



**BARRETT 660 TELEPHONE INTERCONNECT
OPERATORS MANUAL
Version 1.1**

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1.0 SYSTEM CONCEPT

The BARRETT 660 Telephone Interconnect is designed to provide telephone interoperability to HF radio users. It is designed to be operated as a completely automatic facility, or it can be used as a semi automatic facility, in which case an operator is required. To prevent any misuse or abuse of the system a number of security devices are used.

Basic facilities offered are:

A radio user with any transceiver fitted with a suitable CCIR 493-4 based Selective Calling (Selcall) board compatible with Barrett Communications format can access the Interconnect system and connect to any of the 98 internal preset telephone numbers. These are preset by the BARRETT 660 owner and can be reprogrammed directly from the front panel of the BARRETT 660. This facility operates purely on the Selcall number which is sent and no further information is required. This allows it to be used by non-microprocessor based transceivers which do not support any method of entering telephone information.

A radio user with a suitable transceiver, generally synthesised, can call the BARRETT 660 Telephone Interconnect and specify any telephone number to be dialed. To do this, the transceiver must be fitted with appropriate control software to allow the entry of both the Selcall number and the telephone number which is required. A suitable transceiver is the BARRETT 550, which is a synthesised transceiver ideal for mobile communications. It provides full support for all BARRETT 660 Telephone Interconnect facilities.

A telephone user can call the BARRETT 660 Telephone Interconnect and Selcall a radio user. If a radio is on channel, but is not attended, they can send their own contact telephone number to the radio and the call can be returned when the radio operator returns.

2.0 HARDWARE

Front Panel

32 character (16 x 2 lines) backlit, supertwist liquid crystal display.

16 control keys for full operation and editing.

5 status LED's giving POWER, TX modulation power, ON LINE, PTT and VOX indications.

Speaker giving full audio response and output power.

Analogue Volume knob with complete POWER ON/OFF control.

International standard 8-pin microphone connector.

Handles, for easy removal from racking installations.

Back Panel

Transceiver Port 1 for connection to BARRETT 550 transceiver. (25 pin 'D' female connector, use cables Barrett P/N BCA50021 or BCA50022 for connection of Barrett 660 to Barrett 550)

Transceiver Port 2 for connection to BARRETT 550 transceiver

RS-232 Port for logging/monitoring and direct programming via remote computer in level three operation. Will also be used to down load stored information to serial printer when required. (9 pin 'D' Connector)

Power lead - To suit BARRETT 522 Power Supply

Telecom line socket (FCC68 type)

Ground Bonding Strap

General

- * 19 inch rack (2U height) 483mmW x 270mmD x 88mmH.
- * Single, removable top lid for easy inspection, servicing and testing.
- * Aluminum construction for reduced weight and good heat conductivity.

3.0 OPTION LEVELS

There are 3 different option levels of BARRETT 660 Telephone Interconnect available. These are only available factory fitted. These options can be upgraded, however this can only be done by returning the BARRETT 660 to the Barrett factory. It is NOT possible for dealers to perform this upgrade.

The 3 option levels are:

Preset telephone numbers only.

This level gives no facility for direct dialing of telephone numbers. Only the 98 internal preset numbers can be used. No system activity information is available.

Standard configuration.

Full direct dialing facilities as well as preset telephone numbers are available. A complete log of system activity is available from the RS-232 port.

Full logging commercial option.

Full direct dialing facilities as well as preset telephone numbers are available. A complete log of system activity is available from the RS-232 port. Full reprogramming facilities from an external computer/terminal are available through the RS-232 port. Logging to a remote computer is available for complete remote site system management.

4.0 PREPARATION FOR OPERATION

SYSTEM INTERCONNECTION

Ensure that all components to be connected into the system are switched Off.
On the BARRETT 660, this involves ensuring the ON/OFF Volume control is fully counter-clockwise.

On the BARRETT 522 Power Supply Unit, The ON/OFF rocker switch to the left of the IDC mains power input connector should be in the off position.

The BARRETT 550M Transceiver does not have an independent power control.

Connect the 25 way interface cable.(Cable BARRETT P/N BCA50021 or BCA50022 depending on configuration) from the transceiver 25 pin auxiliary connector to the BARRETT 660 25 pin transceiver connector.

Connect the supplied 37 pin to 9 pin "D" connector cable from the 37 pin connector on the rear of the BARRETT 660 to the 9 pin connector on the BARRETT 550 transceiver module.(Supplies the power on signal and PTT control to the 550M)

Connect the BARRETT 660's ground bonding strap to the transceiver and the BARRETT 550's ground bonding strap to the 522 PSU.

It is very important that these bonding straps are correctly fitted or transmitter instability may occur.

Connect the supplied telephone cable to the 'Telephone' socket of the BARRETT 660 and the Telecom PSTN socket.

Connect any equipment that will be using the RS-232 connector (9 Pin) on the BARRETT 660.

Connect the power leads to the BARRETT 550 and BARRETT 660.

If a power supply other than the BARRETT 522 is to be used, it must be capable of providing the BARRETT 660 with +13.8V @ 2A and the BARRETT 550 with +13.8V @ 20A.

Connect a suitable antenna to the BARRETT 550 transceiver module. Antenna will depend on operational requirements of the system. If further information is required please refer to the BARRETT Technical Training Programme, Unit 11, Antennas, Installation and Grounding. Available on request from BARRETT COMMUNICATIONS.

Check all connections, ensuring plugs are properly fitted and all locking screws are finger tight

See Appendix C for important information concerning the BARRETT 550M.

SYSTEM START UP

Apply power to any external equipment connected to the RS-232 connector.

Switch the rocker switch on the BARRETT 522 to the on position. The green Power On LED in the top left corner of the BARRETT 522 front panel will light. For further information concerning the BARRETT 522 PSU please refer to the BARRETT 522 User Manual.

Switch the ON/OFF Volume control on the BARRETT 660 On. To do this, turn the knob clockwise. A click will result and the BARRETT 660 LCD will light, on the BARRETT 550M a green LED in the top left corner of the front panel will light. Both units are now powered. Further turning of this knob adjusts the volume of the front panel speaker.

The BARRETT 660 will now perform self test and boot up sequences, which will take approximately 30 seconds. (Error messages can occur during this sequence and are usually of no concern as the software will rectify the perceived problem. Error messages are listed at Appendix A.)

If the BARRETT 660 has been supplied preprogrammed to the users requirements, by the factory, the system is now ready for operation. However some system checks should be carried out at this stage to ensure correct operation of all the components of the system.

PROGRAMMING FOR OPERATION

If the user does not specify the programming required for the BARRETT 660 before purchase then the unit will be supplied unprogrammed. In this case, before commissioning the system will need to be programmed. This section will explain programming of the BARRETT 660 in detail.

To programme the BARRETT 660 you must enter the 'Parameter Editor'. This is done by pressing the 'END' key during 'Manual' or 'Automatic' operation. The parameters available for editing are displayed on the bottom line of the display.

To choose the parameter to be edited, use the 'UP' and 'DOWN' keys to find the required parameter then once found, press the 'RIGHT' key to enter the editor for that parameter.

To move back up a level in the Parameter Editor use the 'END' or 'CANCEL' keys. END will save any changes you have made, CANCEL will delete any changes you have made.

The Parameter Editor can be exited by pressing the 'END' or 'CANCEL' key at any time.

Again using END will save changes. Using CANCEL will delete changes.

Parameters available for editing are:

1. Operating mode
2. Scan mode
3. Scan channels
4. VOX operation
5. Channel frequencies
6. Selcall number
7. Call duration limit
8. Delay before answering
9. Dial method
10. DIALtone checking
11. Remote logging
12. Dial-back number
13. Dial-back time
14. Preset telephone numbers
15. Time and date
16. User privileges
17. Record Digital Voice Message
18. Play Digital Voice Message
19. RS-232 Speed
20. Start-up Display Message
21. Restore factory defaults

Most parameters are directly accessible, however, some are PIN number protected, while others are only available to BARRETT 660's with level 2 or 3 options fitted.

The first operation in Programming a new BARRETT 660 must always be 'Restore Factory Defaults'. This wipes any previously programmed information and allows you to start with a clean sheet.

NOTE: If you are Reprogramming a BARRETT 660 for any reason the first operation must be to download all previously stored information via the RS-232 port to a Serial Printer.

If this is not done all previously stored information, such as preset telephone numbers, authorised users and their levels of access, will be lost unless held elsewhere in hard copy.

To download connect a serial printer to the RS-232 port, enter the parameter editor by pressing END, scroll by pressing the DOWN ARROW key, until '**Config -> RS-232**' is reached. Pressing the RIGHT ARROW key now will cause the BARRETT 660 to send all it's programmed information to the serial printer.

To perform a 'Factory Default' enter the Parameter Editor by pressing END. Using the DOWN ARROW key scroll to '**Factory Defaults**'. You will now be asked to enter a pin number, this is a security measure designed to prevent accidental erasure of programming information. Enter the pin number, the 'Factory Default' will commence automatically. The display will now show '**Performing Factory Default**' .

NOTE: Before entering the Pin number be very sure that you have all the information you require from any previous programming. Once the Pin number is entered it will be impossible to recover any of that information.

Factory Default will take 30 seconds to complete. Once it is complete the Parameter Editor will default to 'System Clock'.

It is now necessary to enter the time.

The default is the current time and date held in the Real Time Clock

Available to Options 1, 2 and 3

Editing of the time and date is done using the 'LEFT' and 'RIGHT' keys to select the necessary fields, (a cursor will be seen under the field being edited) and the 'UP' and 'DOWN' keys to modify them. (UP will cycle forward, Down will cycle backward.)

The fields are:

Day of Week, Day of Month, Month, Year, Hour, Minute, Second, Calibration

The Calibration setting is used if the Real Time Clock is losing or gaining time. A '+' value forces it to run faster and a '-' value slower. A complete calibration cycle takes 64 minutes. A new calibration setting can, therefore, only be accurately checked after this time.

Pressing 'END' will save the new clock settings.

Pressing 'CANCEL' will exit with no alteration to the clock settings. The clock keeps running normally while in the editor, but the changes are not displayed.

When the same key is kept held down for several changes, it speeds up until it is released. This enables faster editing.

After setting the clock the next parameter to be set is the 'Channel Frequencies'.

