PARIS

MEC Manual

E-MU ®

E-MU Systems

MEC Manual

Your Authorized E-MU Dealer is your primary source for service and support. The above information will be helpful in communicating with your Authorized E-MU Dealer, and provide necessary information should you need to contact E-MU Customer Service. If you have any questions concerning the use of this unit, please contact your Authorized E-MU Dealer first. For additional technical support, or to find the name of the nearest Authorized E-MU Service Center or call E-MU Customer Service at (831) 438-1921 between the hours of 8:00AM and 5:00PM Pacific Standard Time. Between 1:15 PM and 5:00 PM we experience our heaviest call load. During these times, there may be delays in answering your call.

In order to fulfill warranty requirements, PARIS should be serviced only by an Authorized E-MU Service Center. The serial number label must appear on the outside of the unit, or the E-MUwarranty is void and the unit will not be serviced

E-MU Part No. FI11438 Rev A

Storage Tips

The MEC contains a substantial amount of computerized and electronic circuitry that can be susceptible to damage when exposed to extreme temperature changes. When the MEC is brought inside after sitting in a cold climate (i.e., the back seat of your car), condensation builds up on the internal circuitry in much the same way a pair of glasses fogs up when you come inside on a cold day. If the unit is powered up as this condensation occurs, components can short out or be damaged. Excessively high temperatures also pose a threat to the unit, stressing both the internal circuits as well as the case. With this in mind, it is highly advisable to follow these precautions when storing and setting up your MEC:

- Avoid leaving the MEC in temperatures of less than 50 degrees Fahrenheit or more than 100 degrees Fahrenheit.
- When bringing the MEC indoors after travel, allow the unit at least 20 minutes to reach room temperature before powering up. In the case of excessive outdoor temperatures (below 50 degrees Fahrenheit or above 100 degrees Fahrenheit), allow an hour or more before power up.
- Avoid leaving the MEC inside a vehicle exposed to direct sunlight.

Clean-Up and Maintenance

Clean the exterior of your MEC with a soft, lint-free, dry (or slightly damp) cloth. You can use a slightly dampened cloth (with a mild neutral detergent) to remove stubborn dirt, but make sure that the MEC is thoroughly dry before turning on the power. Never use alcohol, benzene, volatile cleaners, solvents, abrasives, polish or rubbing compounds.
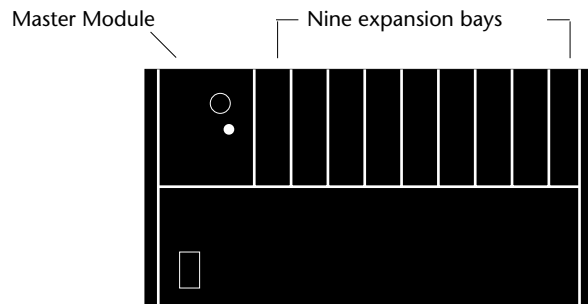
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Introduction to the PARIS MEC

Overview

Congratulations on your purchase of ENSONIQ's PARIS MEC (Modular Expansion Chassis). The MEC comes equipped with a Master Module that provides four 1/4" analog inputs, four 1/4" analog outputs, S/PDIF digital I/O, external clock I/O and a stereo headphone jack with monitoring controls.

In addition, the MEC's nine expansion bays allow you to expand your PARIS system through the purchase and installation of PARIS expansion modules.

Master Module — Nine expansion bays

Software Requirements

In order to use the MEC, you must be using Version 1.10 or higher of the PARIS application. To obtain the latest PARIS software, visit the PARIS Web site at: *http://paris.ensoniq.com*.

Connecting the MEC

To attach the MEC to your PARIS system:

1. Power down your computer.
2. Connect one end of the supplied EDS-SC6 cable to the MD50 connector labeled "EDS Interface" on the EDS-1000 PCI card.
3. Connect the other end of the EDS-SC6 cable to the jack labeled "EDS Computer Interface" on the MEC.
4. Connect one end of the supplied power cord to the MEC's rear-panel AC Line jack, and the other end to a grounded power outlet.
5. Press the top of the MEC's front-panel power switch to turn on the MEC.
6. Boot up your computer.

Some products, such as older guitar amplifiers, do not have polarized plugs and can be connected to an outlet incorrectly. This may result in dangerous high voltages on the audio connections—this could cause you physical harm, or damage any properly grounded equipment to which they are connected, such as your MEC.

