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TEXT LITE®

PX 2000

COMMUNICATION TERMINAL

INSTRUCTION MANUAL

The TEXT LITE PX 2000

The TEXT LITE PX 2000 box contains:

- The TEXT LITE PX 2000
- soft leather case
- AC/DC adaptor
- lead with two plugs, one to plug into the PX 2000 and a 25 pin D-connector on the other end to attach to a computer, printer or modem
- instruction manual
- guarantee certificate

Contents

1.0 INTRODUCTION

The PX 2000 is a multi-facetted communication terminal. You can compose text with it or do calculations in a spreadsheet form, and store these two types of files in the directory.
The files may, if neccessary, be changed into a secret code, by means of highly sophisticated encoding system.
The files can be sent or received in serial form (to/from peripherals such as printers, or to other computers), or in the form of audible tones, allowing data to be transmitted by telephone or radio, or stored in a standard taperecorder.
To facilitate sending or receiving through any ordinary telephone, an acoustic coupler is incorporated in the unit.
The PX 2000 can be set to communicate with any system, using one of the PX 2000 sets of frequencies

CCITT V21
CCITT V22
CCITT V23
BELL 202
BELL 103
BELL 212

terminal emulation: VT 52
VT 100
VIDEOTEXT
TTY

The following versions are available:

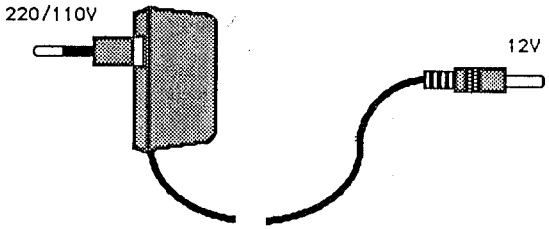
Version 1:	Version 2
V23	V21
	V22
Bell 202	Bell 103
	Bell 212

A special feature of the PX 2000 employs a specific set of instructions that can be stored in a communications file, which allows the unit to log-on automatically into other systems.

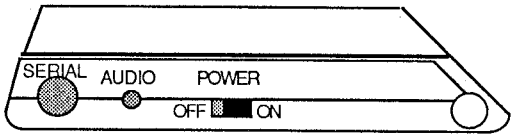
2.0 Charging the PX 2000

Before the TEXT LITE PX 2000 can be used for the first time, it is necessary to charge its batteries. Insert the wall plug in the mains (check the voltage in your country!).
Three types of adaptor are available:

1. 220V
2. 110V
3. 220V/110V

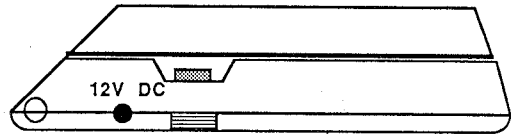


Use the switch on the right side of the unit to turn it on. See illustration below.



Switch the PX 2000 off only when it will be out of use for longer periods.
In that case the clock is also switched off, but the contents of the memory module is saved.

Insert the small plug of the charger in the left side of the unit, indicated by 12V DC.



The red lamp lights up when the unit is charging.
It is necessary to charge the PX 2000 for at least 12 hours, before using it for the first time. Once in use the PX 2000 needs a recharge of approximately 5-6 hours.

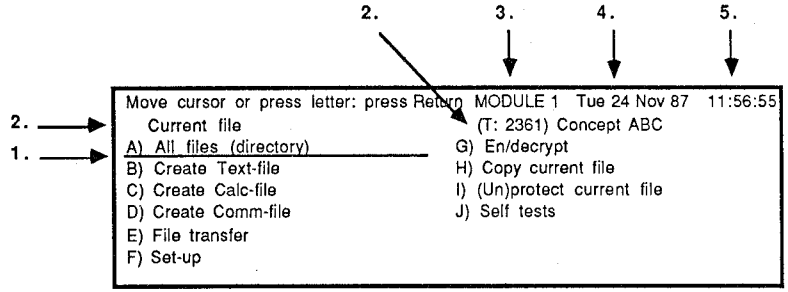
Connecting the PX 2000 to other computers or peripherals:
The PX 2000 comes equipped with a 2-plu lead. One plug fits in the PX 2000 and the other, a 25-pind D-connector, plugs into a computer or a printer.
Check the specifications of your computer, terminal or printer. See the 'Printer setup' section.

3.0 The Main MENU Screen.

Switch the unit on by pressing the **ON/STOP** key. The Menu then appears in the display.

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                              (T: 2361) Concept ABC
A) All files (directory)                  G) En/decrypt
B) Create Text-file                       H) Copy current file
C) Create Calc-file                       I) (Un)protect current file
D) Create Comm-file                       J) Self tests
E) File transfer
F) Set-up
```

This Menu screen of the PX 2000 consists of the following items:



Explanation of the numbers in the drawing above:

1. The cursor, moved by pressing the cursor keys on the keyboard or the desired letter, shows the selected item. Press the RETURN key to access e.g. the directory, text file, calc file.
2. The display shows the current file, the file type, the size in bytes and the name of the file.
3. You can give each memory module its own name. The name of the module is displayed on the top line of the MENU screen.
4. The PX 2000 has a real clock, showing the current day and date.
5. The correct time is displayed in this corner of the screen.

You can select an item and open it by pressing RETURN. The options in the MENU screen can also be achieved by pressing the the RED (FUNCTION) key, e.g. the RED (FUNCTION) key pressed and leter J will open a new text file. The RED (FUNCTION) key pressed and letter H will open a calc file. Study the keyboard.

3.1 Main Menu Contents

A. All files (directory):
Shows a list of all files (the directory).

B. Create Text-file:
Opens a new text file.

C. Create Calc-file:
Opens a new calc file.

D. Create Comm-file
Opens a new comm-file.

E. File transfer
For transfering files to modem, serial port, or taperecorder (if connected).

F. Setup
Shows the general set up arrangement: the set up of clock/alarm, module name, keyboard click, printer setup and changed ASCII values for printing, etc.

G. En/decrypt
For encoding or decoding the current file, for changing encrypting/ decrypting key.

H. Copy current file
Creating a duplicate file of the current file in the directory.

I. (Un)protect current file
(Un)Protects selected file in directory against (accidental) erasure.

J. Selftests
For service and calibration purposes only. Playing with the self tests will not damage the unit.

File types:
When the cursor is under letter A: (All files (directory)) then press the RETURN key. The display may show e.g.:

```
Move cursor, press RETURN to select      MODULE 1      Tue 24 Nov 87 12:56:11
     9 FILES, 3422 BYTES                 20882 BYTES FREE
<C :  654> calc a        <c:  654> calc b        <p:  654> calc c
<X :  432> comm a        <x:  432> comm b        <p:  432> comm c
<T :  625> text a        <t:  625> text b        <p:  625> text c
```

You can open the indicated file by the pressing the RETURN key.

File types.

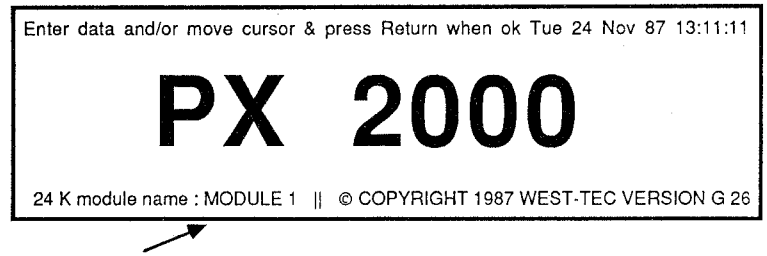
< C nr> = Calc file, not coded, not protected
< X nr> = Comm file, not coded, not protected
< T nr> = Text file, not coded, not protected
< c nr> = Calc file, coded, not protected
< x nr> = Comm file, coded, not protected
< t nr> = Text file, coded, not protected
< p nr> = Protected calc, comm, or text file

3.2 The Set-Up of the PX 2000

In order to set up the different items in the PX 2000, press letter F or use the cursor keys to move the cursor under F and press RETURN. The display shows:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                                (T: 2361) Concept ABC
A) Module name                                G) Enter cmail id
B) Set the clock                              H) Printer setup
C) Set the alarm                              I) Printer replace codes
D) Keyboard click                             J) Reset printer setup
E) Auto off time
F) Videotex colors
```

A. Module name:
When you want to give the memory module a name, press letter A (or use cursor keys to select A) and press RETURN.
The display shows:



The cursor is blinking. Insert the name selected for your memory module. When correct press RETURN. Now you are back in F (Set up) and the module name is displayed:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                                (T: 2361) Concept ABC
A) Module name                                G) Enter cmail id
B) Set the clock                              H) Printer setup
C) Set the alarm                              I) Printer replace codes
D) Keyboard click                             J) Reset printer setup
E) Auto off time
F) Videotex colors
```

B. Set the Clock:
To set the day of the week, day, month, year, hour and minutes. Use the cursor keys to select B or press letter B. Press RETURN. The next screen reads:

```
Enter data and/or move cursor & press Return when ok Tue 24 Nov 87 13:11:11

Day in the week : Tue  [use SPACE bar]     Hour   :  13 [ 0 -  23 ]
Day             : 24  [  1  -  31 ]        Minute :  44 [ 0 -  59 ]
Month           : Nov [use SPACE bar]
Year            :  87 [  0  -  99 ]
```

Day in the week:
The cursor is blinking at the correct day of the week. To run through the days of the week use the SPACE bar. Select the correct day.
Day:
Press the cursor down key. Insert the date (two digits) by overtyping the date displayed.
Month:
Press the cursor down key. Select the month by pressing the SPACE bar. Select the month.
Year:
Press the cursor down key. Insert the correct year (two digits) by overtyping the numbers displayed.
Hour:
Press the cursor down key. Insert the hour (two digits) by overtyping the numbers displayed.
Minute:
Press the cursor down key. Insert the minutes (two digits) by overtyping the numbers displayed.

When all parameters are set correctly, press RETURN. If one of the items is incorrect use the up or down cursor keys to select the item in question and correct it.
When you press RETURN the correct date and time are displayed in the top line of the PX 2000.

The displays now shows e.g.:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                              (T: 2361) Concept ABC
A) Module name                          G) Enter cmail id
B) Set the clock                        H) Printer setup
C) Set the alarm                        I) Printer replace codes
D) Keyboard click                       J) Reset printer setup
E) Auto off time
F) Videotex colors
```


C. Set the alarm:
To set the alarm of the PX 2000, select C by using the cursor keys or press letter C. Press the RETURN key. Inserting the day of the week, hour, minutes and ON/OFF is done is the same way as described for setting the time and date. When these are correct press RETURN.
The display shows:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                              (T: 2361) Concept ABC
A) Module name                          G) Enter cmail id
B) Set the clock                        H) Printer setup
C) Set the alarm                        I) Printer replace codes
D) Keyboard click                       J) Reset printer setup
E) Auto off time
F) Videotex colors
```

D. Keyboard click:
You should hear a single beep each time you press a key. Two beeps mean the key has registered twice, no beep that the key has not registered at all. A longer beep indicates a mistake. To silence the beep select D from the MENU by using the cursor keys or press character D. Press RETURN.
The display asks whether the keyboard click must be switched on or off. Use the SPACE bar to make your selection. After selecting press RETURN.

E. Auto off time:
Select E from the MENU by using the cursor keys or press letter E. Press RETURN. The display shows:

```
Enter data and/or move cursor & press Return when ok Tue 24 Nov 87 13:11:11

Auto off time (x10  s):    20  [  1 -   99]
```

When the PX 2000 is not used for some time it will switch itself off. The user is can decide for which period of time the PX 2000 will remain on, by typing two digits. The number inserted must be multiplied by 10 (seconds). In the example shown above, the unit will switch itself off after 20 x 10 secs. = 200 seconds.

F. Videotex colors:

1. Select F from the set up MENU by using the cursor keys or press letter F.
2. Press the RETURN key. The display shows:

```
Enter data and/or move cursor & press Return when ok Tue 24 Nov 87 13:11:11

Red     : NORMAL  [use SPACE bar]  Magenta : NORMAL  [use SPACE bar]
Green   : NORMAL  [use SPACE bar]  Cyan    : NORMAL  [use SPACE bar]
Yellow  : NORMAL  [use SPACE bar]  White   : NORMAL  [use SPACE bar]
Bleu    : NORMAL  [use SPACE bar]
```

When on line with a data base, a color monitor could show characters in colors. Because the screen of the PX 2000 uses no colours it might be useful to know if some characters are displayed in for example red.
When you want to see if some characters are red, use the SPACE bar to change NORMAL to UNDERLINED. Once online with a data base, all characters in red are underlined in the display of the PX 2000.
You can spot the green characters at the same time by switching NORMAL (after green) to ENHANCED. In this example red characters are underlined, green characters are enhanced. A third colour can be detected by changing the setting to BOTH (ENHANCED and UNDERLINED).

G. Enter C-Mail ID:

The PX 2000 can be used to enter a C-Mail system. This is an electronic mailbox system, developed by TEXT LITE, that is on line 24 hours a day for sending and receiving messages to and from a mailbox and further to enable you to send and receive telex messages.
The TEXT LITE C-Mail system expects the user to have a user name and a password. When a message is sent or received, C-Mail checks the name and the password of the user before allowing him to use the system.
When you are a member/user of such a system you can store your user,password in the PX 2000's memory.

1. Select letter G from the set-up MENU by using the cursor keys of press character G. Press RETURN.
   The display shows e.g.:

```
Enter data and/or move cursor & press Return when ok Tue 24 Nov 87 13:11:11

Cmail id   : H. PRONK   ||

Password :  ----------  ||
```

   The cursor is blinking at the insertion point.
2. Type your C-Mail ID (user) as agreed with the system operator.
3. Press cursor down.
4. Type your password and press RETURN.

In case you want to change your password, act as follows:

- Hold down the **SHIFT** key and press **DEL LINE.** All dashes are gone.
- Type the password.
- Check your password. Is it typed correctly?
- Yes, press **RETURN.**
- No, press **SHIFT** and **DEL LINE.**
- Type your password again. Correct?
- Press **RETURN.**

When you select G again from the MENU the same screen appears as shown above. Your password becomes invisible, but it is there nevertheless!
Press RETURN to return to the set up MENU.

H. Printer setup:

The PX 2000 comes equipped with a lead with two plugs, one to put in the PX 2000 and a 25 pin D-connectoron the other end to attach to a computer or printer.

1. Connect the PX 2000 to a computer or printer.
2. Select H from the set up MENU by using the cursor keys or type letter H.
3. Press RETURN. The display shows:

```
Enter data and/or move cursor & press Return when ok Tue 24 Nov 87 13:11:11

Baud-rate  : 1200  [use SPACE bar]     CWait * 10ms:     0  [ 0 -  99]
Bits       : 8d,none,1s [use SPACE bar] Underl. on    : 1B2D01 || Enter
New-line   : CR+LF  [use SPACE bar]     Underline off : 1B2D00 ||ASCII control
Graphics   : YES  [use SPACE bar]       Enhance on    : 1B45   || in HEX
L. Margin  :    0  [  0  -  40  ]       Enhance off   : 1B 46  ||
Paper length:   0  [  0  -  99  ]  If 0 formfeeds are used
```

These settings are standard for an Epson (or compatible) printer.
Use your printer manual (terminal) to check that the settings are correct for your printer.

Baud-rate:

The default Baud rate for the PX 2000 is 1200 Baud. If your printer or terminal can handle 9600 Baud for example, select this value by using the SPACE bar. The Baud rate can be set between 75 and 9600 Baud.

Bits:

When you have selected the Baud rate, move the cursor to **Bits.**
Your printer manual will show you the settings needed. Use the SPACE bar to make your selection.

New-line:

Your manual will tell you whether the printer (terminal) expects at the end of a line a CARRIAGE RETURN + LINE FEED, or a CARRIAGE RETURN without LINE FEED, or a LINE FEED without a CARRIAGE RETURN. Use the SPACE bar to make your selection.

Graphics:
If you have a text with or without graphics which you want to print on an Epson (or compatible) printer, leave the YES after GRAPHICS as it is.
The printer will print the text as it is on the screen of your PX 2000.
When you are using another type of printer, it is possible that it will not print the graphics as shown on the screen, becauce some Escape codes are sent. It that case GRAPHICS must be switched off by using the SPACE bar to set Graphics: NO.

Left Margin:
The printer will start printing at the beginning of the sheet of paper when you leave the 0 after L. Margin unchanged.
Type 1 or 2 digits for the number of space you want at the start of the line.

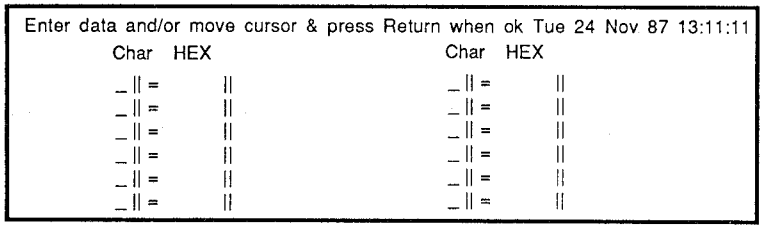
Paper Length:
When you want to change the paper length, because you are using a sheet of paper smaller or larger than standard computer paper, or you want a specific layout, type two digits. This intstructs the printer to print that number of lines per form (sheet of paper).

CWait * 10ms:
When you are using a printer other than the above mentioned Epson (or compatible) printer, it may happen, as with some printers, that the printer drops characters, because the PX 2000 is sending its characters too fast.
In that case type a number to follow: CWAIT * 10ms e.g. 5.
The PX 2000 will pause, after sending a character, 5 times 10 milli seconds, before sending the next character. If this does not solve the problem try a higher number, or check the Baud-rate of your printer.

Underline on/off and **Enhance on/off:**
You can write your text with the PX 2000 using the underline and enhance features. Your Epson (or compatible) printer will print this in the appropriate way. When using a different printer, you will probably have to change this code. Check the printer manual for the correct code for printing underlined or enhanced characters. Overtype the existing code with the correct code.

When you have finished press RETURN. You are back in the SET UP MENU.

I. Printer replace codes:
Some printers may have a different set of characters. In order to replace the characters for your printer:
1. Select character I from the set-up MENU by using the cursor keys or press character I.
2. Press the RETURN key. The display shows:

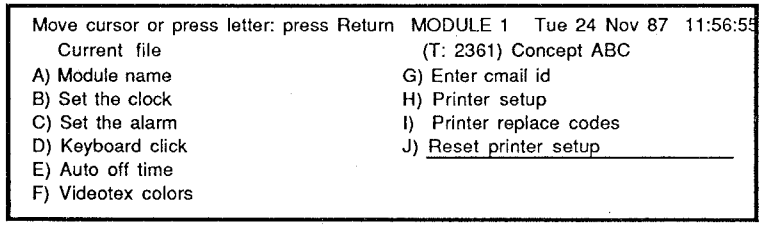


3. Insert the character you want to change.
4. Press cursor right key.
5. Type the new HEX code.
6. Press cursor down key.
7. Type the next character code.
8. Press cursor right key.
9. Type the new HEX code.

To complete the printer replace codes operation, press RETURN.
Now the PX 2000 will now make the desired conversions and send the correct characters to the printer.

Note:
Editing during insertion is not possible.
Start again after a reset printer set up (see the Main Menu section).

J. Reset printer setup:
In order to reset the PX 2000 to the standard setup for an Epson (or compatible) printer and to clear replaced printer codes, select letter J from the Set-Up MENU by using the cursor keys or press character J. The display shows:



When the cursor is under letter J, press RETURN.
No new screen will appear, but all settings return to standard mode. You can check this by selecting the letter H or letter I from the Main MENU.

4.0 Creating a Text-File

Press the ON/STOP key to switch the unit on. The display shows:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file
A) All files (directory)                  G) En/decrypt
B) Create Text-file                       H) Copy current file
C) Create Calc-file                       I) (Un)protect current file
D) Create Comm-file                       J) Self tests
E) File transfer
F) Set-up
```

Select letter B from the MENU or use the cursor keys to select letter B.
Press RETURN.
The following appears in the screen:

```
Enter data and or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Filename      :                ||
Line-length   :  80 [ 10 - 80 ]
Page-length   :  66 [  0 - 99 ]
Show returns :  NO [use SPACE bar]
```

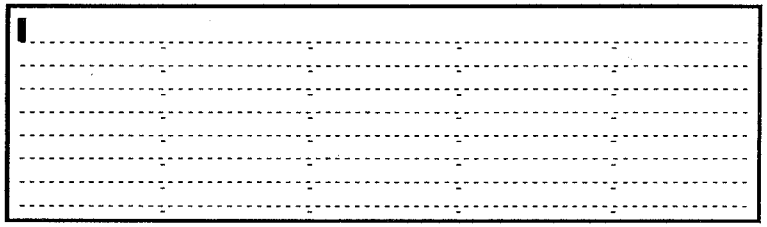
Filename:
The cursor is blinking at the insertion point. You may enter a filename of up to 11 letters or figures. The PX 2000 does not check whether or not that name has already been used. You may thereforehave two or more files with the same name.

Line-length:
The display of the PX 2000 has a maximum of 80 characters per line. When you want your text to have fewer characters per line then use the cursor down key to move the cursor to line length.
Overtype the existing number with two digits. e.g. 69.
This number is shown in the display and is valid for this file only.

Page-length:
The pagelength for the printer set up will specify the page length. This setup will instruct the PX 2000 how many lines will be printed on that page.
The standard number of lines for an A4 page is 66.
Move the cursor down to select Page-length.
Overtype the existing digits with the desired number.

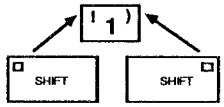
Show returns:
It is some times useful when the screen shows where a (hard) RETURN was used to end a line and start a new paragraph.
Move the cusor down to select: Show returns.
Use the SPACE bar to select YES or NO.
When all settings are correct press RETURN.

The display shows:

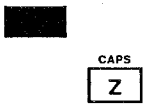


4.1 Editing Texts

Type in your text as on a normal type writer. Use the SHIFT key for capital letters. The left SHIFT is used for the characters to the top left of a key and the right SHIFT for the characters to the top right of a key.



Capitals:
If you only want to type capital letters then press the **RED (FUNCTION) key** and the letter **Z (CAPS)**.



All letters typed are in capitals. To revert to lower case press RED (FUNCTION) key and Z (CAPS) again.

Line NRS:
By pressing the RED (FUNCTION) key and letter N (LINE NRS), you switch the line numbers on or off.
Note that the PX 2000 will act slower when the line numbers are switched on.
When the line numbers are switched on, the display shows:

```
01-01
01-02
01-03
01-04
01-05
01-06
01-07
01-08
```

The first number indicates the page you are working on. The second number is the number of the line.

Word wrap.
Do not worry about how long the line is; the PX 2000 will automatically break off at the end of a line and write the following word at the start of the next line.

To end a paragraph.
Press RETURN, which has the same function as the carriage return on a typewriter. To leave a full line clear before the next paragraph press RETURN again.

To enter a space.
Press the long space bar in the center of the bottom row of keys. The underlining in the display, which indicates the blank part of a line has not (yet) been taken up by text, will disappear to indicate that you have entered a space.

4.2 Using the Edit Functions:

When you are typing in text you can use the edit functions on the keyboard.

Moving text files.
The cursor (the flashing block in the display) shows you where you are in the text. Various keys are provided to help move this cursor quickly around the text, in the same way you move your finger over a page or turn the pages of a book. These keys work as follows:

SHIFT + RED (FUNCTION) key	◁	cursor back 1 position
	◁	cursor back 1 word
	◁	cursor back to beginning of line
SHIFT + RED (FUNCTION) key	▷	cursor forward 1 position
	▷	cursor forward 1 word
	▷	cursor forward to end of line
SHIFT + RED (FUNCTION) key	△	cursor 1 line up
	△	cursor remains in place, the display scrolls 1 line down
	△	cursor to the beginning of file
SHIFT + RED (FUNCTION) key	▽	cursor 1 line down
	▽	cursor remains in place, the display scrolls 1 line up
	▽	cursor to the end of the file

Thumbing through the pages.
If you composed a longer text and wish to go through the text quickly, use the RED (FUNCTION) key and letter V or B. The PX 2000 will go to the next page or previous page
Standard page length is 66 lines. If, during the setup of the file, you have chosen a different number of lines per page, the scrolling of the pages relates to that number.

Correcting typing errors.
1. Place the cursor under the letter you wish to correct.
2. Type the correct letter. If you continue typing you will 'overtype' any existing text.

Erasing a letter or characters.
1. Place the cursor directly after the letter you wish to correct.
2. Press DELETE.
Repeated pressing of DELETE 'eats' its way back into the existing text, erasing one letter at a time. This operation affects letters, numbers, punctuation marks and spaces entered with the space bar. To delete a RETURN end of paragraph) instruction, move the cursor to the start of the next line and press DELETE.

Erasing a line or lines of text.
1. Place the cursor at the start of the line.
2. Press SHIFT + DELETE (DEL LINE).
3. If you continue pressing DEL LINE it will go on deleting lines until you release it or until you reach the end of the text.
If the cursor is not at the start of the line, these keys (SHIFT+ DELETE) will only erase the part of the line to the right of the cursor.

Deleting the complete text file.
Press the RED (FUNCTION) key and letter I (DELETE FILE). The display shows:

```
DELETE FILE text abc      ? (PRESS RETURN)---------- 01-01
---------- ---------- ---------- ---------- ---------- 01-02
---------- ---------- ---------- ---------- ---------- 01-03
---------- ---------- ---------- ---------- ---------- 01-04
---------- ---------- ---------- ---------- ---------- 01-05
---------- ---------- ---------- ---------- ---------- 01-06
---------- ---------- ---------- ---------- ---------- 01-07
---------- ---------- ---------- ---------- ---------- 01-08
```

Pressing RETURN deletes the entire the file is deleted. There is no way to restore that file.

Deleting all files.
If you want to erase the complete memory of your PX 2000 module, press the RED (FUNCTION) key and letter U (CLEAR ALL).
The display will ask: **DELETE ALL FILES? Are you SURE? Y/N**
When you press the **Y** key all files are deleted.
There is no way to restore the files.
Pressing any other key will interrupt this operation.

Inserting additional text without deleting existing text.
1. Move the cursor to the desired insertion position.
2. Press the INSERT key. The cursor disappears. Only the flashing underlining appears on the screen.
3. Type the desired text.
4. To stop insertion press the INSERT key again. Use of TAB in INSERT mode enters a space equal to the existing tab distance from the margin.

Inserting a line.
Press one of the SHIFT keys and the INSERT key.

Tabulation.
To assist you in the layout of your text, standard 'tabulator stops' have been preset previously at every 16th position from the left margin in the display. If you press TAB, the cursor will jump to the next preset tabulator stop. This also provides a 'fast forward' option within the line.

Inserting a tab at a different position or positions.
1. Move the cursor to the desired position.
2. Press the RED (FUNCTION) key and TAB (TAB SET). The new tab position is underlined in the display.
3. To revert to standard tabs press the right SHIFT and TAB.

Decimal tab.
To assist you in composing a text with figures, the PX 2000 is equipped with a (english) decimal tab.
- Move the cursor to the desired point.
- Press left SHIFT key and with TAB (D).

Any figures now entered in the text will appear on the left side of the decimal tab, until you type a decimal point. You have to press left SHIFT and TAB (D) for each additional line, because it is necessary to define each tabulator stop as a decimal tab.
The following screen demonstrates the use of the decimal:

```
        2345.49---------- ---------- ---------- 01-01
        9873.56---------- ---------- ---------- 01-02
        3456.23---------- ---------- ---------- 01-03
        3456.25---------- ---------- ---------- 01-04
---------- ---------- ---------- ---------- ---------- 01-05
---------- ---------- ---------- ---------- ---------- 01-06
---------- ---------- ---------- ---------- ---------- 01-07
---------- ---------- ---------- ---------- ---------- 01-08
```

Searching for a particular place in a text.
The PX 2000 can locate any given combination of 1 - 16 characters occuring in the file.
When using this facility to search for a particular position, try to select a unique set of characters, i.e. a sequence of letters or figures which probably only occur once in the file. A suitable selection is often the last letters of one word, a space and the first letters of the next word.
Proceed as follows:
1. Press the RED (FUNCTION) key and the letter L (SEARCH). The display shows:

```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:16:11

String to search          : ▮                    ||
Upper/lowercase must match : YES [use SPACE bar]
```

2. Type in your search string. Select whether or not you want upper/lower case to match.
3. Press RETURN. The cursor is flashing at the spot where the string has been located.

