HF Radio Digital Voice and Secure Digital Voice

User Guide

BCM40504/08

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OVERVIEW 1

Products Covered in This Manual 4000 Series Transceiver Digital Voice Products

For use with Barrett 4000 Series HF SDR Transceivers

1. Digital voice module - DV

P/N BCO40505 Digital Voice auto vocoder module 700/1200/2400 bps, no encryption

2. Secure digital voice module with DES 56 encryption - SDV-56

P/N BCO40506 - Secure digital voice auto vocoder module 700/1200/2400 bps with DES 56 encryption

3. Secure digital voice module with AES 256 encryption - SDV-256

P/N BCO40507 - Secure digital voice module auto vocoder 600/1200/2400 bps with AES 256 encryption.

Export Licence required.

4. Key management software DES 56

P/N BCA40521 For use with SDV-56 - P/N BCO40506

5. Key management software AES 256

P/N BCA40520 For use with SDV-256 - P/N BCO40507

2050 HF Transceiver Digital Voice Products

1. Digital voice module - DV

P/N BCO20515 - Digital voice auto vocoder module 700/1200/2400 bps, no encryption

2. Secure digital voice module with DES 56 encryption - SDV-56

P/N BCO20521 Secure digital voice module auto vocoder 700/1200/2400 with DES 56 encryption

3. Secure digital voice module with AES 256 encryption - SDV-256

P/N BCO20520 Secure digital voice module low rate auto vocoder 600/1200/2400 with AES 256 encryption.

Export licence required.

- Key management software DES 56
 P/N BCA20521 For use with SDV-56 P/N BCO20521
- 5. Key management software AES 256

P/N BCA20520 For use with SDV-256 - P/N BCO20520

PRC-2090 HF Transceiver Digital Voice Products

1. Digital voice module - DV

P/N BCO20515 - Digital Voice auto vocoder module 700/1200/2400 bps, no encryption

2. Secure digital voice module with DES 56 encryption - SDV-56

P/N BCO20521 Secure digital voice module auto vocoder 700/1200/2400 with DES 56 encryption

3. Secure digital voice module with AES 256 encryption - SDV-256

P/N BCO20520 Secure digital voice module low rate auto vocoder 600/1200/2400 with AES 256 encryption.

Export licence required.

4. Key management software DES 56

P/N 2090-01-51 For use with SDV-56 - P/N BCO20521

5. Key management software AES 256

P/N 2090-01-50 For use with SDV-256 - P/N BCO20520

Introduction

This manual describes utilising Digital Voice (DV) and encryption (Secure Digital Voice (SDV)) for HF radio with the different Digital Voice (DV) and Secure Digital Voice (SDV) products available from Barrett Communications. Details on how to install, configure and use the DV and SDV products with Barrett 4000 and 2000 series HF Transceivers are covered in this manual.

Digital voice can improve the reliability of communications over noisy channels where reception of analogue voice can be very poor. Poor voice quality can be improved markedly by the use of digital voice modules to the point where barely usable frequencies are made clear. SDV allows users to encrypt their communications over HF therefore providing a secure HF network.

Both DV and SDV capability can be utilised in Barrett 4000 and 2000 series HF transceivers using Barrett digital voice modules which are designated as:

- DV Digital Voice module with no encryption
- SDV-56 Secure Digital Voice module with DES 56 encryption (No export licence required)
- SDV-256 Secure Digital Voice module with AES 256 encryption (Export licence required)

Signal-to-noise ratio conditions can change during communications between HF stations. The digital voice modules have auto baud capabilities which automatically adjust baud rates up or down whilst communicating between the transceivers allowing the users to transmit and receive signals with optimal voice clarity.

PLEASE NOTE, the SDV-56 and SDV-256 are not compatible due to different baud rate capabilities.

Operating with Digital Voice

To achieve the best results from the digital voice capabilities of Barrett transceivers fitted with DV/SDV modules, it is important to understand how the system works. This section describes the system and also details operational scenarios which will assist operators in getting the most from their equipment.

