BARRETT

# RS232 Control Manual

## Barrett 4050 HF SDR Transceiver


BCM40505/05
s/w version: 1.7.0

# Contents

# Terms and Abbreviations

| Term / Abbreviation | Meaning |
|---|---|
| ALE | Automatic Link Establishment |
| AM | Amplitude Modulation |
| ARINC | A set of standards as established by Aeronautical Radio, Incorporated (ARINC) |
| CCIR | One of many possible Selcall formats as defined by the Consultative Committee on International Radio |
| CW | Continuous Wave |
| dB | Decibels |
| dBc | Decibels relative to the carrier - is the power ratio of a signal to a carrier signal, expressed in decibels. |
| DSP | Digital Signal Processing |
| FSK | Frequency Shift Keying |
| GPS | Global Positioning System |
| HF | High Frequency |
| LSB | Lower Sideband |
| OEM | Original Equipment Manufacturer |
| PTT | Press-To-Talk button |
| RF | Radio Frequency |
| Rx | Receive |
| Scan Table | A list of channels used when scanning for incoming calls |
| Selcall | Selective Calls |
| SSSI | Scan Step Speed Increment (ms) |
| SSB | Single Sideband (a transmission format) |
| Telcall | Telephone calls via the Selective Call protocol |
| Tx | Transmit |
| USB | Upper Sideband |
| VCO | Voltage Controlled Oscillator |
| VSWR | Voltage Standing Wave Ratio |

# RS-232 Communications Protocol & Asynchronous Indications

## Overview of Communications Protocol

The communications port of the transceiver can be used by a range of external systems including:

- Barrett accessories
- Third party systems such as vehicle tracking software and third party remote control systems.

The protocol implemented over the interface provides for both command and response type interactions and for asynchronous indications or messages from the Transceiver that are used to signal events such as a local channel change or the start or end of a Selcall reception.

The communications port is used for control and monitoring.

This section describes the basic protocol of communications from the transceiver to an external system, describing the format of the low level communications and provides descriptions of the sequence of communications between an external system and the transceiver for:

- Asynchronous indications resulting from events on the transceiver
- Simple external system commands and the transceiver responses
- Mixtures of commands, responses and asynchronous indications that require more complex protocol processing.

Following the sequence descriptions, this section provides a basic state machine that an external system might implement to handle the above communications.

Details are given of all the possible asynchronous indications and the conditions required for them to be available (events, system settings, etc).

## Low Level Communication Format

The low level protocol is based on human readable ASCII commands, responses and indications. In general, the transceiver may take some time to complete commands. For example, a command to send a Selcall may take 30 seconds or so to process and the Transceiver uses XOFF and XON characters to frame the responses. This utilises XOFF as a pseudo flow control mechanism to prevent

the external equipment from sending further commands while the current command is being processed.

Commands sent to the Transceiver have the following format:

<ASCII command string><CR>

The Transceiver uses the <CR> character to detect the end of the incoming command.

The new line character (<NR>, hexadecimal 0x0a) is not used in communications from an external system to the Transceiver, but it is used in the communications from the Transceiver to an external system. In general, the new line <NL> character (0x0a) is used to terminate all responses to commands and all asynchronous indications. Most have the optional carriage return <CR> character, so that a synchronous response or asynchronous indication takes on the following format:

<ASCII data><Optional CR><NL>

Using the XON/XOFF framing, the responses and indications from the Transceiver generally have the following format:

<XOFF><ASCII data><Optional CR><NL><XON>

Additionally, there are a very few command responses in which the Transceiver omits both the <CR> and <NL> characters, so the following is also valid:

<XOFF><ASCII data><XON>

## Networked RS232 Connection

The 4050 is capable of redirecting all RS232 data from the serial communications port to a TCP/IP connection. Setting “RS232 Connection” to “networked” or “direct” in the IO Settings menu will switch between the two modes.

After enabling the networked RS232 connection and successfully connecting the 4050 to an IP network (see IP Connectivity Guide [P/N BCM40507]), the IP server port 58001 on the 4050 will provide access to the serial communications port via TCP.

If a remote access password is set, the connecting client application needs to unlock the connection by issuing “UNLOCK<remote access password>”. The UNLOCK command follows the same protocol as described above.

During a networked RS232 connection any incoming data on the serial communications port is ignored.

The following sequence describes a successful interaction between a client application and the 4050:

1. Connect the 4050 to a IP network either via Ethernet or WiFi
2. Enable networked RS232 connection in the IO Settings menu of the 4050
3. Start a client application and create a TCP connection to the IP address of 4050 on port 58001
4. Set the socket option TCP_NODELAY to disable Nagle’s algorithm
5. If the issued commands return “ELOCKED”, execute “UNLOCK<remote access password>”
6. Start exchanging data according to the protocol as described above
7. Disconnect from the 4050 by closing the TCP connection

Connecting more than one client application to a 4050 simultaneously is not recommended.

## Asynchronous Indications

Asynchronous indications do not use the XON/XOFF framing, and all asynchronous indications are terminated by an optional CR and a NL. Figure 1 below illustrates the sequence of events of an isolated asynchronous indication.

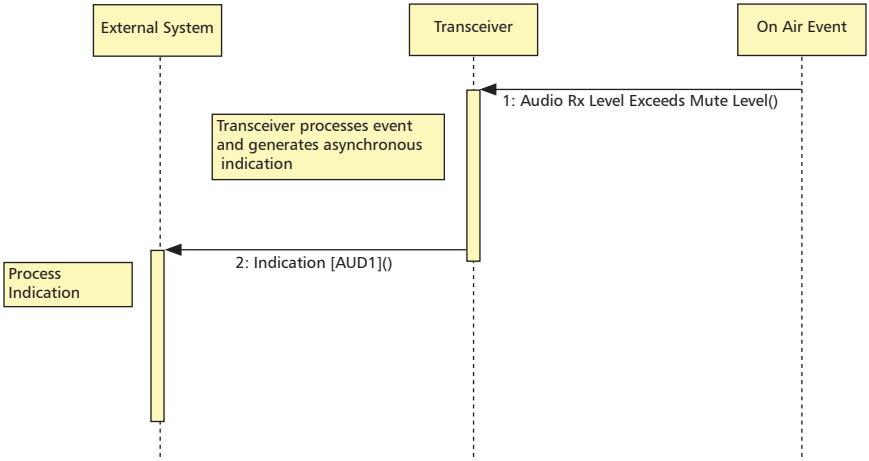


Figure 1 - Asynchronous Indication Sequence Diagram

## Command and Response

Figure 2 below illustrates the sequence of events for external equipment sending a command to the Transceiver and the response from the Transceiver. Remember that there can be a significant delay between the <XOFF> and the <ASCII data> response.

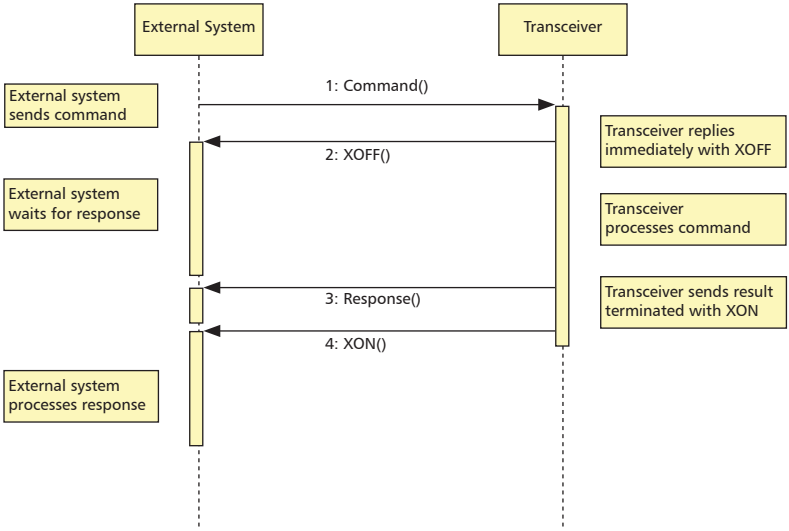


Figure 2 - Command and Response Sequence Diagram

## Command, Response and Indications

If the command sent to the Transceiver is an execute command that could generate an asynchronous indication, the synchronous response to the command will precede any asynchronous indications. An example is when the external equipment controls the scanning of the Transceiver. If RS-232 Out has been enabled, and the Transceiver is scanning, the XN0 command will cause the Transceiver to stop scanning and to additionally send the scan stop indication (SS). In the cases where the command results in additional indications, the XOFF / XON framing includes both the command response and the asynchronous indication. For example, OK for the XN0 command and the subsequent SS indication. The sequence diagram in Figure 3 below illustrates this.

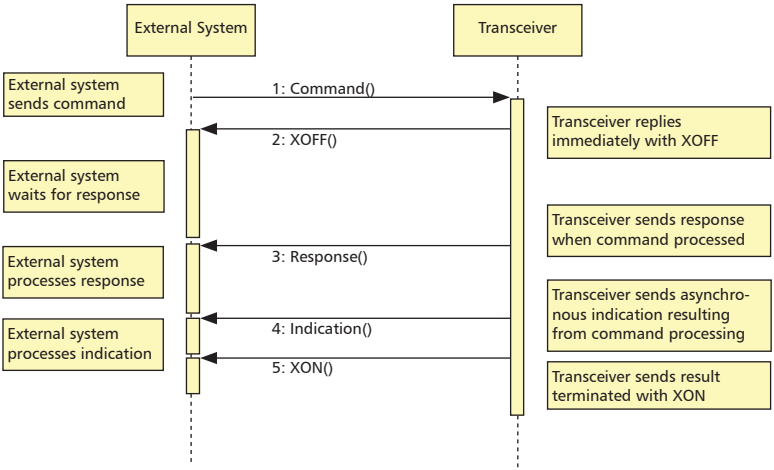


Figure 3 - Command and Response with Indication Sequence Diagram

An illustrative example is the response to the command sequence

XN0<CR><NL>

sent while the Transceiver is scanning and RS-232 Out is enabled. The Transceiver responds with:

<XOFF> OK<CR><NL> SS<CR><NL><XON>

The OK<CR><NL> part is the synchronous response to the XNO<CR><NL> command and the SS<CR><NL> is the asynchronous Scan Stop indication. Some commands may result in more than one asynchronous indication but these will always follow the synchronous response (typically OK) to the command.

## Transceiver Command Buffering Requires Asynchronous Indication Detection

The preceding examples would seem to indicate that the external system can know what to expect - either it is quiescent and it can expect asynchronous indications or it has sent a command and it expects and is waiting for the XOFF/XON framed response and zero or more indications. However, due to the buffering of communications in the Transceiver, it is important that an external system can distinguish between asynchronous indications and synchronous responses.

The diagram in Figure 4 below illustrates an example of a sequence of events that requires the external system to detect asynchronous indications as distinct from the synchronous response to a command. In this example, the Transceiver is actively scanning channels. Each channel change during the scan takes some time to process, (50 milliseconds or so). The Transceiver's low level RS-232 communications buffers incoming commands through an interrupt service routine so that commands are not lost when the Transceiver is busy performing Transceiver functions, such as the channel change in this example.

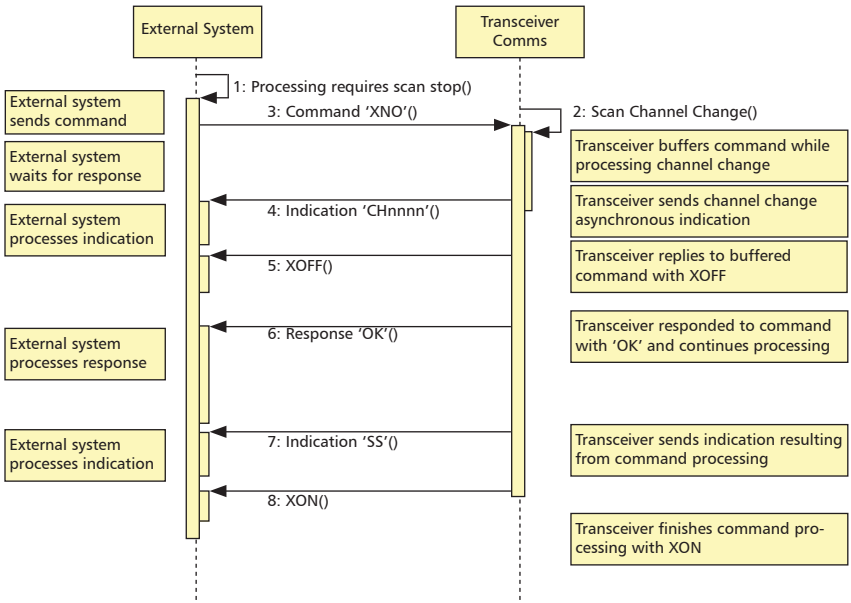


Figure 4 - Buffered Command with Asynchronous Indication Sequence Diagram

The sequence of events illustrates the external system sending the Scan Stop command (XN0) while the Transceiver is processing a scan channel change. The channel change results in the asynchronous CHnnnn indication which arrives at the external system while it is waiting for the response to the Scan Stop command. In order not to misinterpret the CHnnnn indication as a response to the command, the external system uses the fact that there has been no XOFF received yet to process the communication as an asynchronous indication.

