



AN INTRODUCTION TO DMR

(Digital Mobile Radio)



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DMR Communications Guide

1. Purpose

The purpose of this guide is to provide a basic introduction to a communications technology known as Digital Mobile Radio (DMR), an European standard, introduced in the USA by Motorola under the MotoTRBO brand name, and more recently offered by HYT under the brand name of Hytera. For additional information on DMR, please visit the DMR Association web site at www.dmrassociation.org.

2. Background

DMR is one of four basic digital 2-way radio standards and is the only one of the four that offers both consumer grade and commercial grade models. Unlike TETRA (not sold in the USA at this time), APCO-25 or P25, and NXDN; DMR was not designed for public safety use. The only approved technology eligible for federal funding is P25. However, many users are choosing DMR as a public safety alternative for reason which will be discussed later in this Guide.

Suffice it to say for now, that there are those who would take exception to our comments concerning suitability of DMR for a mission critical user. For those with a contrarian view, we suggest a quick review of a listing of MotoTRBO users currently licensed in the USA at [http://wiki.radioreference.com/index.php/MOTOTRBO#MOTOTRBO Systems in Use](http://wiki.radioreference.com/index.php/MOTOTRBO#MOTOTRBO_Systems_in_Use). For additional comments on the suitability of MotoTRBO for public safety, please visit our Blog page at <http://falconinfo.blogspot.com/2009/05/mototrbo-for-public-safety.html>.

3. Why Hytera?

The question to many is *why would Hytera jump into a market dominated by Motorola and why would these products be offered to public safety mission critical users?* The answer is that following Motorola's market direction is rarely a bad choice, in particular if you can offer better features at lower cost (more about this later).

As far as offering DMR products to mission critical users is concerned, the obvious answer is that DMR equipment with comparable features to P25 is considerably less expensive. Also consider that a DMR user can talk to a P25 user in the analog mode for interoperability use. Add to that, the fact that Motorola has the largest sales force and marketing resources of any communications vendor, and you can begin to understand why an increasing number of public safety agencies are purchasing DMR. Our task is to simply help you make the best decision for your individual needs. A Power Point presentation that provides more information on Hytera is available at www.info4u.us/HyteraIntro.pdf.

What in the world is a Hytera?



Hytera is a new product offering from HYT America, one of the fastest growing communications companies in the USA and a subsidiary of the 5th largest 2-way radio manufacturer in the world! As the battle lines are drawn between differing narrow band technologies, one fact is very clear. Like it or not, 2-way radio communications is going digital. Not only is it going digital, it is also moving toward the fusion of communications and computers.

Aside from the endless debates as to which is the best technology, the fact that there has been no competitive offering to MotoTRBO which has been a major concern by many prospective users. The Hytera offering, for the first time, provides an alternative to MotoTRBO. In the case of P25, there are many competitors. With NXDN, there are currently three choices, and now MotoTRBO users have a choice as well. Competition advances technology and reduces cost to the consumer. We think this is a good thing!

We'll be telling you more about Hytera very soon. For now, we just wanted to keep you informed on the rapidly changing dynamics of wireless communications technology. In the meantime, we know that a great deal of confusion is being caused by overly aggressive, often misinformed, and in some cases, deceptive sales representatives. For the sake of clarification, let us address a few fundamental issues.

First - P25 is the ONLY technology approved for PUBLIC SAFETY communications. Some misguided sales representatives are attempting to present MotoTRBO as a public safety solution. It is NOT! The following is an excerpt from the Motorola Q&A website at <http://mototrbo.motorola.com/frequently-asked-questions/#qtwelve>.

Is MOTOTRBO compatible with P25 technology/systems?

No. The P25 protocol (TIA Project 25 standard) was adopted for public safety sector use and currently uses 12.5 KHz FDMA technology. MOTOTRBO supports the ETSI Digital Mobile Radio (DMR) standard for large organization/enterprise two-way radio customers and uses 12.5 KHz (6.25 equivalent-6.25e) TDMA technology.

What types of organizations would be best suited for MOTOTRBO?

Public (government) **administration**, public **works**, manufacturing facilities, transportation companies, small campuses such as resorts and schools, construction sites, and energy/utility companies, as well as small, municipal public safety organizations ([as long as they don't use FEMA grant money for the purchase and they have no desire to participate in a statewide Interoperability plan - Comments ours](#)).

The battle for superiority in the public safety sector will be by those who provide top quality P25 equipment at reasonable cost. Already, there are some really competitive offerings as you will see in a special report available at www.info4u.us/P25Guide.pdf. Check it out for information that we hope will be useful in your system planning.