To avoid shock hazards or equipment damage, we recommend the following precautions:

- If you own equipment with two-pronged power cords, check to see if they are polarized or non-polarized. You might consider having an authorized repair station change any non-polarized plugs on your equipment to polarized plugs to avoid future problems.
- Exercise caution when using extension cords or plug adapters. Proper polarization should always be maintained from the outlet to the plug. The use of polarized extension cords and adapters is the easiest way to maintain proper polarity.
- Whenever possible, connect all products with grounded power cords to the same outlet ground. This will ensure a common ground level to prevent equipment damage and minimize hum in the audio output.

AC outlet testers are available from many electronic supply and hardware stores. These can be used to check for proper polarity of outlets and cords.

AC Line Conditioning

As with any computer device, the MEC is sensitive to sharp peaks and drops in the AC line voltage. Lightning strikes, power drops, or sudden and erratic surges in the AC line voltage can scramble the internal memory, and in some cases, damage the unit's hardware. Here are a few suggestions to help guard against such occurrences:

- A surge/spike suppressor—The cheaper of the options, a surge/spike suppressor absorbs surges and protects your gear from all but the most severe over-voltage conditions. You can get multi-outlet power strips with built-in surge/spike suppressors for little more than the cost of unprotected power strips, so using one is a good investment for all your electronic equipment.
- A line conditioner—This is the best, but by far the more expensive way, to protect your gear. In addition to protecting against surges and spikes, a line conditioner guards the equipment against excessively high or low line voltages. If you use the MEC in lots of different locations with varying or unknown AC line conditions, you might consider investing in a line conditioner.

Safe Operation of the MEC

In order to ensure safe operation of the MEC, follow these guidelines.

Operate the MEC at a safe temperature

- The MEC can operate safely in ambient temperatures up to 100 degrees Fahrenheit or 37.7 degrees Celsius.
- Remember that when the MEC is rack-mounted, it is operating in an environment that is likely to be hotter than the surrounding space as a result of the heat generated by the MEC and other devices installed in the rack. Make sure that the temperature inside the rack does not exceed the recommend limit.
- The MEC contains a fan that vents on the left side of the MEC (as viewed from the front). Therefore, when the MEC has been installed in a rack, do not block the vent by filling the space between this side of the MEC and the rack enclosure.

When installing the MEC in a rack, mount it securely

- Use four screws appropriate to your rack hardware to safely secure the MEC into your rack.
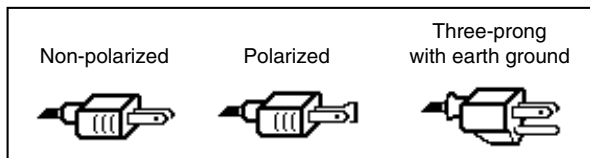
Don't overload your power circuit

- Take care not to overload the circuit to which the MEC is connected. The MEC's maximum power usage is 2A (amps).

Make sure that your AC power is reliably grounded

- When using a power strip, make sure that the strip is properly grounded.

Polarization and Grounding Tips

Like many modern electrical devices, your MEC has a three-prong power cord with earth ground to ensure safe operation. Some products have power cords with only two prongs and no earth ground. To ensure safe operation, modern products with two-prong power cords have polarized plugs which can only be inserted into an outlet the proper way.

Non-polarized   Polarized   Three-prong with earth ground

Extending or Replacing the MEC Cable

If you need to replace the supplied cable, make sure that the new cable has 50 conductors—some cables don't—and that the total length of the cable is no greater than ten feet. Use of longer cables or cables with less than 50 conductors may produce unexpected results.

Warning: Do NOT connect the EDS Interface cable to the SCSI interface connector on your computer. Doing so may result in permanent damage to your computer, the MEC, or both.

Connecting the Interface 2 if You are Using a MEC

You can connect an Interface 2 to the MEC's rear-panel Interface 2 connector jack to add an additional two analog inputs and outputs to your system. The Interface 2 will appear in the Patch Bay Window in the PARIS application.

Warning: The MEC and your computer must be powered down when you attach the Interface 2. It's also important that you connect the Interface 2 to the MEC, and not directly to the EDS-1000 PCI card.

To Install an Expansion Module

1. Power down your computer.
2. Power down the MEC (you can leave it plugged in—the power cord's grounding will help discharge any static build-up).
3. Decide which of the MEC's nine expansion bays you'd like to use for your expansion module.
4. Using the hex wrench that came with your MEC, remove the two screws holding the desired bay's face plate in place—at its top and bottom—and set aside the face plate.
5. Mount your expansion module's face plate using the two just-removed hex screws. Tighten the screws all the way, and then loosen them by about half of a turn so that the plate can move up and down and side-to-side. This will help ensure an easy connection with the module.
6. Using a Philips-head screwdriver, remove the bay's back panel.
7. Insert the expansion module into the rear bay opening so that the printing on the back plate of the module is facing outward and right-side-up, and so that the edges of the expansion module's card slide into the plastic card guides at the top and bottom of the bay.
8. Slide the expansion module into the bay, pressing it into place as its inner edge connectors make contact with the front face plate.
9. Using the two Philips-head screws, attach the back plate of the expansion module to the MEC chassis.
10. Tighten the two loose front plate screws.