As mentioned earlier, the DV/SDV modules achieve the best results in terms of digital voice clarity by automatically changing baud rates. This is achieved by the DV or SDV module assessing the signal-to-noise ratio (SNR) in the current conditions and then changing the baud rate appropriately to allow best synchronization between all transceivers. This is known as auto baud i.e. the DV modules have "auto baud capabilities".

The DV and SDV-56 modules have baud rates of 700/1200/2400 bps. The SDV-256 has baud rates of 600/1200/2400 bps. As the baud rates are different for the SDV-56 and SDV-256, the modules are not compatible in terms of being able to be utilised for DV operation. However, analogue voice would still be available for voice communications.

The module will adjust up or down between the above baud levels for effective use of digital voice. All the modules require a minimum SNR of -3 dB to operate at the low level. It is quite common that the baud rates being used between stations can vary as the SNR can be different at each station. This can be due to the antenna types being used, fixed or mobile stations, and/or local area interference.

The method the DV modules follow for achieving the optimal baud rate for conditions is as follows:

- The DV modules will, by default, start at the low baud rate for the first transmission.
- During each transmission, as well as the digital audio being transmitted, the SNR received on the previous transmission is also sent back to the transmitting station.
- After four successful transmissions at the low rate, the DV module will assess the received SNR values and if favourable, the baud will increase to the medium rate. This assessment process will repeat and if SNR has improved it will go to the high baud rate. It is possible that if the SNR is optimal after the first assessment it may go directly to the high baud rate bypassing the medium baud rate.

4000 series transceivers will display the current baud rate and update the display as the baud rate changes.

2000 series transceivers are unable to display the baud rates. However, these can be determined by the sound of the two beeps heard at the beginning of each received transmission.

| Low pitched tones: | Low baud rate |
|-----------------------|---|
| Medium pitched tones: | Medium baud rate (can sound like one long continuous tone) |
| High pitched tones: | High baud rate |

If the DV module senses no outgoing or incoming signals for two minutes, the DV module will revert to the default low baud rate. If the operator initiates two short transmissions (PTTs), for example by pressing the microphone PTT button twice, the module in the transceiver in question will revert to the default low baud rate.

set-up 2

Encryption

To enable digitally encrypted communications between transceivers fitted with DV-56 or SDV-256 modules they must have the same encryption key loaded and selected.

Barrett Communications Key Management Software allows encryption keys to be loaded into Barrett Communications 4000 and 2000 series transceivers, which are fitted with S/DV modules. This is supplied on a USB device and once inserted into a PC can be installed following the on-screen prompts.

This section of the manual covers the following:

- Using Barrett Key Management Software (KMS) (used with 2000 and 4000 series transceivers) including generating keys
- Loading keys into 4000 series transceivers
- Selecting keys in 4000 series transceivers
- Enable digital and secure voice in 4000 series transceivers
- Loading keys into 2000 series transceivers
- Selecting keys in 2000 series transceivers
- Enabling Scrambler Mode in 2000 series transceivers

Barrett Communications Key Management Software Quick Start Guide (2000 & 4000 Series Transceivers)

Two variants of the software are available, a 56-bit version for use with DES keys and a 256-bit version for use with AES keys. These variants are the same, except for the length of the keys that are generated. The 56-bit version is shown throughout this manual although the instructions contained are applicable to both variants.

The typical steps to generate keys and load them onto a transceiver are as follows:

- 1. Key Management Software (KMS): Install, generate the keys (255 secure keys for 4000 series transceivers and 15 secure keys for 2000 series transceivers) and export the keys to an appropriate location
- Load the keys onto the transceiver using either the Configuration Load Software (4000 and 2000 series) via serial connection or the USB socket on the transceiver (4000 series only). When using the Configuration Load Software please refer to "Configuration Load Software (4000 and 2000 series)" section starting on page 18.

