70-1470

TITAN MOBILE PROGRAMMING SOFTWARE

USER'S MANUAL

70-998225
04.2K4

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INTRODUCTION

The 70-1470 PC Programming Software allows the user to program Midland Titan Mobile Radios. It runs under Windows 95 and newer operating systems (Version 1.03 and higher required for Windows NT/2000/XP). It cannot run under DOS or Windows 3.xx.

MINIMUM REQUIREMENTS

IBM-Compatible PC
Windows 95 or newer Windows operating system
1 MB Hard Drive Space

INSTALLATION

1. Insert the disk into your drive.
2. From the Start menu select Run and type D:\Titan Install.exe where D is the drive letter the disk is in.
3. Titan Install.exe will copy the files on the disk to C:\Program Files\Midland Programmers\Titan Mobile by default (you will have the opportunity to change the directory).

GETTING STARTED

> **NOTE:** The display should be set to at least 800x600 pixels for proper viewing. In general, it is a good idea to read a radio, or open a saved file, rather than create a new file from scratch. There are many settings on the *Edit*|*Channel data* and *Edit*|*System options* windows that affect proper radio operation.

1. From the *Start* menu select *Programs*|*Midland Programmers*|*Titan Mobile Programmer*. The program will start on the *Model select* window.
2. From the *Radio* menu select *Comm port set* and select the communications port 70-1309 programming cable is plugged into. A standard DB9 to DB25 serial adapter will be required to connect the 70-1309 programming cable to most computers.
3. To upload the contents of a radio into the program select *Read/Write* from the *Radio* menu.
4. Make sure the radio is not in scan then turn the radio off. Plug the programming cable into the microphone jack. Turn the radio back on.
5. Click the *Read from Radio* button. A *Please wait* dialog box will pop up and the radio display will read COPY (CPY). If an error occurs, check comm port selection, cable connections and repeat step 2.
6. After successful upload an *EEPROM copy complete* dialog box will pop-up. Click the *OK* button.
7. To edit the programming select *Model select* from the *Edit* menu. A *Copy OK?* dialog box will pop-up. Select *OK* to overwrite any configuration data that is already resident in the program (At this point only the default configuration data is resident. This process is necessary so the *Verify* function can work properly).
8. Select *Channel data* from the *Edit* menu to check and/or edit channel data. Select other screens (*System options*, *2-tone/ANI set*, etc.) to edit other parameters as required.
9. Select *Read/Write* from the Radio menu. Click the *Write to Radio* button to write the edited configuration data to the radio EEPROM. The radio will display PROG (PRG) while downloading. When the download is complete an *EEPROM program complete* dialog box will pop-up and the radio will display SCI. Click the *OK* button, turn the radio off and unplug the programming cable.

FILE MENU

Open

Select *Open* from the *File* menu to bring up an *Open* dialog box to retrieve a previously created data file. The file extension is .dmp.

Save

Select *Save* from the *File* menu to bring up a *Save As* dialog box to save the current configuration data to a file. The file extension is .dmp.

Print

Select *Print* then *Text format* from the *File* menu to bring up a print preview dialog box of the current configuration data. Click the *Print* button to bring up the *Print* dialog box, or click the *Close* button to cancel and return to the previous window. Select *Print* then *Hex format* to print a listing of the hexadecimal data that the program sends to the EEPROM.

Clear

Select *Clear* from the *File* menu to reset all current configuration data to default values.

! All current configuration data will be lost if it has not been previously saved.

Default directory

Select *Default directory* from the *File* menu to specify the default *Open* and *Save As* directories used by the program.

Version 1.03 and higher uses the last accessed directory rather than this setting.

Exit

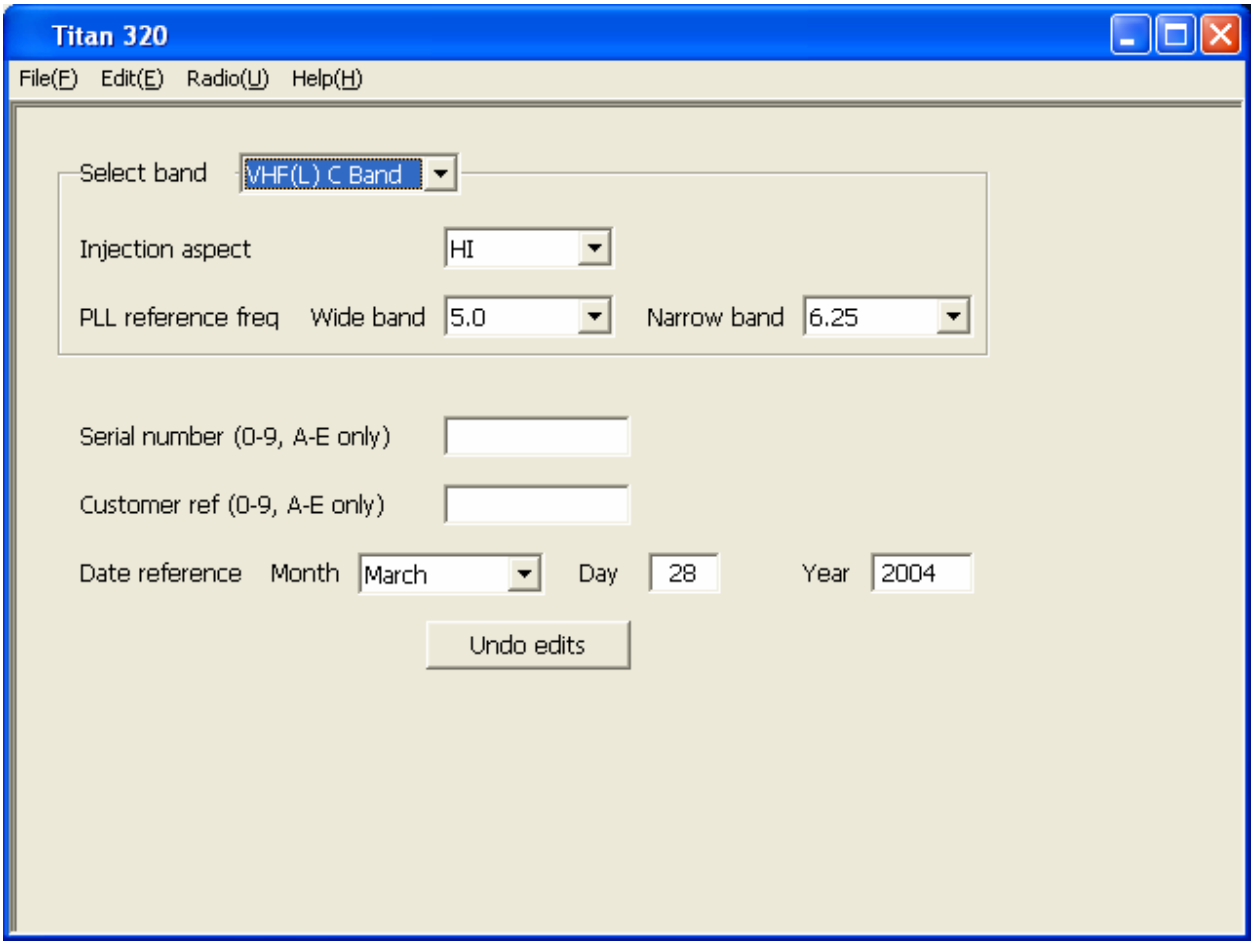
Select *Exit* from the *File* menu to close the program.

! All current configuration data will be lost if it has not been previously saved.

EDIT MENU

Model select/view

Select *Model select/view* from the *Edit* menu to open the *Model select/view* window. A model must be selected in the *Model* drop box before you will be able to select any of the remaining *Edit* menu items.



- **Select band**

Click on the *Select band* drop box and select the desired band. The following table summarizes common model numbers and their corresponding *Select band* drop box selection.

