

Chapter 1. The PX3

1.1 The PX3 Text Mode

PX3 firmware version 1.39 and above allows us to display decoded CW, PSK, and RTTY text on the PX3 and to add a USB keyboard so it can act as a data terminal for both receiving and transmitting these modes. You can type text to be transmitted in real-time or store text messages in as many as fifty, 95-character message memories. Any of these messages can be transmitted repetitively as a beacon. Another interesting feature is that you can enter and edit macros to control the KX3 and PX3.

The PX3 does not do any text decoding -- that is done by the KX3 and so you must turn it on in the KX3. The KX3 can decode CW, AFSK A, FSK D and PSK D. It cannot decode DATA A. It can only transmit CW, FSK D and PSK D.

1.1.1 PX3 Screen Display

The PX3 display has three display states as shown in Figure 1-1 to Figure 1-3. Figure 1-1 shows the basic PX3 display with the spectrum and waterfall displays.

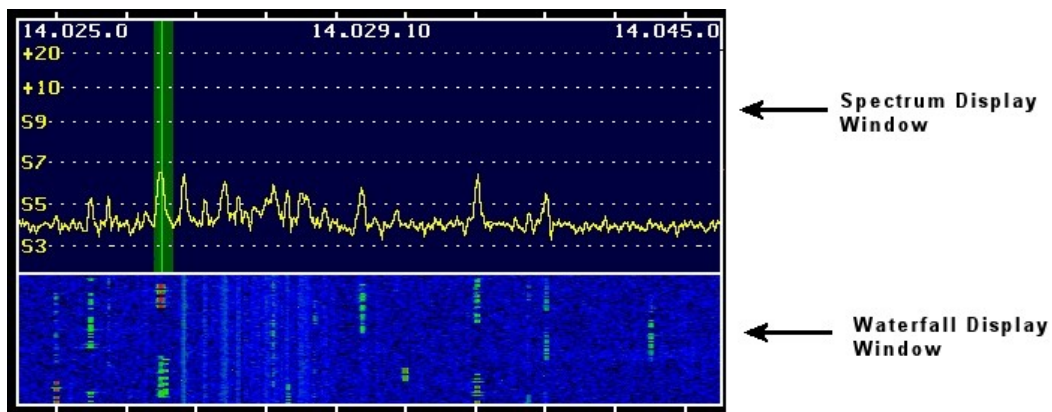


Figure 1-1. PX3 display with spectrum and waterfall windows.

Holding **LABELS** once reduces the spectrum display area to show the PX3 function key labels, Figure 1-2.

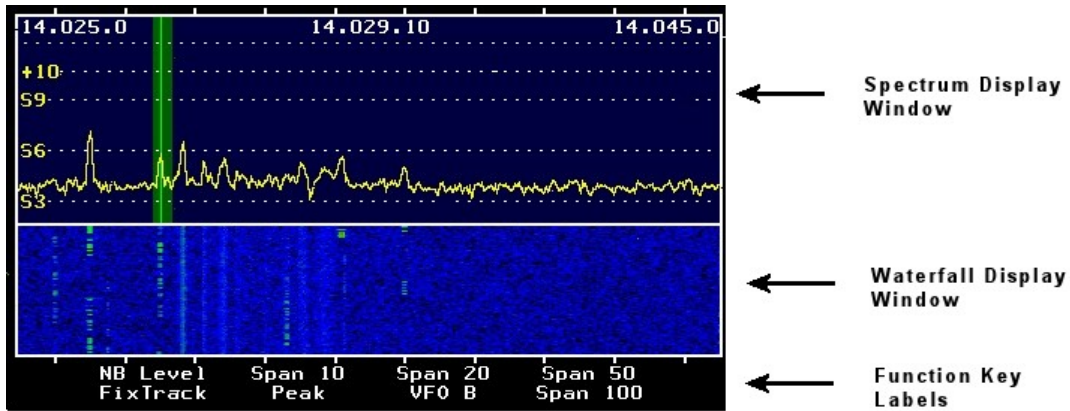


Figure 1-2. PX3 display with function key labels.

