Entry Level
Digital Mobile Radio
(DMR) "Today"

Product & Feature Overview

**Prepared by 2826 Limited in Partnership
with UK DMR Manufacturer**

sepura

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Introduction

Over the last 7 years there has been a major change within the business two way radio industry, in that a new digital era has arrived. In the past, all two way radio transmissions have been analogue and speech has been sent in the transmission by modulating the signal to speech patterns. This method of transmission has been extremely successful over many, many years. However the launch of digital transmission has led to the design and implementation of new digital protocols for the business radio industry.

Sepura has taken these new protocols and emerged with a new product portfolio that offers digital transmission of both voice and data so that we can all benefit from the features digital mobile radio (DMR) can deliver.

Below we talk about basic entry level systems for small to medium size organisations, however we have further documentation which explains in more detail about linking multiple sites, networking, unique software and dispatcher packages for larger systems. This document "Advanced DMR Today" can be requested by contacting one of our team.

Analogue versus Digital

The introduction of Digital Mobile Radio (DMR) brings some fundamental questions which are answered here.

- **Q.**   *What does the new DMR platform offer over analogue?*

    - **A.**   The main advantages of DMR (Digital Mobile Radio) over analogue are audio quality, data transmission and integration with other systems and devices.

        Audio quality with analogue systems deteriorate over distance and as a result, as the signal gets weaker, the audio quality falls away. With digital transmission, the audio is coded into data before transmission and decoded on arrival. If the signal gets through, you hear the same quality audio at the receiver as left the transmitter.

        With regard to data transmission, the Sepura radio is built to handle data and hence has the capability to be more effective. The digital platform can therefore be more useful for transmitting data such as GPS information and text type messages to enhance feature lists. Sepura digital two way radios use IP based protocols and will therefore integrate more easily with back office systems.

Q. *When is it time to migrate to digital?*

o **A.** The new digital platform for business two way radio users has been available for almost 7 years. Sepura have provided an upgrade path for users so that digital equipment is backward compatible and users can easily migrate their systems over a period of time.

Once all radios have been upgraded to digital, the radios can be reprogrammed to digital mode. If your business is considering a new installation or replacement of an old one, then Sepura DMR should be your only consideration, as manufacturers have begun cancellation of many analogue portfolios. Any new analogue installation could mean potential problems sourcing equipment and would lead to the need to upgrade to digital in the future in any case. This could mean more investment and possible disruptions.

- **Q.** *Are there different digital platforms and are they all compatible?*

o **A.** There are two protocols that have been developed and used by different manufacturers and unfortunately they are not all compatible with each other. These protocols are widely known in the market place as dPMR and DMR. The easiest analogy to explain the differences would be a VHS/Betamax scenario making it very difficult for customers to choose the right path, however market research clearly shows the majority of UK systems sold use the DMR protocols as they are far more advanced and indeed reliable.

Features & Product Information of Digital Mobile Radio

The feature list of the Sepura Digital Mobile Radio (DMR) range is extensive and growing all the time.

Radio products available today include:

- Digital Repeater Station
- Desk Top Fixed Radios
- Vehicle Radios
- Portable Radios
- Associated Accessories
- Software Applications / Integrations

Product Information: Sepura Digital Repeater Station

The Sepura digital repeater station has a very unique dual voice slot feature. Due to the use of TDMA technology (Time Divisional Multiple Access) used in the digital transmission, the repeater station is able to send two voice transmissions using a single frequency so you get the use of two channels for the price of one when using a repeater station. Furthermore the unit has battery backup capability and an external RJ45 IP connection to allow units to be connected together over a network. This feature is very useful for connecting remote sites together or increasing radio coverage if required.

Sepura DMR Repeater (SBR8000)

The Sepura DMR repeater station also offers an upgrade path from analogue to digital in that it will work in analogue mode, digital mode or a "mixed mode" option. This will allow digital transmission when receiving a digital signal from a digital radio and then analogue transmission when receiving an analogue signal from an analogue radio. This basically means you can run both digital and analogue radios through the same repeater station, making migration simple and painless.

Product Information: Sepura Digital Desktop / Vehicle Radios

Both configurations above utilise the same Sepura mobile radio terminal, however dependant on the requirement, depends on the accessories utilised.

For a vehicle configuration units will come with a mounting bracket, power cables and fist microphone and for desktop or fixed scenarios a 240v power supply. All fixed or vehicle radios come as standard with a colour display to make best use of features available such as messaging, lone worker alarms and emergency calling.

Sepura DMR Mobile (SBM8000)

Product Information: Sepura Digital Portable Radios

Sepura DMR portable radios are available with and without keypad and display and these choices will be dependant on the features required. As mentioned before some features such as text messaging, lone worker and emergency calling work so much better with a portable radio with visual display.

Both display and non display units meet IP67 build standards, which includes the ability to fully submerse radios in water for 30 minutes at depths of 1 metre without damage.

Sepura Portable units are supplied as standard with a belt clip, antenna and lithium polymer batteries. Radios are also available with optional coloured bezels to easily identify users groups or departments and are available in Orange, Yellow, Green and Blue.

Sepura DMR Portables (SBP8000)

Digital Features

When installing a new Sepura DMR system that uses a repeater station, whereas with an analogue repeater station you would have one operational channel, with a digital repeater and digital portables you actually get two channels. This is achieved by breaking the channel up into slots. When transmissions take place over a digital network the speech is turned into data which is compressed. This compression means that the voice can be transmitted in half the time that an analogue system would take.

