

SMPTE STANDARD

for Motion-Pictures —
Dubbing Stages (Mixing Rooms),
Screening Rooms and
Indoor Theaters —
B-Chain Electroacoustic Response



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative Practices.

SMPTE ST 202 was prepared by Technology Committee 20F.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

1 Scope

This standard specifies the measurement methods and characteristic electroacoustic frequency response of the B-chain of motion-picture dubbing theaters (mixing rooms), screening rooms, and indoor theaters whose room volume exceeds 125 m (4414 ft). It is intended to assist in standardization of monitoring and reproduction of motion-picture sound in such rooms. The goal is to have constant perceived loudness and frequency response from installation to installation, and from position-to-position within an installation. This standard does not cover that part of the motion-picture sound system extending from the transducer to the input source audio selector.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; followed by formal languages; then figures; and then any other language forms.

3 Normative Reference

Note: All references in this document to other SMPTE documents use the current numbering style (e.g. SMPTE ST 208:1992) although, during a transitional phase, the document as published (printed or PDF) may bear an older designation (such as ANSI/SMPTE 208M-1992). Documents with the same root number (e.g. 208) and publication year (e.g. 1992) are functionally identical.

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ANSI/ASA S1.13-2005, Measurement of Sound Pressure Levels in Air

4 Definitions

4.1 complete sound reproduction system: Represented diagrammatically in Figures 1 and 2 and used in indoor theaters and screening rooms and in motion-picture sound post-production facilities such as dubbing theaters, mix rooms and ADR control rooms. The complete system in an indoor theater or review room is generally considered to consist of an A-chain and a B-chain.

4.2 pre-emphasized audio track: An audio record, either magnetic or photographic, containing high-frequency boost equalization, which is intended for playback over de-emphasized theater playback systems. Now very rarely used, but found on all films prior to the mid-1970s. Part of the playback de-emphasis was generated by use of Curve-N in previous versions of this standard. (See Section 4.10 and Annex A.10.)

4.3 wide-range audio track: An audio record, either magnetic, analog photographic or digital, which is intended for playback over theater playback systems aligned to this standard. This characteristic was previously referred to as Curve-X (see Section 4.9). Such tracks are recorded without fixed pre- and de-emphasis. Analog wide-range sound-tracks invariably use noise reduction companding technology.

4.4 A-chain (transducer system): That part of a motion-picture audio system extending as far as the input source selector, as shown in Figures 1 and 2.

4.5 B-chain (final chain): That part of a motion-picture sound reproduction system, as shown in Figures 1 and 2, commencing at the input source audio selector and terminating in the listening area.

