



Analog  
Communications Planner

# A wireless planning guide for communications users

from



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## If you listen.....

to all the talk in the media, by manufacturers, sales representatives, and all the technical people in the know, you may conclude that all communications will soon be digital and if you don't make your move right now, you can be losing out on the greatest thing since sliced bread!

However, there is a contrarian opinion, not greatly publicized, but an opinion based on currently available statistical data. There are actually some people who claim that the cost savings of analog outweighs the perceived benefits of digital communications. Our job is not to debate the issues of analog versus digital, but to give you the facts you need to intelligently decide which is best for you.

Let's start by reviewing some of that statistical data. Mission Critical magazine, a highly respected magazine serving the communications industry and the major users of private wireless services recently conducted a reader survey to determine who is using what at the current time. The results may be surprising to many of the self proclaimed experts in the private wireless industry. Here are the results of the survey"

- 73% Use Analog Conventional Systems
- 38% Use Digital Trunked Systems
- 32% Use Digital Conventional Systems
- 30% Use Analog Trunked Systems
- 12% Use Commercial PTT (iDEN, Verizon, etc) Systems
- 9% Use Satellite Systems

Source - Mission Critical Communications -June, 2010

Mission Critical magazine is primarily focused on users involved in public safety, but in general, commercial users could be expected to reflect the same patterns. What we learn from these statistics is a trend from conventional (single channel, single user) systems to trunked systems where two or more users combine their frequencies for more efficiency. Putting it another way – any radio purchased today should be capable of trunking (multi-channel operation with automatic frequency selection) regardless of whether that radio is analog or digital.

As you will note, some agencies use commercial networks for wide area, even nationwide PTT (Push to talk service). While very popular just a few years ago, the demand for carrier provided service is declining since the demands of public safety communications are quite different from commercial networks. An even smaller number use Satellites for wide area PTT service. Satellite communications can be very useful, but in general, the high cost of non-existent coverage in buildings limits use for public safety users.

The bottom line is that the whole issue of analog versus digital communications is considerably more complex than some would have you believe. We hope that the material contained herein will be helpful making the right decision for YOU!

## Digital Differences

Before we discuss analog technology in detail, we think it would be beneficial to address the different types of digital systems currently available. As mentioned previously, we will not discuss carrier network or satellite networks since our focus is on the privately owned systems primarily used by mission critical public safety users. In addition to analog systems, there are three major forms of digital technology. They are DMR, NXDN, and P25. Outside the USA, there is a fourth system, known as TETRA which is very popular in China, the Middle East, and the Southern Pacific region. At this time (July 2010), this technology is being considered by larger utility users, but for now, the following would be the main choices for users in the USA.

### DMR

Initially offered by Motorola, and more recently by HYT, DMR (Digital Mobile Radio) is fundamentally a European technology standard. In essence, DMR is based on 12.5 kHz narrow band operating standards with the ability to split the allotted bandwidth into two separate “channels”. This allows two simultaneous communications paths – One for data and one for voice, two voice paths, or two data channels. The Motorola version of DMR is known as MotoTRBO. The HYT offering is known as Hytera. We have a complete information guide available at [www.info4u.us/DMR.pdf](http://www.info4u.us/DMR.pdf). Typical user pricing for mobiles is in the eight hundred dollar range, portables in the seven hundred dollar range, and repeaters in the twenty five hundred dollar range. Neither Motorola or Hytera suggests DMR as a mission critical communications technology, although it is sometimes chosen as it is significantly less expensive than the government approved P25 technology. We will deal with this in more detail shortly.

### NXDN

Many of the innovations in communications are developed by and for amateur communication users, alternately known as Hams. A technology developed by ICOM for amateur use is the building block for the technology known today as NXDN. The amateur digital format known as D-Star quickly became a defacto world standard with many of the features and functions that are now a part of NXDN technology. The primary providers of NXDN are ICOM (IDAS) and Kenwood (NexEdge). ICOM had approximately a one year head start over Kenwood, primarily as a result of experience with D-Star. NXDN is not suggested by either manufacturer for mission critical applications although the American Association of Railroads has accepted NXDN as the standard for railroad use. The severe operating environments of rail use require extremely rugged communications equipment. Additionally, NXDN is the only technology currently available capable of operating at 6.25 kHz Very Narrow Band (VNB) channel spacing. The prices are comparable to DMR. More information is available at [www.info4u.us/IDAS-Guide.pdf](http://www.info4u.us/IDAS-Guide.pdf).