Scroll up in the Parameter Editor until the display is 'Ch frequencies'

The default is no channels fitted

Available to Options 1, 2 and 3

The BARRETT 550 used with the BARRETT 660 is a synthesised transceiver with RS-232 control. It's channel frequencies are loaded, on power up, from the BARRETT 660. Press the RIGHT ARROW key to enter the editor.

Upon entering this editor, a prompt for the channel number to be edited appears. Channel 1 is selected by pressing '1' followed by 'END', if digits '2' to '9' are pressed, these channels are automatically selected, channels 10 to 12 are entered by pressing the required two digits.

The current frequency of the selected channel is displayed on the top line of the display, labeled as 'OLD', in the format the new frequency must be entered. After a 'Factory Default' this will be 00000.00. The bottom line shows what is being entered as the new frequency.

If a mistake is made, pressing 'CANCEL' will cause no changes to occur.

If the channel frequency is either 2 or 3MHz, a zero will need to precede the frequency. This is because the BARRETT 660 can be programmed with 20 to 30 MHz frequencies and so the software will assume a 20 to 30 Mhz frequency unless the initial zero is entered for a 2 or 3 Mhz frequency.

4 to 9MHz do not need a zero as this is automatically entered. Frequencies higher than 30Mhz cannot be programmed. The '0' can be entered however, if desired. The frequency is automatically saved after the sixth digit is entered.

When no channel is fitted, the frequency should be entered as 0. After a channel frequency is entered, you are returned to the channel selection screen to allow additional channel frequencies to be entered.

To exit back to the Parameter Editor selection, press 'END' or 'CANCEL' from the channel selection screen.

Next you will set 'SCAN Channels'

Scroll to 'SCAN Channels ' in the Parameter Editor.

The default is 'Empty'

Available to Options 1, 2 and 3

The BARRETT 660/550 combination can have up to 12 channels fitted. Timing constraints of the Selcall system prohibit all 12 channels from being scanned with no Selcall being missed. The BARRETT 660 allows 9 channels to be programmed into its scan table. These can be any of the 12 available channels, in any order, and the same channel can appear more than once in the scan table. Best operation is achieved if no more than 8 different frequencies are scanned.

The scan table entry order provides another useful feature. When the BARRETT 660 is called from a telephone user while it is scanning, when the telephone call is answered, the BARRETT 660 stops scanning. The first channel of the scan table is automatically selected as the current channel. If one particular channel is used more often than any other channel, it could be entered as the first entry in the scan table. This will cause it to be selected automatically when a call from a telephone user is answered.

Once in the editor, you are asked to enter the channels in the order they are required to be scanned. To enter channel 1, press '1' followed by 'END'. (This will tell the editor that it is channel 1 and not a channel from 10-12 causing it to wait for a second number to be entered.)

If a channel from 2-9 is required, simply pressing that single number key will enter it and prompt for the next channel in the scan table.

To enter channels 10-12, press the two required digits which will be automatically recognised.

Once the scan table is complete, when prompted for the next scan channel, press the 'END' key to store it. If a mistake is made during entry, press 'CANCEL' and start again. If all 9 channels have been entered, the scan table will be automatically saved and the editor exited immediately after the last channel is entered. If a valid scan table is entered, the 'Scan Mode' default is automatically set to On. If no channels or only one channel is entered, scanning will not be performed. These are not valid scan tables.

From this point on the rest of the programming can follow in order as it appears in the Parameter Editor.

'Operating mode'

Options - Automatic, Manual

Default - Automatic

Available to Options 1, 2 and 3

This parameter is the default operating mode upon starting the system. It is used to select either fully automatic or manual/semi-automatic operation. These different modes are fully described in the 'Operating Modes' section later in this manual.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

NOTE: The BARRETT 660 will not operate in the Automatic mode with only one channel. If only one frequency is available enter the same frequency in two channels and set up a scan table (see I above) to reflect this.

'SCAN mode'

Options - On, Off
Default - Off
Available to Options 1, 2 and 3

This parameter is not available for selection until a valid scan table has been entered. This is performed by the 'Scan Channels' editor. After the 'Scan Channels' have been entered, Scan Mode is automatically selected On.

This parameter is the default scan mode of the system. When the system first starts and after a telephone call is completed, this parameter determines whether the BARRETT 660 remains on it's current channel or if it returns to scanning. If more than one channel is fitted to the transceiver, then scanning is recommended as the default setting. This ensures that the BARRETT 660 will always return automatically to scanning after the completion of a call and no future Selcall's will be missed.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options. Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

'VOX operation'

Options - Automatic, Manual
Default - Automatic
Available to Options 1, 2 and 3

This is the default VOX setting when the BARRETT 660 is started or after the completion of a telephone call. If you do not wish people to use the Automatic VOX system, you can force the BARRETT 660 to operate in Manual VOX mode. If a user on a Manual VOX BARRETT 660 is comfortable with Automatic VOX they can force it into Automatic VOX during their call, but once the call is complete, the default VOX setting will be restored. Most users find it more convenient to use Automatic VOX, Manual VOX is seldom used.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options. Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

'Selcall number'

Default - 00 (00xx)
Available to Options 1, 2 and 3

Entry to this editor is restricted by PIN number security. Unauthorised modification of this number would make the system inaccessible to radio users, as they would be calling the previous, now incorrect number. This number will only normally be changed during an initial installation or if a major security breakdown occurs, such as unauthorised people gaining access to the system via common Selcall numbers. The best method to use to thwart security problems which may arise should be discussed with Barrett Communications. There are several methods which are available - the best depends upon the actual security breach which is occurring.

The BARRETT 660 system is based upon Selcall identification and information. The BARRETT 660 is allocated a set of 100 Selcall numbers for its operation, compared to the single Selcall number which transceivers use. This facilitates the 98 preset telephone numbers and the test beacon. The set of 99 Selcall numbers used by the BARRETT 660 is programmed in this editor. The first 2 digits of the 4 digit Selcall system are unique to the BARRETT 660. For example, if the Selcall number is programmed to 12, then 12xx is indicated as the Selcall ID. This means that 1299 is the test beacon and 1201 to 1298 are the 98 preset telephone numbers. 1200 is illegal as a Selcall number as it is used for group call functions under Selcall guidelines.

Upon successful entry to this editor, the current Selcall number of the BARRETT 960 is displayed on the top line of the display. The new Selcall number is displayed on the bottom line of the display as it is entered.

To select the new Selcall number of the BARRETT 960, simply press the two digits required. The new Selcall number is automatically saved after the second digit is entered. Pressing 'CANCEL' before the second digit is entered will exit the editor with no change to the Selcall number.

'Call duration'

Options - 00 to 60
Default - 30
Available to Options 1, 2 and 3

This editor programs the current call time limit. This value is the absolute maximum call length (measured in minutes) allowed to all users of the BARRETT 660. Setting this to 00 will result in there being no time limit on calls.

To change this setting, use the 'UP' and 'DOWN' keys. If 00 is displayed and 'DOWN' is pressed, 60 is the next value. Similarly, if 60 is displayed and 'UP' is pressed, 00 is the next value.

Pressing 'END' will save the new setting.
Pressing 'CANCEL' will exit with no change.

' Answer Delay '

Options - Short, Long
Default - Short
Available to Options 1, 2 and 3

When the BARRETT 660 is called by a telephone user, the incoming call must be answered. This is normally done immediately (within 3 seconds) of the telephone ringing. If the telephone connection is used for a standard telephone as well as the BARRETT 660, it will be desirable to have the BARRETT 660 delay longer before answering the incoming call. This allows the call to be answered using the normal telephone by an operator instead of the BARRETT 660. If no-one is in attendance, the BARRETT 660 will then answer the telephone call.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options. Pressing 'END' will activate and save the new setting. Pressing 'CANCEL' will exit with no change.

'Dial method'

Options - DTMF, Decadic
Default - DTMF
Available to Options 1, 2 and 3

Most telephone exchanges across Australia, and the world, are now equipped to perform DTMF dialing. It is possible to still find older Decadic only exchanges in operation. This editor allows the BARRETT 660 to be configured to dial either DTMF or Decadic depending upon the capability of the telephone line provided. If DTMF is available it should be used. When requesting a new telephone line from the Provider, an AXE exchange line should be requested, if available. These are the latest type of digital exchange and provide DTMF facilities and higher grade lines.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options. Pressing 'END' will activate and save the new setting. Pressing 'CANCEL' will exit with no change.

'Dialtone Check'

Options - On, Off
Default - On
Available to Options 1, 2 and 3

On some telephone exchanges, particularly older or overseas, the dialtone present on the telephone line before dialing is different to the newer standards now used. These will not be recognised by the BARRETT 660. If dialtone checking is On, a telephone number will not be dialed if the dialtone is firstly detected. To disable dialtone checking so that all telephone numbers are automatically dialed without first checking for dialtone, set this parameter to Off. This is known as 'Blind Dialing'.

NOTE: It is often possible, if provided with tone specifications, to prepare the BARRETT 660 software to make it recognise local telephone tones where these are different from Australian standards. To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options. Pressing 'END' will activate and save the new setting. Pressing 'CANCEL' will exit with no change.

'Remote Logging'

Options - On, Off
Default - On
Available to Level 3 only

If Level 3 is fitted to the BARRETT 660, then it is possible for the BARRETT 660 to internally store all chargeable system activity so that bills can be produced in commercial applications. The Remote Logging option enables the BARRETT 660 to send this data to a remotely located computer via on-board modem. This allows routine collection of data without the need to travel to the BARRETT 660 site to collect it. This is particularly useful when the BARRETT 660 is in a remote location, as most will be. It also allows one central collection centre to process all data automatically from many BARRETT 660 units located possibly all over the country.

The selection of this parameter to On results in the BARRETT 660 storing the system usage data into internal memory. It will also cause other automatic remote logging procedures to occur, depending upon how these are configured.

Remote logging also allows remote control of the BARRETT 660. This means that any of the parameters discussed in this section of this manual can be altered by remote control using a PC and modem in another location. In other words a country wide ~~system~~ can be reconfigured, users can be updated, their access can be changed, new users can be added, users can be deleted, Preset telephone numbers can be changed etc., in all locations, by a single operator at the system hub, with no requirement for anyone to visit the remote sites in normal operating conditions.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options. Pressing 'END' will activate and save the new setting. Pressing 'CANCEL' will exit with no change.

