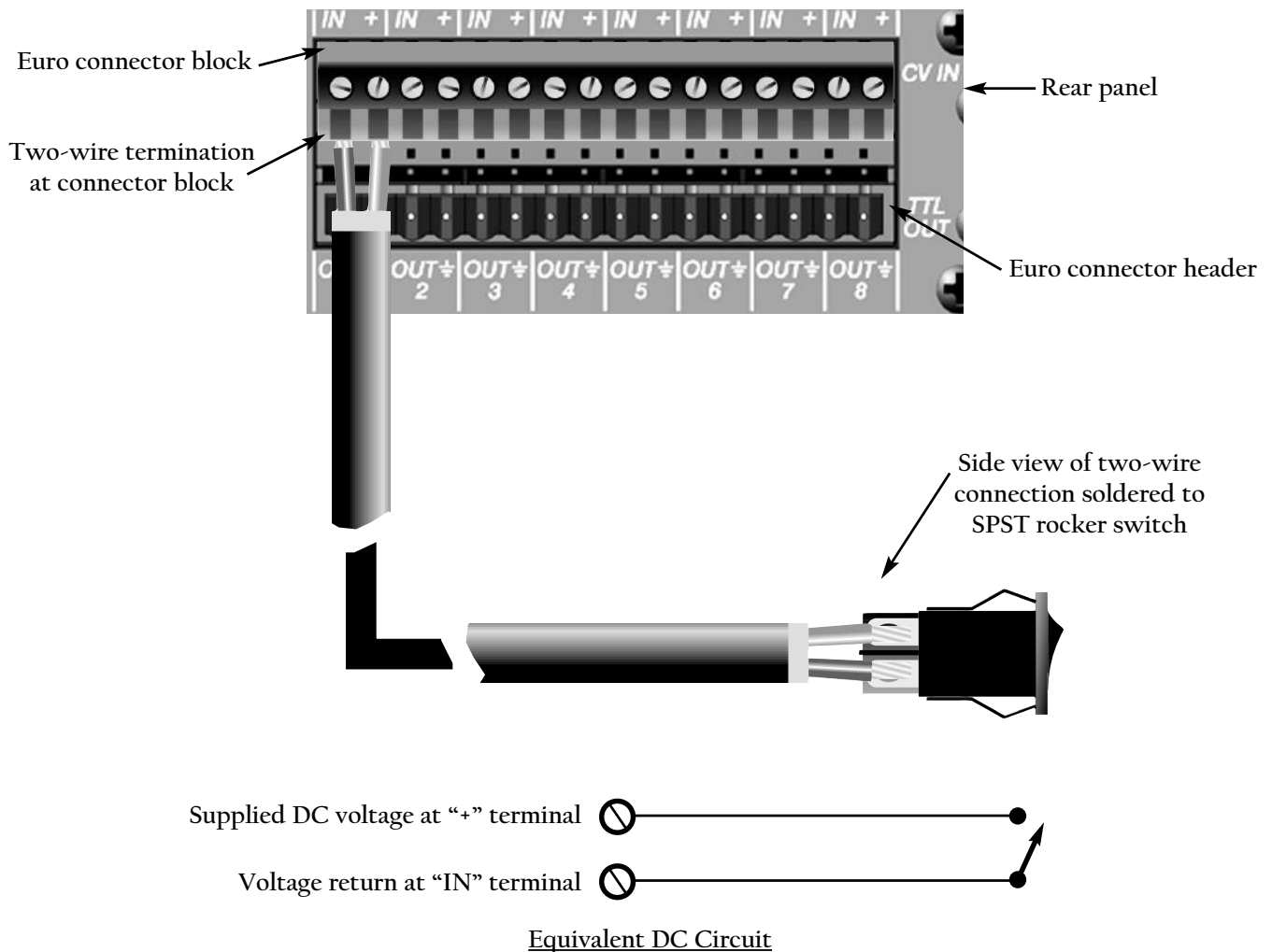
When making this type of connection, it is advisable to use a high quality 2-conductor cable. A shield is not necessary, but the conductors should be at least 20AWG. Heavier wire should be used as cable runs exceed 100'.

Remember, unless a voltage is returned to the "IN" pin of the CV port, nothing will happen within the software.

Although good wiring practice would dictate that your voltage and return conductors are labeled in the field, in reality, this is not necessary. Actually, it doesn't matter which conductor you use for the return and voltage connections, since you can inverse the connection in the software when you calibrate the controls. For more information on this topic, please refer to pages 34-35 and the online help in both the MWare™ 3.1.2 and X-Frame™ 88 software.

CV Input Rotary Control Interface

The next illustration shows the same CV port using an external rotary control as the external device. This is a common scenario, as wall controls are often implemented for use as audio volume controls.

Notice in the illustration that only two wires are connected to the rotary control. The scenario is the same as the switch in the previous example. We are taking the supplied voltage from the MM-8802's CV port, Pin 2 and connecting it to one side of the control. The other side of the control is carried through back to the CV return pin, Pin 1. In this configuration, the control is a variable resistor. It is very important to note that this is NOT a potentiometer, as there is not a third connection (ground) carried out to the control. All that is required to activate the CV port is a voltage within range of 0-10 Volts on the return pin of the port.

Equivalent DC Circuit
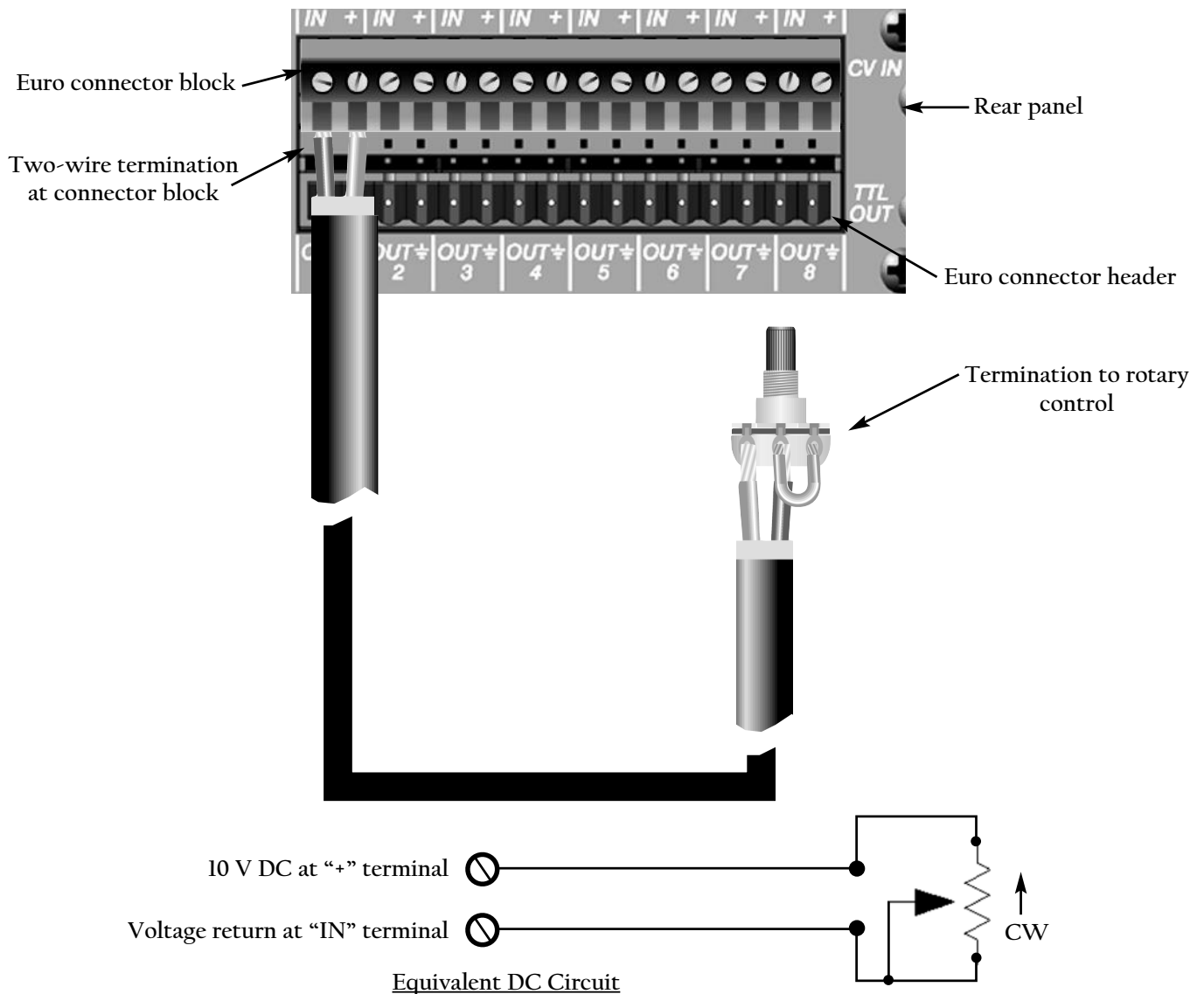
You can convert the above configuration into a true potentiometer by moving the wiper to the "IN" terminal, the top of the control to the "+" terminal, and bringing the ground terminal out to the bottom leg of the pot. This ground connection can be found on the second row of pins. If you require this configuration, you should use a 10k Ohm linear taper potentiometer for best results. Normally this is not required for simple rotary controls. All that is required is that the voltage be returned to the IN pin, via whatever analog device that is needed for the application. The connection is the same for many other external devices. Essentially, you can use anything that will either return the DC voltage to the IN pin, or vary the voltage between the pins, as in the above example with the rotary control. For information on how to calibrate the software side of this configuration, please see pages 36-37 or refer to the online help for MediaMatrix® MWare® 3.1.2 or X-Frame® 88 software.