### APCO-25 (P25)

APCO-25 or P25 is the oldest basic digital technology used in the USA but is an evolving technology which means that for future use, it is most likely the safest choice. It is the only technology endorsed by the Department of Homeland Security (DHS), FEMA, and SAFECOM and is required for use by all federal agencies and any governmental agency contemplating the use of federal funds for communications purchases. Prices will generally be at least twice as much as DMR or NXDN (in some cases, three of four times more. Additional information is available at [www.info4u.us/P25Guide.pdf](http://www.info4u.us/P25Guide.pdf).

## What are to Top 5 reasons for choosing digital radios?

**Number 5 - Technical benefits** – Digital radios consume less current than analog radios. This means portable batteries operate longer between charges. This leads to longer intervals between charges and that means longer battery operating life before replacement. Most digital radios use memory free, high capacity Lithium-Ion batteries that are smaller and lighter than the old Nickel-Cadmium or even Nickel Metal-Hydride batteries. Lower current consumption means less vehicle battery drain and longer operating life when fixed stations are operating on battery backup in an emergency situation.

**Number 4 - Advanced features** – There are some really beneficial options that can easily be incorporated in a digital communications system. The reason is that digital communications systems convert everything to data (including voice). This means it is fairly easy to add 2-way text messaging and GPS either for finding directions, fleet dispatch, or vehicle tracking. The most popular at this time is text messaging.

**Number 3 - Privacy** – The difference in 2-way radio and cellular communications is that cellular communications are designed for one-to-one communications whereas 2-way radio is designed for one-to-many communications. This is great for group coordination, dispatch, and other activities where a large group of people need to communicate with each other. The shortcoming of the one-to-many communications is the lack of privacy. Analog systems can easily be monitored by the public – not so with digital. Of equal importance, digital radio systems allow user groups, or even individuals, to communicate with each other in PRIVATE while still being available to monitor group activity. This is a huge benefit!

**Number 2 - Elimination of Noise** – Static, hiss, and fringe area communications are words that do not apply to digital communications. With an analog system, as the signal level degrades with distance, noise intensifies until the noise is actually greater in the fringe areas than the actual communication signal. You may be able to hear a transmission, but it is unintelligible because of noise – Not so with digital. If you've got a signal – it's crystal clear since there is no noise. A digital system sounds like it is talking farther than analog. Actually it doesn't. It just gives you maximum communications capability that sounds great!

**Number 1 - Elimination of interference** – Ever since 2-way radios became practical for vehicular and personal use; we have been conditioned to accept the fact that interference from other users that may be sharing the channel must be accepted. We have been told that there is no such thing as a private channel. We have added privacy options such as tone coded squelch and more recently, digital coded squelch but we still have interference UNLESS we use digital radios. We may still share channels with other users. In some cases, this may be beneficial where Police, Fire, and EMS share a frequency for common emergency use. The difference in digital is that we can either segment or combine different users on the same channel with unwanted interference being a thing of the past. Better yet, we get better utilization of available frequency spectrum – truly a win-win benefit.

As a final comment, it should be noted that interoperability to communicate with other users and compliance with mandatory government regulations are important, but the real reasons for going digital are as shown above.

That still leaves a lot of room for analog radios. We've been using (and are still using) analog radios for close to a century. That should be reason enough to at least consider looking at our analog offerings. The price is right, and analog may be just the right choice for YOU!

## A Reintroduction to Analog Radio

There are two compelling reasons to consider analog radios over digital. They are LESS EXPENSIVE, compatible with other systems, and generally smaller and lighter. Features and functions for analog radios are available that provide similar capabilities to their digital counterparts. The chart below will give you an overview of analog and digital radios.