'Dial-Back Number'

Default - Empty
Available to Level 3 only

When Remote Logging is in use, the internally stored data can be sent automatically to a remotely located computer at a preset time each day. The location of this computer is stored in this Dial-Back Number.

Entry to this editor is protected by PIN number security. Upon entering the editor, the current dial-back telephone number is displayed on the first line. Using the number keys, enter the new telephone number. When the telephone number is complete, press the 'END' key to save it and exit the editor. The telephone number can be from 1 to 16 digits long. If it is 16 digits long, it is automatically saved after the 16th digit is pressed. To remove the old telephone number, but not enter a new one, simply press 'END' without entering any numbers. Entering an empty telephone number turns the Daily Remote Logging function off.

Pressing 'CANCEL' at any time will exit the editor with no change to the current telephone number, even if you have begun entering a new telephone number.

'Dial-Back Time'

Default - 00:00 (Off)
Available to Level 3 only

When Remote Logging is in use, the internally stored data can be sent automatically to a remotely located computer at a preset time each day. The time that this occurs is set in this editor.

Upon entering this editor, the current dial-back time setting is displayed. It is in Hours and Minutes in 24 hour format.

A cursor is used to indicate which number, Hours or Minutes, is currently being edited. To change between Hours and Minutes use the 'LEFT' and 'RIGHT' keys. To change their value use the 'UP' and 'DOWN' keys.

A setting of 00:00 turns the Daily Remote Logging function off. This does not represent a midnight time setting as may be expected. If midnight is required, choose 00:01 to choose 1 minute after midnight, or similar.

Pressing 'END' will save the new setting.
Pressing 'CANCEL' will exit with no change.

'Preset Telephone'

Default - All numbers empty
Available to Options 1, 2 and 3

The BARRETT 660 has the ability to store 98 preset telephone numbers for automatic dialing and use by non-synthesised transceivers such as the BARRETT 530. Programming or viewing these preset telephone numbers is performed by this editor.

Entry to this editor is protected by PIN number security.

Upon entering the editor, the number to be edited is requested. Numbers range from 01 to 98, giving a total of 98 possible preset telephone numbers, each of which can be 16 digits long. The two digit identifying number selected corresponds to the last two digits of the BARRETT 660 Selcall ID.

To select the required preset telephone number, simply press the two applicable number keys. After the second number is pressed, the number is automatically processed. The display will then show the current preset telephone number on the top line of the display, and place the cursor on the bottom line ready for the entry of the new number. To exit without changing the current telephone number, press the 'CANCEL' key. This causes you to return to the previous level of the editor, asking for which telephone number to modify. It is not necessary to re-enter the PIN number as authorisation has already been gained to the editor.

To remove the current telephone number, simply press 'END' without entering any digits for the telephone number. This will deem it 'Empty' and therefore inaccessible to radio users. Do not enter it as 0, simply press the 'END' key without anything else.

To enter a new telephone number, simply press the appropriate number keys until the full number is shown on the display and then press 'END'. The telephone number can be from 1 to 16 digits long. If it is 16 digits long, it is automatically saved after the 16th digit is pressed.

Once in the editor, as many preset telephone numbers can be edited as required. Once complete, press 'END' or 'CANCEL' from the number ID entry routine to exit back to the Parameter Editor selection table.

If Level 2 or 3 are fitted to the BARRETT 660, selecting '99' as the preset number to be edited will result in a list of all current preset telephone numbers being sent to the RS-232 port of the BARRETT 960. This is useful for checking what preset numbers have been programmed into the system as this is unrealistic by entering and leaving all 98 preset number areas.

'User privileges'

Options -	Suspend Access	
	Restore Access	
	Preset Only	
	Preset and Local	(Levels 2 and 3 only)
	Preset, Local, 008	(Levels 2 and 3 only)
	Preset, Local, 008 and STD	(Levels 2 and 3 only)
	No Limits	(Levels 2 and 3 only)
	RS-232 list	(Levels 2 and 3 only)
Default -	All users set to Preset Only with Suspended Access	
Available to	Options 1, 2 and 3	

To provide a system which is shielded from unauthorised use, a complete security system has been incorporated into the BARRETT 660 which allows every Selcall number to each have a separate security access level(In practice a total of 8900 useable numbers in total, from 0001 to 9999 but excluding the group of 100 numbers used by the Barrett 660 and the group call numbers, that is, numbers ending in 0) . This allows only people authorised to use the system into it. This is extremely important as telephone calls, especially long distance, can become extremely expensive. This editor gives the BARRETT 660 owner the ability to prohibit any Selcall from the system, or limit the type of telephone calls that permitted Selcall's can make.

Entry to this editor is protected by PIN number security.

To accelerate the setting of user privileges, editing is performed in chunks. This requires selecting a range of Selcall numbers to all be changed to the same security level.

Upon entering the editor you are asked for the Start ID. Use the number keys to enter the 4 digit Selcall ID of the first user to be modified. After the 4th digit of the Selcall ID has been entered, you are immediately asked for the Stop ID. Use the number keys to enter the 4 digit Selcall ID of the last user to be modified. After the 4th digit of the Selcall ID has been entered you are immediately asked for the change required.

Use the 'UP' and 'DOWN' keys to select the required change. Once the correct option is shown, press the 'END' key to update the security levels.

To change only 1 Selcall, make the Start ID and the Stop ID the same.

To change all Selcall's specify the Start ID as 0000 and the Stop ID as 9999.

The Stop ID must be higher than or the same as the Start ID. If it is not, you will be prompted to enter them both again.

Pressing the 'CANCEL' key at any time will exit the editor with no change.

The options available perform the following security functions:

' Suspend access ' - This causes the Selcall number(s) to be completely prohibited from using the system. Their previous security level is still remembered to allow easy restoration if necessary.

' Restore access ' - This restores the Selcall number(s) access into the system after having it previously suspended. Whatever access level was previously held is restored.

' Preset only ' - This gives the Selcall number(s) access to the system, but only the ability to use the preset telephone numbers. No direct dialing facilities are allowed. This setting should also be set for any radios which cannot directly enter telephone numbers. This will give better system integrity when a telephone caller tries to send a telephone number to an unattended radio.

' Preset & Local ' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers and limited direct dialing facilities. The restriction is that only telephone numbers up to 7 digits long can be selected. Any numbers which are longer are prohibited.

'Local and 008' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers, access to any telephone number of 7 digits or less, plus the ability to dial any number which starts with 008 as its first three digits. (008 numbers are an Australian facility whereby the called party not the caller pays for the call and will probably have no application outside Australia.) All other numbers are prohibited.

' STD ' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers, and the ability to dial any telephone number of 10 digits or less. All longer numbers are prohibited.

' No limits ' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers and the ability to dial any telephone number. Up to 16 digit telephone numbers are supported by the system.

' RS-232 list ' - This is not a security level. When this option is selected, a list of the current security levels of the range of Selcall's currently selected is sent to the RS-232 port. This can be used to test the current security levels of users of the system. There is no available indication on the front panel display of the current individual security levels.

Whenever a user requests a prohibited operation, a digitally recorded voice message is returned advising of this. This applies to radio users trying to dial prohibited numbers, telephone users trying to contact prohibited Selcall numbers or telephone users trying to send telephone numbers to radios which the radio cannot dial back due to security limitations.

Updating a large range of numbers can take a fair amount of time.

To indicate that all is well while the update takes place, a message displaying ' ** UPDATING ** ' is shown. Once complete, the original editor prompt appears allowing the selection of another range of Selcall numbers to edit. When all changes are complete, 'END' or 'CANCEL' should be pressed when asked for the Start ID. The user is then placed back in the Parameter Editor selection table.

' Record message '

Options - ' No Dialtone '
' Call is answered '
' Access denied '
' Erase messages '

Default - All messages are empty
Available to Options 1, 2 and 3

Three operator recordable messages are handled by the BARRETT 660. They are assigned to the following tasks:

' No Dialtone ' - When a call from a transceiver to the telephone is being attempted and the BARRETT 660 was not able to recognise dialtone on the telephone line before dialing, this message will be transmitted to the transceiver. As no telephone service tones were produced, this is the only indication to the remote unit that the telephone number could not be dialed and that dialing was not even attempted.

SAMPLE: "Your call could not be placed at this time, please try again later."

' Call is answered ' - This is played to the telephone user when they first call into the BARRETT 660 and the BARRETT 660 automatically answers the incoming call. It can be used to welcome them into the system and give a guide on how to use it and what to expect if they have not used it before.

SAMPLE: "You have dialed the BARRETT telephone interconnect system. There are eight channels available. To select a channel press 01 to 08. To make a call press the STAR button, enter the four digit selcall number, press the HASH button

twice."

' Access denied ' - This could be sent to either the telephone user or the radio user when they attempt an operation which is not possible. This is usually to do with security restrictions set within the system.

SAMPLE: "You are not authorised access to this system, for further information please call BARRETT Communications on XXXXXXXX"

' Erase messages ' - This option causes all previously recorded messages to be erased.

To select a message to record, use the 'UP' and 'DOWN' keys until the message required is shown on the display. While selecting the message, empty messages are indicated by a '*' in the top right corner of the display. Pressing 'END' or 'CANCEL' will exit back to the Parameter Editor selection table. When the required message is displayed, press the 'RIGHT' key. Pressing 'CANCEL' will exit without recording a new message.

To start recording, press and hold the microphone PTT button. The message should now be spoken into the microphone. Recording ends when the microphone PTT switch is released or when the message storage space is filled. The current status is always displayed on the front panel to guide the operator through the recording process. When recording concludes, any remaining storage space will be blanked. While this occurs, the message 'Complete Please Wait' is displayed. When this is complete, the operator is returned to the message selection table.

' Play Message '

Options - ' No Dialtone '
 ' Call is answered '
 ' Access denied '

Available to Options 1, 2 and 3

This editor is used for the playback of Digital Voice Messages which have already been recorded. This can be used as a method of testing if the messages were successfully recorded and if they are loud, clear and correct.

Use the 'UP' and 'DOWN' keys to select the message to play.
Press the 'RIGHT' key to play the message. The message is played through the front panel speaker.
Press 'END' or 'CANCEL' to exit back to the Parameter Editor selection table.

Any messages which are empty are indicated by a '*' in the top right corner of the display.

