DK - Technologies

Understanding LOUDNESS

The Explanation...

Loudness Range (LRA)
Loudness range is a statistic calculation of the material's dynamic range based on the short term (sliding) loudness (3 secs).

Momentary Loudness (M)
Momentary loudness is the sum of the RLB weighted audio channels and integrated over 400ms. Momentary loudness is used to calculate short term and integrated loudness.

Short Term Loudness (S) (Sliding)
Short term loudness is a 3 seconds integration of the momentary loudness. (10 and 30 seconds are also used in some standards/regions).

Absolute Gated Integrated Loudness
The absolute integrated loudness is a long term measurement (an integration over the entire material) based on the momentary loudness.

It uses an absolute gate at -70LUFS/LKFS (M) which means that if the momentary loudness is getting under -70LUFS/LKFS then the measurement holds until the momentary loudness goes above.

The absolute loudness is not used directly by the user, but is used to calculate the dynamic gate. The dynamic gate is according to ITU-R BS.1770-2, -10 LU below the absolute gated loudness.

Reclaim Factor
The reclaim factor is the difference between the absolute gated loudness and the dynamic gated loudness. It indicates how much you can gain by making sure that your material is always above the dynamic gate. If the material is always above the dynamic gate then the reclaim factor is equal 0 LU (dB relative to I).

Dynamic Gated Integrated Loudness (I)*
The dynamic gated loudness is a long term measurement (an integration over the entire material) based on the momentary loudness.

It uses a dynamic gate at -10 LU under (dB relative to) the absolute gated loudness which means that the measurement is on hold if the momentary loudness gets under the dynamic gate.

It is always the last value of the dynamic gate which is used on the material. This means that it is necessary to include or exclude any material from the "past" if the dynamic gate is changing. This means that the dynamic gate is always -10 LU under (dB relative to) the end result of the dynamic gated loudness.

True Peak (TP)
True peak is an estimation of the maximum peak that the digital signal will result in, in the analogue domain. This value is useful when making sure the digital to analogue converter is not being saturated.

LU, LUFS and LKFS
LU stands for Loudness Unit and LUFS for Loudness Unit Full Scale.

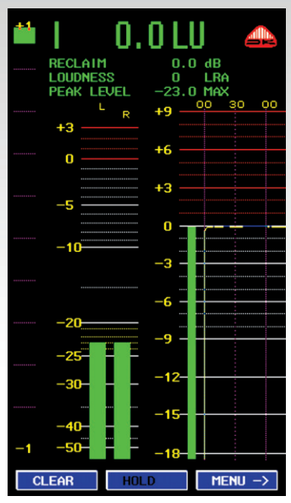
0 LU is equal to the reference level. The reference level is varying between the different recommendations. (R128, 0 LU eq -23 LUFS).

LKFS is the same as LUFS. ITU-R BS.1770-2 are using the terms LKFS. EBU R128 and using LUFS.

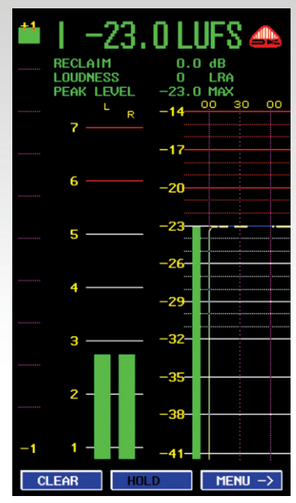
0 LUFS/LKFS is equal to 0 dBFs @ 1KHz according to ITU-R BS.1770-2 and EBU R128 (some recommendations may use 400Hz).

***Subject to operational mode and local requirement.**

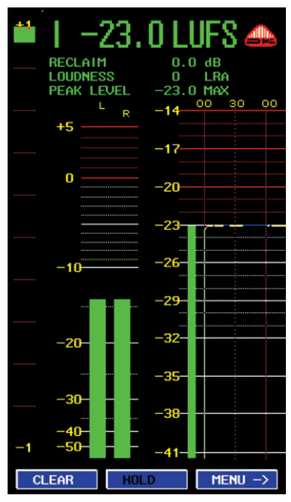
DK METER SERIES



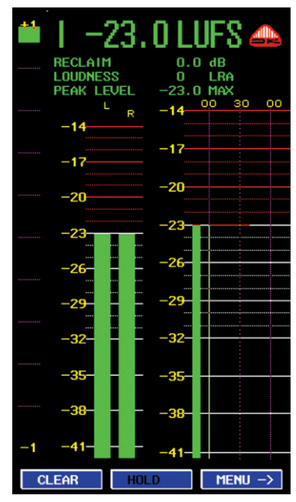
DK meter screen showing LU and the WEB PEAK (WEBP) scale. The WEB PEAK scale is a true peak scale showing the true peak value as described in ITU-R BS.1770-2.



