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You can read the recommendations in the user guide, the technical guide or the installation guide for RANE MX 23. You'll find the answers to all your questions on the RANE MX 23 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

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QUICK START

When, hold on there. Even if you don't read manuals as a matter of principle, at least read this section to avoid hurting yourself or your equipment.

Connect the MX 23 with the **POWER off**. Balanced XLR cables are recommended, but if you must convert to 1/4" connectors, buy or make a cable like the ones on page Manual-11 and keep them as short as possible. *This device uses low impedance balanced line drivers. Do not connect the "+" or "-" output pins to ground, as this may cause the power supply to shut down. For unbalanced use, leave the unused output pin ("+" or "-") unterminated.*

Consult the speaker manufacturers for the correct crossover **FREQUENCY** settings. As rugged as some drivers are, many (especially compression drivers) will not accept frequencies outside of their normal range without producing distortion and possibly self-destruction.

With all equipment turned off and **LEVEL** controls down, begin making connections to the system as shown on page Manual-4 or 5. When turning on the system, switch on the power amplifiers *last*. Now, feed the MX 23 some program material. Start by turning up the **LOW LEVEL**, **MID LEVEL** and **HIGH LEVEL** to the 0 dB marks. Slowly increase the **INPUT LEVEL**, even if it goes all the way to 10, so the +4 dBu (green) light blinks occasionally and the **OL** (red) light stays out. This delivers the best signal-to-noise performance.

The **MONO SUB OUTPUT** is a sum of the Left and Right Low Outputs. The **MONO SUB LEVEL** adjusts only this Output and is not affected by the **LOW LEVEL** control. When using a single mono bass bin along with stereo mid- and high-range cabinets, set the **100 Hz FILTER** to **OUT**, allowing the front panel **FREQUENCY** to control the subwoofer crossover point. When used with 3-way cabinets and a subwoofer, set the **100 Hz FILTER** switch to **IN** to allow only frequencies below 100 Hz at this output jack. This way, the MX 23 almost does the job of a Stereo 4-Way crossover, but without removing that awesome bass from the Left and Right Low Outputs.

WEAR PARTS: This product contains no wear parts.

Manual-1



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Manual abstract:

Even if you don't read manuals as a matter of principle, at least read this section to avoid hurting yourself or your equipment. Connect the MX 23 with the POWER off. Balanced XLR cables are recommended, but if you must convert to 1/4" connectors, buy or make a cable like the ones on page Manual-11 and keep them as short as possible. This device uses low impedance balanced line drivers. Do not connect the "+" or "-" output pins to ground, as this may cause the power supply to shut down. For unbalanced use, leave the unused output pin ("+" or "-") unterminated. Consult the speaker manufacturers for the correct crossover FREQUENCY settings. As rugged as some drivers are, many (especially compression drivers) will not accept frequencies outside of their normal range without producing distortion and possibly self-destruction. With all equipment turned off and LEVEL controls down, begin making connections to the system as shown on page Manual-4 or 5. When turning on the system, switch on the power amplifiers last.

Now, feed the MX 23 some program material. Start by turning up the LOW LEVEL, MID LEVEL and HIGH LEVEL to the 0 dB marks. Slowly increase the INPUT LEVEL, even if it goes all the way to 10, so the +4 dBu (green) light blinks occasionally and the OL (red) light stays out. This delivers the best signal-to-noise performance. The MONO SUB OUTPUT is a sum of the Left and Right Low Outputs.

@@@@@@@Input gain is +6 dB at "10". With signal applied, set this control so the +4 dBu LED lights occasionally, indicating sufficient signal. Flashing of the OL (overload) LED during peaks can be avoided by turning the INPUT LEVEL down. LOW LEVEL control This controls the level of signal going to the LOW OUTPUT jacks. Unity gain is reached at the "0 dB" mark with the INPUT LEVEL set to "10".

This control does not affect the MONO SUB OUTPUT level. Refer to Operating Instructions on page Manual-6. LOW/MID FREQUENCY control This 31-position selector sets the crossover frequency between the Low and Mid frequency Outputs in both Channels. Consult the manufacturer of the drivers or cabinets for the correct setting. Cable Wiring In agreement with IEC and AES/ANSI standards, Rane wiring convention is pin 2 Positive (hot), pin 3 Negative (cold or return), and pin 1 signal grounded and chassis grounded (to allow unbalanced operation). The XLR case is chassis grounded. This device uses low impedance balanced line drivers. Do not connect the "+" or "-" output pins to ground, as this may cause the power supply to shut down. For unbalanced use, leave the unused output pin ("+" or "-") unterminated. HIGH OUTPUTS These are balanced Output jacks.