The MEC Master Module

The MEC Master Module Rear Panel

1/4" TRS analog
Audio Input jacks
1 and 2

Input
ground-lift
switch

1/4" TRS analog
Audio Input jacks
3 and 4

1/4" TRS analog
Audio Output
jacks 1 and 2

Output ground
Compensated/
Balanced switch

1/4" TRS analog
Audio Output
jacks 3 and 4

Audio Inputs

1

Main

2

Lifted

Ground

Connected
(Typical)

3

Aux

4

1

Main

2

Balanced

Ground

Compensated
(Typical)

3

Monitor

4

Audio Outputs

External Clock

In

Out

External Clock
input and output
jacks

S/PDIF

In

Out

S/PDIF-format
digital input and
output jacks

Interface 2

PARIS Interface 2
(IF-2) connector
jack

AC Line

100-240 VAC ~
50/60 Hz

WARNING!
To reduce the risk of
fire or electric shock
do not expose this
product to rain or
moisture

AC Line power
cable connection
jack

EDS Computer Interface

EDS-SC6 connector jack for connecting MEC to
EDS-1000 PCI card

Making Master Module Connections

Connecting Audio Signals to the Master Module

The level-matching switches for the MEC Master Module set the operating level of the inputs and the outputs. The switches are found in the Configuration dialog for the Master Module in the Patch Bay Window (see "Working with the Master Module in the Patch Bay" later in this manual). Each pair of inputs and outputs can be set to +4 dBu or -10 dBV. These are the two most common standard reference levels for audio equipment. Most professional equipment operates at the higher +4 dBu reference level while most semi-professional and consumer

When synced to an external source running at exactly 44.1 or 48 kHz, any deviations in the sample rate will cause the associated Sample Rate LED to blink.

When changing the clock source settings from the Project Window, the MEC will check for the presence of external clock signals and set its front panel LEDs accordingly. If the external signals requested are not present, the clock source will remain set to Internal.

MEC Specs

Master Module Audio Specs

Maximum Input and Output Level (Clip Point)
+18 dBu (+4 dBu with 14 dB of headroom) @ +4 dBu level setting
+4 dBV (-10 dBV with 14 dB of headroom) @ -10 dBV level setting

Frequency Response
+0/-.5 dB   7 Hz-20 kHz (@ 44.1 or 48 kHz)
+0/-3 dB   1.5 Hz-23.1 kHz (@ 48 kHz)

Crosstalk (any input to any output, Ref=+18 dBu)
<-90 dB @ 1 kHz   <-76 dB @ 15 kHz

THD+N (@ 1 kHz, input to output, Ref=+18 dBu)
@ +4 dBu = -94 dB (.002%)   @ +18 dBu = -84 dB (.0063%)

Signal to Noise Ratio (Ref=+18 dBu)
>94 dB

A/D Converters
1-bit delta-sigma, 128X oversampling, 20-bit output

D/A Converters
1-bit delta-sigma, 128X oversampling, 20-bit input

MEC Expansion Module Current Limits

Installed expansion modules are powered by the MEC's three power supplies. It is anticipated that they will provide sufficient current for any combination of planned modules.

Power Supply	Capacity
+5	2000 milliamps
+12	3300 milliamps
-12	400 milliamps

AC Requirements

100-240 VAC   50-60 Hz

The Sync Source LEDs

The Sync Source LEDs indicate the source of the master clock that's currently driving PARIS.

LED	Sync Source
Internal	PARIS' internal timing generator
S/PDIF	External digital source connected to S/PDIF jacks
Module	Timing generated by installed expansion module whose Sync Master LED is lit
External Clock-Word	External clock input signal at the sample rate (word clock)
External Clock-256 Fs	External clock input signal at 256 times the sample rate

Sync Source Error Conditions

When the system is running from an external or digital clock source, the Master Module continually checks that the incoming clock source is valid. If the clock source changes or becomes invalid in any way, the currently lit Sync Source LED will blink to indicate an error condition. If sync has been lost, the audio outputs will also be muted until the error condition is resolved and sync is re-established.

