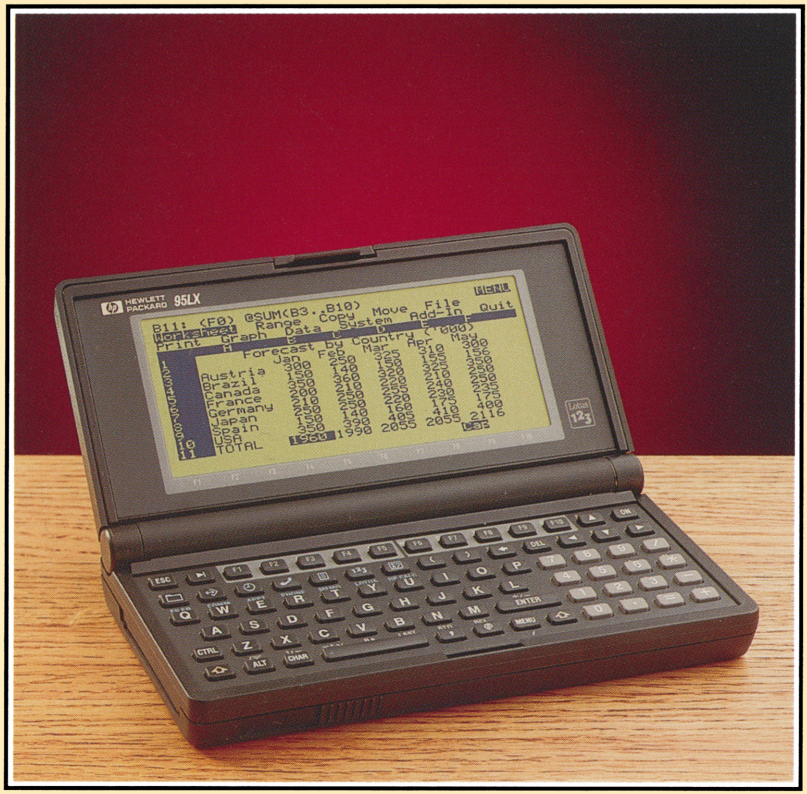
The Answers You Need



for the

HP 95LX Palmtop PC

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by

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Printed in the United States of America
ISBN 0-931011-35-3

First Printing – November, 1991

Contents

0. First Thoughts

About This Book

This book gives you short, clear answers to your questions about the HP 95LX Palmtop PC. It does not replace the *User's Guide* that came with the machine. Rather, it is a *companion* book, "a pocket guide." The *User's Guide* documents each command of the machine—helpful as a reference, but not so much for *prioritizing* information. By contrast, this book distills out answers and anticipate your difficulties, so that, for common topics, you need not search in the *User's Guide*.

About Your Palmtop

What It Cannot Do

The HP Palmtop is a real PC—roughly equivalent to an IBM XT with a monochrome display and *MS-DOS* version 3.22. And just like any such PC, it is limited by the software available for it. *Some programs for a desktop XT-compatible will not work on the Palmtop*—especially if they need a graphic display or extended memory (see pages 111 and 123).

What It Can Do—If You Really Insist

The Palmtop is not really designed to write books, publish elaborate spreadsheets, develop software, etc. You *can* do those things, but you'd be working harder than necessary; far better to use a desktop PC for such tasks. For example, the Palmtop has a Memo Editor with some standard word-processing features, but its keyboard size is not the best for touch-typing a lengthy document. Likewise, the built-in *1-2-3* program is great for analyzing, but you'll find it more convenient to prepare the final *presentation* output of a spreadsheet on a desktop system.

What It Was Designed to Do

The HP Palmtop isn't meant to be used for *everything* that you use a desktop PC for—just the things you need most often while "on the move:"

- A personal information manager: It offers you a complete address book, appointment calendar and to-do list capabilities.
- An analytic tool: It gives you the "what-iffing" ability of Lotus 1-2-3 and the ability to solve for missing variables (HP Solver).
- Enough memory capacity to store and manipulate quite a bit of data.

It has *MS-DOS* built-in, too, but that's mainly so you can add other analytic tools—and send/receive files to/from a desktop PC for the tasks it's not so good at.

If You Already Know About PC's

You'll find that many of the Palmtop's features behave like those of other PC's. All the built-in applications have Lotus-like menus, from which you select any item by typing the first character of its name. And, at the bottom of most screens is a list of highlighted items corresponding to the function keys (F1–F10) on the top of the keyboard. To execute a listed command, press the corresponding function key.

One big difference between the Palmtop and other PC's is that you can have multiple applications open simultaneously in the Palmtop—and switch by pressing just one key (although you can't access the *DOS* prompt or run a *DOS*-based application unless all built-in applications are closed (more about this on p. 114).