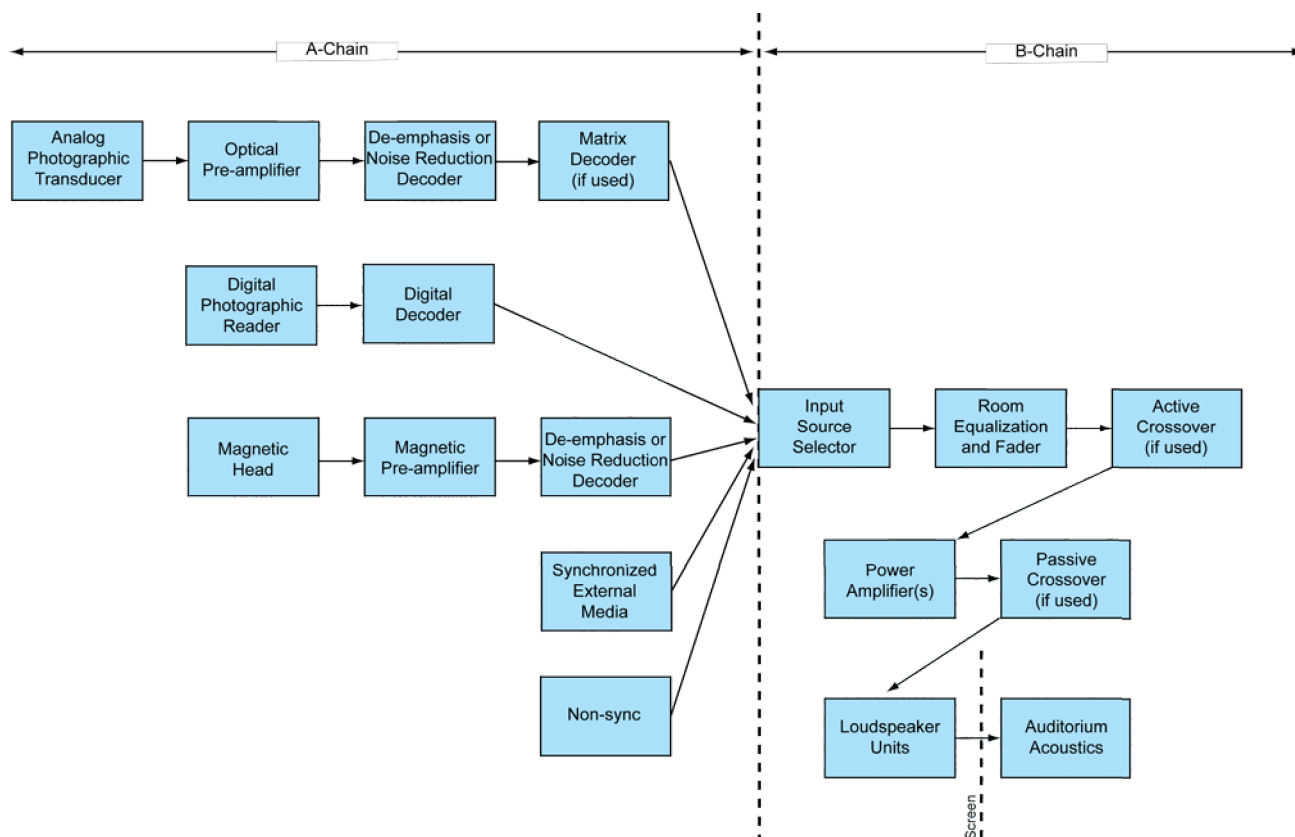


Figure 1 – Complete theatrical audio reproducing chain – Traditional Film Formats