Criteria	Analog	Digital
Narrow band 12.5 kHz capable	Yes	Yes
Encryption for private communications	Yes (Some models)	Yes
User ID (Name displays on screen of other units)	Yes (Display models)	Yes (Display models)
Extended battery life	Yes	Yes
High output audio	Yes (Some models)	Yes (Some models)
GPS Option	Available	Available
Limited texting capability	Yes (Some models)	Yes (Some models)
Trunking, single and multiple site	Available	Available
2-Tone Paging	Yes	Yes
Audible and vibrate alert	Yes (Some models)	No
Message record and playback	Yes (Some models)	No
Intrinsically safe	Yes (Some models)	Yes (Some models)
Compatible with call boxes & wireless alarms	Yes	No
Narrow band FCC licensing cost	No	Yes

Well now, suddenly, analog doesn't look so bad does it? It should be noted that all digital radios, whether DMR, NXDN, or P25 are backwards compatible with analog radios operating at either 25 or 12.5 kHz channel spacing. All digital radios have CTCSS and DCS tone squelch capability in the analog mode. This means that an analog radio CAN talk to a digital radio (as long as both are operating in the analog mode).

Digital radios can talk to each other only if both radios use the same digital operating system. (i.e. a DMR radio cannot talk to a P25 radio unless both radios switch to the analog mode). In addition, the standard protocol is for fire departments to switch to the analog mode when conducting on-scene communications. The reason being that analog has a higher level of immunity to background noise than digital!

Don't get us wrong. We encourage those we serve to seriously consider digital radio (in particular if they will be using federal funds to pay for their radios). Still, there are situations where budget, local interoperability and other factors can favor analog. Our job is to provide you with the facts and let YOU make the ultimate decision.

## The FCC and you!

One of the major influences toward the move to digital was an FCC requirement for all VHF or UHF radios sold in the USA after January 1, 2011 to be capable of operating with two 6.25 kHz slots (channels) within a 12.5 kHz channel width. FM Analog radios were not, and are not designed for this Very Narrow Band (VNB) standard.

Many users were moving to digital as they were prompted by the manufacturers to make the conversion to digital to avoid future problems and additional expense as the industry moved to VNB technology. This was good advice until June 30, 2010 when the rules were inexplicitly changed to eliminate this requirement. Suddenly the analog/digital playing field was leveled! More detailed information follows:



Score a knockout for another FCC mandatory compliance date! For those who keep up with such things, you know that the FCC yielded to pressure to cancel their original date of 2018 for mandatory 6.25 kHz Very Narrow Band (VNB) channel spacing.

There was also a requirement for all VHF and UHF 2-way radio equipment manufactured in the USA (you've got to be wondering who that would be) or any 2-way radio imported into the USA would have to be capable of operating at 6.25 kHz channel spacing. This was later changed to 6.25 kHz equivalence for 12.5 kHz Narrow Band Channel spacing (i.e. two 6.25 kHz channels per 12.5 kHz "channel").

Now, the FCC dropped the requirement for manufacturers to produce 6.25 kHz capable or equivalent equipment starting in 2011 and moved the date up to January 1, 2013. The bottom line is that 6.25 kHz has taken a SERIOUS hit! There are no established coordination policies for 6.25 kHz frequencies. The message from the FCC is very clear. The manufacturers who invested heavily in developing 6.25 kHz compliant technology as well as users trying to advance greater utilization of existing spectrum have just been rewarded with a *Thanks but no thanks* message for trying to meet yet another unfunded mandate.

Shame on you FCC, and even more shame upon the special interest groups, lobbyists, and self serving bureaucrats who blocked the advancement of useful technology. For those that did the right thing - *thank you for your effort, your investment, and your commitment for advancing communications technology.*

The good news is you can purchase 6.25 kHz equipment at reasonable cost that can still operate at 12.5 or even 25 kHz channel spacing in both analog and digital modes with some truly unique capabilities. Go to [www.info4u.us/IDAS-Guide.pdf](http://www.info4u.us/IDAS-Guide.pdf) for a free copy of our IDAS Narrow Band Planning Guide. We hope you will find it to be useful! For now, let's return to our discussion of analog versus digital radios.

