

MicPre 5.0

Microphone Preamp & Mix Node

Reference Manual



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Introduction



MicPre 5.0 - Microphone Preamp and Mix Node

General Thank you for purchasing our MicPre 5.0 microphone preamplifier. The MicPre 5.0 has operational features that are easy to understand and you should be up and running in no time. If you are unfamiliar with audio equipment or audio signal flow, it is recommended that you read this manual. If you have any questions regarding the MicPre 5.0 or any Speck product, do not hesitate to contact Speck Electronics. Our phone number is +760-723-4281.

The MicPre 5.0 is a complete single channel microphone preamp that offers features and flexibility for use in recording, live sound or any application that requires a high quality microphone preamp.

In this manual the MicPre 5.0 will also be referred to as the MP 5.0.

The signal path consists of a matched discrete transistor front-end, premium IC's, and transformer output stage. With the push of a button, the MP 5.0 can change from a "Transformer-Balanced" output to a "Active-Balanced" output.

The MP 5.0 also includes a mix section that makes it perfect for DAW's and remote recording. With an optional interface cable, the mix section of the MP 5.0 can be linked with additional MP 5.0's to form a fully integrated mix section.

The compact ½ rack format of the MP5.0 can easily be rack mounted and combined with the Speck Model ASC equalizer to create a highly functional outboard channel strip.

The MicPre 5.0 is available in 2 versions; The Model MP5.0-NA designed to operate with 100 and 120 VAC power, and the Model MP5.0-EU that is designed to operate with 220, 230 or 240 VAC power.

Standard accessories

The MP5.0 is supplied with the following list of accessories:

Operations Manual**Power cord** (NA version only)

(4) rubber bumpers - used for table top mounting or stacking multiple units.

(2) 6-32 x ½" machine screws - supplied to mount the MP 5.0 to an optional rack shelf.

Optional accessories

The following is a list of optional accessories that are available from the factory or your Speck dealer:

Mix link interface cables - to interface additional MP 5.0's.

2 unit cable - P/N MP50-Link2

4 unit cable - P/N MP50-Link4

6 unit cable - P/N MP50-Link6

8 unit cable - P/N MP50-Link8

M-S interface cable - a 12" cable used to connect two MP5.0's for use in a M-S micing configuration.

P/N MP50-MS

D.C. interface cable - Used to supply power to the Model ASC equalizer.

P/N ASC-DCI

1U rack tray - may be used to rack mount two MP 5.0's or one MP 5.0 and one Model ASC equalizer.

**Operator Safety
Summary****Power Source**

The MP 5.0 is intended to operate from an AC power source that does not apply more than 120 Volts RMS (Model MP5.0-NA) or 240 Volts RMS (Model MP5.0-EU) between the supply conductors. Always make certain that power cord matches the operating voltage shown on the rear panel above the power switch.

Grounding the product

To avoid electrical shock, plug the power cord into a properly wired receptacle. The ground pin of the power cord is internally connected to the chassis. For safety reasons, **do not lift the ground on the power plug by using a ground lift adapter.** The MicPre 5.0 should never be exposed to rain or moisture.

Do not remove the cover

To avoid personal injury, do not remove the top cover of the MP 5.0 and never operate the MP 5.0 without the cover properly installed.

The MP 5.0 with its internal power supply contains voltages that can cause serious injury or death. Refer all repairs to a qualified service technician, or directly to Speck Electronics.

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Installation

General The following information should give you the basics on how to install the MP 5.0. The proper installation of the MP 5.0 as part of a larger system requires a clear understanding of audio wiring, AC distribution, grounding, and shielding techniques.

When the MP 5.0 is being installed into a larger system it may be necessary to retain the services of someone experienced in these matters.

Unpacking and inspection The MP 5.0 is delivered in a special, protective shipping container and was carefully inspected both mechanically and electrically before shipment. It should be physically free of marks and scratches and in perfect electrical order upon receipt. To confirm this, the product should be inspected for physical damage that may have occurred in transit. Any damage should be reported to your delivery company as soon as possible.

Environmental considerations If installed in an equipment rack that also contains heat producing equipment, adequate ventilation should be provided. This will prolong component life and maximize operational stability.

To insure adequate airflow around the unit and to prevent overheating, we recommend leaving a 1U blank panel above and below the MP 5.0 and do not obstruct the air vents on the side.

While the internal circuitry of the MP 5.0 is fully shielded by the steel chassis, installation should nevertheless be planned to avoid locating it immediately adjacent to power amplifiers, power supplies, or any source of low frequency electromagnetic emissions.

Electrical grounding safety Merely affixing the MP 5.0 into an equipment rack is no guarantee that the product is making a reliable ground connection. The mounting rails in the equipment rack should never be depended upon for a ground connection. To protect operating personnel, the National Electrical Manufacturers Association (NEMA) recommends that rack cabinets be grounded.

Upon loss of a protective ground connection, all accessible conductive parts, including knobs and controls that may appear to be insulating, can render an electric shock.

To avoid electrical shock, plug the MP 5.0 into a properly wired receptacle. The ground pin of the power cord is internally connected to the chassis. For safety reasons, **do not lift the ground on the power plug by using a ground lift adapter.**

Mechanical installation

The location of the MP 5.0 should be such that the operator has a clear, unobstructed view of the front panel from his/her normal operating position. The unit should also be within easy reach of the operators normal position in order to facilitate the use of the front panel controls

The ½ rack form factor of the MP 5.0 allows a single unit to be mounted on a table top with the (4) rubber bumpers supplied with the unit, multiple units stacked, or two units mounted side-by-side on a 1U rack shelf manufactured by Middle Atlantic Products (Model UTR1).

When attaching the MP 5.0 to the rack shelf, it should be secured with the (2) 6-32 x ½" machine screws supplied with the unit. Do not use screws that are longer than ½" in length as they could damage the internal circuit board. When the MP 5.0 or multiple MP 5.0's are mounted to the rack shelf, they may be installed into any 19" wide equipment rack that uses standard E.I.A. universal spacing.

Physical placement of adjacent equipment

Any device that emits a high EMI (Electro Magnetic Interference) or RFI (Radio Frequency Interference) energy field should be treated with suspicion. EMI is considered any unwanted signal which adversely affects the operation of the MP 5.0 or the audio system. This subject is discussed in Chapter 4.

Electronic equipment such as power amplifiers, power supplies, video monitors, computers, certain synths and samplers must be located away from the MP 5.0 and its associated audio cables. It may be necessary to alter the positions of certain equipment that you feel would cause buzzes or hums in the audio system.

Cleaning

The front panel is a high quality painted surface and the panel lettering is applied using a silkscreen printing technique.

To clean the front panel, wipe the surface gently using a soft lint-free cloth to avoid scratching the panel or markings. Paper towels are not recommended. Commercially available window cleaner solutions may be used; however, the solution should be applied to the cloth and not the panel to avoid the seepage of liquid to the inside of the enclosure.

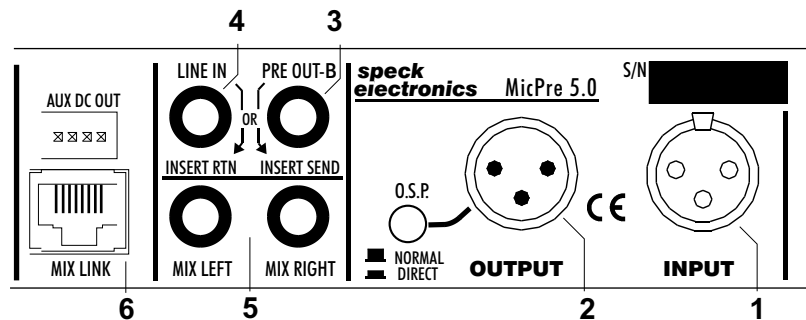
Repacking for shipment

If the MP 5.0 is to be shipped to Speck Electronics for service or repair, attach a tag to the product identifying the owner and indicating the service or repair to be accomplished. Include the model number and serial number of the product. Place the product in the original container if available. If the original container is not available, a suitable one can be purchased from Speck Electronics.