Typical causes of loss of digital or external sync include:

Removal of the S/PDIF or external clock cables

Loss of power to the device providing the clock source

Sudden changes in S/PDIF sample rate (as would happen if a DAT tape was recorded at multiple rates).

The Sample Rate LEDs

The Sample Rate LEDs indicate the current sample rate at which PARIS is running. The LEDs will light solidly or blink to indicate different sample rates. These LED states apply to internal, external and digital sync with one exception: the 32 kHz rate is only available when the clock source is S/PDIF. This allows the transfer of data from DAT machines and other equipment that can record at the 32 kHz rate (to record additional material or properly play back such data, PARIS' sample rate must be derived from an external 32 kHz S/PDIF source).

LED	State	Sample Rate
44.1kHz	On	Sample rate is exactly 44.1 kHz
44.1kHz	Blinking	Sample rate is between 40 kHz and 46079 kHz
48 kHz	On	Sample rate is exactly 48 kHz
48 kHz	Blinking	Sample rate is between 46080 and 50 kHz
Both	Off	Sample rate is 32 kHz

equipment and many instruments use the lower -10dBV level. When the switch is set to +4dBu, the inputs are optimized for a higher input level and the output level will be louder—it may therefore overload the inputs of some equipment. If you are unsure, start with the -10dBV setting; if the input and output levels are too low, try the higher +4 dBu setting. Please refer to the documentation for your other equipment to determine the correct setting to use.

The audio inputs and outputs of the Master Module are 1/4" TRS phone jack connectors.

Note: In order to obtain best results and lowest noise levels, it is very important to make sure that your computer and the other device are both grounded to the same reference. This usually means that you should be using grounded AC cables on both systems and make sure that both systems are connected to the same grounded outlet.

There are two switches on the rear panel of the Master Module that can be used to correct grounding problems.

The Audio Inputs

The input-jack ground lift switch, located among the input jacks, controls the grounding for all four inputs. When the switch is in its "Lifted" position, the connection is broken between the chassis and the sleeve of the input jacks. It will usually be necessary to leave the input ground connected in countries without an AC ground, such as Japan.

The inputs are electronically balanced.

• When the Master Module is set to +4dBu, the jacks will accept balanced signals from cables using TRS plugs. Unbalanced cables with 2-conductor (TS) plugs may also be used.

• When the Master Module is set to -10dBV, the jacks will accept unbalanced, 2-conductor cables.

The Audio Outputs

A ground Compensated/Balanced switch is available among the Master Module's four output jacks. Set this switch to its Compensated position when an AC ground is present and 2-conductor cables are used. Set it to its Balanced position whenever 3-conductor cables are used, or when 2-conductor cables are used in countries where there is no AC ground (such as Japan).

Digital Audio Input and Output

The digital input and output connectors—the digital I/O—on the Master Module are a pair of RCA phono jacks, the standard type of connector used for S/PDIF (Sony/Philips Digital InterFace) connections. Each connector supports two-channels of digital audio.
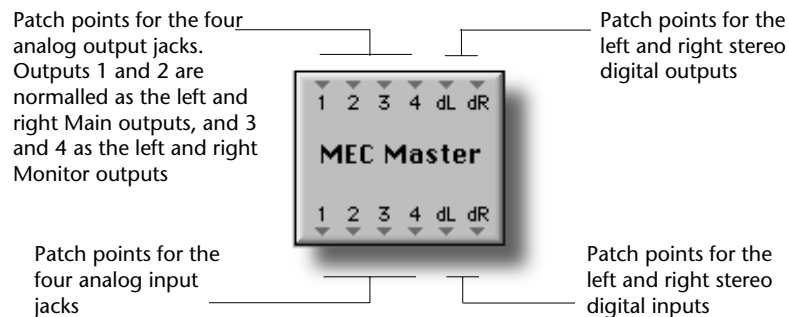
The S/PDIF format supports transmission of digital audio data with word lengths of up to 20 bits. PARIS digital I/O can be used for the reception and/or transmission of digital data from any external digital device such as a DAT machine, an external analog-to-digital converter or an external signal processor equipped with digital inputs and outputs. The digital inputs and outputs appear in the Patch Bay window in the PARIS application.

Connecting Clock Signals to the Master Module

The MEC Master Module has rear panel inputs and outputs for clock signals. Clock signals can be used in a studio when a common, stable sample rate reference is required to keep multiple pieces of digital equipment running at the same rate. It is also referred to as "house clock" or "house sync." This clock source can be either the sample rate (such as 48.000 kHz) or at 256 times the sample rate. A BNC connector is the most common connector found on cables used for this purpose. Connect incoming clock signals to the Master Module's External Clock In jack. Connect a cable to the External Clock Out jack to re-distribute incoming clock signals to other devices in the studio's chain.