External DC Power Supply Interface

In most applications, the DC voltage would come directly from the MM-8802's CV ports. However, you can connect external voltages to the MM-8802's control ports as well. This is handy when using external controllers that output precise variations of voltage for control. In this case, you would have to connect the MM-8802's ground to the ground of the external voltage source, and the positive DC voltage (0-10 V DC) from the external controller to the CV "IN" or return pin.
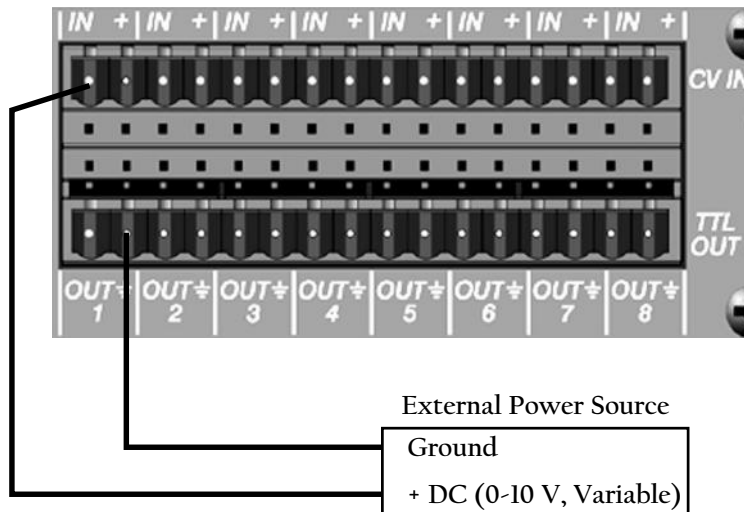
WARNING: Do not exceed 10 volts DC when using an external power supply. Driving the IN pin of the CV IN port with voltages exceeding 10 V DC could damage the MM-8802 and is not covered under warranty!

External Power Source
Ground
+ DC (0-10 V, Variable)

The DC voltage required to operate the software side of the external control input port is based on a 10 Volt scale. The range of effective control is 0-10 V, which is divided into 256 steps within the software. Therefore, you should use controllers designed to output standard 0-10 V DC control voltages for optimal performance.

CV Input Notes....

In addition to the previous examples, the CV input ports provide even more options for external control of software devices. In fact, the functionality of these ports and their associated software devices is limited only by the imagination of the system designer.

Besides the switch, rotary control, and external voltage options shown in this manual, other common configurations include opto-isolators, resistive voltage dividing networks, and TTL logic inputs.

Try to keep in mind that the CV input port is essentially an analog "portal" to a 256-step software device that resides inside of the MediaMatrix® system. The voltages that you return to the port represent values within the software, that are converted to actual control actions. These values are based on how many control positions are required, and how they are divided among the 256 steps, or increments of 10 volts. For example, in a switching configuration, there are only two values, ON or OFF. When the return pin sees 10 volts, an ON condition is present. How fine the range between ON and OFF is a matter of calibration.

In the case of variable controls, such as a fader that has a value of -100 dB to 0 dB, the range of the control voltage is calibrated across 256 individual values that represent the audio range of the control. Exactly how much voltage that is required for the control to adjust to exactly -12 dB, again, is a matter of calibration within the software.

For fixed position routers, the equation is even simpler. Since the port is simply distributing voltages across a common control, a single multiple-position audio router requires only one port to operate its select switches. If the router has four inputs, the voltage required to switch the inputs is based on a four-part division of 10 Volts. For an 8-input device, the division is eight, and so on. The MediaMatrix software provides functionality to calibrate the external control, so that you can compensate for wire distance, voltage loss, etc.

Logic Output Ports

In addition to the CV ports that allow for external controls, the MM™-8802 features eight additional ports that provide logic outputs. Unlike the CV inputs, the logic outputs are fixed state ports. In other words, they are either on or off. There is no variation or scale to these ports. Each port outputs a positive DC voltage (5 V DC) when the logic is high. The voltage is referenced to the same internal ground as the CV inputs. (Refer to Fig. 6, Logic Output Port Connections.) Each of the eight ports includes two pins, just like the CV inputs. Each of the even numbered pins is wired to ground. This is the ground that was used in the previous example when an external voltage source is required. The odd numbered pins on the logic output connector are the logic outputs. When logic is toggled ON from the MediaMatrix® software, the odd numbered pin will output +5 V DC, referenced to the ground pin. This is typical of each port.
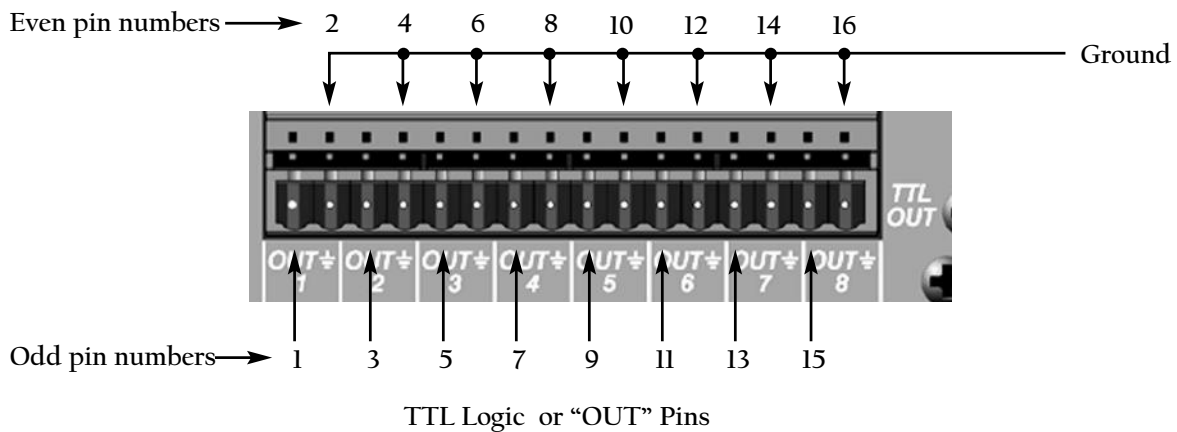
Fig. 6, Logic Output Port Connections