If the combination of characters is not found the display shows:

```
*** NOT FOUND ***                          Tue 24 Nov 87 12:56:11

String to search              : order form        ||
Upper/lowercase must match : YES  [use SPACE bar]
```

Printing a file.
You have typed in a text and want to print it.

1. Switch on your printer.
2. Insert paper. You have already set up the PX 2000 for your printer (see section PRINTER SET UP).
3. Insert the plug in the serial output on the right side of the unit.
4. Connect the cable to your printer.
5. Press the RED key and E (PRINT). The following appears in the screen:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Print:                                    <T:   239>

A) Current file
B) Directory
C) Marked block
D) Printer setup
```

A) Current file:
Do you want to print the current file? Press RETURN. The PX 2000 begins sending the file to the printer and the printer starts printing.

B) Directory:
Select B from this MENU and press RETURN. The directory is now printed.

C) Marked block:
Do you only want to print the marked block?
Go back to the active file by pressing the ON/STOP key.
To select a block you want to print the following:

- Put the cursor at the start of the block.
- Press the RED (FUNCTION) key and S (MARK).
- Put the cursor at the end of the block.
- Press the RED (FUNCTION) key and D (MARK).
  The block you want to print is now enhanced.
- Press the RED (FUNCTION) key and letter E (PRINT).

To print this block select letter C from the screen displayed above.

D) Printer setup:
Has the printer failed to print what you intended it to print?.
Select letter D.
Check the settings for the printer.

4.3 Encoding/decoding a file.

Your text is finished. You do not want an unauthorized person to read it.
Press the RED (FUNCTION) key and letter G (CRYPT). The display shows:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                              <T:   239>
A) Encrypt current file
B) New en/decrypt key
```

The cursor is under A. Press RETURN.
The display shows:

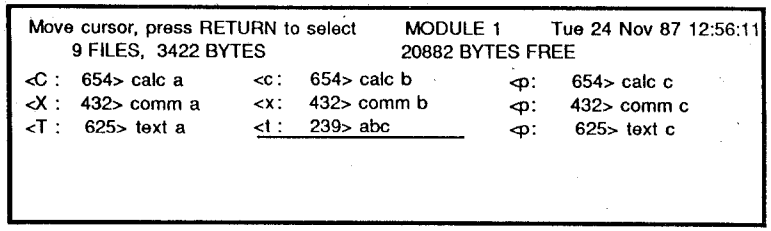
```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Press RETURN to en/decrypt file   <T:  239> abc

Enter a temporary key - if not entered, permanent key will be used.
Temporary key : .I. . . . . . . . . . . . . . ||
```

When you do not wish to use the permanent key, then insert a key with a maximum of 16 positions. The key may consist of: letters, figures or punctuation marks.
Use a key that is easy to remember, otherwise you may be unable to decode this file.

Press RETURN. While the PX 2000 is coding your file the screen shows:

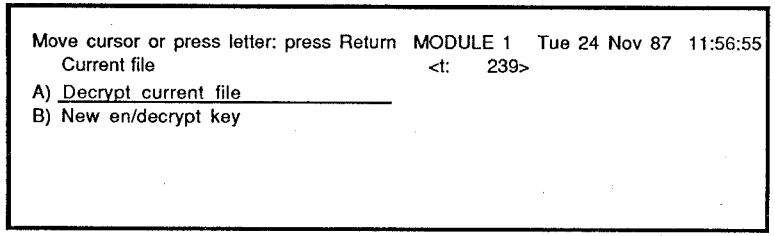
```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:16:11

Press RETURN to en/decrypt file   <T:  239> abc

- PLEASE WAIT -
Enter a temporary key - if not entered, permanent key will be used.
Temporary key : .I. . . . . . . . . . . . . . ||
```

After coding the file the PX 2000 will automatically return to the directory and show the following display:

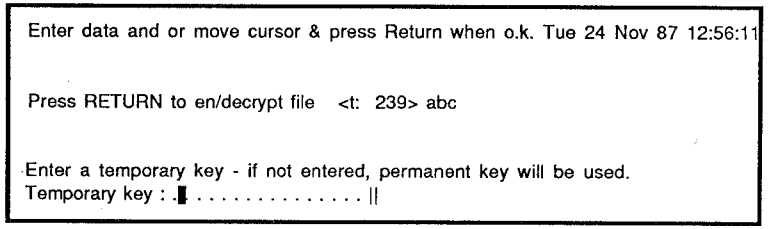


Decoding a file.
Place the cursor under the relevant file in the directory. Press the RED (FUNCTION) key and G (CRYPT).

The display shows:

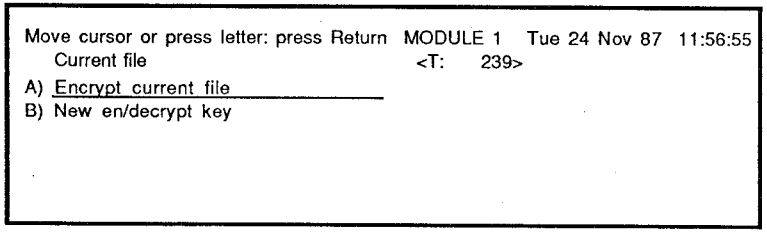


Press RETURN.

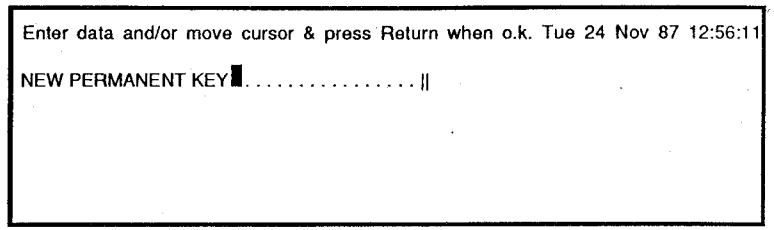


If you used a temporary key, then insert it and press RETURN.
After - PLEASE WAIT - the decoded text will be shown in the display.

Inserting a permanent key.
Press the RED (FUNCTION) key and G (CRYPT). The display shows:



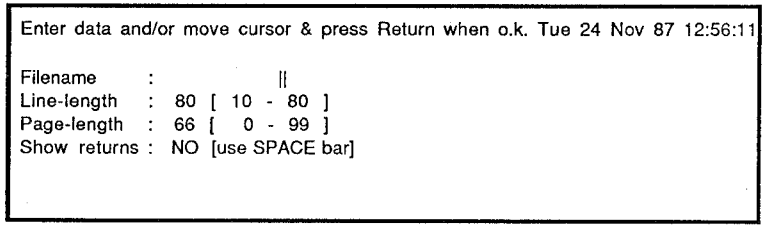
Select B by using the cursor keys or press letter B. The following display appears:



Insert a key with a maximum of 16 positions. The key may consist of letters, figures or punctuation marks. Press RETURN. The PX 2000 returns to the active file.

Copying a file.
You may sometimes want to edit an already existing file. To prevent loss of the original you can make a copy of the file.

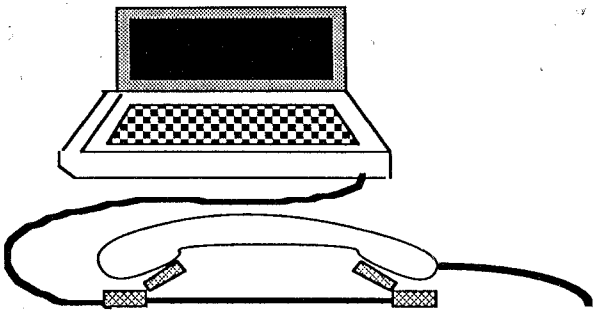
1. Select All files (directory) from the main MENU.
2. Select the file you want to copy by placing the cursor under the file name.
3. Press the MENU key. The display will read:
   Current file <T: 239> abc
4. Select H (Copy current file) by pressing H or using the cursor keys. Press RETURN.
5. The display will show:



6. Give the copy of the file a new name or use the old name with an extension, e.g. abc.1.

Sending a text to a C-Mail (mailbox)system (V 23 mode only)
If you are a member of a C-Mail system and you want to send and/or receive electronic mail, telexes and send fax messages, proceed as follows.

1. Be sure you have entered your user name and password in the PX 2000 (see Set up Menu section).
2. Remove the acoustic coupler. Arrange the handset as follows:



3. Open the text file you want to send.
4. Press the RED (FUNCTION) key and letter Q (TRANSMIT).

The display shows:

```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Ready to transmit     < T:  239> abc

Mode     : C-Mail      [use SPACE bar]
Baudrate:    600  [use SPACE bar]

Press RETURN or SEND to start transmission.
```

Make the selection shown above by using the space bar and cursor keys. Press RETURN or SEND key.
For instructions on how to use electronic mail, contact the system operator.

5.0 Creating a Calc(ulation) File.

To create a calculation file select C from the main MENU, using the cursor keys or press character C. The next screen shows:

```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Filename : ▌              ||     Printer Cell Width      :  10  [ 4 - 40 ]
Calculate : YES  [use SPACE bar] Print Formula's         :  NO  [ use Space bar ]
Cell width: 10    [ 4 - 40 ]     Print Upperleft Corner  : A00
Precision :  4    [ 0 - 10 ]     Print Lowerright Corner P39
Decimals :  2     [ 2 - 10 ]
```

File name.
To enter a file name, type any combination of characters; maximum 11. Remember that file names are listed alphabetically in the directory (All files).

Calculate.
If set to YES, whenever a value is changed, all cells will be automatically re-calculated. In very large files this may considerably slow down the input of single calculations. In such cases it is desirable to choose NO. Calculation will then follow after the RED (FUNCTION) key together with letter M (CALCULATE)are pressed.

Cell width.
The cell size can be set for 4 to 40 characters. The cell can be changed any time if the RED (FUNCTION) key and letter A (SETUP)are pressed.
Characters that do not fit within the cell limits will be visible in the next cell, if it is empty. If the following cell is not empty, characters that do not fit within the cell limits will remain invisible (see 'Cells').

Precision.
The number of decimalplaces that can be calculated can be set from 0 to 10. For the sake of convenience sake, this number is preset to 4.

Decimals.
This number of decimal places that appear in the display can be set from 0 to 10. For the sake of convenience, this number is preset to 2.

Printer Cell width.
If you want to print a file differently from how it appears on the screen. Be sure that the figures or formula's do not exceed the cell width of your printer.

Print Formulas.
The PX 2000 is preset so as not to print the formulas used. If you want to print formulas instead of resulting values, select YES by using the SPACE bar.

Print Upperleft Corner.
You select starting place of cell selection to be printed. Overtype the preset A00 with the number of the cell you want to start with.

Print Lowerright Corner.
Select the end point of the print selection. Overtype the preset P39 with the number of the selected cell.

Having SET UP the calc file, press RETURN. The screen shows:

```
     A    B    C    D    E    F    G    H    I    J
00: --------
01:
02:
03:
04:
05:
06:
```

Press RETURN.

```
NEW A00: FREE
00:
01: --------
02:
03:
04:
05:
06:
```

The cells.
The spreadsheet consists of 640 cells. Cells are determined by their coordinates: row number (00, 01, 02, etc.) and column (A, B, C, etc.). The first cell is cell A00, the last is P39.
To indicate which cell is selected for input, the selected cell is underlined. Any of the cells can be selected for input with the cursor keys.

There are three types of cells: free (empty) cells, number cells and text cells. What you typed in a cell determines how the cell will be distinguished: as a text cell or as a number cell.
Number cell: the text in the cell consists of figures (or calculations containing cell coordinates).
Text cell: the cell contains any text other than figures, calculations or cell coordinates.
The distinction, text cell - number cell, is important: what is typed in a text cell cannot be part of a (re)-calculation. If the contents of a text cell are used in a calc cell, a 'T. REF' error message will appear.

Typing text or figures in cell.
As shown above, cell A00 is empty. You are now ready to enter text, figures or calculations in this cell.
If an unoccupied cell is selected, the text or figures in that cell can only be changed after RETURN is pressed.
The display will show:


```
A00: TEXT:  SALES
00: SALES
01:
02:
03:
04:
05:
06:
```

To delete the contents of a cell, move the cursor key to the end of the string of characters. Press the DELETE key. Insert the correct characters and press RETURN.
Most word processing operations, like INSERT and DELETE, can be used. If you press RETURN, or cursor up or cursor down key input into will be completed. Another cell may then be selected for input, or the file may be closed.
The contents of a cell can be changed at any time: select the cell, press the SPACE bar or RETURN and re-edit the contents - as you would re-edit a piece of text. Then press RETURN or cursor keys.

Typing in number cells.
If a number or calculation is typed in a cell, the value is shown in that cell. The PX 2000 can perform most arithmetical operations: addition, subtraction, multiplication, division, square and square root calculations. The calculations are entered as you would normally write them e.g.

```
NEW  A00:  FREE  10+45.5:(120-√60)2
00: --------
01:
02:
03:
04:
05:
06:
```

The symbols that may be used are:
+ - x(or*) :(or/) √ 2(square) ()(sets of brackets).

More than one set of brackets may be used in a calculation. If a calculation is written incorrectly e.g. 2*((3.9)18 it will not be performed. A error message will appear.
If the calculation is written correctly, it will be performed after pressing RETURN or using the cursor keys. The result of the calculation is visible in the cell.
The standard order calculations are performed is: square root, square, multiply, divide, add, subtract. You may change this order with the use of brackets.

