

Monitor Loudspeaker System
MLS 1/80

BARCO

AUDIO / ^{LOUD} SPEAKERS



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Product application.

The MLS1 has not been designed for sound reinforcement applications, but literally for monitoring applications. It provides the precision and the transparency where accurately reproduced sound is desired for listening distances up to 4 meters.

As all artistic judgments of recordings are made subjectively through the loudspeaker system, the quality of the latter is of vital importance to the recording process. The MLS1 ensures that the studio engineer (Tonmeister, Musicus-Modulator,...) gets a flawless reproduction of the original takings and/or tracks in the mix-down process. In most applications the audio mixer is a prisoner of the deficiencies of the studio acoustics, the available microphones, listening room acoustics, and loudspeakers. In this chain the MLS1 is the BARCO contribution to the removal of at least this weak loudspeaker link. Since the availability of the MLS1 as a neutral electro-acoustical transducer it is worthwhile considering proper blueprint work with regard to e.g. acoustics of the mixing room for new installations, in order to adapt the mixing room function to the state of the audio art of tomorrow.

Product description.

The MLS1 is designed as a precision instrument between the electrical sound information and the trained and experienced musician-mixer's ears.

Frequency response.

It's frequency response starts from the seldomly applied extreme low octave 32-64 Hz to the highest instrument overtones which are reproduced up to at least 20 kHz.

It's frequency response is very linear; it does not vary by more than 2 dB from 50 to 20.000 Hz.

At 32 Hz the sound pressure is down by not more than 4 dB. It is important to know that the majority of studio microphones roll-off more or less steeply below 50 Hz. The MLS1 is not designed to compensate for this roll-off, but to reproduce the truth of the take. It is also good to remember that the extreme low frequencies are lost if the studio and the listening room do not have adequate volume.



Well dosed directivity.

In order to achieve a proper stereophonic picture of the taking and/or mixing down the listening distance may not be too large with regard to the room size to avoid spoiling of the stereophonic impression by wall, floor and ceiling reflections. The MLS1 achieves a well dosed directivity for the medium frequency range to enhance the ratio of direct sound versus reflected sound level.

Speakers.

For a start the MLS1 is a 3-way system. The low frequency speaker takes advantage of the adequately damped and carefully semi-staggered tuned vented baffle in order to minimize harmonic distortion for frequencies down to 30 Hz at the appropriately specified sound pressure levels.

The cone movement of the woofer up to an amplitude of about 1 cm does not produce harmonics. The driving voice coil windings remain in a constant magnetic flux density, which is achieved by a relatively long voice coil, and a specially shaped central pole piece. Also the spider and cone surround are selected to support the distortion free design of the driving mechanism. The medium speaker which is of relatively small diameter, handles a very wide frequency range thanks to its aluminium voice coil.

Its cone performs no "cone break up" for the lower medium and medium frequencies, whilst it has a gradual absorption from driving center to the surround for the high medium range. The speaker is housed in a built-in infinite (closed) baffle in the MLS1 which is adequately sized and damped to obtain a smooth take over by the bass speaker system.

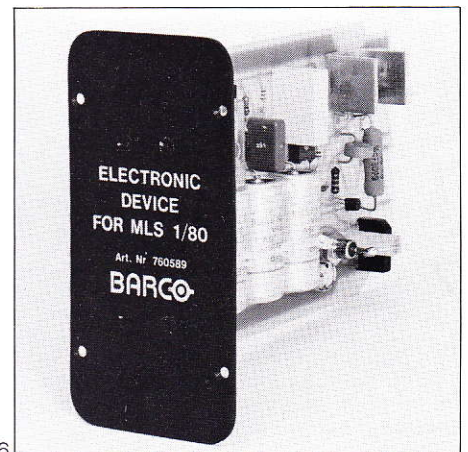
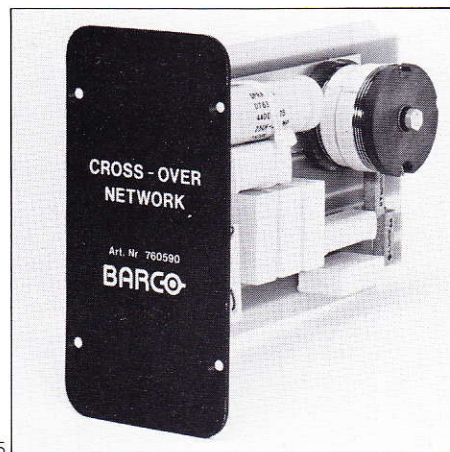
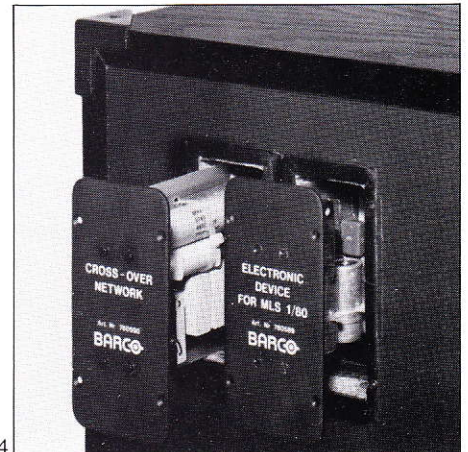
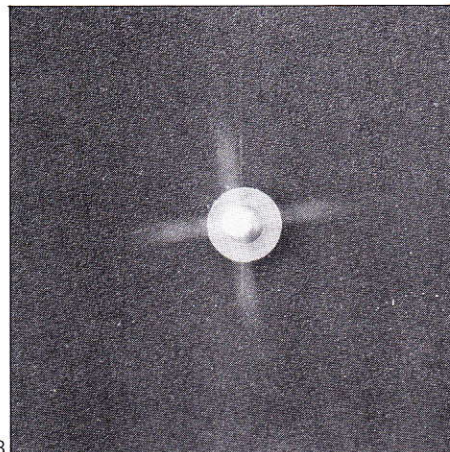
The "dome tweeter" takes care of the higher order overtones of the sound generators concerned i.e. musical instruments etc.

