Mercom TLR
Trunked Logging Recorder for Com-Net Ericsson EDACS and ProVoice Systems

How Mercom TLR and EDACS work together:

Introduction:
Mercom's TLR Recording Server is designed to work with Com-Net Ericsson Integrated Multisite Controller's (IMC) Digital Recording Interface capabilities to provide reliable and efficient real-time recording of both trunked and conventional radio transmissions. In addition to thorough and accurate audio recording, the Mercom TLR Recording Server utilizes a high-speed licensed data interface to the IMC that allows subsequent quick search, retrieval and playback of recorded transmission files. The result is a highly-integrated, Windows NT-based recording solution that has been fully-optimized to meet the mission-critical needs of Public Safety customers.

IMC Transmission Pre-Processing:
The IMC pre-processes over-the-air transmission audio (analog, digital, and/or encrypted digital), and normalizes all transmission types to standard non-encrypted 64kbps PCM voice. The IMC also performs de-trunking of the radio transmissions such that each individual transmission (trunked and conventional) is handed-off to the Mercom TLR Recording Server in the same manner, via a dynamically allocated pool of channels. This results in efficient use of recorder channel resources, as there is no need to statically allocate a recorder channel for each trunk, each talkgroup, or each conventional frequency.

EDACS to Mercom TLR Audio Interface:
The audio interface between the EDACS system and the Mercom TLR Recording Server employs from 1 to 4 point-to-point T1 tie trunks with instant-start E&M signaling. Configurations of 24, 48, 72, and 96 Recorder Channels can thereby be accommodated (24 channels per T1). The use of E&M instant-start signaling from the EDACS system allows the recorder channels to Start and Stop recording in synchronization with the EDACS transmissions. This positive start/stop control is superior to older Voice activation techniques, and results in accurate recording file management (with 1 exact-length file per transmission).

Recording on the Mercom TLR:
The Mercom TLR Recording Server receives up to twenty-four simultaneous 64kbps PCM digitized audio timeslots per T1 from the EDACS system. In the Mercom TLR Recording Server the T1 is de-multiplexed, robbed-bit call-control signaling is detected, E&M Start/Stop commands are decoded, and the individual 64kbps audio timeslots are transferred to a DSP resource card for voice processing. Voice Processing resources in the Mercom TLR Recording Server compress via ADPCM to a nominal compression ratio of 2.5:1, resulting in a recording rate of 24kbps. This recording rate acts to

simultaneously conserve storage space while preserving excellent audio quality for later playback. The result is crisp, clear audio reproduction. As compression occurs, the compressed ADPCM audio packets are immediately streamed to the recording file on the Mercom TLR Recording Server's hard drive.

EDACS to Mercom TLR data interface:
A separate data channel is maintained through which the EDACS system sends entity and transmission information to the Mercom TLR Recording Server. This data channel employs the use of an EDACS "TRIM PC" computer that receives real-time transmission activity data from one or two TRIM cards in the IMC, pre-processes and packetizes the activity data, and sends it to the Mercom TLR Recording Server via a 100Mbps Ethernet socket connection. Data sent from the EDACS system includes an entity database download (from EDACS to Mercom TLR), as well as real-time entity data for each transmission. The EDACS entity database download is used by the Mercom TLR Recording Server to pre-populate database tables (establishing alpha-numeric entity name to entity ID relationships). The real-time entity data for each transmission is received by the Mercom TLR Recording Server's CTILink software module, which promptly captures and caches the transmission-associated data.

Mercom TLR SQL Database:
In addition to recording the audio from each transmission (under the control of E&M signaling on the T1 circuits), the Mercom TLR Recording Server maintains a SQL database of transmission files. Microsoft SQL Server is employed in order to provide a scalable, robust database that meets the multi-million call record requirements typical of trunked radio recording applications. The transmission-associated entity data that is sent by EDACS via the TRIM PC is cached real-time (external to the database). An asynchronous process then adds this data to the Mercom TLR Recording Server's SQL database, allowing subsequent multi-parameter recording search and retrieval.