Holding **LABELS** a second time reduces the spectrum display further, removes the function key labels, and turns on the PX3 Text Mode. In this mode three lines are the Receive Data Window and two lines are the Transmit Data Window. When a keyboard or wireless dongle is attached a small **K** appears in the Spectrum Display Window. See Figure 1-3.

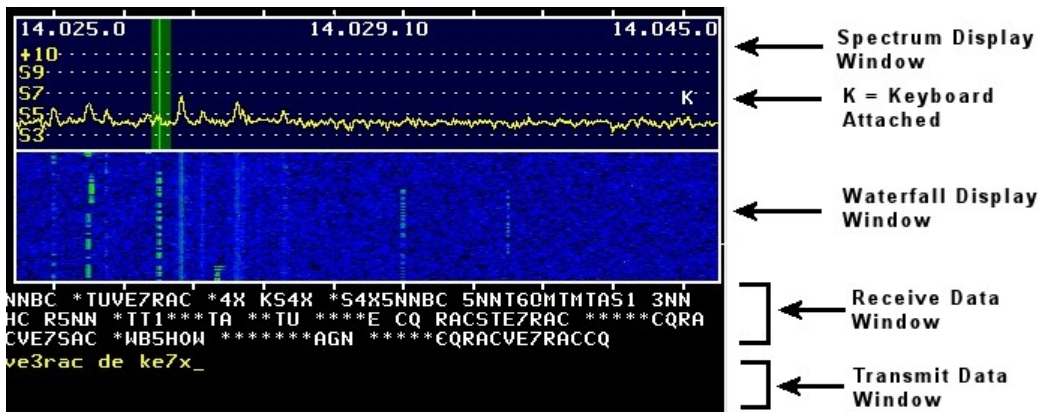


Figure 1-3. PX3 with text mode display.

Spectrum Display Window: The *PX3 font* menu sets the character font size in this window.

Waterfall Display Window: The *PX3 Waterfall* menu sets the size of the window.

Receive Data Window: This window is three lines. The *PX3 Text TxtFont* menu sets the character font size. Larger font sizes expand the display area occupied by this window. Decoded text appears in this window when the KX3 text decoding is turned on (Section 1.1.3, page 4.)

Transmit Data Window: This window is two lines and the *PX3 Text TxtFont* menu sets the character font size. Larger font sizes expand the display area occupied by this window. Text typed on the USB keyboard appears in this window.

1.1.2 PX3 Text Mode Menu

Controls for the PX3 Text Mode are found in the *PX3 Text* menu shown in Table 1-1.

1. Tap **MENU** to enter the PX3 menu selection from normal operation.
2. Rotate **SELECT ⌀** to display *Text menu*.
3. Tap **SELECT ⌀** to choose it.
4. Rotate **SELECT ⌀** to *TxtEnb* and tap **SELECT ⌀** to toggle the PX3 Text Mode and the data windows (Figure 1-3) on and off.
5. Rotate and tap **SELECT ⌀** to choose other options from the *Text menu* shown in Table 1-1.
6. When a menu has been selected, use **SELECT ⌀** to change any of its settings.
7. When finished adjusting a *Text menu* item, either tap **SELECT ⌀** to exit the entire PX3 menu system or tap **MENU** to go back to the *PX3 menu*.

Table 1-1. PX3 Text menu functions.

Menu	Default	Description
<i>BcnIntvl</i> Beacon Interval.	20	Tap and then rotate SELECT ⌀ to set the interval between beacon transmissions. The range is 1 to 3600 seconds. See <i>Beaconing</i> , page 10.
<i>Bcon Mem#</i> Beacon Memory Number.	1	Tap and then rotate SELECT ⌀ to select the KX3 message memory used to store the beacon message. See <i>Beaconing</i> , page 10.
<i>KybTxMode</i> Keyboard Transmit Mode.	<i>Enter key</i>	Tap and then rotate SELECT ⌀ to choose the keyboard key that will start a transmission. <i>Enter key:</i> Type Enter or Carriage Return to transmit. <i>^R/^T toggle:</i> Type Ctrl-T to transmit the message and Ctrl-R to interrupt the transmission and switch to receive mode while transmitting. <i>Any key:</i> Tapping any key will start the transmission. If you are entering text, each letter will be sent as entered. If recalling a message from memory, it will be sent automatically. <i>Space key:</i> Transmits after the first space key is typed. See <i>Transmitting Text Messages</i> , page 7.
<i>KybTxHang</i> Keyboard Transmit Hang Time.	3000	Tap and then rotate SELECT ⌀ to set the length of time in milliseconds the KX3 is held in transmit mode after the last character of the message is sent. If you are typing your conversation and find the transmission catches up with your text entry and switches to receive, try increasing this time. The range is 0 to 3000 milliseconds and hangs only for PSK and RTTY, not CW.