' RS-232 Speed '

Options - 300
 600
 1200
 2400
 4800
 9600
 19200
Default - 2400
Available to Levels 2 and 3

The 9 Pin 'D' Connector on the back of the BARRETT 960 is a RS-232 port. Levels 2 and 3 allow information to be transferred via this RS-232 port. All system activity is constantly sent to this port and can be collected on a serial printer or captured in a Personal Computer. To facilitate the widest range of RS-232 products to be connected to the BARRETT 960, and to reduce transfer times when high transfer speeds are available, this editor allows the RS-232 port speed of the BARRETT 960 to be programmed.

Use the 'UP' key to select a higher RS-232 baud rate.
Use the 'DOWN' key to select a lower RS-232 baud rate.
Press 'END' to set the new RS-232 port speed.
Press 'CANCEL' to exit without saving any changes.

After a new RS-232 setting has been set, the initial system data which is normally sent to the RS-232 port when the BARRETT 960 is switched on is again sent, but at the new speed.

'Startup message '

Default - ' BARRETT 660 '
 ' INTERCONNECT '
 (same as the fixed startup message)
Available to Options 1, 2 and 3

When the BARRETT 960 is first switched on, a product identifying message is displayed on the front panel display for 1 second. Following this, a second message is displayed. Initially this is set to be the same as the first message, so no change appears. This second message can, however, be changed by the BARRETT 660 operator. This may serve useful for dealer advertising or more likely as a security feature. By placing the owners name and location in this message area it can be used for identification if stolen or lost. This information can also be used during remote logging to identify which BARRETT 960 unit is contacting the remote computer if several BARRETT 960 units are present in a system.

Entry to this area is protected by PIN number security.

Once in the editor, the current message is displayed as it would appear. The 'LEFT' and 'RIGHT' keys are used to select the character(s) to be modified. This is indicated by the cursor under the current character. Once the character is marked, it can be changed by using the 'UP' and 'DOWN' keys.

When the same key is kept held down for several changes, it speeds up until it is released. This enables faster editing times as a large range of characters (96 in total) are available for use in the message, plus 32 characters make up the total display. The complete table is shown below.

It should be noted that the first character in the table is a 'blank' character and is, of course, selectable. It is recommended that messages be worked out on paper before commencing, using a 16 x 2 box grid.

Pressing 'END' will save the new message and exit to the Parameter Editor selection table.

Pressing 'CANCEL' will exit back to the Parameter Editor selection table without saving the new message.

Available Message Characters

	0	@	P	`	p
!	1	A	Q	a	q
"	2	B	R	b	r
#	3	C	S	c	s
\$	4	D	T	d	t
%	5	E	U	e	u
&	6	F	V	f	v
'	7	G	W	g	w
(	8	H	X	h	x
)	9	I	Y	l	y
*	:	J	Z	j	z
+	;	K	[	k	{
,	<	L		l	|
-	=	M	]	m	}
.	>	N	^	n	
/	?	O	_	o	

' Call duration '

Options - 00 to 99 seconds

Default - 00

Available to Options 1, 2 and 3

This editor programs the time delay the dialing system will wait before commencing the dial sequence. This variable is provided to cater for congested exchanges where getting a dial-tone may take more than five seconds. This value is a fixed delay inserted in the dialing sequence, it does not end if dial-tone is detected. It is advised that this parameter only be used during peak exchange periods.

To change this setting, use the 'UP' and 'DOWN' keys. If 00 is displayed and 'DOWN' is pressed, 99 is the next value. Similarly, if 99 is displayed and 'UP' is pressed, 00 is the next value.

Pressing 'END' will save the new setting.

Pressing 'CANCEL' will exit with no change.

Exit the Parameter Editor by pressing END.

This completes the programming of the BARRETT 660. If you entered 'Automatic' at the Operating Mode editor and 'On' at the Scan Mode editor, the BARRETT 660 will now display 'SCANNING' & 'AUTO' and the channel display will be scrolling.

All that is left is to test the system and to make any minor adjustments that are necessary.

FINAL SETTING UP AND ADJUSTMENTS

NOTE: You should be familiar with the Manual Operators menu described in section four of this manual, as well as the Users operational guide, before commencing the next steps.

There are very few adjustments in the 660. On the mother-board there are six. In a new BARRETT 660 straight from the factory only output line level (b), VOX hysteresis (d) and VOX sensitivity (e) may need to be adjusted to suit local conditions as these will have been factory preset to suit Australian conditions which may vary somewhat from conditions encountered in other countries.

RV4 is used to set the contrast of the LCD display.

The additional 500~ potentiometer attached to T2 is used to set the line level to the PSTN system. This must be set to a level which is adequate for the PSTN system and must be monitored at telephone for level and distortion.

RV5 sets the output level from the BARRETT 660 to the BARRETT 550 transceiver and should not need to be adjusted.

RV3 sets the VOX hysteresis or hang on time. This should initially be set to give 2.08V at TP6.

RV1, VOX sensitivity, should be set to full anti clockwise.

The adjustment of VOX Hysteresis and VOX sensitivity is subjective and is to some extent dependant upon the voices using the system. Hysteresis and sensitivity should be set so that VOX is sensitive enough to open on the first syllable of voice traffic and hangs on sufficiently long that it does not cut off between words in normal speech, but that it is not so sensitive that it stays open on background noise.

Make sure the volume of the 660 is turned down to minimum to avoid feedback from the telephone while testing.

Call the BARRETT 660 from a telephone. This will place the 660 on line. At this stage the only LED's on the front panel which should be lit are:

- * power
- * on-line
- * and vox (this may occasionally flash)

If you have the PTT and Tx mod LED's on as well turn RV3 clockwise until unit comes out of PTT.

Speak into the telephone handset and adjust RV1 clockwise until you can trip the VOX when speaking normally.

Adjust RV3 anti-clockwise until a reasonable hang on delay is reached.

RV1 and RV3 are interactive so if a large adjustment has been made on one of these pots, adjustment again will be needed on the other.

RV6 on the mother board is not used unless unbalanced audio input is in use.

On the voice board there is one adjustment, VR1, this sets the length of time available for the messages. It should not need to be adjusted, it should not be adjusted to increase the length of time available because this will cause distortion of the audio. It should be noted that adjusting VR1 with a message already recorded will cause the voice to speed up or slow down.

On the Selcall board there is one adjustment, VR2, this is used to set the Selcall tone at 1785Hz. Move the link from LK1 to LK2 and monitor with a frequency counter at pin 3 of IC2. Adjust VR2 to obtain 1785Hz on the frequency counter.

TESTING

Only simple testing needs to be carried out. The only test equipment needed is a peak reading power meter in order to check forward and reflected power. A Transceiver and a telephone will also be necessary.

Connect the Power meter in line with the antenna.

Prepare the Transceiver with an antenna or dummy load. Ensure that the transceiver has a Selcall number that has been enabled in the BARRETT 660. (Parameter editor, User privileges)

Go to the Manual operators menu and make a Selcall from the BARRETT 660 to the Transceiver. Do this more than once and check forward and reverse power with the power meter to ensure that there are no antenna problems, as well as ensuring that the Selcall is received by the Transceiver.

Go to the Manual operators menu and make a telephone call from the BARRETT 660.

Now make a Telcall from the transceiver to the telephone through the BARRETT 660.

Reverse the process and make a call from the telephone to the transceiver through the BARRETT 660.

If no problems are encountered the system is now ready for operation.

5.0 OPERATION

After switching on, the BARRETT 660 performs a series of internal checks and displays important system information on the front panel display. If Levels 2 or 3 are fitted, additional information is sent to the RS-232 port.

Using the BARRETT 660 as an Automatic Telephone Interconnect

To operate the BARRETT 660 as an Automatic Telephone Interconnect, the Operating Mode should be set to 'Auto' in the Parameter Editor as discussed in 'Programming for operation' above. Once this setting is made, the BARRETT 660 will always default to Automatic Mode after a telephone call is completed.

When running as an Automatic Telephone Interconnect, the BARRETT 660 will process all requests fully automatically. All selected frequencies are monitored for Selcall traffic and all Selcall's are processed. If Level 2 or 3 is fitted to the BARRETT 660, then ALL Selcall traffic data is sent to the RS-232 port.

When a received Selcall is intended for the BARRETT 660, it will attempt to perform the requested operation. The security access of the caller and the validity of the request is first checked by the BARRETT 660. If all checks are clear, the request is then performed.

The telephone line is constantly monitored by the BARRETT 660. Should a telephone call be received by the BARRETT 660, it will be automatically answered.

Once a telephone call is complete, the BARRETT 660 will return to scan if scanning is selected as the system default.

In the automatic mode the BARRETT 660 can be installed in a remote location as there is no need for an operator. If level 3 is selected all configuration changes, i.e. adding and deleting of users, down loading of billing information can be carried out from a remote PC with no need for physical access to the BARRETT 660 except in the very unlikely event of equipment malfunction.

Using the BARRETT 660 as a Manually Operated Telephone Interconnect

For the BARRETT 660 to be used efficiently as a Manually Operated Telephone Interconnect, a standard PSTN provider Telephone should be placed in parallel to the BARRETT 660.

To operate the BARRETT 660 as a Manual Telephone Interconnect, the Operating Mode should be set to 'Manual' in the Parameter Editor. Once this setting is made, the BARRETT 660 will always default to Manual Mode after a telephone call is completed.

If the BARRETT 660 is to scan several channels, then the Scanning defaults should be configured in the Parameter Editor.

Manual Operator's Control Menu

Put the BARRETT 660 in the 'Manual' mode by pressing the CANCEL key. If the BARRETT 660 is scanning take it out of scan by pressing the 0 key. The direction keys give access to the Manual Operator's Control Menu. This menu gives a manual operator the ability to:-

- Directly make Selcall's.
- Directly dial telephone numbers.
- Place the BARRETT 660 online.
- Place the BARRETT 660 offline.

To enter the Manual Operator's Control Menu, press the 'LEFT' key. Use the 'UP' and 'DOWN' keys to select the function required. Once selected, press the 'RIGHT' key to perform that function. When making a Selcall or dialing a telephone number you are placed in an editor. Press 'CANCEL' at any time to exit the Manual Operator Control Menu without any actions being performed.

Making a Selcall

When making a Selcall, use the UP/DOWN keys to select 'Send Selcall'.

Press the RIGHT key.

Enter the four digit Selcall number using the numeric keypad. If a mistake is made press CANCEL and try again.