Connect the LEFT HIGH OUTPUT to the left channel input of the high frequency amplifier, and the RIGHT HIGH OUTPUT to the right channel input of the high frequency amplifier. When using different model amplifiers for the low and high outputs, use the amplifier with the most wattage for the low outputs.

MID OUTPUTS These are balanced Output jacks. Connect the LEFT MID OUTPUT to the left channel input of the mid frequency amplifier, and the RIGHT MID OUTPUT to the right channel input of the mid frequency amplifier. Manual-2 MID & HIGH LEVEL controls This controls the level of signal going to the HIGH OUTPUT jacks. Unity gain is reached at the "0 dB" mark with the INPUT LEVEL set to "10". Refer to Operating Instructions on page Manual-6.

MID/HIGH FREQUENCY control This 31-position selector sets the crossover frequency between the Mid and High frequency Outputs in both Channels.

Consult the manufacturer of the drivers or cabinets for the correct setting. Power ON switch and LED Your basic, straightforward power switch.

When the yellow LED is lit, the MX 23 is ready to go. MONO SUB OUTPUT, LEVEL trim, and 100 Hz FILTER switch This Output contains the summed signals of the LEFT and RIGHT LOW OUTPUTS. It may be used instead of, or along with the LOW OUTPUTS. The output may be adjusted with the LEVEL trim from +6 dB to -10 dB. Unity gain is straight up at 12:00.

Switch the 100 Hz FILTER to IN when using a subwoofer along with the LOW OUTPUTS. This sends only the lowest frequencies to the subwoofer. INPUTS LOW OUTPUTS Connect the LEFT LOW OUTPUT to the left channel of the low frequency amplifier, and the RIGHT LOW OUTPUT to the right channel of the low amplifier. When driving a single subwoofer, use the MONO SUB OUTPUT jack instead. These are balanced Inputs.

It is best to use balanced lines, especially when connecting cables over 10 feet in length. If you are feeding the MX 23 from a device that does not have balanced XLR connectors, consult the SOUND SYSTEM INTERCONNECTION section on page Manual-10. Manual-3 APPLICATION -- ACTIVE 3-WAY WITH (or without) MONO SUB Connect as shown for a mono subwoofer. Set the 100 Hz FILTER switch to the IN position. If a mono subwoofer is not used, the FILTER switch setting will not matter, since all low frequencies will be sent to the LEFT and RIGHT LOW OUTPUTS. The front panel LOW/MID FREQUENCY control determines the frequency division between the low and mid drivers, while only low frequencies below 100 Hz are sent to the mono subwoofer. Manual-4 OPERATING INSTRUCTIONS Selecting Crossover Frequencies Most speaker manufacturers supply low and/or high frequency cut-off points for each driver, especially if these are supplied in a system. These cut-off frequencies are based on each driver's performance, with a certain safety margin to accommodate more gentle filter roll-offs. The MX 23 utilizes 31-position precision DC control voltage potentiometers to select the FREQUENCY points. This crossover circuit design assures consistent accuracy from Channel-to-Channel and unit-to-unit.

This is a distinct advantage over continuously variable designs using ganged potentiometers which can yield large variations in channel-to-channel matching.

Even with 31 choices it is possible that the exact recommended Crossover Frequency may not fall on one of the detents on the selector. Not to panic, for drivers have their own gradual rolloffs and tolerance variations. Just pick the closest one. When in doubt, choose the higher Frequency setting. The illustrations and tables below detail the crossover frequencies available on the detents that are not labeled. For best overall system results, try to choose the speaker components so that each operates well within its recommended limits. This provides valuable leeway so that crossover points may be adjusted in order to fine-tune the system. This also yields higher system reliability. If at all possible, always use some kind of realtime analyzer to tune your crossover, and then fine-tune each system with an equalizer.

Keep reading for further alignment details. Setting the Output Level Controls The INPUT LEVEL is an overall system sensitivity adjustment.



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Use this control to decrease the overall sensitivity of the entire sound system, including the mono subwoofer if you are using one. You will generally want to start with this control in the full clockwise (or "10") position. @@@@Crossover Philosophy Now it gets real fun.

@@@@@They are affordable, easy to use and amazingly effective. @@@@The LOW LEVEL control has no affect on the MONO SUB OUTPUT. @@@@We had to get our plug. 1. @@2.