Each logic port shares a logic driver and a common load capability. The total amount of current sink or source is 7 mA per port. It is very important to observe this current limit. Connecting a device that will require more than the available current can damage the MM™-8802's logic output circuit and is NOT covered under warranty. The logic ports are normally used for low current LEDs, however, it is possible to use an intermediate device to trigger logic from a larger, stand-alone power supply. This is the preferred configuration for triggering relays and other high-current draw devices. See page 35 for details. The following illustration shows the basic circuit architecture for the Logic Output section of the MM-8802.
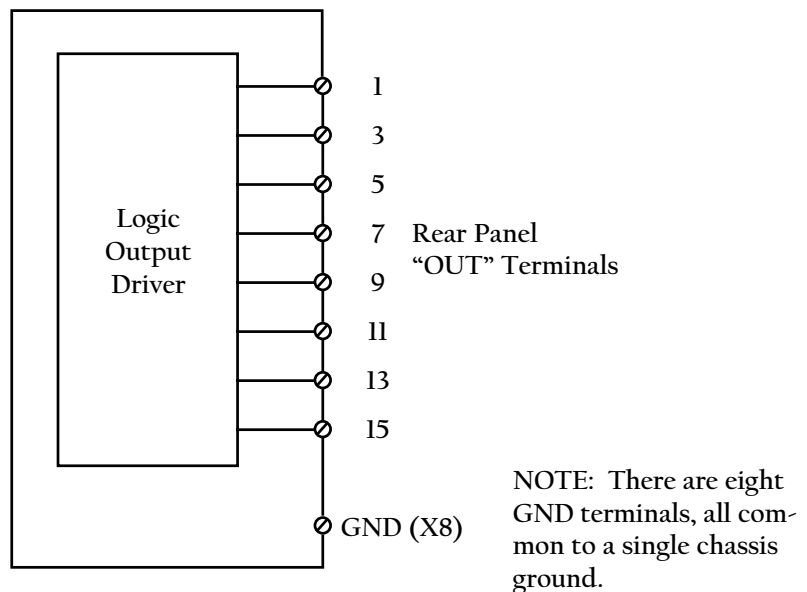
Fig. 7, Logic Output Circuit

Using Logic Ports with LEDs

This example shows how you can connect an external LED to provide visual status of software-based controls. Using a low-current, standard LED, you can use the TTL output port to directly activate the LED based on your desired software function. The ground terminal in this case is pin 2 (GND) of the TTL output connector and is wired to the cathode side of the LED. The OUT pin (Pin 1) is wired to a current limiting resistor, then to the anode side of the LED.

Euro connector block

Rear panel

Two-wire termination at connector block

Euro connector header

Side view of two-wire connection soldered to a resistor and the pins of an LED

5 V Logic at "OUT" terminal

270

Ground terminal

Equivalent DC Circuit
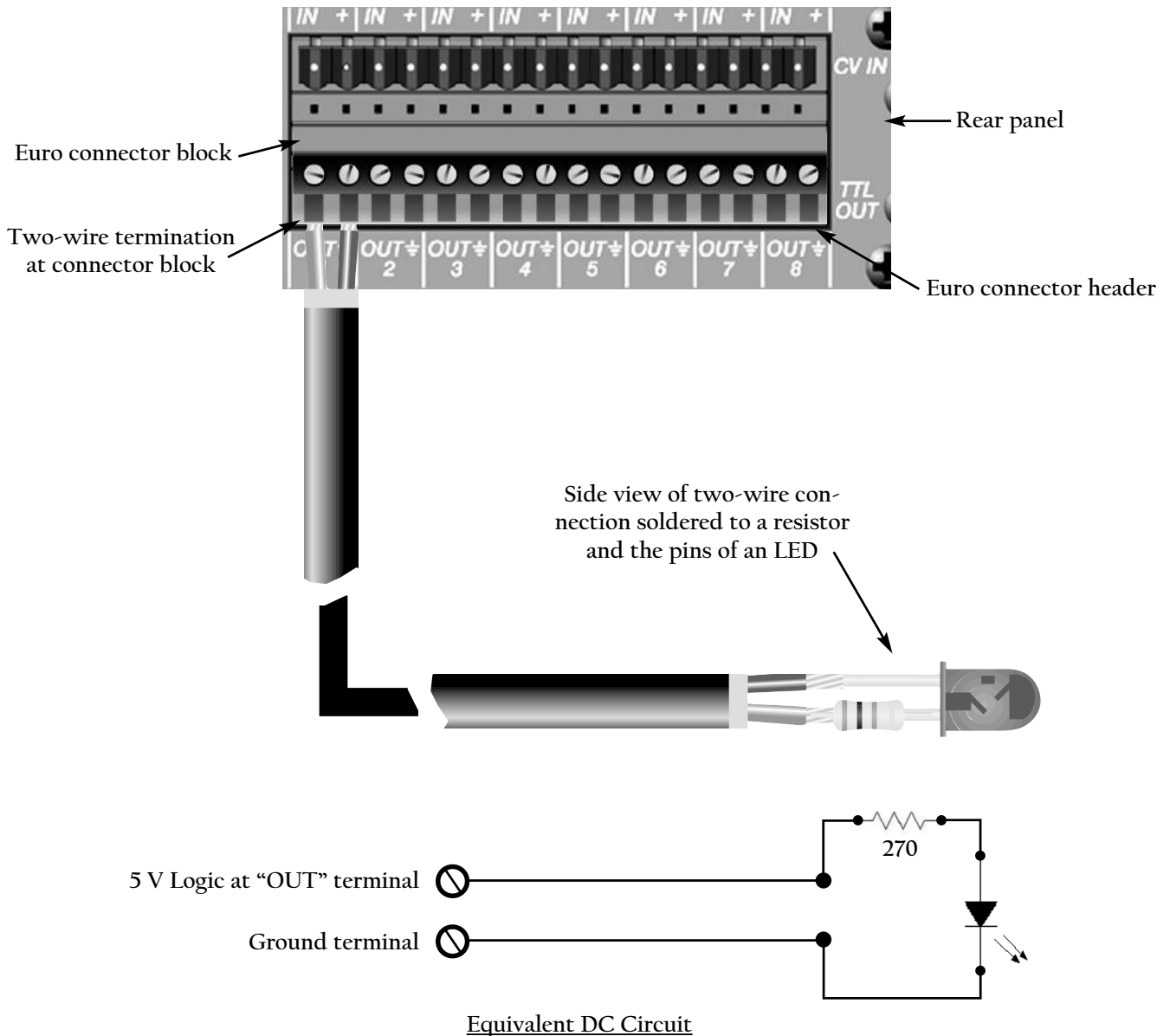
As before, it is advisable to use a high quality 2-conductor cable. A shield is not necessary, but the conductors should be at least 20AWG. Heavier wire should be used as cable runs exceed 100'.