If the original container is not used, wrap the product in heavy plastic before placing in an inner container. Use plenty of packing material around all sides of the product and protect panel faces with cardboard strips. Mark shipping container with "Delicate Instrument" or "Fragile", and insure the shipment for the proper amount.

Note: Speck Electronics cannot be responsible for equipment that arrives damaged or uninsured.

Basic connections to the MicPre 5.0



Input / Output connectors

The XL mic input and XL pre output are the primary connections to the MP 5.0. The XL microphone **input** (1) is designed to receive a signal from any low impedance balanced microphone. The preamp **output** (2) is a line level output and is switchable from "Transformer-Balanced" or "Active-Balanced" output.

Insert jacks

The **Insert Send** (3) and **Insert Return** (4) jacks provides line level interstage access to connect a limiter or equalizer. Any device interfaced to these jacks will be processed after the main preamp gain stage and before the high pass filter section. The processed signal is available at the main XL output, the left and right mix outputs and the left/right output terminals on the mix link connector.

The active-balanced TRS insert jacks serve a secondary function on the MP 5.0. The Insert Send may be used as an additional balanced **Pre Out-B** (3) and the Insert Return may be used as an auxiliary **Line In** (4).

Mix output jacks

The active-balanced TRS left and right **Mix Outputs** (5) provide a low impedance source for connection to the input of any balanced line input.

Wiring the MP 5.0 to unbalanced inputs

The output circuits of the MP 5.0 were designed for balanced lines and should only be connected to balanced inputs. If that is not possible and it is necessary to connect to an unbalanced input, care must be taken not to connect the low (-) terminal to ground. If the low (-) terminal of these outputs are connected to ground, the result will be a high level of audio distortion.

If wiring the **XL Pre Out** for unbalanced operation, the cable should be wired according to the diagram shown below in Figure 1.

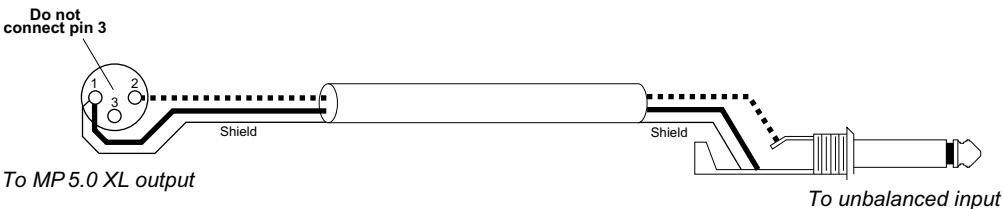


Figure 1. Unbalanced wiring for XL output

If wiring the **Insert Send (Pre Out-B)** or **Mix Outs** for unbalanced operation, the cable should be wired according to the diagram shown below in Figure 2.

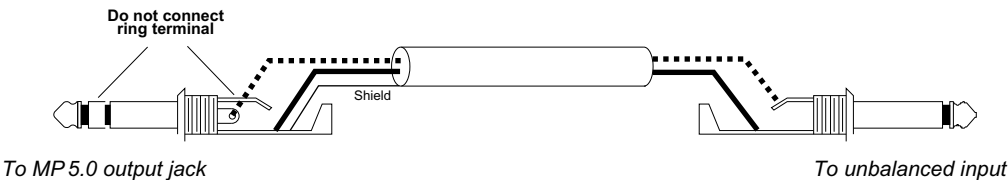


Figure 2. Unbalanced wiring for TRS outputs

Mix Link Connector

The **Mix Link** connector (6) is a RJ45 modular jack that allows the mix section of the MP 5.0 to be combined with additional MP 5.0's. The terminals on the mix link connector include the left/right mix outputs and the left/right summing inputs.

A selection of standard and custom interface cables used to link the MP 5.0's are available from Speck Electronics or may be assembled using standard 8 pin RJ45 modular plugs and 4 conductor cable.

The Pin-outs for the mix link connector are shown below in Figure 3.

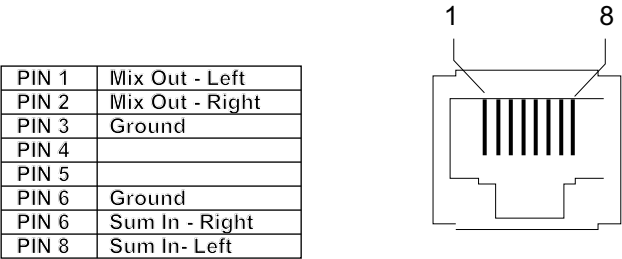


Figure 3. Pin-outs for mix link connector

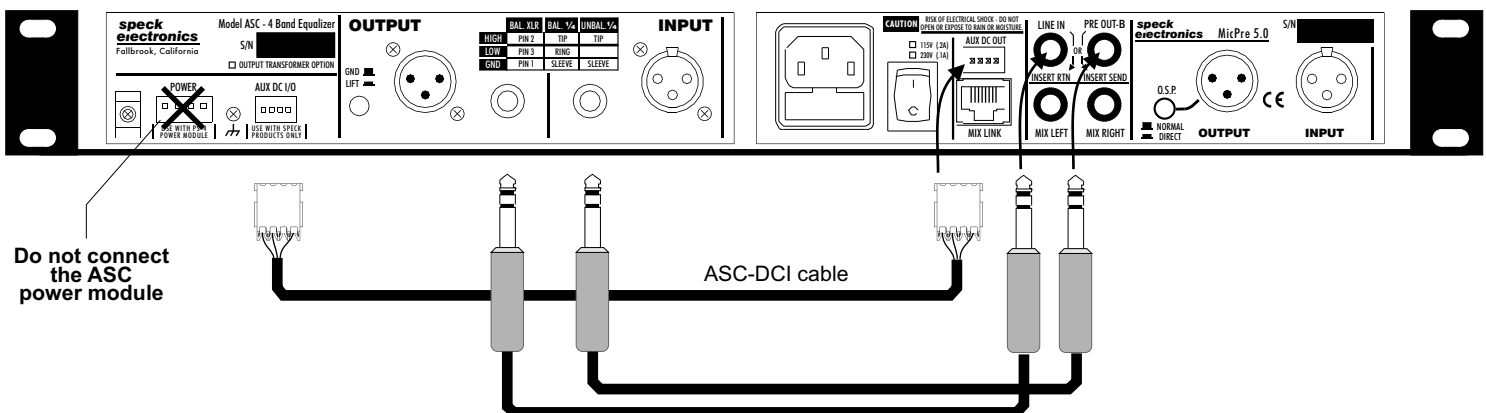
Connecting the MP 5.0 to the Model ASC EQ

With only a few simple connections, the MP 5.0 can be combined with the Speck Electronics "Model ASC" 4 band equalizer to form a single channel strip.

The following illustration shows how to interface the ASC equalizer to the insert send/return jacks of the MP5.0 and how to power the ASC from the Aux DC power source of the MP 5.0.

If you use the optional ASC-DCI cable, do not use the ASC power module for the installation.