Its directivity is at least as wide as the well-dosed radiation pattern of the mid-range speaker.

Cross-over networks.

Besides the neutral balance over the whole sound spectrum it is important for a monitor speaker that it itself never generates harmonic and transient distortion.

The extreme care in the development and the manufacturing of each detail of the system is oriented to minimize harmonic and transient distortion. Proper phase linearity has been achieved by careful selection of cross-over networks



and mutual speaker placing, taking into account the capacities of each speaker system combined in a 3-way device and last but not least by the critical ear of several experts.

Enclosure.

The cabinet stiffness, which is due to its construction with high density chip-board of 32 mm thickness which is further damped by the application of an absorbent 6 mm layer, eliminates cabinet vibration, which otherwise brings along not only some contribution to the frequency response, but worse still introduces undesired transient distortion.

Electronic hold down device.

The MLS1, being an objective (transparent) instrument guarantees true reproduction of the signal sources regardless of the loudness at which it is driven. Therefore an electronic device (powered by the audio itself, which means: no extra wiring) pulls the reproduced sound level automatically down by about 30 dB each time the MLS1 system tries to introduce harmonic distortion trespassing the one per cent level. In order to comfort the operator, a red LED lights at a level of some 10 dB lower than the cut-down of the MLS1. In

this way the mixer obtains one: no distortion from his monitor speakers, two: no fear of ruining his monitors during trials and errors, or while cueing tapes, three: notwithstanding the high sensitivity of the MLS1, the system planner is allowed to install an amplifier of up to 500 Watts in order to keep amplifier distortion below the guaranteed MLS1 figure.

As soon as the applied driving level to the monitors is pulled back to normal the MLS1 switches automatically back from its minus 30 dB SPL. The musician-mixer has no longer to burden himself with speaker overloading and can devote himself entirely to his creative task, thanks to the MLS1.

1. The MLS1 monitor speaker.
2. Tweeter, midrange and woofer used in the MLS1.
3. In order to comfort the operator a red LED lights some 10 dB lower than the cut-down of the MLS1.
4. Plug-in construction for easy servicing.
5. Cross-over module.
6. Electronic protection circuit.

Programme peaks.

With regard to programme peaks, (the reproduction of very short high leveled peaks) the MLS1 will reproduce such up to a driving level of some 250 Watts, resulting in a peak sound level of over 120 dB (at 1 meter) for which eventual distortion is masked by the overloading of the human ear. At a listening distance as far as 4 meters (which is already pretty large for proper operation) from a couple of MLS1's such peaks will still reach to over 115 dB SPL. If such high leveled program peaks occur several times in a few seconds, or if the average sound level during one second becomes objectional, the MLS1 will switch automatically down by the built-in electronic sensor as a protection not only for the speakers but also for the operator's organ of hearing. With such a system the musician-mixers talents can be utilized for many many years without degradation by temporary or permanent deafness. If the average input power were 20 Watt (102 dB SPL at 1 m) then one MLS1 would still handle peak power inputs of the order of 250 Watt for a few miliseconds.