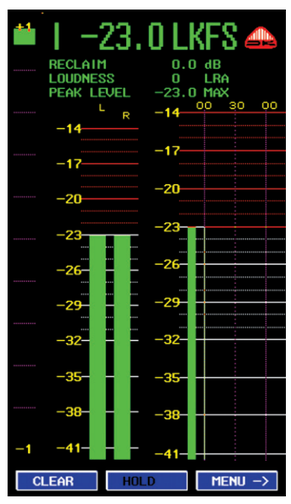
DK meter screen showing LUFS and the BBC scale (IIB).



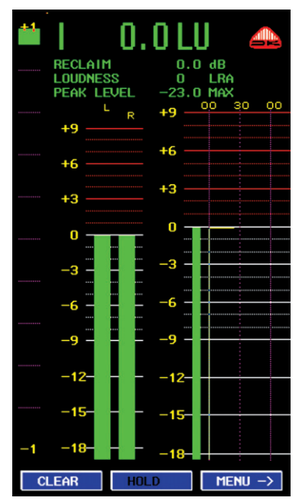
DK meter screen showing LUFS and the DIN scale.



DK meter screen showing LUFS and the loudness scale (ITU).



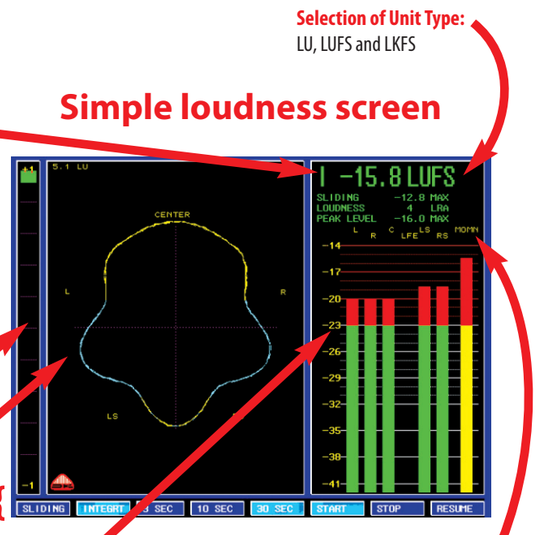
DK meter screen showing LKFS and the loudness scale (ITU).



DK meter screen showing LU and the loudness scale (ITU).

DK PT0700 SERIES

Simple loudness screen



Selection of Unit Type:
LU, LUFS and LKFS

4 User definable lines
Select between:
Integrated Loudness
Sliding Loudness
Momentary Loudness
Loudness Range
True Peak
Reclaim Factor
Preset Name
...and more

Phase Meter

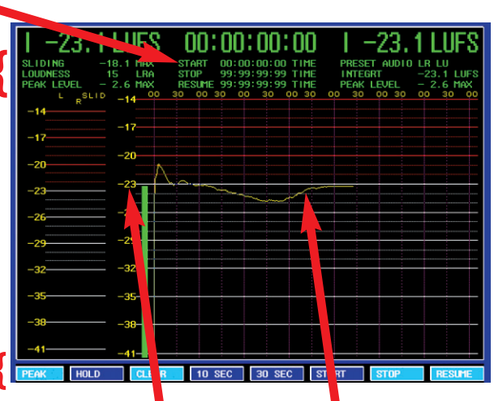
StarFish™

User-configurable loudness menu

Adjustable Loudness Reference:
Set at -23dBFs but adjustable from -9dBFs to -24dBFs at 1kHz or 400Hz