## Analog Radio Choices

Falcon Direct offers analog radios by Headline, HYT/Hytera, ICOM, Maxon, Midland, Motorola, Relm/BK, Ritron, TEKK and TYT. We've got our favorites based on cost of ownership, functionality, performance, and price. We will share some of our favorites with you and offer links to more detailed information if you want to take a closer look at the model, manufacturer, or both. Let's start with the heart of the system – the base or repeater station.

Repeaters come in essentially four versions – low cost, low power analog versions for on-site use (churches, schools, etc.) cross band to link VHF and UHF systems, mid-power 40-60 watt models designed primarily for analog operation but with the capability of also operating in the DMR or NXDN digital modes. At the top of the line are high power 100/110 watt models for analog or full digital modes. Additional information follows on the next page as well a detailed comparison guide at [www.info4u.us/NewRepeatersII.pdf](http://www.info4u.us/NewRepeatersII.pdf).

# REPEATERS

## Bypass Repeaters



Bypass repeaters are used to extend talk-back power from portable radios when reception from the associated base/repeater station is acceptable, but the talk-back range from the portable is inadequate. Two versions are available for either VHF or UHF use. The power is 45/50 watts depending on frequency band. The pocket repeater can be installed at a fixed location in difficult talk-back coverage areas at minimal cost (typically, about half the cost of a conventional repeater plus the advantage of requiring no switching at the dispatch location). For more information, see [www.info4u.us/RepeaterPlanner.pdf](http://www.info4u.us/RepeaterPlanner.pdf).

## Vehicular Repeaters



Vehicular repeaters provide essentially the same function as Bypass Repeaters except the repeater is located in a vehicle rather than in a fixed location. These devices are particularly useful in public safety and utility vehicles when the driver need mobile radio performance when using a portable radio. Both Bypass and Vehicular repeaters require a “control” frequency in the associated portable radio which is used to switch the repeater on or off. Additional information on our popular I-Box model is available at [www.info4u.us/I-Box.pdf](http://www.info4u.us/I-Box.pdf).

## Mid-Power Base/Repeaters



Mid-Power repeaters will generally meet the needs of most users, even those requiring large municipal or even county wide coverage. Generally rated at 40 to 50 watts for either VHF or UHF, our most popular models are the ICOM CY5000 (See [www.info4u.us/CY-5000.pdf](http://www.info4u.us/CY-5000.pdf)) which has both analog and NXDN digital capability. The Hytera RD-982 (See [www.info4u.us/RD982.pdf](http://www.info4u.us/RD982.pdf)) series and the Motorola XPR8300 series (See [www.info4u.us/XPR8300.pdf](http://www.info4u.us/XPR8300.pdf)) can operate on both analog and DMR digital modes. All are priced under \$2,500 excluding duplexer, FCC license and antenna system.

## High-Power Base/Repeaters



High power repeaters are typically used for county or regional coverage. Most often these repeaters will be analog only with the ability to upgrade to P25 digital or with both analog and P25 digital capability when acquired with federal (DHS/FEMA) grant funds. The Eclipse 2 from ICOM America systems ([www.info4u.us/Eclipse2.pdf](http://www.info4u.us/Eclipse2.pdf)) is a very affordable 100 watt repeater that can be upgraded or initially provided with full P25 capability. The analog version is priced at under \$8,000 excluding duplexer, FCC license, and antenna system. 100 watt versions of DMR and NXDN repeaters are available for under \$5,000.

## Cross Band Repeaters



Cross Band Repeaters are used to link VHF and UHF radio systems so that they function as a single operating system. These units are also used by small dispatch centers to provide an efficient desk top console with independent microphones for VHF and UHF. In some applications, these devices, known as X-Band 50 can be installed in a vehicle to provide on-scene VHF/UHF interoperability. Additional information is available at [www.info4u.us/XBand50.pdf](http://www.info4u.us/XBand50.pdf). If you have a need to connect 700/800 MHz systems or a PC to VHF or UHF radio networks, we also offer a device known as The Extender to accomplish this objective. Additional information is available at [www.info4u.us/EXTender.pdf](http://www.info4u.us/EXTender.pdf).

