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Ericsson's EDACS Trunking

Motorola has several competitors in the trunked public safety radio system marketplace. One popular alternative is the Ericsson/General Electric Enhanced Digital Access Communications System, or EDACS for short.

EDACS operates in VHF, UHF, 800, and 900 MHz bands, and is used by private businesses as well as public safety organizations. Second generation trunk-tracking scanners such as the Bearcat 245XLT and PRO-92 as well as publicly available computer software are capable of scanning these systems effectively.

Channels

Each repeater site in an EDACS system has a dedicated Control Channel that continuously transmits signaling and command information out to the mobile radios. Channel requests and other mobile messages are transmitted to the repeater on this channel as well. Listening to this channel on a normal scanner will result in just a constant buzz of digital information.

Each EDACS site, in addition to the Control Channel, may have as many as 23 Working Channels. These channels carry voice and data between mobile radios and dispatch centers.

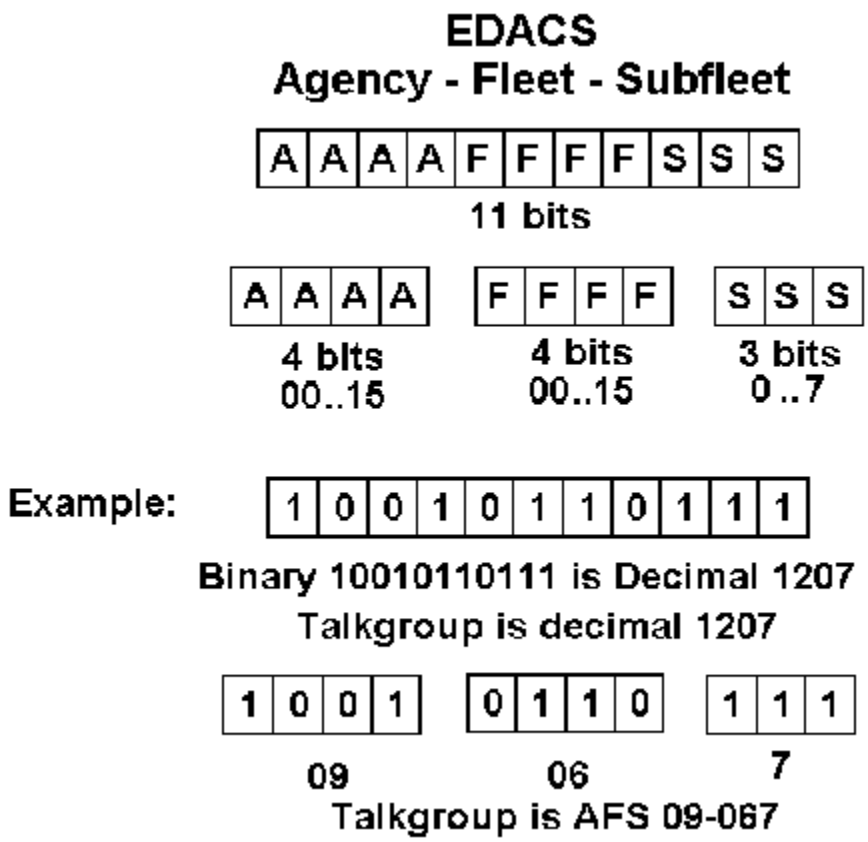
From an operational perspective EDACS systems have better performance should equipment fail or interconnections be lost. If the central controller in a Motorola system fails or cannot communicate with a repeater, the repeater will revert to conventional mode, losing all ability to trunk and forcing users to share frequencies manually. EDACS, on the other hand, goes into a "failsoft" mode where trunking cards at each repeater site continue to provide basic trunking features.

Another difference between Motorola and EDACS is how channels are assigned. Control messages in a Motorola system use a FCC channel number to indicate the specific radio frequency to use, so listeners can enter those frequencies into trunk-tracking scanners in any order.

