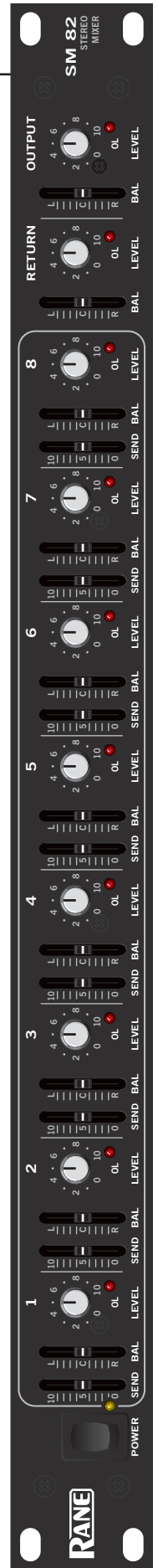




SM 82

STEREO LINE MIXER



IMPORTANT SAFETY INSTRUCTIONS

For the continued safety of yourself and others we recommend that you read the following safety and installation instructions. Keep this document in a safe location for future reference. Please heed all warnings and follow all instructions.

Do **not** use this equipment in a location where it might become wet. Clean only with a damp cloth.

This equipment may be installed in an industry standard equipment rack. We recommend that all mounting holes be used, providing the best physical support. The equipment may be used as a table top device, although stacking of the equipment is dangerous and not recommended.

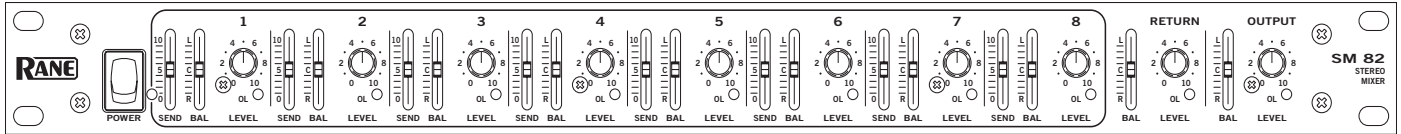
Do not directly block any of the ventilation openings. If rackmounting, please provide adequate ventilation. Equipment may be located directly above or below this unit, but note that some equipment (like large power amplifiers) may cause an unacceptable amount of hum or may generate too much heat and degrade the performance of this equipment.

Protect the power cord and plug from damage caused by being walked on or pinched. Protect the line cord, where it exits the unit, from excessive strain. Only use attachments and accessories specified by Rane.

Unplug this equipment during lightning storms or when unused for long periods of time.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug damage, spilled liquid, fallen objects into an opened chassis, exposure to rain or moisture, a dropped unit, or abnormal operation.





QUICK START

No one likes to read manuals. Everyone likes to just start pushing buttons and turning knobs until the desired results magically emerge. That's usually OK, and with a very few exceptions, damage is unlikely to result from such procedures with the SM 82.

This product is quite obvious: Input **LEVEL** controls make Inputs louder or not, the stereo **SENDS** make things happen at the **LOOP SEND** outputs, and so on. No real magic there. You should be aware, however, that if you want to connect a mono source to the SM 82, use only the **LEFT** Input of a channel so that the mono source will drive both the Left and the Right channels.

Set the levels of the mixer so that the red lights stay off. If they come on, you are overdoing it and distortion will result.

Never connect anything except an RS 1 or other approved Rane AC power supply to the thing that looks like a telephone jack on the rear of the SM 82. This is an AC input and requires some special attention if you do not have an operational power supply *exactly* like the one that was originally packed with your unit. See the full explanation of the power supply requirements on page Manual-3..

SM 82 CONNECTION

When connecting the SM 82 to other components in your system for the first time, *leave the power supply for last*. This will give you a chance to make mistakes and correct them before any damage is done to your fragile speakers and ears.

INPUTS

The SM 82's Inputs are unbalanced. This means that standard 1/4" connectors on the ends of any good quality cable will work well between your signal sources, signal processing and amplification. For best rejection of nasty things like hum and RF, keep input cables under 10 feet (3 meters) in length.

Most sources give you the choice of stereo or mono output. The mixer gives you the same choice. You will note that nomenclature has been placed beneath the input jacks indicating which is **RIGHT** and which is **LEFT (MONO)**. If a source is plugged only into the Left jack and not into the Right, both Right and Left channels will be fed with the Left Input. This allows the use of either stereo or mono sources.