# PORTABLE RADIOS

Portable radios are available in a variety of models and configurations to match the special needs of each user. One user wants a very simple personal 2-way communicator with just a single channel or two with no display or special features. Another wants a lot of power, sophisticated scanning capability, and other features such as paging, user ID display, alphanumeric display etc. Still another wants a radio that can be upgraded to digital at a later date. Dust and water resistance is a key requirement, as is size, weight, and cost of operation. Intrinsically safe operating capability is a requirement for many users while others want long battery use cycles, the loudest possible audio and the highest level of reliability. We have chosen several models to address varying needs as the best of the best in their respective categories. Hopefully, one of them will be just right for YOU!

## Basic Portable Radio



The ICOM F3001 (VHF) and F4001 (UHF) is an excellent choice for general use. ICOM is a world leader in Amateur, Aviation, Land Mobile, Marine, and Military communications. Please visit <http://falconinfo.blogspot.com/2010/02/new-vhf-pager-radio-now-available.html> for more information. General specifications are as follows:

Power: 5 watts VHF, 4 watts UHF	- Channel Capacity: 16
2-tone Paging – Decode/Encode	- Digital ID: MDC1200
Battery type: Lithium-Ion	- Battery use life: 14 hours
Size: 4-3/8" x 2-9/32 x 1-7/32"	- Weight 11.6 Oz.
Audio Output: 800 mW	- Factory warranty – 2 years
MIL-SPEC Rating: 810F	- Dust/Water protection IP54
<b>Price: FOB Birmingham AL with up to 16 channels programmed - \$238</b>	

## Portable Radio with Scrambler



HYT is the 5<sup>th</sup> largest communications manufacturer in the world and a long time supplier for private label products by some of the best known names in the industry. Product reliability and outstanding customer support makes HYT a favored choice by an increasing number of discriminating users. The TC-700 has a built in scrambler, whisper mode, and audible channel selection announcements. This is an excellent choice for law enforcement use. See [www.falcondirect.com/hyt](http://www.falcondirect.com/hyt) for more information.

Power: 5 watts VHF, 4 watts UHF - Channel Capacity: 16  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Battery type: Lithium-Ion - Battery use life: 14 hours  
 Size: 4.8 x 2.2 x 1.4" - Weight 11.15 Oz.  
 Audio Output: 1000 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: 810F - Dust/Water protection IP54  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$379**

## Portable Radio with Scrambler and Display



The TC-780 has all the features and functions of the TC-700 shown above plus a full function keypad, alphanumeric display, a vibrate alert mode and much, much more. This is a truly professional grade radio ideally suited for incident command use by fire department users. It is the radio of choice by more fire departments in Okaloosa County, Florida than any other brand or model! Both the TC-700 and the TC-780 cover the entire 136-174 or 400-470 MHz bands. Additional information is available at [www.falcondirect.com/hyt](http://www.falcondirect.com/hyt).

Power: 5 watts VHF, 4 watts UHF - Channel Capacity: 256  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Battery type: Lithium-Ion - Battery use life: 14 hours  
 Size: 4.88 x 2.13 x 1.38" - Weight 11.99 Oz.  
 Audio Output: 800 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: 810F - Dust/Water protection IP54  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$442**

## Portable Radio with Scrambler and Trunking



The F3161 (VHF) and F4161 (UHF) can be operated in either conventional or LTR trunking modes (Additional information on LTR trunking is available at [www.info4u.us/ltr.pdf](http://www.info4u.us/ltr.pdf)). This is an ideal radio for hospitals, law enforcement and other users who need both privacy, system compatibility, and future upgrade capability. These radios can operate in the standard analog mode or optionally upgraded to 6.25 kHz NXDN digital compatibility as required. More information is available at [www.info4u.us/IDAS-Guide.pdf](http://www.info4u.us/IDAS-Guide.pdf).

