

Analog versus Digital

One example of analog radios is AM aircraft radios used to communicate with control towers and air traffic controllers. Another is a Family Radio Service walkie talkie. Equipment is less complex than digital. Many VHF and UHF for LMR business users and Amateur Radio is analog FM.

- **Advantage:** In high-quality equipment, better ability to communicate in cases where a received signal is weak or noisy.
- **Disadvantage:** Only one conversation at a time can occur on each channel.

Examples of digital communication are APCO Project 25, a standard for digital public safety radios, Nextel's iDEN, Motorola's MOTOTRBO, and NXDN implemented by Icom as IDAS and by Kenwood as NEXEDGE.

- **Advantage:** More simultaneous talking paths are possible and information such as unit ID, status buttons, or text messages can be embedded into a single digital radio channel.
- **Disadvantage:** Radios must be designed to the same, compatible standard, radios can become obsolete quickly, cost more to purchase, and are more complicated.

Project 25 (P25) or APCO-25 refer to a suite of standards for digital radio communications for use by federal, state/province and local public safety agencies in North America to enable them to communicate with other agencies and mutual aid response teams in emergencies. In this regard, P25 fills the same role as the European Tetra protocol, although not interoperable with it.

The P25 suite of standards involves digital Land Mobile Radio (LMR) services for local, state/provincial and national (federal) public safety organizations and agencies.

Although developed primarily for North American public safety services, P25 technology and products are not limited to public safety alone and have also been selected and deployed in other private system application, worldwide.

P25 Open Interfaces

P25's Suite of Standards specifies eight open interfaces between the various components of a land mobile radio system. These interfaces are:

- **Common Air Interface (CAI)** standard specifies the type and content of signals transmitted by compliant radios. One radio using CAI should be able to communicate with any other CAI radio, regardless of manufacturer
- **Subscriber Data Peripheral Interface** standard specifies the port through which mobiles and portables can connect to laptops or data networks
- **Fixed Station Interface** standard specifies a set of mandatory messages supporting digital voice, data, encryption and telephone interconnect necessary for communication between a Fixed Station and P25 RF Subsystem
- **Console Subsystem Interface** standard specifies the basic messaging to interface a console subsystem to a P25 RF Subsystem

- Network Management Interface standard specifies a single network management scheme which will allow all network elements of the RF subsystem to be managed
- Data Network Interface standard specifies the RF Subsystem's connections to computers, data networks, or external data sources
- Telephone Interconnect Interface standard specifies the interface to Public Switched Telephone Network (PSTN) supporting both analog and ISDN telephone interfaces.
- Inter RF Subsystem Interface (ISSI) standard specifies the interface between RF subsystems which will allow them to be connected into wide area networks

More information on P25 >>> <http://en.wikipedia.org/wiki/P25>



>>> <http://www.project25.org/>

NXDN is a Common Air Interface (CAI) technical protocol for mobile communications. It was developed jointly by Icom Incorporated and Kenwood Corporation. The NXDN Forum was formed in order to promote the NXDN protocol in North and South America. The forum's members are:

- Aeroflex Wichita, Inc.
- Daniels Electronics, Ltd.
- Icom Incorporated
- Kenwood Corporation
- Ritron, Inc.
- Trident Micro Systems

NXDN is implemented by Icom in their IDAS system and by Kenwood as NEXEDGE.

More info on NXDN >>> <http://en.wikipedia.org/wiki/NXDN>

MOTOTRBO is Motorola's first digital two-way radio system specifically designed to meet the requirements of professional organizations that need a customizable, business-critical communication solution using licensed spectrum.

More info on MOTOTRBO >>> <http://mototrbo.motorola.com/>

TErrestrial Trunked Radio (TETRA) (formerly known as *Trans European Trunked RAdio*) is a specialist Professional Mobile Radio and two-way transceiver (colloquially known as a walkie talkie) specification. TETRA was specifically designed for use by government agencies, emergency services, (police forces, fire departments, ambulance), rail transportation staff, transport services and the military.

TETRA is an ETSI standard, first version published 1995. ETSI were the body that published the standard for GSM which is the most popular standard for mobile phones in the world, TETRA works in a very similar way to GSM the main differences being, the handsets have a longer range and there is more bandwidth allocated for data. TETRA is endorsed by the European Radio Communications Committee (ERC) and mandated for use in Europe.

More info on TETRA >>> http://en.wikipedia.org/wiki/Terrestrial_Trunked_Radio

DIGITAL D-STAR

D-STAR (Digital Smart Technologies for Amateur Radio) is a digital voice and data protocol specification developed as the result of research by the Japan Amateur Radio League to investigate digital technologies for amateur radio. While there are other digital on-air technologies being used by amateurs that have come from other services, D-Star is one of the first on-air and packet-based standards to be widely deployed and sold by a major radio manufacturer that is designed specifically for amateur service use.

Other non-digital voice modes such as amplitude modulation, frequency modulation, and single sideband have been widely used since the first half of the twentieth century. By comparison, digital D-STAR signals offer clearer signals and use less bandwidth than their non-digital counterparts. As long as the signal strength is above a minimum threshold, and no multi-path is occurring, the quality of the data received is better than an analog signal at the same strength.

D-Star compatible radios are available on VHF, UHF, and microwave amateur radio bands. In addition to the over-the-air protocol, D-Star also provides specifications for network connectivity, enabling D-Star radios to be connected to the Internet or other networks and provisions for routing data streams of voice or packet data via amateur radio call signs.

The first manufacturer to offer D-Star compatible radios is Icom. As of December 30, 2008, no other amateur radio equipment manufacturer has chosen to include D-Star technology in their radios. Kenwood re-brands an Icom radio and distributes it in Japan only.

More info on D-STAR >>> <http://en.wikipedia.org/wiki/D-STAR>

Related Links:

[DSTAR Users Organization](#)

[DSTAR Technical Requirements](#)

[DSTAR System Locator](#)

[DSTAR Video \(D-Chat\)](#)



D-STAR *Digital Radio Information Page*
>>> <http://www.comfac.com/SMCARA/DSTAR.htm>



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