

## HOW TO TRANSPORT AN AUDIO SIGNAL UP TO 600 FEET

When transporting an audio signal more than 10 feet indoors or out, the environment could cause a major problems that manifest itself in inductive noise. THIS TYPE OF NOISE IS NOT ATTRIBUTED TO GROUND LOOP.

So how does this happen? We know that electricity is generated when a moving magnet is moved forward and backward near a long wire. So the same is true. When you have long runs of CAT5, CAT6, RCA, XLR wires, all conductors such as wires or cables that travel through space are vulnerable to this type of electrical INDUCTION. Typically you have low level signal of 1V or even 2V. As the signal travels through these wires, magnetic fields generate electricity in the signal wire.

### Example

Lets assume that you have 50 feet of wire going from a control room in a house and travels up into an attic and then back down into a theater room. The wire run is traveling between several circuits that have 110V and 220V AC. These AC circuits generate electricity into the signal wire. Lets assume that you have a 1V signal and a 50 foot run. This could easily generate 0.25V of hum noise. Now Lets refer to the table below.

| Noise Level            | 0dB  | .01         | .1          | 0.25V Signal Level |
|------------------------|------|-------------|-------------|--------------------|
|                        |      |             |             |                    |
|                        | 6dB  | .02         | .2          | .5V                |
|                        | 12dB | .04         | .4          | <b>1V</b>          |
| <b>S/N</b>             |      |             |             | <b>12dB</b>        |
|                        |      |             |             |                    |
|                        | 18dB | .08         | .8          | 2V                 |
|                        | 24dB | .16         | <b>1.6</b>  | 4V                 |
| <b>S/N</b>             |      |             | <b>24dB</b> |                    |
|                        | 30dB | .32         | 3.2         | 8V                 |
|                        | 36dB | .64         | 6.4         | 16V                |
| <b>Hum Kleaner S/N</b> |      |             |             | <b>36dB</b>        |
|                        | 42dB | <b>1.28</b> | 12.8        | 32V                |
| <b>S/N</b>             | 46dB |             | <b>46dB</b> |                    |
|                        | 48dB | 2.56        | 25.8        |                    |
|                        | 54dB | 5.12        |             |                    |
|                        | 60dB | 10.24       |             |                    |
|                        | 66dB | 20.48       |             |                    |
| <b>Hum Kleaner S/N</b> |      | 63dB        |             |                    |

If my reference in decibels is 0.25 which is the noise level and the signal is 1V, then it is clear that the S/N ratio is 12dB. This is terrible. This table shows how a 0.01, 0.1, or 0.2 volt noise is compromised by the low voltage signal of 1–1.6V. Using the Hum Kleaner will allow you to scale up a 1V signal to a 16V signal. You are now able to transport the signal (high signal low noise pickup) and once it arrives towards the end of the run you reduced it back down with the HLLC-200 to a 1V balanced signal. Please note that the HLLC-200 also has a balanced ground loop isolator as well as a high low adapter. In addition; the HLLC-200 can produce a 12V trigger to control other components.

## WIRING

Please note that all outputs are Active. If you use RCA on the input side then the XLR, RCA, and TRS are active and all are balanced. Turn the gain to MAX and you can then transport the signal up to 600 feet.

The Hum Kleaner is a pre-amplifier that allows for a non-balanced signal to be amplified and balanced. A 1V input on the RCA will allow up to 8 VAC output. A 1V input on the XLR will be amplified to 16V. You must select the input you intend to use.

### Optional

You can use 12VDC on B+ and ground on GND. Once you have an audio signal, the REM terminal will generate a 12VDC output to control amplifiers, drapes, etc.

### Optional

I used the shielded ground here, but it is not necessary.

Before you can use the amplified audio signal, you must use the HLLC-200. This is a differential high low adapter with a built-in ground loop isolator. It is set for the HLLC-200 and its output is matching to 99% of all audio amplifiers. It has 2 right and two left RCA outputs.