Radio Model Numbers	*Program Model Selection*
70-0511B, 70-0514B, 70-0611B, 70-0614B, 70-0571B, 70-0574B, 70-0671B, 70-0674B	VHF(L) B Band
70-0511C, 70-0514C, 70-0611C, 70-0614C, 70-0571C,70-0574C, 70-0671C, 70-0674C	VHF(L) C Band
70-1341B, 701344B, 70-1441B, 70-1444B, 70-1391B, 70-1394B, 70-1491B, 70-1494B	VHF(H) B Band
70-1541B, 70-1544B, 70-1641B, 70-1644, 70-1591B, 70-1594B, 70-1691B, 70-1694B	UHF B Band

- **Injection aspect**

The *Injection aspect* drop box will automatically be completed when the *Band* is selected.

! Do not change it unless an alternate injection kit has been installed in the radio.

- **PLL reference frequency**

Click on the *PLL Reference Freq* drop boxes to select the prescaler reference frequencies for wide band and narrow band. Available selections vary by the *Band* selected. All receive and transmit frequencies to be programmed into the radio must be evenly divisible by the selected reference frequencies.

- **Serial number**

(Optional) Enter a serial number to be associated with the radio in the *Serial Number* box. Enter up to 8 characters 0-9, A-E.

- **Customer reference**

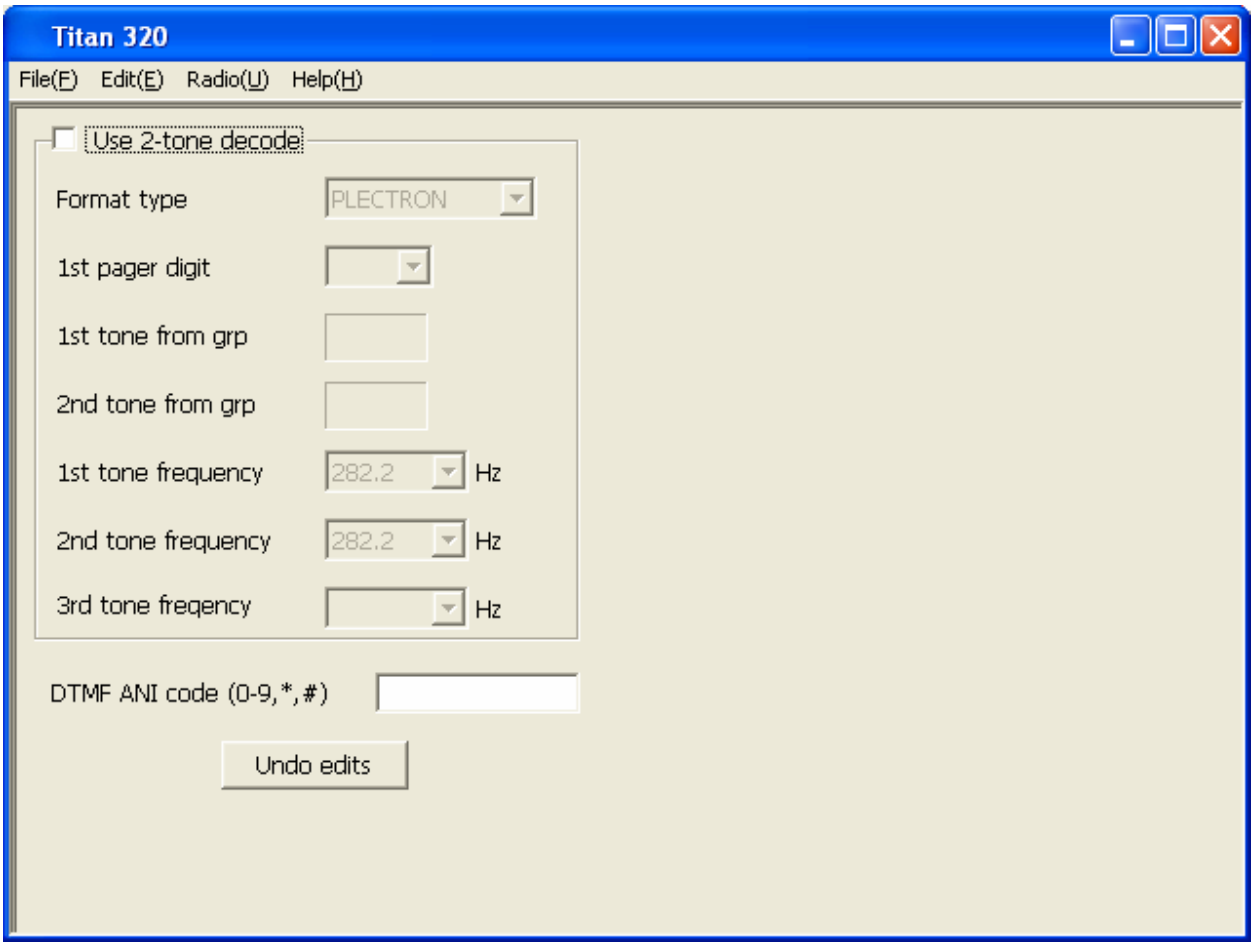
(Optional) Enter a customer name to be associated with the radio in the *Customer* box. Enter up to 10 characters 0-9, A-E.

- **Date reference**

The current system date will automatically be entered in the *Date* boxes, but can be edited if desired.

2-tone/ANI set-up

Select *2-tone/ANI set* from the *Edit* menu to set 2-tone signaling options and the DTMF ANI code.



- **Use 2-tone decode**

Check the *Use 2-tone decode* to enable 2-tone decode on the radio. In addition to setting the format and frequencies, 2-tone decode must be enabled for each channel using the drop box on the *Edit|Channel data* window. Refer to the operator's manual for instructions on how to mute to radio until it decodes the 2-tone signal.

- **Format Type**

Select the desired 2-tone format from the *Format type* drop box. Timing parameters, group parameters and possible frequency selections will vary depending on the format selected.

- **1st pager digit**

For "Motorola 1+1" or "Reach" *Format Types*, click on the *1st pager digit* drop box to select the groups (sometimes referred to as the Reed group) from which the 1st and 2nd tone frequencies can be selected. The actual groups for the selected *Group Format Code* will be displayed in the *1st tone group* and *2nd tone group* boxes.

- **1st, 2nd and 3rd tone frequency**

Click on the *1st tone frequency* and *2nd tone frequency* drop boxes to select the 1st and 2nd tone frequencies. 3rd tone frequency selection is available for ""Motorola 2+2" *Format type*.

- **DTMF ANI code**

Enter up to 10 DTMF digits in the *DTMF ANI code* box that will be sent upon PTT press when ANI is enabled. In addition to entering the DTMF code in the *DTMF ANI code* box, the DTMF timing should be set on the *Edit*|*System options* window and the *DTMF ANI on by default* box on the *Edit*|*Channel data* window may be enabled for any channel. Note that ANI can be enabled in two ways:

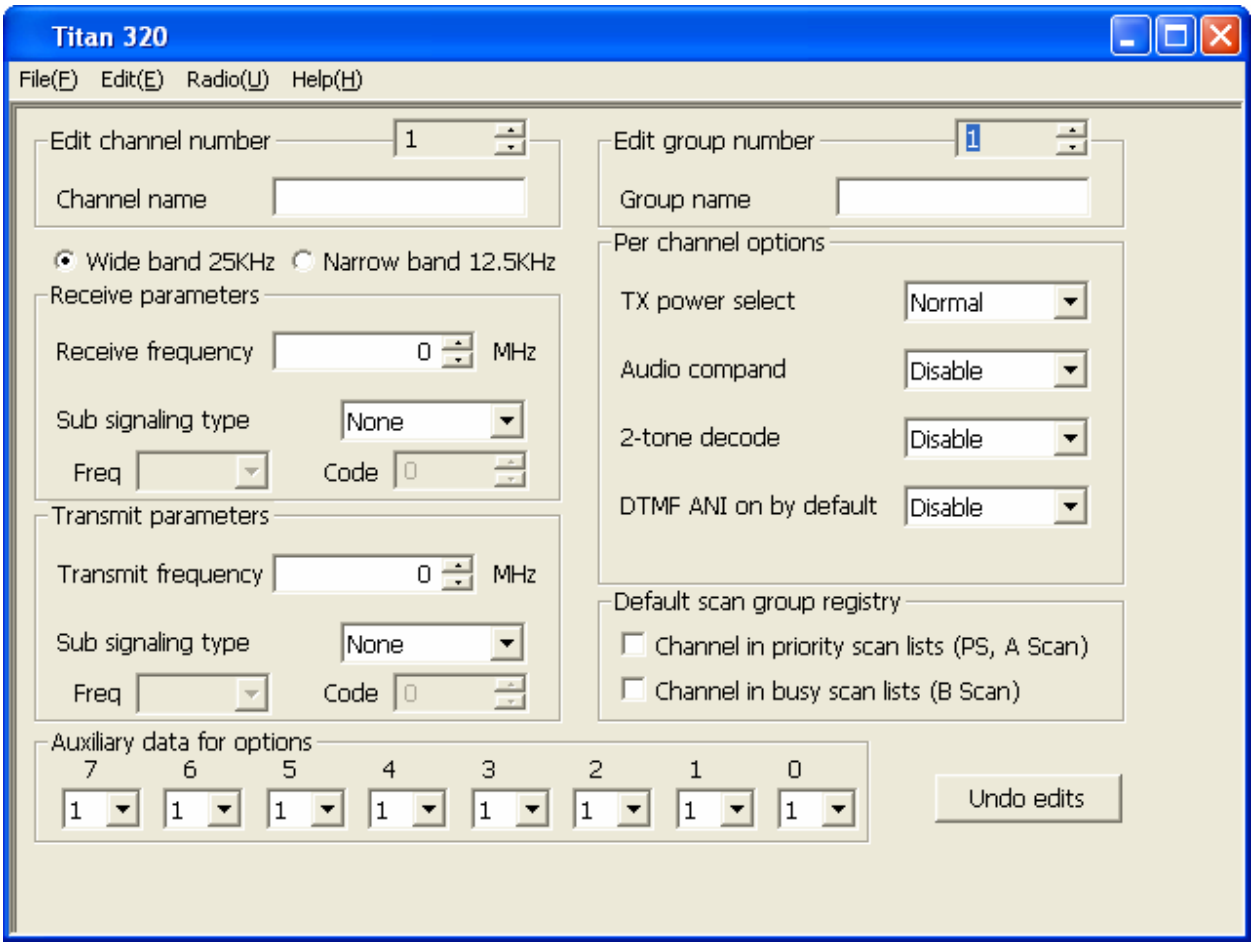
1. If a code has been entered in the *DTMF ANI code* box **and** the *DTMF ANI on by default* box on the *Edit*|*Channel data* window is *Disabled* for the channel, ANI may be enabled by the user through the menu functions on the channel knob. When the radio is turned off ANI will be disabled until the user turns it back on using the menu function.

2. If a code has been entered in the *DTMF ANI code* box **and** the *DTMF ANI on by default* box on the *Edit*|*Channel data* window is *Enabled* for the channel, ANI will always be enabled for the channel.

    - Each time PTT is released a 25 second timer will be started. ANI will not be sent on the next PTT press unless this timer has expired.

Channel data

Select *Channel data* from the *Edit* menu to set per channel programmable data.



- **Edit channel number**

Use the *Edit channel number* arrows to choose the channel to be edited.

- **Channel name**

Optional: Enter up to 12 (only the first three will be displayed on the standard control head) characters (0—9, A—Z.*,+,- and =) to be displayed on the control head instead of the channel number. The alpha name can also be used to create the appearance of out of sequence channel selection or the channel being in more than one channel group (the same name is given to an identical channel programmed in each group).

- **Edit group number**

Use the *Edit group number* arrows to quickly switch to the next available channel group. The group number will automatically update as the *Edit channel number* is incremented. The number of groups available equals the total number of channels (120 or 320) divided by the *Number of channel groups* drop box on the *Edit*|*System options* window. The channels are equally and incrementally divided among the

number of available groups. For example, if 4 groups are selected on a 120-channel radio, channels 1 through 30 are in channel group 1, 31 through 60 are in channel group 2, etc.

The channel groups can be used to bring the number of channels a user has available and/or is scanning at one time down to a more manageable size. The menu functions on the channel knob allow the user to select the current group and whether the radio scans just the current group or all groups.

- **Group name**

Optional: Enter up to 12 (only the first three will be displayed on the standard control head) characters (0—9, A—Z.*,+,- and =) to be displayed on the control head instead of the group number when the user performs group selection.

- **Wide band/Narrow band**

Click the *Wide band* or *Narrow band* bullet to select the occupied bandwidth desired for the current channel.

- **Receive frequency**

Click on the *Receive frequency* arrows, or directly enter the desired receive frequency (in MHz) in the *Receive frequency* box.

- **Sub signaling type (receive)**

Click on the *Sub signaling type* drop box and select *CTCSS* to set a receive CTCSS decode frequency. Then use the left drop box to select the desired CTCSS frequency (67.0 – 254.1 Hz).

Click on the *Sub signaling* drop box and select *DCS* to set a receive DCS decode code. Then use the arrows on the right box to select the desired DCS code (0-777).

Click on the *Sub signaling* drop box and select *None* to clear any previously selected signaling type.

- **Transmit frequency**

Click on the *Transmit frequency* arrows, or directly enter the desired transmit frequency (in MHz) in the *Transmit frequency* box.

- **Sub signaling type (transmit)**

Click on the *Sub signaling type* drop box and select *CTCSS* to set a transmit CTCSS encode frequency. Then use the left drop box to select the desired CTCSS frequency (67.0 – 254.1 Hz).

Click on the *Sub signaling type* drop box and select *DCS* to set a transmit DCS encode code. Then use the arrows on the right box to select the desired DCS code (0-777).

Click on the *Sub signaling type* drop box and select *None* to clear any previously selected signaling type.

- **TX power select**

Click on the *TX power select* drop box then select *Lowpower* or *Normal* to set the transmit power level used on the channel. The actual power level corresponding to each selection may be adjusted on the *Edit|Alignment* window.

- **Audio compand**

Click on the *Audio compand* drop box to *Enable* or *Disable* the compander circuit.

- **2-tone decode**

Click on the *2-tone decode* drop box to *Enable* or *Disable* 2-tone decode on the current channel.

- **DTMF ANI on by default**

Click on the *DTMF ANI on by default* drop box and select *Enable* or *Disable* for ANI operation.

3. If a code has been entered in the *DTMF ANI code* box on the *Edit|2-tone/ANI set* menu **and** the *DTMF ANI on by default* box is *Disabled* for the channel, ANI may be enabled by the user through the menu functions on the channel knob. When the radio is turned off ANI will be disabled until the user turns it back on using the menu function.

4. If a code has been entered in the *DTMF ANI code* box on the *Edit|2-tone/ANI set* menu **and** the *DTMF ANI on by default* box is *Enabled* for the channel, ANI will always be enabled for the channel.

    - Each time PTT is released a 25 second timer will be started. ANI will not be sent on the next PTT press unless this timer has expired.

- **Default scan group registry**

Check the *Channel in priority scan lists* box to initially register the channel in the scan list when using Type A and Type P/S scan types. The scan type depends on the *Scan selection* selected on the *Edit*|*System Options* window **and** the scan type selected on the channel knob menu selections by the user. The user may also set the radio to scan only channels in the selected channel group (See *Number of channel groups* on the *Edit*|*System Options* window) or all programmed channels registered in the priority scan list.

- Channels may also be added or deleted from the scan list by the user. The conditions under which the user additions and deletions reset to the *Default scan group registry* are programmable under the *Scan list reset at* on the *Edit*|*System options* window.

Check the *Channel in busy scan lists* box to initially register the channel in the scan list when using Type B or Type B' scan types. The scan type depends on the *Scan selection* selected on the *EditSystem options* window **and** the scan type selected on the channel knob menu selections by the user. The user may also set the radio to scan only channels in the selected channel group (See *Number of channel groups* on the *Edit*|*System Options* window) or all programmed channels registered in the busy scan list.