<p><i>Msg Ctr</i> Contact Counter Number.</p>	<p>1</p>	<p>Embedding lc anywhere in a stored message will cause a contact (QSO) counter to be added that increments each time the message is sent. This could be used to add an automatically-incremented QSO number in a text message for contesting.</p> <p>Tapping and turning SELECT selects a different starting number. When sending a series of messages, the message number will increment to show the next number to be sent. See Table 1-3, page 8.</p>
<p><i>Macro 1-8</i> Execute a Macro.</p>	<p>1</p>	<p>Tap and then rotate SELECT to scroll through the first eight of the 50 KX3 macro locations stored in the PX3. Tap the knob to execute the macro or tap or hold function keys FN1 – FN8 to assign that macro to that PX3 function key. See <i>Macros</i>, page 10.</p>
<p><i>TxtAuto</i> Switch to Text Mode Automatically.</p>	<p>On</p>	<p>Tap SELECT to toggle between <i>On</i> and <i>Off</i>. When <i>On</i>, the PX3 switches to text mode automatically when CW, PSK, or RTTY modes are selected at the KX3. It switches out of Text Mode when the KX3 is changed back to SSB or FM.</p>
<p><i>TxEnb</i> Enable Text Mode.</p>	<p>Off</p>	<p>Tap SELECT to toggle Text Mode <i>On</i> and <i>Off</i>. If <i>TxAuto</i> is <i>On</i>, Text Mode will be enabled automatically the next time the KX3 is switched to a digital mode, even if <i>TxEnb</i> is off.</p> <p>You can also enter Text mode by successively holding LABELS until the Receive and Transmit Data Windows are displayed.</p>
<p><i>TxtFont</i> Set the Text Window Font Size.</p>		<p>Tap and then rotate SELECT to set the Text Windows font size to 5x7, 7x11, or 9x14. This affects the font size only in the Text Windows. See the <i>PX3 Font</i> menu to change the font size in the spectrum window.</p>

1.1.3 PX3 Text Mode Receiving

Note: To display CW, RTTY or PSK decoded signals on the PX3, you must activate text decoding on the KX3.

Make sure that you do not have the KX3 Utility Terminal program active to display and send text while you are trying to use the PX3 keyboard, or vice versa. The KX3's text decode can be fed to only one place. You will see dropped characters if the utility is active when using the keyboard. They both cannot be used at the same time.

By using the KX3's ability to decode and send CW, FSK D RTTY, and PSK D and attaching a USB keyboard, the PX3 display can act as a data mode terminal. When setting up to tune any of the data modes, it is useful to set the PX3's span to 5 or 10 kHz and to use the KX3 **FINE** tuning.

Text mode adds two windows at the bottom of the PX3 monitor as shown in Figure 1-3. One is for received data and one for transmitted data. The windows occupy part of the area used by the PX3

spectrum display. The sizes of the receive and transmit data windows are three and two lines respectively, and the font size is set by the *Text TxFont* menu as described in Table 1-1, page 3.

If the KX3 Utility is active, close it to use the PX3 Text Mode.

There are three ways to enter the PX3 Text Mode:

1. If the PX3 function keys are not displayed (Figure 1-1) hold the PX3 **MENU** twice. If the function keys are displayed (Figure 1-2), hold **MENU** once.
2. Enable Text Mode using the *TxtEnb* menu shown in Table 1-1.
3. Enter Text Mode automatically by enabling *TxAuto* as shown in Table 14-1 and switching to CW, PSK or RTTY mode on the KX3.

