ICOM

iDAS™
ICOM DIGITAL ADVANCED SYSTEM

dPMR digital™

Open Standard, Maximum Flexibility

- Peer to Peer
- Single/Multi-site Trunking
- Cost Saving System
- Conventional Repeater Systems
- Small Scale to Nationwide Networks
- ETSI Open Standard

What is dPMR™? Why Digital?

What is dPMR™?

dPMR is a 6.25 kHz FDMA based digital radio protocol described in the ETSI technical standards TS 102 490 and TS 102 658. The TS 102 490 standard defines dPMR 446 license-free radio and the TS 102 658 defines Mode 1 peer-to-peer mode, Mode 2 repeater mode and Mode 3 digital trunking. dPMR is specifically targeting highly functional solutions by using lower cost and less complex technology. Details of the dPMR protocol can be found on the dPMR Association website. (http://www.dpmr-mou.org)

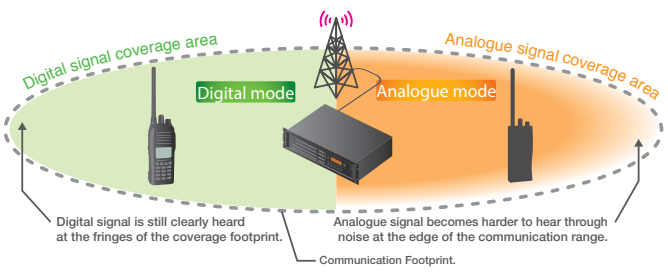
ETSI Standards	Tier	Mode	Descriptions
TS 102 490	Tier 1	–	License-free (dPMR 446)
TS 102 658	Tier 2	Mode 1	Direct Peer-to-peer Mode
		Mode 2	Conventional Repeater Mode
		Mode 3	Digital Trunking Mode

Why Digital?

Currently, the broad range of products and services including telecommunication, broadcast and information services use digital technology and the PMR (Private Mobile Radio) market is no exception. The move toward digital systems started over a decade ago and this trend is still growing rapidly. The merits of moving from analogue to digital are outlined below.

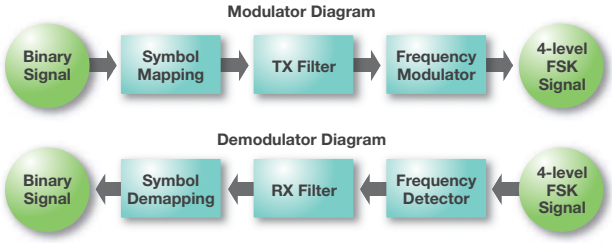
• Wider communication coverage

When compared to an analogue FM signal, digital easily out-performs analogue at the fringes of the communication range, thus providing more intelligible audio over a greater total area, even if the coverage footprint is the same as analogue FM.



• Better audio quality

dPMR radios incorporate the industry standard DVSI AMBE+2™ vocoder. The vocoder converts the analogue audio signal to a digital signal and reduces unwanted signals such as background noise and acoustic echo to deliver better voice quality and clarity.



• Secure conversation

Using digital modulation, dPMR radios cannot be easily monitored with an analogue receiver. A 15-bit digital scrambler also adds to the enhanced security of dPMR radios.

Cannot be easily monitored

• Flexible migration and upgrade path

The dPMR system allows you to scale migration to a digital system at your own pace and needs, while running your existing system. If the radio users increase in the future, or you require expanded communication coverage, the dPMR conventional system can be upgraded to a multi-site system, or grow into a Mode 3 trunking system while using the same subscribers*. This provides investment protection for your communication system.

* Depending on radio model/firmware revision.

• IP network connectivity

Since the dPMR system uses digital signals, these can be easily converted and transferred to an IP network or IP based applications. This means an increase in communication coverage.

dPMR™ Calling Features

Voice Services

Selective call and group call: Radio to radio, radio to group and radio to all users calls are supported.

Priority call: Several levels of priority call gives priority over lower level calls. Applicable to individual, group and gateway calls.

Data Services

Data call: A short data message of up to 100 characters can be sent and received.

Status call: 32 preprogrammed status messages can be sent and received. The status call can be used as a trigger for special functions such as ambience listening, remote stun/kill/revive and GPS data delivery.

Transparent data call: This function uses a dPMR radio as a data modem allowing data communication on a 6.25kHz channel such as for a remote telemetry system or data applications.

GPS data delivery: For GPS-based vehicle management applications.