1. Key Management Software (KMS)

Installing the KMS requires that the logged-on user has administrator privileges. The Installer may be run by inserting the USB device provided into an available USB port on the PC, navigating to the drive and running the installer file.

KMS installers are typically named:

Barrett_Communications_56-bit_vx.x.xx_setup.exe

Follow the prompts to install the software.



Barrett_Commun ications_KMS_56bit_v4.3.18_setup

256

Barrett_Commun ications_KMS_25 6-bit_v4.3.18_set up

Using Key Management Software

Upon start-up, three options are available:

- Create a new Key Configuration File: Choose this option if a new Key Configuration File has to be created.
- Edit an existing Key Configuration File: Choose this option if a Key Configuration File has already been created, but needs to be modified.
- Export an existing Key Configuration File to USB Fill Device: Choose this
 option if a Key Configuration File has already been created, and needs to
 be programmed into a transceiver.



Select the appropriate option and continue.

| Insert the random | passphrase or generate one autor | natically. |
|--------------------------------|--|------------------|
| Barrett Key Management Softw | vare 56-bit (KMS) | ? |
| tep 1: Generate Cry | yptographic Keys | |
| he cryptographic keys of the . | 2000/4000 Series Radio must now be created. En | ter a Key |
| ndom characters. | oox below or press the Random Phrase button to fill | the box with |
| RDbbgHXXwA 1E8A]u@}%o | pj]rdIc-M_e-kOLOb(/ w>sC>Nuba | the box with |
| RDbbgHXXwA 1E8A]u@}%o | yox below or press the Kandom Phrase button to hu yj]rdIc-M_e-kOLOb(/ w>sC>Nuba | the box with |
| RDbbgHXXwA 1E8A]u@}%o | yox below or press the Kandom Phrase button to hill | the box with |
| RDbbgHXXwA 1E8A]u@}%o | yox below or press the Kandom Phrase button to h⊪ | the box with |

Select the initial and default cryptographic key (Key Number) from the list of 255 keys below by

| Key # | Hidden Key | Key Use | ^ |
|-------|------------|--------------------------|---|
| 1 | ****** | Barrett 2000/4000 Series | |
| 2 | ***** | Barrett 2000/4000 Series | |
| 3 | ******* | Barrett 2000/4000 Series | |
| 4 | ***** | Barrett 2000/4000 Series | |
| | ***** | Parrett 2000/4000 Series | × |

X

Cancel

1

2

3

5

Key Generation Phrase

The Strength bar shows the measured complexity of the phrase (how difficult the passphrase would be to hack). Greater complexity will ensure that the keys are not related and that they are cryptographically secure.

< Back

Next >

The "Add unique hidden text... are unique" check box includes the current time in the key generation process. This ensures that regenerating the keys using the same passphrase at a different time will result in different keys.

Clicking this button automatically generates a 100% strength pass phrase.

Selecting the Show keys checkbox will display the keys in hexadecimal format

Saving the Keys

Saving the keys is required to modify or re-export the keyset at a later stage.

The keyset is stored in the C:\Users\<user>\Documents\Barrett Communications KMS Files folder. Where <user> is the username of the currently logged on user. This file needs to be kept secure as access to this file can compromise key security.

WARNING

Anyone with access to the stored keyset file (.kms) can reproduce the generated keys. Take care to protect or remove this file as appropriate.

| Key Configu | ration Filename : | | | | | |
|---------------|---------------------|-----------------|-----------------|-----------------|----|---|
| barrett_comr | nunications_kms-5 | 6-bit_2019_01_3 | 0 | | | _ |
| Status: | Not Saved | 22.1 | | 10.0 | ά. | |
| Save Location | : C:/Users/Training | g/Documents/Bar | rett Communicat | tions KMS Files | / | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Choose a name and save the keyset.