Connect one end of the ASC-DCI interface cable (green mark - face up) to the connection marked "Aux DC Out" on the MP5.0. Connect the other end of the interface cable (green mark - face up) to the connection marked "Aux DC I/O" on the ASC. The plugs and respective connectors are keyed so they will fit in only one direction.

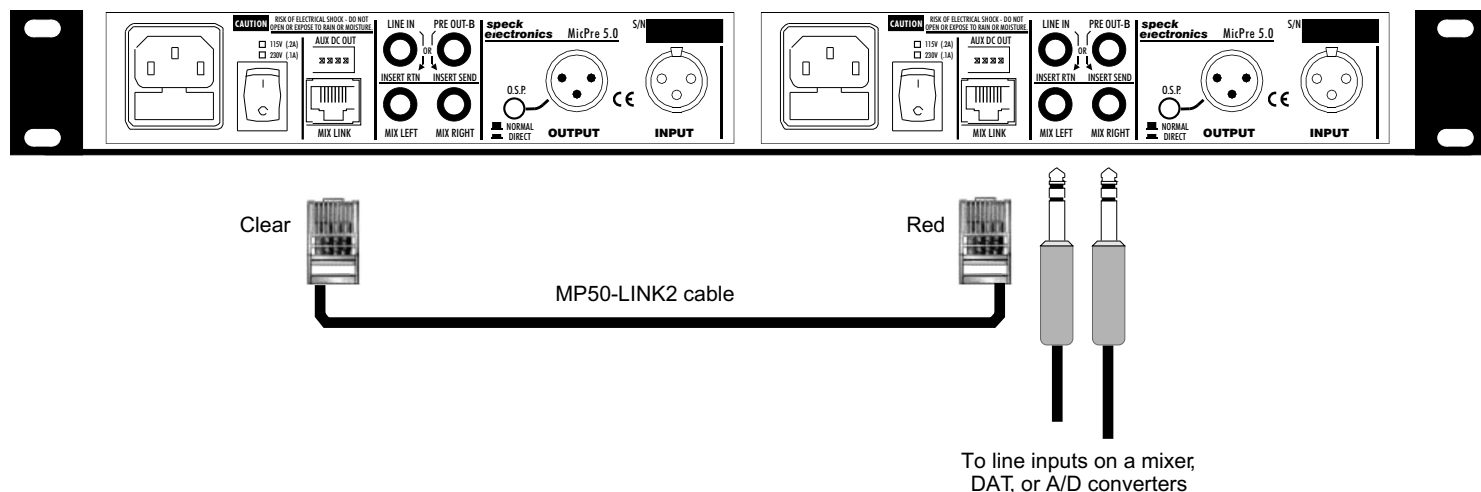


Linking two MP 5.0's

With only a simple connection, the mix sections of two MP 5.0's can be summed together and operate like a multichannel mixer.

To link two MP 5.0's, an optional MP50-LINK2 mix link cable is required. This link cable has RJ-45 modular plugs on both ends. One end has a "clear" colored plug and the other end has a "red" plug. The MP 5.0 that receives the "red" plug is the unit that will become the master.

The illustration below shows how to link two MP 5.0's.

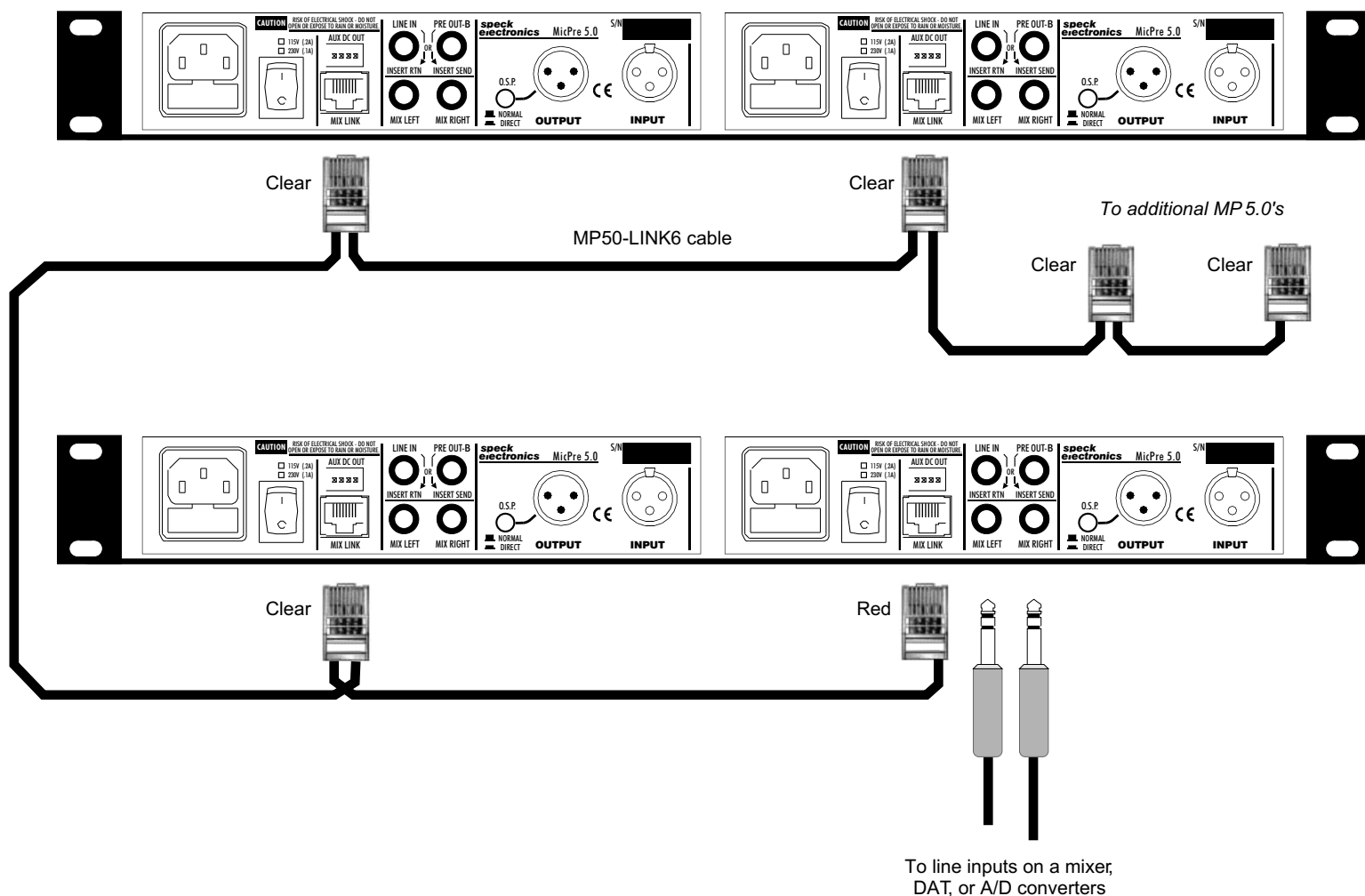


Linking more than two MP 5.0's

With only a simple connection, three or more MP 5.0's can be summed together and operate like a multichannel mixer.

To link the MP 5.0's, an optional mix link cable is required. This link cable has as many as eight RJ-45 modular plugs wired in a "daisy chain" configuration. All of the plugs are a "clear" color except for a "red" colored plug at one end. The MP 5.0 that receives the "red" plug is the unit that will become the master.

The illustration below shows how to link multiple MP 5.0's.

