



So you're thinking about digital.....

There are a lot of reasons for considering moving to digital communications. Cell phones made the move over a decade ago, TV will be 100% digital by 2009, broadcast AM and FM radio is making the move, and U.S. Government agencies are under a mandatory directive to purchase only digital communications.

In general, technological advances in communications come first from the military, then Federal agencies, and then it trickles down to the State, County, and Municipal level. Sometimes this technology is well suited for commercial applications – sometimes not. More recently, U.S. technology has been challenged by technology developed by Asian and European user groups operating under a common standard such as DMR from Europe which is suitable for both governmental and commercial use.

In Japan, the technology developed for home country use shows up in the offerings of major amateur radio communications equipment suppliers. D-Star, developed by ICOM, is the forerunner to the commercial counterpart of the technology we now know as IDAS (ICOM Digital Advanced System).

In the U.S., there are now five basic types of digital 2-way systems. They are as follows:

SDR (Software Defined Radio) Very expensive multi-band radio primarily developed by Harris Corporation, and more recently Thales Communications. Not a good choice for local government, commercial, or private use but it is the most advanced technology.

P25 – Also known as APCO-Project 25. The standard selected by all agencies of the federal government and the defacto standard for State, County, and Municipal Government. Generally considered to be too pricey for commercial or personal use.

MotoTRBO – Also technically known as TDMA or DMR in Europe. The equipment is feature rich and affordable. Unfortunately, it is available only from a single source and is not well suited for government use due to a number of issues. It is well suited for commercial use and can be a good choice if compatibility with existing analog radios is not required.

IDAS – Also known as FDMA is the system generally best suited for commercial use since it meets all FCC technical standards through 2018 and is backwards compatible with 25 kHz, 12.5 kHz analog systems plus capable of operating in the digital mode on 25, 12.5, and 6.25 kHz channel spacing.

DTR – Technically known as FHSS (Frequency Hopping Spread Spectrum) can be operated without a license for government, commercial, or personal use. These radios are available only as portable units for on-site use. An excellent choice for retail stores, small manufacturing plants, salvage yards, and warehouses.

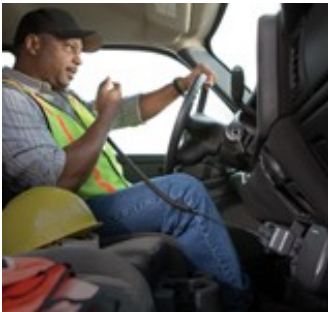
The information contained herein is primarily directed toward commercial or utility users that are currently using 2-way radios systems involving base stations, mobiles, portables, and repeaters. Before getting into more detail on the commercial applications of digital communications, we will make some brief recommendations for other users.



Governmental Users – State, county, and municipal agencies should follow the lead of federal agencies and standardize on P25. Additional information is available on this subject at www.icomfuture.com. The best pricing on P25 radios is available from ICOM using the Federal GSA contract through Falcon Direct. The best value on P25 radios is by Midland using the Alabama State Contract pricing. Additional information is available at www.midlandradios.us. The best choice for an analog radio with the ability of being upgraded to P25 digital operation is the Motorola PM1500 mobile and PR860 portable. Additional information is available at www.motosbest.com.



Unlicensed Users – The absolute best value for on-site communications, whether it be commercial, educational, governmental, or personal use, is the Motorola DTR650 digital portable radio. It costs a little more than analog radios but interference from other users will be a thing of the past and the features cannot be matched by any analog radio at any price. Additional information on the DTR650 is available at www.dtr2way.com. If you would like to see how the DTR650 compares against some of the more popular economy portable radios, please visit www.mursradios.com.



Commercial & Utility Users - Now, let's turn our attention to addressing the needs of commercial and utility fleet users. Operationally, we will address the needs of two basic user groups – those who have an existing system that wish to upgrade to digital versus those that are starting with a brand new system. We will assume the use of the VHF (150-174 MHz) frequency band since it offers the greatest range at the least cost. UHF (450-470 MHz) is optionally available at essentially the same cost.