OUTPUTS

The SM 82 offers balanced main outputs only. This means that you may use them as either balanced or unbalanced, the choice being made by the way the connectors are wired. It's a good idea to always use a TRS or stereo connector in the outputs no matter which mode you are using. If a "mono" connector is used, inserting it into the output will short the ring (-) to ground and could conceivably cause a small amount of distortion to be placed on the tip (+). While this is not destructive, it may be significant enough to be audible. Balancing therefore requires

that both tip (+) and ring (-) be wired to the following device. Unbalanced requires only tip and sleeve connected, leaving the unused ring open.

EFFECTS DEVICES

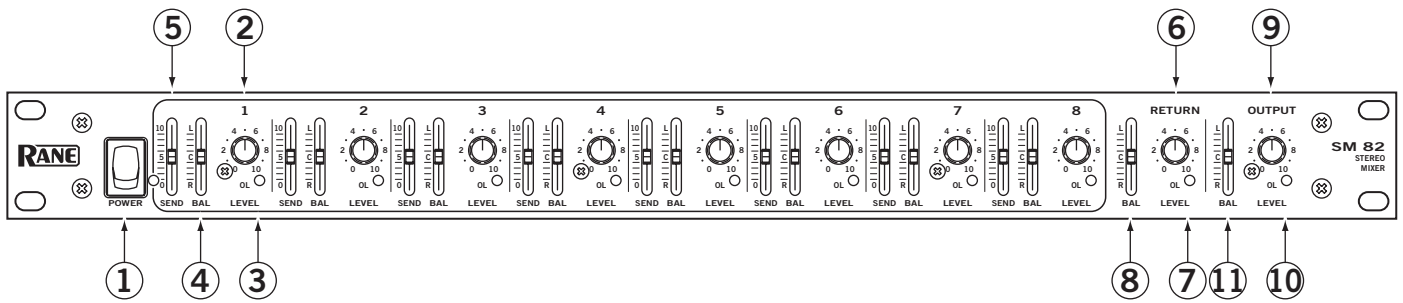
External devices which might be used could be either mono in and out, while some may be mono in and stereo out, while still others may be stereo on both ends. The SM 82 easily accommodates all of these varieties. If your effect is mono on both ends, connect its input to the SM 82 **LEFT LOOP SEND** and the effect's output to the SM 82 **LEFT LOOP RETURN**. This configuration will sum Right and Left Loop Outputs to the mono effect input and will sum the mono effect output to the Left and Right Input buses. A mono-in stereo-out device would connect to the loop outputs in the same way; however the stereo outputs connect to the respective **LEFT** and **RIGHT LOOP RETURNS**.

EXPANDING

Connecting two or more SM 82s together to achieve more than eight stereo Inputs requires that a stereo cable (tip, ring, sleeve) be connected between the **MAIN EXPAND OUTPUT** of the first mixer and the **MAIN EXPAND INPUT** of the second. All 32 inputs will then appear at the main **OUTPUT** of mixer number two. Only the first sixteen Inputs will be available at the main Outputs of mixer number one. Should you wish to have all Loop buses tied, connect the **LOOP SENDS** of mixer one to the **LOOP EXPAND INPUT** of mixer two. All sixteen stereo sends will then become active at the **LOOP SENDS** of the second mixer.

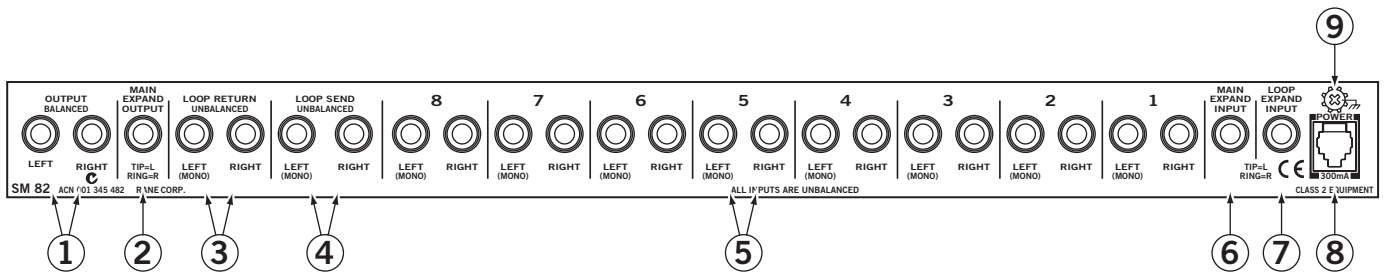
WEAR PARTS: This product contains no wear parts.