If You Already Know About HP Calculators

If you've used any of HP's recent financial calculators, you'll find that the Palmtop Calculator feature can do just about everything they can (though it may take you some time to adjust to how those calculator features look on the Palmtop's screen). The big difference between the calculators and the Palmtop is how the Palmtop uses built-in Lotus 1-2-3 templates to do statistical and cash-flow analyses.

Looking at the Keyboard

The HP 95LX keyboard is not the standard PC keyboard, but it's probably more convenient. Take a look:

Character Keys

- The alphabet keys are arranged in the standard *q w e r t y* format.
- The gold shift key (⇧) and the special character key (CHAR) give you access to special punctuation, international, and symbolic characters (summarized on pages 140-142). These keys are "sticky" keys: once you press ⇧,, the next key you press will produce the shifted character. *Unlike a typewriter or standard keyboard, you don't have to hold down ⇧ or CHAR while you press other alphabet keys.*
- The @ and , characters (bottom row) are given their own keys because of their common use in Lotus functions and formulae.

Cursor Keys

- Above the numeric pad are the cursor keys: ◀, ▶, ▼, ▲, HOME, END, PG DN, and PG UP. Use the gold shift key (⇧) to get the gold-printed, "shifted" versions of the four arrow keys. The tab (▶|) and back-tab (|◀) keys are also cursor keys, but tab is actually a character that you can insert into text.

Calculator/Numeric Keys

- There is a very normal-looking numeric pad to the right of the *q w e r t y* keys.
- The bottom row of letters on the *q w e r t y* keyboard (and the letter L) behave differently when the calculator (🖩) application is active. These functions (√x, 1/x, x≷y, R↓, LAST, STO, RCL and +/–) are printed in white—not gold like the shifted functions—because they're active only in one application.

Application Keys

- The keys marked in *blue* give you access to the eight built-in applications: [▦], [1²3], [▤], [☎], [◷], [⇨], [▭] and [SET UP] ([⇧][▭]).

Special Keys

- The [ON]/[OFF] key is in the upper-right hand corner.
- The [CTRL] and [ALT] keys are special control keys that give you access to various commands. These keys work only when pressed *simultaneously* with another key, as in [CTRL][Z] or [ALT][F1].
- There are several keys that will "undo" something you've done:
  - [ESC] allows you to escape from your current menu choice, and will return you to the previous menu or to the current application, whichever is appropriate. Whenever you use [ESC], nothing you've done within the current menu will be saved.
  - [DEL] deletes the character currently underlined by the cursor.
  - [←] backspaces, deleting the character immediately to the left of the cursor.
- The [MENU] key displays the current menu of a built-in application (whichever is open and *current*). Thus, [MENU] acts like the [/] key does in *Lotus 1-2-3* (which is why a slash is printed under the [MENU] key).

Function Keys

- In the middle of the top row are the 10 function keys (also called *softkeys*), [F1]–[F10]. The labels *printed* above these keys show their meanings in the Lotus 1-2-3 application, but in all other applications, the current meaning(s) of each function key will be listed on the bottom of the *display* immediately above each key. For example: **Cut** or **Paste** or **Help**. Of course, if the space above a key is blank, it has no current meaning.

1. Organizing Information

All About Files

The convenience of the HP 95LX is impressive. But, like any other Information Manager, you must use it wisely and efficiently to gain its power and convenience. To use it best, you must start by understanding its filing system.

Naming Files

The basic unit of organization on the Palmtop—as on any PC—is the *file.* Files have different structures and formats depending on what kind of data they contain and what programs use them. The HP 95LX uses the *filename extension*—the three character suffix of a filename that follows the period (.)—to classify the various kinds of files its built-in programs use. Here's a list of these file extensions:

- .ABK: An Appointment Book data file that can be opened only from within the Appointment Book application.
- .BAT: A DOS-based batch file—a kind of "macro for DOS."
- .CNF: A file containing current settings or data for an added System Manager application.
- .COM: A DOS-based program or system command.
- .CTF: A Character Translation Facility file, used to translate characters when communicating with a system with a different character set.
- .DAT: A file containing reference data used by the System Manager.
- .DCF: A Datacomm Configuration File, containing a particular collection of settings needed for connecting to an external source via Datacomm.
- .ENV: A collection of the overall System Manager environment settings.
- .EQN: A file contains a list of Solver equations that can be opened only from within the Calculator.
- .EXE: A DOS-based program which can be run only from DOS.
- .EXM: A System-Manager-based program which can be accessed (once it is installed) only from within the System Manager.