### Portable Radio with Scrambler and Trunking – Continued



Power: 5 watts VHF or UHF - Channel Capacity: 512  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Battery type: Lithium-Ion - Battery use life: 14 hours  
 Size: 5-11/32 x 2.3-3/32 x 1.17/32" - Weight 11.9 Oz.  
 Audio Output: 500 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: 810F - Dust/Water protection IP55  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$569**

### Intrinsically Safe Waterproof Portable Radio

The ICOM F50 (VHF) and the F60 (UHF) I.S. versions are water submersible (3 feet for 30 minutes totally submerged without damage). It is compact, lightweight, and rated Intrinsically Safe for use in explosive atmospheres. An inversion type voice encryption system (scrambler) is standard. Additional information is available at [www.info4u.us/F50.pdf](http://www.info4u.us/F50.pdf).



Power: 5 watts VHF or 4 watts UHF - Channel Capacity: 128  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Battery type: Lithium-Ion - Battery use life: 9-10 hours  
 Size: 3-13/16 x 2.3-7/32 x 1-7/16" - Weight 9.9 Oz.  
 Audio Output: 500 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: 810E - Dust/Water protection IP67  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$589**

### Pager/ Radio with Vibrate and Message Record

The ICOM F50V (VHF) and the F60V (UHF) versions are especially designed for fire, rescue, and hospital use with built in paging, audible/vibrate alert and message record/playback capability. An inversion type voice encryption system (scrambler) is standard. These radios have 700 mW audio and full MIL-SPEC 810F rating. Additional info available at [www.info4u.us/F50V.pdf](http://www.info4u.us/F50V.pdf).



Power: 5 watts VHF or 4 watts UHF - Channel Capacity: 128  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Battery type: Lithium-Ion - Battery use life: 9-10 hours  
 Size: 3-13/16 x 2.3-7/32 x 1-7/16" - Weight 9.9 Oz.  
 Audio Output: 800 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: 810F - Dust/Water protection IP67  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$569**

## Dual Band Portables with Scrambler and Display



Our incredible new dual band portable can operate on both VHF and UHF channels. Scan them if you wish, and it has built in 2-tone paging for fire department users plus a built in scrambler for use by healthcare and law enforcement users. It even has audible channel change announcements and it can be programmed both by PC and by the keypad for field use! Additional information is available at [http://falconinfo.blogspot.com/2010/03/dual-band-radios-demystified\\_22.html](http://falconinfo.blogspot.com/2010/03/dual-band-radios-demystified_22.html).

Power: 5 watts VHF or 4 watts UHF - Channel Capacity: 128  
 2-tone Paging – Decode/Encode - Digital ID: Not available  
 Battery type: Lithium-Ion - Battery use life: 9-10 hours  
 Size: 4.53 x 2.17 x 1.22" - Weight 9.17 Oz.  
 Audio Output: 500 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: Not rated - IP Class – Not rated  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$199**

## VHF Analog/DMR Submersible Portables



The ICOM analog F3161 (See Page 9) can be upgraded to NXDN digital capability. The analog Motorola XPR6350 can be later upgraded to DMR (MotoTRBO) digital capabilities. Although slightly more expensive than an analog only radio, you have the option to upgrade to DMR digital secure communications when desired. The XPR6350 can be ordered with intrinsically safe capability for \$50 additional. More info at [www.info4u.us/XPR6350.pdf](http://www.info4u.us/XPR6350.pdf). Buy 8 radios and get a \$200 rebate directly from Motorola if you purchase before August 28, 2010.