Exporting the Keys

During this step the keys are exported to a file that can be programmed into a 4000 or 2000 series Barrett radio. A security code is required to keep the keys secure. This code will be required each time the exported keyset is loaded into a radio.

| Secure the Key Configuration File JSB Fill Device. | with a Sec | urity Code | and expo | rt it to the 2 | 000/4000 | Series | |
|---|----------------------------|-------------------------|------------------------|-------------------------------|-----------|--------|--|
| (MS Security Code (12 digits and/ | or letters): | 6 5 | 4 3 2 | 8 1 7 | 8 8 8 | 2 | |
| NOTE: All 12 characters have to | be entered | before exp | orting will | be enabled! | | | |
| NOTE: This KMS Security Code Series Config Load Software i | needs to b n order to l | e entered oad the Ke | on the FD y Configu | T Terminal c iration File. | r 2000/40 | DO | |
| Export | | | | | | | |
| Status: Not Exported | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

- 1. Type a Security Code to allow the keys to be exported. Make a note of the security code, to protect the generated keys because it is impossible to recover keys without the security code.
- 2. Select a folder to export the keys to.

A dialogue box will pop up and indicate that the keys were saved successfully.

A file **barrett_communications_kms.rtk** should be present in the chosen folder.

2. Loading the Keys

Loading the keys generated and export by the KMS is handled by the Configuration Load Software (CLS) for both the 2000 and 4000 series transceivers. Additionally, this can be done through the USB port of the 4000 series transceiver.

Via USB (4000 series only)

Loading keys into a 4000 series transceiver involves simply inserting the USB device with the appropriate exported keys on it into the transceiver. The transceiver will detect the insertion of the device and ask the user to load the keys.



- Insert the USB device into the socket. The USB device must contain a .rtk file that has been exported.
- 2. Select "SDV Encryption Keys" when the pop-up appears. If it does not appear, go to Settings<Import/Update.
- 3. Select the .rtk file that represents the keyset to load.

The installation will start automatically and a progress bar should appear.

Upon completion of the progress bar, the keys are loaded and available for use on the transceiver.

Configuration Load Software (4000 and 2000 series)

The CLS is compatible with both 2000 and 4000 series transceivers via the serial connection on the back of the transceivers with a Programming Cable (P/N BCA40001), via RJ45 Ethernet cable (via adaptor (P/N BCA40504)) or via WiFi option (P/N BCO40508).

The Configuration Load Software is responsible for loading keys into 2000 and 4000 series transceivers. It is capable of loading exported keyset files. These files have the extension .rtk.

Installation

Installing the CLS requires that the logged on user has administrator privileges. The installer may be run by inserting the USB device into an open port, navigating to the drive and running the installer file.

CLS installers are typically named:

Barrett_Communications_56-bit_vx.x.xx_setup.exe

• Follow the prompts to complete the installation.



Connect the transceiver to the PC

4050se HF SDR Transceiver - Serial



3 USB to serial adaptor (P/N BCA92318)

Windows PC

4

4050ip HF SDR Transceiver - IP Network

This diagram represents the connection between a Barrett 4050ip HF SDR Transceiver with an Ethernet socket in the rear panel and an IP network.





Barrett 4050ip HF SDR Transceiver (rear) (P/N BC405000ip)

Ethernet (RJ45) cable

4050se HF SDR Transceiver - IP Network

This diagram represents all possible connections between the Barrett 4050se HF SDR Transceiver and an IP network. See Barrett 4000 Series IP Connectivity/ Networking Guide.



- WiFi Adaptor (P/N BCO40508)
 - 4050 to USB Adaptor (P/N BCA40504)
 - Barrett 4050 HF SDR Transceiver (front) (P/N BC405000)

4

5

4050/4090 Control handset

When using a 4050/4090 Control Handset without a docking station, a PRC-4090 Handset USB Interface (4090-01-27) must be attached to the rear of the handset.

The PRC-4090 Handset USB Interface is attached as shown in the diagrams below. Once in place, turn the wheel until unit is secure.



