

Trunked Radio Communications

OpenSky Radio Systems Learn How These Work!

By Matthew Payne

In this month's Trunked Radio Communications column, we are going to take a look at the OpenSky radio system, manufactured by M/A Com, Incorporated. OpenSky is a fairly new and advanced form of trunked radio system, already chosen for one statewide trunked radio network, and likely to gain even more popularity across the country.

This article was prompted by a email from a loyal reader named Ira in Royal Oak, Michigan. Oakland County, Michigan is preparing to implement an OpenSky system, and local scanner enthusiasts are concerned that their scanners might soon "grow silent"

OpenSky trunked radio systems are primarily designed for use in the popular 800 MHz part of the RF spectrum. One of the primary benefits of this network is the extensive integration of voice and data throughout the entire system, and the scalable structure of the network. Another key feature is the extensive over-the-air programming capabilities. We'll explore these features and more, as we take an extensive look at this communications system.

The OpenSky network was designed to provide integrated voice and data capabilities in one radio system, using only one set of RF Frequencies. To accomplish this, OpenSky uses a technique called TDMA (or Time Division Multiple Access) to split each RF channel into two segments. These two segments can be used to send any combination of voice or data signaling. Additionally, control channel data is encoded on each channel in the network, which eliminates the need for a completely dedicated control channel.

Data from the network can then, for example, be routed to either the officer's mobile radio (for voice communications) or to the MDT (for data communications). Each radio on the OpenSky system can handle double duty, functioning as both a computer and as a radio. Not only

can officers talk on their radios, as before, now they actually log onto the radios, and thus onto the network.

One of the most interesting features of the system is the IP Based network that they chose to utilize. Each radio has it's own address, and acts much like a server would on the World Wide Web. Administrators can access each radio remotely, and change talkgroups, characteristics, radio attributes, or individual settings at will. In the case of a stolen radio, they can also disable the radio, and more than likely have the capability to lock the radio on transmit as well. But there are other benefits to having the radios on a network.

Remember how I said that each officer logged into the radio network via the radio itself? The officer's individual settings for talkgroups, volume, and other preferences are stored on the network, and are pulled off the system when he logs into the radio. So even if an officer does not have a radio of his/her own, his radio is personalized to his position and preferences when he/she logs on. This also allows supervisory personnel and dispatchers to see who is logged on and in service at a glance.

Data applications on the OpenSky networks are equally impressive. Data can be sent over the air at a fairly brisk 19.2 KB/s, and can easily include text, pictures, and other data. Besides the obvious uses of police MDT's, other data that has been sent using the OpenSky system includes vehicle maintenance telemetry, and patient information and vital sign telemetry for EMS. Each radio has an integrated GPS engine, allowing for real time vehicle tracking and location.

A dispatcher knows where each police, fire and EMS vehicle is located, which are the closest to a particular scene, and which have remained stationary for an unusually long period of time. All of this means increased safety to the officers and personnel in the field, and



If your local public safety agency moves to OpenSky, don't give up on your radio hobby!

Increased safety and response to the public as well.

Well, that about explains what OpenSky is and how it works. But now for the important question: What does this mean to us scanner listeners? Well, right now things look pretty dismal. But, as we described in the NexTel column a few months ago, this does not have to remain the case indefinitely. OpenSky uses TDMA to divide the RF channels into two segments. Additionally, the OpenSky system uses standard ABME modulation to process and compress the digital audio data.

Both of these schemes are fairly well documented, and reverse engineering would in theory be possible. As was the case with NexTel, I would seriously recommend that scanner hobbyists in areas adopting OpenSky networks band together and make your voices heard to the scanner industry. Pressure on the manufacturers is the best way of insuring that a desired product is developed and brought to market.

Still not enough? Seriously addicted scanner monitors might want to consider purchasing an OpenSky capable radio. These might be able to be programmed to receive the transmissions from the system, although this may only be possible with extensive help of someone friendly within the

system itself. The prices for these radios are fairly prohibitive, but may be worth it for the "extreme hobbyist".

Is there a system you would like me to feature in an upcoming article? Follow Ira's lead and email your suggestions today! I'm always looking for more material for future articles!

Until next month, Happy Trunk-Tracking, and stay warm!

Featured Trunked Radio System (Info taken from trunkedradio.net).

System Name: City of Toledo

Location: Toledo, OH County: Lucas

System Type: Motorola Type II Smartnet

851.0625 851.4375 851.4875 852.0625 852.4375 852.4625
 852.4875* 853.0625 853.4375 853.4625 853.4875* 854.0625
 854.4375 854.4625 854.4875* 855.0625 855.4375 855.4625
 855.4875*

Emergency / Mutual Aid Talkgroups

DEC	HEX	Display	Description
16	001	FIRE ATG	Fire Fleet ALL-CALL
336	015	COORDINATE	System Coordination / Interagency
368	017	MANAGEMNT	System Management
400	019	DOT ANNC	DOT Fleet ALL-CALL
464	01d	UTIL ANNC	DPU Fleet ALL-CALL
496	01f	MUTUAL ANNC	Mutual Aid ALL-CALL
528	021	PD ANNC	Police Fleet ALL-CALL
1712	06b		Forestry Fleet ALL-CALL
2160	087		Lucas County Fleet ALL-CALL

Toledo Fire / EMS Talkgroups

DEC	HEX	Display	Description
48	003	CH1 DISP	Dispatch
80	005	CH2 EMS	EMS Operations
112	007	CH3 FGND 1	Fireground 1
144	009	CH4 FGND2	Fireground 2
176	00b	CH5 HAZMAT	HazMat / Ops
208	00d	CH6 TRAINING	Training
240	00f	CH7 SP EVENT	Special Events
272	011	CH8 TAC	FIU / Tactical
304	013	CH9 MUT AID	Mutual Aid [Can be Linked to 154.1900]
1840	073	FD 1A	Fire Alert [OLD FD 13 Emergency]

Toledo Police Talkgroups

DEC	HEX	Display	Description
656	029	CH1 PTRL N	Patrol NORTH
688	02b	CH2 PTRL S	Patrol SOUTH
720	02d	CH3 PTRL C	Patrol CENTRAL
752	02f	CH4 INVEST	Investigative
784	031	CH5 DIR PAT	Directed Patrol
816	033	CH6 RCRD 1	Records 1 (Records/Info)
848	035	CH7 RCRD 2	Records 2 (Traffic/Auto)
880	037	CH11 TAC 1	Tactical 1
912	039	CH12 TAC 2	Tactical 2
944	03b	CH15	Clandestine
976	03d	CH9 RES 1	Reserved 1 (General Broadcasts) [Linked to 460.4000]