Power: 5 watts VHF or 4 watts UHF - Channel Capacity: 32  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Battery type: Lithium-Ion - Battery use life: 9-13 hours  
 Size: 5.12 x 2.50 x 1.39 " - Weight 11.63 Oz.  
 Audio Output: 500 mW - Factory warranty – 2 years  
 MIL-SPEC Rating: 810E - Dust/Water protection IP57  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$843**

## UHF Analog/DMR Submersible Portables w/Display



The VHF XPR6350 (See above) has both analog and DMR digital capability. The UHF Hytera PD782, although slightly more expensive than an analog only radio has full DMR digital secure communications capability right out of the box! The PD782 includes intrinsically safe capability, full color display, full keypad and a FIVE YEAR WARRANTY. More info at [www.falcondirect.com/PD782.pdf](http://www.falcondirect.com/PD782.pdf). Buy six radios or more and get a \$100 per radio trade allowance for your old radios. Call 800.489.2611 for more information.

### UHF Analog/DMR Submersible Portables – Continued



- |   |                                |
|---|--------------------------------|
| Power: 4 watts UHF  | - Channel Capacity: 256        |
| 2-tone Paging – Decode/Encode   | - Digital ID: MDC1200          |
| Battery type: Lithium-Ion   | - Battery use life: 9-12 hours |
| Size: 4.69 x 2.2 x 1.3 "  | - Weight 11.3 Oz.              |
| Audio Output: 500 mW  | - Factory warranty – 5 years   |
| MIL-SPEC Rating: 810E   | - Dust/Water protection IP57   |
| <b>Price: FOB Birmingham AL with up to 16 channels programmed - \$843</b> |                                |

## MOBILE RADIOS

Analog mobile radios essentially fall into three power categories – low power (2-25 watts), intermediate power (40-60 watts) and high power (75-110 watts) in either single piece construction (dash mount), remote mount (separate control head and RF transceiver) in four configurations – analog only, analog with DMR upgrade capability, analog with NXDN upgrade capability, and analog/DMR capable radios. AC power supplies to allow fixed station operation are available for all models. We have chosen our top choice mobiles in each of the four main configurations as follows (We have not listed a low power mobile since there is no appreciable price difference between a 25 and 50 watt radio):

### VHF or UHF Analog Only Mid Power Mobiles

The ICOM F121 (VHF) and F221 (UHF) are both rated at 50/45 watts. Although economically priced, these mobile radios have all the features and functionality you would expect in far more expensive mobile radios. See [www.info4u.us/F121.pdf](http://www.info4u.us/F121.pdf) for more info.



- |   |                              |
|---|------------------------------|
| Power: 50W VHF or 45W UHF   | - Channel Capacity: 128      |
| 2-tone Paging – Decode/Encode   | - Digital ID: MDC1200        |
| Rear mount capability – No  | - Digital upgradeable - No   |
| Size: 5-29/32 x 6-19/32 x 1-19/16"  | - Weight 2.4 Pounds          |
| Audio Output: 4 Watts   | - Factory warranty – 2 years |
| MIL-SPEC Rating: 810F   | - Scrambler option available |
| <b>Price: FOB Birmingham AL with up to 16 channels programmed - \$379</b> |                              |

### VHF Analog Only High Power Mobiles

The Midland MO-7128 is the highest powered, most affordable high powered mobile available in the USA! With 128 channels and 70 watts of power, it is in a class by itself! Additional information is available at [www.info4u.us/MO.pdf](http://www.info4u.us/MO.pdf).



- |   |                              |
|---|------------------------------|
| Power: 70W VHF  | - Channel Capacity: 128      |
| 2-tone Paging – Decode/Encode   | - MIL-SPEC 810F              |
| Rear mount capability – No  | - Digital upgradeable - No   |
| Audio Output: 4 Watts   | - Factory warranty – 3 years |
| <b>Price: FOB Birmingham AL with up to 16 channels programmed - \$429</b> |                              |

### VHF Mid Power Analog DMR Upgradeable Mobiles

The analog Motorola XPR4550 can be later upgraded to DMR (MotoTRBO) digital capabilities. Although slightly more expensive than an analog only radio, you have the option to upgrade to DMR digital secure communications when desired. More info at [www.info4u.us/XPR4550.pdf](http://www.info4u.us/XPR4550.pdf). Buy 8 radios and get a \$200 rebate directly from Motorola if you purchase before August 28, 2010.