When the Selcall number displayed is correct, press 'END' to send the call. (The most recent Selcall number through the system automatically becomes the default. If you wish to send that Selcall number delete step (d), simply press the 'END' key after step (b).

Press 'CANCEL' at any time to exit without making the call.

The 'UP' and 'DOWN' keys are ignored by the Selcall number editor.

Making a Telephone call

When making a telephone call, use the UP/DOWN keys to select 'Make Phone call'.

Press the RIGHT key.

Enter the telephone number required by using the numeric keypad. If a mistake is made press CANCEL and try again.

When the telephone number displayed is correct press END to dial the number. (If a 16 digit number is entered, the number is dialed immediately after the 16th digit is entered.)

Press CANCEL at any time to exit without making the call.

Placing ON/OFF Line

When placing the BARRETT 960 On Line and Off Line, the current line status is always shown by the front panel LED's. The centre LED is the On Line indicator. If you are already On Line, the 'Place On Line' and 'Make Phone Call' options are not available. Similarly, if Off Line, the 'Place Off Line' option is not available.

Use the UP/DOWN keys to select 'Place On/Off Line'.

Press the RIGHT key.

Processing a Selcall

If a valid Selcall is received by the BARRETT 660, it will be displayed on the front panel and an alarm will sound. The operator then has two options:

Accept the call:

To accept a Selcall and have the BARRETT 660 automatically finish processing it, the 'LEFT' key should be pressed. The BARRETT 660 will process the request and if successful, the telephone number will be dialed. The call may then proceed as if it was an automatic call.

Ignore the call:

To ignore a Selcall press the 'RIGHT' key. This will remove the Selcall information from the BARRETT 660's memory. The BARRETT 660 will revert to scan if scanning is selected as the system default.

Processing a Telephone Call

When the BARRETT 660 is placed into 'Manual' mode, all incoming telephone calls are ignored. They are recognised but not answered.

If a standard telephone is connected in parallel to the BARRETT 660 the call can be manually answered by the operator. The operator can then Selcall the required transceiver using the Manual Operator's Control Menu. Once contact is established, the telephone user can be connected into the system by selecting 'Place On Line' from the Manual Operator's Control Menu.

Completing a Call

The radio operator can send a Hangup Request. This will be displayed on the front panel and pressing the 'LEFT' key will confirm this action.

The telephone user can request a Hangup by entering '99' on their DTMF telephone handsets. This will cause immediate call completion.

The telephone user can hangup the telephone and the PSTN service tones will result in call completion. The service tones are not immediately available as the call was started from the BARRETT 660, however if this does occur, the call will be completed.

The BARRETT 660 operator can select 'Place Off Line' from the Manual Operator's Control Menu.

Once a telephone call is complete, the BARRETT 660 will revert to scan if scanning is selected as the system default.

Using the BARRETT 660 as a Base Station

To operate the BARRETT 660 as a Base Station, the Operating Mode should be set to 'Manual' in the Parameter Editor.

If the BARRETT 660 is to scan several channels, then the Scanning defaults should be configured in the Parameter Editor.

If a valid Selcall is received by the BARRETT 660, it will be displayed on the front panel and an alarm will sound. The operator should press the 'RIGHT' key to clear the Selcall information from the BARRETT 660's memory.

The operator can now talk to the radio user which called.

6.0 FACILITIES AVAILABLE TO THE TELEPHONE USER

A telephone user who is using a DTMF telephone handset has the following facilities available:

Selecting a Channel

Any channel which is fitted to the BARRETT 660 system can be directly accessed. There are two ways of achieving this change:

Pressing the two buttons which correspond to the channel number. Valid numbers are, therefore, from 01 to 12. Once the second number is pressed, the request automatically takes place.

Pressing a single digit followed by the '#' key. This will select that channel. Valid numbers are 1 to 9.

Option (b) is especially useful for telephone systems which have STD-bar limits placed upon them. These telephones usually have a system fitted which prohibits the first digit pressed from being a zero.

Once DTMF entry has begun, the receiver noise will disappear from the telephone speaker until the DTMF function being entered is complete. This can be used to identify whether you are still in the DTMF request sequence when you believe you have finished.

As each DTMF digit is entered, they are read back to confirm they were received. Once the channel request is complete, a message indicates if it was successful or not.

Making a Selcall

A Selcall can be sent at any time.

To request a Selcall, press the '*' key.

If the '*' key is recognised the receiver noise will disappear. Some DTMF telephones do not send the '*' and '#' tones. This should be tested before the system is first used.

Enter the 4 digit Selcall of the radio you wish to contact followed by two '#' key presses (only one '#' press is necessary on Level 1 Interconnects). The call will then be heard through the telephone speaker as it is being sent. All keys must be pressed within 4 seconds of each other or the editor will be exited and the partially complete request ignored. Receiver audio returning to the telephone speaker also indicates this occurring.

Once the Selcall has been sent, if the radio with that Selcall ID is on channel, an audible acknowledgment will be heard. The telephone user should then wait for the radio operator to make voice contact. If no voice contact is made, a telephone number can be sent using the 'Sending a Telephone Number' procedure.

If no audible acknowledgment tones are heard, the radio may be on another channel, or switched off. To try to make contact on another channel, follow the 'Selecting a Channel' procedure, then repeat the 'Making a Selcall' procedure.

If you wish to dial the same Selcall No. again, press * *.

Sending a Telephone Number

This facility is not available to Level 1 Interconnects.

In the event that a radio responds to a Selcall, but no voice contact is established, a telephone number can be sent to the radio and stored in its memory. This will enable the radio operator, upon returning to the radio to return the call.

When a telephone number is attempted to be sent, the telephone security level of the radio user is first checked. If it is found that the telephone number requested could not actually be dialed by the radio user, then it will not be sent to radio and the telephone user will receive a recorded message saying that the request was not performed.

To send the telephone number, press '*' followed by the 4 digit Selcall number, then press '#'. Enter the desired telephone number (up to 16 digits long) and then press '#' again. The Selcall will then be sent and the telephone number will be stored in the radio's memory. An audible acknowledgment will be heard if successful.

This procedure is exactly the same as 'Sending a Selcall', except that pressing '#' twice after entering the Selcall indicates that no telephone number is to be sent with the Selcall.

The key format for sending a Selcall is, therefore, ***xxxx#nnnnnnnnnnnnnnnnnnnn#**, where **xxxx** is the 4 digit Selcall ID of the radio, and **nnnnnnnnnnnnnnnnnnnn** is the telephone number to be sent. If no telephone number is required, then the format reduces to ***xxxx##**. The telephone number can be any length from 1 digit to 16 digits long. Security restrictions may limit this length for individual users.

Change the Voice Switching (VOX) Method

It must always be remembered that the system is **half-duplex**. This means that voice can go in both directions, but only one direction at any one time. A transceiver attached to the Interconnect is being used to send the voice information to the radio operator. Normal radio operation involves pressing a button on a microphone when you wish your voice to be transmitted and releasing it when finished so the other user can reply. If both users try to send at the same time, neither will hear the other. This is why correct radio operating procedure is important. When you have completed your sentence, you say 'OVER'. This tells the other user that they are clear to reply and you will not interrupt until they have completed their reply. The Interconnect works the same way.

The two methods of controlling the switching of the transceiver are 'Automatic' and 'Manual'. The default setting for the VOX is programmable, so a telephone user could be presented with either types of VOX control. They can override this setting by pressing **88** on the telephone at any time.

'Manual' VOX control gives the telephone user the equivalent of pressing the transceiver's microphone button. To switch the transceiver state, ie. activate the microphone button, press the '#' key. It should not be held down, simply pressed like any other key. To release the transmitter, press the '#' key again. This gives total control of the transceiver switching and is not dependent upon the user speaking, nor the level of noise near the telephone.

Correct radio operator procedure is required to achieve efficient operation, and the

concepts involved may appear a little uncomfortable to a user who has never used a radio before. The current transceiver state is easily recognised. When the telephone is silent you are transmitting, when there is noise you are receiving.

'Automatic' VOX control removes the need for the telephone user to have to think about what is happening. Whenever they say something, the transceiver is automatically switched to transmit. Whenever they stop or pause for a while, it switches back to receive. This is a very easy system to use, however, it can be effected by loud background noise such as noisy machinery and in some cases, air conditioning. If this becomes a problem in a particular environment, simply switch to 'Manual' mode.

The great benefit of the system is that individual users can use whichever mode is preferred. When they complete their call, the system reverts back to the programmed default for the next call.

When switching between 'Automatic' and 'Manual' VOX a message is sent to the telephone user to indicate which state the VOX is now in. An 'ON' message indicates 'Automatic' VOX is On and an 'OFF' message indicates 'Automatic' VOX is Off.

Request Current Channel Information

The telephone user can request the current channel's frequency information at any time by entering **77** on their telephone keypad.

The internal voice will inform the telephone user which channel number they are currently on and the frequency that is fitted in that channel.

Completing a Call - Hanging Up

Two methods will work under the telephone users' control.

The fastest and most efficient method is to enter **99** on the telephone keypad. This causes the Interconnect to instantly hangup. The telephone user can then hangup as well as the call is complete. The Interconnect will be immediately ready for the next caller.

The second method is to simply hang up their telephone handset. This is fine if they actually dialed into the Interconnect unit, as a 'BUSY' service tone will be detected and final completion of the call recorded. If the telephone user received the call from the radio operator, placing the telephone handset back on the hook will not cause the 'BUSY' tones to be generated by the PSTN exchange until it times out several minutes later. This time will, of course, be chargeable if billing applies, plus the system is not accessible to a new user during this time.

A timeout is also built into the system which causes the Interconnect to automatically complete the call if the telephone user does nothing (VOX or DTMF) for longer than 3 minutes.

7.0 FACILITIES AVAILABLE TO THE RADIO USER

The BARRETT 660 uses a block of 99 selcall numbers. Numbers XX01 to XX98 are for preset Telephone numbers. Number XX99 is for a Beacon.
(In this discussion XX is the BARRETT 660's selcall ID entered in the Parameter editor during system setup.)

Beacon: If the radio user enters the selcall number XX99 and transmits it. He will receive back from the BARRETT 660 a series of tones. The readability of these tones can be used to gauge the usability of a channel. Where possible the best channel should be used, so by calling for a beacon on a number of channels the best channel for the time of day and distance can be selected. Of course one should listen first to ensure no one else is using the channel before transmitting on it.