Unlike the CV port, care must be taken to ensure that the proper polarity is observed for making connections with the TTL Logic Output ports. This is a DC output, and the polarity is positive, referenced to ground, at the OUT terminal. There is no provision for adjusting the polarity within the software. For more information on this topic, please refer to the online help in both the MWare™ 3.1.2 and X-Frame™ 88 software.

Using Logic Ports with High-Current Devices

As mentioned on page 33, the TTL Logic Output has a limited source/sink capability of 7mA per port. To properly interface high-current devices, an intermediate switching stage must be constructed using the TTL out logic from the MM™-8802 as a control voltage or triggering logic. One of the most efficient, reliable and cost effective methods may be to use a simple transistor logic circuit. The transistor is gated using the low-current TTL Logic Output of the MM-8802. The transistor, in turn, triggers a larger power supply and relay providing a higher current contact output. These contacts can then be used to trigger motors, lights, or other high-current devices. The example below is typical of such a circuit, shown with a single N.O. output.

Rear panel

Euro connector block

Two-wire termination at connector block

From external power supply. This supply powers the simple transistor circuit only.

Contractor fabricated PCB with simple transistor logic circuit and wiring harness for external connections

Normally open relay w/dry contacts rated at 3A
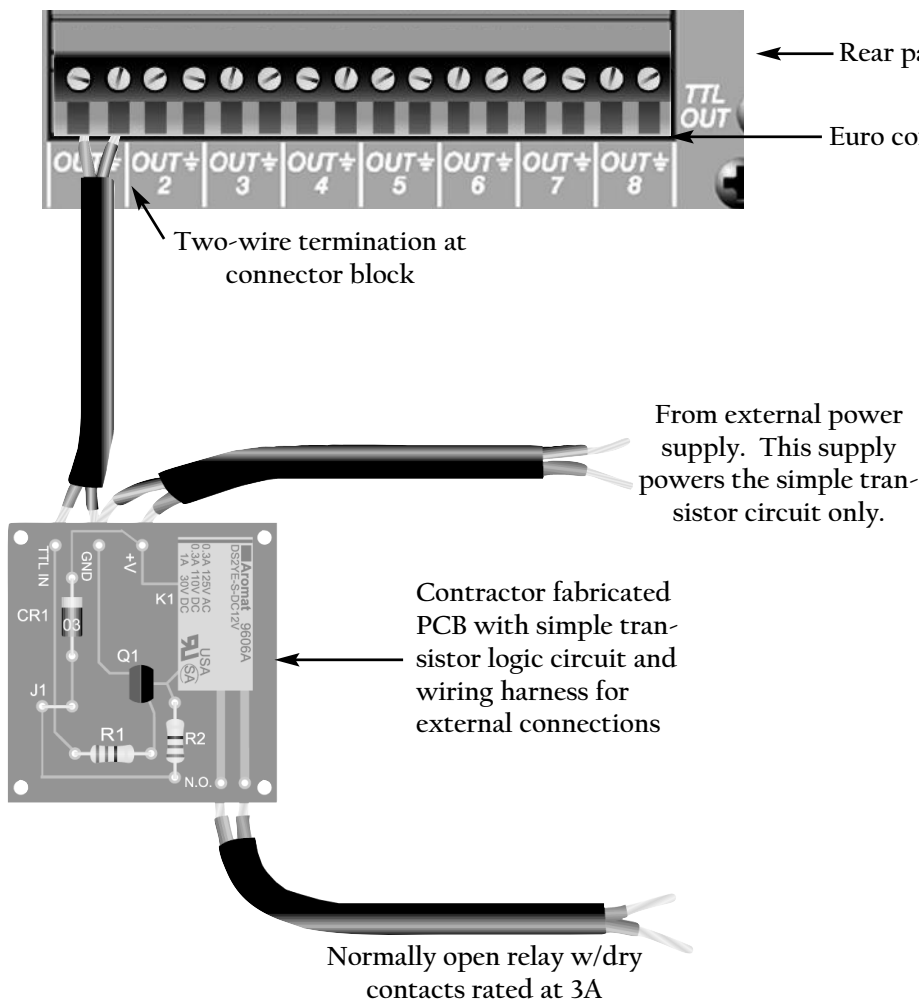
The circuit examples shown on this page are intended to illustrate the use of the TTL Logic Output port with simple transistor circuits. This is NOT a circuit design. The values, parts and configuration of this circuit are an approximation of what would actually be required in real-world audio systems installations. Any circuit constructed for this purpose should be designed specifically for the application in which they are intended. Peavey Electronics Corp. assumes no responsibility for the accuracy of such circuits, their design, construction or installation. These types of circuits should be implemented ONLY by qualified electronics personnel.

Equivalent DC Circuit

+V

D1

K1

R2

N.O.

5 V Logic at "OUT" terminal

R1

Q1

Ground terminal
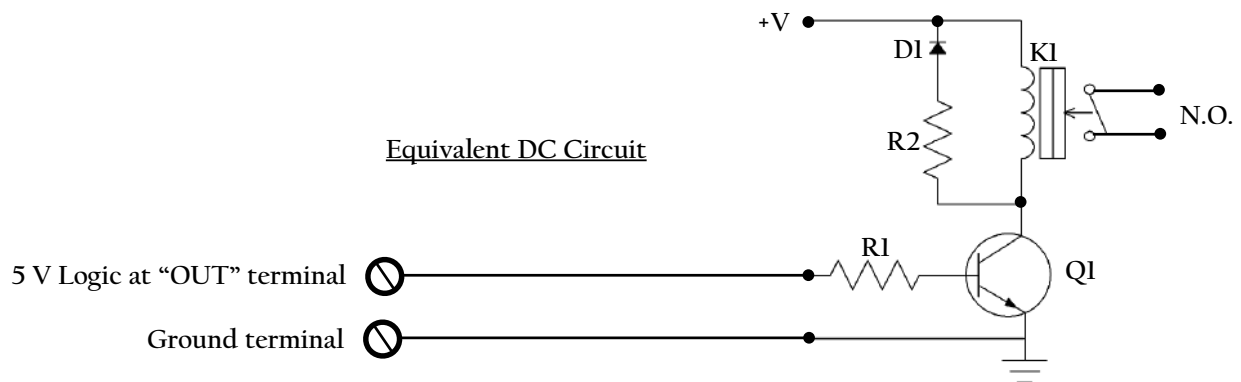
Software Devices for Control Ports

The external control voltage (CV) and logic ports are integrated devices. In addition to their physical ports, they contain a software component that resides within the MediaMatrix® application. Now that you have seen how the logic ports are connected to external devices, you should also understand how the ports are used within the software.

Within MediaMatrix, both the CV input port and the logic output ports have software components that allow for their configuration and use. These components can be found in the MM-8802's software control panel (see page 20). In order for these components to work with actual audio controls, they must be grouped using the Control Grouping functionality within the MWare™ application. (Please refer to the MediaMatrix software and its help file for information on Control Grouping.)

The CV input data is displayed in two places. One is a row of small boxes labeled "CV Inputs" (Refer to Fig. 8). This box displays the calibrated incoming value based on the voltage present on the return pin for the port. The range is 0-100. The actual value read will vary on the tolerance of the device returning the voltage, the voltage drop across the wire, and how the control is calibrated. Also located on this control panel is a block labeled "CV Cal". This block includes additional controls and indicators. These controls display raw input values and allow for calibration for each individual port. (Refer to Fig. 9.)

