MediaMatrix® X-Frame™

T he overwhelming success of MediaMatrix®, both the larger Mainframe® Series and the smaller Miniframe® Series has led to the design and development of the newest MediaMatrix product, the X-Frame™. The X-Frame is a smaller, but no less powerful, version of its processors. While very similar to MediaMatrix hardware and software, it is different enough to warrant a separate publication to provide the designer a high level view of what the X-Frame is all about. We strongly recommend that the information presented here be reviewed before attempting to design and install your first X-Frame system.

Using the latest 32-bit X-Ware®, the X-Frame has capabilities and functionality not yet found in the larger MediaMatrix systems. The Windows® 95 application has a new look and feel, and with the Drag & Drop style interface, system design is now an even simpler task.

The X-Frame offers new features including fully programmable front panel controls and new serial control devices. Optional analog I/O including external control and the normal real time on-screen control found in the regular MediaMatrix are also featured.

As the hardware no longer incorporates a system controller card or on-board hard-disk storage device, all programming is accomplished via a laptop or notebook computer. Using your computer, you can configure, control, modify, change or create new systems. While your laptop is attached, you can alter system settings in real-time mode. The X-Frame gives you many options for installation, providing additional features and benefits for the end user.

DESCRIPTION

The X-Frame is a fully programmable, fully configurable Digital Signal Processor (DSP) based audio processing and control system. It includes a core Digital Processing Unit (DPU), referred to as a Sound Engine, Graphical User Interface, (GUI) interface and control options. The DPU is a 24-bit parallel processing core and is fully configurable to allow the system designer unlimited versatility in system design. Unlike other similar DSP products, factory configurations, preset signal flow or so-called "standard" setups do not limit the X-Frame. The intuitive software interface provides incredibly rich functionality for both signal flow configuration and user control.

The X-Frame's host-processor and non-volatile flash memory maintain the configuration and provide interface to the unit's front panel control and optional external control interfaces. The configuration is enhanced by a full compliment of audio devices available from the Win32-based interface. Almost any style of audio system can be designed and implemented using a "drag, drop, and wire" interface. The signal flow can be as simple as two channels of loudspeaker processing or as complex as a multi-zone paging system with multiple levels of priority, ducking, fire alarm override, scene-snapshot control and automatic level ramping. Audio processing devices available include, but are not limited to, automatic mixers, crossovers, AGC, gates, limiters, expanders, duckers, ambient sensing controllers, delay lines, meters, mixers, routers, test signal sources and equalizers of every variety. In addition, you can create your own devices for custom applications. These devices, once created can then become a part of your device palate for repeated use.

FEATURES

- ☛ AES/EBU digital input/output (I/O)
  (Note: AES/EBU provides 2 audio per connection)
- ☛ Two (2) balanced analog inputs
- ☛ Four (4) balanced analog outputs
- ☛ 20-bit A/D and D/A converters
- ☛ User selectable sample rates of: 32 kHz, 44.1 kHz or 48 kHz
- ☛ Two (2) user assignable front panel LED meters
- ☛ Eight (8) user assignable front panel preset recall buttons
- ☛ Front panel output level trim knob, configurable for 8 "virtual" knobs
- ☛ 24-Bit parallel processing performed by three Motorola® 56002 DSPs
- ☛ RS-232 connection for easy set-up and operation
- ☛ RS-485 connection for remote serial control functions
- ☛ Expandable I/O using a standard MediaMatrix Break-out-Box (BoB) adds:
    - Eight analog inputs
    - Eight analog outputs
    - Eight control input ports (0-10 V DC)
    - Eight TTL output ports (0 or 5 V DC)

MECHANICAL

The X-Frame is a stand alone rack mount package, two EIA rack units high. In addition to the front panel features already mentioned, the rear panel includes connections for audio, control, and the optional MM™-8800 Series BoB.

The audio connections, both inputs and outputs, RS-485 port, and AES/EBU I/O are terminated via removable "phoenix" style connectors. The RS-232 port is a DB9 male connector, and the port for the optional MM-880 Series BoB is a DB-9 female connector. There is a standard IEC connector for the supplied AC power cable, mini rocker power switch and a panel fuse holder.