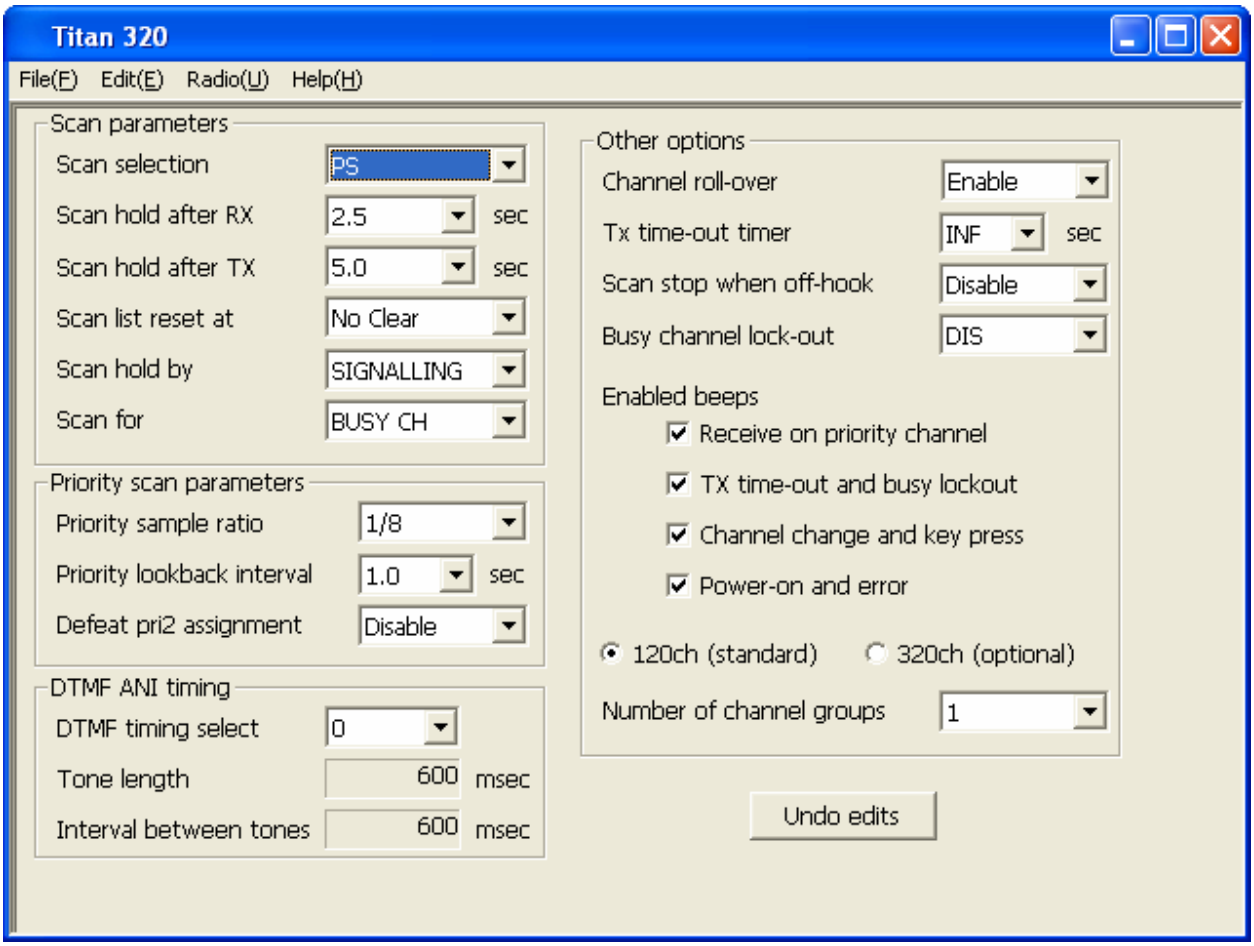
- Channels may also be added or deleted from the scan list by the user. The conditions under which the user additions and deletions reset to the *Default scan group registry* are programmable under the *Scan list reset at* on the *Edit*|*System options* window.

- **Auxiliary Data**

Click on an *Auxiliary data* drop box to select either 0 or 1 for each of the 8 bits of auxiliary data (used only for optional functions). This auxiliary data is sent in serial form for each channel when the channel is selected. When AUX STB pin (J903 pin 1) is pulsed, the previous 8 bits on the DATA pin (J401 pin 3, using DCLK to clock the data) correspond to the *Auxiliary Data* settings.

System options

Select *System options* from the *Edit* menu to set scan options and other conditions.



- **Scan Parameters**

Scan selection Click on the drop box to select the desired scan type (Normal, Modify, Second, or PS). This selection along with the channel knob menu selection made by the user determines the type of scan in use. If *Normal* scan is selected the user may select A Scan or B Scan. If *Modify* is selected the user may select A Scan, B' Scan or GRP A Scan. If *Second* is selected the user may select S CH Scan, B' Scan or A Scan. If *PS* is selected only PS scan will be available to the user. See the table below to determine the scan type and Appendix A for a description of each scan type.

Programmed scan selection	*Normal*	*Modify*	*Second*	*PS*
User Selected PRI	A Scan	A Scan	S CH Scan	PS Scan
User Selected SCN	B Scan	B' Scan	B' Scan	N/A
User Selected P/S	N/A	GRP A Scan	A Scan	N/A

Scan hold after RX — Click on the drop box to select the length of time, in seconds, that scan waits after a signal has been received before resuming. The time interval begins upon loss of the signal that stopped scan. Choose *0.5, 2.5, 5.0,* or *Infinite* (if *Infinite* is selected, can will not resume until the operator rotates the Channel Knob).

Scan hold after TX — Click on the drop box to select the length of time, in seconds, that scan waits before resuming after PTT has been released. Choose *0.5, 2.5, 5.0*, or *Infinite* (if *Infinite* is selected, scan will not resume until the operator rotates the Channel Knob).

Scan list reset at — Click on the drop box to select the condition that clears the scan list (*Power/Scan*, *When Power On*, *When Scan Off*, *No Clear*). The list will be reset to the settings of the *Channel in Scan Group A* or *B* check boxes on the *Edit Channel* screen and the One Group Scan/All Group Scan channel knob menu selection.

Scan hold by — Click on the drop box to select *NSQ* (scan holds when carrier is present) or *SIGNALING* (scan holds when a CTCSS tone or DCS code is present).

Scan for — Click on the drop box to choose if scan holds on a *VACANT CH* or *BUSY CH*.

- **Priority scan parameters**

Priority sample ratio — Click on the drop box to select the priority channel sampling ratio (1/4 or 1/8). This sets the number of non-priority channels that will be scanned between each sampling of a priority channel.

Priority lookback interval — Click on the drop box to select the number of seconds (0.5, 0.75, 1.0 or 1.5) between each priority channel sampling.

Defeat pri2 assignment — Click on the drop box to enable/disable use of a second priority channel. If *Defeat pri2 assignment* is chosen as *Disable* and a PRI2 channel has been assigned, the PRI2 channel will be checked every third priority sampling. If *Defeat pri2 assignment* is selected as *Enable*, there will be no PRI2 channel sampling.

The PRI2 channel is assigned by the user by selecting the desired channel, then holding the scan button for more than two seconds. The channel number will flash to indicate it is assigned as the PRI2 channel.

- **DTMF ANI condition**

DTMF timing select — Click on the drop box to select a number code, 1—7, corresponding to the desired *Tone length* and *Interval*, as follows:

Selected Code	*On Time (ms)*	*Off Time (ms)*
0	600	600
1	600	300
2	300	300
3	300	150
4	150	150
5	150	75
6	75	75
7	75	30

- **Other options**

Channel roll-over — Select *Enable* from the drop box to allow channel scroll to start over when the highest or lowest channel is reached.

TX time-out timer — Click on the drop box to select the length of time, in seconds, that the PTT may be held on continuously before the transmitter is shut down. Choose 90, 120, 150, 180, 210 or INF.