Using the value of cells as 'variables' in other cells.
It is possible to use the value of cell coordinates (A00, A01, BO2, F05 etc.)as 'variables' in calculations in other cells.
The value of the cell can be the result of input, or a calculation. The value is at all times visible in the cell. This value - that may vary as the contents of the cell vary - can be written in other cells by typing the cell coordinates in a calculation.
If no value can be assigned to a cell (e.g. an empty cell or a text-cell), a 'T.REF' error message will appear.

Example:
Open a new calc file. The cursor position is at A00.
1. Type 2 and press RETURN.
2. Move the cursor to cell A01.
3. Type 10 and press RETURN.
4. Move the cursor to cell A02.
5. Type A00xA01 and press RETURN.

```
A02:  NUMBER:  A00XA01
--------------------------------------------------------------------------------
00:          2
01:         10
02:  --------20
03:
04:
05:
06:
```

The value of A02 is now 20.
6. Move the cursor back to cell A00.
7. Type 8 (the 8 will overtype the 2) and press RETURN.

The value of cell A00 is now 8 and the value of cell A02 has become 80.

It is possible to combine figures or calculations and coordinates.
8. Change the text in cell A02 to (2+A00)+A01 and press RETURN. The value in A02 is now 100.

The use of brackets will change the order of calculation.
9. Change the text in cell A02 to (2+A00)xA01

```
A02:  NUMBER:  (2+A00)+A01
--------------------------------------------------------------------------------
00:          8
01:         10
02:  --------100
03:
04:
05:
06:
```

The value of A02 is now 100.
The use of cell values as variables in other cells, enables you to put together a complex spreadsheet for budgetting, tax, scientific calculations, etc, that you may save as a file for later use.

Input errors.
OVFLW (overflow):
The maximum number of digits that can be calculated by the PX 2000 is 15 (including decimals). If input or the result of a calculation consists of more than 15 digits, the value will be incalculable: an OVFLW (overflow) error message will appear instead.

((.)) (error in parentheses)
If a **(** (called parenthesis) is used in a calculation, a closing **)** must be used to separate that calculation from the next - to change the order of calculation. More than one set of ()s may be used, but every set must start with a (and end with a). If this is done incorrectly, the above error message will appear when you enter the calculation.

E.REF (error cell reference)
This message will appear if you refer to a cell coordinate that contains an error.

T.REF (text cell reference)
This message will appear if you refer to a cell coordinate that contains text or is empty: a text cell or a free cell.

U.REF (unused cell reference)
This message will appear if you refer to a cell coordinate that is empty.

C.REF (circular reference):
If cell coordinates are used as variables, the cell coordinate must have a value. The value can be the value written in the coordinate, or derived from other coordinates. The value of a coordinate can never be derived solely from itself: if a coordinate refers to itself, a C REF (circular reference) error message will appear.

DIV 0 (division by 0):
Division by 0 is mathematical impossible. If you instruct the PX to perform this impossible calculation, the unit will remind you of the error with the message DIV 0 (division by 0).

INSERT, DELETE LINE
To insert a row of 16 empty cells above the selected cell, press the SHIFT key and INSERT (INSERT LINE).
This operation will delete the bottom row of cells.
To delete a row of 16 cells, including the selected cell, press the SHIFT key and DELETE (DELETE LINE).
A row of 16 empty cells will then be added to the the bottom row.

All cells that change postion as a result of this insertion/deletion, will have different coordinates: any reference to the original coordinates in the spreadsheet will automatically be changed to the new coordinates.

INSERT, DELETE COLUMN
To insert a column of 40 empty cells right of the selected cell, press the RED (FUNCTION) key and INSERT (INSERT COLUMN).
This operation will delete the last column of cells.
To delete a column of 40 cells, including the selected cell, press he RED (FUNCTION) key and DELETE (DELETE COLUMN).
A column of 16 empty cells will then be added to the the last column.

Copying cells.
Pressing the RED (FUNCTION) key and S (MARK (down)) in a cell, will select the contents of that cell for copying to any cell:
Move cursor to free cell coordinates and press the RED (FUNCTION) key and F (BLOCK...). The contents of the selected cell are copied to the editing line of the new cell. Further additions of text or figures (or re-editing) remains possible.
Press RETURN to close the cell.
Press the RED (FUNCTION) key and D (MARK (up)) or ON/STOP to de-select cell for further copying.

Line nrs.
If the RED (FUNCTION) key and N (LINE NRS) are pressed in a calculation file, the contents of each selected cell will be visible on the first line instead of as column letters.

```
A02:  NUMBER:  (2+A00)+A01
00:        8
01:       10
02:      100
03:
04:
05:
06:
```

Pressing the RED (FUNCTION) key and N (LINE NRS) again will make the column letters reappear.


```
      A     B     C     D     E     F     G     H     I     J
00:  --------
01:
02:
03:
04:
05:
06:
```

Printing calc files.
To print a file, press the RED (FUNCTION) key and E (PRINT).
The SETUP can be changed before printing:
Cell width: if you want to print this differently from how it appears onscreen.
Formulas: if you want to print cell formula s instead of the resulting values.
Upperleft corner: to start the cell selection to be printed.
Lowerright corner: to end the cell selection to be printed.

Press the RED (FUNCTION) key and A (SETUP).
The display shows:

```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Filename : ▌              ||     Printer Cell Width      :  10 [ 4 - 40 ]
Calculate : YES [use SPACE bar] Print Formula's          :  NO [ use Space bar ]
Cell width: 10   [ 4 - 40 ]     Print Upperleft Corner :  A00
Precision :  4   [ 0 - 10 ]     Print Lowerright Corner  P39
Decimals :  2    [ 2 - 10 ]
```

Make your selection. Press RETURN. You are back in the calc file.
Press the RED (FUNCTION) key and E (PRINT). The display shows:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Print:                                   <C:  1232>
A) Current-file
B) Directory
C) Marked block
D) Printer setup
```

Select:
A to print the current file.
B to print the directory
C to print a marked text block
D to check your printer set up

Encoding calc files.
A calc file be be encoded. After encoding, the contents cannot be changed. The file can only be stored, deleted or again decoded again. For explanation see: To en/decode files.

Transmitting/receiving calc files.
To transmit a file (in PX format), press the RED (FUNCTION) key and letter Q (TRANSMIT).
To receive a file (in PX format), press the RED (FUNCTION) key and letter W (RECEIVE). See section Communication with other PX units.

6.0 Using the PX 2000 As a Calculator.

The PX 2000 can be used as a calculator.
The symbols used are:
+ - x(or*) :(or/) √ 2(square) ()(sets of brackets).

More than one set of brackets may be used in a calculation. If a calculation is written incorrectly e.g. 2*((3.9)18 the calculation will not be performed. An error message will be displayed.

Press:

CALCULATE
M

The display shows:

```
Enter calculation e.g.2*(+6) then press RETURN. Press TAPE or ON/STOP to exit.
```

Type your calculation e.g.

```
1234*36.5-9870
Enter calculation e.g.2*(+6) then press RETURN. Press TAPE or ON/STOP to exit.
```

Press RETURN. The calculation will be executed.

```
1234*36.5-9870=35171
Enter calculation e.g.2*(+6) then press RETURN. Press TAPE or ON/STOP to exit.
```

When you press the ON/STOP key the PX 2000 will return to the active text file or the main MENU.

Transferring a calculation to a text file.

You have made a calculation with your PX 2000. To tranfer the calculation to a text file proceed as follows:

```
1234*36.5-9870=35171
Enter calculation e.g.2*(+6) then press RETURN. Press TAPE or ON/STOP to exit.
```

1. Press the RED (FUNCTION) key toegether with letter T (TAPE).

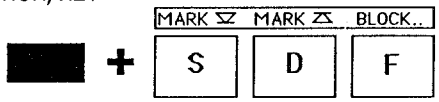
The following display appears:

```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Filename      :                ||
Line-length   :  80 [  10  -  80  ]
Page-length   :  66 [   0  -  99  ]
Show returns  :  NO [use SPACE bar]
```

2. Type the file name.
   Press RETURN. The screen has become a text file.
3. To transfer this screen (text file) to another text file proceed as described above.

7.0 Using Marked Blocks

The following keys:
RED (FUNCTION) KEY



can be used to mark a certain part of text file or a cell within calc file to be copied, moved, changed, deleted, printed, merged etc..

```
Dear Mr. Jones,

I herewith confirm our appointment at your office for the 19th of February
1988.
Proposed agenda:
a. Figures 1987
b. Plans for 1988
c. Long term marketing strategy
```

Marking a block.

1. Place the cursor at the beginning of the block.
2. Press the RED (FUNCTION) key and letter S.
3. All text after the MARK down symbol will appear in ENHANCED characters.
4. Move the cursor to the end of the block.
5. Press the RED (FUNCTION) key and letter D.
6. The block you have chosen appears in reversed video (white instead of black). The remaining text is displayed normally.

You now have a marked block. Press the RED (FUNCTION) key and letter F (BLOCK..).
The following appears:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
    Current file                                <T:  2190> lttr Jones
A) Copy                                     G) Cancel
B) Move within file
C) Delete
D) Print
E) Change case
F) Capitalise
```

Copy.
Marked text is copied to the new cursor position. After copying, the original text wil remain intact. This new cursor position can be anywhere in the current file, an existing file, or in a newly created file, except inside a marked block.

Move within file.
Marked text is moved to a new cursor position in the current file. After moving, the original text will have disappeared.

Delete.
Marked text is deleted.

Print.
Marked text is printed (sent to serial port in preset print format, see 'Set up PX 2000'.

Change case.
In marked text blocks all capitals change into lowercase letters. All lowercase letters change into capitals. This process is reversible.

Capitalize.
In marked text all lowercase letters will change into capitals. Existing capitals remain as they are. This process is not usually reversible.

Cancel.
Will cancel any marking of blocks.

When copying or moving text, it is essential to place the cursor at the exact position you want the marked text inserted.
This position can be anywhere in the same text file (excluding the part marked!) or in any other text file. Marking will remain valid, even while one file is closed and another file opened.

8.0 Transfering Text Between Files.

Parts of text can be transferred between files or to new files.
If you want to insert a new file, it is first necessary to create that file.

a. Select the block you want to transfer.
b. Press MENU
c. Press A (ALL FILES)
d. Select from the directory the file in which you want to insert the marked block.
e. Put the cursor at the insert position.
f. Press the RED (FUNCTION) key and F (BLOCK..).
g. Select Copy and press RETURN.

The marked block is now inserted in the file.
h. Press the RED (FUNCTION) key and letter F (BLOCK..)
i. Select G (Cancel) and press RETURN.

It is important to use only the cursor keys when transferring a block. When you touch any keys other than the RETURN key or cursor keys, the marked block is no longer valid and the operation must be repeated from the beginning.

Transferring a calc file into a text file.
The calc file is open.
The screen displays the cells you want to insert into an existing text file.
Only the items visible on the screen can be transferred.
1. Press the RED (FUNCTION) key and letter T.

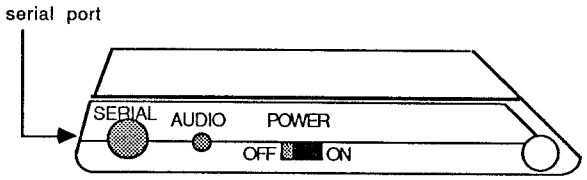
The following display appears:

```
Enter data and/or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Filename      :                ||
Line-length   :  80 [  10  -  80 ]
Page-length   :  66 [   0  -  99 ]
Show returns :  NO  [use SPACE bar]
```

2. Type the file name.
   Press RETURN. The part of the calc file displayed has become a text file.
3. Delete all irrelevant characters.
4. To transfer this screen (text file) to another text file, proceed as described above.

9.0 Communication with Other Computers and Peripherals

The PX 2000 can be set to communicate with any computer, by means of its built-in modem which uses one of the CCITT V23 or BELL 202 (or in other units V21, V22 and Bell 103,212) sets of frequencies.
The PX 2000 can also be set to communicate by means of its RS 232 serial port.



9.1 Using the RS 232C Serial Port.

To send/receive a file using the RS 232C serial port:

1. Make sure the serial connection is made in the correct way.
   Make sure the set up of the communications mode chosen is compatible with the set up of the other computer. The other computer must be set to one of the the following protocols: PX 2000, PX 1000, C-Mail. (see Technical Data)
2. Press the RED (FUNCTION) key and letter Y (SERIAL).
   Select A (Transmit) or B (Receive).
   Press RETURN.
   If you choose A (Transmit) the following display appears:

```
Enter data and or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Ready to transmit     < T:   239> abc

Mode     : C-Mail      [use SPACE bar]
Baudrate:     600  [use SPACE bar]

Press RETURN or SEND to start transmission.
```

   Select SERIAL communication parameters with the SPACE bar, press the RETURN key or the SEND key.
   If you have chosen B (Receive) the PX 2000 will select the protocol itself while receiving data.

9.1 Using a Communication/Terminal Program

Connect your PX 2000 to another computer by using the serial lead.
Start up a communication/terminal program in the other computer.
Select the correct settings in your PX 2000 as well as in the other computer.

To download text to the other computer:
From the directory select the file you want to download to the other computer.
1. Press the RED (FUNCTION) key and letter E(PRINT).
2. Select A (Current file).
3. Press RETURN.

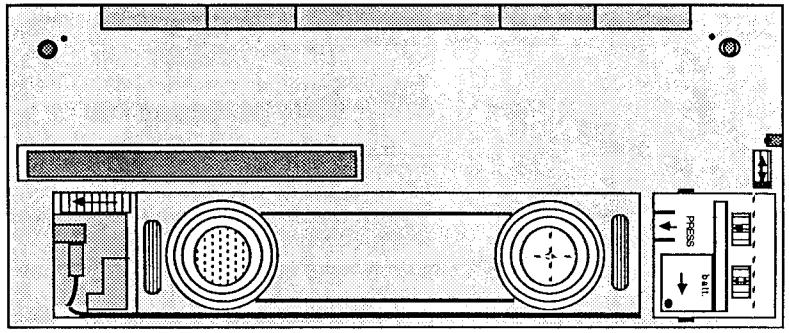
The text has now been sent to the other computer.