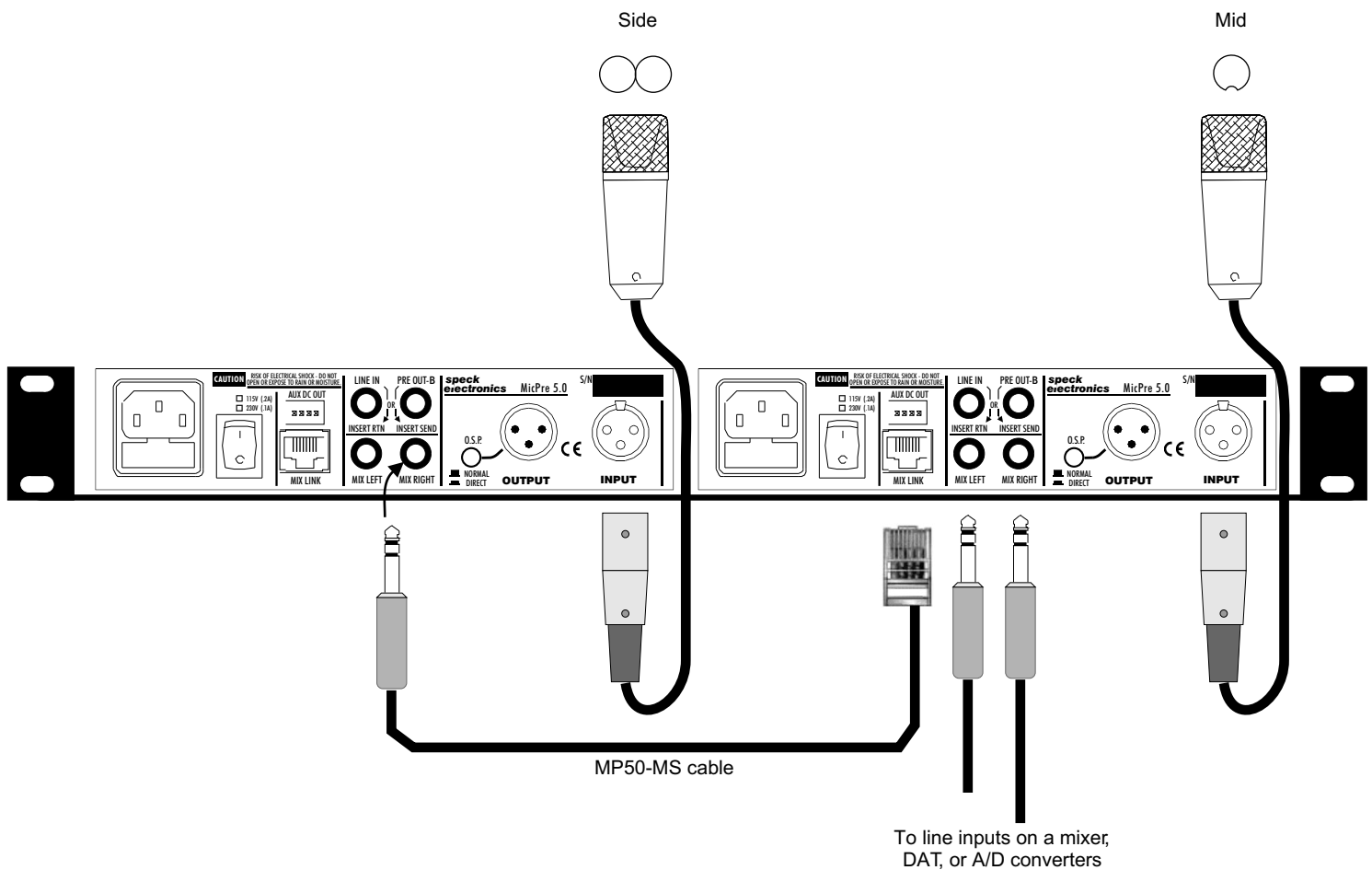


Interfacing two MP 5.0's for M-S operation

With only a simple connection, two MP 5.0's can be linked together for M-S (Mid-Side) mic'ing.

To link MP 5.0's for M-S mic'ing, an optional link cable is required. This link cable has a RJ-45 modular plug on one end, and a TRS 1/4" plug at the other end. The MP 5.0 that receives the RJ-45 modular plug is this unit that will become the master.

The illustration below shows how to link two MP 5.0's.



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Operation

General

In this section we hope to give you basic information on the operation of the MicPre 5.0 and adequately describe its controls, switches, and connectors.

The information in this section of the manual is intended to help with the technical process when using your MP 5.0. Words alone could not adequately describe how to adjust the controls for every situation you might encounter with the MP 5.0. You should experiment with settings and micing techniques to achieve the best results for any particular situation. Your ears should be your best gauge of how to adjust the settings on the MP 5.0 to make the sound fit your requirements.

Default Control Settings

Before any attempt is made to operate the MP 5.0, it would be a good idea to set all the controls to their neutral positions. This gives you a reference point to work from when adjusting controls and switches. The Gain, HP filter, and Mix level controls should be set to their full counter-clockwise setting. The Trim and Mix Pan controls should be set to their "0" center detented position. All pushbutton switches should be set to the "Out" position.

When any future reference is made to the controls or switches of the MP 5.0, it will be assumed that they have been set to their neutral positions.

Signal flow diagram

Use this signal flow diagram shown below (Figure 4) as a reference when reading the descriptions of the controls and connectors that follow in this chapter.

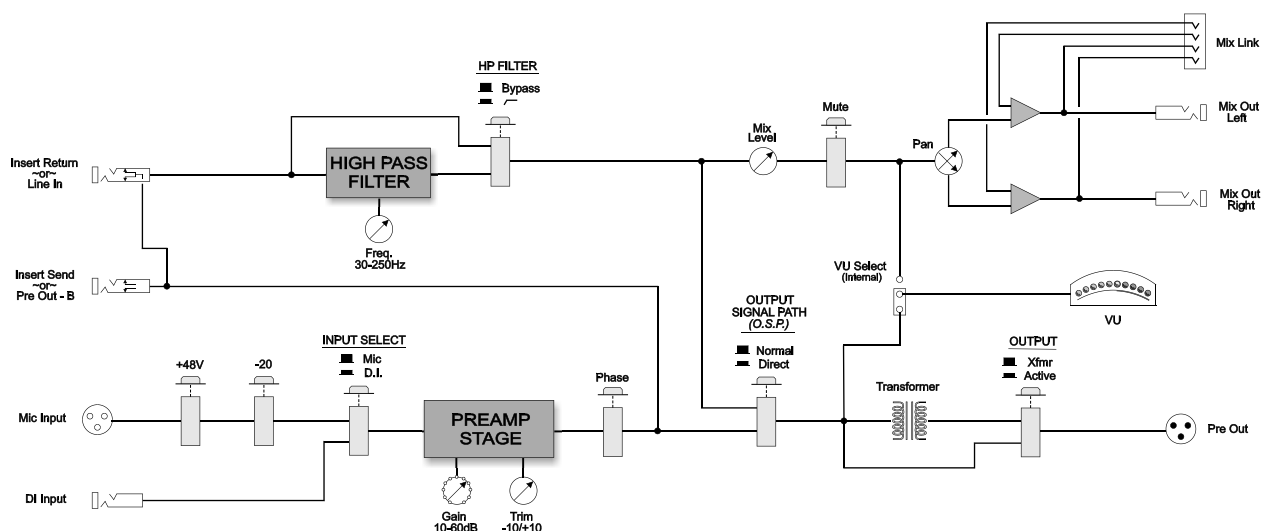
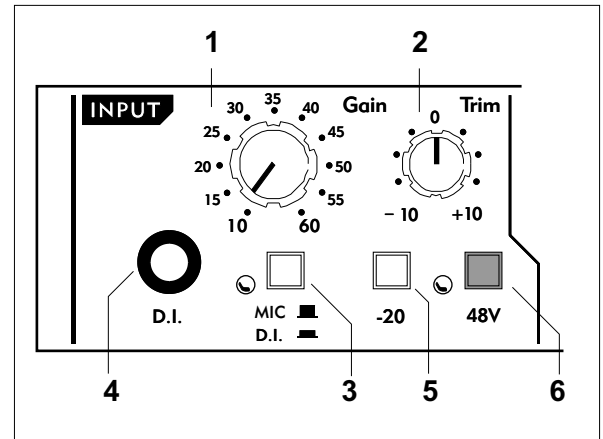