Once the Transceiver has finished processing the scan channel change, it retrieves the buffered XN0 command and immediately sends the XOFF to indicate that it is actively processing the command. It eventually sends the command response (OK) and (in this example) sends an indication resulting from the processing (SS) to indicate that the Transceiver has stopped scanning channels and concludes the frame with the XON.

## External System Protocol State Machine

The following diagram illustrates a State Machine that can process this protocol, handling:

- Independent asynchronous indications (from events in the Transceiver not caused by commands)
- Simple synchronous responses to commands
- Complex responses which have the synchronous response to the command followed by one or more asynchronous indications that result from the processing of the command
- Asynchronous indications sent after the external system has issued a command.

The state diagram below shows the states the system can be in and the transitions caused by all possible events in those states and the processing required for each transition. These states, events, transitions and associated processing are described below.

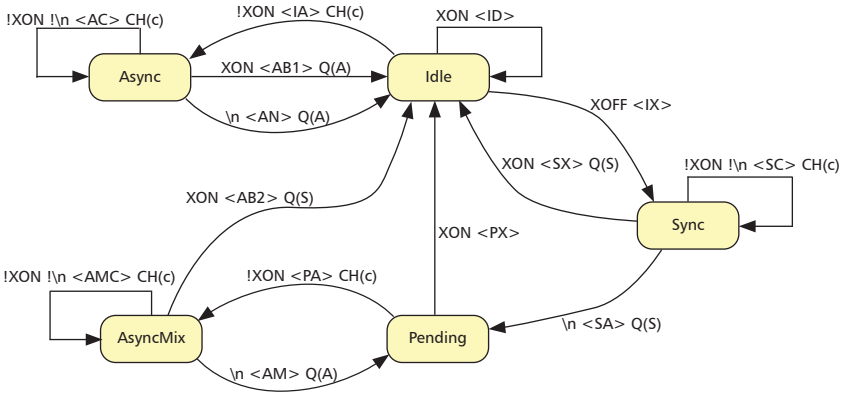


Figure 5 - Response and Indication State Machine Diagram

## Protocol States

| State | Description |
|---|---|
| Idle | No commands sent, this is the initial state of the system. This is the only state when commands may be sent to the Transceiver. |
| Sync | A command has been sent and the Transceiver has sent the XOFF and the response is being received, waiting for the new line or an XON. Carriage return characters are ignored during this state. |
| Pending | A response of zero or more characters followed by a new line character has been received. In this state, the system waits to see if XON to terminate the response or other characters that are part of an asynchronous indication resulting from the processing of the command is received. |
| AsyncMix | The system is receiving the characters of an asynchronous indication. If a new line is received, the State Machine returns to the Pending state, in case there are multiple indications resulting from the command. If an XON is received without a new line, the State Machine returns to the Idle state. |
| Async | In the Idle state, a non-XOFF character and characters of the indication is received until either a new line or an XON is obtained. XON is actually an error within the protocol but for robust behaviour the state machine processes the indication and returns to the Idle state. |

## Events

| Event | Description |
|---|---|
| XOFF | The XOFF character (0x13) |
| XON | The XON character (0x11) |
| \n | The new line character (0x0a) |
| !XON !\n | Any character that is not XON and not new line |

## Transitions

| Transition | Description | Action |
|---|---|---|
| <ID> | In the Idle state and a XON character received. | Do nothing. This may indicate some characters have been lost.<br>For example, the XOFF was lost and the last response was incorrectly processed as an Asynchronous Indication. |
| <IX> | In the Idle state and XOFF received. | Move to the Sync state to receive zero or more characters of the response to the last command sent. |
| <SC> | In the Sync state and a character (c) other than XON or new line received. | Action CH(c) buffers the character of the response. |
| <SX> | In the Sync state and the XON character and Response received. | Move back to Idle and perform action Q(S) to process the synchronous response.<br>Q(S) might queue the response and tag it as synchronous for a foreground thread to process later. |

| Transition | Description | Action |
|---|---|---|
| <SA> | In the Sync state and the new line character (\n) that terminates the response received.<br>However, there may be asynchronous indications resulting from the command that will arrive before the XON. | Move to the Pending state and perform action Q(S). |
| <PX> | In the Pending state, a synchronous response and zero or more asynchronous indications has been processed and the XON character received. | Do nothing and move back to the Idle state. |
| <PA> | In the Pending state and a character (c) other than XON received.<br>This indicates the start of an asynchronous indication resulting from the command processing. | Action CH(c) buffers the character of the indication. |
| <AMC> | In the AsyncMix state, and a character (c) other than XON or new line (\n) received. | Remain in the AsyncMix state and perform action CH(c) to buffer the character. |
| <AM> | In the AsyncMix state and the new line (\n) character that terminates the indication being buffered received. | Perform action Q(A) to process the indication. Q(A) might queue the response and tag it as an asynchronous indication for a foreground thread to process later.<br>Move to state Pending so that if the command caused more than one indication, it can be processed before the terminating XON. |

| Transition | Description | Action |
|---|---|---|
| <AB2> | In the AsyncMix state buffering an indication and the XON character received before the indications terminating a new line (\n) has been received.<br>This is probably an error condition. | Perform action Q(A) and move back to the Idle state. |
| <IA> | In the Idle state and a character other than XON received.<br>This is the start of an asynchronous indication caused by an event in the Transceiver such as start or end of Selcall reception, mute break or restore, etc. | Perform action CH(c) to start buffering the characters of the indication and move to the Async state. |
| <AC> | In the Async state and a character (c) other than XON or new line received. | Action CH(c) buffers the character of the indication. |
| <AN> | In the Async state and the new line (\n) character that terminates the indication received. | Perform action Q(A) and move back to the Idle state. |
| <AB1> | In the Async state buffering an indication and the XON character before receiving the indications terminating new line (\n) received.<br>This is probably an error condition. | Perform action Q(A) and move back to the Idle state. |

## Actions

| Action | Description |
|---|---|
| CH(c) | Buffer the received character for processing when termination of the response or indication is detected. |
| Q(S) | Process the buffered characters as a synchronous response to the last command sent. |
| Q(A) | Process the buffered characters as an asynchronous indication. |

## Asynchronous Indications

This section describes how to enable the asynchronous indications and lists the indications in the following categories:

- General Indications

  These are indications that can arise from basic Transceiver functions, such as channel scanning or mute state changes.

- Selcall Indications

  When the Transceiver has the Selcall options enabled, a number of Selcall specific indications can occur.

- ALE Indications

  The ALE system is complex and there are a few asynchronous indications that can occur. An external system can control which of these indications are provided.

## Enabling Asynchronous Indications

By default, the Transceiver does not send any asynchronous indications. The RS232 Out setting enables asynchronous indications. This can be set by:

- Programming Software
- Control head I/O Settings menu
- RS-232 command XOY.

## General Indications

These are the general indications that the Transceiver will issue through normal operation.

| | |
|---|---|
| AUD<0/1> | Indicates change of mute state:<br><0/1> 0 = mute active, 1 = mute broken.<br>(AUD indications are only issued if the XAS command has been sent to the Transceiver prior.) |
| CHnnnn | Change of channel to channel nnnn. |
| SS | Indicates the channel scan has stopped. This can be caused by processing commands, front panel activity (eg, pressing CLEAR during scan) or scan broken by Selcall activity. |

## Selcall Specific Indications

If Options 1 or 2 are installed and RS-232 Out is enabled, the Transceiver will issue indications whenever a valid Selcall is detected, even if the Selcall is not addressed to the Transceiver, using the following general format:

S<Chan><Source><Target><Type><Data>

Where:

| | |
|---|---|
| <Chan> | Four digit channel number in range 0001 to 9999. |
| <Source> | Four or six digit source Selcall address. |
| <Target> | Four or six digit target Selcall address. This is not necessarily one of the Transceiver's Selcall IDs, the Transceiver reports all valid Selcalls detected. |

| | | |
|---|---|---|
| <Type> | G | GPS Data (<Data> has GPS information from source Transceiver) |
| | C | Secure Call |
| | W | Status Request |
| | T | Telcall (<Data> has the Telcall number) |
| | P | Pagecall (<Data> has the Pagecall message) |
| | S | Selcall |
| | B | Beacon |
| | E | Emergency Call |
| | H | Hangup (terminates Secure Call) |
| | D | Data call |

<Data> The format of <Data> depends on the call type:

GPS Data:

L<ddd><mm>.<nnn><N/S><ddd><mm>.<nnn><E/W>

where:

| | |
|---|---|
| <ddd> | Degrees of the longitude or latitude |
| <mm> | Minutes of the longitude or latitude |
| <nnn> | Decimal fraction of the minutes |
| <N/S> | Either N for North or S for South latitude |
| <E/W> | Either E for East or W for West longitude |

Telcall Data:

<nn><tel>

where:

| | |
|---|---|
| <nn> | Digit length |
| <tel> | Telephone number of <nn> digits long |

Pagecall Data:

0 to 128 characters of message.

The following Selcall specific asynchronous indications are provided:

SEL<0/1> Selcall tone detection:

<0/1> 0 = no tones detected, 1 = tones present

(Only occurs when the XAS command has been sent to the Transceiver and does not require RS232 Control Enabled (XOY).)

| | |
|---|---|
| EF | GPS Status Selcall received and the sending station either does not have the GPS option installed or the GPS has been set to disabled. |
| EG | GPS Status Selcall received as a response to this station's GPS Request and the sending station's GPS either does not have a valid satellite fix or the GPS is not connected. |
| L<GPSdata> | GPS Status Selcall received as a response to this stations GPS Request.<br><GPSdata> has the format:<br><ddd><mm>.<nnn><N/S><ddd><mm>.<nnn><E/W><br>where:<br><ddd> Degrees of the longitude or latitude<br><mm> Minutes of the longitude or latitude<br><nnn> Decimal fraction of the minutes<br><N/S> Either N for North or S for South latitude<br><E/W> Either E for East or W for West longitude |

## ALE Specific Indications

If the Transceiver has option 5 installed, ALE indications can be provided. The ALE indications are not dependent on the RS-232 Out setting. They are either provided as a response to an interrogation command or if the external system requests them though the ALE registration commands.

The ALE indications are controlled by ALE commands. ie, to get ALE indications the external system must specifically request them by sending the following commands to the Transceiver:

| | |
|---|---|
| ARAMDM<0/1> | Register for new AMD messages:<br><0/1> 0 = unregister, 1 = register |
| ARAMDP<0/1> | Register for new AMD Phone calls:<br><0/1> 0 = unregister, 1 = register |
| ARCALL<0/1> | Register for new calls:<br><0/1> 0 = unregister, 1 = register |
| ARLINK<0/1> | Register for new links:<br><0/1> 0 = unregister, 1 = register<br>*NOTE: This command is inactive in current Transceiver software.* |

| | |
|---|---|
| ARLTBL<0/1> | Register for link table changes:<br><0/1> 0 = unregister, 1 = register |
| ARMESS<0/1> | Register for ALE events:<br><0/1> 0 = unregister, 1 = register |
| ARSTAT<0/1> | Register for status changes:<br><0/1> 0 = unregister, 1 = register |
| ARCALL<0/1> | Register for ALE 2G call indications<br><0/1>0 = unregister, 1 = register |

Depending on the settings described above, the Transceiver will issue the following ALE indications:

| | |
|---|---|
| AIAMDM[LL][RR][XX][...] | Indicates an incoming ALE message in the following format:<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index<br>XX] (00-90) Length of message received<br>[...] Message received (up to 90 expanded 64 ASCII subset characters 'SP' 0x20 to '_' 0x5f inclusive) |
| AIAMDP[LL][RR][XX][...] | Indicates an incoming ALE phone message in the following format:<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index<br>[XX] (00-77) Length of message received<br>[...] Phone number received (up to 77 expanded 64 ASCII subset characters 'SP' 0x20 to '_' 0x5f inclusive) |
| AILTBL[II][LL][RR] | Indicates a list of the stations currently linked in the following format whenever a change in the list occurs.<br>*(Note: The indication data will include [II][LL][RR] for each current link):*<br>[II] (00-15) Link index<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index |

| | |
|---|---|
| AIMESS[M] | Indicates ALE events: [M] single digit code for the system event that has occurred:<br>1 = Offline<br>2 = Manual mode<br>3 = Receive / scan mode |
| AISTAT[M][E][X][T][LL][CC] | Indicates ALE status change in the following format:<br>[M] The current ALE system mode:<br>1 Offline<br>2 Manual mode<br>3 Receive / scan mode<br>[E] The current process of the ALE:<br>0 or 5 Idle<br>1 Call transmit start<br>2 Incoming call<br>3 Sounding transmit<br>4 Sounding receive<br>[X] (0/1) Currently transmitting<br>[T] (0/1) Currently tuning<br>[LL] (00-16) Number of current links<br>[CC] (00-99) Scan list index selected |
| AICALL[LL][RR] | Indicates an ALE 2G call in the following format:<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index |
| AILINK[LL][RR] | Indicates an ALE 2G call in the following format:<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index |

It is important to note that the ALE indications do not behave in the same way as standard indications as they are all framed by <XOFF> and <XON> characters by default, so they appear to be synchronous responses instead of asynchronous indications.