The consideration of whether an existing analog user is migrating to digital capability is very important. When it is necessary to phase out older equipment over a period of time while retaining the ability to function in both the analog and digital modes, you *need multi-mode* capability. If this situation applies, we cannot recommend the MotoTRBO systems since the base and repeater stations and operate in only one mode (analog or digital but not both). The ICOM IDAS system can operate in both modes simultaneously. This is known as multi-mode operation. P25 equipment also has this capability. If you are starting with a new system where migration from analog to digital is not a consideration, the MotoTRBO system would be an excellent choice with prices basically comparable to the ICOM IDAS system.

Before discussing the ICOM IDAS system in more detail, there is one last consideration requiring attention.

FCC Licensing – With the exception of the DTR650 radio, all other systems require an FCC license. The fact that you have an existing license does not negate the need to update to digital operation. For budget, allow a thousand dollars to address this requirement. Exact cost can be provided when we know your specific requirements. The point for now is that you cannot simply start operating digital equipment when you are licensed only for analog. Call us at 800.489.2611 for additional information.

An Introduction to ICOM IDAS series digital land mobile radios



Subtitle	VHF or UHF Digital Handheld Transceivers
Model name	IC-F3161DT/DS,F4161DT/DS

Subtitle	VHF or UHF Digital Mobile Transceivers
Model name	IC-F5061D/F6061D

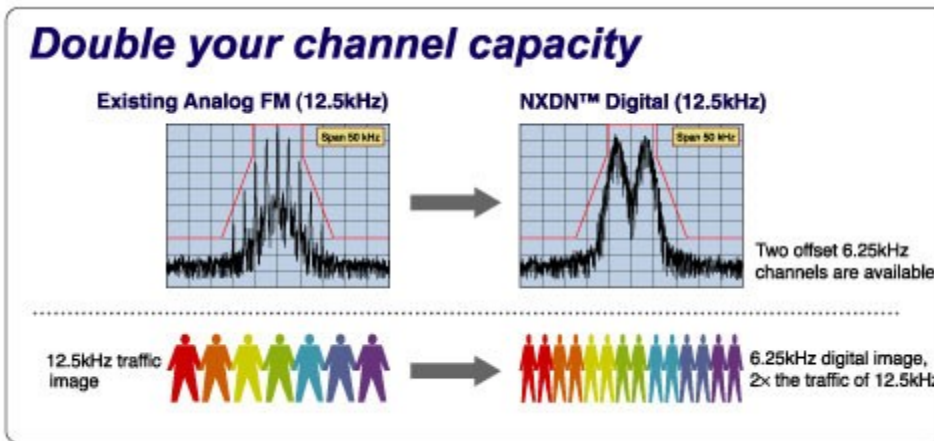
Subtitle	VHF or UHF Digital Repeaters
Model name	IC-FR5000/FR6000

In 1995 the FCC (Federal Communications Commission) mandated that all land mobile radio equipment had to have 6.25 kHz capability by January 1st, 2005 (Since extended to January 1st, 2011). This mandate was issued on the basis of efficiently using scarce radio spectrum. In response to this mandate, ICOM developed the IDAS system which offers a complete radio system including base, mobile, portable and repeater radios that operate with a 6.25 kHz FDMA modulation scheme.