The diagram below shows the possible connections between the above 4050/4090 Control Handset and an IP network.



| 1 | 4050/4090 Control Handset (P/N BCA40500/4090-01-09) |
|---|---|
| 2 | PRC-4090 Handset USB Interface (4090-01-27) |
| 3 | WiFi Adaptor (P/N BCO40508) |
| 4 | USB to Ethernet Adaptor with USB ports (P/N BCA40505) |
| 5 | Ethernet (RJ45) cable |

4090 SDS

The below diagram shows the network connection from a Barrett PRC-4090 HF SDR Transceiver in Mobile configuration (P/N 4091-00-10).





Barrett PRC-4090 HF SDR Transceiver in Mobile configuration (P/N 4091-00-10)



tion (P/N 4091-00-10)

Ethernet (RJ45) cable

2000 Series Connection Diagrams

2050 HF Transceiver



PRC 2090/2090 HF Transceiver 0 o⊕© םר 8 4 1 3 冒 1 Front of PRC 2090/2090 HF Transceiver 2 Serial cable to suit 2090 with DB9 adaptors (P/N SA-29109) 3 USB to serial adaptor (P/N BCA92318) 4 Windows PC

Setting Up the Connection - Serial

Choose the device type (Barrett 4000 or 2000 series) from the top right drop down menu. Select the interface from the left drop down menu: serial.

When using a serial connection, ensure that the correct serial port is entered. If the serial port number is incorrect, the software will not connect to the transceiver.

| Device Type Barrett 400 | 00 Series Interface: | Serial 🔻 |
|--|-----------------------------|-----------|
| Port : COM1 (PCIe to Hig | gh Speed Serial Port) [] | ▼ Connect |
| Silicon Serial Number : Network ID : Ready | Node ID : | |
| System Configuration | Cryptographic Configuration | |
| | | Desuga |

For 4000 series transceivers, SDV/4026 programming mode needs to be "Enabled" in the Security menu and that in the I/O menu, the Networked RS232 is set to "Direct" to ensure connection.



2000 series transceivers can only be connected to a PC via Serial cable. Follow the below procedure to enable Scrambler mode (must be enabled to load keys).



Setting Up the Connection - Ethernet or WiFi

Choose the device type (Barrett 4000) from the top right drop down menu. Select the interface from the left drop down menu: serial.

When using an ethernet or WiFi connection, ensure that the correct IP address and serial port are entered. If either of these are incorrect, the software will not connect to the transceiver

For more information on setting up a 4000 series transceiver for WiFi, please consult

the Barrett 4000 Series HF IP Connectivity/Networking Guide (P/N BCM40507) available from www. barrettcomms.com.

Barrett Config Load Software (CLS) (4.3.19) X Device Type: Barrett 4000 Series 🔻 Interface: Ethernet Address : 192.168.13.2 Port: 58001 Connect Connection Status : Disconnecter Software Version : Silicon Serial Number : Node ID : Network ID : Ready System Configuration Cryptographic Configuration SCS File : Browse Save System Configuration to modem Settings Settings I/0 5 RS232 Connection Network RS232 Network Encryption To ensure connection, make sure Disabled the RS232 Connection is set to "Network" and that SDV/4026 Programming mode is "Enabled". Settinas Settings Security Security \$ **Remote Access Password** SDV/4026 Programming Mode Enabled Service Mode

Connecting to CLS

Each of the below windows show the connection via Serial interface, however the process is identical when connecting via Ethernet or WiFi i.e the below windows may appear slightly different depending on your configuration.

| evice Type: | Barrett 400 | 0 Series 🔻 | | Interface: | Serial | • | | |
|---|---|---|------------------------|--------------|--------|---|---------|------|
| ort : COM1 | (PCIe to Hi | h Speed Serial P | ort)[] | | | • | Disconn | nect |
| onnection St oftware Vers ilicon Serial N letwork ID : | atus : Der sion : Barn lumber : 2C7 0 (1 | vice connected ett-3G-DIG_AUD 1000A45163731 NET63) | V5.6.28 (TC Node ID | 2-Rev2) : | | | | |
| | figure | | | | | | | |
| leady to com | | 27 27 125 | | | | | | |
| System Cor | nfiguration | Cryptographic | Configuration | n | | | | |

Clicking on the connect button will cause the software to attempt communication with the internal modem.