The XAX command allows control of the framing to force the framing to be the same as the general response and indication framing. When the XAX command has been issued to the Transceiver, the ALE indications are formatted in the same way as general indications. (ie, there are no <XOFF> and <XON> characters.)

# Program Channel Command

The program channel command is used to program the Transceiver's channel parameters. This command is the full channel program command. Short form commands (described later), are used to program or edit each parameter in the channel program command individually without the need to enter the full command syntax.

There are two forms of the Program Channel Command; one form makes a permanent change to the radio configuration, the other makes a temporary change that does not persist across radio resets or power cycles. The first is the 'PC' command and the second is the 'TC' command. All the optional parameter fields are the same for both 'PC' and 'TC' commands.

| | |
|---|---|
| Syntax: | <P> [<C><chan>] or <T> [<C><chan>]<br>[<R><rx frequency>]<br>[<T><tx frequency>]<br>[<Z><Selcall enabled/disabled>]<br>[<S><scan enabled/disabled>]<br>[<H><rf power level>]<br>[<B><mode select>]<br>[<L><label number>]<br>[<A><antenna socket>] |
| Purpose: | Program channel parameters |
| Comments | The command parameters can be entered in any order once the P has been sent. (NB: the <C> command is optional, without it the current channel will be programmed.)<br>However, if the channel number is going to be programmed, the <C> command must immediately follow the <P> command byte.<br><chan> must be a four digit integer number representing the channel to be programmed.<br><Rx frequency> must be an eight digit integer number representing the new receive frequency.<br><Tx frequency> must be an eight digit integer number representing the new transmit frequency. |

Comments (continued):

<Selcall enabled/disabled> - single letter as follows:

| | |
|---|---|
| N | No Selcall |
| Y | International Selcall enabled |
| S | International Selcall enabled |
| W | CCIR Selcall enabled |
| R | OEM Selcall enabled |

<scan enabled/disabled> - single letter or number as follows:

| | |
|---|---|
| N | Scan disabled |
| Y | Put in scan table 1 |
| 1 | Put in scan table 1 |
| 2 | Put in scan table 2 |
| 3 | Put in scan table 3 |
| 4 | Put in scan table 4 |
| 5 | Put in scan table 5 |
| 6 | Put in scan table 6 |
| 7 | Put in scan table 7 |
| 8 | Put in scan table 8 |

<power> - single letter as follows:

| | |
|---|---|
| H | High power set |
| M | Medium power set |
| L | Low power set |

<mode select> - is the mode to change to. Valid mode selection options are as follows:

| | |
|---|---|
| L - J3E | LSB mode selected |
| U - J3E | USB mode selected |
| A - H3E | mode selected |
| F - CF | mode selected |
| C - J2A | mode selected |

<label number> - channel use label number. This number is an integer between 0 and the number of labels already programmed (must be 3 digits).

| | |
|---|---|
| Comments (continued) | <antenna socket> - antenna socket to use. Single number as follows:<br>1 Antenna socket 1<br>2 Antenna socket 2<br>*Note: The Transceiver must have antenna 2 enabled for the changes to be effective.* |
| Returns: | OK if successful.<br>E0, E6, E7, E8, ED or EE on error. |
| Examples: | PC0001R12365000T06850000ZYSNHHBAl015A1<br>This is a full program command which will:<br>Channel 1<br>Receive frequency 12365 kHz<br>Transmit frequency 6850 kHz<br>Selcall Enabled<br>Scan Disabled<br>Power High<br>Mode H3E<br>Label number 15<br>Antenna socket 1<br>PL013T3265<br>This is an abbreviated program command that will set the current channel to the following:<br>Label number 13<br>Transmit frequency 3265 kHz<br>All other parameters remain unchanged.<br>PR08932500ZNS3HLBU<br>This is an abbreviated program command that will set the current channel to the following:<br>Receive frequency 8932.5 kHz<br>Selcall Disabled<br>Scan Put channel into scan table 3<br>Power Low<br>Mode J3E - USB<br>All other parameters remain unchanged. |

# Editing Commands

## Set SSL Mute Sensitivity

| | |
|---|---|
| Syntax: | <E><A><mute sensitivity> |
| Purpose: | Set SSL mute sensitivity level. |
| Comments: | <mute sensitivity><br>H High sensitivity<br>M Medium sensitivity<br>L Low sensitivity |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EAL<br>This will change the SSL mute sensitivity to Low. |

## Set Scan Stop Dwell Time

| | |
|---|---|
| Syntax: | <E><A><D><dwell time> or <E><D><dwell time> |
| Purpose: | Set the length of time the Transceiver will stop the scan for, after a scan stop condition has gone. |
| Comments: | <dwell time> - Length of dwell in seconds. Valid range is 1 to 10. |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EAD3 or ED3<br>This will set the scan dwell to three seconds. |

## Set Transceiver TX Configuration

| | |
|---|---|
| Syntax: | <E><B><T><path> |
| Purpose: | Sets the transmit audio path of the Transceiver. |
| Comments: | <path><br>L Internal transmit source<br>R External transmit source |

| | |
|---|---|
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EBTL<br>This will set the Transceiver's transmit audio source to internal. |

## Set Clarifier

| | |
|---|---|
| Syntax: | <E><F><sign><clarify value> |
| Purpose: | Program new clarifier value for current channel, backwards compatibility. |
| Comments: | <sign> "-" for a negative clarifier, "+" for a positive clarifier value <clarify value> new clarifier value in Hz.<br>This number is an integer value between 0000 and 1000 inclusive. (0 to 1000 Hz.)<br>Please note that the clarifier value is reset on channel change. |
| Returns: | OK if successful.<br>E0, EA or EC on error. |
| Example: | EF+0856<br>This will change the clarifier value to plus 856 Hz. |

## Select AGC Hang

| | |
|---|---|
| Syntax: | <E><G><AGC Hang> |
| Purpose: | The selection depends on the receiver environment and should be set for optimum receiver performance.<br>In the presence of high static and sporadic noise, the function of the hang AGC may result in gaps in the received signal due to the slow AGC recovery. |
| Comments: | <AGC Hang><br>H Enable AGC Hang<br>N Disable AGC Hang |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EGH<br>This will turn on the AGC Hang. |

## Set Global RF Power Level

| | |
|---|---|
| Syntax: | <E><H><power> |
| Purpose: | Set RF maximum global power level to full power - 150 watts, high power - 125 watts, medium power - 30 watts or low power - 10 watts. |
| Comments: | <power> -<br>F full power enabled (150W)<br>H high power enabled (125W)<br>M Medium power enabled (30W)<br>L Low power enabled (10W) |
| Returns: | OK if successful.<br>E0 or E4 on error. |
| Example: | EHH<br>Sets the RF power of Transceiver to high power- 100/125 watts. |

## Select Noise Reduction On Line Enable

| | |
|---|---|
| Syntax: | <E><K> <State> |
| Purpose: | Select noise reduction on line enable on or off. |
| Comments: | <State><br>Y On<br>N Off |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EKY<br>This will turn the noise reduction on line enable on. |

## Set Channel Usage Label

| | |
|---|---|
| Syntax: | <E><L><999><T><label> |
| Purpose: | Set channel usage label values. |
| Comments: | <999> - Label number to be edited. Must be three digits between 000 and 127.<br><label> - New label string. Up to 20 characters long. |

| | |
|---|---|
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EL012T Hello World<br>Sets channel usage label 12 to Hello World. |

## Set Line-In Level

| | |
|---|---|
| Syntax: | <E><L><I><n> |
| Purpose: | Set line-in level. |
| Comments: | 0 -24 dBm<br>1 -18 dBm<br>2 -12 dBm<br>3 -6 dBm<br>4 0 dBm |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | ELI3<br>Sets the line-in level to -6 dBm. |

## Set Line Mute

| | |
|---|---|
| Syntax: | <E><L><M><F/U> |
| Purpose: | Set line mute to follow mute, or un-muted. |
| Comments: | F Follow<br>U Un-muted |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | ELMF<br>Sets line mute to follow. |

## Set Line-Out Level

| | |
|---|---|
| Syntax: | <E><L><O><n> |
| Purpose: | Set line-out level. |
| Comments: | 0 -6 dBm<br>1 -3 dBm<br>2 0 dBm<br>3 3 dBm<br>4 6 dBm<br>5 9 dBm |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | ELO3<br>Sets line-out level to 3 dBm. |

## Select Noise Reduction State

| | |
|---|---|
| Syntax: | <E><M><state> |
| Purpose: | Sets the Noise Reduction State. |
| Comments: | <state><br>L Set noise reduction to low<br>M Set noise reduction to medium<br>H Set noise reduction to high<br>N Set noise reduction off<br>Y Set noise reduction on (to the last level previously set) |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EMM<br>This sets the noise reduction to medium. |

## Select Noise Blanker State

| | |
|---|---|
| Syntax: | <E><N><state> |

| | |
|---|---|
| Purpose: | Selects noise blanker on or off. |
| Comments: | <state><br>Y Noise blanker on<br>N Noise blanker off |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | ENY<br>This will turn the noise blanker on. |

## Select Hopping State

| | |
|---|---|
| Syntax: | <E><O><state> |
| Purpose: | Selects Hopping mode on or off. |
| Comments: | <state><br>Y Frequency hopping on<br>N Frequency hopping off |
| Returns: | OK if successful.<br>E0 on error. |

## Set RF Pre-Amplifier On / Off

| | |
|---|---|
| Syntax: | <E><P><0/1> |
| Purpose: | Set RF receive pre-amplifier on or off. |
| Comments: | 0 Off<br>1 On |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EP1<br>This will turn the pre-amplifier on. |

## Select Scan Rate

| | |
|---|---|
| Syntax: | <E><R><S><rate> |

| | |
|---|---|
| Purpose: | Selects the scan rate for non selcall channels. |
| Comments: | <rate> Scan rate setting between 0 and 6 inclusive, where:<br>0 300 ms<br>1 500 ms<br>2 700 ms<br>3 1000 ms<br>4 1500 ms<br>5 2000 ms<br>6 5000 ms |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | ERS4<br>This will set the Transceiver scan rate to 1.5 seconds per channel. |

## Select Scan Resume Time

| | |
|---|---|
| Syntax: | <E><R><resume time> |
| Purpose: | Selects the scan resume time after a scan stop condition has ended. |
| Comments: | <resume time> Scan rate setting between 0 and 8 inclusive, where:<br>0 Off (No scan resume)<br>1 1 minute<br>2 2 minutes<br>3 3 minutes<br>4 5 minutes<br>5 10 minutes<br>6 15 minutes<br>7 20 minutes<br>8 30 minutes |
| Returns: | OK if successful.<br>E0 on error. |

| | |
|---|---|
| Example: | ER2<br>This will set the Transceiver scan resume time to two minutes after the scan has been turned off. |

## Add a Channel to a Scan Table

| | |
|---|---|
| Syntax: | <E><S><n><A><chan> |
| Purpose: | Adds a channel to a scan table.<br>Using the special table 0, a channel can be added to all tables in one operation. |
| Comments: | <n> The target scan table to add the channel to (1 to 8), special case 0 adds channel to all eight scan tables.<br><chan> Four digit channel number to be added to scan table. |
| Returns: | 0 or 1 to indicate either failure or success of the operation followed by OK.<br>In the case of a single target scan table (ie, 1 to 8), a single digit success code is returned, and for the case of the all tables target (ie 0) a string of 8 0 or 1 is returned.<br>E0 on syntax error, invalid table number, or if transceiver is scanning.<br>E5 if channel does not exist in the Transceiver. |

Example: ES1A0022

1OK

Channel 22 was successfully added to scan table 1 or channel 22 was already in scan table 1.