Features	Mode 3	Mode 1/2
Individual Call	✔	✔
Group Call	✔	✔
Broadcast Call	✔	✔
All Call	✔	✔
Gateway Call	✔ (PSTN/PBX)	✔
Priority Call	✔ (Normal/Priority)	–
Data Call (SDM)	✔	✔
Status Call	✔*	✔
Transparent Data Call	✔	✔
GPS Data Delivery	✔	✔
Emergency Call & Alert	✔	✔
Pre-emptive Emergency	✔	–
Ambience Listening	✔	✔
Remote Kill/Stun/Revive	✔	✔
Call Back	✔ (Maximum 10 stack)	–
Call Queue	✔	–
Digital Voice Scrambler	✔	✔
ANI	✔	✔
Late Entry	✔	✔
Call Set-up	✔	✔

* Individual call only.

Supplementary Service

Emergency call: This function sends an automated emergency signal to the dispatcher or another radio. The man down and lone worker functions can be used for the emergency call trigger.

Pre-emptive emergency: If a network is busy, this call service clears down the existing call and gives the highest priority for the emergency call.

Ambience listening: The ambience listening function allows the dispatcher to turn on the PTT from a remote location and transmit anything the microphone hears for a preprogrammed period.

Remote kill: This function disables a lost or stolen radio over the air, eliminating security threats from undesired listeners.

Remote stun/revive: The remote stun function temporary locks out a radio until the revive command is received, or the user password is entered.

Call back: Up to ten missed incoming calls can be stored to return the call later.

Call queue: If a called party or channel is busy, the call queue automatically connects when a channel becomes free.

Digital voice scrambler: A built-in digital voice scrambler provides about 32,000 codes scrambler for secure conversations.

ANI (Automatic number identification): The ANI function shows the alias ID number on the LCD while receiving a call, allowing the radio user to identify who is calling.

Late entry: If a call is in progress when you turn on the radio or come into the radio coverage area, this function shows the caller's name, and allows you to join a conversation.

Application examples

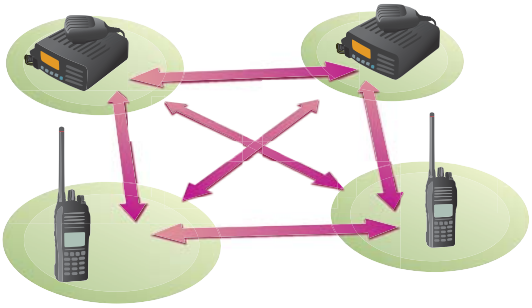
In combination with various applications, the following services can be provided.

- SIP phone/analogue phone connectivity
- Connect to a building public address system to speak over using the dPMR radio
- PC dispatch capability
- Cross protocol communication between dPMR and MPT

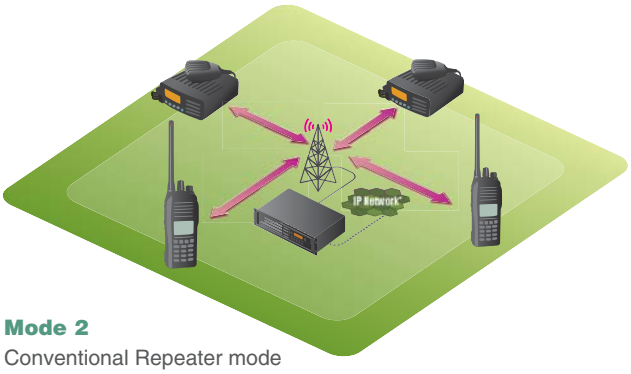
dPMR™ Conventional Modes

dPMR™ Conventional Mode (Mode 1/ Mode 2)