Power: 45 watts - Channel Capacity: 160  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Size: 6.89 x 8.11 x 2.01 " - Weight 4.0 pounds  
 Rear mount capability – No - Digital upgradeable - Yes  
 Audio Output: 3 Watts - Factory warranty – 2 years  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$751**

### UHF Mid Power Analog/Digital DMR Mobiles

The UHF Hytera MD782, although slightly more expensive than an analog only radio has full DMR digital secure communications capability right out of the box! The MD782 includes full color display and a FIVE YEAR WARRANTY. More information is available at [www.falcondirect.com/MD782.pdf](http://www.falcondirect.com/MD782.pdf). Buy six radios or more and get a \$100 per radio trade allowance for your old radios. Call 800.489.2611 for more information.



Power: 45 watts - Channel Capacity: 256  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Size: 6.9 x 7.9 x 2.4 " - Weight 4.4 pounds  
 Rear mount capability – No - Digital capable - Yes  
 Audio Output: 3 Watts - Factory warranty – 2 years  
**Price: FOB Birmingham AL with up to 16 channels programmed - \$742**

### VHF High Power Analog/Digital P25 Mobiles

The Midland STM-1115B Series is a professional grade mobile especially well suited for rural public safety and fully compliant with DHS requirements for FEMA funding. A compact control head, remote RF package and remote speaker is standard. More information is available at [www.info4u.us/STM.pdf](http://www.info4u.us/STM.pdf). Buy six radios or more and get a \$100 per radio trade allowance.



Power: 110 watts - Channel Capacity: 999  
 2-tone Paging – Decode/Encode - Digital ID: MDC1200  
 Size: 9 x 11.7 x 2.6 " - Weight 7.72 pounds  
 Rear mount capability – Yes - Digital capable – Yes (P25)  
 Audio Output: 10 Watts - Factory warranty – 3 years  
**Price: FOB Birmingham AL with 16 channels programmed - \$2,595**

## SUMMARY

We think you may now agree that analog radios are far from being extinct. As to which digital technology will ultimately become the standard (in the USA), the jury is still out. The government wants all agencies to standardize on P25. The leading manufacturer (Motorola) is pushing DMR. NXDN (in our opinion) is a superior technology, but we can remember when the best video tape recording system was Betamax by Sony. The problem was that Sony would not license the technology to other users while VHS was an open standard. We don't have to tell you who won that battle.

Based on practicality, economics of scale, open standards, pricing, and marketing, we would conclude that the probable winner in the digital battle will be DMR (Motorola and Hytera with an assist by the FCC). DMR also has another major advantage. It is the only major digital technology that includes planning for a low cost consumer type offering (already available in Europe).

One last comment on an often overlooked capability of analog technology may also be in order. A variety of specialized products including low cost fixed office radios, call boxes, and repeaters for on-site use are available for churches, schools, institutional, office, plant, and warehouse users. Falcon Direct is proud to represent Ritron, Inc., a family owned American manufacturer of some very unique products. You can check them out at [www.usa-radio1.com](http://www.usa-radio1.com). You'll be glad you did!

There are still a large number of public safety users who depend on alerting voice monitor pagers for response to emergencies. Unfortunately, there are no digital voice pagers available in the USA. However, there are some excellent analog offerings for those who need voice paging capability at [www.info4u.us/NewPagers.pdf](http://www.info4u.us/NewPagers.pdf).

In the area of alarm reporting, status monitoring, and surveillance; Falcon Direct offers a unique product known as the Vodaeco Reporter. You shouldn't be surprised to learn that it is available in analog models only. Additional information is available on our Blog page at <http://falconinfo.blogspot.com/2010/05/new-vodaeco-reporter-is-now-available.html>. By the way, if you want to keep up with all the latest news in voice, data, and video technology, please visit our web page at [www.falcondirect.com](http://www.falcondirect.com) and sign up to receive our monthly eNewsletter.

The value of narrow band analog communications is a compelling reason to stay with analog for now although purchasing radios with digital upgrade capability or full analog/digital functionality could be the right choice for you. We hope this information has been useful.

The Falcon Team  
*At your service!*

**Falcon Direct**

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