LM100 Broadcast Loudness Meter

The Dolby LM100 Broadcast Loudness Meter is a tool for measuring the subjective loudness of dialogue within broadcast programming.

Differences in audio levels between programs, or between programs and commercials, are a major annoyance to TV viewers. However, although obvious to the viewer, these differences have proven difficult for broadcasters to measure with conventional methods and equipment. The Dolby® LM100 Broadcast Loudness Meter solves that problem through Dialogue Intelligence™, a revolutionary technology developed specifically to measure the perceived loudness of dialogue. Research shows that most viewers adjust TV volume to normalize dialogue levels. By analyzing the input signal and measuring program loudness only during the presence of speech, Dialogue Intelligence objectively measures what viewers subjectively experience.

Applications

Applications for the LM100 range from postproduction and quality control to final transmission, program turnaround, and cable head-end facilities.

Easy-to-Read Measurements

The LM100 utilizes ITU-R BS.1770-1 as its core measurement algorithm. Users can also select Leq(A). A software upgrade option is available that adds the ITU-R BS.1770-1 algorithm to existing units manufactured prior to August 2008.

The LM100 presents its measurements in an easy-to-understand numerical format. This eliminates the variations in results multiple operators often find when using VU or PPM meters, neither of which was designed to measure subjective loudness. The LM100 can also determine the unweighted peak and a range of other information about the signal. The unit can simultaneously display the incoming dialogue normalization (dialnorm) value of a Dolby Digital program (or any program within a Dolby E bitstream) for direct comparison to the actual measured value.

Front- and rear-panel serial interfaces provide capabilities for software updates and the LM100 software remote application. The remote application will assist users with advanced loudness measurement, logging features, and enhanced error reporting.

A set of user-definable alarms and monitoring functions can inform an operator of input loss, signal clipping, overmodulation (LM100-NTSC version), high or low signal levels, silence, and incorrectly set dialnorm values.

Configurations

The LM100-LTC includes a timecode input, which allows alarm and other signal conditions to be logged to either the internal time-of-day clock or external timecode. The LM100-NTSC includes an RF input specifically for NTSC CATV and “off-air” television measurement applications. Because the RF tuner replaces the linear timecode input in this version, logging is referenced to the internal clock.

LM100 Broadcast Loudness Meter

Front Panel

Display and Controls

Intuitive, easy-to-read user interface; input source selection determines display parameters

Keypad

Enables local control of setup functions and status display

Alarm LEDs

Audio alarm, fault, and error

Headphone Output

6.35 mm (1/4-inch) standard stereo headphone jack, level-adjustable for confidence monitoring

RS-232 Serial Remote Control Input Port

8-pin female mini-DIN connector for the LM100 software remote application and software upgrades

Core Measurement Algorithms (User Selectable)

ITU-R BS.1770-1

Leq(A)

Dialogue Intelligence Algorithm

Proprietary; patent pending

Audio Sampling Rates

32, 44.1, and 48 kHz

Measurement/Analysis System Log

480 events stored in internal nonvolatile RAM

Unlimited event storage and retrieval with use of LM100 software remote application on a PC

Power Requirements

90–264 VAC, 50–60 Hz, auto-sensing, 15 W maximum; designed to operate from a centrally switched power source

Dimensions and Weight

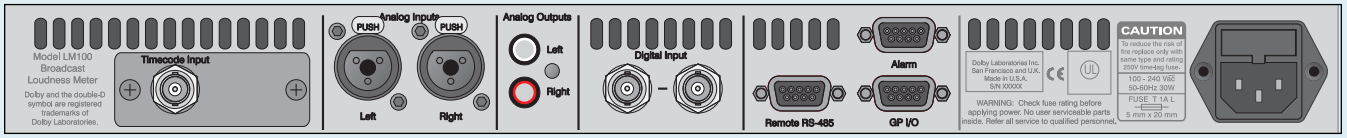
1-U rackmount: 44 × 483 × 375 mm (1.75 × 19 × 14.75 inches)

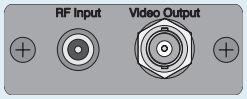
Net: 2.5 kg (5.5 lb)

One-year limited, parts and labor; see disclaimer.