Loudness Bargraph:
Select between:
Integrated, Sliding or momentary Loudness

Graphical Loudness screen



Start, Stop & Resume time

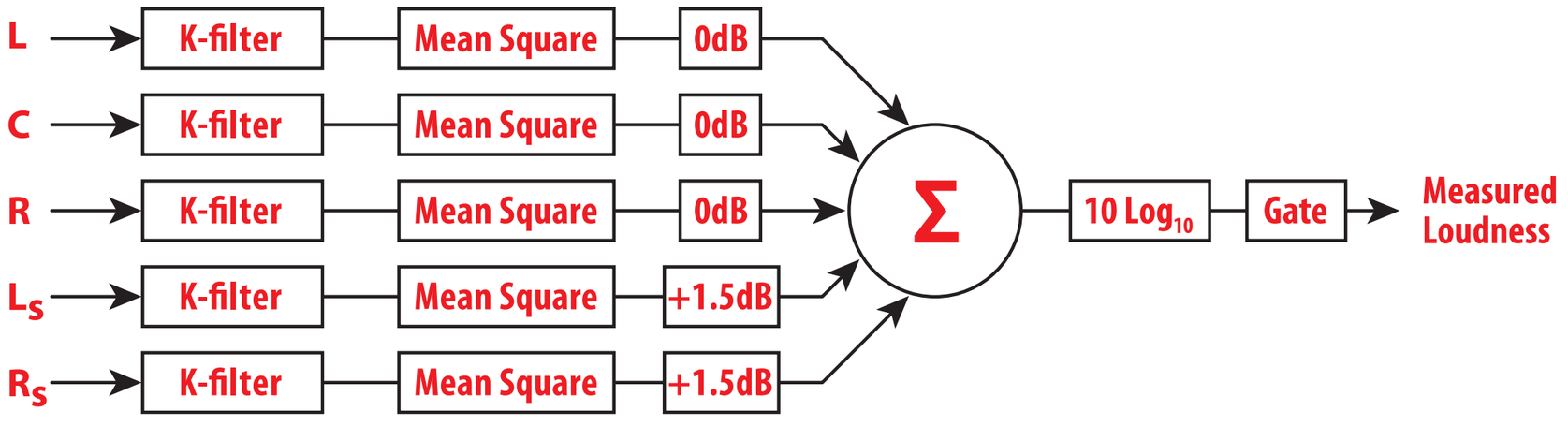
4 User definable lines
Select between:
Integrated Loudness
Sliding Loudness
Momentary Loudness
Loudness Range
True Peak
Reclaim Factor
Preset Name
...and more

User-configurable loudness menu

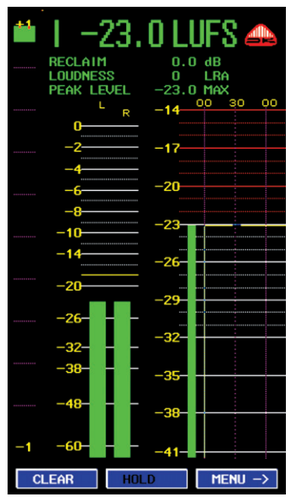
Adjustable Loudness Reference:
Set at -23dBFs but adjustable from -9dBFs to -24dBFs at 1kHz or 400Hz

Graphical histogram of integrated or short-term Loudness - the last 5 minutes

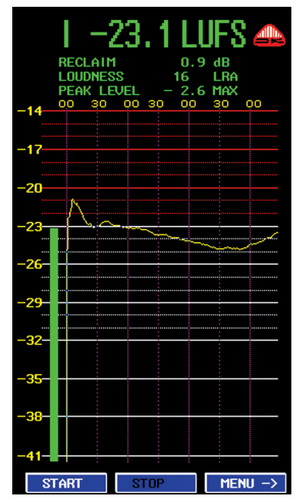
ITU-R BS.1770-2 Simplified block diagram of multichannel loudness algorithm



The block diagram shows a simplification of the loudness algorithm. It starts with the "K" weighting, a mean square calculation and a gain weighting factor for each channel. For L, R and C the gain factor is 0dB, for Ls and Rs it is ~+1.5dB. The LFE channel is not included in the loudness calculation. All the channels are summed thereafter and the loudness value given.



DK meter screen showing LUFS and the DMUI scale. The DMUI scale is a true sample peak.



DK meter screen showing the graphical representation of the integrated loudness the last 3 minutes on a LUFS scale.