Place the analyzer microphone at least 15 feet away from the speaker stack, on axis (dead ahead) and about chest level. Minimize any background noise (fans, air conditioners, traffic, wild animals, etc.) that could affect readings. 3. Run pink noise through the system, either through a mixer channel or directly into the crossover. Turn all amplifier controls at least half way up. 4. Slowly turn up the LOW LEVEL control until you hear a healthy level of noise through the low frequency drivers (it should sound like rumble). 4. Adjust the display controls on the analyzer so that it shows the greatest number of 0 dB LED's (green on Rane equipment) below the crossover frequency.

6. Now slowly turn up the MID LEVEL control until the display shows the same high frequency output level average as the low frequency section. 7. Repeat this procedure for all crossover frequency sections, lowest to highest, so the end result is as flat response as possible on the analyzer display near each crossover point. **IMPORTANT:** Compression driver or horn high frequency roll-off, bass roll-off, and room acoustics usually cannot be corrected by the crossover. If, for example, you are provided. (In other words, don't modify cables, or try your own version of grounding unless you really understand exactly what type of output and input you have to connect.) **THE ABSOLUTE BEST RIGHT WAY TO DO IT** Use balanced lines and tie the cable shield to the metal chassis (right where it enters the chassis) at both ends of the cable. A balanced line requires three separate conductors, two of which are signal (+ and -) and one shield. The shield serves to guard the sensitive audio lines from interference.

Only by using balanced line interconnects can you guarantee (yes, guarantee) hum-free results. Always use twisted pair cable. Chassis tying the shield at each end also guarantees the best possible protection from RFI [radio frequency interference] and other noises [neon signs, lighting dimmers]. **THE NEXT BEST RIGHT WAY TO DO IT** The quickest, quietest and most foolproof method to connect balanced and unbalanced is to transformer isolate all unbalanced connections. Your audio dealer can recommend such a transformer.

The goal of transformer adaptors is to allow the use of standard cables. With these transformer isolation boxes, modification of cable assemblies is unnecessary. Virtually any two pieces of audio equipment can be successfully interfaced without risk of unwanted hum and noise. Another way to create the necessary isolation is to use a direct box. Originally named for its use to convert the high impedance, high level output of an electric guitar to the low impedance, low level input of a recording console, it allowed the player to plug "directly" into the console.

Now this term is commonly used to describe any box used to convert unbalanced lines to balanced lines. **THE LAST BEST RIGHT WAY TO DO IT** If transformer isolation is not an option, special cable assemblies are a last resort. The key here is to prevent the shield currents from flowing into a unit whose grounding scheme creates ground loops (hum) in the audio path (i.e., most audio equipment). Do not be tempted to use 3-prong to 2-prong "cheater" adapters to lift grounds. This is a dangerous and illegal practice. It is true that connecting both ends of the shield is theoretically the best way to interconnect equipment though this assumes the interconnected equipment is internally grounded properly. Since most equipment is not internally grounded properly, connecting both ends of the shield is not often practiced, since doing so can create noisy interconnections. A common solution to these noisy hum and buzz problems involves disconnecting one end of the shield, even though one can not buy off-the-shelf cables with the shield disconnected at one end.

The best end to disconnect is a matter of personal preference and should be religiously obeyed; choose inputs or outputs and always lift the side you choose (our drawings happen to disconnect the outputs). If one end of the shield is disconnected, the noisy hum current stops flowing and away goes the hum -- but only at low frequencies. A one-end-only shield connection increases the possibility of high frequency (radio) interference since the shield may act as an antenna. Many reduce this potential RF interference by providing an RF path through a small capacitor (0.1 or 0.01 microfarad ceramic disc) connected from the lifted end of the shield to the chassis. The fact that many modern day installers still follow this one-end-only rule with consistent success indicates this and other acceptable solutions to RF issues exist, though the increasing use of digital and wireless technology greatly increases the possibility of future RF problems. See the following page for suggested cable assemblies for your particular interconnection needs. Find the appropriate output configuration from either your mixer output or the MX 22 output (down the left side), and then match this with the correct balanced or unbalanced input to the MX 22 or the amplifier (down the right side.) An "off-the-shelf" cable may be available or modifiable.

Soldering should only be attempted by those trained in the art. **SUMMARY** If you are unable to do things correctly (i.e. @@@@. Any unbalanced cable must be kept under ten feet (three meters) in length. Lengths longer than this will amplify the nasty side effects of unbalanced circuitry's ground loops.

This information was condensed from Rane Note 110, "Sound System Interconnection". If you would like the complete note, call or email the factory, download it from Rane's web site, or ask your dealer for a copy. Manual-7 VARIOUS XLR CABLE ASSEMBLIES ©Rane Corporation 10802 47th Ave. W., Mukilteo WA 98275-5098 TEL (425)355-6000 FAX (425)347-7757 WEB <http://www.rane.com>

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