To receive text in your PX 2000 from another computer:
Check if communication is possible.
1. Open a new comm-file.
2. Select the correct settings.
3. Press RETURN. Your PX is now in waiting mode.
4. Press the RED (FUNCTION) key and letter W.
5. Insert a file name.
6. Press RETURN again.
7. Instruct the other computer to send the file.

The text is received as a text file.
After reception press the RED (FUNCTION) key and letter W to close the text file.
Press the ON/STOP key to discontinue the communication mode.

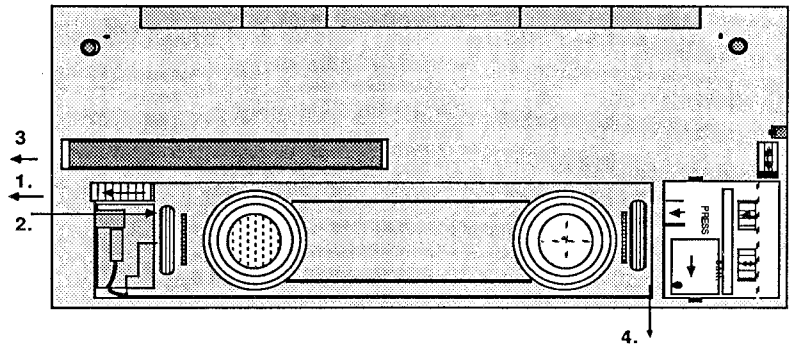
Read the text by selecting the file from the directory.

9.3 The Acoustic Coupler



The slimline acoustic coupler is fitted at the back of the PX 2000. In order to remove the coupler, proceed as follows (see drawing below):

1. Push button 1. forward with your thumb.
2. Use a finger your other hand to pull the coupler up, speaker end first (2).

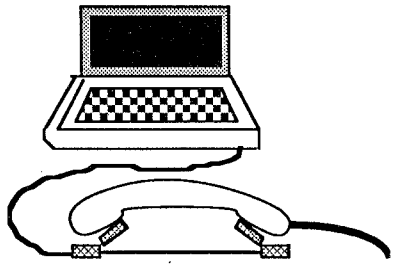


Be careful when removing the lead.

3. Push the microphone and speaker pad and flip upwards.
4. Adjust the coupler to you handset.

Using the acoustic coupler.

Place the handset of the telephone on the coupler as shown below. Position your telephone receiver on top of the adapter, placing the microphone of the coupler opposite the speaker of your telephone receiver and vice versa.



An easy way to remember how to position the telephone receiver on the coupler is to make sure that the cord of the coupler is at one end and the cord of the telephone receiver is at the other end. It is advisible to position the coupler on a soft surface (e.g. the brown plastic sleeve of the PX 2000).

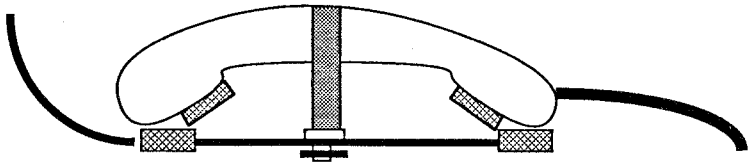
To replace the coupler in the underside of the PX 2000.

a. Fold both pads back.
b. Push the pads towards each other to reduce the size of the coupler.
c. Insert the coupler into the PX 2000, microphone-end first, leading the cord in the place reserved for it.
d. Push the coupler downwards and release button 1.
e. Push the cord into hte elongated slot reserved for it.
f. If the strap has been used, do not faial to replace it in the unit.

Attaching the strap.

The strap is shown in the above illustration of the rearside of the PX 2000. If your handset does not rest firmly on the coupler:

a. Remove the strap by pulling the rubber end in the direction indicated (3.) See the above illustration.
b. Pull the strap to the opposite side to remove it completely.
c. Place the lower end of the strap on the table. The telescopic parts of the coupler fit into the holes in the strap's metal parts..
d. Pull the rubber band over the handset and hook it to the metal part at the base of the strap.



9.4 Using the Modem.

To send/receive a file using the built-in CCITT V23/BELL 202 modem:

1. Press the MENU key.

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                              (T: 2361) Concept ABC
A) All files (directory)                  G) En/decrypt
B) Create Text-file                       H) Copy current file
C) Create Calc-file                       I) (Un)protect current file
D) Create Comm-file                       J) Self tests
E) File transfer
F) Set-up
```

2. Select D (Create comm-file) by using the cursor keys or typing character D and press RETURN. Or open an existing Comm-file.

   When you open a new comm file the display shows:

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11

Filename  : ■                 ||
Connect to : Modem  [use SPACE bar]
```

3. Enter a file name.
4. Press cursor down to select: Modem or RS232.
   Select Modem for communication by means of modem and acoustic coupler.
5. Press RETURN and the standard settings for VIDEOTEXT communication will appear:

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
 <X: 10> TEST
System     : VIDEOTEXT  [use SPACE bar]   Local echo: OFF  [use SPACE bar]
Bits       : 7d,even,1s [use SPACE bar]   Monitor   : OFF  [use SPACE bar]
Freq. code : CCITT V23    75/1200 baud  [use SPACE bar]
Auto Logon :
                                                                        ||
```


System.
Can be set to VIDEOTEXT or TTY.
VIDEOTEXT: 24 lines per page with 40 characters in the display.
TTY: 80 characters per line in the display. No standard page length. By using the cursor keys 24 lines can be read.

Bits.
Can be set according to the requirements of the data base e.g.:
8d,none,1s = 8 databits, no parity, 1 stopbit

The possible settings are:

8d,none, 1s	(8 databits, no parity, 1 stopbit)
8d,none,2s	(8 databits, no parity, 2 stopbits)
8d,even,1s	(8 databits, even parity, 1 stopbit)
8d,odd,1s	(8 databits, odd parity, 1 stopbit)
8d,zero,1s	(8 databits, zero parity, 1 stopbit)
7d,none,2s	(7 databits, no parity, 2 stopbits)
7d,even,1s	(7 databits, even parity, 1 stopbit)
7d,odd,1s	(7 databits, odd parity, 1 stopbit)
7d,zero,1s	(7 databits, zero parity, 1 stopbit)
7d,even,2s	(7 databits, even parity, 2 stopbits)
7d,odd,2s	(7 databits, odd parity, 2 stopbits)
7d,zero,2s	(7 databits, zero parity, 2 stopbits)

Frequency code.
Possible settings are:

Half duplex:	**CCITT V23**	**75 /1200 baud**
	CCITT V23	**1200 /75 baud**
	CCITT V23	**75 /600 baud**
	CCITT V23	**600 /75 baud**
Full duplex	**BELL 202**	**150/1200 baud**
	BELL 202	**1200/150 baud**

LOCAL ECHO,
Shows the character you typed/sent to the receiving end.

MONITOR
Shows you all the codes ('escape codes' and other codes) sent by another computer to your PX 2000.

NOTE: Local echo and **Monitor** can be switched off in most cases.

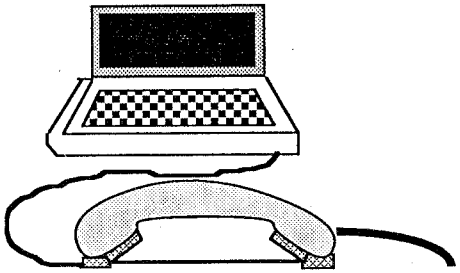
9.5 Connecting a Database.

1. Use SPACE bar and cursor keys to select the settings
   Make sure the settings, as visible on the comm file start page, correspond with the requirements of the system that is to be communicated with e.g.:

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
<X: 10> MEMOCOM
System     : TTY          [use SPACE bar]   Local echo:  OFF  [use SPACE bar]
Bits       : 7d,even,1s [use SPACE bar]   Monitor   :  OFF  [use SPACE bar]
Freq. code : CCITT V23    75/1200 baud  [use SPACE bar]
Auto Logon :
                                                                          ||
```

(The name 'Memocom' is the property of the Dutch PTT.)

2. Make sure the connection with the acoustical coupler is arranged in the correctly.



3. Dial the telephone number which the modem of the other computer system is connected to.
4. As soon as the access tone of the modem is heard, join the telephone receiver to the acoustical coupler and press RETURN.
   The unit is now in 'terminal' mode: any text typed, will be sent; any text received, will be visible on the display e.g.:

```
please type your terminal identifier
```

NOTE: Red key + space bar + Escape / Send key = Control key

■ + SPACE bar = ESCAPE

SEND = CONTROL

9.6 While On Line with a Data Base.

- **To read all received text,** use the cursor keys (scroll up, scroll down). Using with the SHIFT keys you are able to go directly to the bottom or topline.

- **To capture the contents of the on line session as a textfile,** press the RED (FUNCTION) key and letter W(RECEIVE) while on line. After reception press the RED (FUNCTION) key and letter W(RECEIVE) again to stop capture.

- **To save the text visible on the screen** - on line - as a text file, press the RED (FUNCTION) key and letter T(TAPE).
  The set up page will be visible: you may enter a file name, and press RETURN again.
  The on line session will continue, although the screen will be empty.

- **To send a text file** - while on line -, press the RED (FUNCTION) key and letter Q (TRANSMIT), select a file, press RETURN.
  The selected file will be sent. Once the transmission has taken place, the screen of your 'terminal' is again ready for further communication.

- **To end 'terminal' mode,** press ON/STOP key. Replace the telephone receiver on the telephone.

WARNING:
The unit will not switch off automatically while in on-line mode. Always press ON/STOP after an on line session.

9.7 AUTO LOG-ON Facilities.

It is possible to access a data base or Videotex service without any on-line typing, to send or request files or pages of Videotex automatically, to save these files, print screen, etc.

A series of instructions can be written into a Comm File, that will be understood and executed by the PX 2000. All that is required is that the instructions are written in a form that can be understood by the PX 2000.

To create a Comm file by pressing MENU, select D (Create Comm-file), press RETURN.

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
 <X:  10>  TEST
System     : VIDEOTEXT  [use SPACE bar]   Local echo:  OFF  [use SPACE bar]
Bits       : 7d,even,1s [use SPACE bar]   Monitor   :  OFF  [use SPACE bar]
Freq. code : CCITT V23    75/1200 baud    [use SPACE bar]
Auto Logon :
                                                                          ||
```

The auto log-on instructions should be typed according to the system's log-on procedure.

LOG-ON instructions.
The following character combinations can be entered on the Comm file set up page after Auto Log-on:

√D123,45678	-	dial the number (V21 and V22 only) (Comma is a pause)
√W (number of half seconds)	-	wait a number of half-seconds (max 99)
√S (characters)	-	send the following characters
√T (name of file)	-	send file with name as selected
√R (name of file)	-	save text as new file, named as written
^M	-	RETURN
√	-	close auto log-on instructions

While 'waiting', the unit is ready to receive.
After the last instruction the unit will return to 'terminal mode'.

If an instruction is incomprehensible (e.g. as a result of a typing error), the unit will immediately return to 'terminal mode' and the message 'ILLEGAL FUNCTION' will appear on screen.

Example of a LOG-ON Sequence

1. Check the set up of the comm file to the following (these are the standard settings to videotext systems):
   VIDEOTEXT
   7d,even,1s
   CCITT V23 75/1200 (transmit 75 Bd., receive 1200 Bd.)
   Local echo OFF
   Monitor OFF

2. On the same set-up page, move the cursor to Auto Log-on.

3. Type e.g.:

√W12	wait 6 seconds
√S4444444444	send 4444444444
√W12	wait 6 seconds
√S4444	send 4444
√w12	wait 6 seconds
√s*2046#	send page number wanted within the system
√w12	wait 6 seconds
√rpage 20	receive page on screen as 'page 20'
√s*2090#	send page number wanted within the system
√w12	wait 6 seconds
√rpage 21	receive page on screen as 'page 21'
√	closing the auto log-on instructions (obligatory)

This will be displayed as follows:

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
<X:  132> PRESTEL
System     : VIDEOTEXT  [use SPACE bar]   Local echo:  OFF  [use SPACE bar]
Bits       : 7d,even,1s [use SPACE bar]   Monitor   :  OFF  [use SPACE bar]
Freq. code : CCITT V23    75/1200 baud    [use SPACE bar]
Auto Logon : √W12√S4444444444√W12√S4444√w12√s*2046#√12√rpage
             20√w12√s*2090#√w12√rpage  21√w12√
                                                                          ||
```

- To save the contents of the on line session as a text file, press RECEIVE while on line. To end cupturing press RECEIVE again.
- To save the text visible on the screen - on line - as a text file, press the RED (FUNCTION) key and letter T (TAPE).
  The set-up page becomes visible: you may enter a file name, and press RETURN again. The graphical representation will be lost: the PX saves text only.
  The on-line session continues, although the screen will be empty.

- To send a pre-selected text file while on line, press press the RED (FUNCTION) key and Q (TRANSMIT). The directory appears.
  Select a text file. This file will be sent while on line.

  To end the 'Videotext' mode, press ON/STOP key. Replace the telephone receiver on the telephone.

Accessing other commercial services.
There is a growing number of commercial services offering mailbox-service, communication transfer (e.g. to telex or package-switched data lines), or on-line data base information (financial, scientific or educational data-banks).
Access to these services is usually on a membership basis.
To access these services,the user generally needs a personal access code and knowledge of the password.

Note: It is possible to set up a company owned mailbox/data bank system using the PX 2000 units as remote terminals (Aask your supplier).

Reverse VIDEOTEXT
As a consequence of the availablity in certain countries of relatively large quantities of Videotext modems capable of handling 75/1200 Baud communication, technique has been created to communication with equipment using Videotext modems.
This is -appropriately named - Reverse Videotex: 1200/75 Baud.
If you set your PX 2000 to communicate in the REVERSE VIDEOTEXT (1200/75 Baud) mode, you can communicate without any problem with Videotext modems (connected to Videotext equipment or home computers) in the way described under 'Communication with Other Computers and Peripherals'.

9.9 Communication with PX Units

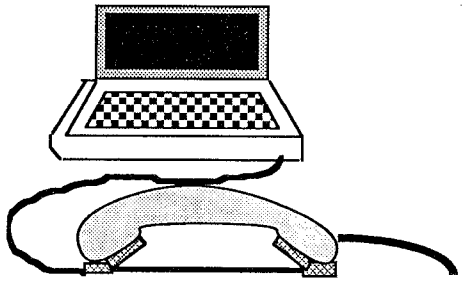
Without preparation of any communications protocol it is possible to send files to and receive files from, other PX units, by telephone.