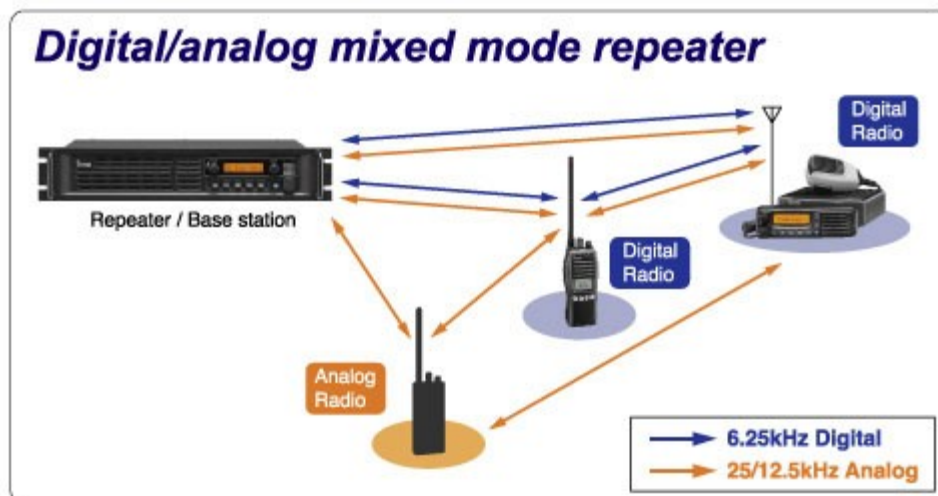
The IDAS series offers digitally modulated clear voice, secure communication with 4800bps data communication and retains compatibility with current analog FM systems. The IDAS series is capable of mixed mode operation in which the radio can receive analog FM mode and digital mode signals on a single channel. The IDAS radio system principle is spectrum efficient with the flexibility to allow you to scale your system migration to narrow band digital, while still running your existing analog system.

Main features

- 6.25kHz channel spacing - Doubles current 12.5kHz narrow band channel capacity
- Digitally modulated clear voice, data communication, secure conversation
- Digital/analog mixed mode operation
- Tough, rugged construction
- Compatibility with current analog FM radios/systems



IDAS is the second generation of 6.25 kHz digital technology. ICOM was the first to offer 6.25 kHz systems in early 2007. The IDAS system represents significant improvements over the original system as well as offering a one year lead over the only other providing similar technology in the U.S.A. The primary benefit is providing the ability to operate two radio channels in the same space as a single analog channel. This is far more efficient and the primary reason for FCC regulations requiring digital operation.



The second benefit, as discussed earlier is that of providing a practical means of migrating from analog to digital operation through the use of a mixed mode base station or repeater. Additional benefits are as follows:



Flexible application possibilities

- Variety of selective callings and data communications
- Network interface (Internet, LAN or WAN) for repeater will soon be available



Digital trunking

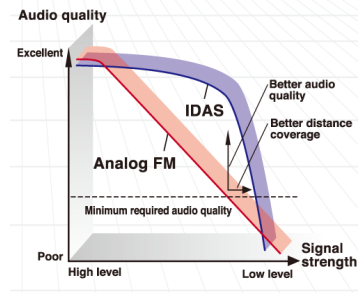
Digital trunking will be available in the near future.



Improved audio quality

AMBE+2™ codec for clear audio with data communication
Better sensitivity and greater communication coverage

Analog vs Digital Coverage



Improved communication security

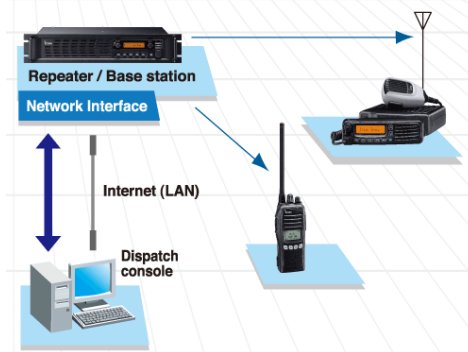
15-bit digital encryption keys standard (about 32,000 keys)

Let's recap – With the IDAS system, you get technical compliance with FCC Rules through 2018 plus digital clarity, privacy, compatibility with older analog systems operating at either 25 or 12.5 kHz plus some very important features that will soon be available.

Network Interface*

The IDAS repeater has a network interface* and can be connected to a LAN or the Internet via Ethernet cable. Communication range is vastly extended by the Internet connection and eliminates the need for expensive leased lines. When connected to a PC via a LAN or the Internet, you can remotely maintain the repeater configuration from your PC.