Scan stop when off hook — Select *Enable* from the drop box to stop scan when the microphone is removed from the hang-up box or the hanger button on the 70-2328A microphone is not grounded.

To use the 70-2328A hanger button for the hang-up function, JP1 must be removed and JP2 must be installed in the control head. The hang-up jumper in the accessory plug on the back of the radio should also be removed.

Busy channel lock-out — Click on the drop arrow to select the conditions for which transmit will be inhibited. Choose None (lock-out disabled), NSQ (when carrier is received), SGNL (when correct CTCSS tone or DCS code is received) or SPCL (when carrier is present without the correct CTCSS tone or DCS code).

Enabled beeps — Check the boxes to enable beeps.

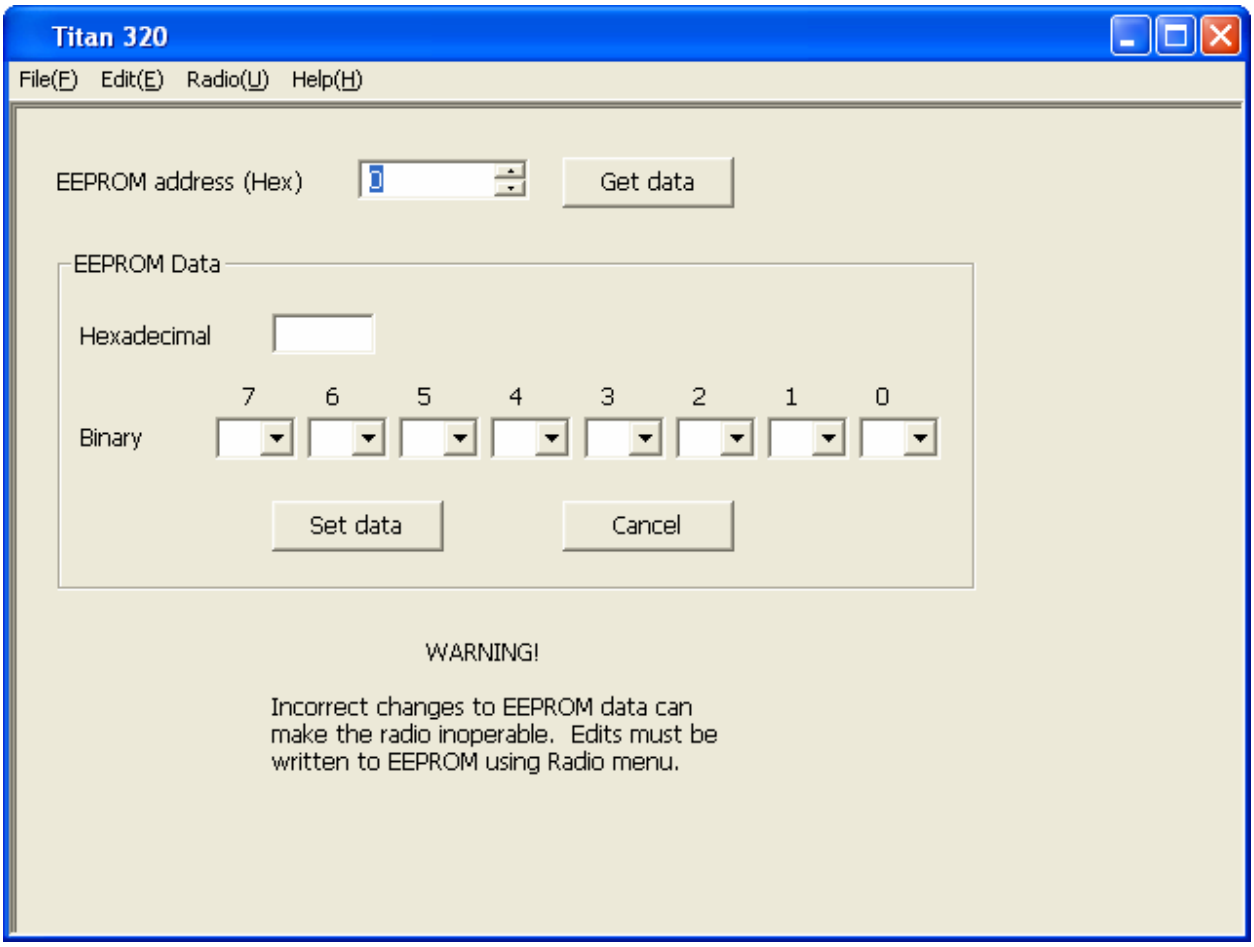
Enabled beeps	***Description***	
priority	Signal on PRI1 Signal on PRI2	(3 short beeps) (1 short beep)
ptt inhibit	TX Time-Out-Timer Expire Busy Channel Lock-Out	(1 long beep) (1 medium beep)
key press	Key Press Channel Change	(1 very short beep) (1 very short beep)
wake up/error	Wake-up Test OK Error Indication	(1 short beep) (5 short beeps)

Number of channel groups — Select either 120 or 320 channels, then click on the drop arrow to decide how many groups these channels will be equally and sequentially divided into.

Manual entry

Select *Manual entry* from the *Edit* menu to open the *Manual entry* window. Manual programming provides direct access the hexadecimal EEPROM data in the computer, which you can then send to the radio's EEPROM.

! **WARNING:** It is important to note that no check is performed to make sure that only safe changes have been made to the EEPROM data. You should never change the EEPROM data manually unless you have access to specific details as to what values to change, as you can make the radio inoperable if incorrect values are entered. Press the "Set data" button to save any changes made to the address being edited.



- **EEPROM address**

This is the location of the memory that you wish to view or modify. The memory range is 0 to FFF.

- **Get data**

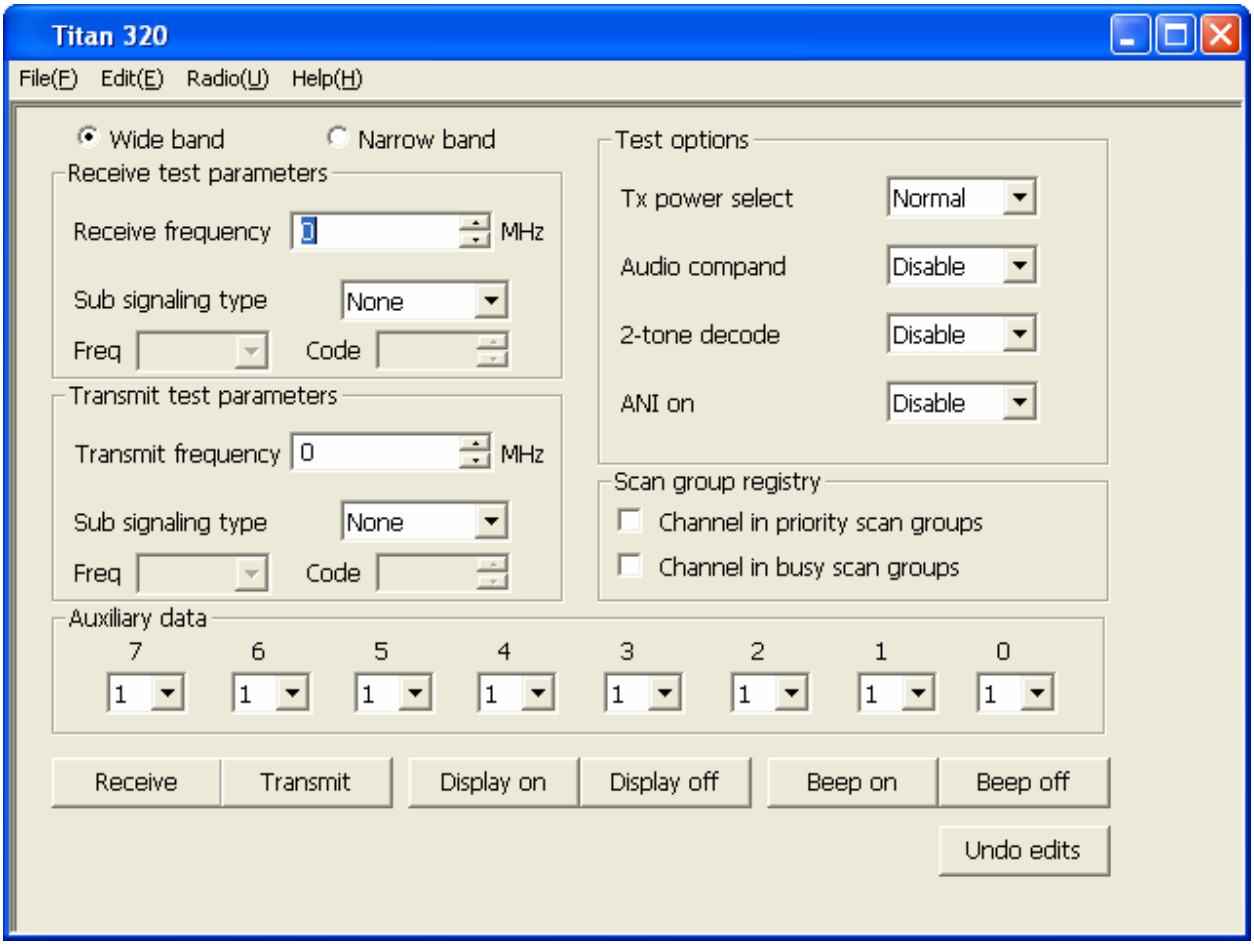
Click on the *Get data* button to view the EEPROM data at the address in the *EEPROM address* window.