Transmitting a file.
If you want to transmit a file to another PX unit, press the RED (FUNCTION) key and letter Q (TRANSMIT).
The file name, file type and length of the selected file will be displayed.
Pressing the SPACE bar, show the possible modes of transmission:
PX 2000 , PX 1000 and C-Mail.
The PX 1000 is a simplex communications terminal of 1200, 600 or 300 baud.
C-Mail is a PX-based electronic message & forwarding system of 1200, 600 or 300 baud.

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11

Ready to trans mit      <T:   29>  TEST

Mode      : C-MAIL      [use SPACE bar]
Baudrate  :    600 [use SPACE bar]

Press RETURN or SEND to start transmission.
```

When transmitting to another PX 2000, the 'PX 2000, 1200 baud' mode is the most efficient way.

PX 2000 mode:
1. Place the acoustical coupler in the correct position.



   Check whether 'Mode: PX 2000' is selected with the SPACE bar.
2. Dial the party you want to send the file to, and signal your intention to send a file to another PX.
3. Make sure the telephone receiver of the other party is coupled to the coupler, and its PX set to 'receive', by pressing the RED (FUNCTION) key and letter W (RECEIVE). After these keys have been pressed, the display shows:

```
Move cursor or press letter; press RETURN  MODULE 1   Fri 20 FEB 88  11:18:11
   Select Receive format                    <T:  139> records
A) PX-2000
B) PX-1000
```

The cursor is now under A. Press RETURN.
The display of the receiving party should show e.g.:

```
Waiting for connection                  24114 BYTES FREE
```

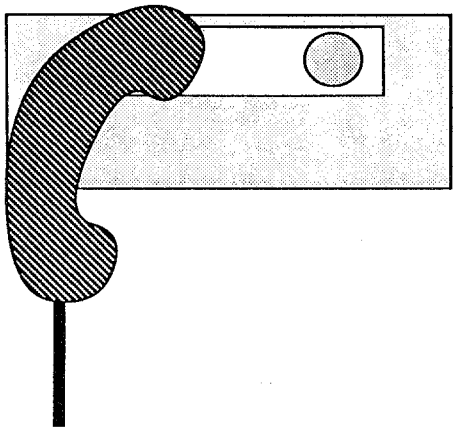
Your PX will now start the transmission when RETURN is pressed.
If no contact is made with a receiving PX 2000, or contact is lost, the message ***** Connection lost ***** will appear in the display.
Check for errors (see above) and start again.
While a file is being transmitted to another unit, the text 'transmitting' is visible in the display.

```
Transmitting              <T:  29> TEST              0 Blocks

SENT BLOCK #    1

ACK. BLOCK #    1
```

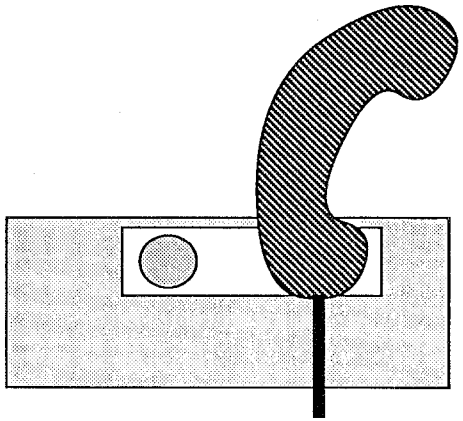
PX-1000 mode:
The send format will be identical to the format used in a PX 1000.

Without taking the acoustical coupler out from the unit, you can send or receive a file, by holding the telephone receiver to the couplers speaker (if sending) or its microphone (if receiving). The microphone is the smaller of the two, with less holes.
It is not possible at the same time to connect both the speaker and the microphone of the telephone receiver to the coupler - while it is mounted on the back of the PX 2000.

The receiver has to be held in two different positions. To receive a file:



To transmit a file:



1. Make sure 'Mode: PX 1000' is selected from the display by pressing the SPACE bar.
2. Close the lid of the unit.
3. Dial the party you want to send the file to, and signal your intention to send a file to another PX.
4. Make sure the telephone receiver of the receiving party is coupled to the coupler, and its PX set to 'receive'. His display should show, e.g.

```
Waiting for connection                    24114 BYTES FREE
```

5. Pick up the unit and hold the speaker of the telephone receiver against the microphone of the coupler (fitted at the bottom of your PX 2000).
6. Press the (yellow) SEND key.

The unit will start transmitting. The red indicator (above the SEND key) begins flashing during transmission.
The transmission will ends when the file has been sent. The red indicator goes out.

The advantage of duplex transmission is that the transmission is continuously checked for possible transmission errors: transmission is not completed unless the full file is transmitted.
The advantage of simplex transmission is that the coupler does not have to be taken off the PX 2000: a much faster and easier way to make contact by telephone.
Communication with C-Mail and TEXT NET centers is made in the TEXT LITE PX 1000 mode.

Receiving a file.
If you want to receive a file from another PX unit by telephone, press the RED (FUNCTION) key and letter W (TRANSMIT).

```
Move cursor or press letter; press RETURN  MODULE 1   Fri 20 FEB 88  11:18:11
   Select Receive format                    <T:  139> records
A) PX-2000
B) PX-1000
```

Select A or B, depending on how the message will be transmitted.
The acoustical coupler has to be connected to both the speaker and microphone of the telephone receiver.
When receiving a file sent in PX 1000 format, it is not necessary for the coupler to be connected to both the microphone and the speaker: only the microphone of the coupler must be held to the speaker of the telephone receiver. The acoustical coupler may remain in its place on the underside of the unit. In PX 1000 format, the baud rate is automatically selected. Press RETURN to start receiving.


```
Waiting for connection                    24114 BYTES FREE
```

Watch the screen, or, if the unit is closed and held to the telephone-receiver, watch the red indicator above the SEND-key.

If a text is being received, the first 8 lines of the text will appear on the display.
Wait until the red indicator stops flashing, and a beep is heard.
The transmission is completed when the red indicator (above the SEND key) stops flashing.
If you have been receiving a file in duplex mode, the cursor will be visible in the top lefthand corner of the display.
After receiving a simplex message, on the following will be displayed:

```
No errors  -  Press any key to continue.
```

Pressing any key will result in this message disappearing and the first 8 lines being displayed. The cursor will be in the top lefthand corner of the display.
If no connection has been made, or if a file has been only partially received, the message '*** **Connection lost** ***' will appear.

A message that has been received is automatically stored as a text file. To assign it a file name, and/or change its format, press the RED (FUNCTION) key and letter A (SETUP).

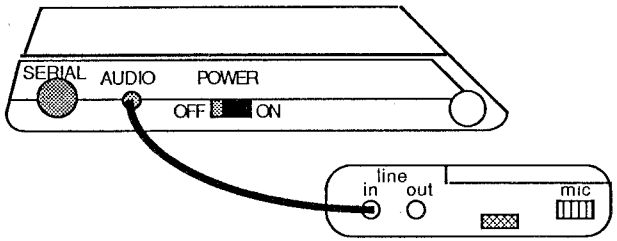
To read the text received, use the cursor keys (scroll up, scroll down).

To print the text received, press PRINT.

10.0 Using a Taperecorder to Save Files

Dumping files.
Any taperecorder may be used to store data dumped from the PX 2000 memory.

1. Connect the audio socket to the line input of a taperecorder (to dump).



2. Press the MENU key.
3. Select E (File transfer).
4. Press RETURN.

```
Move cursor or press letter; press RETURN  MODULE 1 Tue 24 Nov 87 12:56:15
   Current file                            <T:  2139>lttr Jones
A) Transmit to modem
B) Receive from modem
C) Transmit to RS-232
D) Receive from RS-232
E) To/From tape
```

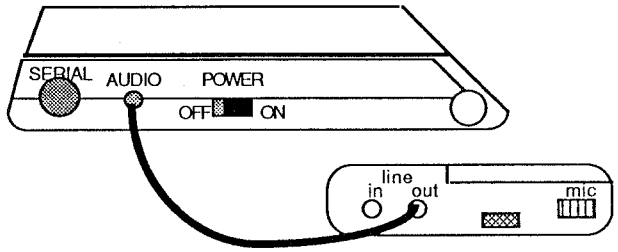
5. Select E (To/From tape).

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
Transfer of file(s) to tape.

Load/dump : DUMP [use SPACE bar]
One/all   :  ONE [use SPACE bar]
Filename  : lttr Jones        ||
```

6. Press the SPACE bar to select DUMP for transferring one or more files to tape.
7. Use the cursor key to go to the next line.
8. Select ONE or ALL files by using the SPACE bar.
   Select ONE. The name of the active file is displayed and is sent providing nothing is changed. If you delete this name and insert another file name, that file is transferred to tape. Select ALL to transfer all files to tape.
   After selecting ALL you can insert after filename those characters corresponding to the first characters of other file names you want transferred to tape.
   e.g. file name: dhv || will transfer all files with names beginning with d, h and v to tape.

9. Switch your recorder to 'record' and start the tape
10. Press RETURN.

Loading from tape.
1. Connect the audio socket to the line output (to load) of a taperecorder.



2. Press the MENU key.
3. Select E (File transfer).
4. Press RETURN.

```
Move cursor or press letter; press RETURN  MODULE 1 Tue 24 Nov 87 12:56:15
   Current file                            <T:  2139>lttr Jones
A) Transmit to modem
B) Receive from modem
C) Transmit to RS-232
D) Receive from RS-232
E) To/From tape
```

5. Select E (To/From tape).

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
Transfer of file(s) to tape.

