NXDN™ Trunking

NXDN™ is one of the leading narrow band digital technologies taking hold worldwide in the migration from analog to digital two-way radio. Developed in 2005 in a technical alliance between Icom Incorporated and Kenwood Corporation, NXDN™ has been instrumental in accelerating the push toward narrow band, spectrum efficient digital two-way radio, both as a solution available today and also as a catalyst to effect regulatory recognition of narrow band digital technology in general worldwide.

The NXDN™ standard is supported by the NXDN™ Forum (http://www.nxdn-forum.com/), an industry group comprised of 16 member companies who in themselves are leading organizations in manufacturing, test measurement equipment, IC development and software protocol stack development in the Land Mobile Radio market.

NXDN™ was a unique technology when it was first introduced into the market as it provided a solution to meet the narrow banding requirements mandated by the Federal Communications Commission (FCC) in the United States for example.

Now NXDN™ adds another unique feature to its growing list of advantages with the capability to offer two types of trunking solutions for the ultimate in system flexibility. Read on in the following pages to learn more about this exciting technology, and what NXDN™ can provide for you and your narrow banding needs.

What is NXDN™?

Simply put, NXDN™ is a very narrow band digital two-way radio protocol. The NXDN™ standard can offer either 6.25 kHz or 12.5 kHz channel spacing using the FDMA (Frequency Divided Multiple Access) method, and conventional, single and multiple site trunking modes are also included in the standard. The technology utilizes the latest in vocoding technology in the AMBE+2™ vocoder. This is the same vocoder that is being required in the APCO Project 25 standard (I.e. Enhanced vocoder). 4-level FSK modulation was also adopted to allow the general design of an NXDN™ radio to be as close to current FM analog radio design as possible (This allows for better product cost performance compared to more complicated digital protocols).

The general specifications are as follows:

- Access Method   : FDMA
- Channel Spacing   : 6.25 kHz or 12.5 kHz
- Transmission Rate : 4800 bps (6.25 kHz) or 9600 bps (12.5kHz)
- Modulation   : 4-level FSK
- Vocoder   : AMBE+2™
- Codec Rate   : 3600
  (Voice 2,450 + Error Correction 1,150 bps)

Abundant System Features:

As mentioned, NXDN™ has a standard conventional digital mode that allows call operation like Individual Call, Group Call and All Call. Selective calling is possible using the Radio Access Number (RAN code) which is similar to CTCSS/DTCS operation in analog mode. The provision for Emergency calls, GPS operation, data messaging and even a digital voice scrambler (15 bit, 32,000 codes) are all part of the standard.

NXDN™ products available now support mixed mode operation (the ability to receive and transmit both analog and digital signals) which is a key element in migrating a legacy analog system to digital. IP networking is also another feature NXDN™ equipment supports to allow the possibility of wide-area system communication. NXDN™ manufacturers have also enhanced the basic system operation with features like dispatch capability via interfacing with consoles or Fleet management services. We recommend you research the current product literature available from manufacturers to obtain more information on what system capabilities are available.

NXDN™ Trunking:

As mentioned, NXDN™ is unique in the fact that two types of trunking are available. We have called these Type-C NXDN™ trunking and Type-D NXDN™ trunking.

NXDN™ Type-C Trunking:

This is a **_Centralized_** (I.e. Control channel based) trunking configuration. The advantages of a centralized system are increased roaming efficiency and call queuing with priority allocation possible.

Type-D NXDN™ Trunking:

This is a ***Distributed Logic*** (I.e. No control channel) trunking configuration. The advantages of a distributed logic system are an extra traffic channel and increased system access probability as a result.

Trunking System Features:

The NXDN™ standard contains a broad spectrum of functions and thus the feature set of a system is determined by the manufacturer developing their system for the market needs they will serve. From this perspective, no one standard feature set can accurately be listed here, but the following could be considered to be common to most NXDN™ trunking systems.

- Single site and Multi-site capability
- Individual and Group call capability
- Data features (Short text, GPS and status messaging)
- Automatic Roaming
- Maximum of up to 60,000 ID's per system
- Wide area networking capability via IP linking

The NXDN™ Forum:

The NXDN™ Forum is a group formed by Land Mobile radio market leader companies for the purpose of making and maintaining the NXDN™ suite of standards, ensuring interoperability between member's NXDN™ products and services and the promotion of NXDN™. Member companies are Icom Incorporated, Kenwood Corporation, Aeroflex Corporation, Daniels Electronics Ltd., Ritron Inc., Trident Microsystems, Anritsu Corporation, CML Microsystems plc. Etherstack Limited, General Dynamics SATCOM Technologies, Meteor Communications Corporation, Inc., Connect Systems Inc., Hoag Electronics, Inc. and Pyramid Communications.
(As of March 8th, 2011)

More details on the NXDN™ Forum can be found at: http://www.nxdn-forum.com/

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The information in this document has been carefully checked, and is believed to be correct and accurate. However, the NXDN™ Forum assumes no responsibility for inaccuracies or mistakes.

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