



AN INTRODUCTION TO DMR

(Digital Mobile Radio)
by

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DMR Communications Guide

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 by Hytera. For additional information on DMR, please visit the DMR Association web site at www.dmrassociation.org.

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 (also available from Hytera), 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 reasons 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. It isn't so much that the technology is not suitable for public safety, or the quality of communications, or even reliability. The problem has mostly to do with the refusal of the major manufacturer of DMR equipment (Motorola) to offer open standard interoperable equipment that can be used with other radios. With P25, neither Motorola or any other manufacture can play the "lock out" game any longer. It has been a long time coming!

The fact is the DMR was designed to be an open standard technology, but the intend and purpose was short lived. The good news is that a worldwide standard is evolving. It is known as Tier III. Hopefully, it will be an end to corporate game playing. For now, let us just say, that in our opinion, DMR open standard radios are your best choice for low cost operation with the features and functions that offer maximum flexibility for both public safety, institutional, and business users.

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, or actually better) 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 the second largest radio communications manufacturer in the world and the parent of HYT, a long established international communications provider! 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.



Hytera began shipping the first of the new MotoTRBO compatible 2-way radios in May of 2010. Until then, in the USA, 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.

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 3 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!



The Hytera of product family began 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 205.202.1269. In the meantime, if you would like to review a brochure on this remarkable new product, click [here](#).

America's most affordable high power mixed mode DMR (Digital Mobile Radio) repeater was 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 RD982 repeater and the economical new RD622 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. Both the RD982 and the RD622 offer 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!

Both the RD982 and the RD622 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 became effective at the end of 2012. With Hytera repeaters, 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 mobile offers more features, at less cost, with a better warranty than any other DMR radio in the world. Compare this radio with the MotoTRBO XPR4550 series by Motorola and you'll see why it is rapidly becoming the radio of choice by professional users around the globe.

Now, you have a choice of DMR (Digital Mobile Radio) professional grade 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 205.202.1269 or email ServinU@Hytera-Alabama.us. 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 along with specifications and pricing on our most popular portable, mobile, and base/repeater radios, but the real story about Hytera versus Motorola (or anyone else) 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 as was 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 from our sister company, Falcon Direct at www.info4u.us/IDAS-Guide.pdf.

In the USA, APCO-25 (P25) is the only Department of Homeland Security (DHS) Federal Emergency Management (FEMA) 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 VHF or UHF	MOTOROLA VHF or UHF
Price	Typically 20% less than Motorola	Typically 20% more than Hytera
Mobile Power	50/45 Watts	40 Watts
Repeater Power	50 or 25 Watts Continuous	40 Watts Continuous
Internal duplexer	Available	Not available
Trunking (2 CH)	Standard	Not available
Color LCD display	Yes	No
Warranty	3 years	2 years

Product Pricing

Please see the following pages for product information and pricing on our most popular portables, mobiles, and base/repeater radios. If you are a government agency (Federal, state, county or municipal, or involved in fire and rescue, or emergency healthcare, you may qualify for special GSA pricing. Additional information available at Hytera-Alabama.us. Or, if you prefer, call us at 205.202.1269. In the meantime, please take note of the special offers for free accessories and radios as well as very liberal trade in allowances now in effect. We make doing busy easy and we have some of the best customer care programs in the industry include our exclusive TimeShare plan. We take care of our customers, and we hope that now includes, or soon will include, YOU!

Note: All Hytera models are currently covered by a 3 year limited factory warranty. Abuse, antennas, batteries, and clips excluded. Prices subject to change without notice.

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Hytera Professional Portable Digital 2-Way Radios



Primary Use

DMR performance at analog radio pricing. Compact, light, and affordable. A great radio for industrial and public safety use.

This is a great little radio for outdoor use with highest rated IP67 rating in a lightweight, yet rugged compact VHF or UHF portable..

Industrial grade radio ideally suited for plant and outdoor use. Both VHF and UHF models are available. Very good dust & water immunity.

Talk and text, even leave a message when privacy is important. The Vibrate mode allows private alerting and GPS tracking keeps you safe.

If safety is important, the PD792Ex is the radio for you with all the feature of the PD782 plus Man Down alert and Intrinsically safe approved..

User Price

\$362

\$489

\$806

\$899

\$1,580

Special Offer

Free speaker-mic

Free 5 yr warranty!

Buy 10 Get 1 FREE!

Free speaker-mic

Buy 10 - Get 1 FREE!