ES2A0023

0OK

Channel 23 was not added to scan table 2, this implies that table 2 is full (has 30 channels).

ES2A0032

E5

Command failed. Channel 32 does not exist in the Transceiver.

ES9A0002

E0

Command failed because the table number is invalid.

ES0A0008 01111011OK

Channel 8 was added or already existed in scan tables 2, 3, 4, 5, 7 and 8 and tables 1 and 6 are both full and do not have channel 8 in them.

## Clear a Scan Table

| | |
|---|---|
| Syntax: | <E><S><n><C> |
| Purpose: | Adds a new label into the channel usage label list. |
| Comments: | <n> The scan table to clear (1 to 8). |
| Returns: | OK if successful.<br>E0 on error, or if transceiver is scanning |
| Example: | ES2C<br>This will clear all channels from the second scan table. |

## Remove a Channel from a Scan Table

| | |
|---|---|
| Syntax: | <E><S><n><R><chan> |
| Purpose: | Removes a channel from a Scan Table.<br>It is possible to remove a channel from all tables with one command by using the special Scan Table number 0. |
| Comments: | <n> The target scan table to add the channel to (1 to 8), special case 0 adds a channel to all eight scan tables.<br><chan> Four digit channel number to be added to scan table. |
| Returns: | 0 or 1 to indicate either failure or success of the operation followed by OK.<br>In the case of a single target scan table (ie, 1 to 8) a single digit success code is returned, and for the case of the all tables target (ie 0) a string of 8 0 or 1 is returned.<br>E0 on syntax error, invalid table number, or if transceiver is scanning.<br>E5 if channel does not exist in the Transceiver. |

| | |
|---|---|
| Example: | ES1R0022<br>1OK<br>Channel 22 was successfully removed from scan table 1.<br><br>ES2R0023<br>0OK<br>Channel 23 was not removed from scan table 2. The channel did not exist in the scan table.<br><br>ES2R0032<br>E5<br>Command failed. Channel 32 does not exist in the Transceiver.<br><br>ES9R0002<br>E0<br>Command failed. Table number invalid.<br><br>ES0R0008<br>01111011OK<br>Channel 8 was removed from scan tables 2, 3, 4, 5, 7 and 8 and tables 1 and 6 did not contain channel 8. |

## Add a Label to the Channel Usage Label List

| | |
|---|---|
| Syntax: | <E><U><label text> |
| Purpose: | Adds a new label into the channel usage label list. |
| Comments: | <label text><br>The text label to be added. Up to 40 characters allowed. |
| Returns: | OK if successful.<br>E0 or E8 on error. |
| Example: | EU Hello World<br>This will add the label 'Hello World' to the channel usage label list. |

## Set Audio Mute Open Level

| | |
|---|---|
| Syntax: | <E><V><level> |
| Purpose: | Set the Audio Mute open level. |
| Comments: | <level><br>L Low level<br>M Medium level<br>H High level |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EVL<br>This will set the Audio Mute open level to the low level. |

## Set Antenna Type

| | |
|---|---|
| Syntax: | <E><W><type> |
| Purpose: | Sets auto tune on or off. |
| Comments: | <type> -<br>1 Base station antenna<br>2 910 Automatic antenna tuner<br>3 911 Automatic antenna tuner<br>4 2019 Mobile antenna<br>5 2018 Loop antenna<br>6 4075 Linear<br>7 4075 Linear than ATU<br>8 4011/4015 Auto Tuner<br>9 4017 Auto Tuner<br>10 OEM Tuner<br>11 OEM Preselector<br>12 OEM 2 Tuner |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EW2<br>This will inform the Transceiver that a Barrett 910 automatic tuning antenna is fitted. |

## Set Digital Voice State

| | |
|---|---|
| Syntax: | <E><X> <State> |
| Purpose: | Select digital voice off, digital or secure. |
| Comments: | <State><br>O Off<br>D Digital<br>S Secure |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EXO<br>This will turn the digital voice off. |

## Set Selcall ID

| | |
|---|---|
| Syntax: | <E><Z><Selcall ID> |
| Purpose: | Set Selcall ID number (4 digit or 6 digit number). |
| Comments: | <Selcall ID> - new Selcall ID of the Transceiver. ID must be either a four digit or six digit integer number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EZ1234<br>Changes the Transceiver's 4 digit International Selcall ID to 1234.<br>EZ654321<br>Changes the Transceiver's 6 digit Selcall ID to 654321. |

## Clear Selcall Received Flag

| | |
|---|---|
| Syntax: | <E><Z><C> |
| Purpose: | Clear the Selcall received flag. |
| Comments: | - |

| | |
|---|---|
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EZC<br>Clears the Selcall received flag. |

## Set Selcall Preamble Length

| | |
|---|---|
| Syntax: | <E><Z><P><preamble> |
| Purpose: | Set Selcall preamble length. |
| Comments: | <preamble> - new Selcall preamble length.<br>Value must be between 1 and 10 inclusive. (1 second = 1) |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EZP5 Changes the Selcall preamble length to five seconds. |

## Set OEM Selcall ID

| | |
|---|---|
| Syntax: | <E><Z><T><Selcall ID> |
| Purpose: | Set OEM Selcall ID number. |
| Comments: | <Selcall ID> - <Selcall ID> new OEM Selcall ID of the Transceiver. ID must be a four or six digit integer number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | EZT4321<br>Changes the Transceiver's four digit OEM Selcall ID to 4321.<br>EZT654321<br>Changes the Transceiver's six digit OEM Selcall ID to 654321 |

# Interrogate Commands

## Return Scan Dwell Time

| | |
|---|---|
| Syntax: | <I><A><D> |
| Purpose: | Returns scan dwell time in seconds. |
| Comments: | - |
| Returns: | Current scan dwell time.<br>E0 on error. |
| Example: | IAD<br>If the scan dwell time is five seconds, the returned value will be 05<CR>. |

## Return Current Signal Strength Level (SSL)

| | |
|---|---|
| Syntax: | <I><A><L> |
| Purpose: | Returns the current signal strength level. |
| Comments: | - |
| Returns: | Value returned is signal level in dBm. |
| Example: | IAL<br>If receive level is -114dBm then returned value will be -114dBm<CR>. |

## Return Signal Strength Mute Level (SSL) Setting

| | |
|---|---|
| Syntax: | <I><A><R> |
| Purpose: | Returns the signal strength level setting where the mute will open in SSL mute. |
| Comments: | - |
| Returns: | The SSL setting. Either L for low, M for medium or H for High.<br>E0 on error. |
| Example: | IAR<br>If the SSL mute open setting is set to low, the returned value will be L<CR>. |

## Return Mode

| | |
|---|---|
| Syntax: | <I><B> |
| Purpose: | Returns the current mode. |
| Comments: | - |
| Returns: | Mode code as follows:<br>L - J3E LSB<br>U - J3E USB<br>A - H3E AM<br>F - CF CF Custom Filter<br>C - J2A CW<br>E0 on error. |
| Example: | IB<br>If the current mode is USB, the returned value will be U. |

## Return Current Channel Number

| | |
|---|---|
| Syntax: | <I><C> |
| Purpose: | Returns the current channel number in use. |
| Comments: | - |
| Returns: | Current channel number (four digits).<br>E0 on error. |
| Example: | IC<br>If the current channel is 22, the returned value will be 0022<CR>. |

## Return Channel Data

| | |
|---|---|
| Syntax: | <I><D><C><channel number> |
| Purpose: | To return channel frequency data of individual channels programmed in the Transceiver. |

| | |
|---|---|
| Comments: | <channel number> - The four digit channel number required. (Valid range is 0001 to 9999 inclusive.) |
| Returns: | Frequencies for each channel in the Transceiver<br>The data received for each channel has the following form:<br>CCCCRRRRRRRRTTTTTTTT<br>where:<br>CCCC Channel number<br>RRRRRRRR Receive frequency in Hz<br>TTTTTTTT Transmit frequency in Hz<br>E0, E5, or E6 on error. |
| Example: | IDC0104<br>This will return all channel data for channel 104.<br>ie. 01040377600006850000<br>This is decoded as:<br>Channel number 104<br>Receive frequency 3776.0 kHz<br>Transmit frequency 6850.0 kHz |

## Return Channel Data

| | |
|---|---|
| Syntax: | <I><D><F> |
| Purpose: | Returns frequency information for all programmed channels. |
| Comments: | |
| Returns: | Frequencies for each channel in the Transceiver.<br>The data received for each channel has the following form:<br>CCCCRRRRRRRRTTTTTTTT<br>where:<br>CCCC Channel number<br>RRRRRRRR Receive frequency in Hz<br>TTTTTTTT Transmit frequency in Hz<br>E0, E5, or E6 on error. |

| | |
|---|---|
| Example: | IDF<br>This will return frequency information for each programmed channel.<br>ie. 0103059400000594000001040377600006850000<br>This is decoded as:<br>Channel number 103<br>Receive frequency 5940.0 kHz<br>Transmit frequency 5940.0 kHz<br>Channel number 104<br>Receive frequency 3776.0 kHz<br>Transmit frequency 6850.0 kHz |

## Return Channel Data

| | |
|---|---|
| Syntax: | <I><D><F><A> |
| Purpose: | Returns frequency information for all programmed ALE channels. |
| Comments: | - |
| Returns: | Frequencies for each ALE channel in the Transceiver.<br>IDFA<channel><channel> ...<br>The data received for each channel has the following form:<br>CCCCRRRRRRRRTTTTTTTTMF<br>where:<br>CCCC Channel number.<br>RRRRRRRR Receive frequency in Hz<br>TTTTTTTT Transmit frequency in Hz<br>M Channel mode (U = USB, L = LSB, A = AM, C = CW, F= Custom filter bandwidth)<br>F Selcall format (N = None, S = International or RFDS, R = OEM, W = CCIR)<br>E0, E5, or E6 on error. |

| | |
|---|---|
| Example: | IDFA<br>This will return frequency information for each programmed channel.<br>ie. IDFA0103059400000594000U-S0104037760000685000UR<br>This is decoded as : |

| | |
|---|---|
| Channel number | 103 |
| Receive frequency | 5940.0 kHz |
| Transmit frequency | 5940.0 kHz |
| Channel mode | USB |
| Selcall format | International |
| Channel number | 104 |
| Receive frequency | 3776.0 kHz |
| Transmit frequency | 6850.0 kHz |
| Channel mode | USB |
| Selcall format | OEM |

## Return Channel Data

| | |
|---|---|
| Syntax: | <I><D><F><S> |
| Purpose: | Returns frequency and Selcall format information for all programmed channels. |
| Comments: | - |
| Returns: | Frequencies and Selcall for each channel in the Transceiver.<br>The data received for each channel has the following form:<br>CCCCRRRRRRRRTTTTTTTT<br>where: |

| | |
|---|---|
| CCCC | Channel number |
| RRRRRRRR | Receive frequency in Hz |
| TTTTTTTT | Transmit frequency in Hz |
| F | Selcall format (N = None, S = International or RFDS, R = OEM, W = CCIR) |

E0, E5, or E6 on error.

| | |
|---|---|
| Example: | IDF<br>This will return frequency information for each programmed channel.<br>ie. IDFS0103059400000594000OS01040377600006850000R<br>This is decoded as :<br>Channel number 103<br>Receive frequency 5940.0 kHz<br>Transmit frequency 5940.0 kHz<br>Selcall format International<br>Channel number 104<br>Receive frequency 3776.0 kHz<br>Transmit frequency 6850.0 kHz<br>Selcall format OEM |

## Return All Channel Use Labels

| | |
|---|---|
| Syntax: | <I><D><L> |
| Purpose: | Returns all channel labels currently programmed. |
| Comments: | - |
| Returns: | Channel labels as ASCII.<br>E0 on error. |
| Example: | IDL<br>Return all the labels with a <CR> to finish. |

## Return Transceiver Series Number

| | |
|---|---|
| Syntax: | <I><D><R> |
| Purpose: | Returns Transceiver series information. |
| Comments: | |
| Returns: | Transceiver series number as ASCII.<br>E0 on error. |
| Example: | IDR<br>Return the series number with a <CR> to finish. (ie. 2000 shows the Transceiver as being in the 2000 series product line.) |