Load/dump : LOAD [use SPACE bar]
One/all   :  ONE [use SPACE bar]
Filename  : lttr Jones        ||
```

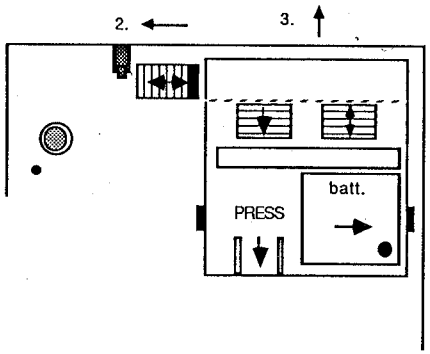
6. Press the SPACE bar to select LOAD to transfer one or more files from tape.
7. Use the cursor key to go to the next line.
8. Select ONE or ALL files by using the SPACE bar.
   Select ONE. Insert file name; that file is loaded from tape.
   Select ALL to read all files from tape.
   After selecting ALL you can insert after filename those characters corresponding to the first characters of other file names you want to be loaded from tape.
   e.g. file name: dhv || will read all files with names beginning with d, h and v from tape.
9. Press RETURN.
10. Switch your recorder to 'play'.

11.0 Changing the Memory Module

On the back of the PX 2000 you will find the 24 Kb interchangeable memory module. The memory module contains a battery to serve as your data backup. The lifespan of the battery is approximately 5 years.

Removing the memory module.

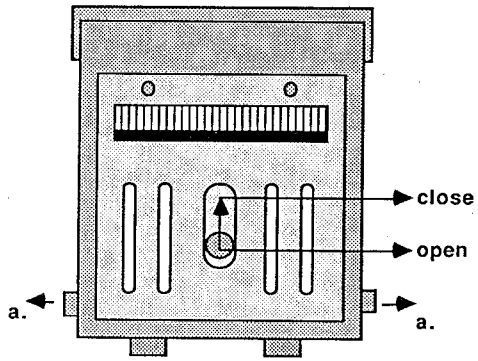
1. Switch off the PX 2000 by simultaneously pressing the RED (FUNCTION) key and the ON/STOP key.



2. Slide the button on the top left of the memory module to the right. A red area will appear (see drawing above).
3. Push the memory module slightly forward in the direction indicated and lift it out.

The memory module.

Once the memory module has been removed, the pins inside the module should be treated with extreme care. Never touch the pins and never put the module inside a pocket unless the opening is closed.
The illustraion below shows you how to open/close the memory module.



Closing the module.

Slide the button in the middle of the module forward. A black plastic strip is now covering the pins and protecting the data.

Replacing a memory module.

First switch off the unit by pressing the RED (FUNCTION)key and the ON/OFF key.

1. Open the memory module by sliding the button in the module downwards. The pins are now free.
2 Slide the module into the PX 2000. First insert the knobs (marked 'a.' see drawing above).
3. Press the front of the module down and push backwards.
4. Slide the button on the top left of the memory module to the closed position (no. 2. in drawing).

12.0 PX 2000 User Trouble Shooting Guide.

The following is a list of some problems with which the user might encounter, while operating the PX 2000, as well as a list of possible remedies to these problem situations. Always recheck the operator's manual if when difficulties with a given operation.

1. ON / STOP is pressed but no reaction from the unit:

   a. The battery is low; insert charger. The LED should light up.
   b. Check that the Memory Module eject switch is off.
   c. Check that the main power switch is on.
   d. Check contrast level.

2. Memory is lost :

   a. Check that Memory Module has been inserted properly.
   b. Try a second Memory Module.
   c. Contact distributor about replacing on Memory Module memory.

3. Part of Memory not functioning :

   a. Check the memory by selecting the RAM test, from the Self test menu. If a part of the memory is not functioning, an error will be indicated in that 24k of memory.
   b. Check again whether 24k Memory Module has been inserted.

4. Serial Communication does not function :

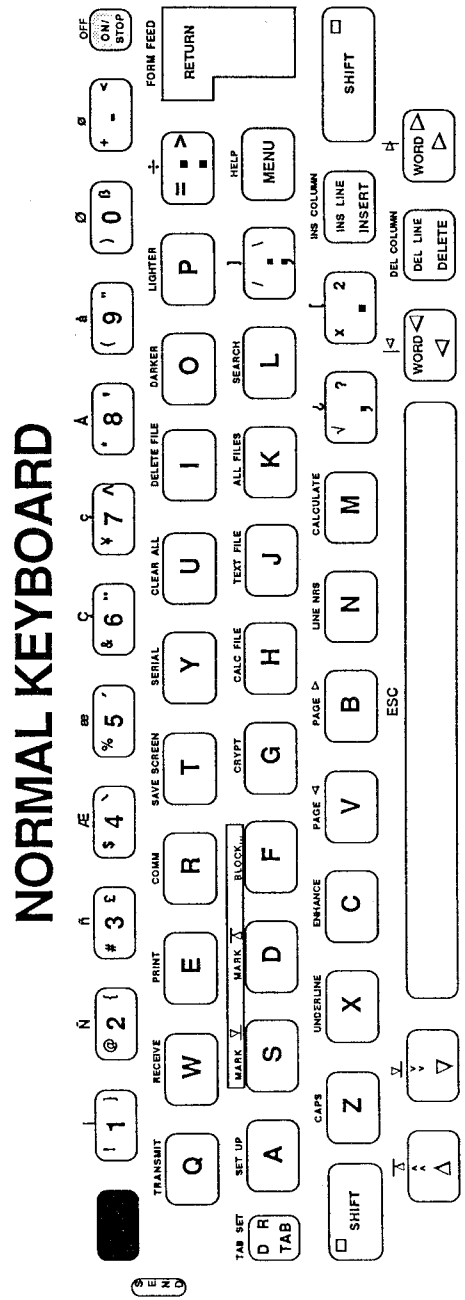
   a. Check that data format is set correctly.
   b. Check that correct communication mode has been selected.
   c. Check cable connections.

5. Modem Communication does not function :

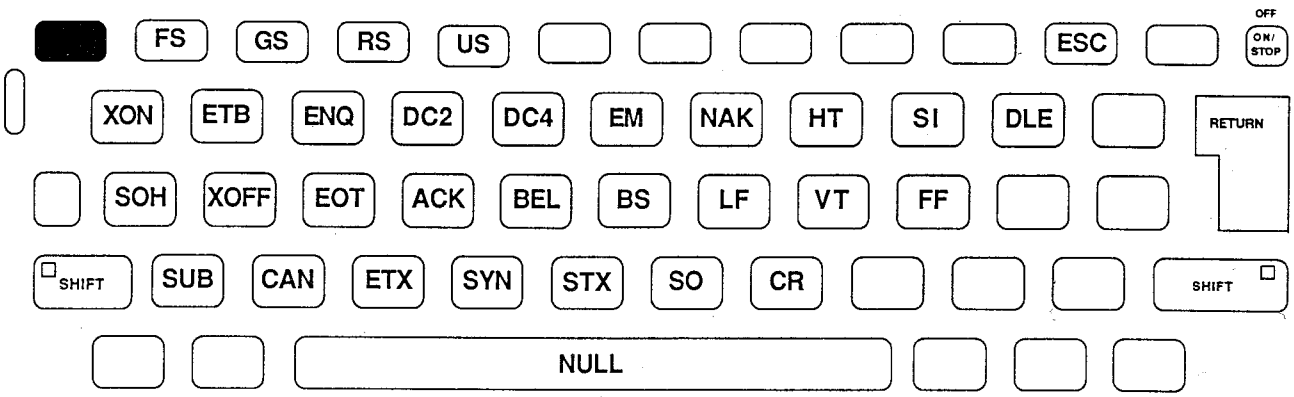
   a. Check that data format, and communication standard are correct.
   b. Check that the correct communication mode is selected.
   c. Check that modem acoustic coupler has been properly connected to the unit and to the telephone handset.

6. No reaction from keys, but LCD's functioning :

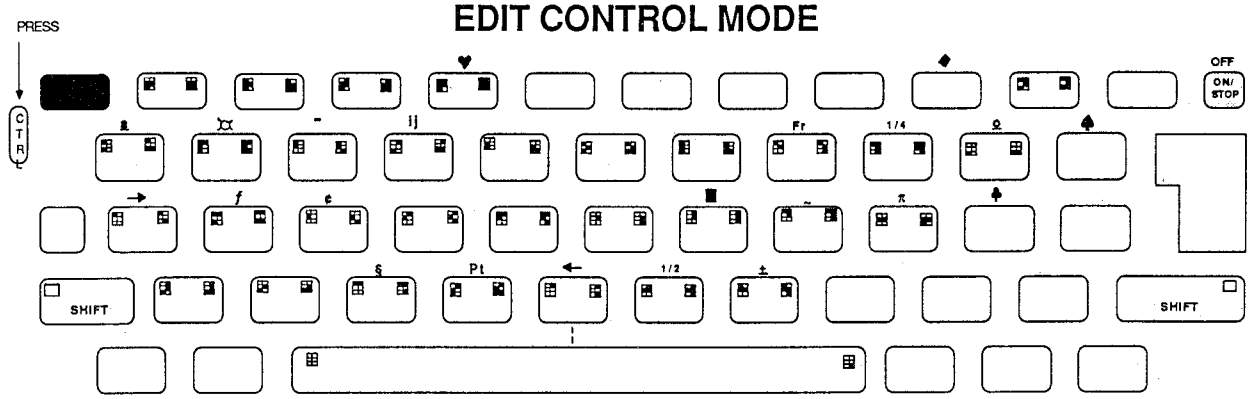
   Try a reset by pressing first the ON/STOP key then both SHIFT keys. Sometimes, because of low battery voltage, it is possible for the PX 2000 to lock up while carrying out some function; to remedy this, a 'master reset' must be done: switch power switch (located at the right-hand side of the unit) to off, then to on, press ON/STOP key.



COMM. CONTROL MODE



EDIT CONTROL MODE



13.0

Supplement for units with: V21, V22, Bell 103, Bell 212 standards

and terminal emulators: VT 52 and VT 100

The TEXT LITE PX 2000 has different built-in modem standards.
Besides the CCITT V23 (75/1200 Baud) standards, a unit is available with the following modem standards:

CCITT V21	300 Baud
CCITT V22	1200 Baud
Bell 103	300 Baud
Bell 212	1200 Baud

and terminal emulators:

VT 52	emulation
VT 100	emulation
TTY	emulation

There is no difference between working with these standards and the CCITT V23 standard described.

As well as the possible settings for sending and receiving in the above mentioned standards some of the screen displays have been changed.

Selecting a comm-file by pressing letter D from the MENU will display after a name has been inserted and a modem selected.

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
  <X: 10> TEST
System     : TTY          [use SPACE bar]   Local echo: OFF  [use SPACE bar]
Bits       : 7d,even,1s [use SPACE bar]   Monitor   : OFF  [use SPACE bar]
Freq. code : V22  1200 Bd  Org  [use SPACE bar]
Auto Logon :
                                                                          ||
```

System.
Possible settings are:
TTY
VT 52
VT 100

Bits. As described before.

Freq. code.

V22	1200	Bd	Org (originate mode)
V22	600	Bd	Org
V21	300	Bd	Org
Bell 212	1200	Bd	Org
Bell 103	300	Bd	Org
V22	1200	Bd	Ans (answer mode)
V22	600	Bd	Ans
V21	300	Bd	Ans
Bell 212	1200	Bd	Ans
Bell103	300	Bd	Ans

In order to make the settings, move the cursor to the required field and use the space bar to select.

Because most of the modems of databases are set in the answer mode, set your PX 2000 to originate (Org) mode.

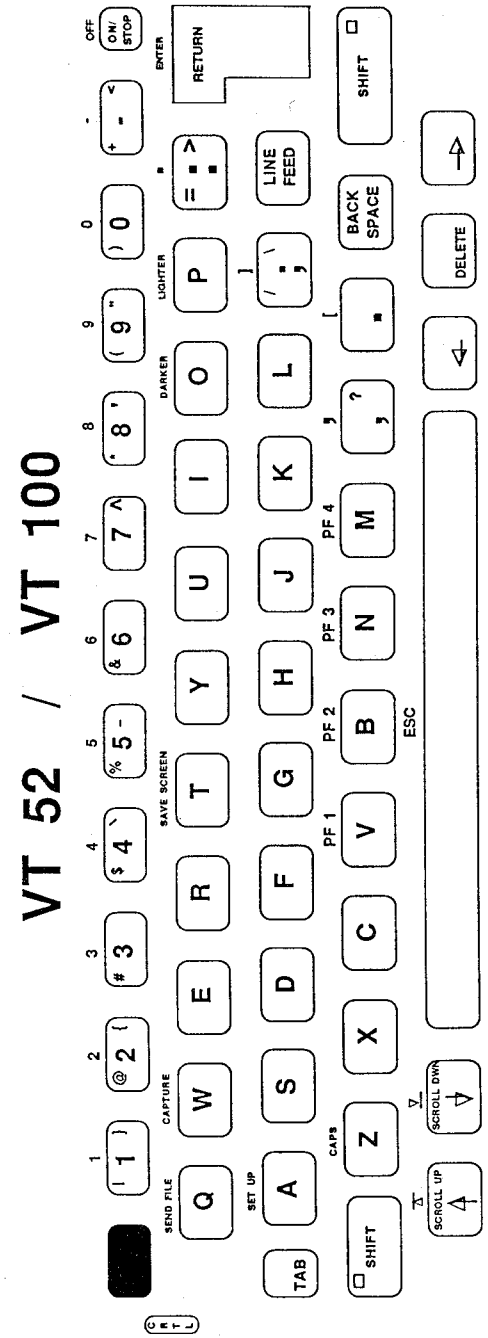
Before linking up with a data base, be sure that the settings are correct.
If you want to change the settings while you are on line with a data base (e.g. to select VT100 instead of TTY), press the RED (FUNCTION) key and letter A (SETUP). The set up screen for communication mode will appear:

```
Enter data and/or move cursor & press Return when ok. Wed 18 Feb 88 16:02:11
  <X: 10> TEST
System      : TTY          [use SPACE bar]  Local echo: OFF  [use SPACE bar]
Bits        : 7d,even,1s [use SPACE bar]  Monitor  : OFF  [use SPACE bar]
Freq. code  : V22  1200 Bd  Org  [use SPACE bar]
Auto Logon :
                                                                        ||
```

Move the cursor and use the SPACE bar to select. Press RETURN. Using the correct settings you will remain on line with the data base.

To perform VT 52 and VT 100 emulation, study the key functions given on the next page.

All the special keypad keys van be found as RED key + key.



13.1 Differences Between the Two PX 2000 Types, Resulting from Different Modem Standards

Set up MENU.
In the PX 2000 containing V21, V22 and Bell 103,212 the MENU of the SET UP has been changed, because this unit does not have the option to send to and receive messages from the TEXT LITE C-Mail system (CCITT V23 standard). The option 'Enter cmail id' has been deleted.

Videotex systems need a V23 standard to run at 75 / 1200 Baud. Because no such standard has been implemented, Videotex colors have also been deleted.

The SET UP MENU now shows:

```
Move cursor or press letter: press Return  MODULE 1   Tue 24 Nov 87  11:56:55
   Current file                            (T: 2361) Concept ABC
A) Module name                          G) Printer replace codes
B) Set the clock                        H) Reset printer setup
C) Set the alarm
D) Keyboard click
E) Auto off time
F) Printer setup
```

Transmit file.
While in a file or in the directory, pressing the RED (FUNTION) key and letter Q will produce the next display:

```
Enter data and or move cursor & press Return when o.k. Tue 24 Nov 87 12:56:11

Ready to transmit     < T:  239> abc

Mode    : Duplex   [use SPACE bar]


Press RETURN or SEND to start transmission.
```

You have the choice of sending the file to another computer or peripheral in simplex or in duplex. Duplex will send the file at 1200 Bd. (CCITT V22 standard). Simplex will transmit the file at 300 Bd. (CCITT V21 standard).

Receive file.
Press the RED (FUNCTION) key and letter W (RECEIVE).
You have the choice of receiving a file from another computer or peripheral in simplex or in duplex. Duplex will receive the file at 1200 Bd. (CCITT V22 standard).
Simplex will receive the file at 300 Bd. (CCITT V21 standard).

14.0 Technical data TEXT LITE PX 2000

Weight	:	750 g
Length	:	255.00 mm
Width	:	110.00 mm
Height	:	35.25 mm

Power

Power Source	:	Internal rechargeable battery pack, recharged by external 12V DC power supply
Charging current	:	60mA (high) 6mA (low)
Charging time	:	5 hours max.
Current Consumption	:	30mA (typical)
Full charge usage	:	5 hours min.

Serial Interface (RS232C Compatible)

Synchronisation	:	Asynchronous		
Bit Rates	:			
75,150,300,600,1200,2400,4800,9600,19200,38400				
Word Format	:	Start Bit	:	1
		Data	:	7 or 8 bits
		Parity	:	odd, even, zero or none
		Stop bits	:	1, or 2
Handshaking	:	READY/BUSY or XON/XOFF		

All the above options can be selected by the user by means of the keyboard.

Signal Levels	:	Output	:	MARK,	logic 1	: -	5V	to - 5V
				SPACE,	logic 0	: +	5V	to + 8V
	:	Input	:	MARK,	logic 1	: -	3V	to - 15V
				SPACE	logic 0	: +	3V	to + 15V

Audio Interface (Modem)

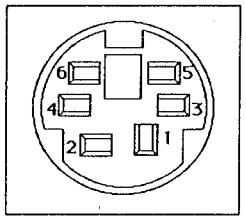
Audio Output Format	:	FSK CCITT V 23, or BELL 202 Standards
	:	Simplex, half Duplex or full Duplex.
Protocols	:	PX-2000
	:	PX-1000

Audio Signal Levels

Acoustic Coupler	:	
output	:	Set in factory to maximum level permitted by the Post and Communication services in the country of purchase
sensitivity	:	-43 dBm to +6 dBm
Audio socket		
output	:	0.28 v p-p
input	:	4.00 v p-p max.

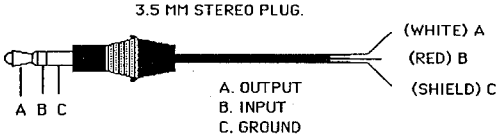
14.1 Wiring Diagrams.