ARCHITECTURE

Software Interface

The X-Frame is configured by a remote PC, and can be operated with or without the PC connected. A single RS-232 port is provided on the rear panel for connection to a Windows 95 PC COM port. This communication link requires a DB-9 extension cable, with female connectors on both ends. Please keep in mind that this is an "extension" type cable and NOT a "serial" or "null" type cable. The PC must have the X-Frame software installed properly, with the system view file residing on the PC's hard drive. The software allows the designer to easily configure the COM port, test the connection and prepare the X-Frame's flash memory for use. No Windows® control panel setup is required, making connection easy.

RS-232 Wiring Diagram
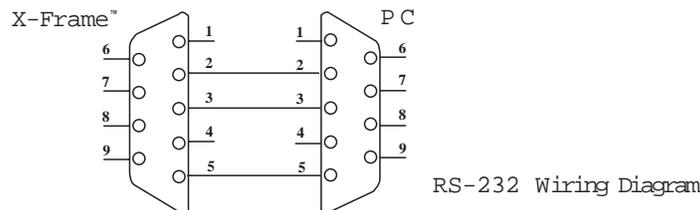
The software allows for two distinct functions—configuration and control. The first, and primary function is configuration. This is the process that sets up the signal flow and configures the basic system parameters. The PC must be connected to the X-Frame to download the configured system view file. Once this is done, and the file is saved in the processor, the PC can be disconnected if on-screen control via the PC is not desired. In the disconnected mode, system control is via the front panel and other external options as discussed below.

The second function of the software is on-screen control. The X-Frame's connected mode allows the designer to remain connected and control the X-Frame live. The designer can create intuitive graphic control interface screens and use this real-time PC as the primary controller for the system, similar to the MediaMatrix systems. Full graphical functionality is included, which allows the use of standard bitmap images to enhance the user interface.

Audio I/O

The base X-Frame hardware includes multiple I/O options. There are two analog inputs and four analog outputs, which are line level and electronically balanced. In addition, there is an AES/EBU input and output for Digital I/O providing an interface for digital sources, as well as a way to link multiple X-Frames and retain the audio in the digital domain. The X-Frame's AES/EBU ports support external sync.

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▼ BoB   ▲ X-Frame
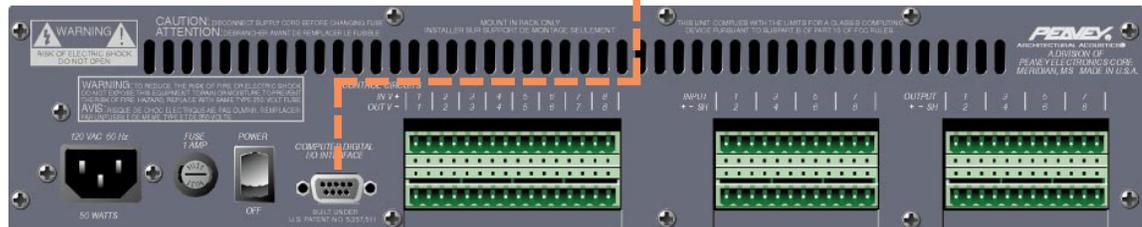
There is also a digital interface port for adding an MM-8800 Series BoB. The MM-8800 Series products provide an additional eight balanced line level inputs, eight balanced line level outputs, eight analog control ports and eight TTL logic outputs. The X-Frame, connected to an MM-8800 Series BoB, expands the system to a total of 10 balanced line level inputs, 12 balanced line level outputs, two digital inputs and two digital outputs. Since all inputs and outputs are available simultaneously, a fully configured X-Frame will provide a very powerful 12x14 audio system.

The analog inputs and outputs feature a new 20-bit, 64X over-sampling converter. In addition, there is a software adjustable analog gain stage, giving the designer control over the analog gain structure and the digital levels simultaneously. No more jumpers to set!

Sample Rates

Like the regular MediaMatrix, the X-Frame supports three sample frequencies: 32 kHz, 44.1 kHz and 48 kHz. The audio frequency response and available system resources are inversely proportional to the sample frequency. You can balance the need of system resources against the required frequency response for your loudspeaker systems. For example, at 32 kHz you would get maximum DSP resources, but high frequency audio response would start to roll off at about 16 kHz. For most commercial sound installations, this is more than adequate. If better audio is required, you could select a higher sample frequency and get better than 20 Hz - 20 kHz frequency response. The differences in system resource usage are minimal, and careful design of system signal flow ensures that these differences are never shown to be extreme.