- .FCF: A Filer Configuration File, containing a collection of Filer settings needed for connecting—via the Filer—to an external source.
- .HLP: A help file to be used from within a particular built-in application.
- .LCF: A Logon Configuration File, containing a script used to automatically log onto specific remote computers.
- .PBK: A Phone Book data file that can be opened only from within the Phone Book application.
- .PCF: A Printer Configuration File that contains the Setup settings for a particular printer.
- .PCX: A graphics file compatible with the Business Card feature.
- .TXT: An ASCII Text file, editable with Memo Editor, that can be opened by some built-in applications and many DOS-based applications.
- .WK1: A spreadsheet that can be opened only from within 1-2-3.

Saving Files

Each of the built-in applications allows you to save a file in *two* different formats—the format particular to the specific application *or* in the ASCII Text format (i.e. what the Appointment Book would look like if it were printed out). For example, you could save a newly-created appointment book as an Appointment Book file (with the .ABK extension) or as an ASCII Text file (with a .TXT extension). The ASCII version would lack alarms and could only be edited within the Memo Editor.

To save a file in an *application-specific format*: From within the application (📅, 📝, 🕐, 📋 or 123), press MENU, File, Save. You'll then be prompted to name your file. You must use the proper extension so that you can retrieve the file again later (this necessary extension is automatically offered by the prompt). Type in a name (eight characters maximum) and press ENTER.

To save a file *as an ASCII file*: From within the application, press MENU, Print, File. You'll then be prompted to name the file (the .TXT extension is automatically offered by the prompt). Type in a name (eight characters maximum) and press ENTER.

Using the Filer

The Filer is the "home base" of the *System Manager* operating system. Not only does it help you organize your files into directories, it also lets you:

- Transfer files to/from a PC (via the Connectivity Pack—see pages 91-93);
- Run DOS-based programs on a plug-in RAM card (see page 120);
- Access the DOS Command line (see pages 114-115).

Disk Drives and the HP 95LX

File organization begins with the disk. On most desktop PCs, the drive designated as `A:` is a floppy drive for *removable* diskettes; the `C:` drive is a *fixed* (or "hard") disk. To find its "boot up" information, the MS-DOS operating system checks the `A:` disk first (if it exists), then the `B:` disk, then the `C:` disk.

Likewise, the HP 95LX comes with a *plug-in* drive into which you can insert RAM or ROM cards. This drive is the `A:` drive. The *internal* combination RAM/ROM card is the `C:` drive. And, as usual, DOS looks at the `A:` drive (the plug-in port) *first* upon boot-up—to see if it's got a card plugged into it.

Pathnames and Directories

You denote each directory in DOS with a backslash (`\`). Each disk's main directory is called the *root directory,* whose name is *only* a backslash (nothing more). For example, the root directory on the `C:` disk is denoted by `C:\`.

The *pathname* of a file is a sequential list of the directories and subdirectories the computer needs to follow (the "path") to find the file. For example, the pathname of a file called `hiding.txt`, located in the `worddoc` directory of the `personal` directory of `projects` directory of the C: root directory would be:

```
C:\projects\personal\worddoc\hiding.txt
```

Notice how each subdirectory is separated by a `\`; the *file*name comes at the end.

The pathname is what makes a file unique. Two files can have the same name (such as `hiding.txt`) but not the same full pathname. In the Filer—and in all applications—you may need to move "up" and "down" the paths in order to find and store files where you want them: You move "down" a path by highlighting a subdirectory and pressing ENTER. You move "up" a path by highlighting `\..` and pressing ENTER. This `\..` represents the *parent directory*—the directory containing the current directory. Practice in the Filer and get comfortable with paths, pathnames and searching directories, before you attempt file transferring or file translation with the Connectivity Pack.

The Built-In Files and Directories

On the Palmtop's `C:` (internal) disk, the root directory (`C:\`) is built-in and contains, in turn, two built-in subdirectories and several other special files. To display it, press F5 (Goto) type `C:`, and press ENTER. You'll see a listing like this:

```
C:\
_DAT          <DIR>      04-01-91   12:00a
CHKDSK   EXE     9680    02-11-91   10:37a
COMMAND  COM      184    02-11-91   10:36a
TF       COM     8170    03-20-91    7:38a
_CARLOAN WK1     5232    03-20-91    7:38a
_CFLOW   WK1     4418    03-20-91    7:38a
_EXPENSE WK1    12406    03-20-91    7:38a
_HOMEBUY WK1     4362    03-20-91    7:38a
_STAT    WK1     5444    03-20-91    7:38a
```

`CHKDSK.EXE` is the *DOS* **CHecKDiSK** command, which examines how a disk's memory is being used.

`COMMAND.COM` is the program that starts the *DOS* interface.

`TF.COM` is the *DOS*-version of a game called Tiger Fox (see page 121).