FRONT PANEL DESCRIPTION



- ① **POWER switch:** Depress the upper portion of this switch to turn the unit on (with power supply plugged in); depress the lower portion to turn the unit off. Depressing the center portion of the switch causes acute indecision stress to the switch's personality profile, which in turn depresses it. To alleviate this condition, the switch must be "turned on", so to speak.
- ② **Input LEVEL control:** is a rotary stereo attenuator that adjusts the amount of both Left and Right signals applied to the Input. Its output is routed to the main summing amplifier for mixing with all other Inputs. The unity gain position of this control is located at "7.5."
- ③ **Input OVERLOAD indicator:** glows red whenever the Input's output exceeds a level 4 dB below clipping, letting you know it's a good idea to turn this Input down a bit.
- ④ **Input BALANCE control:** In its center detent, Left and Right signals to each channel are allowed to pass at their original relative levels, therefore preserving the stereo image from instrument connected to the Inputs. When the control is moved vertically toward the "L" position, the Right channel level is *decreased* while the Left channel level is *maintained*. The opposite occurs if the control is moved from the detent down toward the "R". When a mono input is used (no plug in the RIGHT Input jack), the BAL control becomes a PAN control, panning the mono signal from the Left to Right channels.
- ⑤ **Input SEND Level control:** determines the amount of *Post-Fade* stereo input is fed to the auxiliary buses. Each Input's stereo SEND is summed on this bus and is available at the respective LEFT and RIGHT LOOP SENDS on the rear of the mixer.
- ⑥ **RETURN LEVEL control:** is a rotary stereo attenuator that controls the amount of Return which is to be added to the Main Output. The unity gain position of this control is located at "7.5."
- ⑦ **RETURN OVERLOAD indicator:** glows red whenever the return levels exceed a level of 4 dB below clipping.
- ⑧ **RETURN BALANCE control:** is a vertical slider that controls the effect or source connected to the LOOP RETURN in the same way the Input BALANCE controls work (see ④ above).
- ⑨ **OUTPUT LEVEL control:** is a rotary stereo attenuator that controls the final signal Level at the main OUTPUT jacks. The unity gain position of this control is located at "7.5".
- ⑩ **OUTPUT OVERLOAD indicator:** glows red any time the output level exceeds 4 dB below clipping.
- ⑪ **OUTPUT BALANCE control:** is a vertical slider that operates in the same fashion as the BALANCE control described in item ④ above. It however, determines the relative levels of the LEFT and RIGHT main OUTPUTS only.

REAR PANEL DESCRIPTION



- ① **Main OUTPUT:** These balanced Tip-Ring-Sleeve jacks are used to connect the main Outputs of the SM 82 to a power amplifier or to additional signal processing. As is the standard with all Rane balanced outputs using ¼" TRS jacks, the Tip is (+), the Ring is (-) and the Sleeve is ground.
- ② **MAIN EXPAND OUTPUT:** This ¼" TRS stereo (Tip = left, Ring = right) Output jack connects one SM 82 to another for the purpose of expanding the number of Inputs available in the system. Only a stereo plug and cord should be used. To do otherwise will cause loss of Right channel signal and possibly distortion to the Left channel. This Output also serves as a fixed pre-fader level useful as tape outputs or other applications.
- ③ **LOOP RETURN:** These ¼" aux returns may connect the output of a reverb or other effect unit to the Loop bus of the SM 82. If no effect is used, they can be used as a *ninth* stereo Input to the mixer in addition to those described in ⑤. As with the other stereo Inputs, mono signal may be connected to the LEFT input to obtain two channel mono operation.
- ④ **LOOP SEND:** This pair of ¼" jacks may drive an effect or similar device which is to be returned to item ③ above. If a mono device is used, both the Left and Right Send channels of the SM 82 are summed together and presented at the LEFT Output if nothing is inserted in the RIGHT Output.
- ⑤ **Channel Input jacks:** consist of Eight pairs of unbalanced ¼" tip-sleeve jacks, used to connect any line-level signal source to the SM 82. As indicated, only the LEFT is to be used if the Input is mono and should therefore appear in both Left and Right channels, depending on the position of the front panel BALANCE control which is now effectively a PAN.
- ⑥ **MAIN EXPAND INPUT:** A ¼" TRS stereo Input jack may link two or more SM 82s together. The Left input is on the Tip, Right on the Ring and the Sleeve is ground. This may also be used to sum any fixed-level stereo signal into the Main Outputs, producing a *tenth* stereo Input when added with ⑤ and ③. As in ② above, use only a stereo TRS cable.
- ⑦ **LOOP EXPAND INPUT:** Another ¼" TRS stereo Input, expands the stereo Loop buses of two SM 82s similar to the MAIN EXPAND OUTPUT in ②. A stereo Tip-Ring-Sleeve cable must be used for this application. Connect the LEFT and RIGHT LOOP SENDS (④) of the first unit to the LOOP EXPAND IN of the second unit. (Tip = left; Ring = right.)
- ⑧ **Remote POWER supply input:** Use only an RS 1 or other remote AC power supply approved by Rane. The SM 82 is supplied from the factory with a remote power supply suitable for connection to this input jack. The power requirements of the SM 82 call for an 18-24 volt AC center-tapped transformer only. It is not a telephone jack. Using any other type of supply may damage the mixer and will void the warranty (which at two years parts and labor is worth safeguarding).
- ⑨ **Chassis ground point:** A #6-32 screw is provided for chassis grounding purposes. See the note below for details.