Trade-In Program

\$50 for old radio

\$75 for old radio

\$50 for old radio

\$75 for old radio

\$100 for old radio

Motorola Comparable Models

Motorola CP200d
Vertex EVX-531

Motorola SL7550

MotoTRBO XPR6350

MotoTRBO XPR6550

MotoTRBO ATEX Series

Warranty (Radio)

3 Years

3 Years

3 Years

3 Years

3 Years

Extend warranty

\$70 (2 years)

\$70 (2 years)

\$70 (2 years)

\$70 (2 years)

\$70 (2 years)

Frequency Band

UHF

UHF

VHF or UHF

VHF or UHF

VHF or UHF

No. of Channels

32

32

32

1024

1024

Dimensions (inches)

4.53 x 2.13 x 1.06"

4.68 x 2.12 x 1.06"

4.9 x 2.2 x 1.4"

4.9 x 2.2 x 1.4 "

5.5 x 2.16 x 1.53 "

Weight

9.17 Ounces

11.22 Ounces

11.82 Ounces

12.5 Ounces

17.0 Ounces

Power Output

4 watts UHF

4 watts UHF

5W VHF - 4W UHF

5W VHF - 4W UHF

1 watt

Audio Output

500 mW

500 mW

500 mW

500 mW

500 mW

Audible announce

Yes

Yes

Yes

Yes

Yes

Battery life

Up to 16 hours

Up to 16 hours

Over 14 hours

Above 16 hours

Approximate 17 hrs.

IS Approved

No

No

No

No

Yes

IP Rating

IP54

IP67

IP57

IP57

IP67

MIL-SPEC Rating

810 C/D/E/F/G

810 C/D/E/F/G

810 C/D/E/F

810 C/D/E/F/G

810 C/D/E/F/G

Speaker-mic adds

\$70 (IP56)

\$70 (IP56)

\$70 (IP56)

\$70 (IP57)

\$70 (IP67)

Add GPS

Not available

Not available

Standard

Standard

Standard

Add man down

Not available

Not available

Not available

\$78

Standard

Programming Kit

\$46

\$46

\$46

\$46

\$46

Spare Battery

\$23 (1500 mAh)

\$23 (1650 mAh)

\$69 (1700 mAh)

\$69 (2000 mAh)

\$69 (1800 mAh)

6 Unit Charger

\$279

\$279

\$390

\$390

\$390

Spare pocket Clip

\$6

\$6

\$6

\$6

\$6

Product brochure

[www.info4u.us/
PD502.pdf](http://www.info4u.us/PD502.pdf)

[www.info4u.us/
PD602.pdf](http://www.info4u.us/PD602.pdf)

[www.info4u.us/
PD702.pdf](http://www.info4u.us/PD702.pdf)

[www.info4u.us/
PD782.pdf](http://www.info4u.us/PD782.pdf)

[www.info4u.us/
PD982.pdf](http://www.info4u.us/PD982.pdf)