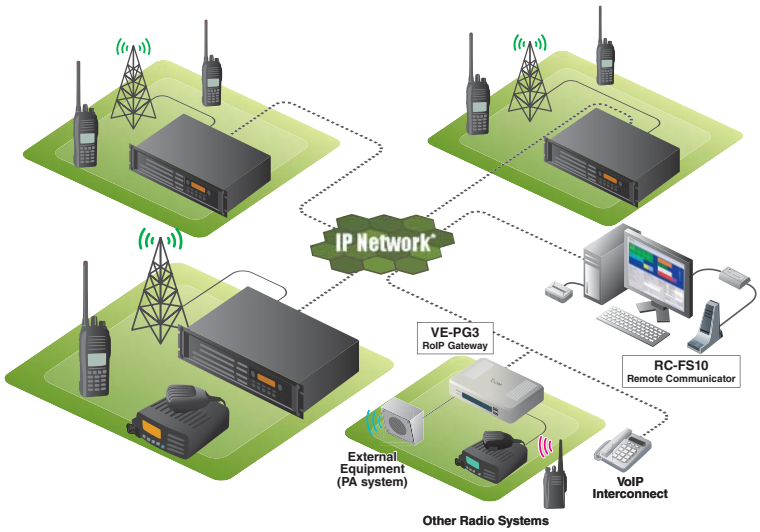
dPMR Mode 1 and Mode 2 are the digital conventional modes for small user systems and/or for low traffic density systems. Mode 1 is peer-to-peer communications and Mode 2 is repeater/infrastructure added to Mode 1.
The analogue PMR system users who are mainly running 5-Tone or BIIS signaling can easily migrate to the digital conventional mode. "Call setup and clear down" operation is implemented for familiarity for analogue users. dPMR radios are designed to coexist with analogue radio systems, and can receive both analogue and digital mode signals on a single channel.
In Mode 2 conventional systems, up to 16 repeater sites can be interconnected over an IP network, and you can build low complexity multi-site systems.



Mode 1
Peer-to-peer mode



Mode 2
Conventional Repeater mode



Up to 16 repeater sites can be connected over an IP network.
*Note: Private IP Network or VPN Tunnels through the Internet with Static endpoints.

- Unique migration solution from analogue to digital
- Up to 16 site Networks • Up to 60,000 subscribers
- Web based system administration
  System software updates and configuration online
- Status call • Data call (SDM)
- Transparent data call
- Digital/Analogue dual mode*

* The Mode 2 conventional IP network cannot relay voice traffic over the IP network if the uplink is analogue.

- RC-FS10 creates a IP-based virtual radio station on a PC and works as a simple dispatch
- Interconnect with IP phone, analogue radio and IP advanced radio systems with the VE-PG3 RoIP gateway

Examples of dPMR™ End Users

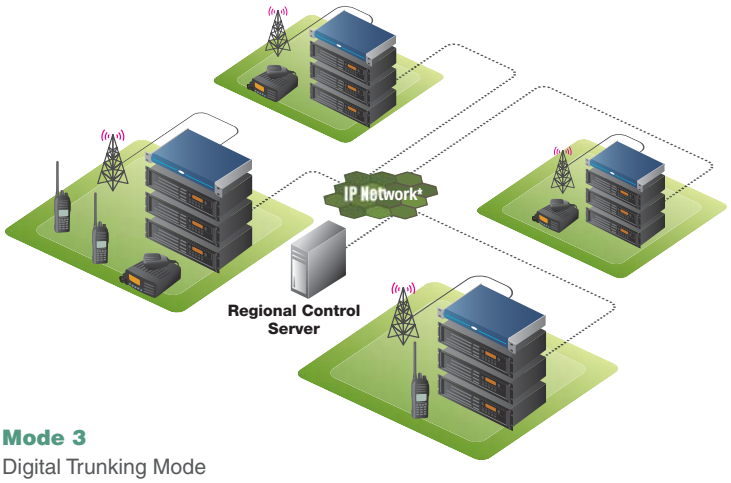
The following are some examples of dPMR™ implementations.

- Local governments (City councils)
- Humanitarian Users
- Utilities (Power Plants)
- SMR services
- Security/Prisons
- B&I Users (Manufactures)
- Airports/Transportations

dPMR™ Mode 3 Digital Trunking

dPMR™ Mode 3 Digital Trunking

In a dPMR Mode 3 digital trunking system, a small number of communication channels are automatically and dynamically allocated to accommodate a large number of subscribers. The trunking sites can be interconnected over an IP network, so the system can be expanded from a single site system to virtually nationwide networks. The MultiLingo™ trunked radio system controller is provided by Fylde Micro. The MultiLingo™ can be used with the Icom IC-FR5100/FR6100 repeaters. The Regional Control Server is required to manage IP traffic and ensure optimum fixed-link performance.