Preset Numbers: Simply by selecting one of the selcall numbers (01 to 98) corresponding to preset telephone numbers the BARRETT 660 will automatically call that telephone number.

ie. Selcall number XX07 was set up to correspond to the telephone number 1234567. By now selecting that selcall number XX07 the radio operator will be put through to telephone 1234567 by the BARRETT 660.

Telcall numbers: If the radio user has Telcall facilities available (BARRETT 550) he can, by entering the selcall number XX99 followed by the telephone number he wishes to contact, ring any telephone in the world. (Depending on the level of his security access, set up in the Parameter editor.)

For more detailed information on how to call the interconnect using Barrett 550 and 530 transceivers refer to the transceiver's user manuals.

APPENDIX A

ERROR MESSAGES

ERROR No. ERROR MESSAGE

E0	Syntax Error The command received was either mistyped or does not exist.
E1	Not an Alarm Channel An attempt was made to initiate an alarm sequence on a channel that doesn't have an alarm enabled.
E2	No selcall history available.
E3	No response to selcall request (i.e. GLL or status request).
E4	Low Power Error An attempt was made to change from low power to high power on a channel programmed for low power only.
E5	Channel Not Found Attempting to edit a channel not previously programmed.
E6	Command Too Long The number of digits/characters sent as part of a command exceeded the length allowed.
E7	Invalid Frequency Attempting to sent a frequency outside the frequency range allowed.
E8	Invalid Label Number Label number selected was greater than the number of programmed labels.
E9	E2ROM Full New data sent to the transceiver to be saved cannot be saved because the radio's memory is full.
EA	Invalid Clarify Attempting to set a clarifier value outside the clarifier allowed.
EB	PTT Error Attempt to PTT on a channel with an invalid transmit frequency. (i.e. tx is 0.kHz)
EC	Function not allowed in selcall.
ED	Pre-programmed channels protected. Attempting to over-write a protected pre-programmed channel.
EE	Transmit frequency program disabled. Attempting to change the transmit frequency when transmit frequency programming is disabled.
EF	GPS not fitted. Attempt to request GPS data from a 550 transceiver without a GPS unit fitted.

- EG** No response from GPS.
Destination unit timed out during GPS data acquisition, causing it to send back a no response message.
- EH** Data checksum bad.
GPS data received from the destination unit has oct a bad checksum.

RUN TIME ERROR CODES

CODE DESCRIPTION

- 2** Syntax error
- 3** RETURN without GOSUB
- 4** Out of DATA
- 5** Illegal function call
- 6** Overflow
- 7** Out of memory
- 9** Subscript out of range
- 10** Duplicate definition
- 11** Division by zero
- 13** Type mismatch
- 14** Out of string space
- 16** String formula too complex
- 19** No RESUME
- 20** RESUME without error
- 24** Device timeout
- 25** Device fault
- 27** Out of paper
- 39** CASE ELSE expected
- 40** Variable required
- 50** FIELD overflow
- 51** Internal error
- 52** Bad file name or number
- 53** File not found
- 54** Bad file mode
- 55** File already open
- 56** FIELD statement active
- 57** Device I/O error
- 58** File already exists
- 59** Bad record length
- 61** Disk full
- 62** Input past end of file
- 63** Bad record number
- 64** Bad file name
- 67** Too many files
- 68** Device unavailable
- 69** Communication-buffer overflow
- 70** Permission denied
- 71** Disk not ready
- 72** Disk-media error
- 73** Advanced feature unavailable
- 74** Rename across disks
- 75** Path/File access error
- 76** Path not found

APPENDIX B

THE PARAMETER EDITOR

Overview

The BARRETT 660 Telephone Interconnect is a complex and very flexible piece of communications equipment. It offers the final user the ultimate in flexibility and versatility. To allow the BARRETT 660 to offer such flexibility, the customer needs to be able to easily reprogram its configuration, and with no extra equipment required. The BARRETT 660 contains a large editor system to allow easy reprogramming directly from the front panel. The Parameter Editor is this main programming editor. It is used for setting the default operating configuration of the BARRETT 660.

The Parameter Editor is entered by pressing the 'END' key during 'Manual' or 'Automatic' operation. The parameters available for editing are displayed on the bottom line of the display.

To choose the parameter to be edited, use the 'UP' and 'DOWN' keys to find the required parameter then once found, press the 'RIGHT' key to enter the editor for that parameter.

The Parameter Editor selection table can be exited by pressing the 'END' or 'CANCEL' key at any time.

Parameters available for editing are:

1. Operating mode
2. Scan mode
3. Scan channels
4. VOX operation
5. Channel frequencies
6. Selcall number
7. Call duration limit
8. Delay before answering
9. Dial method
10. Dialtone checking
11. Remote logging
12. Dial-back number
13. Dial-back time
14. Preset telephone numbers
15. Time and date
16. User privileges
17. Record Digital Voice Message
18. Play Digital Voice Message
19. RS-232 Speed
20. Start-up Display Message
21. Restore factory defaults

Most parameters are directly accessible, however, some are PIN number protected, while others are only available to BARRETT 660's with high-end options fitted.

- 1. Operating Mode** ' Operating mode '
- Options - Automatic, Manual
Default - Automatic
Available to Options 1, 2 and 3

This parameter is the default operating mode upon starting the system. It is used to select either fully automatic or manual/semi-automatic operation. These different modes are fully described in the 'Operating Modes' section earlier in this manual.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

- 2. Scan Mode** ' SCAN mode '

Options - On, Off
Default - Off
Available to Options 1, 2 and 3

This parameter is not available for selection until a valid scan table has been entered.

This is performed by the 'Scan Channels' editor. After the 'Scan Channels' have been entered, Scan Mode is automatically selected On.

This parameter is the default scan mode of the system. When the system first starts and after a telephone call is completed, this parameter determines whether the BARRETT 660 remains on it's current channel or if it returns to scanning. If more than one channel is fitted to the transceiver, then scanning is recommended as the default setting. This ensures that the BARRETT 660 will always return automatically to scanning after the completion of a call and no future Selcall's will be missed.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

3. Scan Channels

' SCAN Channels '

Default - Empty
Available to Options 1, 2 and 3

The BARRETT 660 when fitted to a BARRETT 550 transceiver can have 12 channels fitted. Timing constraints of the Selcall system prohibit all 12 channels from being scanned with no Selcall being missed. The BARRETT 660 allows 9 channels to be programmed into its scan table. These can be any of the 12 available channels, in any order, and the same channel can appear more than once in the scan table.

The scan table entry order provides another useful feature. When the BARRETT 660 is called from a telephone user while it is scanning, when the telephone call is answered, the BARRETT 660 stops scanning. The first channel of the scan table is automatically selected as the current channel. If one particular channel is used more often than any other channel, it could be entered as the first entry in the scan table. This will cause it to be selected automatically when a call from a telephone user is answered.

Once in the editor, you are asked to enter the channels in the order they are required to be scanned. If a channel from 2-9 is required, simply pressing that single number key will enter it and prompt for the next channel in the scan table. To enter channels 10-12, press the two required digits which will be automatically recognised. To enter channel 1, press '1' followed by 'END'. This will tell the editor that it is channel 1 and not a channel from 10-12 causing it to wait for a second number to be entered.

Once the scan table is complete, when prompted for the next scan channel, press the 'END' key to store it. If a mistake is made during entry, press 'CANCEL' and start again. If all 9 channels have been entered, the scan table will be automatically saved and the editor exited immediately after the last channel is entered. If a valid scan table is entered, the 'Scan Mode' default is automatically set to On. If no channels or only one channel is entered, scanning will not be performed. These are not valid scan tables.

4. VOX Operation

' VOX operation '

Options - Automatic, Manual
Default - Automatic
Available to Options 1, 2 and 3

This is the default VOX setting when the BARRETT 660 is started or after the completion of a telephone call. If you do not wish people to use the Automatic VOX system, you can force the BARRETT 660 to operate in Manual VOX mode. If a user on a Manual VOX BARRETT 660 is comfortable with Automatic VOX they can force it into Automatic VOX during their call, but once the call is complete, the default VOX setting will be restored.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.
Pressing 'CANCEL' will exit with no change.

5. Channel Frequencies

' Ch frequencies '

Default - All channels not fitted (000000)
Available to Options 1, 2 and 3

The BARRETT 550 used with the Barrett 660 is a synthesised transceiver with RS-232 control. Its channel frequencies are loaded on power up from the Barrett 660. Channel information is loaded into the Barrett 660 as follows:-

Upon entering this editor, a prompt for the channel number to be edited appears. This responds in a similar way to the Scan Channel entry. If digits '2' to '9' are pressed, these channels are automatically selected, channels 10 to 12 are entered by pressing the required two digits and channel 1 is selected by pressing '1' followed by 'END'.

The current frequency of the selected channel is displayed on the top line of the display, labelled as 'OLD' in the format the new frequency must be entered. The bottom line shows what is being entered as the new frequency. If a mistake is made, pressing 'CANCEL' will cause no changes to occur. If the channel frequency is either 2 or 3MHz, a zero will need to precede the frequency. Whereas 4 - 9MHz does not need a zero as this is automatically entered. Pressing the MHz digit will result in a '0' being placed before the digit. The '0' can be entered however, if desired. The frequency is automatically saved after the sixth digit is entered. When no channel is fitted, the frequency should be entered as 0. After a channel frequency is entered, you are returned to the channel selection screen to allow additional channel frequencies to be entered. To exit back to the Parameter Editor selection, press 'END' or 'CANCEL' from the channel selection screen.

02 A zero must be put first for 2 and 3MHz
03
4
5
6

6. Selcall Number

' Selcall number '

Default - 00 (00xx)
Available to Options 1, 2 and 3

Entry to this editor is restricted by PIN number security. Unauthorised modification of this number would make the system inaccessible to radio users, as they would be calling the previous, now incorrect number. This number will only normally be changed during an initial installation or if a major security breakdown occurs, such as unauthorised people gaining access to the system via common Selcall numbers. The best method to use to thwart security problems which may arise is best discussed with Barrett Communications. There are several methods which are available - the best depends upon the actual security breach which is occurring.