EDACS, however, assigns each radio frequency a Logical Channel Number (LCN). These LCNs are programmed into each radio in the system, and the control channel uses the LCN to instruct a radio to tune to the corresponding frequency. What this means is that a listener must enter EDACS frequencies in LCN order in order to track the system properly.

Talkgroups

EDACS talkgroups are divided into agencies. Each agency has a number of fleets, and each of these fleets has a number of subfleets. This hierarchy is similar to a Motorola Type I system, although there are no limitations on the number of individual radios in each subfleet. This Agency-Fleet-Subfleet scheme is abbreviated AFS.



EDACS uses 11 binary digits (bits) to identify a talkgroup. These 11 bits are divided into three pieces, one piece for the Agency, one for the Fleet, and one for the Subfleet. Each of these pieces uses a certain number of the 11 total bits to represent the identifying number. Each EDACS system may divide these bits up differently, but the most common arrangement for public safety agencies is four bits for the Agency, four bits for the Fleet, and the remaining three bits for Subfleet. This is represented by the last entry in the table, which shows a maximum of 16 Agencies, 16 Fleets per Agency, and 8 Subfleets per Fleet.

POSSIBLE EDACS AFS ASSIGNMENTS

AGENCIES	FLEETS	SUBFLEETS
2	4	256
2	8	128
2	16	64
2	32	32
4	32	16
8	8	32
8	16	16
16	16	8

The AFS is usually shown in the format `AA-FFS` where `AA` is the Agency, `FF` is the Fleet and `S` is the Subfleet. Newer trunk-tracking scanners that support EDACS default to displaying talkgroups in AFS format rather than a simple decimal number. The AFS format makes it easier

to scan entire Agencies and/or Fleets without needing to enter each individual talkgroup. The Bearcat 245XLT in particular has a feature called XPAND which is designed to do just that.

Some talkgroups have a special function. The first talkgroup in the system, 00-000, is known as "System All-Call." Every radio in the system will hear a message sent to this talkgroup.

Similarly, an "Agent All-Call" is the first talkgroup in an Agency, where the Fleet and Subfleet are both zero. For instance, a transmission to talkgroup 03-000 would be heard by all radios assigned to that Agency.

There is also a "Fleet All-Call" which is the first talkgroup in each fleet. A transmission to talkgroup 04-080, for example, would be heard by every radio in Fleet 8 of Agency 4.

Ocean City, Maryland

This resort town on Maryland's Eastern Shore operates an EDACS for several city agencies through two 800 MHz towers. The primary site has eleven repeaters while a backup site a few miles away has three.

LCN	Frequency
1	859.9875
2	853.9625
3	855.2375
4	860.9875
5	856.7375
6	857.7375
7	858.7375
8	859.7375
9	860.7375
10	859.2375
11	857.2375

TALKGROUPS

POLICE

02-021 Boardwalk
02-022 Patrol
02-023 Tactical 2
02-024 Channel 4
02-025 Tactical 1
02-026 Channel 6
02-027 Channel 7
02-030 Channel 8

FIRE/EMS

02-041 Fire/EMS Dispatch
02-042 Fire Operations 1
02-043 Fire Operations 2
02-044 EMS Operations
02-045 Trooper/Helicopter
02-046 US Coast Guard
02-047 Worcester County
02-050 Fire Marshalls
02-051 Emergency
02-052 Beach Patrol Channel 1

PUBLIC WORKS

02-061 Public Works 1
02-062 Public Works 2
02-063 Solid Waste
02-064 Recycling
02-065 Transportation 1
02-066 Transportation 2
02-067 Ocean City Airport
02-070 Building Inspectors
02-077 Wastewater

Brevard County, Florida

Florida's "Space Coast," home to Merritt Island, Cape Canaveral, and the historic Launch Complex 39, lies within Brevard County. The county operates an interconnected EDACS system through 400 foot towers in Titusville, Rockledge, and Palm Bay.