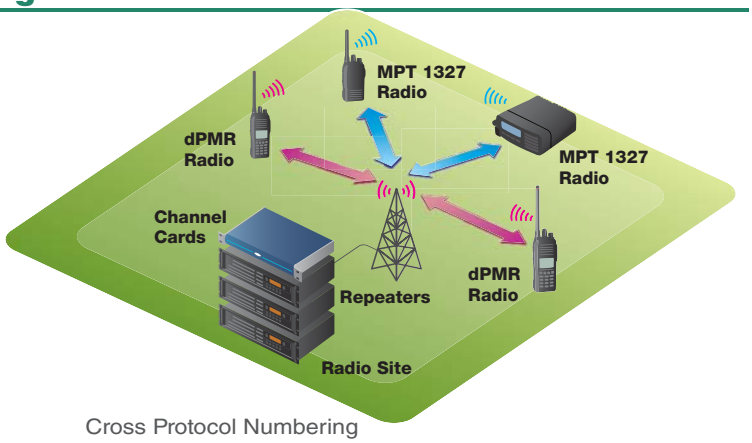


Mode 3
Digital Trunking Mode
(Example of sites with three repeaters controlled by two MultiLingo cards)

- Unique migration solution from MPT to dPMR™
- Up to 62 channels per site
- Up to 500,000 subscribers • 50–60 subscribers per channel
- Minimum 2 channel single site trunking
- Interoperable cross protocol calling dPMR to MPT (See below)
- Web based system administration
- Phone interconnection with an external SIP server
  System software updates and configuration on-line
- Full queuing for both resource and busy parties
- Individual and group calls, including broadcast
- Status call • Subscriber control and basic call logging
- Short data service • Transparent data call

Interoperable Cross Protocol Numbering

dPMR and MPT1327 have different numbering schemes. To enable communication between these protocols, some form of translation must be provided. Fylde Micro's Multi-Lingo™ controller uses a unique translation table to ensure that dPMR users can be included in MPT1327 group calls and vice versa. This insures there are no restrictions on protocol to protocol communication.



Cross Protocol Numbering

This partnership brings together the pioneering work undertaken by Icom in 6.25 kHz narrowband digital protocol development with the unrivalled experience amassed by Fylde in the development of rugged and reliable trunked radio systems over the past 25 years.

VHF HANDHELD TRANSCEIVERS

IC-F3262DT (5W)
IC-F3262DS (5W)

UHF HANDHELD TRANSCEIVERS

IC-F4262DT (5W)
IC-F4262DS (5W)

Left: S Series (Simple keypad)
Right: T Series (10-keypad)

IP67 GPS Rugged MIL-STD 810

» IDAS™ Features

- dPMR Mode 1, 2 and 3 compatible
- Individual and group selective call
- Broadcast call • Ambience listening
- Status call and data call (Short Message)
- Transparent data call
- Emergency call and alert
- Remote kill, stun and revive
- Digital voice scrambler

» General and Analogue Features

- 136–174MHz, 5W • 400–470MHz*, 5W
  (* Other frequency versions may also be available in some countries.)
- 512 memory channels with 128 zones
- Menu-driven user interface
- IP67 dust-tight and waterproof
- MIL-STD rugged construction
- Large capacity Lithium-Ion battery pack
- 800mW loud audio with BTL amplifier
- 14-pin accessory connector with BTL amplifier output
- Mode dependent scan • Priority scan
- 8 DTMF autodial memories
- Lone worker function
- Integrated GPS receiver and man down function* (* Depending on version)
- 5-Tone, 2-Tone, CTCSS and DTCS capability
- Built-in audio compander
- Inversion voice scrambler

VHF HANDHELD TRANSCEIVER

IC-F1000D (5W)

UHF HANDHELD TRANSCEIVER

IC-F2000D (4W)

IC-F1000D

IP67 Rugged MIL-STD 810

» IDAS™ Features

- dPMR Mode 1 and 2 compatible
- Individual/Group call • PTT ID (TX)
- Ambience listening • Emergency (TX)
- SDM (Short Data Message)/Status RX beep
- Remote kill, stun and revive (RX)
- Digital voice scrambler

» General and Analogue Features

- 136–174MHz, 5W • 400–470MHz, 4W
- 16 memory channels with voice announcement
- IP67, dust-tight and waterproof protection
- Operating time: 18 hours* (approx. with BP-280 battery pack)
  * Tx: Rx: standby=5:5:90. Power save on.
- 52.2 (W) × 111.8 (H) × 30.3 (D) mm compact body (with BP-280)
- Motion detection, man down and lone worker functions
- BIIS 1200 functions: PTT ID and emergency call
- Surveillance function
- 5-Tone, 2-Tone, CTCSS and DTCS capability
- DTMF autodial memory
- 800mW (typ.) loud companded audio
- Optional GPS microphone, HM-171GPW

IECEx/ATEX INTRINSICALLY SAFE RADIO

VHF HANDHELD TRANSCEIVER

IC-F3202DEX (1W)