The underscore character (`_`) indicates *built-in* directories and data files. The last five files listed above are 1-2-3 worksheet templates that you cannot delete or modify (you copy them and modify the copies). And there are two subdirectories, `_DAT` and `_SYS` also built into ROM. You can see the `_DAT` subdirectory listed here, but not the `_SYS` subdirectory. Why not?...

_SYS is a *hidden* file—hidden, that is, from the directory listings of the Filer and *DOS*. To get it to display, press F5 (Shift-K) type C:_sys, and press ENTER. You'll see a listing similar to this:

```
C:\_sys
  ..          -View Up-
1000      PCX      4419   03-04-91     8:57a
123       DYN     13679   03-13-91    11:45a
123       SET     13298   02-22-91    12:04p
123US     HLP     85576   12-20-90    10:14a
123US     RI      19454   03-13-91    11:35a
APPTUS    HLP      4091   01-16-91     1:15p
COMPUSRV  DCF        71   02-05-91    12:00a
DEBUG     EXE     15631   03-15-91    11:55a
DOWJONES  DCF        71   02-05-91    12:00a
EDITORUS  HLP      1915   01-16-91     1:15p
FILERUS   HLP      3411   02-28-91     2:09p
GENIE     DCF        71   02-27-91     7:36a
HB        EXM      6702   03-29-91     4:34p
JCALCUS   HLP      5498   03-14-91     5:58p
MCI       DCF        71   02-05-91    12:00a
PHONEUS   HLP      2034   01-16-91     1:15p
SAMPLE    CTF       481   12-19-90     5:47p
SERINT    COM       164   02-28-91    12:11p
SETUPUS   HLP      2425   01-16-91     1:15p
SYSINIT   BAT       338   03-07-91    10:17p
TERMUS    HLP      2232   01-16-91     1:15p
TFOX      EXM      8315   03-18-91     1:54p
TOPCARD   PCX      1252   03-04-91     3:43p
TOPUS     HLP      1825   01-16-91     1:15p
WTIME     DAT        66   12-07-90    12:38p
WTIME     US       2877   03-20-91     7:35a
_1        PBK       512   02-27-91     4:18p
```

Of course, the files listed above are for the U.S. release version (as the US on the ends of the .HLP filenames indicate). You may copy files in _sys to other directories, but you cannot delete or change any of the files in this directory, nor add files to it.

The _dat Subdirectory

The _dat subdirectory is visible from the Filer. In the Filer, press F5 (Goto), c:_dat, ENTER move to the _dat subdirectory. You will see a collection of .ENV files for each of the built-in applications, copies of some of the settings and configuration files from the _sys subdirectory (which may have been subsequently modified), and maybe a few other files that you've created. You can modify the _dat directory to a degree: you can add and delete files and even change the directory name (although you *really don't want to do that*—each of the built-in applications expects to find its current setup information in the _dat subdirectory).

Sorting and Organizing Files

The Filer's primary use, of course, is to help you keep track of files. In your work with your Palmtop, you will create a lot of documents—particularly with the Editor and 1-2-3. You'll probably have a couple of phone books, at least one appointment book, a collection of Solver equations, and a few DOS-based applications. You may also have some additional *System Manager*-compatible applications "attached" to keys on the keyboard.

Generally, you want to put any Phone Books and Appointment Books you create into the _dat file (memory permitting, of course). This gives you quick access to them. Then organize your other documents by creating subdirectories and then moving files into the appropriate spots.

Creating a Subdirectory

1. Display the directory in which you want to place the new subdirectory, using the arrow keys to select it and the ENTER key to display it.
2. Press MENU, D*irectory*, C*reate*.
3. Press ▶ several times until you've moved to the end of the pathname.
4. Type the name of the subdirectory—making sure that you begin it with a backslash (\)—and press ENTER.

Moving Files

To move files one at a time:

1. Highlight the file to be moved.
2. Press F10 (Move). You'll be prompted for the path to the new destination.
3. Type the new pathname (the *file*name is optional) and press ENTER. Be sure to separate each directory level with \ (e.g. `c:\doc\corresp\sept91`).

You can also move files as a group *if all the files are in the same subdirectory.* To do this, you must "tag" each file in the group: Use the arrow keys to highlight it, and press F9 (Tag). To tag more than one file at a time, here are your options:

F9 (Tag):	Tags or untags the highlighted file.
ALT–F4 (Up):	Tags the highlighted file and all *preceding* files in the current directory, as they're now sorted (see below).
ALT–F3 (Down):	Tags the highlighted file and all *subsequent* files in the current directory, as they are now sorted (see below).
ALT–F5 (All):	Tags all files in the current directory.
ALT–F9 (Untag):	Untags all files in the current directory.