- **EEPROM data**

The *EEPROM data* may be entered as a hexadecimal number (0—FF) or a binary number (00000000—11111111). Press the *Set data* button to save any changes to the data.

Test

Select *Test* from the *Edit* menu to open the *Test* window. This will allow you to test the radio's performance and adjustments may be made from the *Edit|Alignment* window. Make sure to terminate the radio antenna connector with the proper 50-ohm load before initiating any receive or transmit tests, and only leave the transmitter on for a short time.



To prepare the radio for alignment: First make sure the radio is not in scan mode, turn it off, then attach the programming cable and turn it back on. Upload the radio to get the current *Adjust*ment settings from the radio. After finishing with any adjustments, turn the radio off and unplug the programming cable.

- **Wide band/Narrow band**

Click on the appropriate selection.

- **Receive parameters**

Receive frequency	Click on the scroll arrows, or manually enter the receive frequency (in MHz).
Sub signaling type	Click on the drop box to select the signaling type (None, CTCSS, DCS).

Receive signaling	If you selected CTCSS as the *Sub signaling type*; use the left hand box to select the desired CTCSS frequency (67.0—254.1 Hz). If you selected DCS as the *Sub signaling type*, use the right box to select the desired DCS code (0 to 777).

- **Transmit parameters**

Transmit frequency	Click the scroll arrows, or manually enter the transmit frequency (in MHz).
Sub signaling type	Click on the drop box to select the signaling type (None, CTCSS, DCS).
Transmit signaling	If you selected CTCSS as the *Sub signaling type*; use the left hand box to select the desired CTCSS frequency (67.0—254.1 Hz). If you selected DCS as the *Sub signaling type*, use the right box to select the desired DCS code (0 to 777).

- **Test options**

TX power select	Click on the drop box to select *Low* or *Normal* power level.
Audio compand	Click on the drop box to *Enable* or *Disable* compander operation.
2-tone decode	Click on the drop box to *Enable* or *Disable* 2 Tone operation.
ANI on	Click on the drop box to *Enable* or *Disable* ANI operation.

- **Scan group registry**

Priority scan groups	Click to put the channel in priority scan groups.
Busy scan groups	Click to put the channel in busy scan groups.

- **Auxiliary data**

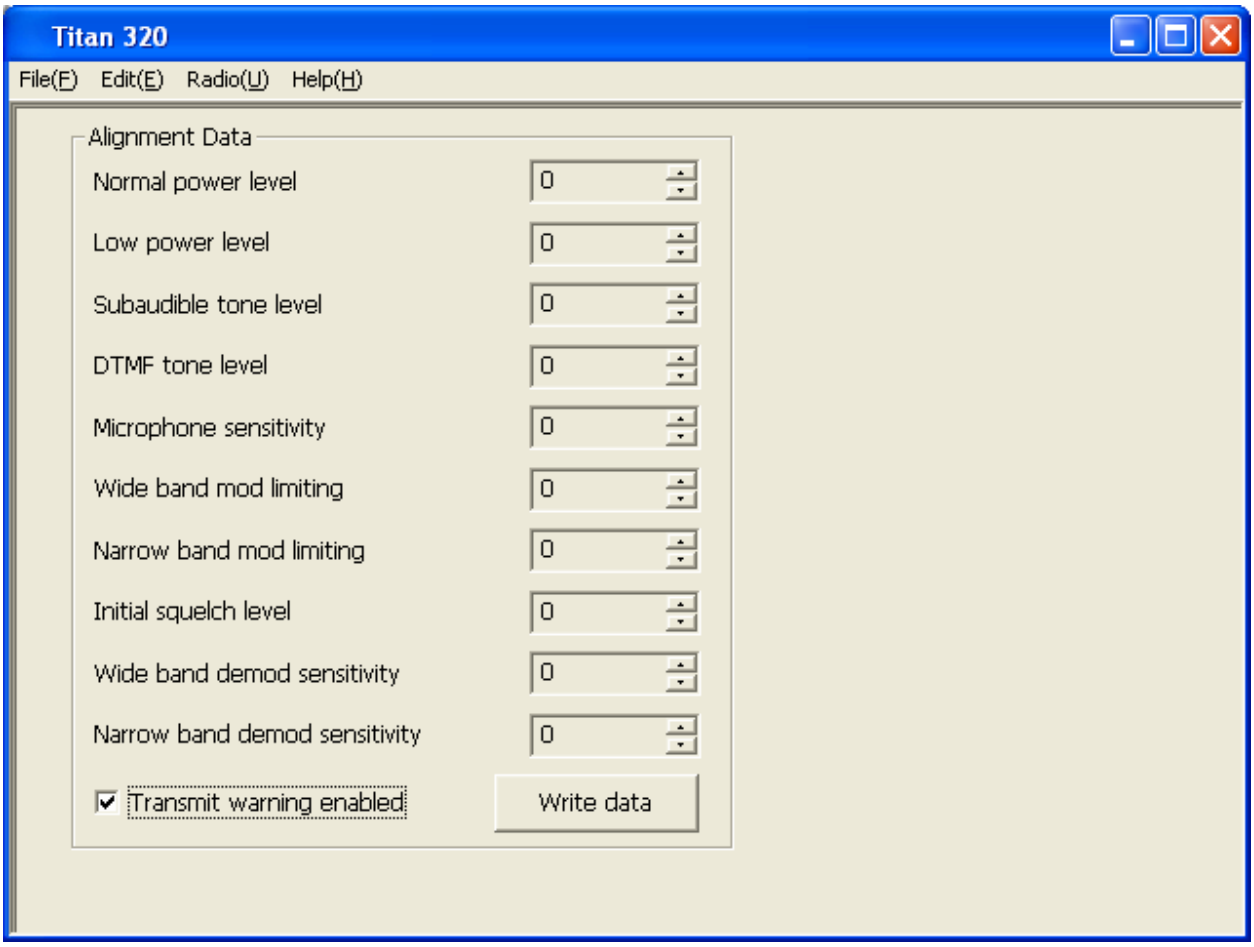
Click on the drop box and select either 0 or 1 for each of the 8 bits of auxiliary data.

- **Buttons**

Receive	Click on this button to initiate a receive test.
Transmit	Click on this button to initiate a transmit test.
Display on	Start display test.
Display off	End display test.
Beep On	Start beep test.
Beep Off	Stop beep test.