TTL Out								
CV Inputs	0.39	0.00	0.00	0.00	0.39	0.00	0.00	0.00
CV Cal...	1	2	3	4	5	6	7	8

Fig. 8, CV Input Values & TTL Logic Output Toggle Buttons

The row of indicators labeled "Raw Input" displays the exact input (Raw Input) from the return pin of the CV port. The scale represents the return of 0-10 Volts in precise hexadecimal steps. The scale is 0-255, with 255 representing 10 Volts. Use this indicator to see exact, precise increments of the external voltage return.

CV Cal...								✕
Raw Input	0	0	0	0	0	0	0	0
Set Max	255	255	255	255	255	255	255	255
Set Min	0	0	0	0	0	0	0	0

Fig. 9, CV Input Calibration Controls

Below the raw input indicator are two sets of buttons labeled "Set Max" and "Set Min". These controls also have an indicator above them. These controls and their associated indicators are used to calibrate the external control devices. Voltage return values are always dependent on the loss through the device, the wire and the termination. These controls allow you to compensate for these losses and configure the control to operate properly, over 100% of the usable range (See next page).

LOGIC OUTPUT SOFTWARE CONTROLS

Unlike the CV inputs, the logic outputs do not require calibration. These ports will output a positive DC voltage based on the simple action of their associated controls. Each control is represented by a simple ON/OFF button in the MM-8802's software control panel (see page 20). When the button is in its default state of OFF, there is no logic voltage. When the button is ON, there is a positive DC voltage present on the logic output port. Refer to the illustration below.

Ground

OFF   0 VDC

ON   +5VDC
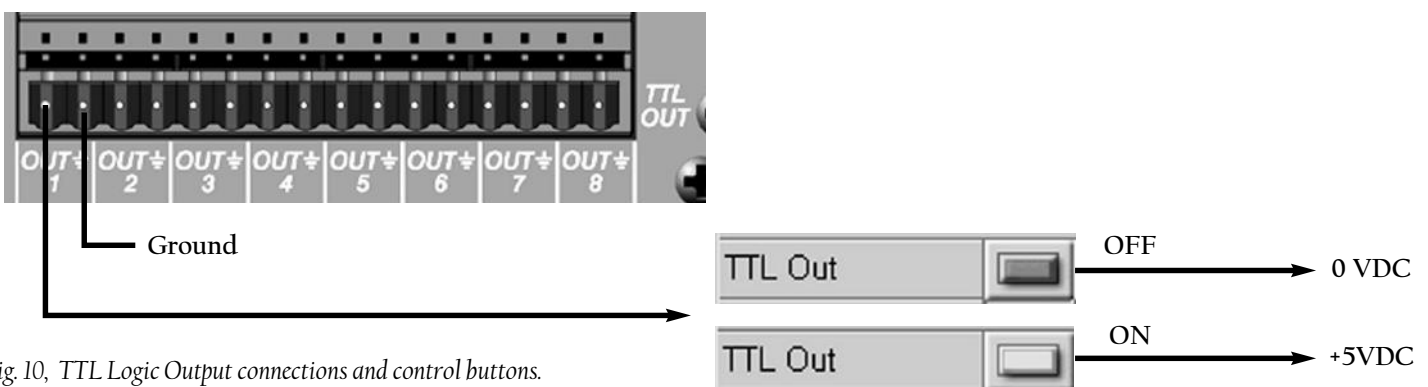
Fig. 10, TTL Logic Output connections and control buttons.

Calibrating CV Inputs

To calibrate these controls, the buttons must be set when the external control device is set at its operating maximum and minimum positions. For example, in the case of a rotary control acting as a variable resistor, these positions would be full counter clockwise for absolute minimum, and full clockwise for absolute maximum. When the control is at these positions, the scale of the raw input value should track likewise. In order to properly calibrate the control, the control should be installed in its final position with the wire and terminations that will actually be used on the jobsite. You may need two people and radios to properly accomplish this procedure on most jobsites, one person at the control location, the other at the MediaMatrix® computer.
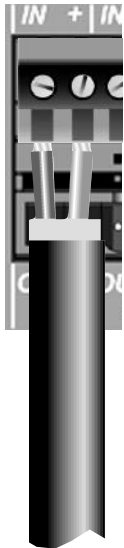
STEP 1: Ensure that all connections are permanent and properly terminated.
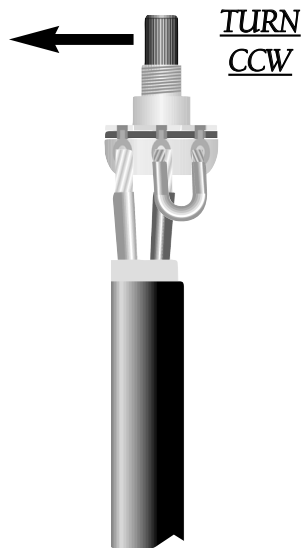
STEP 2: Turn the rotary control completely to its minimum position, or whatever position would be considered "OFF".
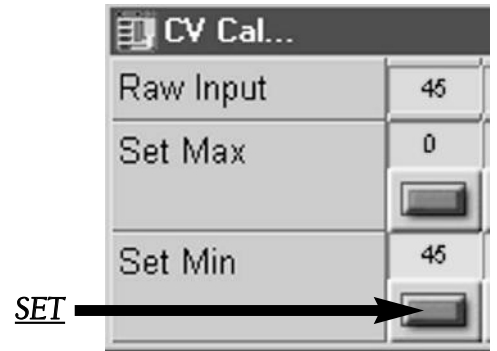
STEP 3: Press the Set Min button for the appropriate port. NOTE: In this example, the minimum value is 45. This is typical, as it represents the total resistance to the control voltage. The resistance includes the loss across the wire, termination points, etc. Do not be alarmed if your min/max values do not reach the limits of 0 or 255.

STEP 4: Turn the rotary control completely to its maximum position, or whatever position would be considered full "ON".
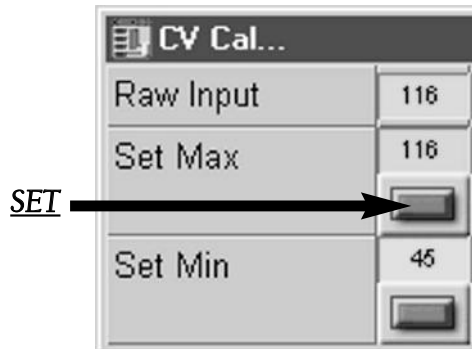
STEP 5: Press the Set Max button for that port within the MM™-8802's software control panel within MediaMatrix. The max value in this example is 116, which again is short of the max value of 255. Do not be concerned about these discrepancies in the range. The point is to calibrate your control to the software so the control will track correctly.

Now operate the external rotary control and observe the range in the Raw Input indicator. If you calibrated the control to its maximum (full clockwise & counterclockwise) travel, then the high and low limits of this range should match the values now showing in the Set Min and Set Max indicators. Repeat this procedure for each externally connected control in your system.