Speaking of planning, we were recently asked to provide a long range plan by a major user looking for a near term solution for converting to narrow band, and a long range objective of selecting the best digital system as well as enhanced features such as paging, trunking, vehicle location, etc. That plan is currently being prepared and shared with a number of users with similar requirements. It is based on the migration to narrow band using NXDN technology for a non-public safety user.

The elements of the plan would generally apply whether you were considering DMR, NXDN, or P25 technology. For more information, please visit www.info4u.us/IDAS-Guide.pdf. We think you may find this information to be very useful in making your plans for narrow banding and enhanced capabilities. For more information, please click [here](#) to visit the Hytera website.



Hytera began shipping the first of the new MotoTRBO compatible 2-way radios in May of 2010. Until then, there was no competitive alternative for MotoTRBO users. Now there is! The DMR (Digital Mobile Radio) technical standard now provides you with a choice!

We have always contended that free and open competition is good for the consumer and good for business. With all new technology, things never really get moving until there are two or more competitors. Prices come down, products are improved, sales increase, more profits are generated, more jobs are created, more taxes are paid, and things get better for all concerned. Kinda puts a lump in your throat doesn't it?

Case in point - for the better part of three years, mixed mode repeater operation and 2-tone paging was not available on MotoTRBO products. Just weeks before the introduction of Hytera, these functions were made available by Motorola.

The result is that Motorola customers directly benefit from the entry of a new competitor. With no competition, it might have been another three years before these features were developed.

Conversely, Hytera knew that had to offer a superior product at lower cost to break into the market. They came out with a family of new products with more power on mobiles and repeaters, a high performance patented antenna for portables along with higher capacity batteries and a standard 5 year warranty. Couple that with an innovative full color display on mobiles, portables, and repeaters, plus lower pricing and you have a real competitive offering! How much lower are the Hytera prices? Quite a bit actually! If you would like to know just exactly how much lower, drop us an email to sales@falcondirect.com. For now, let's take a look at the major Hytera offerings!



We are delighted to announce the first of a family of products beginning with the PD782 portable. Think of it as a direct equivalent of the MotoTRBO XPR6550 with all the features and functionality PLUS smaller size and weight, 25% more battery capacity, 20% less cost, a FULL COLOR LCD, icon function selection, new top mounted controls for single handed operation and a world wide patented low profile dual function (GPS/UHF) antenna that we guarantee to out talk any other UHF portable regardless of brand, price or power. Want to put us to the test? Just give us a call at 205.854.2611. In the meantime, if you would like to review a brochure on this remarkable new product, click [here](#).



Hytera has introduced America's most affordable mixed mode DMR (Digital Mobile Radio) repeater especially designed to work with Motorola's MotoTRBO XPR Series mobile and portable radios as well as the Hytera PD782 portable and MD782 mobile analog/digital radios.

The new RD982 repeater allows analog radios to be phased out as budgets permit with the capability of operating both analog and digital radios simultaneously through the same station. That is a huge benefit, but here is an ever better feature. The RD982 offers two channel trunking as a STANDARD feature. A single Hytera repeater can operate on a single 12.5 kHz channel with a single duplexer and a single antenna with the ability to provide TWO simultaneous talk paths for the price of a single repeater - a Hytera exclusive!

The RD982 can operate at 25 kHz, 12.5 kHz, and 6.25 kHz to meet current requirements as well as the mandatory narrow band standard which becomes effective at the end of 2012. With the RD982, you can literally have two repeaters for the price of one with voice or data operation or mixed as desired.

Unlike the XPR8300 and XPR8400, the RD982 can accommodate an internal duplexer plus it is smaller, lighter, more powerful, less expensive, and it has front panel control with a color LCD display. Nothing else even comes close!



The Hytera MD782 is the newest DMR offering in the USA! As you may have noticed in our previous posting, there is now a second source of DMR radios, along with the MotoTRBO XPR4550 series by Motorola.

Now, you have a choice of DMR (Digital Mobile Radio) offerings. Until now, you had only one choice for a DMR compatible mobile radio. The MD782 gives you an alternative that is smaller, lighter, more powerful, with more function control buttons, a full color LCD display with simple GUI interface and significant cost savings.