Figure 4. MicPre 5.0 signal flow diagram



Front Panel Controls

- 1. Gain switch** This 11 position rotary switch adjusts the mic gain in 5dB steps from +10dB to +60dB. When the **Mic/DI** switch is selected for D.I., the gain range is from -10dB to +40dB in 5 dB steps.
- 2. Trim control** The trim control provides -10dB to +10dB of continuous adjustment with a center detent of 0dB. A total gain of 70 dB is available when the **Gain** adjust is set to 60, the **Trim** is set to +10, and the **-20 Pad** is disabled.
- 3. Mic/DI select** This switch will select the microphone **Input** on the rear panel or the 1/4" **D.I.** input jack on the front panel. A yellow LED indicates the operation of the D.I. input jack.
- 4. D.I. input jack** This Direct Input (D.I.) jack will accept a balanced or unbalanced input signal and is selected when the **Mic/DI** switch is depressed. This input may be used for electric guitar, bass, or keyboards.
- 5. 20dB Pad** When this switch is depressed, the microphone input signal is reduced by 20dB. The D.I. input is unaffected by this switch.



Application: There may be occasions when the minimum gain settings (10 on the gain switch and -10 on the trim) is just not low enough. This can happen when the mic is producing a very high output.

6. 48V Phantom

The phantom switch supplies a DC voltage of +48 volts to pins 2 and 3 of the XL mic input connector for powered microphones that do not use their own external power supply. A red LED indicates the operation of the phantom power.

Important information regarding phantom power

Before using the +48 Phantom power switch, always follow these rules:

Always check the user guide that comes with your microphone regarding the use of phantom power. There is a potential to damage your microphone if instructions are not followed. In fact, most ribbon microphones can be permanently damaged with 48V phantom power.

Always connect your powered microphone to the XL input before depressing the phantom power switch.

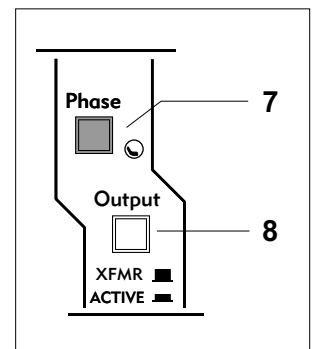
Always be mindful that any audio gear that connects to the output of the mic preamp (mixer, etc.) should be muted before enabling the phantom power switch. When the phantom power switch is depressed, it not only applies +48 volts to the powered microphone, but also induces a small voltage into the mic preamp. This small voltage has the potential, when amplified, to cause a very loud "thump" that can damage a power amp and speakers.

7. Phase switch

This switch reverses the polarity of the mic input or D.I. input signal by 180 degrees. A red LED indicates the operation of the phase switch.

8. Output select switch

This switch will select either a "transformer-balanced" output or "active-balanced" output for the main XL pre output. The selection of this switch does not affect the Pre Out-B or the Mix Outputs.

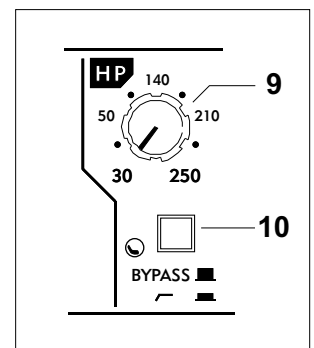


High Pass Filter Section

This High Pass filter section includes a variable frequency control and a bypass switch. The HP filter is helpful at eliminating unwanted low frequency noise or just contouring the audio band to roll off low frequency information.

9. HP frequency control

This control adjusts the frequency from 30Hz (Full CCW) to 250Hz (Full CW) with a slope of 12dB/octave.

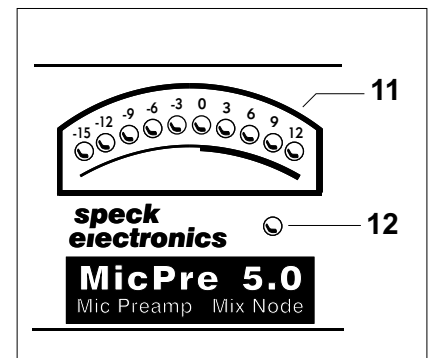


10. Filter bypass switch

This switch is used to enable or disable the High Pass filter circuit. In the “out” position, this switch completely bypasses all filter circuitry. When this switch is depressed, the HP filter is enabled. A yellow LED indicates the operation of the High Pass filter.

11. VU Meter

This 10-segment VU (volume units) meter will indicate the relative output level of the mic preamp signal and is sensitive from -15dB to +12dB in 3dB increments. A meter reading of zero VU reflects a preamp output level of +4dBu, the industry professional standard. This VU meter circuit was designed to approximate the ballistics of a "Taut Band" analog style VU meter.

**12. Power indicator**

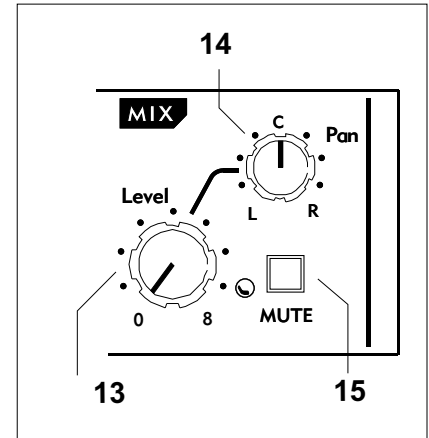
This LED will illuminate green when the power is applied to the MP 5.0.

The Mix Section

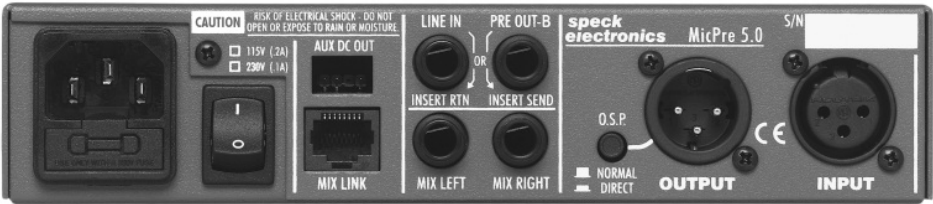
The mix section of the MicPre 5.0 provides a separate left and right mix output with level, pan and mute. The source of the mix level may be the mic input, the DI input, or any line level signal that is connected to the line in jack on the rear panel. The mix section feeds the left and right mix outputs on the rear panel as well as the left/right terminals on the mix link connector. The adjustment to the mix section does not affect the signal at the main XL output or the Pre Out-B.

With only a simple interface cable, this mix section, or “Mix Node” can be linked with any number of MP 5.0's to form a fully integrated mix section. In many situations such as desktop or location recording, this expandable feature of the MP 5.0 can eliminate the need for a separate audio mixer.