Hytera Covert Portable, Mobile, and Base/Repeater Radios

Model	X1e & X1p	MD652G	MD782G	RD622	RD982-AN
					
Primary Use	America's thinnest and most affordable digital portables. Your choice of non-display Model X1e or the full featured X1p with keypad/display	Similar to X1e but with display and full keypad for messaging, built in Bluetooth, GPS and selectable audible or vibrate alerting	Get more value for less money with DMR analog and digital capable mobile with built in GPS, up to 50 watts of power and data capability..	Compact and affordable repeater with analog and DMR capability right out of the box. Ideal for plant operations, golf courses, and hospitals..	Start with analog and add digital when needed plus link repeaters and you can perform remote diagnostics with optional IP connect.
User Price	\$999-\$1,259	\$652	\$799	\$1,999	\$1,440
Digital Upgrade	Digital standard	Digital standard	Digital standard	Digital Standard	\$810
Special Offer	Buy 10 Get 1 FREE!	Buy 10 Get 1 FREE!	Buy 10 Get 1 FREE!	Free Duplexer!	Free Duplexer
Trade-In Program	\$50 for old radio	\$50 for old radio	\$100 for old radio	\$150 for old radio	\$200 for old radio
Motorola Comparable Models	Motorola SL7550 (X1p)	No comparable equivalent	MotoTRBO XPR4550	No comparable equivalent	MotoTRBO XPR8400
Warranty (Radio)	3 years	3 years	3 years	3 years	3 years
Extend Warranty	\$70 (2 years)	\$70 (2 years)	\$70 (2 years)	Not available	Not available
Frequency Band	UHF	VHF or UHF	VHF or UHF	VHF or UHF	VHF or UHF
No. of Channels	32/1024	1024	1024	16	16
Dimensions (Note 2)	4.7 x 2.2 x 0.71	6.5 x 1.81 x 5.5"	6.9W x 2.4H x 7.9D"	11.85 x 7.24 x 2.0"	19.02 x 3.46 x 14.4"
Weight	7.05 Ounces	2.31 Pounds	3.75 Pounds	6.61 Pounds	18.7 Pounds
Power Output	5W VHF-4W UHF	25W VHF or UHF	50/45W V/U	1 to 25W VHF/UHF	5-50W VHF/UHF
Audio Output	500 mW	3W	3W	500 mW	500 mW
Battery life	Over 10 hours	Not applicable	Not applicable	Not applicable	Not applicable
Vibrate alert	Standard	Not applicable	Not applicable	Not applicable	Not applicable
GPS available	Standard	Standard	Adds \$57	Not applicable	Not applicable
IP/MIL-SPEC	IP67 810C-G	IP54-810C-G	IP54-810F	Not rated	Not rated
Internal duplexer	Not applicable	Not applicable	Not applicable	\$357	\$424
AC power supply	Not applicable	\$149	\$149	Included	\$154
IP Connectivity	Not applicable	Not applicable	Not applicable	\$334	\$334
Programming Kit	\$41	\$46	\$46	\$46	\$46
Spare Battery	\$112 (1100 mAh)	Not applicable	Not applicable	Not applicable	Not applicable
Audio Accessory	\$59 (See Note 1)	Not applicable	Not applicable	Not applicable	Not applicable
Bluetooth earpiece	\$258	Not applicable	Not applicable	Not applicable	Not applicable
Carrying pouch	\$19	Not applicable	Not applicable	Not applicable	Not applicable
Product brochure	www.info4u.us/x1e.pdf (and x1p)	www.info4u.us/MD652.pdf	www.info4u.us/MD782.pdf	www.info4u.us/RD622.pdf	www.info4u.us/RD982.pdf

Note 1: Your choice of speaker-microphone, earbud with lip microphone, or surveillance headset.

Note 2: Measurements for x1e are for 1100 mAh ultra slip battery. Add 0.09 inches for 1800 mAh battery thickness measurement.



Most people think of condos, or vacation resorts in relation to the term *Time Share*. Richer folks think of planes, and yachts.....

Smart folks.....

think of paying only for what you need when you need it! In private wireless communications (2-way radio to you old timers), outright purchase is the traditional way to acquire needed services.

Then, along came extended payment programs which allowed a user to spread the cost over a prolonged period of time – often up to five years. More recently, companies such as Hytera-Alabama RMC have offered equipment on a short term rental basis – daily, weekly, and monthly being the most popular rental terms. Call us for additional information at 205.202.1269.

Our latest concept is admittedly borrowed from the time shared condo concept. Many of us would like a place at the beach or in the mountains but few of us have the opportunity to spend more than 30 days per year at these vacation properties. So the idea of time shared ownership became very attractive. In essence, you get a group of a dozen folks together who purchase the condo with a 1/12th ownership. Each owner gets the use of the condo for up to 30 days per year. Not a bad idea!

Now, let's apply that concept to 2-way radio. There are two distinct applications that immediately come to mind. The first is a repeater station. We know of one public safety user that was off the air for almost six months awaiting repair of a lightning damaged repeater. If this user had owned a 1/12th equity in a standby repeater, he could have been back on the air within 24 hours.

His cost would have been an annual cost of \$350 plus the cost of delivery and set up of a replacement repeater (\$125 within the Birmingham Metro area or \$250 anywhere in Alabama. The \$250 charge includes up to 30 days of service, which can be extended if desired.. If for some reason, repairs could not be made on his damaged station within 30 days, you would simply pay of for an additional 30 days of use.

The same concept can be applied to mobiles or handheld radios. The annual time share cost on most popular mobiles and/or handheld radios is \$90 for a 1/12th share and a setup and a charge of \$45 for sending a replacement radio via UPS Next Day service, plus call tags to pick up your defective radio. No running over to the local radio shop or waiting for them to come to you. Within 24 hours, you have a replacement radio

So what do you have to do to participate? It's as simple as letting us know whether you want ownership in a repeater, mobile or handheld. Send us your frequency programming information along with your check for the applicable time share amount. Your unit will be available when needed – simple, efficient, and affordable, and only available from Falcon Direct!

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