Thus, to move a group of files:

1. Tag the group of files you want to move.
2. Press F10 (Move). You'll be prompted for a path to the destination directory.
3. Type a path and press ENTER. If the destination directory doesn't yet exist, at the error message, press ESC and create it (see page 15). Then move the files.

Sorting the Files in a Directory

You can rearrange the files in each directory in any one of four ways:

- Alphabetically, by filename: Press MENU, F*ile-Sort*, F*ilename*.
- Alphabetically, by file extension: Press MENU, F*ile-Sort*, E*xtension*.
- Chronologically, by last update: Press MENU, F*ile-Sort*, D*ate/Time*.
- Order of size (largest to smallest): Press MENU, F*ile-Sort*, S*ize*.

Viewing Files

You can view a file directly from within Filer, although that's not always very helpful. Example: Highlight the COMPUSRV.DCF file in the _dat subdirectory and press [ENTER]. You'll see this:

```
Filer                          09/18/91  2:52 pm
Viewing file: C:\_dat\compusrv.dcf
═══════════════════════════════════════════════
T0 ↑ @@@@@@@aiva
                                  ♦Pαarel
```

Not much useful information there! However, there are several types of files that can be usefully viewed from Filer. Special files that you create in Memo Editor, such as AUTOEXEC.BAT and CONFIG.SYS are text (ASCII) files. Any .TXT files or .BAT files can also be viewed using Filer. Press [F5] (Goto), type c:_sys\sysinit.bat [ENTER] to view the batch file which copies the required files from the _sys folder (ROM) to the _dat folder (RAM) where the built-in applications expect to find them. You should see:

```
Filer                          08/29/91  2:02 pm
Viewing file: C:\_sys\sysinit.bat
═══════════════════════════════════════════════
echo off
copy c:\_sys\*.env c:\_DAT > nul
copy c:\_sys\*.?bk c:\_DAT > nul
copy c:\_sys\topcard.pcx c:\_DAT > nul
copy c:\_sys\*.dcf c:\_DAT > nul
copy c:\_sys\*.lcf c:\_DAT > nul
copy c:\_sys\*.ctf c:\_DAT > nul
copy c:\_sys\*.ccf c:\_DAT > nul
copy c:\_sys\*.fcf c:\_DAT > nul
copy c:\_sys\wtime.dat c:\_DAT > nul
echo on
```

Editing Files

When you view files with the Filer, you may only look at them, you cannot edit them in any way. If you want to edit a file, you must open the application that created that file and then retrieve the file. .ABK files can be edited within the Appointment Book, .PBK files within the Phone Book, .EQN within the Solver section of the Calculator, .WK1 files within 1-2-3, and any kind of text file (.LST, .TXT, .BAT, etc.) within the Memo Editor.

Your Appointment Book

About Appointments

Every appointment consists of up to three pieces of information:

- A description of the appointment (Who with? For what?);
- The beginning time of the appointment;
- The duration of the appointment.

The HP 95LX allows you to add two other things to your appointments:

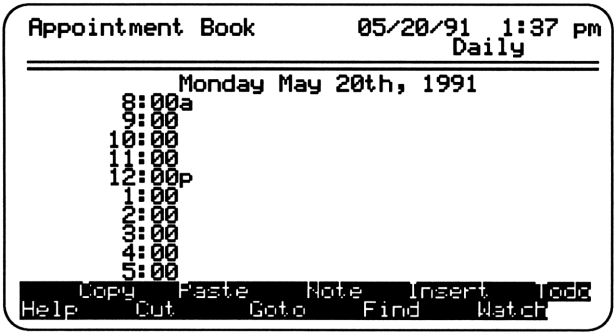
- Alarms to help you remember them;
- Special Notes to help you prepare quickly for them.

Appointments can be either *One-Time-Only* or *Repeating*. You can enter repeating appointments that recur weekly, monthly (on the same date), monthly (at the same position—i.e. second Monday), or yearly.

Setting the Date and Time

1. Press [↑][SET UP] to enter the Setup Utility.
2. Press [D]*ate* [C]*urrent* and type in the date in a format like that shown opposite.
3. Press [ENTER].
4. Press [D]*ate* [W]*eek-Start* to specify the first day of the week (usually Sunday or Monday) as you want the Appointment Book to interpret it.
5. Select Sunday or Monday using [◀] or [▶] and press [ENTER].
6. Press [T]*ime* [C]*urrent* and type in the time in a format like that shown opposite.
7. Press [ENTER].