CHASSIS GROUNDING

If after hooking up your system it exhibits excessive hum or buzzing, there is an incompatibility in the grounding configuration between units somewhere. Your mission is to discover how your particular system wants to be grounded. Here are some things to try:

1. Try combinations of lifting grounds on units that are supplied with ground lift switches or links.
2. If your equipment is in a rack, verify that all chassis are tied to a good earth ground, either through the line cord grounding pin or the rack screws to another grounded chassis.
3. Units with outboard power supplies, such as the SM 82, do not ground the chassis through the line cord. Make sure that these units are grounded either to another chassis which is earth grounded, or directly to the grounding screw on an AC outlet cover by means of a wire connected to a screw on the chassis with a star washer to guarantee proper contact.

Please refer to the RaneNote, "Sound System Interconnection" (supplied in this manual and available separately) for further information on system grounding.

OPERATING INSTRUCTIONS

CIRCUIT DESCRIPTION

Learning to operate the SM 82 might be a bit easier if you glance at the Block Diagram below. All eight stereo Inputs operate in exactly the same way. Signal applied to the Inputs is acted on by a radio interference filter (we have assumed that local broadcasts should not be a part of your music) and is then routed to a stereo LEVEL control. If you are using a mono source, connect it only to the LEFT Input to send this mono signal to both the Left and Right sides of the input circuitry. The output of the Level control sections is applied to a unity gain buffer to prevent the LEVEL control from adversely interacting with downstream circuitry. The Input overload sensor monitors here to alert the user via LED to any possible Input overload conditions. Left and Right audio is then subjected to the channel BALANCE control to allow the user to place the stereo image of the source as desired to the Left and Right Outputs. If a mono input is present, the BALANCE control becomes a PAN control. After the BALANCE control has done its job, a stereo SEND LEVEL control adjusts the amount of each Input routed to the Loop Output.

All eight stereo Inputs are simultaneously adjusted for stereo placement by the OUTPUT BALANCE control. The resultant signal is added together and fed to the OUTPUT LEVEL control, which has its own Overload indicator. The main Outputs are fully actively balanced, allowing the use of correctly wired long cables.

EFFECTS LOOP

The LOOP SENDS receive their audio from the Send bus which is the sum of all the Inputs as determined by the Input SEND controls. This Output may be used to drive a stereo effects processor. The output of the effect device is returned to the SM 82 through the LOOP RETURNS. The level of the returned effect is determined by the RETURN LEVEL control on the front panel. The return section also provides a BALANCE control for image placement.

BALANCE CONTROLS

These do not increase the level of either Left or Right signal. As the controls are moved toward one channel, the level of the other channel is only reduced.

HIGH NOISE IMMUNITY

One of the most unusual features of the SM 82 is its inherent immunity from noise. All eight of the stereo inputs may be turned all the way up without increasing the internal noise of the mixer. This is critical due to the wide variation in output levels found in musical instruments and tape devices. A fairly low-level synthesizer may be combined in the same system with a high level unit without any undesirable side-effects. The SM 82 eliminates the concerns normally associated with mixing so-called -10 dBV units with +4 dBu types.

Block Diagram