UHF HANDHELD TRANSCEIVER

IC-F4202DEX (1W)

IC-F3202DEX

IP67 Rugged MIL-STD 810

» IEC Certifications

Mining : Ex ib I Mb
Gas : Ex ib IIC T4 Gb
Dust : Ex ib IIIC T110°C Db
–20°C≤Ta≤+55°C
IEC 60079-0 (2011), IEC 60079-11 (2011)

» ATEX Certifications

Mining : I M2 Ex ib I Mb
Gas : II 2G Ex ib IIC T4 Gb
Dust : II 2D Ex ib IIIC T110°C Db
–20°C≤Ta≤+55°C
EN 60079-0 (2012), EN 60079-11 (2012)

» Features

- 136–174MHz, 1W • 400–470MHz, 1W
- dPMR Mode 1 and 2 compatible
- 16 memory channels
- Lone worker and man down functions
- Low electrical resistivity body; Carrying case is not required
- IP67 dust-tight and waterproof
- Operating time: 21.5/19 hours* (VHF/UHF, approx. with BP-277EX battery pack)
  * Tx: Rx: Standby=5:5:90. Power save on.
- 2-Tone, 5-Tone, CTCSS and DTCS capability
- BIIS 1200 PTT ID transmission
- Option speaker-microphone
- Channel announcement function

dPMR™ 446/PMR446 TRANSCEIVER

IC-F29DR (500mW ERP)

LICENCE FREE

IC-F29DR

IP67 Rugged MIL-STD 810

» Features

- dPMR 446 and analogue PMR 446 compatible
- Digital and analogue dual mode
- No licence* is required to use the radio
- IP67, dust-tight and waterproof protection
- 800mW (typ.) loud audio
- Operating time: 26 hours* (approx. with BP-280 battery pack)
  * Tx: Rx: standby=5:5:90. Power save on.
- Call-Ring function provides 12 types of ring tone
- Answer back call function (analogue mode)
- Voice announcement
- Tone scan (analogue mode)
- CTCSS, DTCS and digital common ID for group call communication
- Operating channel, CTCSS, DTCS and common ID are programmable in the field (without PC programming)
- 52.2 (W) × 186.1 (H) × 30.3 (D) mm compact, slim body (with BP-280)
- 270g lightweight body (with BP-280 and MB-133)
- 500mW output power (ERP)
  * Simple licence or application may be required in some countries.

VHF MOBILE TRANSCEIVER
IC-F5062D (25W)

UHF MOBILE TRANSCEIVER
IC-F6062D (25W)

IP54
Only controller and RMK-3.

Rugged MIL-STD 810

The above photo includes optional seperation kit, RMK-3, and separation cable, OPC-609.

» IDAS™ Features

- dPMR Mode 1, 2 and 3 compatible • Individual and group selective call
- Broadcast call • Ambience listening • Status call and data call (Short Message) • Transparent data call • Emergency call and alert
- Remote kill, stun and revive • Digital voice scrambler

» General and Analogue Features

- 136–174MHz, 25W • 400–470MHz*, 25W
  (* Other frequency versions may also be available in some countries.)
- 512 memory channels with 128 zones
- Menu-driven user interface
- Backlit dot-matrix display • Power on password
- IP54 dust-protection and splash resistance (Controller only)
- Detachable front panel (Optional RMK-3 and separation cable required)
- MIL-STD rugged construction • DTMF autodial
- Front mounted speaker • Lone worker function
- D-SUB 25-pin accessory connector • Ignition sensing line
- Mode dependent scan • Built-in inversion voice scrambler
- 5-Tone, 2-Tone, CTCSS and DTCS capability
- Built-in audio compander • Radio kill, stun and revive function

VHF HANDHELD TRANSCEIVER
IC-F3102D (5W)

UHF HANDHELD TRANSCEIVER
IC-F4102D (4W)

VHF MOBILE TRANSCEIVER
IC-F5122D (25W)

UHF MOBILE TRANSCEIVER
IC-F6122D (25W)

IP54

Rugged MIL-STD 810

IC-F3102D

Rugged MIL-STD 810

IC-F5122D

» IDAS™ Features

- dPMR Mode 1 and 2 compatible • PTT ID • Individual/Group call
- Remote kill, stun and revive (RX)
- Emergency (TX) • Ambient listening (RX) • Digital voice scrambler
- Status call and data call (Short Data Message)(IC-F5122D series)
- Transparent data call (Xon/Xoff)(IC-F5122D series)