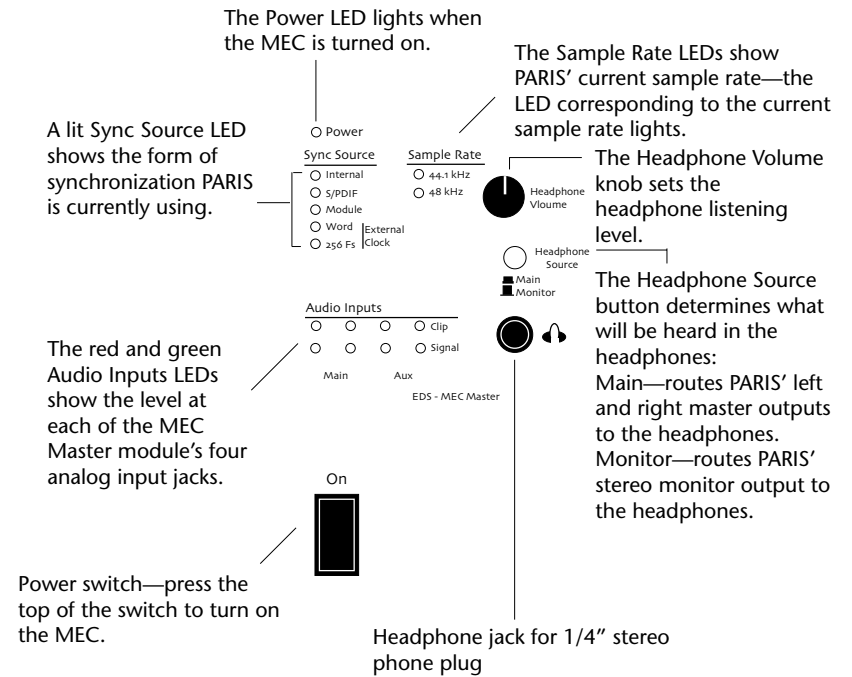## Working with the Master Module in the Patch Bay

Audio is routed in and out of the Master Module according to the connections made to its object in PARIS' Patch Bay Window.

Patch points for the four analog output jacks. Outputs 1 and 2 are normalled as the left and right Main outputs, and 3 and 4 as the left and right Monitor outputs

Patch points for the left and right stereo digital outputs

Patch points for the four analog input jacks

Patch points for the left and right stereo digital inputs

You can set the levels for each pair of analog inputs and outputs in the Patch Bay Window's Master Module Configuration dialog. Inputs 1 and 2 are labeled in the dialog as "Main In Level," Inputs 3 and 4 are "Aux In Level," Outputs 1 and 2 are "Main Out Level," and Outputs 3 and 4 are "Control Room Out Level." These names reflect the default—or "normalled"— connections for the Master Module's inputs and outputs.

The Configuration dialog also provides a switch for setting the Master Module's clock output mode.

The MEC Master Module Front Panel

The Power LED lights when the MEC is turned on.

The Sample Rate LEDs show PARIS' current sample rate—the LED corresponding to the current sample rate lights.

A lit Sync Source LED shows the form of synchronization PARIS is currently using.

The Headphone Volume knob sets the headphone listening level.

The Headphone Source button determines what will be heard in the headphones:
Main—routes PARIS' left and right master outputs to the headphones.
Monitor—routes PARIS' stereo monitor output to the headphones.

The red and green Audio Inputs LEDs show the level at each of the MEC Master module's four analog input jacks.

Power switch—press the top of the switch to turn on the MEC.

Headphone jack for 1/4" stereo phone plug

The MEC Master Module Front Panel LEDs

The Audio Input LEDs

There are two input level LED indicators on each of the four analog inputs of the MEC's Master Module. The green LED indicates presence of signal and comes on at -40 dB below clipping. The red LED indicates that the signal is clipping (with a +4 setting, clipping occurs at +18 dBu; at -10, it occurs at +4 dBV). These LEDs monitor the signal directly at the analog-to-digital converters and before any processing by the rest of the system.

Tip: When setting the levels for signals being sent into PARIS, the red level indicators should flash only occasionally.

The Sync Source and Sample Rate LEDs

There are two sets of LED indicators on the front panel of the Master Module that show both the timing synchronization source and sample rate for PARIS. These indicators reflect the current settings in the Project Window and the Master Module Configuration in the Patch Bay.