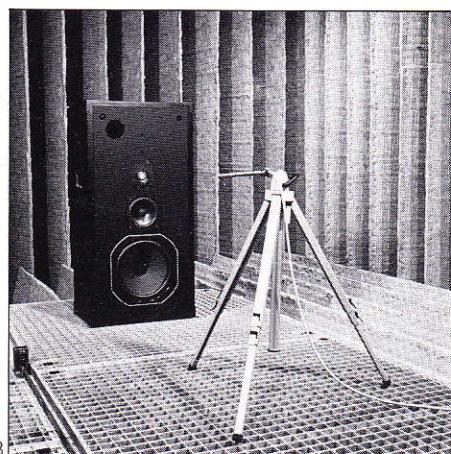
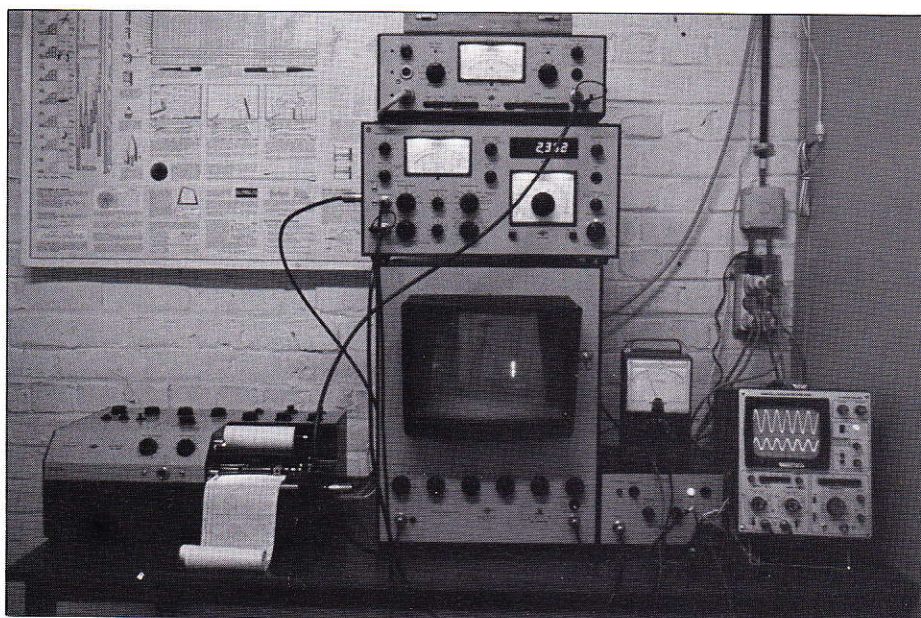
Construction.

The MLS1 is not only the result of BARCO's excellent measurement and test gear such as B & K response and distortion analysis apparatus and anechoic room but also from the experience gained in more than ten years by its own expert and enthusiastic design, development and manufacturing personnel.

From the manufacturing point of view the MLS1 has a plug-in cross-over filter module and a plug-in electronic sensor. It is important to know that BARCO manufactures its own pole pieces, voice coils, membranes, enclosures, inductor coils and epoxy printed circuit boards to mount cross-over filters and electronic circuitry. The direct control of development and manufacturing in the plant itself is a guarantee of performance, reliability and customer satisfaction.

1. Registration and analysis of the sound reproduction characteristics
2. Numerical controlled machines wind aluminium wire voice coils.
3. Amplitude response measurement.

BARCO continually engages in research related to its precision product improvement. New materials, production methods and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason any current precision product may differ in some respect from its published description but will always equal or exceed the original design specifications unless otherwise stated.



Technical Specifications.

Frequency response:

1 meter on axis between treble and mid-range speaker, 50-20.000 Hz \pm 2 dB, 32 Hz at - 4 dB.

Nominal impedance:

8 Ohms.

Minimum impedance:

8 Ohms.

Terminals:

Canon XLR 3/11 (+ free mating plug XLR3).

Power capacity for continuous sine wave.

40 Watt for low frequency range
25 Watt for medium frequency range
12 Watt for high frequency range.

Short-term power handling capacity:

(10 mS): 250 Watt.

Amplifier Power Limit:

500 Watt RMS continuously.

Electronic circuitry cuts the SPL down by about 30 dB

- to limit THD to less than 1 % for the whole frequency range

32-20.000 Hz.

- to protect the 3 speakers against deterioration due to continuous power trespassing
- to limit peak programme levels to 250 Watt.

Sensitivity:

89 dB SPL at 1 meter with 1 Watt pink noise.

Cabinet size:

81 cm (31") high
40.5 cm (16") wide
30.6 cm (12") deep.

Weight:

Net 35 kg (77 lbs)
export packed ... kg (... lbs)
carrying handle on each side.

On special request the MLS1 can be supplied with the electronic device adjusted for radiation up to maximum 0,5 % or 2 % THD instead of the standard 1 % THD.