Error Conditions

| ort : COM1 (PCIe to | High Speed Serial Po | ort)[] | ¥ | Disconnec |
|--|--|----------------------------|---|-----------|
| oftware Version : | Barrett-3G-DIG_AUD 2C71000A45163731 | V5.6.28 (TC2-Rev2) | | |
| ilicon Serial Number : etwork ID : | 0 (NET63) | Node ID ; | | |
| llicon Serial Number : letwork ID ; eady to configure | 0 (NET63) | Node ID : | | |
| licon Serial Number : etwork ID : eady to configure System Configuratio | 0 (NET63) | Node ID : Configuration | | |

If the software reports that the device is not responding, check that the transceiver is in key programming mode, that cable is connected and is secure.

Loading Keys

Loading a keyset stores the keys on the transceiver indefinitely, those keys will be available until new keys are loaded or the keys are purged.

- 1. Select the Cryptographic Configuration tab.
- 2. Browse for a file with an .rtk extension that was exported previously.

| evice type: Bar | rett 4000 Series 🚿 | Interface: | Serial 🔹 | |
|---|--|---------------------------------------|----------|------------|
| ort: COM1(PC | Ie to High Speed Serial | Port)[] | • | Disconnect |
| onnection Status oftware Version : ilicon Serial Numb | : Device connecte Barrett-3G-DIG_AU er : 2C71000A4516373 | d D V5.6.28 (TC2-Rev2) 1 | | |
| etwork ID : | 0 (NET63) | Node ID : | | |
| | | | | |
| | | | | |
| eady to configure | : | c Configuration | | |
| eady to configure System Configur | ation Cryptographi | c Configuration | | |
| eady to configure System Configur KMS File : | ation Cryptographi | c Configuration | | Browse |

 Enter the Security Code when prompted to load the keys onto the transceiver. This was entered in the Exporting the Keys stage of the KMS (see page 16)

| Enter KMS Access Code | ? | × |
|--|------|--------|
| Leave blank and click Ok if not encryp | ted | |
| | | |
| | OK (| Cancel |

When the status is shown as Cryptographic Configuration Complete the transceiver may be replaced to load keys onto another unit or the CLS may be closed.

The transceiver will need to be restarted in order to use the keys.

| Device Type: Barrett 40 | 000 Series 🔻 | Interface: | Serial 🔻 | |
|--|---|---------------------------|----------|------------|
| Port : COM1 (PCIe to H | ligh Speed Serial Port | t)[] | × | Disconnect |
| Software Version: Ba Silicon Serial Number:2C | rrett-3G-DIG_AUD V5 71000A45163731 | 5.6.28 (TC2-Rev2) | | |
| Network ID : 0 (| (NET63) | Node ID : | | |
| Network ID : 0 (Cryptographic Config System Configuration | (NET63) uration complete Cryptographic Co | Node ID : onfiguration | | |
| Network ID : 0 (Cryptographic Config System Configuration | (NET63) uration complete Cryptographic Co | Node ID : onfiguration | | |

OPERATION 3

Selecting Keys in 4000 Series Transceivers

The selected key is displayed as the Secure Digital Voice/Data Key.

To access the key, tap the Settings menu from the Swipe menu and then select Security.

Scroll down by using the touch screen or the arrow keys on the keypad until Secure Digital Voice/Data Key can be selected.

PLEASE NOTE: The menu options shown on the right will vary depending on the options available to you, and installed on your transceiver.