Here is how you can set up the text display feature to turn on automatically for CW and digital modes:

- Tap **MENU** and rotate **SELECT** to the *Text menu*.
- Tap **SELECT** and then rotate **SELECT** to *TxtAuto*. Tap **SELECT** again to toggle it on (or off if it is currently on). The state you select is briefly shown on the PX3 display.
- Tap **MENU** to exit the menu selection.
- Tap the KX3 **MODE** to select CW or **DATA** to select one of the data modes.
- Enable text decode (hold **TEXT**) for CW or your data mode.

With this set up, every time you select CW or a data mode on the KX3 the PX3 text display will activate but you will lose your function key label display. (The function keys are still active, however.) To turn the PX3 text display off, enter the PX3 *Text menu*, select *Txt Enb* and tap **SELECT** to toggle Text Enable on and off.

Exercise

How can I program a PX3 function key to turn text decode on and off?

Tap **MENU** and rotate **SELECT** to the *Text menu*.

Tap **SELECT** and then rotate **SELECT** to *Txt Enb*.

Now either tap or hold the function key you want to program.

Tap **MENU** to exit the menu selection.

To display CW, turn the KX3 CW decoder. To display RTTY or PSK, turn on the KX3 RTTY or PSK decoder. When you have successfully tuned in a CW, RTTY, or PSK signal you should see it being displayed on the KX3 VFO B display area and in the PX3 receive window.

1.1.4 PX3 Text Mode Transmitting

Note: To send text using the PX3 monitor, you must connect a USB keyboard to the PX3. Not all keyboards are compatible. You may have to try more than one. Most wired and wireless keyboards are supported, except for Blue Tooth keyboards. Elecraft Customer Support maintains a list of compatible keyboards. See http://www.elecraft.com/manual/px3_keyboard_list_A3.pdf.

Keyboard Setup

Plug your keyboard or wireless dongle into the KEYBD port on the side of the PX3. When a keyboard is attached or a dongle is plugged, in the letter **K** will display in the Spectrum Display Window.

There are two keyboard setup options shown in Table 1-1. Choose the method to activate the transmission with the *KybTxMode* menu. You will likely want to try different methods depending on how you operate. See *Transmitting Text Messages*, page 7.

The *KybTxHang* menu defines how long the KX3 remains in transmit mode after sending the last character. If most of your conversations are made typing on the keyboard instead of picking pre-stored messages, you may want to choose a longer hang time.

Keyboard Shortcuts

The following keyboard shortcuts can be used when transmitting:

Table 1-2. Keyboard shortcuts.

Key	Function
Ctrl-H	Opens a help screen for normal operation and when editing messages or macros. Type any key to exit.
Backspace	Deletes character to the left. You cannot erase characters that have been sent.
Ctrl-Backspace	Deletes the word to the left.
Ctrl-Alt-M	Opens the KX3 macro entry menu. See <i>Macros</i> , page 10.
Ctrl-Alt-T	Opens the text messages menu. See <i>Editing Text Message Memories</i> , page 9.
Ctrl-Alt-B	Starts the beacon transmit. The message transmitted is defined in the <i>Bcon Mem#</i> menu. See <i>Beaconing</i> , page 10
Esc	Switches the KX3 to receive and clears the transmit data window.
Ctrl-Alt-R	Replays all keyboard input stored in the Replay Buffer.
Ctrl-R	When <i>KybTxMode</i> is <i>^T/^R</i> and the KX3 is transmitting, Ctrl-R stops transmitting and switches to receive mode.
Alt-R	Clears the replay buffer.
Ctrl-T	Starts sending the text in the Transmit Data Window when <i>KybTxMode</i> is <i>^T/^R</i> .
Ctrl-C	Clears Transmit and Receive Data Windows and the Replay Buffer.
Enter	Starts sending the text in the Transmit Data Window when <i>KybTxMode</i> is <i>Enter</i> .
Space	Starts sending the text in the Transmit Data Window when <i>KybTxMode</i> is <i>Space key</i> .

Replay Buffer

Note: This description of the Replay Buffer is valid for PX3 firmware revision 1.39. This may change with future firmware upgrades.

Text typed directly into the Transmit Data Window (not text recalled from a message memory) is stored in a Replay Buffer. You can recall this text by typing Ctrl-Alt-R. Alt-R and Ctrl-C clear this buffer.

