

Technical Note

Product: Jade 2

Cable Details

Introduction

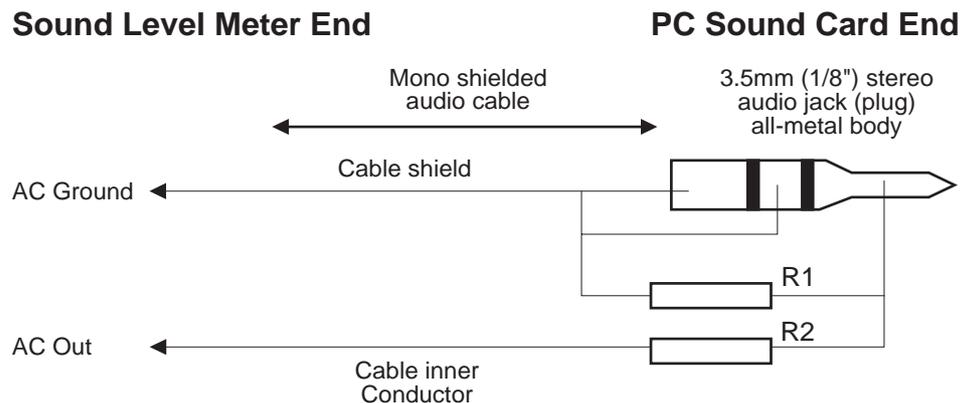
Jade 2 requires a simple cable to connect a sound level meter to the PC sound card. Essentially, this is similar to a standard audio cable, but in some circumstances you may need to attenuation resistors to the cable.

Some meters generate 0.7V RMS FS on the AC output. If this is the case with your meter, you may be able to avoid using any attenuation and so a simple audio cable will be sufficient. The worst that can happen is that you will lose the top 2dB or so of the meter range. However, for best results, you should consider adding attenuation on any level above 0.5V RMS.

If your meter generates more than 0.5V to 0.7V RMS for full scale, you should add suitable attenuation to the cable. Sound cards usually have a maximum input level in the range 1V to 2V RMS. Therefore, an ordinary audio cable may not be sufficient as the higher voltage level may damage the sound card.

Cable Connections

The following diagram shows the cable required:



Note: If using identical connectors, e.g. 3.5mm (1/8") jacks, make sure you identify the ends

How to work out R1 and R2

The general principle is that the maximum RMS voltage to the sound card should not be greater than about 0.5V RMS when the sound level meter is displaying top of range. The minimum values of R1 and R2 are determined by the minimum load impedance specified by the sound level meter manufacturer (typically between 10K Ohms and 50K Ohms). In addition, sound cards have input impedances that are typically in the 50K Ohm to 100K Ohm range.

The ratio of R1 to R1+R2 theoretically determines the attenuation factor. However, in practice R1 is paralleled by the sound card's input impedance, reducing the effective value slightly. Values of R1 between 1K and 5K usually result in negligible errors in the attenuation factor.

As an example, for the CEL-231/254 meters, CEL specify a minimum load impedance of 39K and a maximum RMS voltage of 7.25V. If we use a value of 39K for R2 (satisfying the minimum load impedance), we can work out an approximate value for R1 as follows:

$$R1 = (39 \times 0.5) / 7.25 = 2.69K$$

The nearest standard value resistor is 2K7, giving a maximum voltage seen by the sound card as:

$$V = (2.7 \times 7.25) / (2.7 + 39) = 0.47V$$

As mentioned earlier, the actual maximum voltage seen by the sound card will be slightly less due to the loading effect of the sound card itself.

In general, you should not try to be too precise with these calculations. Answers within 5 or 10 percent are usually adequate (given the number of unknowns anyway). If you are particularly unfortunate, you may find that you need to adjust R1 in your cable to the next available standard value once you have tried calibrating your meter in Jade (depending on whether the results are too high or too low).

If you need any help, please contact Ptolemy Services at dev@ptolserv.com.