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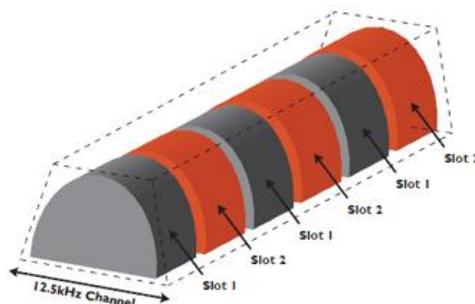
Call Types

There are many different call types that can be programmed to a Sepura DMR system including:

- Individual Private Call
- Group Call
- All Call
- Emergency Call
- Remote Monitor Call
- Remote Disable / Enable Call

The ability to programme and configure radios with sophisticated calling structures will give rise to a very versatile and robust radio system that can be tailored to specific applications and needs.
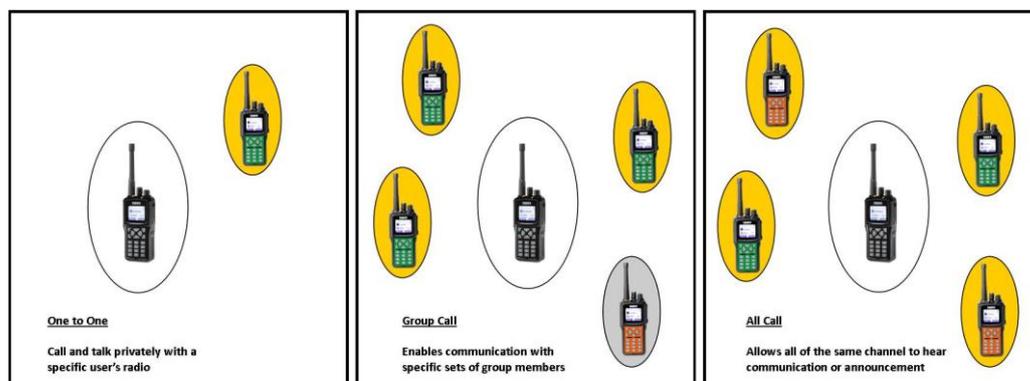
Radio users can select to call individual radios for a one-one conversation or perhaps select a specific group to make a call; further users could select all radios in the fleet to make an announcement. Calling from the office radio or display radio can be initiated from a contact list within the radio. The contact list can be pre programmed or manually adjusted by the user.

If a radio user is called and they are unable to answer, a "call indicator" will show in the radios display to show that a call was received. Display radios can be programmed to show the incoming caller ID number or indeed alphanumeric name.

There is an emergency button on the top of the radios that can be aimed at a particular radio user or group. The receiving radio, with a display, will show the emergency call and who made the call. If the system is busy when the emergency call is made, the radio will slot the emergency call within an active conversation to get the emergency through.

The remote monitor call is used to switch a remote radio in to transmit such that local noise or background to the radio is transmitted automatically to you. As an example, perhaps a portable radio user activated an emergency call to alert the office radio but no further transmission was heard. It could be that the radio user is in conversation with somebody and cannot use the radio. The office can then activate a remote monitor call to put the portable radio into transmit with the microphone live. The office can then hear the conversation or noise without the radio user knowing. This can also be done with vehicle radios. This feature is programmable per radio user.

The radio disable/radio enable feature can be used to remove radios from the system if they are stolen. If at any point a radio is stolen and is being used to cause interference to your fleet, the office radio could use this feature to disable the nuisance radio, should this radio unit be recovered the radio can then be enabled again.

One to One	Group Call	All Call
Call and talk privately with a specific user's radio	Enables communication with specific sets of group members	Allows all of the same channel to hear communication or announcement

Crystal Clear Audio

One of the key benefits of a Sepura digital system over a legacy analogue system is the crystal clear audio achieved. This is due to the speech being encoded and sent as data and is decoded by recipient radios such that the voice is received exactly as it left the transmitting unit. With legacy analogue systems a weak signal meant weak audio, whereas a weak digital signal can still bring crystal clear audio. Of all the benefits of digital over analogue systems, the clear audio is top of the list and ensures every call within coverage is heard clearly. The audio crispness experienced using a Sepura portable is simply the best in its class. This has been achieved by the company's global experience developing TETRA terminals for the mission critical markets and their huge annual investment in R&D at HQ in Cambridge.

Reducing Background Noise

When transmitting on a Sepura digital radio the audio processor samples the audio from the microphone and is able to cleverly discriminate between what is speech and what is noise. The noise is filtered to leave a much clearer voice transmission. This facility will greatly improve transmission from radio users operating in high noise environments. A great example of this facility is the Formula 1 Grand Prix teams now being able to communicate more clearly with their pit crews and you as a viewer can now hear those conversations broadcast live on TV. The reason this is possible is from the introduction of digital radio transmissions that remove background noise.

Longer Battery Life

With digital radio transmissions the radio compresses the speech which takes up to half the transmit time. The radio actually transmits in pulses and thus transmitting for less time. This improves the life of batteries by up to 40% on average allowing users more operating time without the need to change or charge batteries.

Strong Robust Portables

Sepura digital portable radios are built to IP67 standards, in a nutshell this means radios are built to military specifications and are put through accelerated life testing to ensure reliability for years to come. Sepura digital radios also come with a minimum of 24 months warranty as standard and this warranty can easily be extended up to 60 months and can even include accidental damage cover. IP67 also means the radio is submersible in water for 30 minutes to depths of 1 m with no degradation or operational issues to the radio.

- **Q**.   **Why choose the Sepura DMR family**

  - o **A.**   Sepura has a pedigree that can be traced back, through well known names such as Phillips and Pye, over 100 years in radio communications, and has been a global leader in the digital sector for over 15 years. The company has successfully delivered over one million digital radio terminals.

    Built on providing robust, secure solutions for use in tough, harsh environments and utilising open standards, Sepura's unique DMR product family remains true to these principles and provides a total DMR solution.

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