Network interface



*1 Option (Available in the future)

Digital Trunking*

The repeater will also have digital trunking capability in the near future. This will allow you further effective channel management by sharing a minimum of channels with a large number of users.

*Some features are planned and released in the future.

The list of features goes on with extended battery life (digital radios consume less current than analog radios). Features found only on high tier analog radios are standard on digital radios such as 2-way text messaging, compatibility with GPS, over the air stun or disable and much, much more.

Now, let's sum it all up!

The migration path to digital.....

The ICOM IDAS product family is being released on a scheduled plan beginning with the mobiles. The F5061D VHF or F6061D are available for shipment right now. These units are digital ready, yet capable of operating in either digital or analog modes. The specifications are provided later for your review. For now, we will simply say that if you are planning a digital migration involving a system utilizing mobiles or desktop base stations, your immediate focus should be on the mobile. Prices are as follows:

MOBILE - F5061D – 50 watt VHF digital/analog mobile - **\$695**

Common options:

Rear mount kit	-	\$100
Mobile antenna kit	-	30
AC Power supply w/cabinet	-	160
Desk Microphone	-	99
5 year warranty extension	-	57

Note: You can deduct \$200 if you want
To start with an upgradeable analog radio
And add the digital upgrade later.



The new F3161D portable will begin shipping in early June, 2008. This is the second generation IDAS portable, not the original F3061 which began shipping in 2007.

PORTABLE - F3161 – 5 watt VHF digital/analog portable - **\$695**

Common options:

Full keypad "T" option	-	\$50
Speaker-microphone	-	69
Carrying case	-	44
Spare battery	-	49
5 year warranty extension	-	57

Note: Available only as digital/analog model



REPEATER – FR5000 – 50 watt VHF digital/analog station - **\$1,995**

Common options:

Duplexer – Mid spec	-	\$300
Duplexer – High Spec	-	1,500
Equipment Cabinet	-	350
100 Watt PA with P/S	-	1,500
New antenna system	-	Call

Note: Estimated availability – Late September 2008



If this equipment is to be used to replace existing equipment, the current antenna and transmission line should be usable. We normally recommend replacement of mobile antennas and cable with the installation of a new mobile radio.

The current repeater is configured for single site, single location only. Before the end of 2008, the network version should be available with the ability to directly connect to a LAN, WAN, or the Internet. This would allow stations at different locations to be operated as a part of a wide area network without the need for leased phone lines or microwave. Only a broadband Internet connection would be required at each site.

A trunking controller will also be available by the 4th quarter of 2008 which will allow multiple stations to be used for dynamic channel assignment at a single site or linked together with the LTR Passport system option. Multiple receivers with RF links and a comparator are available for receiver voting requirements. For a quotation or additional information, please use our EZ-Quote form (www.info4u.us/EZQuote.dot) or call us at 800.489.2611. Product specifications follow:



VHF Digital Transceiver

IC-F5061D

UHF Digital Transceiver

IC-F6061D

- Compatibility with NXDN™ protocol and abundant digital functions
- 512 memory channels with 128 zones
- Large dot matrix display and multi-function LCD
- Detachable front panel with optional RMK-3 and separation cable
- D-Sub accessory connector and ignition sensing line
- 50W (VHF), 45W (UHF) RF output power
- IP54 dust-protection and splash resistance
- (Controller only)
- MIL-STD rugged construction
- Voting mode scanning
- Front mounted loud speaker and audio compander
- Built-in 2-Tone / 5-Tone / CTCSS / DTCS signaling (
- For analog FM mode)
- Built-in basic LTR™ mode operation (For analog FM mode)
- MDC 1200 compatible (For analog FM mode)
- Built-in inversion type voice scrambler and optional UT-109R/110R for higher security (For analog FM mode)
- 8 DTMF auto-dialing memories and ANI function (For analog FM mode)
- Escalating alarm

Options



SM-25
Desktop microphone



RMK-3
Separation kit



OPC-609 (1.9m; 6.2ft),
OPC-607 (3m; 9.8ft),
OPC-608 (8m; 26.2ft)
Separation cables.