- 13. Mix level control** This control adjusts the level being sent to the mix outputs. The operation of this control does not affect the signal at the main XL output connector.
- 14. Mix pan control** The pan control allows the mix signal to be panned anywhere in the stereo perspective.
- 15. Mix mute switch** Depressing this switch removes the mix signal from the left/right mix output and the left/right terminals of the mix link connector.



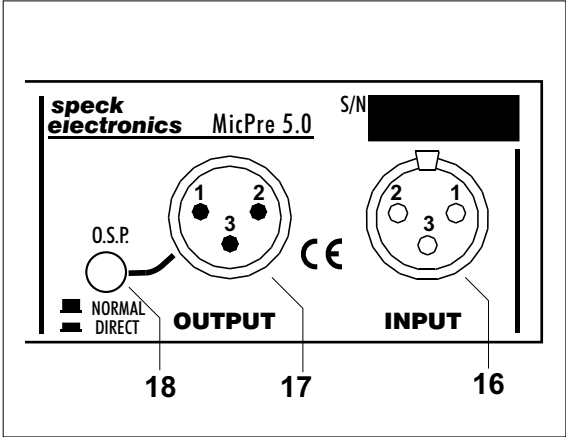
Muting the mix section will not affect the signal at the XL pre output, the Pre Out-B, or any signal returning into the left/right summing input terminals of the mix link connector. A green LED indicates the operation of the mute switch.



Rear Panel

16. Microphone input

This microphone input XL connector is used to connect a low impedance microphone. The mic input is selected with the **Mic/DI** switch on the front panel. Before connecting your microphone, it is recommended to set the **Gain** to the 10dB setting and the **48V** phantom power switch to the off position. The mic input XL connector is wired as shown below in Figure 5.



HIGH	PIN 2
LOW	PIN 3
GROUND	PIN 1

Figure 5. Mic input wiring

17. Preamp output

This is the main output of the preamp. This XL output may be “Transformer-Balanced” or “Active-Balanced” depending on the switch setting on the front panel. The pre out XL connector is wired as shown below in Figure 6.

HIGH	PIN 2
LOW	PIN 3
GROUND	PIN 1

Figure 6. Pre output wiring

Wiring the MP 5.0 to unbalanced inputs

Do not use the XL preamp output with an unbalanced input. When wiring unbalanced cables and connectors, care must be taken not to connect the low terminal (pin 3) to ground.

Any unbalanced XL plug interfaced to this connector should be wired according to the diagram shown below in Figure 7.

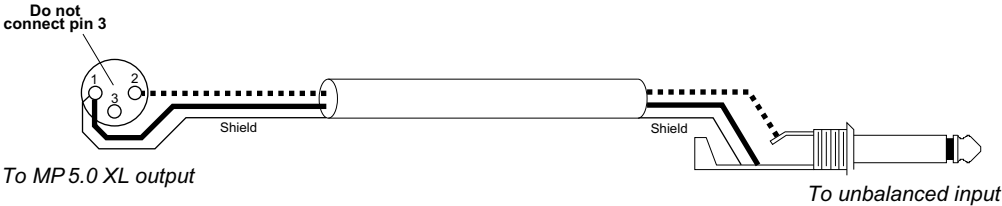


Figure 7. Unbalanced wiring for XL output

18. O.S.P. (Output Signal Path)

The Output Signal Path (O.S.P) switch gives you the choice of two paths for the signals originating at the mic or D.I. inputs and exiting at the XL preamp output.

When set to the “Normal” position, the mic or D.I. signal will pass through the main preamp stage, the insert send and return jacks, and high pass filter section before passing to the XL output connector. The "Normal" signal path is shown with the bold line in the flow chart below (Figure 8).

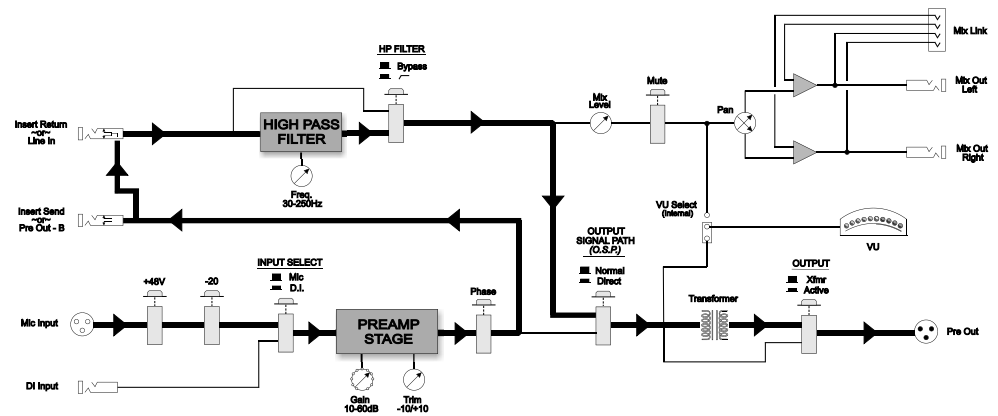


Figure 9. Output signal path (O.S.P.) "Normal" setting

When the O.S.P. switch is set to the “direct” position, the mic or D.I. signal passes only through the main preamp stage before passing to the pre output XL connector. The “Direct” switch setting bypasses the insert send and return jacks and the filter section. The "Direct" signal path is shown with the bold line in the flow chart below (Figure 9).

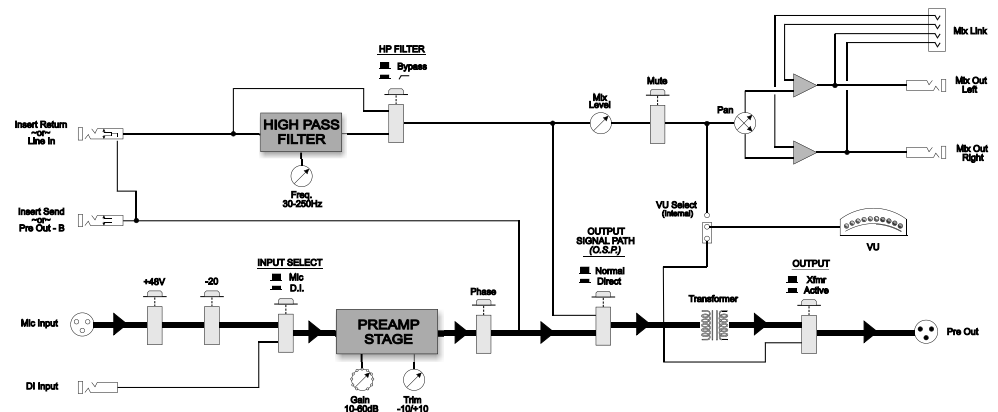


Figure 9. Output signal path (O.S.P.) "Direct" setting

19. Insert Send and Insert Return jacks

The MP 5.0 provides balanced TRS insert send and return jacks for line level interstage access after the mic preamp stage and before the high pass filter section.

The insert jacks may be used to connect limiters or equalizers. The Insert Send jacks are wired as shown below in Figure 10.

HIGH	TIP
LOW	RING
GROUND	SLEEVE

Figure 10. Wiring for insert send and return jacks

Wiring the MP 5.0 to unbalanced inputs

Do not use the Insert Send (Pre Out-B) with an unbalanced input. When wiring unbalanced cables and connectors, care must be taken not to connect the low terminal (ring) to ground.

Any unbalanced 1/4" plug interfaced to this jack should be wired according to the diagram shown below in Figure 11.