Mercom TLR On-Line Storage:
The Mercom TLR Recording Server is equipped with an internal hard drive providing over 2,500 Hours of on-line recording storage (at 24kbps ADPCM recording rate). As each transmission is recorded, a separate file is utilized, resulting in the most efficient use of on-line and archival storage (silent periods between transmissions are not recorded). On-Line recordings may be played back at the Mercom TLR Recording Server via its optional Multi-Channel Player, or at one or more Client PC's (Mercom offers Multi-Channel client playback software for installation on existing sound and network-equipped Win32 PC's).

Mercom TLR Archival Storage:
Recorded calls are automatically archived to removable optical media by the Mercom TLR. Each Mercom TLR Recording Server includes integrated, internal Archive Drives (either a single drive or dual drives for cascade or parallel archiving). 9.4GB DVD-RAM drives are standard. Faster 5.2GB Magneto-Optical drives are optional. Both types of optical storage technology exhibit excellent error protection, long shelf-life for media, and nearly-instant recording retrieval. The Mercom TLR Recording Server maintains a

Library database of all recorded optical media cartridges. In addition, each recorded optical media cartridge contains its own Catalog database of recordings and recording-associated entity data.

Mercom TLR Support for Network Attached Storage:
The Mercom TLR Recording Server can optionally be licensed to permit automatic upload of recording files to a customer-supplied or reseller-supplied Network Attached Storage device. NAS appliances and architectures (such as SnapServers and other RAID-based NAS systems) that support Microsoft Windows Name resolution and that permit a dedicated share for the Mercom TLR storage are supported. (the use of NAS devices that require "drive mounting", such as jukeboxes, RAIT, and such are not supported).

Mercom TLR Network Capability:
The Mercom TLR Recording Server is a single-server recording solution running under the Windows NT 4.0 Server operating system, and is equipped with dual 100Mbps Ethernet ports. One Ethernet port is dedicated for point-to-point communication with the EDACS TRIM PC. The other Ethernet port is intended for connection to the enterprise LAN, allowing multiple remote users to have simultaneous access for remote management and recording playback. Most network capabilities supported by the underlying Windows NT operating system are supported by Mercom TLR Recording Server software.

Mercom TLR Time Synchronization:
Through the use of Microsoft's "TIMESERV" utility for Windows NT, the Mercom TLR Recording Server is able to synchronize with a wide variety of external time standards. Synchronization may occur via the enterprise LAN to another Windows NT-based computer that acts as clock master. Alternately, direct synchronization to a Spectracom Netclock is supported via the enterprise LAN (requiring the optional Spectracom Model 8188 Ethernet interface).

Recording Playback at the Mercom TLR Server:
The Mercom TLR Recording Server includes a built-in 4-channel Mercom Multi-Channel Player (MCP4). MCP4 allows the selection and playback of multiple recording files via a user-friendly database view and search tools. MCP4 generates a graphical time-line representation of the selected recording files (including presentation of silent periods between recordings). Audio mixing of overlapping recording files is included, allowing accurate reproduction of multiple-party events. Playback controls include START, PAUSE, STOP, FF (10%), REWIND (10%), BEGINNING, END, NEXT FILE, PREVIOUS FILE, and LOOP. Due to the complex nature of mixed multi-channel audio presentation, the Mercom Multi-channel player does not include variable speed playback. Note that for applications requiring the replay of more than 4 simultaneous recording channels, Mercom offers client software accommodating 8-channel and 16-channel playback.

Talking Time & Date at the Mercom TLR Server:

The Multi-Channel Player (MCP4) on the Mercom TLR Recording Server includes a synthesized talking Time & Date presentation, which can be user-enabled to speak at the start and end of a multi-call playback sequence, or at the start of each individual recording file. The synthesized Talking Time and Date feature can be disabled at the option of the user.