This buffer holds the last 95 characters typed in the Transmit Data Window. It acts as a First In-First Out (FIFO) stack for the last 95 characters. Characters are pushed into the buffer as you type them. They do not have to be transmitted. When you recall the buffer (Ctrl-Alt-R) and your *KeybTxMode* is *Enter key*, *Any key*, or *Space key*, the buffer is sent automatically if the sending character is stored in the buffer. When using *^R/^T* mode, *^T* is not saved in the buffer so you must type it to send the buffer contents.

Exercise

I don't quite understand how the Replay Buffer works. Can you give me an example?

1. Choose the *^R/^T KybTxMode* so you can control when you transmit.
2. Set the KX3 output power to **0.0** when testing.
3. Type Alt-R or Ctrl-C to clear the Replay Buffer.
4. Now type TEST 1 Ctrl-T. TEST 1 will be transmitted.
5. Now type Ctrl-Alt-R. This recalls the Replay Buffer. TEST 1 will appear in the Transmit Data Window. Type Ctrl-T to transmit it. In the other *KybTxModes* TEST 1 will be transmitted immediately.
6. Now type TEST 2 Ctrl-T. TEST 2 will be transmitted.
7. Now type Ctrl-Alt-R. TEST 1TEST 2 will appear in the Transmit Data Window. This is because the buffer wasn't cleared (as in Step 3) and the 95-character memory isn't yet full.) Type Ctrl-T to transmit TEST 1TEST 2.

Entering Text from the Keyboard

Typing on the keyboard when in Text Mode enters text in the two-line Transmit Data Window. Two lines may be entered before the text begins to scroll. Backspace deletes the character to the left of the cursor and Ctrl-Backspace the word left of the cursor.

Transmitting Text Messages

When getting familiar with the PX3 Text Mode transmitting feature, it is best to not transmit on the air until you are comfortable with it. You can turn to **PWR** to 0.0 watts or transmit into a dummy load.¹

Characters typed in the Transmit Data Window are yellow before they have been sent. When you type the selected *KybTxMode* character, the KX3 starts to transmit and the characters turn green as they are sent to the KX3.² You may continue to type characters as the KX3 is sending your message. If you reach the limit of the type-ahead buffer you won't be able to enter more characters until the PX3 clears some buffer space by sending it to the KX3.

Change to the Text Mode display shown in Figure 1-3 by way of any of the three methods shown in Section 1.1.3, page 4. Choose CW, PSK or RTTY mode on the KX3. When getting up-to-speed, try the following *KybTxModes*.

Enter key: Type text on your keyboard. When you type the Enter key (often called the Carriage Return key), the KX3 starts to transmit and the characters turn green as they are sent to the KX3. The KX3 returns to receive mode when all characters have been transmitted and the *KybTxHang* time has elapsed. Typing Esc returns to receive mode immediately and clears the Transmit Data Window.

^R/^T: In Ctrl-R/Ctrl-T mode, Ctrl-T starts to send any text in the Transmit Data Window and returns to receive mode after all text has been sent and *KybTxHang* time has elapsed. You may continue to enter text while you are transmitting. You may stop transmitting by typing Ctrl-R, Esc, or Ctrl-C.

¹ It is better to turn the power to zero because sometimes even a dummy load can radiate enough power to make a contact.

² The characters the KX3 is actually sending may be behind what the PX3 shows as green depending on the KX3's character transmission rate.

Any key: Transmission starts as soon as a new character is typed in the Transmit Data Window. You may continue to enter text while you are transmitting but you may want to set the *KybTxHang* time to the maximum so the KX3 is not continually switching from transmit to receive when the transmitted data catches up with your typing.

Space key: This mode is similar to *Any key* except transmission starts when a space character is typed.

Interrupting Transmissions

Typing the Esc and Ctrl-C characters interrupts your transmission. Each behaves slightly differently.

Esc: Typing Esc stops transmission immediately and clears the Transmit Data Window. It does not affect the Replay Buffer contents.

Ctrl-C: Typing Ctrl-C stops the PX3 from sending characters to the KX3 for transmission. You will notice that the KX3 continues to send a few more characters until it clears its own transmit buffer. Ctrl-C clears the Transmit and Receive Data Windows and also clears the Replay Buffer.

