

USING CONSUMER LEVEL EQUIPMENT IN A PROFESSIONAL AUDIO ENVIRONMENT

In recent years good quality consumer electronic equipment has found its way into many Broadcast TV and Cable TV systems because of its high quality and low price. In some cases the equipment required is only available in consumer grade equipment. While this equipment is reliable, low cost, and high quality it does lack some of the features that are normally included in professional grade equipment that can lead to problems.

As an example most consumer grade equipment comes equipped with RCA connectors for both the audio and the video inputs and outputs and this type of connector works quite well when both ends of a short cable are connected to matching unbalanced RCA connectors. Both pieces of equipment are designed for consumer levels and are expecting an unbalanced signal.

However the problems start when you try to mix unbalanced connectors with balanced connectors. Take for example when consumer playback equipment with unbalanced RCA output connectors are connected to a professional grade modulator or fiber optic transmitter with balanced input connectors. In this case a mismatch of levels normally occurs and the input on the next piece of equipment is expecting to see a balanced signal and instead gets a signal with a short circuit on one of its balanced inputs. This mismatch will cause a lower than expected audio level at the modulator that will make for low volume level and a greater amount of noise in the programming, not to mention ground loop hum problems as well.

An RCA connector by its design is unbalanced, that is it has a center connector and an outer shield that is grounded to the equipment at both ends. This ground connected at both ends of the cable can allow ground loop interfering signals to travel on the same wires and in so doing induce 60 Hz and other unwanted frequencies into your audio programming. These unwanted signals get into the audio because of the grounding at each end of the cable. You can minimize this problem by locating your equipment together at one location and power all the equipment with the same power outlet. However you must still deal with the mismatch of unbalanced to balanced connections.

Professional equipment have balanced inputs and outputs that use a Plus (+) and a Minus (-) conductor with no connection to ground at the ends. The term balanced refers to a signal transmission system that has two active signals of opposite polarity on the wires and neither one is connected to ground. With a balanced audio system any interfering signal that get onto the two balanced wires will be cancelled at the end of the wire by "Common Mode Rejection" on the balanced input of the professional equipment.

The main problem with consumer equipment is that the input and output signal levels are normally much lower than the level used in professional equipment. This level is typically 10 to 14 dB lower with output levels like -10dB that is 3 to 5 times lower in level than what you will find with professional equipment.

This becomes a problem when you connect an unbalanced consumer grade signal that starts out at a lower level to begin with, to a balanced input that expects a much higher level and then again half of the level can be lost at the unbalanced to balanced connection point. To solve this problem you must find a way to boost the levels between equipment and convert an unbalanced drive into a balanced drive signal for a good match.

So what do you do if you have unbalanced RCA connectors on your equipment with low signal levels?

To get the consumer grade equipment working correctly you must place an amplifier in the line between the consumer equipment and the professional equipment. This amplifier should provided the conversion from unbalanced input to balanced output as well as shift the audio level to match the professional equipment and it should be placed as close to the unbalanced input signal as possible. This would be an excellent place to do some audio gain control to take care of audio loudness variations at the same time you are correcting the level and fixing the unbalanced connector situation.

One such amplifier / gain control is the ALM771-10 Audio Level Master that is used to control audio levels and convert unbalanced audio inputs into balanced audio outputs. It will solve the unbalance and raise the consumer levels from -10dBm up to the professional levels of 0dBm or even +4dBm to drive the professional equipment upstream. This product will bring the program levels up when they are low and bring them down when the program levels are too high to control the audio listening volume as perceived by the ear to a constant level. The ALM771-10 comes complete with a power supply and an unbalanced input connector adapter ready for installation.

For more information call 800-235-6960 or use this link: <http://www.fmsystems-inc.com/cw/Details.cfm?ProdID=48&category=18> . To see other product solutions see our website at: www.fmsystems-inc.com.

ALM771-10



Unbalanced Adaptor not shown