COMPUTER REQUIREMENTS

Programming your X-Frame requires a Wintel (Windows/Intel) compatible computer, serial cable and the X-Frame software. The PC should have the following features for optimum performance:

☛ At least a 486/66 MHz processor or faster.
   An Intel Pentium 100 MHz, equivalent, or better is preferred.
☛ Windows 95 or NT 4.0

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- ☞ At least 16 MB of RAM (at least 32 MB for NT 4.0)
- ☞ At least 40 MB of free hard disk space for storing the X-Frame software and any associated View (.pav) files.
  Super VGA (1024x768) or better display adapter and monitor.
- ☞ A DB-9 female to female extension cable (6' to 10' long)

It is important to note that the regular MediaMatrix software, MWare™ will not operate with the X-Frame or vice versa. View files created on one system are not fully compatible with the other. Therefore, you should design your system the software you intend to use.

Also, the X-Frame reports the DSP resources differently than the regular MediaMatrix. For example, you might be creating a system design on using MWare, and later discover that the X-Frame might work for that particular project, and want to convert the design. In this case, it is a safe practice to estimate the X-Frame's DSP requirements at .75 DSP in the regular MediaMatrix. But since the X-Frame uses a newer and faster generation DSP, it is possible to compile a larger system on the X-Frame than the .75 DSP that MWare reports. For this reason, it is recommended that X-Frame system design be done on X-Ware software.

CONTROL

The X-Frame offers multiple options of user control. All control options allow maximum system security, streamlined operation and insurance against unwanted system adjustments. Additionally, all control options summarized below can be used simultaneously, providing even more powerful interface.

Real Time Computer Control

As mentioned earlier, you can use the PC to provide a very intuitive control interface for the end user. Using the software's extensive graphic capabilities, multiple levels of on-screen control can easily be created. Using the keyboard, mouse and monitor provides a familiar Windows look and feel. You can import bitmap images, such as CAD drawings and photos, to create simple point and click control screens. Limited only by imagination, this option provides the most powerful system control interface.

Besides the software-based, on-screen interface, there are several other options that provide additional control interface for the most common commercial sound installations. These options allow the user the required control of obvious system functions, but allow the designer to install a system that does not require a host computer. These options are perfect for the project that does not need a computer, keyboard, mouse and monitor in the rack.

Front Panel Control

The X-Frame front panel includes a simple yet powerful control interface. There are two LED ladder meters, eight preset buttons, an LCD backlit screen and a data wheel. The meters are fully programmable, and can be configured by the designer. Using the configuration function of the software, individual meters can be placed at any point within the signal flow. They can be RMS or peak-style meters. In addition, multiple signal paths can use a single meter for a summed meter reading. This can be a very useful feature, giving the user a good at-a-glance visual status of the audio in, out or through the system.

The eight preset buttons are fixed to the eight programmable presets or "scene snapshots" within the system. These presets provide total recall of all system controls. Any number of available system controls within the digital domain can be stored as a part of any preset. The front panel provides space to label each button and enable simple identification for the end user. In addition, these preset recall controls are available on the optional MM-8800 Series BoB in the form of a two-wire contact closure. Both the front panel preset buttons and the optional interface are available for simultaneous use. The front panel LED indicators will show the active preset regardless of how they are keyed. Additional visual status of active presets can also be provided by the optional MM-8800 Series' TTL logic outputs. Again, both the front panel visual indicator and remote indicator are active simultaneously.

The front panel LCD screen provides many useful features. In addition to showing basic indications of software version, etc., the screen also provides additional benefits in the form of programmable text. The system configuration, or view file name will display on the screen. You can use this to put your client's name on the screen or provide your field technicians with the name of the file being used. Then, if required, the corresponding backup file can be easily located for service or modifications. The screen also provides text identification of the 8 functions of the data wheel knob.

Finally, the front panel features a data wheel. This knob can be programmed to be up to eight virtual controls. The knob is a continuous action control, and the LCD screen provides feedback on the value of the control position. A front panel select button allows the user to step through all eight positions of the knob. The designer can identify within the software any or all knob functions and provide a text name which displays on the LCD screen. The value of the control function shown within the LCD display is in dB. This output display will also reflect the programmed range of the control. For example, if there is a master volume control configured for a maximum range of 6 dB, the display will show a value from -3 dB to +3 dB. In other words, what you see on the screen is the actual value of the selected knob function.