Text Message Memories

There are fifty, 95-character text message memories that can be used in CW, RTTY or PSK. These are stored in non-volatile memory and will not be lost when power is cycled. Each mode does not have separate message memories.

Text messages are saved or restored with the PX3 configuration data.

Embedded Commands

Table 1-3. Embedded Message Characters.

Key	Function
\c	Embedding \c anywhere in a stored message will cause a contact (QSO) counter to be added that increments each time the message is sent. The default is a five-digit number, such as 00001, for the first number. You can reduce the number of digits by adding a number following the c. For example, \c3 will result in three-digit numbers being sent. The number of digits sent increases automatically as needed. If you don't want to see leading zeros in your QSO count, you can use \c1. The numbers sent would then be 1, 2, ... 9, 10, 11 ... More than one \c characters in a message results in the current value of the counter being repeated. The second \c does not increment the counter. Typing \c when sending text from the key board will not insert the counter. The starting number can be set using the <i>Msg Cntr</i> menu as shown in Table 1-1, page 3. The count persists through power on/off cycles so if you start a new contest you have to reset the counter.
\p	Transmits the contents of the replay buffer at this point.
\r	Inserts a carriage return.
\n	Inserts a line feed.
\b	Inserts a bell character that will make a sound on a remote terminal.
(vertical bar)	When inserted in a text message causes the KX3 to revert to receive mode at the end of the message. (Does not wait for the transmit timeout period to end.)

Editing Text Message Memories

1. Press Ctrl-Alt-T to enter the text message window.

[Message] Up/Dn, CR select, Ctrl-H Help mem:1 key:<empty>

2. Press the ↑ and ↓ arrow keys to find an empty message buffer, one that is no longer needed, or one that you would like to edit. Here we select mem:4.

[Message] Up/Dn, CR select, Ctrl-H Help mem:4 key:<empty>

Press Enter to select the indicated memory.

3. Choose a Ctrl-, Alt- or Ctrl-Alt-, or F-key to send the message.

Press assign key, ^C=clr, CR= no change

Press the key you want to use to recall this message. You may choose a function key or Alt-, Ctrl-, or Alt-Ctrl combination (except Ctrl-C). Typing CR³ keeps the all ready assigned key. If, when you type a key it is not displayed, it is in use for some other memory or is not allowed for some other reason and you must choose another key. You can reuse a key by editing the other memory where it is used. You will not be able to move to the next editing stage until you have chosen a valid recall key. Here we type Ctrl-Q.

4. Enter the message text.

Enter text, CR=done, ^C=clr mem:4 key: Ctrl-Q
CQ CQ CQ de KE7X KE7X KE7X k

Type up to 95 characters (including spaces) for the message. You cannot use a carriage return in the message because that terminates the message entry. You may, however, use the \r to insert a carriage return for RTTY and PSK messages. The \r will be ignored in a CW message.

5. When finished, press Enter to save the message and start editing the next message location.
6. Press Esc to exit the text message editing screen.

To send a message, simply type the key assigned to the message in step 3 and then, if necessary, type Enter or Ctrl-T depending on the *KybTxMode*. If *KybTxMode* is *Any key* or *Space key*, the message is sent immediately.

To edit a message, select it and return to step 3 or step 4 screens and make the desired changes.

To erase a message select it and at the key assignment window, step 3, press Ctrl-C.

³ Not CR literally, the Enter or Carriage Return key.

While a message is transmitting you can type into the Transmit Data Window to append text to the end of the message. This won't be added to the saved message text.

Beaconing

The beacon mode can repetitively send a selected message, such as the CQ shown above in message memory 4.

1. Enter the *Text menu* as shown in Section 1.1.2, page 3, select *BconIntvl* and tap and rotate to set the interval between beacon transmissions. The range is 1 to 3600 seconds (six hours).
2. Return to the *Text menu* and select *Bcon Mem#*. Tap and rotate to choose the message memory to be used as the beacon text.
3. Tap or to exit.

Start beacon operation by pressing Ctrl-Alt-B on the keyboard. A **B** character shows on the screen next to the **K** keyboard character when beaconing.