Secure Digital Voice/Data Key

The secure digital voice/data key is used for secure digital voice and data. Keys need to be loaded into the SDV module first using the Barrett Communications Keyfill Software.

Select from 1 to 255.

PLEASE NOTE: All transceivers must have the same key selected in order to communicate.





| Secu | Secure Digital Voice/Data Key | 1 |
|-----------------|-------------------------------|---------|
| Key us | 1 | |
| Selca Hoppin | 2 | andard |
| Selca | 3 | **** |
| Code f | 4 | icablad |
| Allows | 3DV/4020 to be comigured | Isabled |

Enable Digital and Secure Voice in 4000 Series Transceivers

From the home screen, tap Encoding once to toggle digital voice or secure digital voice on or off. Tap and hold the Encoding button for two seconds to change between Digital and Secure Digital Voice encryptions.

The orange label indicates the current mode of the transceiver.



Making a Digital/Secure Digital Voice Call

Making a Digital or Secure Digital Voice call operates the same as making a analogue voice call and can be activated before or during a voice call.

For the digital voice system to work at its optimum level, each transceiver needs to wait for the end of transmissions tones before beginning to transmit. This allows the baud rates sufficient time to synchronise for optimal clarity of transmission.

Call Mute and Digital Voice

When Call Mute (on the home screen) is enabled in tandem with Digital or Secure Voice, digital voice traffic will become quiet i.e. background HF noise will be quietened and voice will be clear.

Digital Voice Baud Rate Selection

There are two ways to access the Digital Voice Baud Rate.

It can be accessed directly from the swipe screen by pressing DV Baud rate, or

From Settings < Security.

The baud rate of Digital Voice encryptions can be fixed by selecting Digital Voice Baud Rate.

It can be set to Auto, 600/700bps, 1200bps or 2400bps.









on

MELP/TWELP

Tri-Wave Excited Linear Prediction (TWELP) and Mixed-Exitation Linear Prediction (MELP) are the two types of voice encoding offered by Barrett Communications. While TWELP has higher speech and non-speech (sirens etc) quality, MELP offers STANAG 4591 (NATO) and MIL-STD 3005 standards.

Both TWELP and MELP offer variable baud rates 600/1200/2400 for AES 256 encryption.

Only TWELP offers variable baud rates 700/1200/2400 for DES 56 encryption.

TWELP is the default waveform used by Barrett transceivers for Digital Voice transmissions. The MELP waveform can be purchased as an option (please contact Barrett Communications) and will alter how Digital Voice operates.

It is not recommended to have a network of mixed MELP and TWELP transceivers for the following reasons:

- MELP and TWELP waveforms do not communicate with each other.
- ALE 3G networks use TWELP only.

Selecting Keys in the 2000 Series Transceivers

When using the SDV module, the encryption key is set using the "Audio Scrambler" menu from the Standard menu.



Note: The same encryption key code must be selected in all transceivers to communicate effectively.

Encryption key codes between 1 and 15 can be selected with an additional "Non Secure" key for clear digital voice transmissions.



Use the scroll keys to choose a code (1 to 15 or Non Secure)

Then press

Press twice to exit to the main screen.





Enabling Scrambler Mode for 2000 Series Transceivers

On the Barrett 2000 series transceivers, secure digital voice capabilities are assigned to Scram key $\frac{\text{Scram}}{\text{tuv} \ 8}$.

Press $\frac{8}{100}$ and hold for more than two seconds to display the "Scrambler Enabled" screen.



While the transceiver is in DV/SDV mode, the "Scrambler On" message displays.



To Disable Scrambler Mode

Press $\frac{8}{100}$ and hold for more than two seconds to display the "Scrambler Disabled" screen.



Secure Scrambler

Advanced Scrambler is automatically set when the transceiver detects a Digital Voice Module. If this is not selected i.e. if settings have been changed, Secure/ Digital Voice communications will not be completed. The following procedure details how to enable the Advanced Scrambler.