Press [◴] and see the following screen (except that the date will be different):



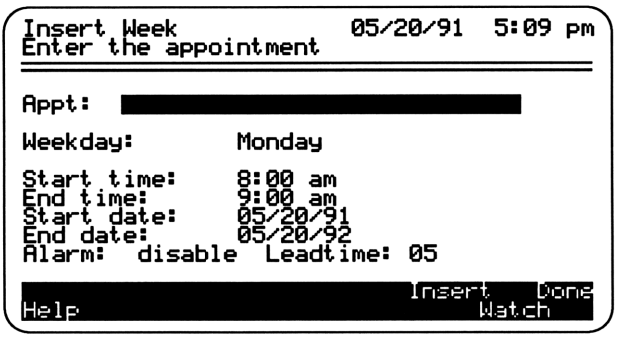
Suppose you have an appointment today at 11:00 with a prospective client, Michael Jordan, to talk about an investment plan. How would you enter it?

1. Make sure that you are viewing the proper day (today's date). Press [F5] (Goto) and then type today's date and press [ENTER] if you aren't already viewing today's date.
2. Press [F8] (Insert).
3. Type `Michael Jordan` and press [ENTER].
4. Press [ENTER] to accept the offered date (today) as the appointment date.
5. Type `11a` to indicate the appointment's starting time.
6. Press [▼]. The Palmtop automatically offers you a ending time, usually one hour later than the start time. You could just press [ENTER] to accept this ending time, but you think the meeting will last for an hour and a half. So type `12:30p` and press [ENTER].
7. Press the space bar to *enable* the alarm, then press [ENTER].
8. Type `15`, to indicate that you want the alarm to go off 15 minutes before the appointment (you can choose any number up to 30), and press [ENTER].
9. Press [F10] (Done) to save your appointment and return to the Daily screen.

Entering Weekly Appointments

Enter an appointment reminder about the half-hour weekly staff meeting on Thursdays at 9:15 in the morning. Make sure it appears each week.

1. Press MENU V*iew* W*eekly-Repeat*.
2. Press F8 (Insert).

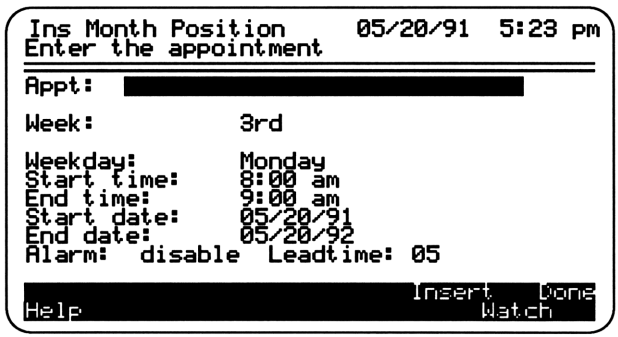


3. Type Staff Meeting and press ENTER.
4. Press the space bar until you see Thursday displayed, and press ENTER.
5. Type the start time, 9:15a, and press ENTER.
6. Type the end time, 9:45a, and press ENTER.
7. Type the date from which the weekly appointments begin. Usually, today's date is sufficient (or next Thursday's date). Press ENTER.
8. Type the date after which the weekly appointments no longer exist. For appointments that have an undetermined end date, you may arbitrarily choose date and modify it later as needed. Press ENTER.
9. Press the space bar to enable the alarm, and press ENTER.
10. Type 5 to give yourself a five-minute warning as a reminder before each staff meeting. Press ENTER.
11. Press F10 (Done) to save the weekly appointments and return to the previous screen.

Entering Monthly-Position Appointments

Enter an appointment reminder about the monthly board meeting for Community Action that runs from 7:30–9:30pm on the second Monday of each month. Make sure it appears each month.

1. Press MENU *View* *Monthly-Repeat* *Position*.
2. Press F8 (Insert).

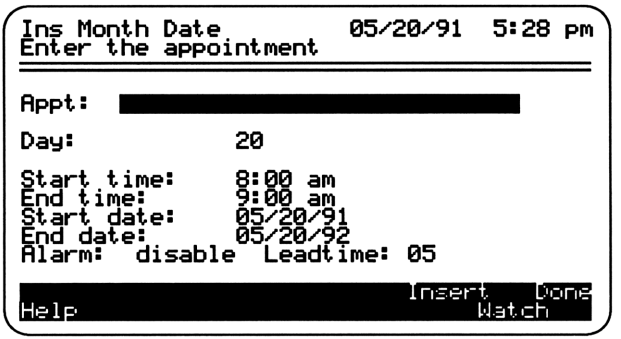


3. Type Community Action Board Mtg. and press ENTER.
4. Press + or −, if necessary, until you see 2nd displayed, and press ENTER.
5. Press + or −, if necessary, until you see Monday displayed, and press ENTER.
6. Type the start time, 7:30p, and press ENTER.
7. Type the end time, 9:30p, and press ENTER.
8. Type the date from which the monthly appointments begin. Usually, today's date is sufficient (or date of the next 2nd Monday). Press ENTER.
9. Type the date after which the monthly appointments no longer exist. For appointments that have an undetermined end date, you may arbitrarily choose date and modify it later as needed. Press ENTER.
10. Press the space bar to enable the alarm, and press ENTER.
11. Type 20 to give yourself a twenty-minute warning as a reminder before each monthly board meeting. Press ENTER.
12. Press F10 (Done) to save the monthly appointments and return to the previous screen.