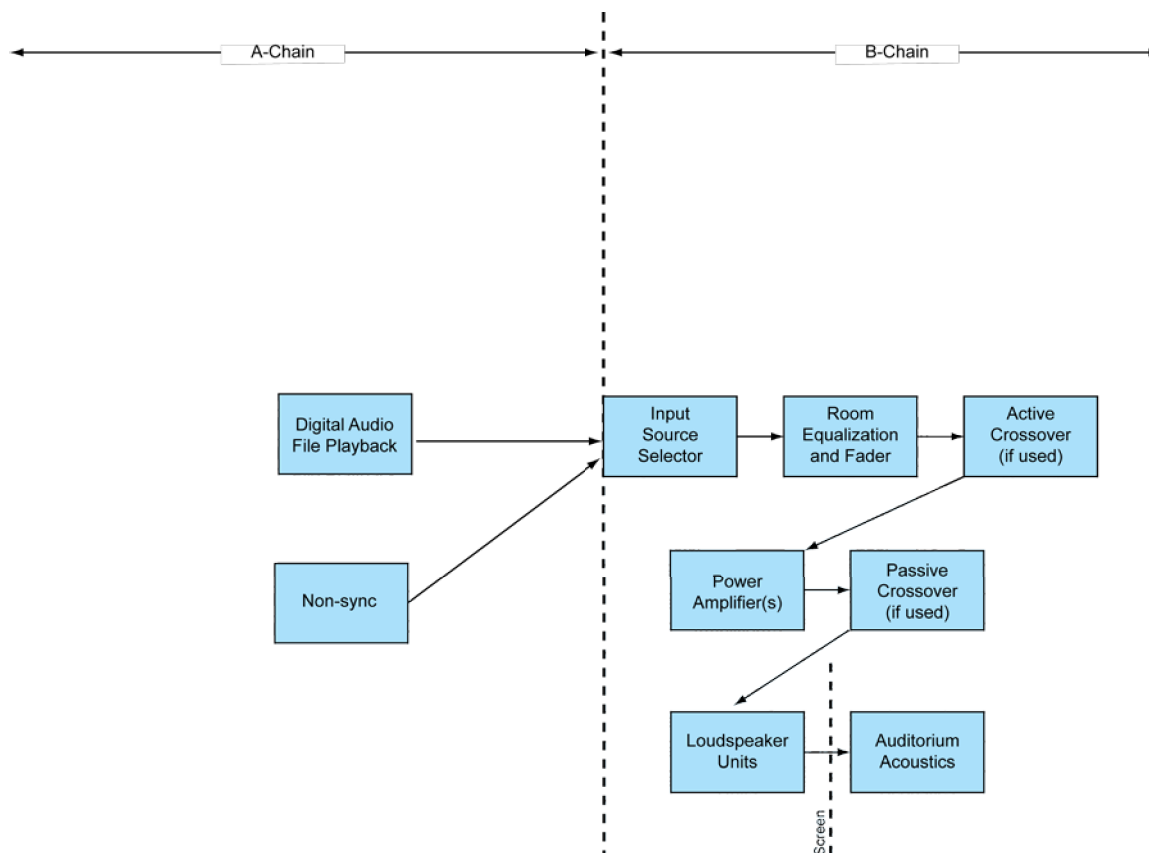


Figure 2 – Complete theatrical audio reproducing chain – Digital Cinema

4.6 pink noise: A stochastic signal having a continuous spectrum with equal energy per equal logarithmic interval of frequency, and with a Gaussian probability distribution of instantaneous amplitude (see Section 5.4).

4.7 wide-band pink noise: Pink noise having a bandwidth exceeding the normal acoustic frequency range. A suitable test signal should have a frequency response flat to within ± 0.5 dB when measured in 1/3-octave bands with center frequencies from 25 Hz to 20 kHz with an integrating averaging technique.

4.8 electroacoustic response: The electroacoustic response of the B-chain is the spatially and temporally averaged sound pressure level measured in 1/3-octave bands expressed in decibels with respect to reference level (see Annex A.9) when wide-band pink noise is applied to the input source selector (see Figures 1 and 2). The electroacoustic response is computed as a spatial and temporal average over the listening area using one of the methods given in Annex A.4.

4.9 Curve-X and X-Curve: Previous versions of this standard defined a B-chain characteristic referred to as Curve-X for wide-range sound-tracks, also known as the X-Curve. This characteristic typically required some high-frequency equalization boost when older loudspeakers were in use, but is now easily achievable with contemporary loudspeakers. All contemporary practice is targeted to the X-Curve.

4.10 Curve-N: Previous versions of this standard defined a B-chain characteristic referred to as Curve-N for use with loudspeakers with much poorer high-frequency response than those typically now in use (see Annex A.10).

5 Method of Measurement

5.1 The electroacoustic response shall be measured with the equipment arranged in accordance with Figures 3 and 4 (see Annex A).