The MD782 has all the features of the MotoTRBO XPR4550 including ALT (Accelerated Life Testing) and Six Sigma* quality standards. The term "Six Sigma" comes from a field of statistics known as process capability studies. Processes that operate with "six sigma quality" over the short term are assumed to produce long-term defect levels below 3.4 Defects Per Million Opportunities (DPMO). Hytera has actually improved the quality levels on their products by advancing the process to a higher level known as DFSS (Design For Six Sigma) by addressing quality levels beginning at the product design stage rather than applying only at the manufacturing level.

If you would like to take a look at a fully MotoTRBO compatible mobile with a side by side comparison, just give us a call at 205.854.2611 or email sales@falcondirect.com. In the meantime, if you would like to review a brochure on this remarkable new product, please click [here](#).

On the following page, we will summarize the information previously discussed with a simple comparison chart, but the real story about Hytera versus Motorola is in the performance! We invite you to compare the features, functions, pricing, and cost of ownership. You tell us the time and place most convenient for a demonstration. We'll be there. You'll be glad we came – guaranteed!

*Six Sigma is a registered Service Mark (SM) and Trademark (TM) of Motorola Inc.



A comparison of DMR Radios

DMR (Digital Mobile Radio) is a technical operating standard primarily developed for use in Europe. It is also available in the USA from Motorola and Hytera. It was not designed or intended for public safety use although a few agencies are using this technology as a relatively inexpensive solution to meeting narrow band (12.5 kHz) operating standards required by the end of 2012.

An alternate technology, known as NXDN offers Very Narrow Band (6.25 kHz) capability at comparable cost and is available from ICOM (IDAS) and Kenwood (NXDN). Additional information is available at www.info4u.us/IDAS-Guide.pdf.

In the USA, APCO-25 (P25) is the only Department of Homeland Security (DHS) and SAFECOM operating standard. Although somewhat more expensive than either DMR or NXDN, this is the standard for interoperable communications by public safety users. More information is available at www.info4u.us/P25Guide.pdf.

For those who may be considering DMR, we offer the following comparisons.

FEATURE	HYTERA UHF	MOTOROLA UHF
Price	Typically 20% less than Motorola	Typically 20% more than Hytera
Portable Power	4 Watts RF	4 Watts
Mobile Power	45 Watts	40 Watts
Repeater Power	50 Watts Continuous	40 Watts Continuous
Internal duplexer	Available	Not available
Trunking (2 CH)	Standard	Not available
Color LCD display	Yes	No
Channel Capacity	256	160
Warranty	5 years	2 years

Product Brochures

Mobiles: www.falcondirect.com/MD782.pdf

Portables: www.falcondirect.com/PD782.pdf

Repeaters: <http://www.falcondirect.com/RD982.pdf>

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HYTERA PRICE SCHEDULE



MOBILES

Model	Description	User Price	Introductory Price
MD782U-1 UHF	UHF 45 watt, 256 channel mobile	\$742	Call 205.854.2611
MD782V-1 VHF	VHF 50 watt, 256 channel mobile	Same Price	More detailed information at:
ANT-MOB-V/U	Rooftop antenna with cable	\$35	www.info4u.us/HyteraPricing.pdf
ANT-GPS-I	GPS antenna for in-vehicle use	35	
ANT-COM	VHF/UHF/GPS antenna, roof mount	95	
AC-POW	AC power supply for office use	125	
SMA-10A1	Desk microphone for office use	103	
ANT-EXT	Antenna with 75' of cable for outside Office use (Omnidirectional)	149	

PORTABLES

Model	Description	User Price	Introductory Price
PD782U-1 UHF	UHF 4 watt, 256 channel portable	\$843	Call 205.854.2611
PD782V-1 VHF	VHF 5 watt, 256 channel portable	Same Price	More detailed information at:
SM18N2	Water-proof speaker microphone	\$100	www.info4u.us/HyteraPricing.pdf
BL2006	Spare battery	100	
PS7002	Six unit multiple power supply	176	

REPEATERS

Model	Description	User Price	Introductory Price
RD982U-1 UHF	UHF 50 watt repeater	\$2,250	Call 205.854.2611
RD982V-1 VHF	VHF 50 watt repeater	Same Price	for special price or visit
PC37	Optional Programming kit	\$45	www.info4u.us/Hytera/Best.pdf
INT-DUP	Internal duplexer with cables	500	
PRO-TEK	AC and Coaxial lightning protection	110	
CAB-30	30" cabinet with 19" internal rack	490	

Note: All Hytera models are currently covered by a 5 year limited factory warranty. Abuse, antennas, batteries, and clips excluded. Prices do not include any applicable taxes, on-site service calls, or shipping outside the USA. We accept Government Purchase orders, credit cards, and PayPal.

Prices and terms subject to change without notice.