 Go to [Protected Menu], [I/O Settings], [Secure Scrambler], then press



2. Use the scroll keys to select the required option. Select Advanced Scrambler for AES 256, DES 56.







Warranty Statement

Barrett Communications (hereafter referred to as 'Seller') provides a three (3) year warranty on all Barrett products from the date of shipment from the Seller. A one (1) year warranty from the date of shipment from the Seller is provided for all batteries.

Each warranty guarantees acceptable performance of the product under normal recommended conditions for the duration of the warranty period. In cases of accident, abuse, incorrect installation or maintenance by a non-Seller representative, subjection to abnormal environmental conditions, negligence or use other than those in accordance with instructions issued by the Seller, the warranty shall be voided. In addition, this warranty shall not cover low performance – specifically the distance or quality of transmission and reception - due to unfavourable environmental or locational conditions. Nor shall this warranty cover the quality of transmission and reception of transceivers mounted in vehicles or vessels that have not been sufficiently electrically suppressed.

Should any fault due to bad design, workmanship or materials be proven at any time within the warranty period, the Seller will rectify such fault free of charge provided that the equipment is returned, freight paid, to Barrett Communications Pty Ltd head office or to an authorised service centre. The repaired or replaced product will remain covered under and throughout the term of the original warranty period up to its expiration. No repair or replacement will extend the warranty term past the original thirty-six (36) month anniversary of the original date of shipment from the Seller.

Firmware and software (pre-installed, stand-alone or provided as an update), hereafter referred to as 'Software', is guaranteed to perform acceptably within the specifications provided by the Seller, provided that the Software is within the warranty period.

Should Software not perform acceptably, the Seller will use all commercially reasonable efforts to correct such nonconformity as reported to the Seller directly or via a support representative. The Seller is not obliged to update Software under warranty if the nonconformity is caused by a) the use or operation of the Software in an environment other than intended or recommended by the Seller in relevant documentation, or b) modifications made to the Software not authorised or undertaken by the Seller or a representative of said Seller.

Subject to the matters set out in this warranty, no liability, expressed or implied is accepted for any consequential loss, damage or injury arising as a result of a fault in the equipment and, all expressed or implied warranties as to quality or fitness for any purpose are hereby excluded.

This warranty does not extend to products supplied by the Seller which are not designed or manufactured by it. The Seller will however make every endeavour to ensure that the purchaser receives full benefit on any warranty given by the original equipment manufacturer.

This warranty is restricted to the original purchaser except where the original purchaser is a reseller authorised by the Seller who has purchased for the purpose of resale, warranty shall be extended to the reseller's customer.

Contact Details

Our customer / dealer technical support department can be contacted via land mail, email, telephone or via support ticket on the technical support web page.

https://www.barrettcommunications.com.au/support/

Barrett Communications Pty Ltd Head Office:

PO Box 1214, Bibra Lake WA 6965 AUSTRALIA

Toll Free Tel: 1800 999 580 (Within Australia) Tel: +618 9434 1700 Fax: +618 9418 6757 email: <u>support@barrettcommunications.com.au</u>

Telephone support from the Australian office is available from 7:30 am to 4:00 pm local time Monday to Friday.

Barrett Communications – Europe:

Unit 9, Fulcrum 2 Victory Park, Solent Way, Whiteley Hampshire PO15 7FN United Kingdom

Tel: +44 (0) 1489 880 332 Fax: +44 (0) 1489 565 422 email: <u>support@barrettcommunications.co.uk</u>

Telephone support from the UK office is available from 8:30 am to 5:00 pm local time Monday to Friday.

Barrett Communications Corporation USA:

90 Office Parkway Pittsford, N.Y. 14534 Tel: +1 585 582 6134 E-Mail: <u>support@barrettusa.com</u>

Telephone support from the USA support office is available from 8:30 am to 5:00 pm local time Monday to Friday.

Head Office

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