

LA100 Application Note 1 – Errors to be expected when using Jack Sockets

Users commonly report small errors in Level measurement which are the result of using jack leads between the units rather than XLR connections as recommended for calibration checking. Apart from possible errors due to dirty contacts there are several predictable sources of error which arise from the various impedance settings of the two units:

1. LA101 set to 10ohm (default), LA102 set to 10k.
The oscillator output impedance is actually 75ohm at the jacks (10 ohms at the XLRs only) and the level is not corrected. Thus an error of -0.065dB ($10\text{K}/10.075\text{k}$) is to be expected on either or both channels.
2. LA101 set to 75ohm, LA102 set to 600ohms.
The oscillator output impedance is 75ohms and the level is corrected for 600ohm loading to ensure a correct reading when one channel is driven. With both channels selected a slight drop results from the fact that 5ohm of the source resistance is actually common to both channels. This error is -0.063dB .
3. LA101 set to 600ohms, LA102 set to 600ohms.
The level is corrected for 600ohm loading with one channel driven. With both channels driven a slight drop in level results from the common 5ohm impedance element. This amounts to -0.054dB .
4. An additional error can be expected due to inaccuracies in source and load impedances which typically will both be within $\pm 1\%$. The worst case combination (606ohm source 594ohm load) gives $\pm 0.087\text{dB}$.

The worst case error to be expected in the 600ohm condition is therefore: $\pm 0.03 \pm 0.087 - 0.054$ (basic level error \pm impedance error – dual channel drop) = -0.171dB . This is actually a high level of performance for a 600ohm system, but it demonstrates the importance of using XLR connections for calibration checking.

If jacks must be used the highest accuracy is achieved by selecting 75ohm source and 600ohm load. A 1% error in both impedances will then cause a worst case additional level error of -0.019dB .