Fault Contacts

One of the new features of the MM-8802 is the Fault Contact connector. This rear-panel connector gives the designer the ability to create external monitoring systems that could be used to generate an alarm, or signal other remote systems in case of failure. This feature works very well for mission-critical environments where systems must be supervised for proper operation.
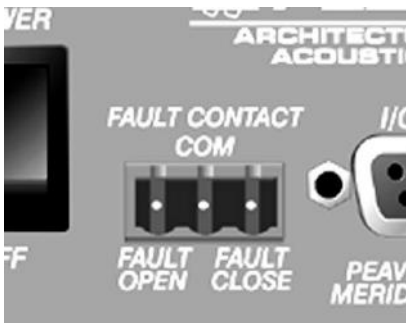
The Fault Contact connector is a separate, 3-pin, removable Euro connector. The contacts are rated at 0.3 amps at 120 VAC, (0.3A at 110 V DC, 1A at 30 V DC), and are attached to a latching relay that provides a Normally Open (N.O.), labeled **Fault Closed**, and Normally Closed (N.C.), **Fault Open**, contact. Both contacts can be used simultaneously if desired, and both indicate identical fault functions.

Proper use of these contacts may require that external relays and other electronics be used to provide signalling and alarm annunciation. Although the current rating of the contacts is sufficient for direct connection to most common devices, good design would suggest an intermediate logic stage with its own supervision be implemented for most systems.
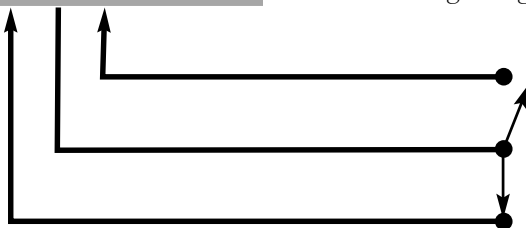
N.O. Normally, under no fault conditions, open. Fault Closed

N.C. Normally, under no fault conditions, closed. Fault Open

The Fault Contact function will activate when any of the following conditions exist within the MM-8802:

- There has been a failure of one or more DC voltage rails within the MM-8802. This includes both analog and digital DC power supply rails.

- The internal temperature of the MM-8802 has exceeded the threshold of normal operation. This fault condition could be an indication of a defective fan or clogged airway.

- There has been a failure, reset, crash or shutdown of the MM-8802's internal microprocessor.

- The integrity of the AC power supply. In most conditions, an abnormal AC power supply condition will be signalled as a fault by the subsequent fault of the DC supply rails.

- Communications between the MM-8802 and the digital audio processor. Communications errors are commonly reported by the MediaMatrix software.

- Audio levels, faults or status.

- DSP faults. Since all DSP hardware resides on the DPU product, the faults are reported by the DSP hardware.

- Windows faults

- System crashes

Essentially, the fault monitoring functionality is limited to conditions specific to the MM-8802. To correctly supervise an integrated system, fault monitoring should be implemented on each hardware component separately. MediaMatrix software provides many additional features that can be used to provide supervision functionality. For more information on these features, please refer to the documentation in the Help of the MediaMatrix or X-Frame™ 88 software applications.

The Legacy Connection

The MM™-8802 includes additional connectivity that supports the original MediaMatrix® DPU I/O interface. This 9-pin DB-9 connector, now known as the "legacy" connector, is used with all previous hardware versions of MediaMatrix products. (See page 25.)

Because the MM-8802 includes this connector, it is possible to use the MM-8802 with MediaMatrix systems of any vintage. The port will connect seamlessly with any MM DSP DPU card, or X-Frame™.

There are several issues to consider when implementing the MM-8802 on older MediaMatrix hardware. New functionality included with the MM-8802 will not be operable on MediaMatrix systems prior to release version 3.1.2. This includes the following:

● Analog gain structure will not be adjustable (Defaults to unity)

● Microphone level inputs are not possible*

● Cable distance is limited to six feet

● It is not possible to use the CAT 5 cable interface

● The sample frequency will not be reported or displayed in the MM-8802's software control panel

The following features are still operable when using the MM-8802 with legacy MediaMatrix systems:

● Automatic sampling rate detection and display

● Front panel metering

● Adjustable Full-Scale Input Sensitivity and Full-Scale Output Drive levels via integral DIP switches

It is very important to remember that when using the legacy connection, the proprietary cable MUST be used. The presence of the 9- pin DB-9 connector does not constitute using standard computer cables. The legacy cable, available only from Peavey Electronics, is the only supported method of connecting the BoB to the MM DSP or X-Frame digital audio processor.

* NOTE: Although microphone level audio could theoretically be terminated to the MM-8802 using the MM-Mic 4 input module, this is not practical. None of the controls included with the MM-Mic 4 are adjustable when using the legacy software, therefore, the useability of this configuration is extremely limited.

Category 5 Cabling

Well, you've been in the audio business for a while now....you know all about audio connections, balanced cables, multi-pairs, SJO, TRS this and XLR that....you can dress off a wiring harness like nobody's business....then, the industry throws "CAT 5" at you! So, what exactly is Category 5 cabling, and how do you terminate it?

Category 5 cable, or "CAT 5" as it is commonly known, is a wiring standard that became popular when computer networks moved from a "bus" topology to a "star" topology. The wire itself is a UTP (Unshielded Twisted Pair) configuration and consists of eight conductors, identified into four pairs. The cable is coupled to in-line, RJ-45 connectors, and special crimping tools are required to make the termination. The tools, connector and wire are available almost everywhere.

Although CAT 5 cabling is used primarily in computer networks, it is often used in proprietary systems as well. Such is the case for the MM-8802. It is very important to understand that this is a proprietary interface. Do not attempt to connect the MM-8802 to computer equipment. Just because there is an RJ-45 connector on a piece of equipment, doesn't mean it's compatible with what you are plugging into it!

Connecting the MM-8802 to equipment other than the MM DSP-RJ or X-Frame™ 88 can seriously damage the MM-8802 and/or the other equipment!!

We strongly recommend that you purchase pre-made CAT 5 cables for use with the MM-8802. They are very inexpensive, and are available in many lengths and colors. However, we realize that in order to properly dress off your rack wiring, you may, at some point, be required to build your own CAT 5 cables.

Just like most wire types, there are stranded and solid varieties of CAT 5 cable. This is important to know, because the RJ-45 connector is different for each type of wire. The standard "bent tyne" style connector is intended for use with solid core wire, and the "aligned tyne" connector is intended for use with stranded wire. There can be errors when using incorrect cable/connector combinations, so be careful. The "bent tyne" connector will generally work on stranded wire by the way, but not the other way around. In general, make sure your connector matches your cable type. If you aren't sure, use the "bent tyne" variety.

When terminating CAT 5 cable, it is important that the natural twist of each pair be carried through as close as possible to the point of termination at the connector. The EIA standard requires no more than 1/2 inch be left untwisted. More than 1/2 inch of untwisted cable will affect performance at high bit rates. It is required that all pairs be terminated, and that the conductors be twisted together in pairs.

The illustrations should give you the basics for getting your cables, and your audio system up and running. Since this manual is printed in grayscale, you will not be able to see the color code of the wire. We have labeled them for your convenience, but you should get familiar with the color schemes so they are second nature to you. An error in the cabling of your audio system is often the primary cause of system errors, so take your time, learn it thoroughly, and DO IT RIGHT THE FIRST TIME!

