

## **It's said to have begun with the Grateful Dead.**

One urban legend has it that headset/beltpack intercom systems came into being when the Grateful Dead began to incorporate electronic instruments into their mix. Up to this time technical crew members communicated over old fashioned telephone operator headsets hooked up in parallel along a single pair, with a voltage on it to make the carbon microphones in the headsets work. But with the band getting louder, the techs could no longer hear one another. And there was no practical way to turn up the volume, turn off the microphone, or signal someone who had removed their headset. The obvious answer was to provide an amplifier for each headset. Enter the beltpack, with its amplifier, volume control, mic switch and signal lamp. The format remains much the same to this day, though the beltpacks are sleeker, better sounding and have bright lamps that don't suck the power supply dry as did the original incandescent bulbs. And the socket for carbon mic headsets has gone the way of the 8-track.

It's both interesting and helpful in understanding how the many variations operate, to spend a brief amount of time reviewing the history. First off the block to enter the market were Clear-Com®, who are said to be the benefactors of the Grateful Dead's new technical requirements. They were certainly in the same neighborhood.

Right from the beginning the choice of cabling influenced product development. Cable, in huge lots, is very, very expensive and heavy. The less of it you have to buy and then carry out from gig to gig, the better. Two conductor shielded microphone cable terminated in 3-pin Cannon (soon to be called XLR) connectors were already being used for microphones and tech crews had miles of them. Why not use those? And they did, setting a standard that continues today, no matter what the brand.

Microphone cables, when actually used on microphones, only function in one direction, and this was before affordable microphones required a voltage to operate mic capsules requiring phantom power. The new intercom systems had to force two-way communications (duplex), the operating current for all the new amplifying beltpacks, and the signal to light the call lamps on the beltpacks, all of it down the two conductors and the shield.

One conductor was set aside for the 24VDC to power the beltpacks, with the shield serving as the 0V reference.

The second conductor had to carry the two-way voice communications and the signal light activation, again with the shield serving as 0V reference. The signal light activation is 12VDC sent down the same conductor as the audio. With components in place to prevent turn on/turn off popping, and very clean DC, the signal activation is unheard. The zero volt reference for the 12V signal lamp is, once again, the shield.

You can see that the shield is doing many things. For this reason, it must be handled very carefully, and never come in to contact with true ground (earth). This is the number one problem for system malfunction and hum. If a strand of the shield is touching the inside of a grounded electrical box somewhere in the system, you're in trouble.

Except for the econoCom, all Pro Intercom power supplies and master stations are, and always have been, built with costly toroidal transformers for ultra quiet audio and virtually zero stray-field radiation. This matters because intercom master stations often share rack space with sensitive lighting controllers.