Entering Monthly-Date Appointments

Enter a monthly appointment to call your brother, Rafael, who's currently doing field work in Tanzania, at 7:00pm (your time) on the 8th of each month.

1. Press MENU *View* *Monthly-Repeat* *Date*.
2. Press F8 (Insert).

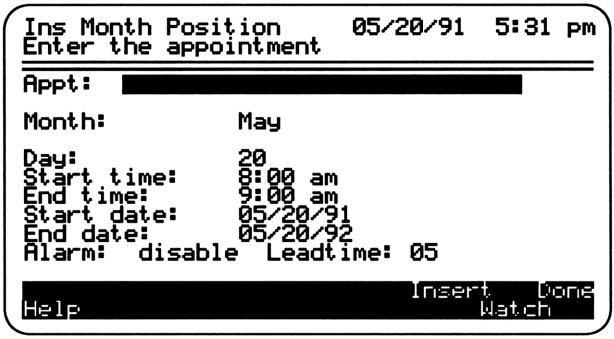


3. Type `Call Rafael` and press ENTER.
4. Type in `8`, and press ENTER to register the day of the month.
5. Type the start time, `7p`, and press ENTER.
6. Press ▼ to accept the default end time (since it seems appropriate). You can always type in an end time and press ENTER if you need to.
7. Type the date from which the monthly appointments begin. Usually, today's date is sufficient. Press ENTER.
8. Type the date after which the monthly appointments are no longer relevant. For appointments that have an undetermined end date, you may arbitrarily choose date and modify it later as needed. Press ENTER.
9. Press the space bar to enable the alarm, and press ENTER.
10. Type `10`, to give yourself a 10-minute warning as a reminder before each phone call. Press ENTER.
11. Press F10 (Done) to save the monthly appointments and return to the previous screen.

Entering Yearly Appointments

Enter a yearly appointment to remind you about your mother's birthday, August 27th, one week earlier on August 20th.

1. Press [MENU] [V]*iew* [Y]*early-Repeat*.
2. Press [F8] (Insert).



3. Type Mom's Birthday (Aug 27) and press [ENTER].
4. Press [+] or [−], if necessary, until you see August displayed, and press [ENTER].
5. Type in 20, and press [ENTER] to register the day of the month.
6. Type the start time, 8a (choose an time early in the day so that you use a spare moment to buy Mom a card and/or gift), and press [ENTER].
7. Press [▼] to accept the default end time. You can always type in an end time and press [ENTER] if you need to.
8. Press [▼] to accept the default start date.
9. Type in a date 5–10 years in the future to stand as an end date (you can modify this later, as necessary). Press [ENTER].
10. Press the space bar to enable the alarm, and press [ENTER].
11. Type 0 so that the alarm will remind you to notice the reminder. Press [ENTER].
12. Press [F10] (Done) to save the monthly appointments and return to the previous screen.

Setting Up a To-Do List

A To-Do list is a prioritized list of tasks that you can check off as you complete them.

You can create only *daily* To-Do lists—no weekly, monthly or yearly To-Do lists.

For example, create a To-Do for tomorrow, that includes these three items:

- Finish the proposal rough draft and deliver to Fred.
- Thank you note to Marge.
- Pay overdue phone bill.

Here's how to do it:

1. From the Daily screen, press F10 (Tools).
2. Move, if necessary, to tomorrow's date by using the ⇧ PG DN and ⇧ PG UP keys (or by pressing F5 (Goto) and typing in tomorrow's date).
3. Press F8 (Insert).
4. Type `Proposal rough to Fred` and press ENTER. Note that you can only type 27 characters per To-Do item.
5. Type in a number from 1–9 that represents the priority of the task. Give Fred's proposal a `2`, and press ENTER.
6. Press the space bar until the carry-forward item says *yes*, and press ENTER. When the carry-forward is enabled, a task will be carried forward onto future To-do lists until it is either checked off or deleted (see page 27).
7. Accept the displayed date and press ENTER.
8. Press F8 (Insert) to save the first To-Do task and then to display a new, blank insert screen for the next To-Do task.
9. Repeat steps 4 through 8 for `Thank you note to Marge` (priority `3`).
10. Repeat steps 4 through 7 for `Pay overdue phone bill` (priority `1`).
11. Press F10 (Done) to save the final To-Do task and return to the Daily appointment screen.