The BARRETT 660 system is based upon Selcall identification and information. The BARRETT 660 is allocated a set of 100 Selcall numbers for its operation, compared to the single Selcall number which transceivers use. This facilitates the 98 preset telephone numbers and the test beacon. The set of 99 Selcall numbers used by the BARRETT 660 is programmed in this editor. The first 2 digits of the 4 digit Selcall system are unique to the BARRETT 660. For example, if the Selcall number is programmed to 12, then 12xx is indicated as the Selcall ID. This means that 1299 is the test beacon and 1201 to 1298 are the 98 preset telephone numbers. 1200 is illegal as a Selcall number as it is used for group call functions under Selcall guidelines.

Upon successful entry to this editor, the current Selcall number of the BARRETT 660 is displayed on the top line of the display. The new Selcall number is displayed on the bottom line of the display as it is entered.

To select the new Selcall number of the BARRETT 660, simply press the two digits required. The new Selcall number is automatically saved after the second digit is entered. Pressing 'CANCEL' before the second digit is entered will exit the editor with no change to the Selcall number.

7. Call duration limit

' Call duration '

Options - 00 to 60
Default - 30
Available to Options 1, 2 and 3

This editor programs the current call time limit. This value is the absolute maximum call length (measured in minutes) allowed to all users of the BARRETT 660. Setting this to 00 will result in no call time limit.

To change this setting, use the 'UP' and 'DOWN' keys. If 00 is displayed and 'DOWN' is pressed, 60 is the next value. Similarly, if 60 is displayed and 'UP' is pressed, 00 is the next value.

Pressing 'END' will save the new setting.

Pressing 'CANCEL' will exit with no change.

8. Answer Delay ' Answer Delay '

Options - Short, Long
Default - Short
Available to Options 1, 2 and 3

When the BARRETT 660 is called by a telephone user, the incoming call must be answered. This is normally performed immediately (within 3 seconds) of the telephone ringing. If the telephone connection is used for a standard telephone as well as the BARRETT 660, it would be desirable to have the BARRETT 660 delay longer before answering the incoming call. This allows the call to be answered by the normal telephone instead of the BARRETT 660. If no-one is in attendance, the BARRETT 660 will then answer the telephone call.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

9. Dial Method ' Dial method '

Options - DTMF, Decadic
Default - DTMF
Available to Options 1, 2 and 3

Most telephone exchanges across Australia, and the world, are now equipped to perform DTMF dialling. It is possible to still find older Decadic only exchanges in operation. This editor allows the BARRETT 660 to be configured to dial either DTMF or Decadic depending upon the capability of the telephone line provided. If DTMF is available it should be used. When requesting a new telephone line from Telecom, an AXE exchange line should be requested. These are the latest type of digital exchange and provide DTMF facilities and higher grade lines.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

10. Dialtone Checking ' Dialtone Check '

Options - On, Off
Default - On
Available to Options 1, 2 and 3

On some telephone exchanges, particularly older or overseas, the dialtone present on the telephone line before dialling is different to the newer standards now used. These will not be recognised by the BARRETT 660. If dialtone checking is On, a telephone number will not be dialled if the dialtone is firstly detected. To disable dialtone checking so that all telephone numbers are automatically dialled without first checking for dialtone, set this parameter to Off. This is known as 'Blind Dialling'.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

11. Remote Logging

' Remote Logging '

Options - On, Off
Default - On
Available to Level 3 only

If Level 3 is fitted to the BARRETT 660, then it is possible for the BARRETT 660 to internally store all chargeable system activity so that bill can be produced in commercial applications. The Remote Logging option enables the BARRETT 660 to send this data to a remotely located computer via on-board modem. This allows routine collection of data without the need to travel to the BARRETT 660 site to collect it. This is particularly useful when the BARRETT 660 is located at a distant location, as most will be. It also allows one central collection centre to process all data automatically from many BARRETT 660 units located possibly all over the country.

The selection of this parameter to On results in the BARRETT 660 storing the system usage data into internal memory. It will also cause other automatic remote logging procedures to occur, depending upon how these are configured.

To change this setting, use the 'UP' or 'DOWN' key to toggle between the two options.

Pressing 'END' will activate and save the new setting.

Pressing 'CANCEL' will exit with no change.

12. Dial-Back Number

' Dial-Back Number '

Default - Empty
Available to Level 3 only

When Remote Logging is in use, the internally stored data can be sent automatically to a remotely located computer at a preset time each day. The location of this computer is stored in this Dial-Back Number.

Entry to this editor is protected by PIN number security.

Upon entering the editor, the current dial-back telephone number is displayed on the first line. Using the number keys, enter the new telephone number. When the telephone number is complete, press the 'END' key to save it and exit the editor. The telephone number can be from 1 to 16 digits long. If it is 16 digits long, it is automatically saved after the 16th digit is pressed. To remove the old telephone number, but not enter a new one, simply press 'END' without entering any numbers. Entering an empty telephone number turns the Daily Remote Logging function off.

Pressing 'CANCEL' at any time will exit the editor with no change to the current telephone number, even if you have begun entering a new telephone number.

13. **Dial-Back Time**

' Dial-Back Time '

Default - 00:00 (Off)
Available to Level 3 only

When Remote Logging is in use, the internally stored data can be sent automatically to a remotely located computer at a preset time each day. The time that this occurs is set in this editor.

Upon entering this editor, the current dial-back time setting is displayed. It is in Hours and Minutes in 24 hour format.

A cursor is used to indicate which number, Hours or Minutes, is currently being edited. To change between Hours and Minutes use the 'LEFT' and 'RIGHT' keys. To change their value use the 'UP' and 'DOWN' keys.

A setting of 00:00 turns the Daily Remote Logging function off. This does not represent a midnight time setting as may be expected. If midnight is required, choose 00:01 to choose 1 minute after midnight, or similar.

Pressing 'END' will save the new setting.
Pressing 'CANCEL' will exit with no change.

14. **Preset Telephone Numbers**

' Preset Telephone '

Default - All numbers empty
Available to Options 1, 2 and 3

The BARRETT 660 has the ability to store 98 preset telephone numbers for automatic dialling and use by non-synthesised transceivers. Programming or viewing these preset telephone numbers is performed by this editor.

Entry to this editor is protected by PIN number security.

Upon entering the editor, the number to be edited is requested. Numbers range from 01 to 98, giving a total of 98 possible preset telephone numbers, each of which can be 16 digits long. The two digit identifying number selected corresponds to the last two digits of the BARRETT 660 Selcall ID.

To select the required preset telephone number, simply press the two applicable number keys. After the second number is pressed, the number is automatically processed. The display will then show the current preset telephone number on the top line of the display, and place the cursor on the bottom line ready for the entry of the new number. To exit without changing the current telephone number, press the 'CANCEL' key. This causes you to return to the previous level of the editor, asking for which telephone number to modify. It is not necessary to re-enter the PIN number as authorisation has already been gained to the editor.

To remove the current telephone number, simply press 'END' without entering any digits for the telephone number. This will deem it 'Empty' and therefore inaccessible to radio users. Do not enter it as 0, simply press the 'END' key without anything else.

To enter a new telephone number, simply press the appropriate number keys until the full number is shown on the display and then press 'END'. The telephone number can be from 1 to 16 digits long. If it is 16 digits long, it is automatically saved after the 16th digit is pressed.

Once in the editor, as many preset telephone numbers can be edited as required. Once complete, press 'END' or 'CANCEL' from the number ID entry routine to exit back to the Parameter Editor selection table.

If Level 2 or 3 are fitted to the BARRETT 660, the selecting '99' as the preset number to be edited will result in a list of all current preset telephone numbers being sent to the RS-232 port of the BARRETT 660. This is useful for checking what preset numbers have been programmed into the system as this is unrealistic by entering and leaving all 98 preset number areas.

15. **System Clock** ' System Clock '

Default - Current time and date held in the Real Time Clock
Available to Options 1, 2 and 3

Editing of the time and date is done using the 'LEFT' and 'RIGHT' keys to select the necessary fields and the 'UP' and 'DOWN' keys to modify them.

The fields are:
Day of Week, Day of Month, Month, Year, Hour, Minute, Second, Calibration

The Calibration setting is used if the Real Time Clock is losing or gaining time. A '+' value forces it to run faster and a '-' value slower. A complete calibration cycle takes 64 minutes. A new calibration setting can, therefore, only be accurately checked after this time.

Pressing 'END' will save the new clock settings.
Pressing 'CANCEL' will exit with no alteration to the clock settings. The clock keeps running normally while in the editor, but the changes are not displayed.

When the same key is kept held down for several changes, it speeds up until it is released. This enables faster editing.

16. **User Privileges** ' User privileges '

Options - Suspend Access
Restore Access
Preset Only
Preset and Local (Levels 2 and 3 only)
Preset, Local, 008 (Levels 2 and 3 only)
Preset, Local, 008 and STD (Levels 2 and 3 only)
No Limits (Levels 2 and 3 only)
RS-232 list (Levels 2 and 3 only)
Default - All users set to Preset Only with Suspended Access
Available to Options 1, 2 and 3

To provide a system which is shielded from unauthorised use, a complete security system has been incorporated into the BARRETT 660 which allows every Selcall number (10000 in total) to each have a separate security access level. This allows only people authorised to use the system into it. This is extremely important as telephone calls, especially long distance, can become extremely expensive. This editor gives the BARRETT 660 owner the ability to prohibit any Selcall from the system, or limit the type of telephone calls that permitted Selcall's can make.

Entry to this editor is protected by PIN number security.
To accelerate the setting of user privileges, editing is performed in chunks. This requires selecting a range of Selcall numbers to all be changed to the same security level.

Upon entering the editor you are asked for the Start ID. Use the number keys to enter the 4 digit Selcall ID of the first user to be modified. After the 4th digit of the Selcall ID has been entered, you are immediately asked for the Stop ID. Use the number keys to enter the 4 digit Selcall ID of the last user to be modified. After the 4th digit of the Selcall ID has been entered you are immediately asked for the change required.

Use the 'UP' and 'DOWN' keys to select the required change. Once the correct option is shown, press the 'END' key to update the security levels.

To change only 1 Selcall, make the Start ID and the Stop ID the same.

To change all Selcall's specify the Start ID as 0000 and the Stop ID as 9999.

The Stop ID must be higher than or the same as the Start ID. If it is not, you will be prompted to enter them both again.

Pressing the 'CANCEL' key at any time will exit the editor with no change.