When a station answers your CQ, or when you want to stop the beacon, type any key (except Ctrl-Alt-B) to stop the beacon at the end of the current message. If you start typing a reply while the beacon is still transmitting, your reply will be transmitted after the beacon has completed its current message and beaconing will stop.

Type Esc or Ctrl-C to end the transmission immediately as described above.

Macros

A macro is a sequence of programming commands that are assigned to a single keypress. You can program the KX3 programmable function keys to perform complex functions such as setting the KX3 in split mode and offsetting VFO B a few kilohertz up the band in preparation for chasing a DX station operating split. The PX3 has this feature as well and allows you to assign KX3 and PX3 macros to PX3 keyboard Ctrl-, Alt-, Ctrl-Alt-, or F-keys, or the PX3 – function keys and thus do not use KX3 function keys.

The KX3 macro capabilities use the KX3 remote control commands described in the *Elecraft K3s, K3 and KX3 Programmer's Reference*.⁴ Similarly, the PX3 remote control commands are described in the *Elecraft PX3 Programmer's Reference*.⁵ You will need to study these manuals to become a proficient macro programmer. Also, the help files in the KX3 and PX3 Utility programs are a great resource.

Before entering a macro into the PX3 macro memory, you can use the KX3 and PX3 Utility program *Command Tester* to perfect the macro before using it.

There is storage for up to 50 of these macros. Macros stored in locations 1 – 8 can be executed by selecting them in the PX3 *Text menu* and they can be assigned to any of the PX3's – function keys. See Table 1-1, page 3.

Macro editing is the same as message editing except Ctrl-Alt-M is used to enter the editing window. There are fifty 95-character macro memories (in addition to the fifty 95-character message memories) and the process for editing macros is the same as editing message memories.

Macros are saved or restored with the PX3 configuration data.

⁴ The Programmer's Reference can be found at <http://www.elecraft.com/manual/K3&KX3%20Pgms%20Ref,%20E11.pdf>

⁵ http://www.elecraft.com/manual/PX3_Pgms_Ref_A2.pdf

1. Press Ctrl-Alt-M to enter the macro memory editing window.

[Macro] Up/Dn, CR select, Ctrl-H Help mem:1 key:<empty>

2. Press the ↑ and ↓ arrow keys to find an empty message buffer, one that is no longer needed, or one that you would like to edit. Here we select mem:2.

[Message] Up/Dn, CR select, Ctrl-H Help mem:2 key:<empty>

Press Enter to select the indicated memory.

3. Choose a Ctrl-, Alt- or Ctrl-Alt-, or F-key to send the macro.

Press assign key, ^C=clr, CR= no change

Press the key you want to use to recall this macro. You may choose a function key or Alt-, Ctrl-, or Alt-Ctrl combination (except Ctrl-C). Typing carriage-return keeps the all ready assigned key. If, when you type a key it is not displayed, it is in use for some other memory or is not allowed for some other reason and you must choose another key. You can reuse a key by editing the other memory where it is used. You will not be able to move to the next editing stage until you have chosen a valid recall key. Here we type F1.

4. Enter the macro text.

Type up to 95 characters for the macro.

Enter macro, CR=done, ^C=clr mem:4 key: F1
FA00014070000;MD6;DT3;#SPN000050;

-
- 5. When finished press Enter to save the macro and start editing the next macro location.
- 6. Press Esc to exit the macro editing screen.

To activate the macro, simply type the key assigned to the macro in step 3.

To assign the macro to a PX3 function key:

1. It is helpful to hold **LABELS** one or two times to display the function keys as shown in Figure 1-2, page 2.
2. Enter the PX3 *Text menu* and rotate **SELECT** to choose the macro memory to be assigned.
3. Tap or hold the PX3 function key to be assigned.

The macro shown above, FA00014070000;MD6;DT3;#SPN000050;, does the following:

FA00014070000; Sets VFO A to 14.070.000.
MD6; Sets the operating mode to DATA.
DT3; Sets the data submode to PSK D.

#SPN000050; Sets the PX3 span to 5 kHz. The # distinguishes a PX3 command from a KX3 command.

When you want to enter a KX3 frequency in a macro, such as FA00014070000; as in step 4 above, you can tune the KX3 to the frequency you want to enter and type Ctrl-F. This will pull VFO A's frequency into the macro.