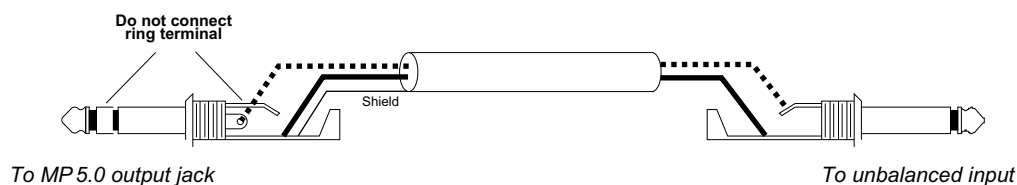


Figure 11. Unbalanced wiring for TRS outputs

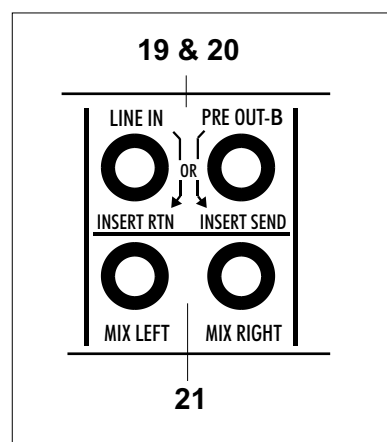
20. Pre Out-B and Line In jacks

The insert send and insert return serve a dual purpose on the MP 5.0. The insert send may be used as **Pre Out-B**. This signal is identical to the main pre out except it is "active-balanced" and is not affected by the **Xfmr/Active** switch on the front panel.

The insert return may be used as a balanced **Line In** for routing a signal to the mix section.

Split Signal Path

The MP 5.0 has the ability to split into two discrete signal paths; A mic or D.I. to the main XL output, and a line in signal to the left/right mix outputs. The **O.S.P.** switch must be set to the "Direct" position to use a split signal path on the MP 5.0.



The signal flow diagram below (Figure 12) shows two separate signal paths with the "mic to pre out" shown in a dashed line and the "line in to mix out" as a solid bold line.

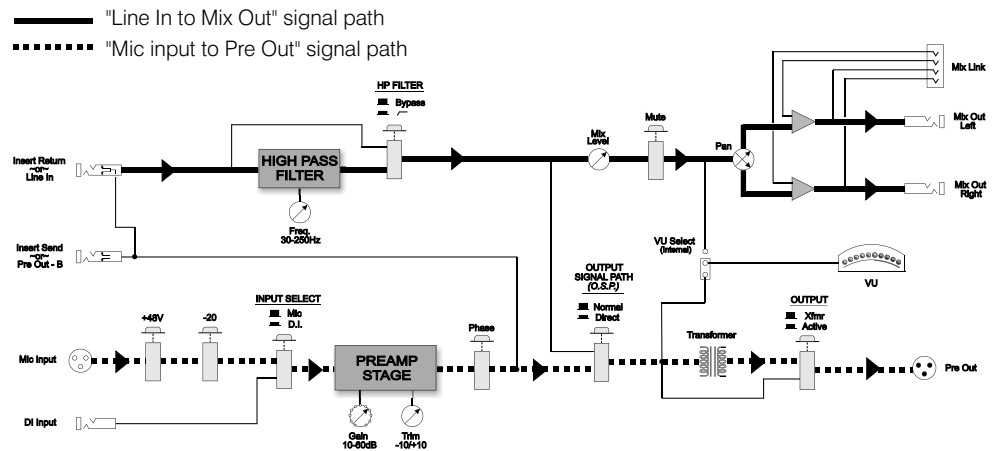


Figure 12. Flow diagram for split signal path

21. Mix output jacks

These "Active-Balanced" TRS jacks are the left and right outputs for the mix section. The signal present at these jacks are adjusted by the mix level and pan controls on the front panel.

The mix outputs are available for interface to the input of an external console, HDR, DAW, etc. The mix out jacks are wired as shown below in Figure 13.

HIGH	TIP
LOW	RING
GROUND	SLEEVE

Figure 13. Wiring for mix output jacks

Wiring the MP 5.0 to unbalanced inputs

Do not use the mix out jacks with an unbalanced input. When wiring unbalanced cables and connectors, care must be taken not to connect the low terminal (ring) to ground.

Any unbalanced 1/4" plug interfaced to this jack should be wired according to the diagram shown below in Figure 14.

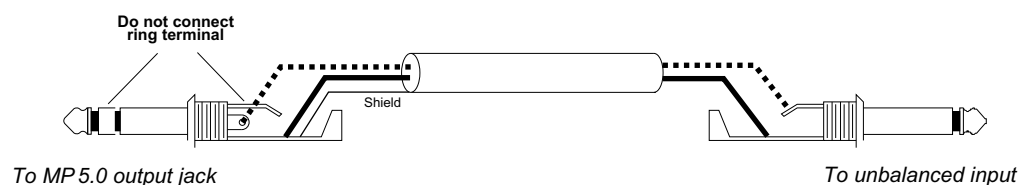
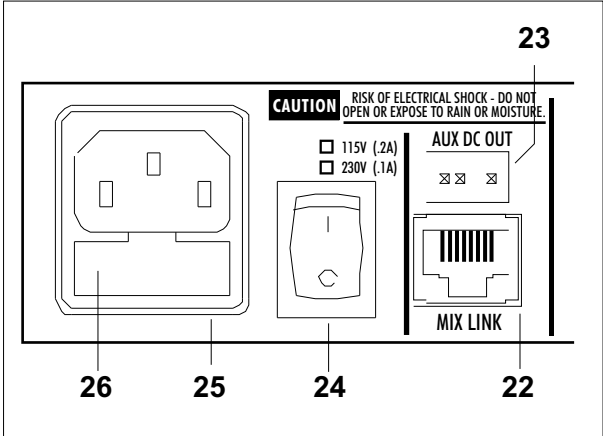


Figure 14. Unbalanced wiring for TRS outputs

22. Mix link connector

The mix link connector allows the mix section of the MP 5.0 to be combined with any number of MP 5.0's to form a fully integrated mix section. The mix link connector can also be used to connect two MP 5.0's for M-S (mid-side) mic'ing.



Refer to page 8 for mix link pin-outs and pages 9 through 12 for examples of MP 5.0 interfaces.

23. Aux DC output connector

This connector is available to provide a source of dual regulated DC voltage to the Speck ASC equalizer and future Speck products. An optional DC interface cable (p/n ASC-DCI) and instructions for connection are available from Speck.

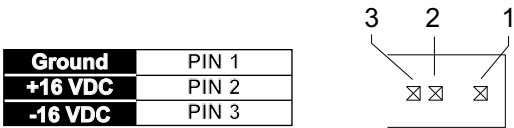


Figure 15. Pin-outs for Aux DC out

24. Power switch

This power switch applies AC (mains) power to the MP 5.0. An LED on the front panel will illuminate when the power is “On”.

25. AC power inlet

This AC (mains) power inlet accepts a standard IEC power cord. Before connecting the power cord, make certain that power cord matches the operating voltage shown on the rear panel above the power switch.

The 120 volt model (Model MP5.0-NA) is designed to operate from 100 or 120 volts, 50/60Hz. The 230 volt model (Model MP5.0-EU) is designed to operate from 220, 230, or 240 volts, 50/60Hz.

The ground pin of the power cord is internally connected to the chassis. For safety reasons, **do not lift the ground on the power plug by using a ground lift adapter.**

26. Fuse

The AC power inlet has integral fuse holder that uses a 5mm x 20mm slow blow type fuse. To avoid the risk of fire, always replace the fuse with the correct value fuse as marked on the rear panel; .2 amp for the 120V model, or .1 amp for the 230V model.