	NORTH	CENTRAL	SOUTH
LCN	**Titusville**	**Rockledge**	**Palm Bay**
1	866.2125	866.0750	866.1250
2	866.8250	866.3250	866.5875
3	868.1625	866.6250	867.0375
4	868.7375	868.5375	868.0750
5	866.2625	868.7875	866.2500
6	866.5500	866.1875	868.3750
7	868.4125	868.6000	868.5625
8	868.6875	868.8500	868.8125
9	866.7625	867.1250	866.3000
10	867.2625	867.3750	866.3750

11	867.7625	867.6250	866.6750
12	868.5125	867.8750	866.9000
13	855.2375	-	867.5375
14	851.0125	-	866.5625
15	-	-	868.6250
16	-	-	856.7625
17	-	-	857.7625
18	-	-	858.7625
19	-	-	859.7625
20	-	-	860.7625

One channel at each site is assigned as a Control Channel. Because any channel in an EDACS system has the capability of operating as a control channel, the assignment may change. The southern site, which includes the city of Melbourne, has more frequencies due to a higher level of activity. Telephone interconnect activity appears to be limited to Channel 2 frequencies.

Illinois State Police

The Illinois State Police in the District Chicago area operate two interconnected EDACS systems for a number of local, state, and federal agencies. District Chicago was formed five years ago out of the old District 3 (Chicago) and District 4 (Crestwood). Several sites in Cook County and surrounding suburbs provide coverage throughout Chicagoland.

The two systems are divided into North and South, with the Eisenhower Expressway as the dividing line. Each has ten channels.

LCN	North	South
1	866.4625	866.4125
2	866.8875	866.4375
3	867.9625	866.9375
4	866.3875	867.4125
5	867.4625	867.9375
6	867.8875	867.9125
7	868.3875	868.4375
8	868.4625	868.4125
9	868.8875	868.9375
10	868.9625	868.9125

The Illinois State Police operates three patrols in the District, North ("Nora"), Middle ("Mary") and South ("Sam"). Argonne is a National Laboratory operated by the Department of Energy located about 25 miles southwest of Chicago.

06-021 Illinois Department of Transportation

06-022 Chicago Fire Department

06-047 North Dispatch

06-053 Dispatch
08-021 Detail/Surveillance
08-022 North Dispatch
08-024 North Car to Car
08-041 Middle Dispatch
08-044 Middle Car to Car
08-061 South Dispatch
08-064 South Car to Car
08-094 Gangs Middle
08-114 Gangs North
08-116 Gangs South
08-121 Priority
08-122 Car to Car
08-123 Surveillance North
08-124 Surveillance South
08-134 Air 1
09-007 DuPage Fire Protection District
09-010 DuPage Fire Protection District
09-031 Drug Enforcement Administration
09-054 Illinois Department of Corrections
14-021 Radio Technicians
14-056 Radio Technicians
14-061 Argonne Fire Department
14-062 Argonne Fire Department
14-063 Argonne Security

Dallas/Fort Worth Airport, Texas

The Dallas/Fort Worth Airport, home to American Airlines, uses an EDACS system for a variety of ground operations including security, fire, emergency medical services (EMS) and transportation.

LCN	FREQUENCY
1	866.0875
2	866.5875
3	867.5875
4	868.0875
5	868.4625
6	866.4625
7	866.9875
8	867.4625
9	868.7125

10 868.9375

00-157 Fire/EMS Alert Operations
02-021 Police 1
02-022 Police Meet Me
02-023 Police 2
02-026 Police 7
04-021 Operations (Primary)
04-023 Operations
04-024 Operations
04-061 Maintenance (Primary)
04-064 Electrical Maintenance
04-065 Bird Operations
04-070 Operations
04-101 Trains (Primary)
04-102 Transit
04-104 Transit
04-106 Transit
06-023 EMS Response
06-033 Police 10
06-041 Fire Response
06-044 Fire Response
06-045 Fire Response
06-046 Fire Response
06-047 Police 5

That's all for this month. I welcome comments, corrections, additional lisitings, and questions via electronic mail at dan@decodesystems.com. There is also more radio-related material on my website at http://www.decodesystems.com. Until next month, happy monitoring!

Comments to Dan Veeneman

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