CAT 5 Cabling & Terminations
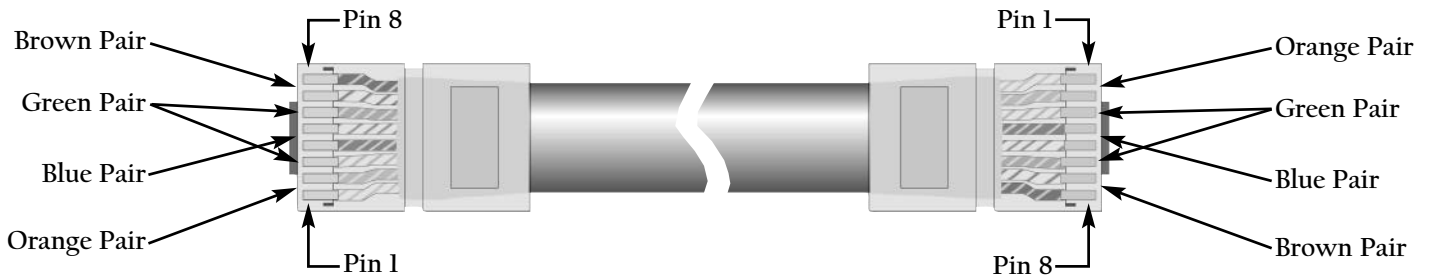
Fig. 9, Standard CAT 5 cable

Conductor	Wire Pair	Connector Pin
White w/blue stripe	1	5
Blue w/white stripe	1	4
White w/orange stripe	2	1
Orange w/white stripe	2	2
White w/green stripe	3	3
Green w/white stripe	3	6
White w/brown stripe	4	7
Brown w/white stripe	4	8

Fig. 10, CAT 5 Wire/Connector cross reference chart

Fig. 11, CAT 5 cable and RJ-45 termination details

The wiring standard used in CAT 5 cabling originates with AT&T, and uses the Bell System color code to identify wire pairs. This color scheme identifies the pair numbers, and conductor polarity, and applies to the WIRE, not the connector. It is important to know which pairs are which, and the function of the pins on the RJ-45 connector.

The colors are BLUE, ORANGE, GREEN and BROWN for the first four pairs. The color code extends well beyond that, but since we are only dealing with four pairs of wire, you don't need to know the entire Bell System color code for terminating a 900 pair distribution trunk! What is often confusing is that the pair numbers do not line up with the pin numbers on the RJ-45 connector. In other words, conductor 1 of the cable (White w/Blue Strip) is NOT terminated to PIN ONE of the connector. The AT&T connecting standard always uses the middle pins for the first pair. After that, they are staggered around, primarily to prevent crosstalk between adjacent pairs. It is very important that you build the cable with ALL PAIRS properly terminated. This will prevent any confusion later, and give your cable a solid mechanical connection.

In accordance with the AT&T standard, there is a positive and negative conductor for each pair, indicated by the color code. In Bell parlance, positive is labeled as the "Tip", and negative as the "Ring". It is important to know this, since a lot of documentation on the subject still uses this terminology.

Notice on the chart that the order of the wire pairs does not follow the connector pins, as mentioned earlier. Don't let that confuse you. The first wire of a given pair is always the white wire with a colored stripe and is the positive (Tip) conductor. The corresponding colored wire with the white stripe is the negative (Ring) conductor for that pair.

If you follow these standards for building your own CAT 5 cables, you should have no problems. Get yourself a high quality crimping tool, an inventory of RJ-45 connectors and stock up on CAT 5 wire.
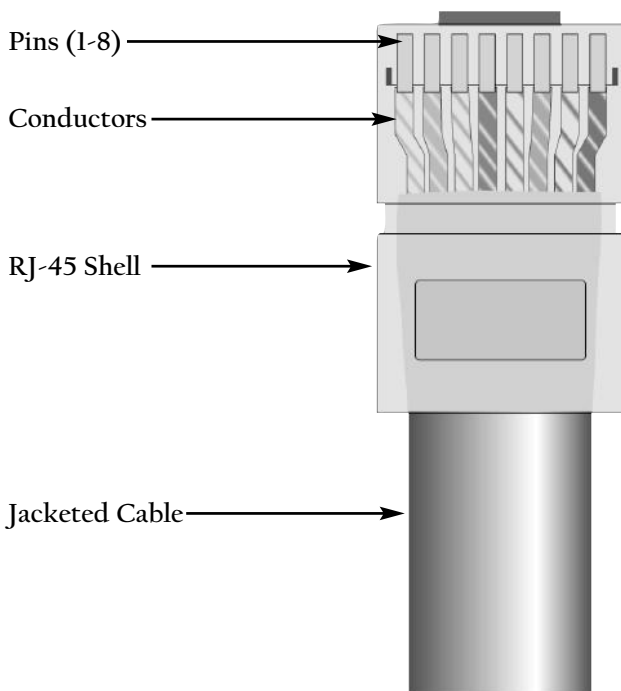
Technical Support

Peavey has an extensive Technical Services Group that provides tech support, repair and implementation services. If you require assistance with your new MM-8802, you can get help from several sources. There are many technical documents, white papers and application notes on our website. There are also brochures, data sheets and our newsletter, "Audio Interactive", published monthly. Also on our website are message board forums that include questions and answers on all audio topics. This forum is a great way to learn more about audio, Peavey products and system design from other audio professionals around the world. You can also get help by sending us an e-mail or posting a request on the message board. Finally, if you still cannot get the information you need, please do not hesitate to call us. We have extensive phone support services and will be happy to assist you. The contact information for the Architectural Acoustics Division is shown below:

Peavey Electronics Corp.
Architectural Acoustics Division
711 A St.
Meridian, MS 39301
USA

Phone: 601-483-5376
Fax: 601-486-1678

Website: http://aa.peavey.com

Warranty Registration

Please take a few minutes and fill out the warranty registration card for your MM-8802. Although your warranty is valid without the registration, the information you provide with the form is crucial to our support group. It enables us to provide better service and customer support, and to keep you informed of new product updates. Refer to the warranty statement in the rear of this manual for details about what your warranty includes and what the limitations are.

Frequently Asked Questions

Q. Can I use the MM™-8802 with my older MediaMatrix® system that has MM DSP cards?

A. Yes. The MM-8802 includes the 9-pin D-Sub legacy port for interfacing with the original MM DSP MediaMatrix DPU card. You must, however, have the matching legacy 9-pin cable, available only from Peavey Electronics.

Q. Is it possible to use both the legacy connection and the new CAT 5 interconnect on the same MM-8802?

A. No, only one interface can be used at a time on a single MM-8802. However, it is possible to mix the MM-8802 with older MM-8800 Series products within the same system.

Q. Can I exceed the 6 foot cable limitation when using the legacy interface?

A. No. Even with the MM-8802, the maximum distance when using the legacy cable interface with the MM DSP DPU card is 6 feet.

Q. Can I exceed the 50 foot cable distance when using the CAT 5 interface and the MM DSP-RJ DPU card?

A. No. The 50 foot distance limitation is a total distance calculation from the MM DSP-RJ card and the nearest MM-8802. This distance, although calculated conservatively, should not be exceeded.

Q. Can I use a Copper/Fiber media converter between the MM-8802 and the MM DSP-RJ card to get a longer cable distance with fiber optic cable?

A. No. The interface between the MM-8802 and the MM DSP-RJ DPU card is not ethernet, or other network standard. This interface is a proprietary connection and will not work with network fiber interconnects. Connecting the MM-8802 to networking equipment can cause damage to the MM-8802 and/or the networking equipment.

Q. Is it possible to use a hub to daisy-chain multiple MM-8802s? I want to do this to extend the capacity of the DSP card.

A. No. The cabling interface on the MM-8802 is not ethernet, or other network standard. This interface is a proprietary connection and will not work with standard networking equipment. Connecting the MM-8802 to networking equipment can cause damage to the MM-8802 and/or the networking equipment.