The options available perform the following security functions:

1. ' Suspend access ' - This causes the Selcall number(s) to be completely prohibited from using the system. Their previous security level is still remembered to allow easy restoration if necessary.
2. ' Restore access ' - This restores the Selcall number(s) access into the system after having it previously suspended. Whatever access level was previously held is restored.
3. ' Preset only ' - This gives the Selcall number(s) access to the system, but only the ability to use the preset telephone numbers. No direct dialling facilities are allowed. This setting should also be set for any radios which cannot directly enter telephone numbers. This will give better system integrity when a telephone caller tries to send a telephone number to an unattended radio.
4. ' Preset & Local ' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers and limited direct dialling facilities. The restriction is that only telephone numbers up to 7 digits long can be selected. Any numbers which are longer are prohibited.
5. 'Local and 008' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers, access to any telephone number of 7 digits or less, plus the ability to dial any number which starts with 008 as its first three digits. All other numbers are prohibited.
6. ' STD ' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers, and the ability to dial any telephone number of 10 digits or less. All longer numbers are prohibited.
7. ' No limits ' - This gives the Selcall number(s) access to the system, access to the preset telephone numbers and the ability to dial any telephone number. Up to 16 digit telephone numbers are supported by the system.
8. ' RS-232 list ' - This is not a security level. When this option is selected, a list of the current security levels of the range of Selcall's currently selected is sent to the RS-232 port. This can be used to test the current security levels of users of the system. There is no available indication on the front panel display of the current individual security levels.

Whenever a user requests a prohibited operation, a digitally recorded voice message is returned advising of this. This applies to radio users trying to dial prohibited numbers, telephone users trying to contact prohibited Selcall numbers or telephone users trying to send telephone numbers to radios which the radio cannot dial back due to security limitations.

Updating a large range of numbers can take a fair amount of time.

To indicate that all is well while the update takes place, a message displaying ' ** UPDATING ** ' is shown. Once complete, the original editor prompt appears allowing the selection of another range of Selcall numbers to edit. When all changes are

complete, 'END' or 'CANCEL' should be pressed when asked for the Start ID. The user is then placed back in the Parameter Editor selection table.

17. Record Digital Voice Message ' Record message '

Options - ' No Dialtone '
' Call is answered '
' Call connects '
' Access denied '
' Erase messages '
Default - All messages are empty
Available to Options 1, 2 and 3

Four operator recordable messages are handled by the BARRETT 660. They are assigned to the following tasks:

1. ' No Dialtone ' - When a call from a transceiver to the telephone is being attempted and the BARRETT 660 was not able to recognise dialtone on the telephone line before dialling, this message will be transmitted to the transceiver. As no telephone service tones were produced, this is the only indication to the remote unit that the telephone number could not be dialled and that dialling was not even attempted.
2. 'Call is answered' - This is played to the telephone user when they first call into the BARRETT 660 and the BARRETT 660 automatically answers the incoming call. It can be used to welcome them into the system and give a guide on how to use it and what to expect if they have not used it before.
3. ' Call connects ' - This is played to the telephone user when the BARRETT 660 believes an outgoing telephone call has been answered. The message would usually inform the telephone user that the call they are receiving is with a radio user, not another telephone user and that the system is voice switched.
4. ' Access denied ' - This could be sent to either the telephone user or the radio user when they attempt an operation which is not possible. This is usually to do with security restrictions set within the system.
5. ' Erase messages ' - This option causes all previously recorded messages to be erased.

To select a message to record, use the 'UP' and 'DOWN' keys until the message required is shown on the display. While selecting the message, empty messages are indicated by a '*' in the top right corner of the display. Pressing 'END' or 'CANCEL' will exit back to the Parameter Editor selection table. When the required message is displayed, press the 'RIGHT' key. Pressing 'CANCEL' will exit without recording a new message.

To start recording, press and hold the microphone PTT button. The message should now be spoken into the microphone. Recording ends when the microphone PTT switch is released or when the message storage space is filled. The current status is always displayed on the front panel to guide the operator through the recording process. When recording concludes, any remaining storage space will be blanked. While this occurs, the message 'Complete Please Wait' is displayed. When this is complete, the operator is returned to the message selection table.

18. Play Digital Voice Message ' Play Message '

Options - ' No Dialtone '
' Call is answered '
' Call connects '
' Access denied '

Available to Options 1, 2 and 3

This editor is used for the playback of Digital Voice Messages which have already been recorded. This can be used as a method of testing if the messages were successfully recorded and if they are loud, clear and correct. Use the 'UP' and 'DOWN' keys to select the message to play. Press the 'RIGHT' key to play the message. The message is played through the front panel speaker. Press 'END' or 'CANCEL' to exit back to the Parameter Editor selection table.

Any messages which are empty are indicated by a '*' in the top right corner of the display.

19. RS-232 Baud Rate ' RS-232 Speed '

Options - 300
600
1200
2400
4800
6600
19200

Default - 2400

Available to Levels 2 and 3

The 9 Pin 'D' Connector on the back of the BARRETT 660 is a RS-232 port. Levels 2 and 3 allow information to be transferred via this RS-232 port. All system activity is constantly sent to this port and can be collected on a serial printer or captured in a Personal Computer. To facilitate the widest range of RS-232 products to be connected to the BARRETT 660, and to reduce transfer times when high transfer speeds are available, this editor allows the RS-232 port speed of the BARRETT 660 to be programmed.

Use the 'UP' key to select a higher RS-232 baud rate.
Use the 'DOWN' key to select a lower RS-232 baud rate.
Press 'END' to set the new RS-232 port speed.
Press 'CANCEL' to exit without saving any changes.

After a new RS-232 setting has been set, the initial system data which is normally sent to the RS-232 port when the BARRETT 660 is switched on is again sent, but at the new speed.

20. Start-up Display Message

'Startup message '

Default - ' BARRETT 660 '
' INTERCONNECT '
(same as the fixed startup message)
Available to Options 1, 2 and 3

When the BARRETT 660 is first switched on, a product identifying message is displayed on the front panel display for 1 second. Following this, a second message is displayed. Initially this is set to be the same as the first message, so no change appears. This second message can, however, be changed by the BARRETT 660 operator. This may serve useful for dealer advertising or more likely as a security feature. By placing the owners name and location in this message area it can be used for identification if stolen or lost. This information can also be used during remote logging to identify which BARRETT 660 unit is contacting the remote computer if several BARRETT 660 units are present in a system.

Entry to this area is protected by PIN number security.

Once in the editor, the current message is displayed as it would appear. The 'LEFT' and 'RIGHT' keys are used to select the character(s) to be modified. This is indicated by the cursor under the current character. Once the character is marked, it can be changed by using the 'UP' and 'DOWN' keys.

When the same key is kept held down for several changes, it speeds up until it is released. This enables faster editing times as a large range of characters (96 in total) are available for use in the message, plus 32 characters make up the total display. The complete table is shown below.

It should be noted that the first character in the table is a 'blank' character and is, of course, selectable. It is recommended that messages be worked out on paper before commencing, using a 16 x 2 box grid.

Pressing 'END' will save the new message and exit to the Parameter Editor selection table.

Pressing 'CANCEL' will exit back to the Parameter Editor selection table without saving the new message.

Available Message Characters

	0	@	P	`	p
!	1	A	Q	a	q
"	2	B	R	b	r
#	3	C	S	c	s
\$	4	D	T	d	t
%	5	E	U	e	u
&	6	F	V	f	v
'	7	G	W	g	w
(	8	H	X	h	x
)	9	I	Y	i	y
*	:	J	Z	j	z
+	;	K	[	k	{
,	<	L		l	|
-	=	M	]	m	}
.	>	N	^	n	
/	?	O	_	o	

21. Restore Factory Defaults 'Factory defaults'

Available to Options 1, 2 and 3

When an BARRETT 660 has been used for demonstration purposes or has been traded in by a customer or simply needs to be reset and configured from scratch again then this option performs that task. It is the best method to ensure that the BARRETT 660 is cleared completely and returned to the factory default state.

This function is protected by PIN number security.

This operation **COMPLETELY** resets the memory system of the BARRETT 660 to the same settings that are fitted in the Barrett factory. The defaults that are selected correspond to the 'Default' values listed against each Parameter Editor option above.

Once the correct PIN number is entered, the reset operation is automatic. An '**UPDATING**' message is displayed during the operation. Once complete, a full system reset takes place and the unit starts as if just switched on. Re-configuring of the system can now take place.

22. List the System Configuration 'Config -> RS-232'

Available to Levels 2 and 3

This option allows the BARRETT 660's current customer configuration to be easily checked. When performed, all programmable system information is tabulated and sent to the RS-232 port where it can be captured on a serial printer or Personal Computer. If your BARRETT 660 is supplied with a configuration that is different from the factory default, this printout will be provided with the BARRETT 660 to identify the current configuration. It would be good practice to keep this original printout with the BARRETT 660 in case reprogramming needs to take place at some time in the future. Also, if major changes are done to the BARRETT 660 configuration, a new printout should be produced if the appropriate equipment is available.

23. Pre-dialling Delay ' Call duration '

Options - 00 to 99 seconds

Default - 00

Available to Options 1, 2 and 3

This editor programs the time delay the dialling system will wait before commencing the dial sequence. This variable is provided to cater for congested exchanges where getting a dial-tone may take more than five seconds. This value is a fixed delay inserted in the dialling sequence, it does not end if dial-tone is detected. It is advised that this parameter only be used during peak exchange periods.

To change this setting, use the 'UP' and 'DOWN' keys. If 00 is displayed and 'DOWN' is pressed, 99 is the next value. Similarly, if 99 is displayed and 'UP' is pressed, 00 is the next value.

Pressing 'END' will save the new setting.

Pressing 'CANCEL' will exit with no change.

APPENDIX C

550 Modification

In order for the BARRETT 550 Transceiver to work with the BARRETT 660 a modification must be carried out on the BARRETT 550 Microprocessor board. This is a wire connecting the anode of the unused half of D13 (BAV70) to Pin 8 of U1 (The CPU) this is usually accomplished at the appropriate end of R45 (100k). Without this modification the BARRETT 550 Transceiver will not go into PTT. Because of this it is not possible to replace the BARRETT 550M provided as part of the BARRETT 660 system with an off the shelf BARRETT 550M or BARRETT 550R body. If it becomes necessary to replace the BARRETT 550M with another BARRETT 550 the modification must first be accomplished.