Specifications

Gain Range (Mic) 70 dB total	+10 to +60dB in 5dB steps -10/+10 variable trim
Gain Range (D.I.)	-20 to +40 dB in 5 dB steps
THD+n (Gain +40, Output +12dBu)	.002% nominal
Noise EIN (22Hz-22kHz) (150 ohm load, 60dB gain)	-126 dBu
Frequency Response	10Hz-200kHz (+0/-3dB)
Mic input impedance	4.6k ohms
D.I. input impedance	50k ohms
Maximum input level	+18dBu (without pad) +30dBu (with 20dB pad in)
Max. output level (10k load)	+28dBu at active outputs +24dBu at transformer output
HP Filter	30Hz-250Hz (12dB/octave)
Phantom Power	+48V regulated
Dimensions	HxWxD=1.75" x 8.5" x 8.00" (44mm x 216mm x 203mm)
Weight	5 Lbs. (2.27kg)
Power Requirements	100-120 VAC 50-60Hz 220-240 VAC 50-60Hz

Wiring & Other

General

The following information is not specific to the operation of the MicPre 5.0, but rather general information regarding the “care and feeding” of an audio system.

A general discussion about AC, AC grounding, audio grounding, EMI, and quality wiring is discussed in this section. These subjects are very often overlooked or misunderstood, and should be given consideration when interfacing your equipment to any audio product.

Start simple

A “quality” installation is essential when wiring any audio system. When the time comes to actually interconnect your equipment, proceed slowly. Interfacing the many pieces of electronic equipment to your MP 5.0 and audio system should be a logical, methodical process.

Start by connecting only your headphones or monitor power amp to the mixer, and then add one line signal to the mixer at a time; carefully listening and monitoring your progress. If a problem arises, such as a buzz, hum, intermittent signal, or nonexistent signal, stop at that point and solve the problem before proceeding.

Audio Cable

Due to the high performance of the MP 5.0, it is recommended that you use only the highest quality audio cable. A high quality cable by definition, is a cable that provides good mechanical strength, high microphonic noise immunity, high frequency response, low crosstalk and 100% shielding ability. All audio cable used with the MP 5.0 should be a 3 conductor foil shield type (2 inner conductors and a shield drain conductor). It is not recommended that the 2 conductor “off the shelf cables” be used.

Connectors

All wire and cable interfaced to the MP 5.0 should be terminated with high quality connectors. A 1/4" plug or XL connector should make a positive connection to its respective mating jack and provide adequate strain relief to its cable. All connectors should also have a metal shell to provide 100% shield for exposed conductors.

Feel free to check with Speck Electronics for recommendation when selecting cable and connectors.

AC Distribution and Safety

Proper AC grounding

When you are evaluating voltage and current requirements for your audio system, it is important that your MP 5.0 and/or audio system does not exceed the capacity of your AC service. You should make certain that the earth (green) wire for the AC system makes a reliable earth connection, and determine as best as possible that the AC system is free of noise that could generate unwanted audible sounds or cause problems in microprocessor based equipment.

Quality AC system

When using a larger rack system it is recommended that a dedicated and isolated AC service be provided. This service should have its own AC wires, isolated receptacle, and breaker and not be shared with other unrelated equipment.

Even with an isolated AC system, it may still be necessary to make use of surge protectors, line filters, isolation transformers, or all of the above. Power conditioners should be selected with care, since they sometimes generate undesirable switching noises in audio systems.

AC distribution

When connecting many pieces of electronic equipment to an AC system it is important that the AC is properly distributed. It is better to connect all plugs to a common AC source than to have AC receptacles in different locations.

When installing a large audio system, it may be necessary to consult a qualified electrician that is familiar with the specialized style of electrical wiring required for recording studios.

Clock noise and AC

Clock noise is one of the greatest enemies of the audio racks AC system. If a computer or any microprocessor based device (most samplers and effects are) emits or somehow couples its clock signal with the neutral or earth of its own power cable, it will contaminate your AC system and carry the clock noise into other equipment; almost always with undesirable results.

Safety earth connection

The AC earth connection exists to protect you, your equipment and possibly your building from an electrical disaster. In a properly wired system, if a 120 volt AC wire were to break within your equipment's chassis, it should make contact with the Safety Earth Wire that is connected to the chassis, and blow the fuse or trip the circuit breaker until the problem has been corrected.

Given the same circumstances, if the AC safety ground has been defeated with a ground lift or the AC service is incorrectly wired, the equipment's chassis and quite possibly everything attached in that rack would be "live" with 120 volts.

Audio earth

In an electronics context, an earth provides a path for unwanted EMI noise to be carried away from your audio equipment. If you disable your earth with a ground lift or do not have a reliable earth connection, the unwanted noise (EMI or RFI), will find an electrical path of least resistance. That will most likely be your audio equipment and would result in unwanted buzzes or hums.

Proper Grounding and shielding

In order for any audio signal to get from "Point A" to "Point B" requires a cable with a minimum of 2 conductors. One conductor is the hot, or high, or whatever you are familiar with; the other conductor is the ground or common. Additionally, all audio wires must be protected from environmental occurrences such as EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) with an outer shield. An outer shield protects the 2 inner conductors from outside interference, and prevents that cable from inducing its signal onto adjacent audio cables.

One common misconception is that the shield of a cable should act as the common. This may be acceptable for guitar cords or semi-professional applications, but not for professional applications. The audio signals must be carried only by the 2 inner conductors and the shield must act only to cover these 2 conductors without transmitting the signal from one location to another. It is recommended that the shield be attached to the common (ground) at one connector's end, and the shield not be connected at the other connector's end. It is recommended that all shields be connected at the mixer end, and the shields not be connected at the other ends (synths, effects, power amps, etc.).

If a patchbay is utilized in your mixing system, the rules for shielding change. With a patchbay, normally all shields are connected at the patchbay jacks, and not connected at the mixer or external audio equipment.

EMI and RFI

The occurrence of EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) in a contemporary studio system should be of great concern and not overlooked when installing the MP 5.0. EMI is defined as any unwanted signal which adversely affects the operation of the MP 5.0 or your audio system.

Stated simply, the undesirable effects of EMI may be perceived as a low frequency smooth sounding 60Hz hum; a low frequency "edgy" sounding 120Hz buzz; or a higher frequency "whine" caused by the timing circuits in microprocessor based devices. Almost every electronic device generates some amount of EMI emissions. These emissions can be transmitted as electromagnetic radiation or simply conducted through audio cables and power cords. In the same respect, most electronic devices are also very susceptible to the EMI emissions generated by other electronic devices.

Sources of EMI

There are natural and man made sources of EMI that you can't do anything about. These sources include radio, TV, and radar transmitters, as well as motors, lights, and computers. Even the Sun and atmospheric conditions can be contributors to noise that you experience in your audio system.

Reducing EMI

There are generally 3 elements that must be present for EMI to exist. These include the source of the EMI (conducted or radiated), the propagation medium by which EMI is transmitted (directly on the cables or through the air), and the receptor that suffers the adverse affects of EMI. If any of these 3 elements are eliminated or reduced, the EMI interference will be eliminated or reduced.

The more electronic equipment operating within a studio or equipment rack, the higher the EMI emissions. The more audio cable and low level audio equipment that exists within the same proximity, the greater possibility of unwanted noise. The result of EMI in an audio system manifests itself as a buzz, hum, whine, or all three.

The most common EMI occurrence in an audio system is radiated emissions from microprocessors in computers, samplers, and magnetic field sources from transformers and power supplies.