Alignment

These settings are made at the factory and do not normally need to be changed. Be sure to read the current data from the radio (*Radio|Read/Write* menu) before making changes to the settings. The *Alignment data* is always read from the radio and is always saved with a saved file, but is not written to the radio when using the *Write to Radio* button on the *Radio|Read/Write* menu. The *Alignment* data is only sent to a radio by clicking the *Write data* button on the *Alignment* window. Please note that all *Alignment* data is sent when the *Write data* button is clicked.



Normal power level	Sets the normal transmit power level. Use the arrows to adjust the value from 0 to 255. Uncheck the *Transmit warning enabled* check box to scroll more than one increment or decrement at a time.
Low power level	Sets the low transmit power level. Use the arrows to adjust the value from 0 to 255. Uncheck the *Transmit warning enabled* check box to scroll more than one increment or decrement at a time.
Subaudible tone level	Sets the subaudible signaling modulation level. Use the arrows to adjust the value from 0 to 127. Uncheck the *Transmit warning enabled* check box to scroll more than one increment or decrement at a time.

DTMF tone level	Sets the DTMF tone level. Use the arrows to adjust the value from 0 to 127. Uncheck the *Transmit warning enabled* check box to scroll more than one increment or decrement at a time.
Microphone sensitivity	Sets the microphone sensitivity. Use the arrows to adjust the value from 0 to 15. Uncheck the *Transmit warning enabled* check box to scroll more than one increment or decrement at a time.
Wide band mod limiting	Sets the maximum modulation level for wideband channels. Use the arrows to adjust the value from 0 to 31. Uncheck the *Transmit warning enabled* check box to scroll more than increment or decrement at a time.
Narrow band mod limiting	Sets the maximum modulation level for narrow band channels. Use the arrows to adjust the value from 0 to 31. Uncheck the *Transmit warning enabled* check box to scroll more than increment or decrement at a time.
Initial squelch level	Sets the initial squelch level after programming. This is the same setting that is adjusted by the user on the channel knob menus. Use the arrows to adjust the value from 0 to 80.
Wide band demod sens	Sets the demodulation sensitivity for channels programmed as wide band. Use the arrows to adjust the value from 0 to 15.
Narrow band demod sens	Sets the demodulation sensitivity for channels programmed as narrow band. Use the arrows to adjust the value from 0 to 15.

- The wide and narrow band settings may be used to change the perceived receive audio balance when switching between narrow and wide band channels.

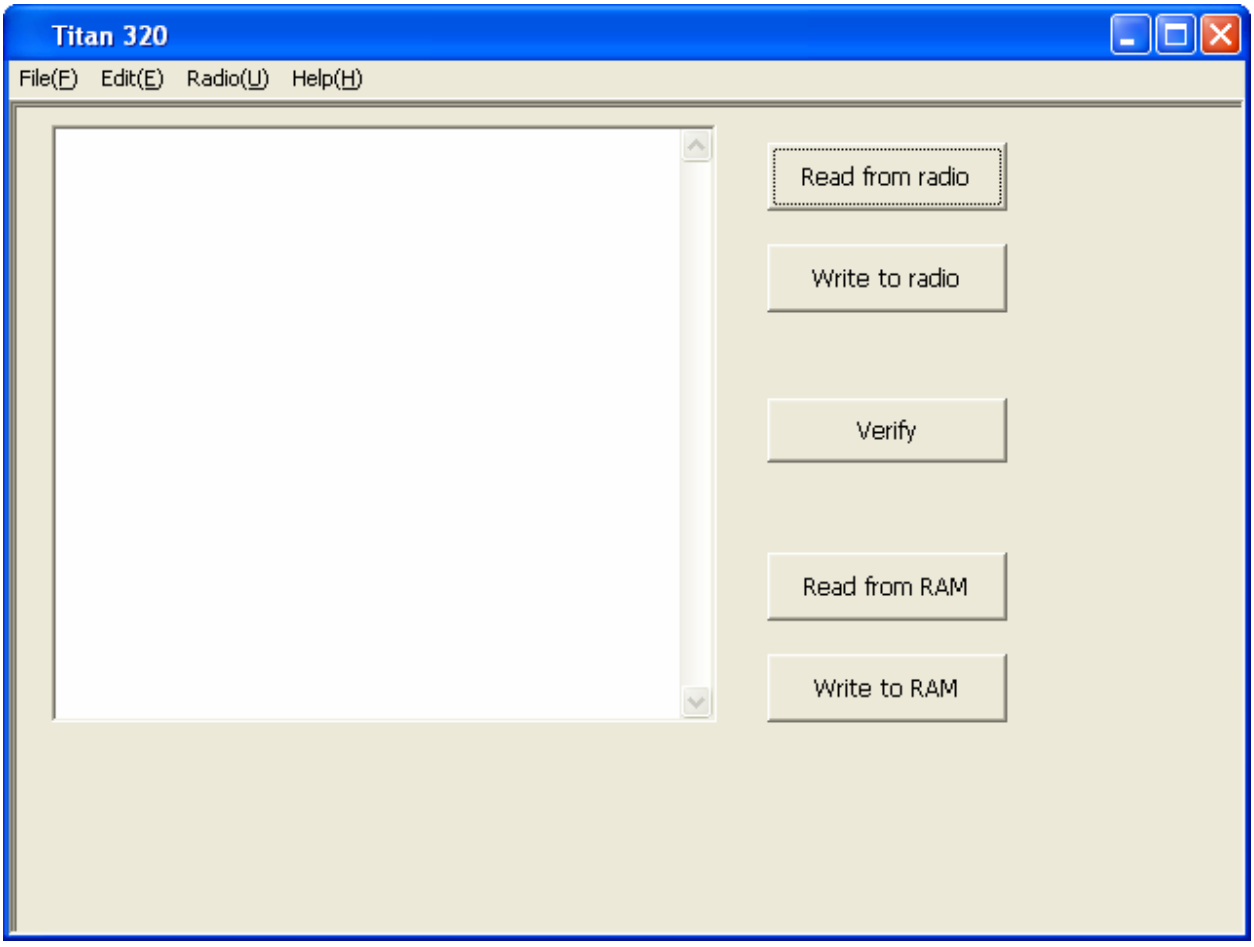
Click the *Write data* button to write any adjustment data changes into the radio's EEPROM. If adjustments are made without clicking the *Write data* button, the original adjustment data settings will be restored after the radio is turned off.

RADIO MENU

Read/Write

Select *Read/Write* from the *Radio* menu to send the EEPROM data to the radio.

- To prepare the radio for programming: First make sure the radio is not in scan mode, turn it off, then attach the programming cable and turn the radio back on. After programming is complete, you will need to turn the radio off, unplug the programming cable, and then turn the radio back on for the new settings to take effect.



- **Read from radio**

Loads the data stored in the radio's EEPROM into temporary memory in the PC software. To view or edit the data it must then be copied into the PC software forms by selecting *Edit|Model select/view* and clicking *OK* when prompted for *Copy OK?*

- The temporary memory is used with the *Verify* function to check if data just uploaded from a radio matches the data already resident in the PC software forms. By clicking *OK* at the *Copy OK?* dialog you are overwriting any data already resident in the PC software.

- **Write to radio**

Writes the current PC data into the radio's EEPROM. All settings, except for the *Alignment* data, are sent to radio.

- **Verify**

Compare the contents of the radio's EEPROM (after *Read from radio*) to the data already in the PC software forms. The data being verified against may be from a previously read radio that was copied into the PC software forms or from a saved file that was loaded into the PC software forms.

If different data is found, the address and data are indicated. Press *Continue* to compare the remaining data, or *Finish* to end Verify.

- **Read from RAM**

Begin read at address	Input a hexadecimal address to read, from 000 to FFF.
Number of bytes to read	Input the number of the bytes to be read, from 1 to 8. Press *Read* to read the data from the radio.

- **Ram Write**

Begin write at address	Input a hexadecimal address to write, from 000 to FFF.
Number of bytes to write	Input the number of the bytes to be written, from 1 to 8. Enter data in hexadecimal data in the boxes and press *Write* to write the data to the radio.

