# OPERATOR'S MANUAL

**Model MX4
Four Channel Microphone Multiplexer**

A multiplexer is a device that allows a single channel Real Time Analyzer to average information from up to four microphone positions in a single test. When this information is processed by an analyzer that has "time averaging", the resulting curve is called "spatially averaged". Spatial averaging is recommended by all of the major film cinema/home theater organizations, including LucasFilm™, and Dolby Laboratories™.

The advantage of multiplexing is that the resulting curve on the real time analyzer reflects the overall response of the room across the entire seating area, rather than only the acoustics of a single point in the room. The multiplexer itself is essentially a small 4x1 mixing board combined with a switching network that automatically samples information from each of the microphones for a specified amount of time.

The MX4 can be used  with all Gold Line 1/3 octave Real Time Analyzers and with most other popular models. If using an analyzer other than a Gold Line, make sure that your RTA has a balanced XLR microphone input. We do not recommend using the MX4 with older analyzers that do not have Time Averaging. Minimum time average for the test should be 20 seconds, and for greatest accuracy we recommend 60 seconds. If used on an RTA that does not have time averaging, slow mode should be used.

The MX4 allows the user to enable single channels or any combination of channels, allowing for comparison of individual microphone locations versus the spatially averaged data from multiple microphone tests.

Each of the four channels has a gain control to allow the user to match the input level from different locations. The MX4 can be provided with three or four model TEF04 reference microphones. If you have a DSP30, use your RTA microphone as the fourth microphone. Additional microphones are available from Gold Line.

**Recommended Test Procedures:**

Before beginning the test you must match the sound pressure level for each of the microphones. This is required because SPL decreases with distance, and typically measurements should provide an even sample from each microphone. Accordingly, the microphones closest to the speaker are cut in level by the MX4 to match the level of microphones that are further from the speakers. All microphones being used for the test should be identical, and must be appropriate for the RTA being used.

1. Plug the battery eliminator supplied with the MX4 into the unit.

2. Plug up to four microphones into the rear panel of the MX4 via standard microphone cables. Place the channel 1 microphone in the left rear of the seating area (furthest from the speaker being tested), at ear level, pointing towards the ceiling, preferably in a microphone stand. Place the channel 2 microphone in the right of the seating area. Place the channel 3 microphone in the left front of the seating area, and the channel 4 microphone in the right front of the seating area.  In larger areas, more than 6 seats, you may wish to move all microphones in approximately ¼ of the length of the seating area.

3.  Plug the output XLR cable on the front of the MX4 into the microphone input on your real time analyzer.

4.  The white on/off button for channel 1 should be set to the in/on position, and the white on/off buttons for channels 2,3,4 should be set to the out/off position.

5. Turn the gain control for channel 1 of the MX4 to the straight up middle position on the control. In this position the MX4 should not provide significant boost or cut.

6. Turn on a pink noise source such as Gold Line models PN2 or PN3A or a third party pink noise laser disk. Adjust the volume level of the system to 80dB in flat weighting.

7. The reference level of your RTA should be approximately 64dB.

8. Turn off channel 1 and disengage the white mute button on channel 2. Adjust the gain control until you read 80dB SPL in flat weighting on your RTA for that channel. Repeat for channels 3 and 4.

9.  Enable all four channels (white buttons in the out positions), and utilize the time averaging mode on your RTA. If you do not have time averaging, use slow mode. If you are using less than four microphones, only enable the channels that are connected to a microphone. For best accuracy, remember to use time averaged mode for measurements. If you do not have time averaging, slow mode can be used, but some variation in the data will be seen as the MX4 switches between channels.

10. Take acoustical measurements as you would as if using a single microphone.

11. The test should be conducted with pink noise sent to one speaker at a time, and should be repeated for all speakers.

12. If you have a multiplot function on your RTA, use it to track the difference between each of the speakers, and to closely match the tonal characteristics of all full range speakers.

**REMEMBER:**
\*     Inputs and outputs on MX4 are at microphone level.
\*\*    The MX4 will supply phantom power.
\*\*\*  Use time averaging on RTA

**NOTES:**

# SPECIFICATIONS

**Inputs:**

| | |
|---|---|
| Channels: | 4 |
| Max. level: | 117dB SPL |
| Typical input impedance: | 1.2kΩ |
| Noise floor: | 35dB SPL |
| CMRR: | |
| 60Hz - 1kHz: | 70 dB |
| 20Hz - 20kHz: | 65 dB |
| Phantom power supplied: each mic input, | 12Vdc, 1.2kΩ x 2 |
| Connectors: XLR, 3 pin jack, | 1 Shield, 2+, 3- |

**Outputs:**

| | |
|---|---|
| Channels: | 1 |
| Type: | Active Balanced |
| Maximum Level: | +10dBu |
| Output Impedance: | 180Ω |
| Connectors: XLR, 3 pin plug, | 1 Shield, 2+, 3- |

| | |
|---|---|
| **Maximum Gain, mic input:** | 7dB |
| Adjustment range per channel: | ±7dB |

**Frequency Response:** 20Hz - 20kHz        ±1dB

**Noise, 20Hz to 20kHz, Typical:**
Output noise all inputs off        -85dBu

**CROSSTALK, Typical:**
Adjacent inputs/outputs, 1kHz        -88dB

**MICROPHONES: (when supplied)**        Gold Line TEF04 omnidirectional electret condenser, require 12Vdc phantom

**Power Supply:**   12Vdc @ 500mA UL approved battery eliminator.

---

*WARRANTY and Factory Service*

GOLD LINE products are proudly made in the USA and are covered by a one year limited warranty. For details of this warranty, consult the enclosed warranty registration card or your local dealer.

GOLD LINE Customer Service will help you get the most from your new multiplexer. For answers to questions regarding use of the unit, or for information not covered in this manual, please write us. If you are experiencing difficulties with your multiplexer, please consult your dealer regarding factory service.  If factory service is needed, you may call or fax us between 9:00am and 4:30pm US Eastern Time for instructions and a return authorization.

**Enter your serial#_____date of purchase_____**

10-728 m_mx4_7f28.doc

**GOLDLINE**
MANUFACTURED IN U.S.A. SINCE 1961

Box 500   West Redding, CT. 06896   203-938-2588 phone - 203-938-8740 fax
http://www.gold-line.com          Email - sales@gold-line.com