## Return Transceiver Serial Number

| | |
|---|---|
| Syntax: | <I><D><S> |
| Purpose: | Returns the Transceiver serial number. |
| Comments: | - |
| Returns: | Transceiver serial number as ASCII.<br>E0 on error. |
| Example: | IDS<br>Return the series number with a <CR> to finish. (ie. 405019205.) |

## Return Scan Table Entries

| | |
|---|---|
| Syntax: | <I><D><S><n> |
| Purpose: | Returns Transceiver series information. |
| Comments: | <n> The scan table to interrogate in the range 0 to 7 (for scan tables 1 to 8). |
| Returns: | 0 to 30 channel numbers as four digit numbers terminated with <CR>.<br>E0 on error. (Invalid scan table number or syntax error.) |
| Example: | IDS0<br>00010004000600100014<br>Scan table 1 has five channels (1, 4, 6, 10 and 14) |

## Return Number of Programmed Channels

| | |
|---|---|
| Syntax: | <I><E> |
| Purpose: | Returns the number of programmed channels in the Transceiver. |
| Comments: | |
| Returns: | Number of programmed channels as an integer.<br>E0 on error. |
| Example: | IE<br>If the number of programmed channels is 31, the returned value will be 31<CR>. |

## Return Clarifier Value

| | |
|---|---|
| Syntax: | <I><F> |
| Purpose: | Returns the clarifier value for the current channel as a hexadecimal number, backwards compatibility. |
| Comments: | - |
| Returns: | Clarifier value (sign and four digit hex integer).<br>E0 on error. |
| Example: | IF<br>The returned value will be +000<CR>. |

## Return GPS Coordinates

| | |
|---|---|
| Syntax: | <I><G> |
| Purpose: | Returns the GPS coordinates of the Transceiver. |
| Comments: | - |
| Returns: | GPS coordinates as Latitude and Longitude.<br>E0 or EG on error. |
| Example: | IG<br>If the Transceiver has a GPS fitted, the latest coordinates will be sent out in the following format:<br>GL03205.748SL11548.044E<CR> |

## Return AGC Hang Setting

| | |
|---|---|
| Syntax: | <I><G><A> |
| Purpose: | Returns the AGC Hang setting. |
| Comments: | |
| Returns: | AGC Hang setting in the form of a one character code:<br>N AGC Hang disabled<br>H AGC Hang Enabled<br>E0 - on error. |
| Example: | IGA<br>If the AGC Hang is enabled, H<CR> is returned. |

## Returns Current Transmit Power Setting

| | |
|---|---|
| Syntax: | <I><H> |
| Purpose: | Returns the maximum transmit power of the Transceiver. |
| Comments: | - |
| Returns: | Power Setting as either<br>L Low power - 10W<br>M Medium Power - 30W<br>H High Power - 125W<br>F Full Power - 150W<br>E0 on error. |
| Example: | IH<br>If the transmit power is set to high, H<CR> is returned. |

## Returns Current Channel's Transmit Power Setting

| | |
|---|---|
| Syntax: | <I><H><C> |
| Purpose: | Returns the maximum transmit power of the current channel.<br>*Note that a channel's power setting may be higher than the Transceiver's global power setting (as returned by the IH command) but when transmitting on that channel, power will be limited to the global setting.* |
| Comments: | - |
| Returns: | Power Setting as either<br>L Low power, 10W<br>M Medium Power 30W<br>H High Power 125W<br>F Full Power 150W<br>E0 on error |
| Example: | IHC<br>If the channel's transmit power is set to high, H<CR> is returned. |

## Return Label

| | |
|---|---|
| Syntax: | <I><L> |
| Purpose: | Returns the label as ASCII characters for the current channel. |
| Comments: | - |
| Returns: | Current label as ASCII characters.<br>E0 on error. |
| Example: | IL<br>If the current channel label is PRIVATE, the returned value will be PRIVATE<CR>. |

## Return Line Mute State

| | |
|---|---|
| Syntax: | <I><L><M> |
| Purpose: | Return current line mute state |
| Comments: | - |
| Returns: | Line Mute state in the form of a one character code:<br><F> The external line audio follows the speaker mute state<br><U> External line audio is always present when in receive mode<br>E0 on error |
| Example: | ILM<br>If Call mute or other mute type is selected, the returned value will be F<CR> . |

## Return Mute State

| | |
|---|---|
| Syntax: | <I><M> |
| Purpose: | Return current mute state |
| Comments: | - |

| | |
|---|---|
| Returns: | Mute state in the form of a one character code:<br><A> Audio mute selected<br><L> Signal strength level mute selected<br><S> Call mute selected<br>E0 on error |
| Example: | IM<br>If Call mute is selected, the returned value will be S<CR> . |

## Return Noise Blanker State

| | |
|---|---|
| Syntax: | <I><N><B> |
| Purpose: | Return current mute state |
| Comments: | - |
| Returns: | Noise blanker state in the form of a one character code:<br>Y Noise blanker enabled<br>N Noise blanker disabled<br>E0 on error |
| Example: | INR<br>If noise blanker is enabled the returned value will be Y<CR> |

## Return Noise Reduction State

| | |
|---|---|
| Syntax: | <I><N><R> |
| Purpose: | Return the Noise Reduction State. |
| Comments: | - |
| Returns: | Noise reduction state in the form of a one character code:<br>L Noise reduction low<br>M Noise reduction medium<br>H Noise reduction high<br>N Noise reduction off<br>E0 on error. |
| Example: | INR<br>If noise reduction is set to medium the returned value will be M<CR>. |

## Return Current Receive Signal Strength

| | |
|---|---|
| Syntax: | <I><O><L> |
| Purpose: | Return the current receive signal strength in dBm. |
| Comments: | If the Transceiver's PTT is active (ie, transmitting), the returned value is 00. |
| Returns: | Current receive signal strength:<br>SSL<nn><br><nn> - two digit signal strength in range 00 to 16.<br>E0 on error. |
| Example: | IOL<br>SSL03. |

## Return VSWR

| | |
|---|---|
| Syntax: | <I><O><V> |
| Purpose: | Return last VSWR reading. |
| Comments: | - |
| Returns: | Last measured VSWR:<br><v.v>:<v.v><br><v.v>:<v.v> - SWR<br>E0 on error. |
| Example: | IOV<br>1.1:1.0 |

## Return PTT State

| | |
|---|---|
| Syntax: | <I><P> |
| Purpose: | Return current PTT state. |
| Comments: | - |
| Returns: | PTT state in the form of a one character code:<br>1 PTT on<br>0 PTT off<br>E0 on error. |

| | |
|---|---|
| Example: | IP<br>If PTT is on, the returned value will be 1<CR>. |

## Return Pre-Amplifier State

| | |
|---|---|
| Syntax: | <I><P><A> |
| Purpose: | Return the current pre-amplifier state. |
| Comments: | - |
| Returns: | Pre-amplifier state in the form of a one character code:<br>1 Pre-amplifier on<br>0 Pre-amplifier off<br>E0 on error. |
| Example: | IPA<br>If Pre-amplifier is on, the returned value will be 1<CR>. |

## Return Receive Frequency

| | |
|---|---|
| Syntax: | <I><R> |
| Purpose: | Returns current receive frequency in use. |
| Comments: | - |
| Returns: | Current receive frequency (eight digit integer).<br>E0 on error |
| Example: | IR<br>If the current receive frequency is 6850 kHz, the returned value will be 06850000<CR>. |

## Return Transceiver Model Number

| | |
|---|---|
| Syntax: | <I><R><T> |
| Purpose: | Return Transceiver model type. |
| Comments: | - |
| Returns: | Transceiver model number.<br>E0 on error. |

| | |
|---|---|
| Example: | IRT<br>If the Transceiver is a 4050, it will return 4050<CR>. |

## Return Transceiver Scan State

| | |
|---|---|
| Syntax: | <I><S> |
| Purpose: | Return whether or not the Transceiver is scanning. |
| Comments: | - |
| Returns: | Transceiver scan state in the following format:<br>N Not scanning<br>Y Scanning<br>E0 on error |
| Example: | IS<br>If the Transceiver is scanning, it will return Y<CR> |

## Return Transceiver System Options

| | |
|---|---|
| Syntax: | <I><S><O> |
| Purpose: | Returns the factory configured options as a string of comma separated option numbers. |
| Comments: | - |

| | |
|---|---|
| Returns: | String of comma separate option numbers from 1 to 12 or the string No Options Enabled<br>Available options are:<br>1 ALE 2G<br>2 ALE 3G<br>3 Secure Call<br>4 Frequency Hopping<br>5 Digital Voice<br>6 Secure Digital Voice (DES56)<br>7 Secure Digital Voice (DES256)<br>8 Remote Access<br>9 ARINC<br>10 GPS Push<br>11 Free Scroll Tx<br>12 Tx Inhibit<br>E0 on error |
| Example: | ISO<br>1,2,4,6<CR><br>Transceiver has options 1, 2, 4 and 6 installed.<br>ISO<br><CR><br>No Options Enabled<br>The Transceiver has not been programmed with any options. |

## Return Transceiver System Time and Date

| | |
|---|---|
| Syntax: | <I><S><T> |
| Purpose: | Return the current UTC time and date of the system |
| Comments: | - |

| | |
|---|---|
| Returns: | Returns the current UTC time and date in the format:<br>HHMMSSDDMMYY<br>Where:<br>HH Two digit hours in range 00 to 23<br>MM Two digit minutes in range 00 to 59<br>SS Two digit seconds in range 00 to 59<br>DD Two digit day of month in range 00 to 31<br>MM Two digit month of the year in range 01 to 12<br>YY Two digit year of the 21st century in the range 00 to 99 |
| Example: | IST<br>124529020618<br>This represents the time 12:45:29PM on the 2nd of June 2018. |

## Return Transmit Frequency

| | |
|---|---|
| Syntax: | <I><T> |
| Purpose: | Returns current transmit frequency. |
| Comments: | - |
| Returns: | Current transmit frequency (eight digits).<br>E0 on error. |
| Example: | IT<br>If the current channel is 6850 kHz the returned value will be 06850000<CR> |

## Return PA Temperature

| | |
|---|---|
| Syntax: | <I><U> |
| Purpose: | Returns current PA temperature as degrees Celsius. |
| Comments: | - |
| Returns: | Current PA temperature.<br>E0 on error. |
| Example: | IU<br>The Transceiver will return 28<CR> |

## Return Software Version Number

| | |
|---|---|
| Syntax: | <I><V> |
| Purpose: | Returns software version number.<br>The command <I><V><S> performs the same function. |
| Comments: | - |
| Returns: | Software version number if successful.<br>E0 on error. |
| Example: | IV<br>If the software version is 1.7 the returned value will be:<br>1.7.0.22277<CR> |

## Return Transceiver Core Firmware Version

| | |
|---|---|
| Syntax: | <I><V><C> |
| Purpose: | Returns Transceiver core firmware version. |
| Comments: | - |
| Returns: | Core firmware version number if successful.<br>E0 on error. |
| Example: | IVC<br>If the software version is 1.11 the returned value will be:<br>1.11<CR> |

## Return Transceiver DSP Firmware Version

| | |
|---|---|
| Syntax: | <I><V><D> |
| Purpose: | Returns Transceiver DSP firmware version. This command is for backwards compatibility as the transceiver does not have a DSP firmware version. |
| Comments: | - |
| Returns: | DSP firmware version number if successful.<br>E0 on error. |
| Example: | IVD<br>Returned value will be:<br>0.0.0<CR> |

## Return Transceiver Head Firmware Version

| | |
|---|---|
| Syntax: | <I><V><H> |
| Purpose: | Returns the version of firmware in the Transceiver's head. |
| Comments: | - |
| Returns: | Transceiver head firmware version.<br>valid output only primary:<br>CH:1:wwwwww-x.y.z<br>CH:1:yyyymmdd_hhmmss<br>valid output only secondary:<br>CH:2:wwwwww-x.y.z<br>CH:2:yyyymmdd_hhmmss<br>valid outputs two heads (please note: lines can be interleaved):<br>CH:1:wwwwww-x.y.z<br>CH:1:yyyymmdd_hhmmss<br>CH:2:wwwwww-x.y.z<br>CH:2:yyyymmdd_hhmmss<br>E0 on error. |
| Example: | IVH<br>If two heads are used, with 1.7.0 installed:<br>CH:1:chbob-fw-dev-1.7.0<br>CH:1:20200312_131415<br>CH:2:chbob-fw-dev-1.7.0<br>CH:2:20200312_131415 |