Specifications subject to change without notice.

Rear Panel





NTSC M standard only; RF tuner replaces LTC input on this version, as shown.

Digital Audio Input

BNC female connector with loop-through, unbalanced, 75Ω, signal levels per AES-3ID-1995 (SMPTE 276M), external 75Ω termination required

Formats supported: PCM data up to 24 bits; Dolby E data supported in 16-, 20-, and 24-bit modes at 48 kHz; Dolby Digital (AC-3) data at 32, 44.1, and 48 kHz sample rates

Analog Audio Inputs

Two Neutrik® combination XLR/¼-inch TRS connectors, electronically balanced

Maximum input level: ~ +22 dBu

Input impedance: 10 kΩ

User-definable nominal operating levels

Analog Audio Outputs

Two RCA-type connectors, unbalanced, stereo; maximum output level: 2 V_{RMS} into a 10 kΩ load per IEC 61938

Timecode Input (LM100-LTC version)

BNC female, unbalanced, per SMPTE 12M-1999

RF Input (LM100-NTSC version)

F-type female connector with internal 75Ω termination

Tuner frequency range: 55.25–801.25 MHz

Supports BTSC encoded stereo signals

Selectable CATV or "off-air" modes

CATV mode supports the Cable Television Channel Identification Plan per EIA 542 (User-selectable: Standard, HRC, or IRC)

Video output: composite, BNC female

RS-485 Serial Remote Control Input Port

9-pin female D-connector for remote control and software upgrades

Alarm Port

9-pin female D-connector, 0–5 V TTL level

User-definable alarms: input clip detection, modulation overload, loudness above threshold, loudness below threshold (silence), dialnorm threshold, and AES input loss

General Purpose Input/Output Port

9-pin female D-connector, 0–5 V TTL level

Functions include: measurement pause, measurement reset, input source select, channel up/down (LM100-NTSC only), measurement state

Environmental Conditions

Operating: 0°C–50°C (32°F–122°F), natural convection cooling, 0%–98% relative humidity (noncondensing)

Nonoperating: –20°C to 70°C (–4°F to 158°F)

Regulatory Notices

North America: This unit complies with the limits for a Class A digital device pursuant to Part 15 of the FCC rules and Industry Canada ICES-003 Class A requirements, and is UL Listed for the US and Canada.

Europe: This unit complies with the requirements of Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC and carries the CE marking accordingly.

Warranty

One-year limited, parts and labor; see disclaimer.

Specifications subject to change without notice.

DISCLAIMER OF WARRANTIES

Equipment manufactured by Dolby Laboratories is warranted against defects in materials and workmanship for a period of one year from the date of purchase. There are no other express and implied warranties and no warranty of merchantability or fitness for a particular purpose, or of noninfringement of third-party rights (including, but not limited to, copyright and patent rights).

LIMITATION OF LIABILITY

It is understood and agreed that Dolby Laboratories' liability, whether in contract, in tort, under any warranty, in negligence, or otherwise, shall not exceed the cost of repair or replacement of the defective components or accused infringing devices, and under no circumstances shall Dolby Laboratories be liable for incidental, special, direct, indirect, or consequential damages (including, but not limited to, damage to software or recorded audio or visual material), cost of defense, or loss of use, revenue, or profit, even if Dolby Laboratories or its agents have been advised, orally or in writing, of the possibility of such damages.

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Dolby Laboratories, Inc.
100 Potrero Avenue, San Francisco, CA 94103-4813 USA T 415-558-0200 F 415-863-1373
Wootton Bassett, Wiltshire SN4 8QJ England T 44-1793-842100 F 44-1793-842101

dolby.com