Specifications

GENERAL

Frequency range	136-174MHz 400-470MHz 450-512MHz		
Number of channels	Max. 512 Ch./128 zones		
Channel spacing	25.0/12.5/6.25kHz, 30.0/15.0/7.5kHz		
Antenna impedance	50Ω		
Power supply requirements	13.6V DC		
Current drain (at 7.2V DC; approx.)	Tx	High (5W)	14.0A
	Rx	AF max.	1.2A
		Stand-by	300mA
Operating Temp. range	-30°C to +60°C -22°F to +140°F		
Dimensions (W×H×D)	160×45×150mm 6 ⁵ / ₁₆ ×1 ²⁵ / ₃₂ ×5 ²⁹ / ₃₂ in		
Weight	340g; 12.0oz (approx.)		

TRANSMITTER

Output power	50W (VHF), 45W (UHF)
Frequency error	±1.0ppm
Spurious emissions	75dB typ.
FM hum and noise	46/40dB typ. (Wide/Narrow)
Audio harmonic distortion	3% typ. (40% deviation)

RECEIVER

Intermediate frequencies	46.35MHz/450kHz (1st/2nd)	
Sensitivity	FM (W, N)	0.25 μV typ. (at 12dB SINAD)
	Digital	0.20 μV typ. (at 5% BER)
Spurious response	90dB min. (Wide/narrow)	
Intermodulation	77dB typ. (Wide/narrow)	
Audio output power	4.0W typ. at 5% distortion with a 4Ω load	



T Series

S Series

VHF Digital Transceiver with 10-keypad **IC-F3161DT**
 UHF Digital Transceiver with 10-keypad **IC-F4161DT**
 VHF Digital Transceiver without 10-keypad **IC-F3161DS**
 UHF Digital Transceiver without 10-keypad **IC-F4161DS**

- Compatibility with NXDN™ protocol and abundant digital functions
- 512 memory channels with 128 zones
- Dot matrix, multi-function LCD
- Large capacity Lithium-Ion battery pack
- Dust-protection and water jet resistance equivalent to IP55
- MIL-STD rugged construction
- 5W RF output power
- VOX for hands-free operation with optional headsets
- Voting mode scanning
- Escalating alarm
- Loud speaker audio with BTL amplifier and audio compander
- Built-in 2-Tone / 5-Tone / CTCSS / DTCS signaling (For analog FM mode)
- Basic LTR™ mode operation (For analog FM mode)
- MDC 1200 compatible (For analog FM mode)
- Built-in inversion type voice scrambler and optional UT-109R / UT-110R for higher security (For analog FM mode)

Options



HM-170GP

GPS speaker-microphone. Equivalent to IP57.



HS-95

Behind-the-head headset with flexible boom microphone.



VS-1SC

PTT/VOX unit. Required when using the headset.



UT-124R

Man down unit. Automatically sends an emergency signal when the transceiver is left in a horizontal position for a preset time.

