



## 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 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 were 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.

# Dolby LM100 Broadcast Loudness Meter

## LM100 Front Panel



### Multifunction Display

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, error

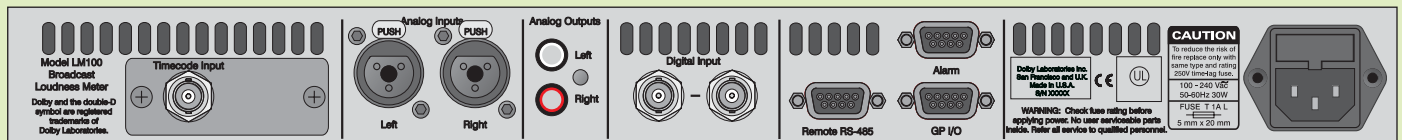
### Headphone Output

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

### RS-232 Serial Remote Input

(For the LM100 software remote application and software upgrades) 8-pin female mini-DIN connector

## LM100 Rear Panel



### Digital Audio Input

BNC female connector with loop-through, unbalanced, 75 $\Omega$ , signal levels per AES-31D-1995 (SMPTE 276M), external 75 $\Omega$  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<sup>®</sup> combination XLR/1/4 inch TRS connectors, electronically balanced  
Maximum input level: ~ +22 dBu  
Input impedance: 10 k $\Omega$   
User-definable nominal operating levels

### Analog Audio Outputs

Two RCA-type connectors, unbalanced, stereo  
Maximum output level: 2 V<sub>RMS</sub> into a 10 k $\Omega$  load per IEC 61938

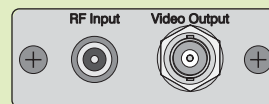
### Timecode Input (LM100-LTC version)

BNC female, unbalanced, per SMPTE 12M-1999

### RF Input (LM100-NTSC version)\*

F-type female connector with internal 75 $\Omega$  termination  
Tuner frequency range: 55.25 to 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

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



### Serial Remote Control Input

9-pin female D-connector, RS-485 (SMPTE 207M)

### 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 (GP I/O) 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

## Core Measurement Algorithm

Leq(A) (IEC 60804)

## 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; unit 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)

## Environmental Conditions

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

Nonoperating: –20° to +70°C (–4° 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 is UL Listed for both 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

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