## Return Transceiver Source Firmware Version

| | |
|---|---|
| Syntax: | <I><V><S> |
| Purpose: | Returns Transceiver Source firmware version. |
| Comments: | - |
| Returns: | Source firmware version number if successful.<br>E0 on error. |

| | |
|---|---|
| Example: | IVS<br>If the software version is 1.7 the returned value will be: 1.7.0.22277<CR> |

## Return Audio Mute Level

| | |
|---|---|
| Syntax: | <I><V><M> |
| Purpose: | Returns current audio mute level. |
| Comments: | - |
| Returns: | One character coded audio mute level:<br>L Audio mute level low<br>M Audio mute level medium<br>H Audio mute level high<br>E0 on error. |
| Example: | IVM<br>If the Audio Mute level is medium, the returned value will be: M<CR>. |

## Return Input Power Supply Voltage

| | |
|---|---|
| Syntax: | <I><Y> |
| Purpose: | Returns Rx and Tx input supply voltage. |
| Comments: | Tx voltage is calculated from the last PTT. |
| Returns: | Voltage in 8 digits, 4 digits for Rx and 4 digits for Tx.<br>The digits are returned with the least significant digits first and the most significant digits second.<br>E0 on error. |
| Example: | IY<br>If the input voltage level is 13.6 volts in Rx and the input voltage level is 13.4 in Tx, the string returned will be 36013401<CR>. |

## Return 4 Digit International Selcall ID

| | |
|---|---|
| Syntax: | <I><Z> |
| Purpose: | Returns Transceiver's Selcall ID. |
| Comments: | - |
| Returns: | Selcall ID (four digits).<br>E0 on error. |
| Example: | IZ<br>If the Selcall ID is 5678, the returned value will be 5678<CR>. |

## Return 4 Digit OEM Selcall ID

| | |
|---|---|
| Syntax: | <I><Z><2> |
| Purpose: | Return Transceiver's OEM Selcall ID. |
| Comments: | - |
| Returns: | Selcall ID (four digits).<br>E0 on error. |
| Example: | IZ2<br>If the OEM Selcall ID is 9876, the returned value will be 9876<CR>. |

## Return 6 Digit Selcall ID

| | |
|---|---|
| Syntax: | <I><Z><6> |
| Purpose: | Return Transceiver's six digit Selcall ID. |
| Comments: | - |
| Returns: | Selcall ID (six digits).<br>E0 on error. |
| Example: | IZ6<br>If the Selcall ID is 125678, the returned value will be 125678<CR>. |

## Return 6 Digit OEM Selcall ID

| | |
|---|---|
| Syntax: | <I><Z><6><2> |
| Purpose: | Return Transceiver's six digit OEM Selcall ID. |
| Comments: | - |
| Returns: | Selcall ID (six digits).<br>E0 on error. |
| Example: | IZ62<br>If the Selcall ID is 125678, the returned value will be 125678<CR>. |

## Return Selcall Preamble Length

| | |
|---|---|
| Syntax: | <I><Z><P> |
| Purpose: | Returns the current Selcall preamble length. |
| Comments: | - |
| Returns: | Pre-amble length in one hundredth of a second increments.<br>E0 on error. |
| Example: | IZP<br>If the current pre-amble length is five seconds, the Transceiver returns the Selcall preamble length as 0500<CR>. |

# Execute Commands

## Set Audio and Selcall Status Notification Flag

| | |
|---|---|
| Syntax: | <X><A><S> |
| Purpose: | Sets the system flag to enable audio mute change and Selcall tone detection asynchronous indications.<br>See the section on Asynchronous Indications on page 20 for a detailed description of asynchronous indications emitted by the Transceiver. |
| Comments: | The flag is cleared on system reset.<br>Once set the flag cannot be cleared.<br>The flag can be set repeatedly with no unexpected side effects. |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | XAS<br>OK<CR>. |

## Set ALE Xoff / Xon Framing Flag

| | |
|---|---|
| Syntax: | <X><A><X> |
| Purpose: | When set and the ALE option is installed and enabled, this command causes ALE asynchronous indications to not be framed with <XOFF> and <XON> frame markers. This allows an external system to handle indications that arrive between a synchronous command and its synchronous response, (see the section ALE Specific Indications on page 23 for more information).<br>On system start up or reset, this flag is cleared and ALE asynchronous indications are framed with <XOFF> and <XON> characters. |
| Comments: | The flag is cleared on system reset.<br>Once set the flag cannot be cleared.<br>The flag can be set repeatedly with no unexpected side effects. |
| Returns: | OK if successful.<br>E0 on error. |

| | |
|---|---|
| Example: | XAX OK<CR> |

## Select Mode

| | |
|---|---|
| Syntax: | <X><B><mode selection> |
| Purpose: | Select new operating mode. |
| Comments: | <mode selection> - mode to change to :<br>L J3E LSB<br>U J3E USB<br>A H3E AM<br>F CF Custom filter bandwidth<br>C J2A CW |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | XBU<br>Selects J3E - USB mode. |

## Select Channel

| | |
|---|---|
| Syntax: | <X><C><channel number> |
| Purpose: | Change current channel. |
| Comments: | <channel number> - new channel number.<br>This number is an integer value between 1 and 9999 inclusive with a maximum length of four digits, with or without leading zeros. |
| Returns: | OK if successful.<br>E0 or E2 or E5 on error. |
| Example: | XC32<br>This will change the current channel to channel 32. |

## Select Channel (Fast Change)

| | |
|---|---|
| Syntax: | <X><C><F><channel number> |

| | |
|---|---|
| Purpose: | Change the current channel and sets the filters to the highest frequency band and does not write the channel to E2ROM.<br>The purpose of this command is to allow external control systems to implement channel scanning without the possibility of exceeding the E2ROMs write limits.<br>The use of a fixed filter setting mimics the Transceiver's own scanning method. |
| Comments: | <channel number> - new channel number.<br>This number is an integer value between 1 and 9999 inclusive with a maximum length of four digits, with or without leading zeros. |
| Returns: | OK if successful.<br>E0 or E2 or E5 on error. |
| Example: | XCF30<br>This will change the current channel to channel 30.<br>XCF010<br>This will change the channel to channel 10. |

## Select Channel (Temporary Change)

| | |
|---|---|
| Syntax: | <X><C><T><channel number> |
| Purpose: | Change current channel, setting the filters but without writing the new channel to the E2ROM.<br>This means that if the Transceiver is powered off and on, it may restore to a different channel than when powered off. |
| Comments: | <channel number> - new channel number.<br>This number is an integer value between 1 and 9999 inclusive with a maximum length of four digits, with or without leading zeros. |
| Returns: | OK if successful.<br>E0 or E2 or E5 on error. |
| Example: | XCT30<br>This will change the current channel to channel 30.<br>XCT010<br>This will change the channel to channel 10. |

## Erase Channel Memory

| | |
|---|---|
| Syntax: | <X><E><C> |
| Purpose: | Erase all programmed non-ALE channels. |
| Comments: | - |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | XEC<br>This will clear all non-ALE programmed channels. |

## Check Fan

| | |
|---|---|
| Syntax: | <X><F><fan state> |
| Purpose: | Turns the fan on or off. |
| Comments: | <fan state> - Fan state selection as follows:<br><1> Turns fan on<br><0> Turns fan off |
| Returns: | OK if successful<br>E0 on error |
| Example: | XF1<br>Turns fan on |

## Select Mute State

| | |
|---|---|
| Syntax: | <X><M><mute selection> |
| Purpose: | Selects new mute state. |
| Comments: | <mute selection> - mute state required as follows :<br><A> Audio mute selected<br><L> Signal strength level mute selected<br><S> Selcall mute selected<br><N> No mute selected |
| Returns: | OK if successful.<br>E0 on error. |

| | |
|---|---|
| Example: | XMA<br>Selects audio mute on. |

## Scan Start / Stop

| | |
|---|---|
| Syntax: | <X><N><start/stop> |
| Purpose: | Turns scanning on and off. |
| Comments: | <start / stop> - mute state required as follows:<br>0 Stop scanning<br>1 Start scanning |
| Returns: | OK if successful.<br>E0 or EU on error. |
| Example: | XN1<br>This will turn scanning on. |

## Enable / Disable Asynchronous Indications

| | |
|---|---|
| Syntax: | <X><O><on/off> |
| Purpose: | Asynchronous Indications on/off.<br>In the off state only the XOY command will be processed. |
| Comments: | <on/off> - mute state required as follows:<br>Y asynchronous indications on<br>N asynchronous indications off |
| Returns: | OK |
| Example: | XOY<br>This will turn RS232 asynchronous indications on. |

For more information, see Asynchronous Indications, page 19.

If asynchronous indications are on, no notification will appear for any received Selcall.

## Select Tx / Rx

| | |
|---|---|
| Syntax: | <X><P><PTT state> |

| | |
|---|---|
| Purpose: | Sets Transceiver to transmit or receive mode (toggles). |
| Comments: | PTT state:<br>1 PTT on<br>0 PTT off |
| Returns: | OK if successful.<br>E0 or E6 on error. |
| Example: | XP1<br>Sets Transceiver to transmit. |

## Reset the Transceiver

| | |
|---|---|
| Syntax: | <X><R> |
| Purpose: | Resets the Transceiver. |
| Comments: | - |
| Returns: | - |
| Example: | XR<br>Resets Transceiver. |

## Select Scan Table to Scan

| | |
|---|---|
| Syntax: | <X><S><T><scan table> |
| Purpose: | Selects which scan table is to be scanned when the Transceiver goes into scan mode. |
| Comments: | Scan table - Number of required scan table (1 to 8 inclusive). |
| Returns: | OK if successful.<br>E0 or EL on error. |
| Example: | XST1<br>Sets Transceiver scan table to scan table 1. |

## Execute a Tune Command

| | |
|---|---|
| Syntax: | <X><T> |
| Purpose: | Executes a tune and returns success or failure with the VSWR |

| | |
|---|---|
| Comments: | - |
| Returns: | T<R><vswr><br><R> P = Tune pass, F = Tune fail<br><vswr> If tune = Pass, the two digit VSWR ratio consisting of units and tenths with an implied decimal point returns. For example, 21 means VSWR of 2.1 : 1.0.<br>EU Transmitter busy<br>EB PTT already active<br>EN Unknown antenna type |
| Example: | XT<br>TF < response ><br>Tune failed.<br>XT<br>TP21 < response ><br>Tune passed with VSWR of 2.1 : 1.0. |

## Set Tune Result

| | |
|---|---|
| Syntax: | <X><T><result> |
| Purpose: | Forces the Transceiver's tune result to pass or fail. |
| Comments: | PTT state <result> -<br>P set tune result pass<br>F set tune result fail |
| Returns: | OK |
| Example: | XTP<br>Sets tune result to pass. |

## Set Transceiver Current Time and Date

| | |
|---|---|
| Syntax: | <X><D><time date> |
| Purpose: | Sets the Transceiver's current time and date. |

| | |
|---|---|
| Comments: | <time date> is of the form:<br>HHMMDDMMYY<CR><br>Where:<br>HH Two digit hours in range 00 to 23<br>MM Two digit minutes in range 00 to 59<br>DD Two digit day of month in range 00 to 31<br>MM Two digit month of the year in range 01 to 12<br>YY Two digit year of the 21st century in the range 00 to 99 |
| Returns: | OK if successful.<br>E0 on error. This command validates the fields to be within the required ranges and also checks that the day of the month is valid. |
| Example: | XD1245020618<br>OK<CR><br>The sysem time is set to 12:45 PM on 2nd of June 2018.<br>XD8720020618<br>E0<CR><br>The command rejected the invalid hour value of 87.<br>XD1245300218<br>E0<CR><br>The command rejected the invalid day of the month (30), February has only 28 days or 29 in a leap year. |

## Transmit ARINC Call

| | |
|---|---|
| Syntax: | <X><Z><A><arinc ID> |
| Purpose: | Send an ARINC call, if the ARINC option is fitted to the Transceiver. |
| Comments: | <arinc ID> - 4 letter ARINC code. (Characters A to S inclusive.) |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | XZAFDEG<br>Sends 'ARINC' call with FDEG code. |

## Transmit Beacon Call

| | |
|---|---|
| Syntax: | <X><Z><B><destination> |
| Purpose: | Initiates Selcall beacon transmission. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 or EQ on error. |
| Example: | XZB1234<br>Transmits a Beacon call to station with ID 1234. |

## Transmit Data Call

| | |
|---|---|
| Syntax: | <X><Z><D><destination> |
| Purpose: | Initiates Selcall data call transmission. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 or EQ on error. |
| Example: | XZD1234<br>Transmits a data call to station with ID 1234. |