Q. Can I order the MM-8802 as an output-only box, or "short-load" the input section?

A. While it is technically possible, we do not currently offer this option. This is due primarily to the fact that the input cards are not user-installable. There is also no "blank" card, or other way to terminate the unused inputs to the MM-8802's core input circuitry. Therefore, all MM-8802s must be shipped with both card bays populated.

Q. I want to add an MM-8802 to an older MediaMatrix system running on Windows® 3.1. Is this possible?

A. Yes, although some of the extended functionality that the MM-8802 provides (analog control, etc.) will not be operable. This is true when running the MM-8802 on any MediaMatrix system prior to the Version 3.1.2 release. In this configuration, the MM-8802 will act just like an older BoB with increased audio performance, front panel metering, etc.

Q. Are both TX and RX cables required to connect the MM-8802?

A. Yes, the "loop" must be completed between the MM-8802's I/O ports and the MediaMatrix system.

Specifications

MECHANICAL

Dimensions:	19" W x 13.25" D x 1.750" H (48.26 x 33.66 x 4.45 cm)
Weight:	9.4 lbs. (4.264 kg) without shipping/packing materials
Mounting:	Single EIA Space Rack Mount
Connections:	Removable "Euro" Connectors for audio and control connections. Dual RJ-45 connectors & 9-pin DB-9 for digital audio interface. IEC receptacle for AC power.

TYPICAL PERFORMANCE SPECIFICATIONS (measured at 44.1 kHz sample rate)

Frequency Response:	+0 / -0.3 dB, 20 - 20 kHz, referenced @ 1 kHz
THD + Noise:	Line Level: 0.006%, Mic Level: < 0.01%
Dynamic Range:	106 dB
Equivalent Input Noise (EIN):	Mic Level: < -126 dBu
Common Mode Rejection Ratio:	55 dB
Crosstalk:	90 dB
Full-Scale Input Sensitivity Settings:	Line Level: +30, +24, +18, or +12 dBu Mic Level: -42 dBu at +63 dB gain
Full-Scale Output Settings:	+24, +18, +12, +6 dBu, Less than 0.5 dB error between settings
Analog Gain Range:	Line Level: -95.5 dB to +30.5 dB, Mic Level: 0 to 63 dB
Input Impedance:	Line Level: 9.5 k Ohms, Mic Level: 4 k Ohms
Output Impedance:	102 Ohms
Minimum Load Impedance:	600 Ohms
Audio I/O:	8 inputs, 8 outputs, line or mic level modular inputs, configurable in groups of four
LED Metering:	16 peak-reading headroom LED meters Zero LED indicates level <1 dB below full-scale

GENERAL SPECIFICATIONS

A/D, D/A Quantization:	24-bit
Audio Transmission Quantization:	24-bit
Sample Rate (Fs):	32, 44.1 or 48 kHz (user selectable)
Master Clock Speed (256 Fs):	8.192, 11.2896 or 12.288 Mhz
Digital Audio Channels per unit:	8 inputs, 8 outputs at 24-bit
Digital Audio Interface:	9-pin DB-9 Proprietary Peavey Cable (Legacy Mode) Dual RJ-45, CAT 5 cables (New Mode)
AC Power Range:	100 - 240 VAC, 47 to 63 Hz Universal Power Supply
AC Line Current:	456 mA (rms)
Power Consumption:	31.5 W
Power Dissipation:	107.5 BTU (27 kcal)
Finish:	Grey powder coat painted steel
Agency Compliance Listings (as of press time):	UL, CUL, CE, and FCC part 15, Class A

Notes:

1. All specifications are typical for any channel(s).
2. All measurements are made from analog input to analog output. Typical performance reflects both input and output analog circuit behavior.
3. All specifications are for an AC line input of 120 Volts rms.
4. All output measurements are made using 600 Ohm balanced loads at +24 dBu full-scale unless otherwise noted.
5. All input measurements are made using a 40 Ohm balanced source impedance at +24 dBu full-scale unless otherwise noted.
6. All measurements are made with gain/attenuation set for unity unless otherwise noted.

Architectural Acoustics®
PEAVEY ELECTRONICS CORPORATION LIMITED WARRANTY
Effective Date: July 1, 1998

What This Warranty Covers
Your Peavey Warranty covers defects in material and workmanship in Peavey products purchased and serviced in the U.S.A. and Canada.

What This Warranty Does Not Cover
The Warranty does not cover: (1) damage caused by accident, misuse, abuse, improper installation or operation, rental, product modification or neglect; (2) damage occurring during shipment; (3) damage caused by repair or service performed by persons not authorized by Peavey; (4) products on which the serial number has been altered, defaced or removed; (5) products not purchased from an Authorized Peavey Dealer.

Who This Warranty Protects
This Warranty protects only the original retail purchaser of the product.

How Long This Warranty Lasts
The Warranty begins on the date of purchase by the original retail purchaser. The duration of the Warranty is as follows:

MediaMatrix® DPU, (Excluding Frames), Cinema Processors,
Power Amplifiers, Pre-Amplifiers, Mixers,
Electronic Crossovers and Equalizers   *2 years *(+ 3 years)*

Loudspeakers   *3 years *(+ 2 years)*

Microphones   *2 years*

Speaker Components (including speakers, baskets, drivers,
diaphragm replacement kits and passive crossovers)
and all Accessories   *90 days*

[*Denotes additional warranty period applicable if optional Warranty Registration Card is completed and returned to Peavey by original retail purchaser within 90 days of purchase.]

What Peavey Will Do
We will repair or replace (at Peavey's discretion) products covered by warranty at no charge for labor or materials. If the product or component must be shipped to Peavey for warranty service, the consumer must pay initial shipping charges. If the repairs are covered by warranty, Peavey will pay the return shipping charges.

How To Get Warranty Service
(1) Take the defective item and your sales receipt or other proof of date of purchase to your Authorized Peavey Dealer or Authorized Peavey Service Center.
OR
(2) Ship the defective item, prepaid, to Peavey Electronics Corporation, International Service Center, 412 Highway 11 & 80 East, Meridian, MS 39301 or Peavey Canada Ltd., 95 Shields Court, Markham, Ontario, Canada L3R 9T5. Include a detailed description of the problem, together with a copy of your sales receipt or other proof of date of purchase as evidence of warranty coverage. Also provide a complete return address.
OR
(3) All MediaMatrix Frames needing repair, should be shipped, prepaid to Peavey Electronics Corporation, International Service Center, 412 Highway 11 & 80 East, Meridian, MS 39301.

Limitation of Implied Warranties
ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY.
Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Exclusions of Damages
PEAVEY'S LIABILITY FOR ANY DEFECTIVE PRODUCT IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE PRODUCT, AT PEAVEY'S OPTION. IF WE ELECT TO REPLACE THE PRODUCT, THE REPLACEMENT MAY BE A RECONDITIONED UNIT. PEAVEY SHALL NOT BE LIABLE FOR DAMAGES BASED ON INCONVENIENCE, LOSS OF USE, LOST PROFITS, LOST SAVINGS, DAMAGE TO ANY OTHER EQUIPMENT OR OTHER ITEMS AT THE SITE OF USE, OR ANY OTHER DAMAGES WHETHER INCIDENTAL, CONSEQUENTIAL OR OTHERWISE, EVEN IF PEAVEY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.
Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If you have any questions about this warranty or service received or if you need assistance in locating an Authorized Service Center, please contact the Peavey International Service Center at (601) 483-5365 / Peavey Canada Ltd. at (905) 475-2578.

Features and specifications subject to change without notice.

INDEX