Recording Playback at Client Workstations:
Mercom offers client software accommodating 4-channel, 8-channel, and 16-channel simultaneous playback (MCP4, MCP8 and MCP16). These client software offerings allow the selection and playback of multiple recording files via a user-friendly database view and search tools. MCP4, MCP8, and MCP16 generate a graphical time-line representation of the selected recording files (including presentation of silent periods between recordings). Audio mixing of overlapping recording files is included, allowing accurate reproduction of multiple-party events. Playback controls include START, PAUSE, STOP, FF (10%), REWIND (10%), BEGINNING, END, NEXT FILE, PREVIOUS FILE, and LOOP. Due to the complex nature of mixed multi-channel audio presentation, the Mercom Multi-channel player does not include variable speed playback.

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Playback via LAN:
Mercom playback client software (Multi-Channel Player MCP4, MCP8, and MCP16) utilizes the enterprise LAN for transfer of the SELECTED recorded files to the client PC. Recordings are streamed to the client at the same rate they were originally recorded (typically 24kbps). Playback via telephone line is not supported by Mercom Multi-Channel Player client software.

Playback on Standard Media Players:
Each EDACS transmission is typically recorded by the Mercom TLR Recording Server at 24kbps, using an ADPCM wave compression algorithm. Mercom offers a no-charge, proprietary, Microsoft-compatible 24k ADPCM CODEC file for installation on any Win32 PC. When the CODEC has been installed on a PC, recording files from the Mercom TLR Recording Server can then be individually played back via a standard Microsoft Media Player.

Mercom TLR Remote Management and Alarms:
Mercom supplies a copy of the Mercom Audiolog Management Console (AMC) client software with each Mercom TLR Recording Server. AMC permits at-a-glance viewing of server status; including online storage usage level and archive drive usage levels. AMC also allows remote configuration and diagnostic access to the Mercom TLR Recording Server. Whenever an alarm condition occurs in the Mercom TLR Recording

Server software, AMC will alert the user to the condition via pop-up, bold text marquee message, and synthesized talking alarm.

Dial-out Alarm Option:
The Mercom TLR Recording Server can be optionally equipped with a single analog channel and associated Dial-Out Alarm module. The Dial-Out Alarms feature will call a sequential list of numbers (phones and/or pagers) until a response is received.

Remote Maintenance:
The Mercom TLR Recording Server can be equipped with a modem and optional Symantec PCAnywhere software for remote diagnostics and maintenance by Mercom reseller staff or Mercom's help desk. PCAnywhere includes logon security capabilities to prevent unauthorized access to the Mercom TLR Recording Server.

Telephony Recording Solutions:
Mercom also offers high-performance telephony Recording Servers capable of recording analog lines, T1 digital trunks, analog and digital PBX telephones, and dispatch/radio consoles. Mercom telephony Recording Servers typically utilize a dedicated channel for each audio source, and therefore support additional client software options that take advantage of static channel dedication. These options include Mercom Instant Recall client software (for quick playback of the "Last Call" and previous calls) and Mercom Remote Live Monitoring client software (for single-channel monitoring of any static/dedicated channel).

About Mercom Systems Inc.:
Mercom Systems Inc. is a software developer and manufacturer of high-performance voice and data recording servers that are used in Public Safety, Government, Industry, and Commerce. Over 2400 Mercom Recording Servers have been installed worldwide since 1997. Mercom is a developer partner with major technology firms, including Com-Net Ericsson, Avaya, Nortel Networks, Siemens, NEC, Genesys Telecommunications Labs, Cisco Systems, and Microsoft. Mercom products are distributed, installed, and maintained by a worldwide network of highly capable authorized Mercom Resellers. Mercom has been recognized for product excellence by numerous industry periodicals and trade shows, and has been included on the INC500 list of fastest growing private companies.

Mercom Systems Inc.
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