## Transmit GPS Position Data

| | |
|---|---|
| Syntax: | <X><Z><G><destination> |
| Purpose: | Transmits the Transceiver's GPS fix to a remote Transceiver. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0, EQ, E3 or EF on error. |
| Example: | XZG1234<br>Transmits the Transceiver's GPS data to the destination address. |

## Transmit GPS Position Request

| | |
|---|---|
| Syntax: | <X><Z><G><destination><R> |
| Purpose: | Get a GPS fix on a remote Transceiver. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | Remote Transceiver's GPS position bytes in the following format:<br>L00000.000(N/S)L11111.111(E/W)V<br>where :<br>L00000.000 Latitude position<br>N Latitude direction (N for north, S for south)<br>L11111.111 Longitude position<br>E Longitude direction (E for east, W for west)<br>V Validation byte (space for no errors, I for possible errors in the data, p - for parity errors in the data)<br>E0, EQ, E3 or EF on error. |
| Example: | XZG1234R<br>Transmits a GPS position request call station with ID 1234.<br>If the call is successful, the Transceiver will return the destination unit's position. |

## Transmit Hangup Call

| | |
|---|---|
| Syntax: | <X><Z><H><destination> |
| Purpose: | Initiates Selcall hangup call, used to hangup telephone interconnect calls. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 or EQ on error. |
| Example: | XZH1299<br>Transmits a hang up call to station with ID 1299. |

## Transmit Pagecall

| | |
|---|---|
| Syntax: | <X><Z><M><destination><M><message> |
| Purpose: | Send a pagecall to a remote Transceiver. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be either a four digit or six digit number between 0000 and 9999 or 000000 and 999999 inclusive.<br><message> - message sent to the called station. The message can be up to 32 characters long. |
| Returns: | OK if successful.<br>E0, EQ or E6 on error. |
| Example: | XZM654321MCALL BASE<br>Sends 'call base' message to station with ID 654321. |

## Transmit Selcall

| | |
|---|---|
| Syntax: | <X><Z><N><destination> |
| Purpose: | Initiates Selcall transmission. |
| Comments: | <destination> - Selcall ID of the station being called<br>This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 or EQ on error. |
| Example: | XZN1234<br>Transmits a Selcall to station with ID 1234. |

## Transmit Status Request

| | |
|---|---|
| Syntax: | <X><Z><S><destination> |
| Purpose: | Get the status of a remote Transceiver. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |

| | |
|---|---|
| Returns: | Remote unit's status bytes in the following format :<br>V111R2222T3333S44W66L7777<br>where :<br>V111 Remote units software version number<br>R2222 Receive battery level (eg 0132 is 13.2 volts)<br>T3333 Transmit battery level<br>S44 Signal strength level in S metre<br>W66 VSWR level<br>L7777 Last caller received Selcall ID number<br>E0, EQ or E3 on error. |
| Example: | XZS1234<br>will return: V170R0131T0131S02W10L1234<br>where: software version is 1.70, receive battery level is 13.1V, transmit battery level is 13.1V, S metre reading is 2, VSWR is 1:1 and last received selcall ID is 1234. |

## Transmit Telcall

| | |
|---|---|
| Syntax: | <X><Z><T><destination><P><phone number> |
| Purpose: | Initiates Telcall transmission. |
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive.<br><phone number> - Telephone number required. Up to 16 digits. |
| Returns: | OK if successful.<br>E0 or EQ on error. |
| Example: | XZT654321P94341700<br>Initiates a Telcall to station 654321 (telephone interconnect ID), to telephone number 94341700. |

## Transmit Secure Call

| | |
|---|---|
| Syntax: | <X><Z><V><destination> |
| Purpose: | Initiates Secure call transmission. |

| | |
|---|---|
| Comments: | <destination> - Selcall ID of the station being called. This ID must be a four or six digit number between 0000 and 9999 or 000000 and 999999 inclusive. |
| Returns: | OK if successful.<br>E0 or EQ on error. |
| Example: | XZV654321<br>Initiates a secure call to station 654321. |

## Cancel Call Transmission / Secure Call

| | |
|---|---|
| Syntax: | <X><Z><X> |
| Purpose: | Cancels Selcall type transmissions or secure call mode. |
| Comments: | N/A |
| Returns: | OK if successful.<br>E0 on error. |
| Example: | XZX<br>Cancels any call the Transceiver is making. |

# Command Summary General Commands

## Program Current Channel Characteristics

<P> [<C><CHAN>][<R><RX FREQUENCY>][<T><TX FREQUENCY>]
[<Z><SELCALL ENABLED/DISABLED>][<S><SCAN ENABLED/DISABLED>]
[<H><RF POWER LEVEL>][<B><MODE SELECT>][<L><LABEL NUMBER>]

[<A><ANTENNA SOCKETE>]

## Edit Commands

| Command | Syntax |
|---|---|
| Set SSL mute level Low, Medium High | <E><A><L/M/H> |
| Set Scan Dwell Time to <n> (1 to 10) | <E><A><D><n> |
| Set transmitter audio path: R = remote, L = local | <E><B><T><path> |
| Set Scan Dwell Time to <n> (1 to 10) | <E><D><n> |
| Set clarifier | <E><F><sign><value> |
| Set AGC Hang H = enable, N = disable | <E><G><AGC Hang> |
| Set Global RF power level, L = low 10W, M = medium 30W, H = high 125W, F = full 150W | <E><H><power> |
| Set noise reduction on line enable on or off | <E><K><Y/N> |
| Set label <num> to <label> | <E><L><num><T><label> |
| Set Line-In level | <E><L><I><n> |
| Set line to Follow Mute or Un-Muted | <E><L><M><F/U> |
| Set Line-Out level | <E><L><O><n> |
| Set noise reduction state | <E><M><state> |
| Set noise blanker on or off. | <E><N><Y/N> |
| Set hopping on or off | <E><O><Y/N> . |
| Set Pre-Amplifier on or off | <E><P><1/0> |
| Set scan rate <rate> = 0 to 6. | <E><R><S><rate> |
| Set scan resume time <time> = 0 to 8 | <E><R><resume time> |

| Command | Syntax |
|---|---|
| Add channel <Chan> to scan table <n> | <E><S><n><A><Chan> |
| Clear scan table <n> | <E><S><n><C> |
| Remove channel <Chan> from scan table <n> | <E><S><n><R><Chan> |
| Add new channel label | <E><U><label> |
| Set audio mute open level, L = low, M = medium, H = high | <E><V><L/M/H> |
| Set antenna type, <type> = 1 to 9 | <E><W><type> |
| Set digital voice, Off, Digital, Secure | <E><X><State> |
| Set International Selcall ID (4 or 6 digit) | <E><Z><Sellcall ID> |
| Clear Selcall flag | <E><Z><C> |
| Set Selcall preamble length <preamble> = 1 to 10 | <E><Z><P><preamble> |
| Set OEM Selcall ID (4 or 6 digit) | <E><Z><T><Selcall ID> |

## Interrogate Commands

| Command | Syntax |
|---|---|
| Return Scan Dwell Time | <I><A><D> |
| Return Current Signal Strength level | <I><A><L> |
| Return Signal Strength mute setting | <I><A><R> |
| Return mode | <I><B> |
| Return current channel number | <I><C> |
| Return specified channel data channel (returns channel number, Rx and Tx frequency) | <I><D><C><chan> |
| Return channel data for all channel (returns channel number, Rx and Tx frequency) | <I><D><F> |
| Return channel data for ALE channels (returns channel number, Rx and Tx frequency, channel mode and Selcall format) | <I><D><F><A> |
| Return channel data for all channels (channel number, Rx and Tx frequency and Selcall format) | <I><D><F><S> |

| Command | Syntax |
|---|---|
| Return all channel labels | <I><D><L> |
| Return Transceiver series number | <I><D><R> |
| Return Transceiver serial number | <I><D><S> |
| Return scan table entries for <table> = 0 to 7 | <I><D><S><table> |
| Return number of programmed channels | <I><E> |
| Return clarifier level | <I><F> |
| Return GPS coordinates | <I><G> |
| Return AGC setting N = enabled, H = disabled | <I><G><A> |
| Return Transceiver's global transmit power setting | <I><H> |
| Return current channel's transmit power setting | <I><H><C> |
| Return label number for current channel | <I><L> |
| Return line mute state <F> for 'follow', <U> for 'umuted' | <I><L><M> |
| Return mute state N = none, S = Selcall, L = signal strength, A = audio mute. | <I><M> |
| Return noise blanker state (Y or N) | <I><N><B> |
| Return noise reduction 'level', <N> off, <L> low, <M> medium and <H> high | <I><N><L> |
| Return noise reduction state, <N> off, <L> low, <M> medium and <H> high | <I><N><R> |
| Return current signal strength | <I><O><L> |
| Return VSWR | <I><O><V> |
| Return PTT state (0 or 1) | <I><P> |
| Return pre-amp state <0> for off, <1> for on | <I><P><A> |
| Return current channel's receive frequency (if not in Secure Mode) | <I><R> |
| Return Transceiver model number | <I><R><T> |
| Return scanning state of Transceiver (Y or N) | <I><S> |
| Return the Transceiver factory options fitted | <I><S><O> |
| Return the current time and date | <I><S><T> |

| Command | Syntax |
|---|---|
| Return current channel's transmit frequency (if not in Secure Mode) | <I><T> |
| Return Transceiver temperature | <I><U> |
| Return software version number | <I><V> |
| Return Core software version | <I><V><C> |
| Return DSP software version | <I><V><D> |
| Return Transceiver series, the copyright notice and the software release date | <I><V><F> |
| Return Transceiver head software vers. | <I><V><H> |
| Return Audio Mute level - L = low, M = medium, H = high. | <I><V><M> |
| Return Firmware software version (same as <I><V> ) | <I><V><S> |
| Return RX/TX power supply voltage level | <I><Y> |
| Return 4 digit Selcall ID | <I><Z> |
| Return 4 digit OEM Selcall ID | <I><Z><2> |
| Return 6 digit Selcall ID | <I><Z><6> |
| Return 6 digit OEM Selcall ID | <I><Z><6><2> |
| Return Selcall preamble length | <I><Z><P> |

## Execute Commands

| Command | Syntax |
|---|---|
| Set Audio Mute / Selcall status notification flag | <X><A><S> |
| Set ALE Xoff/Xon framing flag | <X><A><X> |
| Select mode for current channel | <X><B><mode> |
| Select channel | <X><C><chan> |
| Select channel (fast change) | <X><C><F><chan> |
| Select channel | <X><C><T><chan> |
| Erase all programmed channels | <X><E><C> |
| Check fan. | <X><F> |

| Command | Syntax |
|---|---|
| Select mute state N = none, A = Audio mute, B = SSL mute, S = Call mute | <X><M><mute> |
| Scan start or stop - 0 = stop, 1 = start | <X><N><start/stop> |
| Enable/Disable Asynchronous indications Y = enable, N = disable | <X><O><on/off> |
| Select Tx/Rx 1 = PTT on, 0 = PTT off | <X><P><PTT state> |
| Restart the Transceiver | <X><R> |
| Select Scan Table, <table> = 1 to 8 | <X><S><T><table> |
| Execute a tune command | <X><T> |
| Set Tune result P = pass, F = fail | <X><T><P/F> |
| Set time and date | <X><T><D><time date> |
| Transmit ARINC call | <X><Z><A><arinc ID> |
| Transmit Beacon Call | <X><Z><B><addr> |
| Transmit GPS position data | <X><Z><G><addr> |
| Transmit GPS position request | <X><Z><G><addr><R> |
| Transmit Hangup Call | <X><Z><H><addr> |
| Transmit pagecall | <X><Z><M><addr><M><msg> |
| Transmit Selcall | <X><Z><N><addr> |
| Transmit status request | <X><Z><S><addr> |
| Transmit Telcall | <X><Z><T><addr><P><num> |
| Transmit Secure Call | <X><Z><V><addr> |
| Cancel Selcall transmission/secure call | <X><Z><X> |

## Error Messages General Commands

| Error Code | 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. |

| Error Code | Error Message |
|---|---|
| E2 | No Selcall history available. |
| E3 | No response to Selcall request. (ie 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 set a frequency outside the frequency range allowed. |
| E8 | Invalid label number. Label number selected was greater than the number of programmed labels. |
| 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 0.0 kHz). |
| EC | For backwards compatibility. |
| ED | Pre-programmed channels protected. Attempting to over- write a protected preprogrammed 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 950 Transceiver without a GPS unit fitted. (backwards compatibility) |
| 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 got a bad checksum. |
| EI | No labels. There are no labels programmed. |
| EL | No scan channels available. There are no channels with scan enabled on them. |
| EM | ALE not enabled. |
| EN | No Auto tune antenna fitted. |

| Error Code | Error Message |
|---|---|
| EO | Option error. Option not available in the Transceiver. |
| EQ | Not a Selcall channel. |
| ET | Data transfer error. Checksum error in data. |
| EU | Busy error. Unable to process current command as Transceiver is busy. |
| EV | 2020 Software error. |
| EW | Function not allowed on an ALE channel. |
| EX | Could not start hopping. |
| EY | Hopping Pin is write only. |
| EZ | Scan table is full. |