Comm port set

Select *Comm port set* from the *Radio* menu then select *Comm port 1* or *Comm port 2*. The value you choose will be saved in the config file by the program.

APPENDIX A – SCAN TYPE DESCRIPTIONS

Many of the buttons and knobs have a secondary function when in scan mode. The particular characteristics of a button are dependent on the type of scan selected. A brief description of the six types of scan and the function of the various knobs and buttons when in scan, follows.

A Scan (Normal Priority Scan Mode)

The radio will scan the channels registered in *priority scan lists*, with the modifications that have been made by the user from Add/Delete Mode. The scan list may be derived the currently selected channel group or from all channel groups depending on the user selection made on the channel/menu knob. Priority monitoring of up to two channels is possible. The PRI 1 channel is assigned as the display channel when scan was activated. The PRI 2 channel is assigned by pressing and holding the SCAN button while scan is off. PRI 2 assignment may not be possible because of programming. The display will show a solid PRI icon and --- for the channel display while scanning.

CH/MENU Knob

When scan is holding on a busy channel, CH UP will restart scan from the next channel in the scan list. Note that the channel is not removed from the scan list. When programmed for *Scan stop when off hook,* and the microphone is off hook, CH UP/DN will change the PRI 1 channel.

PTT Bar

Pressing PTT, while in A Scan, will transmit on the PRI 1 channel.

SCAN Button

Press and release the SCAN button to exit scan and go to the PRI 1 channel.

MON Button

Press and release the MON button to enter monitor mode.

A/D Button

When scan is holding on a busy channel, press and release the A/D button to remove the channel from the scan list and restart scan from the next channel. The PRI 1 channel can not be deleted. Depending on programming of *Scan list reset at,* the deleted channel(s) may be added back to the scan list when scan is turned off, when power is turned off, or when either occurs. When programmed for *Scan stop when off hook,* and the microphone is off hook, press and hold the A/D button to initialize the scan list to the *Default scan group registry* programming.

AUX Button

Press and release the AUX button to activate the auxiliary function. If Scan Escape is set up as the auxiliary function, scan will stop and the radio will switch to the last busy channel. Press and release the AUX button to resume scanning from Scan Escape mode without changing the PRI 1 channel.

B Scan (Normal Busy Scan Mode)

The radio will scan the channels registered in *busy scan lists*, with the modifications that have been made by the user from Add/Delete Mode. The scan list may be derived the currently selected channel group or from all channel groups depending on the user selection made on the channel/menu knob. Priority monitoring is not possible. The display will show a solid SCAN icon and --- for the channel display while scanning.

CH/MENU Knob

When scan is holding on a busy channel, CH UP will restart scan from the next channel in the scan list. Note that the channel is not removed from the scan list.

PTT Bar

Pressing PTT, while in B Scan, will transmit on the last busy channel. If there is no last busy channel, transmit will occur on the displayed channel when scan was activated.

SCAN Button

Press and release the SCAN button to exit scan and go to the last busy channel.

MON Button

Press and release the MON button to enter monitor mode.

A/D Button

When scan is holding on a busy channel, press and release the A/D button to remove the channel from the scan list and restart scan from the next channel. Depending on programming of *Scan list reset at,* the deleted channel(s) may be added back to the scan list when scan is turned off, when power is turned off, or when either occurs. When programmed for *Scan stop when off hook,* and the microphone is off hook, press and hold the A/D button to initialize the scan list to the *Default scan group registry* programming.

AUX Button

Press and release the AUX button to activate the auxiliary function. Scan Escape is not possible in B Scan.

B' Scan (Alternate Busy Scan Mode)

The radio will scan the channels registered in *busy scan lists*, with the modifications that have been made by the user from Add/Delete Mode. The scan list may be derived the currently selected channel group or from all channel groups depending on the user selection made on the channel/menu knob. Priority monitoring is not possible. B' Scan differs from B Scan only because it exits scan to the channel selected when scan was started. The display will show a solid SCAN icon and --- for the channel display while scanning.

CH/MENU Knob

When scan is holding on a busy channel, CH UP will restart scan from the next channel in the scan list. Note that the channel is not removed from the scan list.

PTT Bar

Pressing PTT, while in B' Scan, will transmit on the last busy channel. If there is no last busy channel, transmit will occur on the displayed channel when scan was activated.

SCAN Button

Press and release the SCAN button to exit scan and go to the channel displayed when scan was activated.

MON Button

Press and release the MON button to enter monitor mode.

A/D Button

When scan is holding on a busy channel, press and release the A/D button to remove the channel from the scan list and restart scan from the next channel. Depending on programming of *Scan list reset at* the deleted channel(s) may be added back to the scan list when scan is turned off, when power is turned off, or when either occurs. When programmed for *Scan stop when off hook,* and the microphone is off hook, press and hold the A/D button to initialize the scan list to the *Default scan group registry* programming.

AUX Button

Press and release the AUX button to activate the auxiliary function. Scan Escape is not possible in B' Scan.

PS Scan (Public Safety Priority Scan Mode)

The radio will scan the channels registered in *priority scan lists*, with the modifications that have been made by the user from Add/Delete Mode. The scan list may be derived the currently selected channel group or from all channel groups depending on the user selection made on the channel/menu knob. Priority monitoring of up to two channels is possible. The PRI 1 channel is assigned as the display channel and may be changed while scanning by rotating the channel knob. The PRI 2 channel is assigned by pressing and holding the SCAN button while scan is off. PRI 2 assignment may not be possible because of programming. The display will show a blinking PRI icon and the PRI 1 channel while scanning.

CH/MENU Knob

CH UP/DN will change the PRI 1 channel. When programmed for *Scan stop when off hook,* and the microphone is off hook, CH UP/DN will change the PRI 1 channel.

PTT Bar

Pressing PTT, while in PS Scan, will transmit on the PRI 1 channel.

SCAN Button

Press and release the SCAN button to exit scan and go to the PRI 1 channel.

MON Button

Press and release the MON button to enter monitor mode.

A/D Button

When scan is holding on a busy channel, press and release the A/D button to remove the channel from the scan list and restart scan from the next channel. The PRI 1 channel can not be deleted. Depending on programming of *Scan list reset at,* the deleted channel(s) may be added back to the scan list when scan is turned off, when power is turned off, or when either occurs. When programmed for *Scan stop when off hook,* and the microphone is off hook, press and hold the A/D button to initialize the scan list to the *Default scan group registry* programming.

AUX Button

Press and release the AUX button to activate the auxiliary function. Scan Escape is not possible in PS Scan.

GRP A Mode (Scan Disable Mode)

GRP A mode is a non-scan mode. No priority channels may be assigned or monitored. When in this mode the display will show solid PRI and SCAN icons and the currently selected channel. The radio will receive and transmit only on the displayed channel. CH UP/DN will change the displayed channel. Press and release the SCAN button to exit GRP A mode and go to the displayed channel.

S CH Mode (Priority Monitor Mode)

S CH mode is a non-scan priority monitor mode. The PRI 1 channel is assigned as the channel displayed when scan was activated. The PRI 2 channel may be assigned when scan is off, by pressing and holding the SCAN button. In S CH mode the radio will receive and transmit on the displayed channel (the Secondary channel) while sampling the PRI 1 and PRI 2 channels. While holding on a priority channel the radio will transmit on the channel it is holding on. When in S CH mode the display will show a solid PRI icon and the Secondary channel. CH UP/DN will change the current displayed channel (the Secondary channel). Press and release the SCAN button to exit scan and go to the PRI 1 channel. When scan is next activated it will again assign the displayed channel as PRI 1 and go to the channel displayed when scan was last exited (the Secondary channel).

APPENDIX B – TRANSCEIVER ERROR CODES

E1	MCU ROM/RAM Error
E2	No Model Number and/or Channel Data Programmed
E3	Synthesizer Unlock
E4	Channel Data Checksum Error
E6	EEPROM Write Counter is Over 100000
E7	EEPROM Backup Data Lost
E8	Program Communication Error
E9	Cloning Error

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