Specifications

GENERAL	
Frequency range	136-174MHz 400-470MHz 450-512MHz
Number of channels	Max. 512 Ch./128 zones
Channel spacing	25.0/12.5/6.25kHz 30.0/15.0/7.5kHz
Antenna impedance	50Ω
Power supply requirements	7.2V DC (nominal)
Current drain	Tx High (5W) 1.5A/1.8A (VHF/UHF) Rx AF max. 600mA Stand-by (With UT-126H) 100mA 150mA/140mA (VHF/UHF)
Operating Temp. range	-30°C to +60°C -22°F to +140°F
Dimensions (W×H×D) (projections not included)	53×136×38.5 mm 2 ¹ / ₃₂ ×5 ¹¹ / ₃₂ ×1 ¹⁷ / ₃₂ in (with BP-232N)
Weight (with BP-232N)	340g; 12.0oz (approx.)
TRANSMITTER	
Output power	5.0W (VHF/UHF)
Frequency error	±1.0ppm
Spurious emissions	75dB typ.
FM hum and noise	46/40dB typ. (Wide/Narrow)
Audio harmonic distortion	3% typ. (40% deviation)
External MIC connector	9-pin multi connector/2.2kΩ
RECEIVER	
Intermediate frequencies	46.35MHz/450kHz (1st/2nd)
Sensitivity	FM (W, N) 0.25 μV typ. (at 12dB SINAD) Digital 0.20 μV typ. (at 5% BER)
Spurious response	70dB min. (Wide/narrow)
Intermodulation	74dB typ. (Wide/narrow)
Audio output power	0.5W typical at 5% distortion with an 8Ω load
External SP connector	9-pin multi connector/8Ω

VHF Digital Repeater

IC-FR5000

UHF Digital Repeater

IC-FR6000



- 19-inch rack mount design, 2U height low profile design
- 12-digit dot-matrix display and 32 memory channels
- Multiple CTCSS, DTCSS tone and digital RAN code decode
- Normal and priority scan setting
- 50W output power at 50% duty operation, 25W at 100% duty operation
- Two RF modules can be installed in a unit for a "2Ch in 1box configuration"
- (Optional UR-FR5000/UR-FR6000 required)
- 5-Tone and DTMF encoder/decoder (For analog FM mode)
- Accessory connector (D-sub 25-pin) for connecting analog trunking controllers or other external devices
- Audio compander (For analog mode)
- Built-in inversion type voice scrambler and optional UT-109R/ UT-110R for higher security (For analog FM mode)
- CW ID transmitter

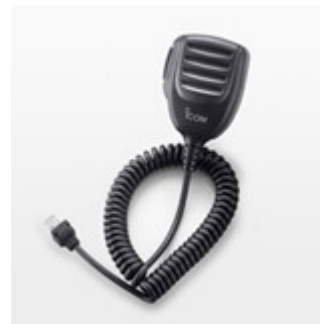
Options



**UR-FR5000 (VHF) /
UR-FR6000 (UHF)**
Channel module units



**Two RF units can be
installed in the unit.**
(Left side is an option.)



HM-152
Hand microphone



SM-25
Desktop microphone

Specifications

GENERAL

Frequency range	136-174MHz 400-470MHz 450-520MHz		
Number of channels	Max. 32 channels		
Channel spacing	25.0/12.5/6.25kHz, 30.0/15.0/7.5kHz		
Antenna impedance	50 Ω (Type-N×2)		
Power supply requirements	13.6V DC		
Current drain (at 7.2V DC; approx.)	Tx	High (5W)	15.0A
	Rx	AF max.	1.9A
		Stand-by	500mA 400mA (FAN off)
Operating Temp. range	-30°C to +60°C -22°F to +140°F		
Dimensions (W×H×D)	483×88×260 mm 19 ¹ / ₃₂ ×3 ¹⁵ / ₃₂ ×10 ¹ / ₄ in		
Weight	5.6kg; 12.3lb (approx.)		

TRANSMITTER

Output power	50W (adjustable to 5W)
Frequency error	±0.5ppm
Spurious emissions	80dB typ.
FM hum and noise	50/45dB typ. (Wide/Narrow)
Audio harmonic distortion	1% typ. (40% deviation)

RECEIVER

Intermediate frequencies	46.35MHz/450kHz (1st/2nd)	
Sensitivity	FM (W, N)	0.25 μV typ. (at 12dB SINAD)
	Digital	0.20 μV typ. (at 5% BER)
Spurious response	90dB min. (Wide/narrow)	
Intermodulation	78dB typ. (Wide/narrow)	
Audio output power	4.0W typ. at 5% distortion with a 4 Ω load	

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