# ALE

## ALE Execute Commands

| Command | Action |
|---|---|
| AXABORT | Cancels the current sequence of calls (including retries). |
| AXALRM<0/1> | Enable or disable alarm. Controls whether or not the Transceiver issues an audible alarm for incoming calls:<br><0/1> 0 = disable, 1 = enable |
| AXCALL<DD><SS> | Make ALE call on current channel:<br><DD> 2 digit destination address<br><SS> 2 digit source address |
| AXENAB<1/0> | Enable or disable ALE:<br><1/0> 1 = enable, 0 = disable |
| AXLINK<DD><SS> | Make a link on current channel, remote station will not alarm:<br><DD> 2 digit destination address<br><SS> 2 digit source address |
| AXNETC<DD><SS> | Make Net Call on current channel:<br><DD> 2 digit network destination address<br><SS> 2 digit source address |
| AXNMSG<DD><SS><LL><text> | Send an AMD message:<br><DD> 2 digit network destination address<br><SS> 2 digit source address<br><LL> 2 digit message length<br><text> message (must consist of valid ALE characters as per standard) |
| AXPHNE<DD><SS><phone> | Make Phone Call:<br><DD> 2 digit destination address<br><SS> 2 digit source address<br><phone> the phone number<br>*(Note: there is no validation of the number and any valid ALE characters will be sent.)* |

| Command | Action |
|---|---|
| AXPMSG<DD><SS><MM> | Send a preset message:<br><DD> 2 digit network destination address<br><SS> 2 digit source address<br><MM> 2 digit preset message number (00 to 19) |
| AXRSPM<M> | Set response mode:<br><M> 0 = off, 1 = global, 2 = preset |
| AXSCNP<1/0> | Set scanning pause:<br><1/0> 1 = paused, 0 = unpaused |
| AXSNDM<M> | Set sounding mode:<br><M> 0 = off, 1 = global, 2 = preset |
| AXSNDP<1/0> | Set sounding pause:<br><1/0> 1 = paused, 0 = unpaused |
| AXTLNK<II> | Terminate link:<br><II> 2 digit link index (00 to 16), 99 terminate all links |

## ALE Interrogate Commands

| Command | Action |
|---|---|
| AIATBL | Return all valid ALE aliases in the following format:<br>AIATBL[II][T][LL][Alias]<br>where:<br>[II] (00-99) Alias index in ALE memory map<br>[T] Alias type (1: self, 2: other)<br>[LL] (00-15) Alias length<br>[Alias] Alias (up to 15 basic 38 ASCII subset characters)<br>*Note: The response data will include consecutive [II][T][LL] [Alias] data, one for each address. Aliases above 99 will not be returned.* |

| | |
|---|---|
| AIAFTBL | Return all valid ALE aliases in the following format:<br>AIATBL[III][T][LL][Alias]<br>where:<br>[III (000-250] Alias index in ALE memory map<br>[T] Alias Type (1: Self, 2: other)<br>[LL] (00-15) Alias Length [Alias] Alias (up to 30 basic 38 ASCII subset characters)<br>*Note: The response data will include consecutive [III][T][LL] [Alias] data, one for each address. Aliases above 99 will not be returned.* |
| AICTBL | Return all valid ALE channels in the format:<br>AICTBL[CCCC][RRRRRRRR][TTTTTTTT]<br>where:<br>[CCCC] (0000-9999) Channel number as displayed on the Transceiver<br>[RRRRRRRR] (00500000-30000000) Channel's receive frequency<br>[TTTTTTTT] (01600000-30000000) Channel's transmit frequency<br>*Note: The response data will include consecutive [CCCC] [RRRRRRRR][TTTTTTTT] data, once for each channel.* |
| AIIFTBL | Return all valid ALE addresses in the following format:<br>AIIFTBL[III][T][LL][Address]<br>where:<br>[III] (000-250) Address index in ALE memory map<br>[T] Address type (1: self, 2: other)<br>[LL] (00-15) Address length<br>[Address] Address (up to 15 basic 38 ASCII subset characters)<br>*Note: The response data will include consecutive [III][T][LL] [Address] data, one for each address.* |

| | |
|---|---|
| AIITBL | Return all valid ALE addresses in the following format:<br>AIITBL[II][T][LL][Address]<br>where:<br>[II] (00-99) Address index in ALE memory map<br>[T] Address type (1: self, 2: other)<br>[LL] (00-15) Address length<br>[Address] Address (up to 15 basic 38 ASCII subset characters)<br>*Note: The response data will include consecutive [II][T][LL] [Address] data, one for each address. Aliases above 99 will not be returned.* |
| AILTBL | Return a list of the stations currently linked in the following format:<br>AILTBL[II][LL][RR]<br>where:<br>[II] (00-15) Link index<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index<br>*Note: The response data will include [II][LL][RR] for each link.* |
| AINTBL | Return all ALE Network addresses in the format:<br>AINTBL[II][LL][Alias]<br>where:<br>[II] (00-99) Network address index in ALE memory map<br>[LL] (00-15) Address alias length<br>[Alias] Address alias (up to 15 basic 38 ASCII subset characters)<br>*Note: The response data will include consecutive [II][LL][Alias] data, one for each network address.* |

| | |
|---|---|
| AIPTBL | Return preset message table in the format:<br>AIPTBL[II][LL][Mess]<br>where:<br>[II] (00-18) Preset message number<br>[LL] (00-90) Message length<br>[Mess] Message received (up to 90 expanded 64 ASCII subset characters 'SP' 0x20 to '_' 0x5f inclusive)<br>*Note: The response will include [II][LL][Mess] once for each preset message in the table* |
| AIRSPM | Return ALE Response Mode in the following format:<br>AIRSPM[M]<br>where:<br>[M] (0-2) State of ALE Response Control<br>(0: off, 1: global, 2: preset) |
| AISCNP | Return ALE Scanning Paused or Unpaused in the following format:<br>AISCNP[B]<br>where:<br>[B] (1/0) State of scanning pause<br>Paused (1) or Unpaused (0) |
| AISNDM | Return ALE Sounding Mode in the following format:<br>ISNDM[M]<br>where:<br>[M] (0-2) State of ALE Sounding<br>(0: off, 1: global, 2: preset) |
| AISNDP | Return ALE Sounding Paused or Unpaused in the following format:<br>AISNDP[B]<br>where:<br>[B] (1/0) State of sounding pause<br>Paused (1) or Unpaused (0) |
| AISTAT | Returns AISTAT Indication in the format described under ALE Indications. |

| | |
|---|---|
| AISTBL[II] | Return all data relating to scan table [II] (list index) in the format:<br>AISTBL[II][LL][Alias][YY][CCCC]<br>where:<br>[LL] (00-15) Scan list alias length<br>[Alias] Scan list alias (up to 15 basic 38 ASCII subset characters)<br>[YY] (00-99) Number of channels in the scan table<br>[CCCC] (0000-9999) Channel number as displayed on the Transceiver for each YY channels<br>*Note: The response data will include consecutive [CCCC] data, once for each channel in the scan table.* |
| AILQA | Return all data relating to remote address index [RR] (00-99)<br>AILQA[RR]<br>(note: the indication data will include [CC][FB][FS][TB][TS] for each channel sounded):<br>[CC] the channel index<br>[FB] the from-BER, FF indicates not measured<br>[FS] the from-SNR, FF indicates not measured<br>[TB] the to-BER, FF indicates not measured<br>[TS] the to-SNR, FF indicates not measured |

## ALE Registration Commands

| Command | Action |
|---|---|
| ARAMDM<0/1> | Register for new AMD messages:<br><0/1> 0 = unregister, 1 = register |
| ARAMDP<0/1> | Register for new AMD Phone calls:<br><0/1> 0 = unregister, 1 = register |
| ARCALL<0/1> | Register for new calls:<br><0/1> 0 = unregister, 1 = register |
| ARLINK<0/1> | Register for new links:<br><0/1> 0 = unregister, 1 = register |
| ARLTBL<0/1> | Register for link table changes:<br><0/1> 0 = unregister, 1 = register |

| | |
|---|---|
| ARMESS<0/1> | Register for ALE events:<br><0/1> 0 = unregister, 1 = register |
| ARSTAT<0/1> | Register for status changes:<br><0/1> 0 = unregister, 1 = register |

## ALE Indications

These are the indications that the Transceiver will issue, either as the result of an Interrogation command or as asynchronous indications when set by a Registration command.

| Indication | Description |
|---|---|
| AIAMDM[LL][RR][XX][...] | Broadcast any incoming ALE message in the following format:<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index<br>[XX] (00-90) Length of message received<br>[...] Message received (up to 90 expanded 64 ASCII subset characters 'SP' 0x20 to '_' 0x5f inclusive) |
| AIAMDP[LL][RR][XX][...] | Broadcast any incoming ALE phone message in the following format:<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index<br>[XX] (00-77) Length of message received<br>[...] Phone number received (up to 77 expanded 64 ASCII subset characters 'SP' 0x20 to '_' 0x5f inclusive) |
| AILTBL[II][LL][RR] | Broadcast a list of the stations currently linked in the following format whenever a change in the list occurs<br>*(Note: The indication data will include [II][LL][RR] for each current link):*<br>[II] (00-15) Link index<br>[LL] (00-99) Local address index<br>[RR] (00-99) Remote address index |

| Indication | Description |
|---|---|
| AIMESS[M] | Broadcast any ALE events:<br>[M] Single digit code for the system event that has occurred |
| AISTAT[M][E][X][T][LL][CC] | Broadcast of ALE status change in the following format:<br>[M] The current ALE system mode:<br>1 Offline<br>2 Manual mode<br>3 Receive / scan mode<br>[E] The current process of the ALE:<br>0 or 5 Idle<br>1 Call transmit start<br>2 Incoming call<br>3 Sounding transmit<br>4 Sounding receive<br>[X] Currently transmitting:<br>0 No (receiving)<br>1 Yes (transmitting ALE tones)<br>[T] Currently tuning:<br>0 Not tuning<br>1 Tuning<br>[LL] (00-16) Number of current links<br>[CC] (00-99) Scan list index selected |
| AICALL[LL][RR] | Indicates an ALE 2G call in the following format:<br>LL] (00-99) Local address index<br>[RR] (00-99) Remote address index |
| AILINK[LL][RR] | Indicates an ALE 2G link establishment in the following format:<br>LL] (00-99) Local address index<br>[RR] (00-99) Remote address index |

# ALE Error Codes

Processing the ALE commands can return errors dependent on the state of the Transceiver and the ALE system. If the Transceiver does not have the ALE option enabled, the error E0 is returned. For operational errors, the general format is EVnn where nn is a two digit number:

| Error Code | Definition | Description |
|---|---|---|
| EV00 | Syntax error | For example, the command starts with A to indicate an ALE command, but it is not formatted correctly. |
| EV01 | Index range error | A parameter in the command is not within the valid range. |
| EV02 | No link | Occurs when the command to terminate a specific link (AXTLNK) was issued and that link is not active. |
| EV03 | Transmit inhibited | The current channel does not have a valid transmit frequency. It is a listen-only channel. |
| EV04 | Busy transmitting | Can't make a call, send a message or terminate a link because the system is busy transmitting. |
| EV05 | Busy scanning | Only returned for the AXENAB command.<br>Check for Transceiver scanning (with IS command) and stop the scan with XN0 before trying to change the ALE system state. |
| EV06 | VCO Lock Lost | May indicate a hardware fault internal to the Transceiver. |
| EV07 | Internal ALE error | Possible causes include:<br>• Link command issued when a data link is established or being established.<br>• Possibly invalid preset message index when setting up a link.<br>• Attempted to set the Response Mode and the ALE system returned an error.<br>• Attempted to set the Sounding Mode and the ALE system returned an error.<br>• Attempted to set Scan Pause and the ALE system returned an error.<br>• Attempted to set Sounding Pause and the ALE system returned an error. |

| Error Code | Definition | Description |
|---|---|---|
| EV08 | Unknown ALE error | Attempted to make a call, set up a link or terminate a link and the ALE system returned an unspecified error. |

# Warranty Statement

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

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

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

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

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

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

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

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

## Contact Details

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

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

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