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Serial Control

*See note

External control of system parameters is possible using independent, third party controllers. These controllers include, but are not limited to, PC controllers; PLC controller; stand-alone programmable controllers, such as those manufactured by AMX, Crestron and others; show controllers, such as those manufactured by Alcorn-McBride, RA Gray, Triad and others; or simple ASCII controllers. A single RS485 port is provided on the rear panel to accommodate these controllers. Please keep in mind that the RS-232 port is for PC connection only, and will not allow external control of system parameters without resident X-Frame software. The RS-485 port is the only port that can be connected to system controls. Similar to the regular MediaMatrix PASHA™ serial-handling adapter, the X-Frame software provides external serial control of basic system devices. This is accomplished with a separate control device that receives a value from the associated third party controller. Devices that support these control parameters include presets, switches, routers, ramps, level controls, gates, and more. A total of 255 separate controls are available simultaneously.

Optional Control with the MM™-8800 Series Break-Out-Box

When the optional BoB is connected, additional control is also available. This includes eight two-wire analog control inputs that can be configured for a variety of functions. The devices that support these control inputs include presets, switches, routers, ramps, level controls, and more. The connection to the control inputs can include dry contact switches, relays, variable potentiometers, 10 V DC output, resistive dividing networks, and more. A variety of external controls can be connected and configured simultaneously.

In addition, there are eight TTL logic outputs that provide two states of logic, high or low. These logic states are assignable within the software to provide the designer a means to create annuciators, visual status of gate or preset states, or to provide external relay control of other system functions. These control outputs are also available as a manual control within the system software. This function can be used to set up an alarm condition for a power failure or other system function that may require an external alarm.

For more information on control via the MM-8800 Series Break-Out-Box, see the paper entitled "External Control via the Break-Out-Box" published by Peavey Electronics Corp.

*NOTE: RS-485 connection, RS-232 to RS-485 convertor may be required

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MediaMatrix® Differences — Standard vs. X-Frame™

FEATURES	STANDARD	X-Frame™
Ambient Sensing Option	Yes	Yes
Amplifier Control Support	Yes	No
Analog Control	Included with BoB	Included with BoB
Analog Gain Control	Jumper Selectable	Software Adjustable
Bitmap Support	Yes	Yes
Computer Functionality	Internal to Hardware	External
Construction	Card Frame	Single Board
Control Communications	RS-232 via COM Port	RS-485
D/A A/D Converters	18 Bit	20 Bit
Digital I/O	AES Optional	AES Standard
DSP Processing	Expandable	Fixed
Fixed Storage	Internal Hard Drive	Flash RAM
Front Panel Control	None	8 Buttons & Knob
Operating System	Win3.1	Win95 or NT 4.0
Portable Storage	Internal Floppy Drive	None
Redundancy Options	Yes	No
Required Rack Space	Varies, Min. 6 Units	4 EIA Units w/BoB
Room Combine Option	Yes	No
Serial Control Software	PASHA™	X-Net™
Software	MWare™ 2.1	X-Ware™ 1.0
Total Analog I/O	Expandable to 256x	Fixed at 10x12
Video Display	Internal Video Card	External
Warranty	1 Year	1 Year

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FACTORY SUPPORT

Peavey provides customer support and service direct from the factory. If you need further assistance or information, don't hesitate to call us. You can reach us 8 a.m. - 5 p.m. CST at (800) 543-2991 or (601) 483-5376. The address for correspondence/ literature on current or new products is:

Peavey Electronics Corp. • MediaMatrix Support Group • 711 A St. • Meridian, MS 39301

You can also access helpful tips, specifications, FAQs, sample files, application notes and other Peavey Architectural Acoustics equipment product information 24 hours a day, seven days a week at our site on the World Wide Web. The URL is:

http://www.peavey.com/division/arch/index.html

In order to provide you with the best technical support, it will probably be necessary to see your view file so we can accurately diagnose your problem. This also helps to streamline your work and make your system more efficient. Using the Internet and e-mail, we can quickly get you up and running. Please direct your mail, and attached view file to:

George Douglas, National Sales Manager	**george@peavey.com**
Ken Valentine, Central Regional District Manager	**ken@peavey.com**
Will Roland, Western Regional District Manager	**will@peavey.com**
Joel Moak, Southeastern Regional District Manager	**joel@peavey.com**
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If you need emergency assistance after business hours or on the weekend, you may reach one of us on our SkyPager at (800) 759-7243. When you hear the prompt tone, enter the PIN 113-4326.

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