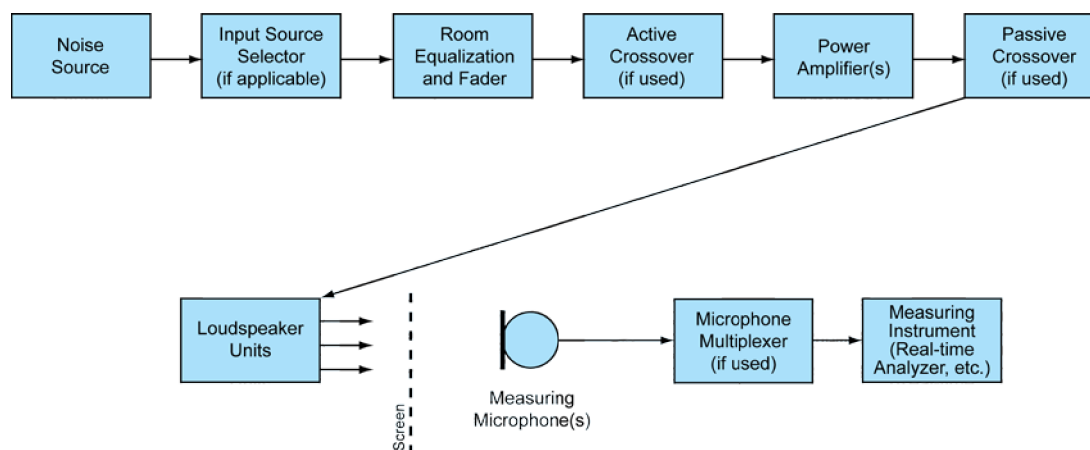


Figure 3 – Method of measurement of B-chain

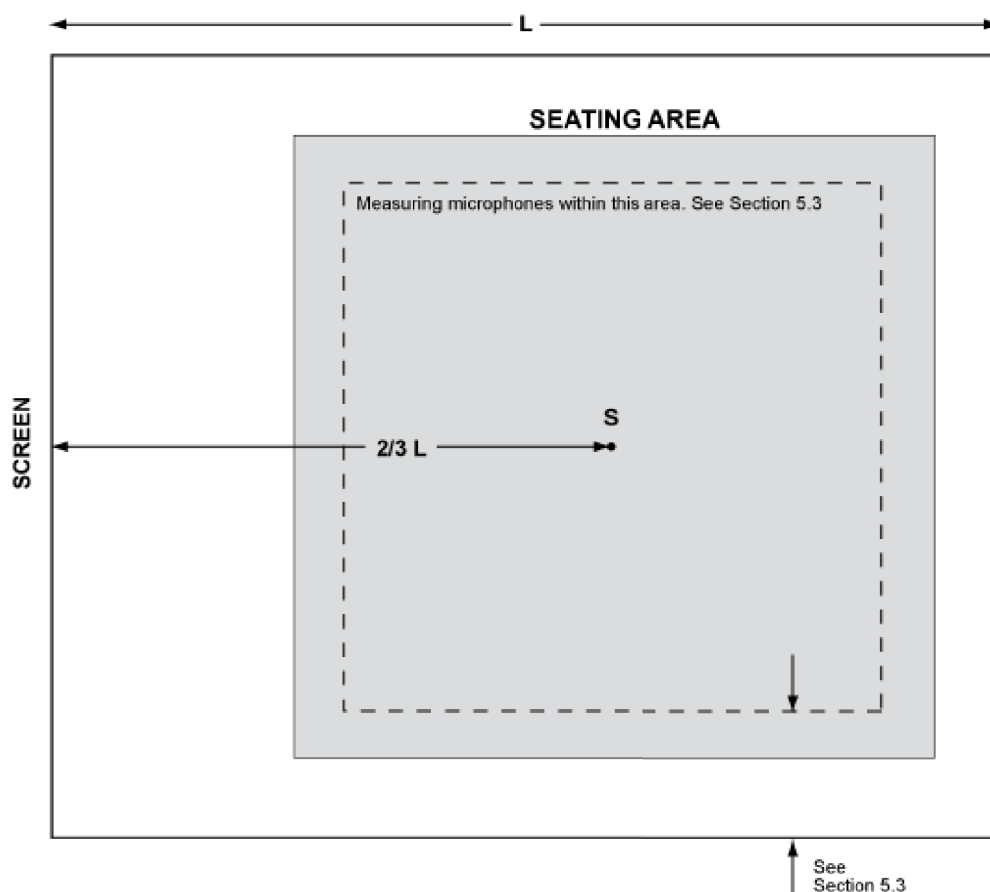


Figure 4 – Range of microphone placements