Serial Communications Socket (front view)



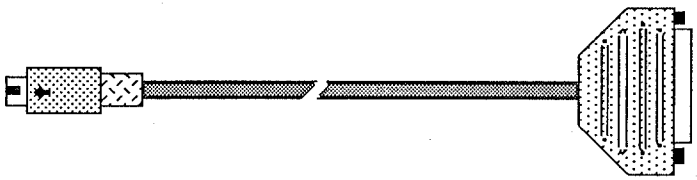
1. DATA OUT
2. DATA IN
3. GND.
4. 12V DC
5. RTS
6. CTS

Audio Socket.



Serial port/printer cable.

6 pin mini-DIN plug	RS 232C DB25 male plug
1	3
2	2
3	7
4	NC
5	5,6,8
6	20



15.0 PX Transmit / Receive Protocols

All transmissions start the same way, so the software can determine the baud rate and transmission protocol. This identification section henceforth to be know as 'header' is defined as follows:

Byte format:
7 databits, even parity, 2 stopbits.

Transmission format:
1.0 sec. mark
    16 null bytes
0.8 sec. mark
    4 file identification bytes as defined in the following table
        00=PX-1000 text
        33=PX-2000 duplex (all file types)
        66=PX-1000 hamming text
        99=PX-1000 hamming encrypted text
        FF=PX-1000 encrypted text

Receive algorithm:
determine baud rate from three consecutive null-bytes.
wait 0.6 secs.
determine file type from next 4 bytes (at least 3 of which should be equal).
then switch to specified file receiving routine.

15.1 PX-1000 text

Baud rate / frequency standard:
CCITT V23 600 baud (1300 Hz. / 1700 Hz.)
    forward channel 300,600,1200 baud.
    back channel suppressed.

Byte format:
7 databits, even parity, 2 stopbits

Transmission format:
Transmit header.
    N data bytes
    16 end-of-transmission (04) bytes.
    1.0 sec. mark

Receive algorithm:
Receive Header.
Receive data;
    check parity & count errors;
    check byte value & count errors.
    Stop on three consecutive EOT (04) bytes.

15.2 PX-2000 Duplex

Baudrate / frequency standard:
CCITT V23 1200 Baud (1300 Hz - 2100 Hz)
forward channel 1200 or 600 or 300 baud.
reverse channel always 75 baud.

Byte format:
8 databits, no parity, 1 stop bit.

Transmission format:
data is sent in blocks consisting of:

byte nr.	contents
0	checksum over bytes 2,4,6,8,10,12,14,16,18,2022,24,26,28,30
1	checksum over bytes 2,5,6,9,10,13,14,17,18,21,22,25,26,29,30
2	block nr. (0 - 15)
3	checksum over bytes 4,5,6,11,12,13,14,19,20,21,22,27,28,29,30
4	length (nr of data bytes in this block)
5-6	2 data bytes
7	checksum over bytes 8,9,10,11,12,13,14,23,24,25,26,27,28,29,30
8-14	7 data bytes
15	checksum over bytes 16,17,18,19,20,21,22,23,24,25,26,27,28,29,30
16-30	15 data bytes

The acknowledge bytes:
1 st byte

bits	contents
0-3	block nr (0-15)
4	checksum of bit 0,1,3
5	checksum of bit 0,1,2
6	checksum of bit 1,2,3
7	always 0 (low)

2 nd byte
logical complement of first byte.

note : *All checksums are calculated with exclusive or.*

Transmit algorithm:

receive the acknowledge bytes while sending.

send Header
send data block # 0 with filetype and filename as data bytes.
file type is an ASCII letter:

T	=	text file
t	=	encrypted text file
C	=	calc file
c	=	encrypted calc file
X	=	communications file

File name consists off 11 ASCII characters excluding the control characters.

If 8 blocks are sent without acknowledgements
then start with first not acknowledged block

If acknowledged block no. higher then next block to send
then start with first not acknowledged block

send next data block with file data.

If the last file-data is sent,
transmit block of length 0.

Receive algorithm:

```
receive a block.
check the checksums.
if checksums are not valid then
        send ack for first block needed for the file ( =nak )
else
        check block no.
        if block no. not within 8 blocks from last acknowledged block then
                send ack for first block needed for the file ( =nak )
        else
                save blockno.
                send ack for first block needed for the file
                if block not already received then
                        save block in buffer
                        while next block of file in the buffer do
                                add buffer to the file
                        if last block was empty (zero length) then
                                stop receiving
```

15.3 PX-2000 Dump /Load Protocol

Baud rate / frequency:

CCITT V23 1200 baud
back channel suppressed

Byte format:

dump : 8 databits, no parity, 2 stopbits.
load : 8 databits, no parity, 1 stopbit.

Transmit format:

5 sec mark
1 SOH ($01) byte
1 file type ascii letter (see PX-2000 duplex)
11 file name in ASCII.
2 length of file (16 bits)
2 length of file "
1 checksum over previous 16 bytes
16 null bytes ($00)

1 STX ($02) byte
length data bytes
2 checksum over data bytes (16 bits)
16 ETX ($03) bytes
0.5 sec mark

Receive algorithm.

select wake up mode (wait for bytes after 10 bits mark)
receive byte
if byte <> SOH start over
receive file type
if illegal start over
receive file name
if not requested file start over
receive length of file twice
if not equal or illegal start over
receive checksum
if not correct start over
create new file
receive bytes till SOH received
receive length data bytes
receive checksum
check for ETX bytes

16.0 DEC VT52

The following are the VT52 commands as described by the Digital VT101 Video Terminal User Guide (EK-VT101-UG-003). An asterisk (*) beside the function indicates that it is currently supported.

Keypad Character Selection:
* ESC = enter alternate keypad mode
* ESC > exit alternate keypad mode

Cursor Position:
* ESC A cursor up
* ESC B cursor down
* ESC C cursor right
* ESC D cursor left
* ESC H cursor home
* ESC Ylc direct cursor position
* ESC I reverse line feed

Character Sets:
* ESC F special graphics character set
* ESC G select character set - US

Erasing:
* ESC K erase to end of line
* ESC J erase to end of screen

Report:
* ESC Z identify terminal type
* ESC / Z report - type VT101

16.1 VT52 KEYBOARD MAP

The following table describes the special function keys of the VT52 and shows the sequences transmitted. It also shows the key or key sequence required to produce this function on the PX-2000 keyboard. The VT52 has four function keys PF1 - PF4, four arrow keys, and a numeric keypad with 0-9, ".", "-", RETURN and ",". The numeric keypad and the arrow keys may be in standard mode or applications mode as set by the host computer. Sequences will be sent as follows:

VT52 key pad key	Escape sent	Press Key red plus
0	ESC ? p	0
1	ESC ? q	1
2	ESC ? r	2
3	ESC ? s	3
4	ESC ? t	4
5	ESC ? u	5
6	ESC ? v	6
7	ESC ? w	7
8	ESC ? x	8
9	ESC ? y	9
-	ESC ? m	-
,	ESC ? l	,
.	ESC ? n	:
RETURN	ESC ? M	RETURN
Arrows:		
Up	ESC A	Up
Down	ESC B	Down
Right	ESC C	Right
Left	ESC D	Left
Functions:		
PF1	ESC P	Y
PF2	ESC Q	B
PF3	ESC R	N
PF4	ESC S	M

16.2 DEC VT100

The following are the VT100 commands as described by the Digital VT101 Video Terminal User Guide (EK-VT101-UG-003). An asterik (*) beside the function indicates that it is currently supported. A plus (+) means the function is trapped and ignored.

Scrolling Functions:

+ ESC [pt ; pb r	set scroll region
+ ESC [? 6 h	turn on region - origin mode
+ ESC [? 6 l	turn off region - full screen mode

Cursor Functions:

* ESC [pn A	cursor up pn times - stop at top
* ESC [pn B	cursor down pn times - stop at bottom
* ESC [pn C	cursor right pn times - stop at far right
* ESC [pn D	cursor left pn times - stop at far left
* ESC [pl ; pc H	set cursor position - pl Line, pc Column
* ESC [H	set cursor home
* ESC [pl ; pc f	set cursor position - pl Line, pc Column
* ESC [f	set cursor home
* ESC D	cursor down - at bottom of region, scroll up
* ESC M	cursor up - at top of region, scroll down
* ESC E	next line (same as CR LF)
* ESC 7	save cursor position (char attr,char set,org)
* ESC 8	restore position (char attr,char set,origin)

Applications / Normal Mode:

* ESC [? 1 h	cursor keys in applications mode
* ESC [? 1 l	cursor keys in cursor positioning mode
* ESC =	keypad keys in applications mode
* ESC >	keypad keys in numeric mode

Character Sets:

+ ESC (A	UK char set as G0
+ ESC (B	US char set as G0
+ ESC (0	line char set as G0
+ ESC) A	UK char set as G1
+ ESC) B	US char set as G1
+ ESC) 0	line char set as G1
+ ESC N	select G2 set for next character only
+ ESC O	select G3 set for next character only

Character Attributes:

* ESC [0 m	turn off attributes - normal video
* ESC [4 m	turn on underline mode
* ESC [7 m	turn on inverse video mode
+ ESC [1 m	highlight
+ ESC [5 m	blink

Line Attributes:

+ ESC # 3	double high (top half) - double wide
+ ESC # 4	double high (bottom half) - double wide
+ ESC # 5	single wide - single height
+ ESC # 6	double wide - single height

Erasing:

* ESC [K	erase to end of line (inclusive)
* ESC [0 K	erase to end of line (inclusive)
* ESC [1 K	erase to beginning of line (inclusive)
* ESC [2 K	erase entire line (cursor doesn't move)
* ESC [J	erase to end of screen (inclusive)
* ESC [0 J	erase to end of screen (inclusive)
* ESC [1 J	erase to beginning of screen (inclusive)
* ESC [2 J	erase entire screen (cursor does not move)

Tabulation:

* ESC H	set tab in current position
* ESC [g	clear tab stop in current position
* ESC [0 g	clear tab stop in current position
* ESC [3 g	clear all tab stops

Requests / Reports:

* ESC [c	request to identify terminal type
* ESC [0 c	request to identify terminal type
* ESC Z	request to identify terminal type
* ESC [? 1;0 c	report - type VT100

Initialization / Tests:

+ ESC c	reset to initial state
+ ESC [2 ; 1 y	power-up test
+ ESC [2 ; 2 y	loop-back test
+ ESC [2 ; 9 y	power up test till failure or power down
+ ESC [2 ; 10 y	report - cursor at line pl, & column pc
+ ESC # 8	video alignment test-fill screen with Es

Setup Functions:

* ESC [? 1 h	aplication cursor keys
* ESC [? 1 l	cursor key mode
* ESC [? 2 l	enter VT52 mode
* ESC <	exit VT52 mode
+ ESC [? 3 h	132 column mode
+ ESC [? 3 l	80 column mode
+ ESC [? 4 h	smooth scroll
+ ESC [? 4 l	jump scroll
+ ESC [? 5 h	black characters on white screen mode
+ ESC [? 5 l	white characters on black screen mode
* ESC [? 7 h	auto wrap to new line
* ESC [? 7 l	auto wrap off
+ ESC [? 8 h	keyboard auto repeat mode on
+ ESC [? 8 l	keyboard auto repeat mode off

* ESC [2 0 h	new line mode (LF, FF, VT, CR = CR/LF)
* ESC [2 0 l	line feed mode (LF, FF, VT = LF ; CR = CR)

Interpreted Control Characters:

* ^O	shift out - selects G0 character set
* ^N	shift out - selects G1 character set

16.3 VT100 KEYBOARD MAP

The following table describes the special function keys of the VT100 and shows the sequences transmitted. It also shows the key or key sequence required to produce this function on the PX-2000 keyboard. The VT100 has four function keys PF1 - PF4, four arrow keys, and a numeric keypad with 0-9, ".", "-", RETURN and ",". The numeric keypad and the arrow keys may be in standard mode or applications mode as set by the host computer. Sequences will be sent as follows:

VT100 Key pad Key	Escape codes send		Press Key with red
0	ESC O p		0
1	ESC O q		1
2	ESC O r		2
3	ESC O s		3
4	ESC O t		4
5	ESC O u		5
6	ESC O v		6
7	ESC O w		7
8	ESC O x		8
9	ESC O y		9
-	ESC O m		-
,	ESC O l		,
.	ESC O n		:
RETURN	ESC O M		RETURN
FUNCTIONS:			
PF1 - Gold	ESC O P		Y
PF2 - Help	ESC O Q		B
PF3 - Next	ESC O R		N
PF4 - DelBrk	ESC O S		M
Arrows:	cursor mode	aplication mode	
Up	ESC [A	ESC O A	Up
Down	ESC [B	ESC O B	Down
Right	ESC [C	ESC O C	Right
Left	ESC [D	ESC O D	Left

17.0 PX 2000 SPECIAL CHARACTERS

The following is a list of the HEX values of the special characters available on the PX-2000.
You can access these characters in the EDIT mode, or while ON-LINE, by pressing the key in the left column in combination with the keys in the top row. The YELLOW key is the SEND key.
Refer to the ASCII table for the form of the actual character.

KEY	YELLOW+ LEFT SHIFT	YELLOW+ RIGHT SHIFT	YELLOW+ RED
SPACE	A0	C0	7C
A	A1	C1	7E
B	A2	C2	7F
C	A3	C3	98
D	A4	C4	9B
E	A5	C5	9E
F	A6	C6	-
G	A7	C7	-
H	A8	C8	-
I	A9	C9	9F
J	AA	CA	E7
K	AB	CA	EC
L	AC	CC	EF
M	AD	CD	F3
N	AE	CE	F4
O	AF	CF	F5
P	B0	D0	F6
Q	B1	D1	F7
R	B2	D2	F8
S	B3	D3	F9
T	B4	D4	-
U	B5	D5	-
V	B6	D6	FA
W	B7	D7	FB
X	B8	D8	-
Y	B9	D9	-
Z	BA	DA	-
0	BB	DB	F6
1	BC	DC	F7
2	BD	DD	F8
3	BE	DE	F9
4	BF	DF	FC
9	-	-	FD
:	-	-	FE
;	-	-	FF

TEXT LITE PX 2000 CHARACTER TABLE