Related Product:

All Telex Dispatch VoIP equipment

Question:

What are Possible Causes of Poor Audio in Telex Radio Dispatch Systems?

Solution:

Telex Radio Dispatch systems have operating requirements which need to be established and verified, in order to insure good quality audio across a system. Here are some fundamental parameters that installers and technicians need to be aware of, which, if not properly ascertained, may be causes of poor quality audio in the system.

Levels are a foundational issue with Telex radio systems; improper digital audio levels are one of the most common defects that impair system audio quality. This means that the digital transmit audio and digital receive audio must be "proportional". "Proportional" means that the sampling and conversion of the analog signals must be in the proper binary value "window". Generally this would be indicated by a VU Meter bar graph deflection of about 2/3 to ¾ scale at voice peaks. Improper digital audio levels are the result of improper analog levels going into the CODEC.

Digital audio that is too low or too high will degrade re-constitution of digital back to analog audio at the end points. The Telex "VU Meter" program allows measurement of the digital audio levels at different points in the network. VU Meter gives a graphic and numeric indication of digital sampling with multicast traffic.

- **Microphones**

The quality of the transmit audio of the entire system depends heavily upon the quality of the signal originating from the microphone. The microphone is where the "tires touch the road" in the system, and a poor quality microphone cannot be compensated for by any external means.

The highest quality radio system will not sound good if the microphone is of poor quality, improperly adjusted, or improperly used. The microphone is the last component in the system that should be a low price based selection.

Poor microphone audio is often caused by improper use of the microphone, or the wrong type of microphone for the application. Without a doubt, the headset mic is the best choice for any dispatching application, whether public safety, or not.

The headset mic is always at a consistent distance from the dispatcher's mouth, and the close proximity minimizes background noise, and promotes a very consistent voice transmit level. Keep in mind that although some dispatchers do not like to wear headsets, no other type of mic will produce as consistently good sound quality as well as a headset mic.

Desktop and gooseneck microphones are designed to be used at a specific distance from the dispatcher's mouth, and when that distance is exceeded, audio quality degrades, and more background noise is picked up along with the voice. It is common to find a desk mic used at a much greater distance than intended, and this creates less than optimal voice audio quality.

Obviously, a microphone gain setting that is too high can also create a similar problem, with excessive pickup of background noise, and excessive voice amplitude. Too low of gain setting, and the voice amplitude will be too soft and accompanied by noise.

Again console mic audio in a RoIP system is adjusted by watching the VU Meter deflection at the console, using a loud talk test. Once the best deflection is attained, further gain adjustments at the radio end ensure proper transmitter modulation, and optimal audio quality. Voice peaks are a recommended reference point for calibration. Tones may not be as accurate for modulation calibration, as digital conversion does not reproduce single frequency sine waves as well as voice modulation.

- **Control Stations**

Control station radios need to be run across the test bench to insure that they meet all performance specifications. Once installed on site, transmit modulation levels need to be re-verified, once the overall system alignment is completed.

- **Mic Jack Audio**

Some radios use the mic jack as the TX audio interface. Be aware that such low level signals are susceptible to local sources of electrical noise, and shielded cables should always be used.

- **RF**

Most installations use multiple control stations in a single rack or shelf arrangement. RF leakage can infiltrate wiring of all kinds, so it is important to minimize any radiation that may occur in the vicinity of the system equipment. Keep lead lengths as short as possible.

Using outside antennas located as far away from equipment as is possible is important, especially when using high power base stations. Use double shielded RF antenna cables to insure that minimal RF radiation is occurring locally at the rack.

iDen phones and similar can generate all kinds of pulse mode interference, especially if the antenna is not cabled to an external location. A loose antenna cable connector can create a lot of RF radiation near the radio. When in doubt, shield everything. Make sure connections are tight. Amplified speaker cables and microphone cables are very susceptible to pulse mode RF interference.

- **High Noise Floor Areas**

For example, if you are planning a power company dispatch center installation, and you have 345,000 volt transmission power lines next to the building, you may have a noise problem. Similarly, areas near commercial radio and television broadcasting towers may also have a very high RF noise floor that must be considered.

Control station interfaces should be located out of the area of these types of noise sources if possible. If installation away from these noise sources is not possible, extra care should be used to shield all wiring. Faraday shielding is the best method of eliminating electrical noise induced from radiating sources.

- **Noise Present via Supplied AC Power**

Variations and transients in AC power can contribute to system noise. Using UPS power supplies or power conditioners can help eliminate AC power noise present on the supply lines. Verifying that the equipment room supply outlets are properly wired and correctly grounded is good practice. Improper grounds can be a significant factor in noise. Telex equipment should always have case grounds installed.

- **DC Power**

Telex equipment in racks should have a common DC power supply, rather than each one on a separate power supply. A power supply plugged into an improperly grounded outlet will almost always cause AC noise.

- **Network**

Network topology can cause VoIP audio problems if there are bandwidth restrictions, or if shared services are causing packet queuing, or data collisions. If operating on a shared network, use VPN Tunnels. Many Telex customers have had good results with products such as DCB (Data Communications for Business) tunnel boxes.

Suggestions or comments:
Contact technical support with suggestions or comments concerning this application note.

Technical Support:
Email: Telexdispatchtechsupport@us.bosch.com
Fax: 1-402-467-3279
Phone: 1-800-898-6723

Bosch Security
Systems, Inc.
8601 East Cornhusker Highway
Lincoln Nebraska
68507

Phone: (800) 752-7560
Fax: (402) 467-3279

Email:
Telexdispatch@us.bosch.com
Web:
www.telex.com