

LOGIC TRUNKED SYSTEMS

Logic Trunked Radio (LTR)

This protocol was developed in 1978 by the E.F. Johnson company and is still in use, primarily by private companies such as taxicabs, utilities, delivery trucks, and repair services. It is not very popular with public safety agencies, who typically operate either Motorola or EDACS trunked radio systems.

LTR operates differently than Motorola and EDACS in several ways.

Decentralized operation

All mobile radios in a centralized trunking system must request service through a single control channel. Access requests are usually handled in sequential order, and this bottleneck may delay messages during periods of heavy use. More importantly, a dedicated control channel also removes one radio frequency from use as a voice channel. A five-channel Motorola system, for instance, would have one control channel and four voice channels.

LTR systems use a distributed method of access where service may be requested on any channel, and every channel may be used for voice communications. In a five-channel LTR system, all five channels can be used for voice traffic, making more efficient use of the assigned radio frequencies. Also, since each repeater operates more or less independently, if equipment associated with one repeater fails, all the others continue to operate normally.

LTR systems can have up to 20 repeaters, one repeater per channel, all of which must be located at a single site. The repeaters are physically interconnected by a data bus and share status information with each other. Each repeater can then transmit information about which channels are idle and which are busy, and which talkgroup is active on which channel.

LTR uses digital control signaling combined with analog voice transmissions. Each repeater continuously transmits information in a sub-audible data stream that rides below the voice information. A 150 Hz tone transfers data at 300 bits per second, but is not usually heard since most scanners only pass audio signals between 300 Hz and 3000 Hz.

Because LTR mobile radios always know which channels are busy, they only transmit a request for service when a channel is idle. Other trunking systems allow their mobiles to attempt access even when every channel is full, further congesting the control channel.

LTR repeaters usually operate in transmission trunking mode, where the channel is used only for the duration of the transmission. When the user who is talking lets up on the push-to-talk switch, the repeater releases the channel and makes it available for other users. As the conversation progresses each transmission may appear on a different radio frequency, giving the impression that the conversation "hops" from one channel to another.

Under some circumstances a repeater may switch to message trunking and hold a channel open for the duration of a conversation. This is often done for telephone calls or other interconnected operations.

Even when in transmission trunking mode, some other trunking systems do not immediately release the channel after the user stops talking. The repeater is configured to hold the channel open for a second or two, giving the other members of the talkgroup an opportunity to respond. If the system is very busy and the channel is released right away, a second conversation may take the channel and a person trying to respond in the first conversation will not be able to answer, since all the channels would be in use. This "hang time" is rarely needed, but it increases the waiting time for other mobile radios to access the system. It also means scanner listeners may hear a moment of dead air or system noise after the conversation ends but before the repeater turns off, which usually prevents the receiver from resuming scanning.

Mobile Identification

Each LTR mobile radio is assigned to one of the repeaters. Whenever a mobile radio is not involved in a call it is listening to its "home" repeater to keep track of idle channels and to know if anyone is calling it. Even though LTR mobile radios have the ability to make a call on any channel, they usually try their home repeater first.

Each repeater can be assigned as many as 250 identification codes. The combination of home repeater number and identification code is the "address" of a mobile radio. A typical five-repeater system could have as many as 1,250 separate addresses and the largest twenty-repeater system may have up to 5,000 addresses. An address may be assigned to an individual mobile radio and used as a unique identifier, or it may be used as a group identifier by assigning it to more than one mobile radio.

Each LTR system also has an "area code" which is usually included in the address. This value can be either 0 or 1, and is usually 0. If two LTR systems are operating close enough to interfere with each other, one system will be assigned area code 0 and the other will be assigned area code 1. Repeaters in area code 0 will ignore transmissions with an area code of 1, and vice versa. Mobile radios will also listen only to their assigned area code.

LTR Talkgroup Format

Area Code	Home Repeater	User ID
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Area Code: 0 or 1

Home Repeater: 01 to 20

User ID: 000 to 254

Enhancements

LTR-Net is a follow-on protocol to the original LTR, providing users with additional features and functionality. The LTR-Net protocol allows multiple sites to interconnect, giving users the ability to dispatch and communicate across a much wider area. It also supports direct radio-to-radio communication, direct dialed telephone calls, and over-the-air radio reprogramming.

The LTR-Net protocol is compatible with the older LTR equipment. LTR radios can operate on an LTR-Net system, and LTR-Net radios can operate on LTR systems. A user with an LTR-Net radio can even be in the same talkgroup as an LTR radio user, and operate on the same channel.

In 1998 the first LTR-Net began operation in Des Moines, Iowa and Omaha, Nebraska to serve customers in the construction and service industries. There is also an LTR-Net system operating in 800 MHz and 900 MHz on the Caribbean island of Puerto Rico, providing voice, data, credit card verification and even GPS position reporting to commercial customers.



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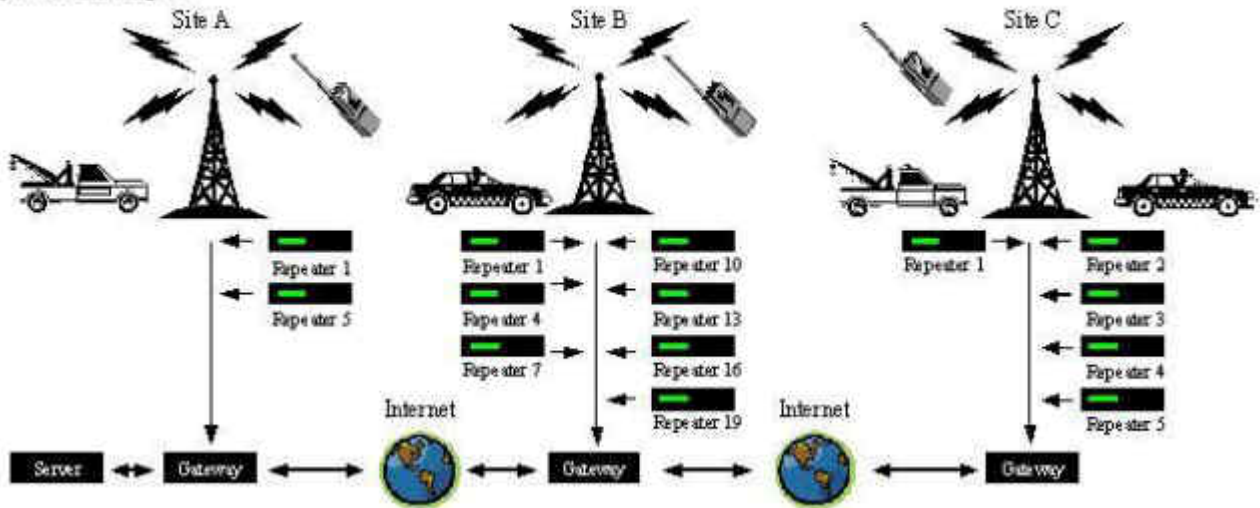


Reach...



Even Further!

System Example:



MORE INFO ON TL-NET CLICK ON >>> <http://wadsworthsales.com/ltrsystem.aspx>



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