» General and Analogue Features

- 136-174MHz and 400-470MHz coverage
- 128 memory channels with 8 zones (IC-F5122D series)
  16 channels with channel announcement (IC-F3102D series)
- MIL-STD rugged construction
- 5-Tone, 2-Tone, CTCSS and DTCS capability
- BIIS PTT ID transmission • DTMF autodial memories
- D-Sub 25-pin accessory connector with optional OPC-2078 (IC-F5122D series)
- Optional GPS microphone, HM-171GP (IC-F3102D series)

REMOTE COMMUNICATOR
RC-FS10

» Features

- The RC-FS10 is a remote communicator software for use in the dPMR™ Mode 2 and analogue radio system with the VE-PG3. It creates a virtual radio/simple dispatch station on a Windows®-based PC with the CT-24 digital voice converter and a microphone and speaker.
- Up to 8 different IDAS or VE-PG3 systems can be programmed
- Up to 40 function buttons are programmable, including individual call, group call, selective call, all call, status call, status polling, and so on
- Caller ID/alias name, called ID/alias name and call type information are displayed on the ANI area for easy recognition
- SDM (short data message), status message and DTMF code can be sent and received

RoIP GATEWAY
VE-PG3

» Features

- Interconnect between dPMR™ Mode 2, analogue radio system and IP Advanced Radio System
- RoIP and SIP gateway functions
- Telephone interconnection with IP phone and PSTN lines
- Direct dialing from radio user* (* Limited to radios with DTMF capability)
- Public address system, siren, warning light and external equipment can be connected to the VE-PG3
- IP router function: PPPoE/IPv6 bridge, NAT, dynamic DNS, VPN pass through, IP filter, SNMP and SYSLOG

VPN ROUTER
SR-VPN1

» Features

- Up to 32 IPsec VPN tunnels (3DES, AES-128, AES-192 or AES-256)
- IPsec wizard focuses on the basic setting items for a VPN connection, and provides simple step-by-step instructions
- High-speed 1000BASE-T gigabit Ethernet connection
- 4 gigabit LAN ports with switch function
- Dynamic DNS client function

VHF REPEATERS
IC-FR5100 (25W)
IC-FR5100H (50W)

UHF REPEATERS
IC-FR6100 (25W)
IC-FR6100H (50W)

Features

- 136–174, 400–470MHz coverage*
  (* Other frequency versions may also be available in some countries.)
- 12-digit dot-matrix display and 32 memory channels
- 19-inch rack mount design, 2U height low profile design
- Multiple CTCSS, DTCS tone and CC decode
- IC-FR5100H/FR6100H: 50W output at 100% duty cycle*
  IC-FR5100/FR6100: 25W output at 100% duty cycle*
  (* 25°C ambient temperature)
- IF output connector for connection to MultiLingo controller (Mode 3 version only)
- ±0.5ppm high stability oscillator
- "2 channel in 1 box" configuration (Optional UR-FR5100/UR-FR6100 required)
- 5-Tone and DTMF encoder/decoder (5-Tone is for the analogue FM mode)
- D-Sub 25-pin connector
- Built-in inversion voice scrambler and optional UT-109R/UT-110R for higher security (For the analogue FM mode)
- CW ID transmitter

Options

UC-FR5000 (#12)
dPMR Mode 2 Network Controller
For dPMR Mode 2 IP networking
(Cannot be installed in Mode 3 version)

CHANNEL MODULES
UR-FR5100 (136-174MHz, 25W)
UR-FR6100 (400-470MHz, 25W)

POWER AMPLIFIERS
UR-PA5000 (VHF),
UR-PA6000 (UHF)
50W, 100% duty

OPC-2202
UR-PA5000/PA6000 connection cable for dPMR Mode 2

OPC-2203
UR-PA5000/PA6000 connection cable for dPMR Mode 3

OPC-2311
MultiLingo connection cable for dPMR Mode 3

FYLDE MICRO MultiLingo™

- Each card can handle 2 simultaneous communications
- Each 1U / 44mm height chassis holds up to 2 cards
- In MPT1327 or dPMR mode this means two repeaters connect to each card
- Each card can operate in MPT1327 or dPMR modes
- Connection is via dual 100/T Ethernet CAT5 sockets for redundancy
- A single connection to each repeater
- All speech is immediately digitised, even in the analogue modes; there are no audio cables or switches
- SIP digital telephony with an external SIP server
- Up to 31 cards per site/62 channels

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