Moving Around in the Appointment Book

Here's a summary of the ways you can move to a different daily screen from the current daily screen:

- Press ESC to move to Calendar view, where you can use the arrow keys to move the cursor to the desired day. Then press F10 (Go To). Use ⇧–▼ and ⇧–▲ to move the calendar forward and backwards more rapidly.
- Press F5 (Date), type the date (in the current format), and press ENTER.
- Press ⇧–▲ to move backwards one day or ⇧–▼ to move forwards one day.

Attaching a Note to an Appointment

A note can contain up to one screenful of information (40 characters by 11 lines). To add a note:

1. Highlight the appointment to wish to augment with a note. Make sure that you've selected the appropriate view (daily, weekly, monthly date, monthly position, or yearly) that corresponds to the appointment.
2. Press F6 (Note) to display the note screen.
3. Type your note like you would in Memo Editor.
4. Press either F10 (Done) to save the note or ESC to cancel what you've done.

To delete a note:

1. Highlight the appointment whose note you want to delete.
2. Press F6 (Note).
3. Press F9 (Mark) to begin selecting the text you want to delete
4. Press ⇧ CTRL–▶ to move the cursor to the end of the note. The entire note should be highlighted.
5. Press F3 (Cut).
6. Press F10 (Done) to complete the deletion.

Changing Appointments

To change any information in an appointment—date, time, duration, etc.:

1. Display that appointment *in the view in which it was originally entered.*
2. Highlight the appointment you want to change.
3. Press [ENTER] to display the edit screen.
4. Move the cursor to the field you want to change.
5. Enter the correct information.
6. Press [F10] ([DONE]) to save the new version of the appointment.

To reschedule or cancel one-time appointments, it's easiest to use Cut and Paste:

1. Highlight the appointment in the daily view.
2. Press [F3] ([CUT]) to cancel the appointment from its current timeslot.
3. If you are rescheduling, move to its new timeslot, highlighting it.
4. Press [F4] ([PASTE]) to insert the appointment in its new timeslot.

To cancel *all days* of a repeating appointment:

1. Display the repeating view in which it was originally entered.
2. Highlight the appointment.
3. Press [F3] ([CUT]). All occurrences of the appointment are canceled.

To reschedule/cancel *one day* of a repeating appointment, don't remove—*add*:

1. Add a "simultaneous" appointment in the bad timeslot, informing you that this one instance is canceled.
2. For a re-schedule, add a one-time appointment in the new timeslot.

Erasing Past Appointments, Notes and To-do Items

To erase all appointments and to-do items before the date you specify (you might first want to print out a paper copy for your records), do this:

1. Press [MENU], [R]*emove*.
2. Either accept the offered date, or type a new date and press [ENTER], [↵].

Viewing Appointments Conveniently

Entering appointments and then *viewing* them are separate tasks. You can use, say, the 15-minute timeslots to *enter* appointments—to find openings around a certain time—but then switch to ***Appts-Only*** view (press MENU, S*ettings*, T*imeline*, A*ppts-Only*, ESC) to see your whole day at a glance. You could also *enter* your appointments in Appts-Only view, but you'll have to type in the start and stop times, since there are no designated timeslots (for just occasional appointments, this may still be the handiest option). However, you won't see the duration bars in the Appts-Only view. In any Daily View, by contrast, you can tell at a glance if an alarm is set for an appointment (the ♫), if an appointment repeats (the ▪), or if it has a note attached (the ■). To inspect the details of any appointment, highlight it and press ENTER. To return after inspecting, press F10 (Done).

Keeping the To-Do Lists Up-to-Date

To-Do items are carried forward whenever you enter them with the carry-forward *enabled.* For example, if you enter `call Mom` in tomorrow's to-do list, with the carry-forward enabled, you've also entered `call Mom` in every to-do list from now on—until you check it off your list (but once you do check it off, it disappears from all future to-do lists except the one for the day you checked it off. That one remains as a record of what you've accomplished—at least until you remove the accumulated reminders to make room for future entries—see page 26). Here's how to check off a To-Do item as completed:

1. Display the To-Do list containing the item—usually today's list.
2. Highlight the item and press the space bar. You will see the "checked-off" symbol (#) in front of the file.
3. If, for any reason, you change your mind about the status of a To-Do item, you can reinstate it by pressing the space bar again while the item is highlighted.

To delete a To-Do item altogether:

1. Display the To-Do list containing the item to be checked off.
2. Highlight the item and press F3 (Cut).

Merging Two Appointment Books into One

When you leave the office with your HP 95LX, you may add appointments and notes while on the road. Meanwhile, back at the office, you may get other appointments scheduled for you on a desktop PC by a secretary or colleague. Upon your return you want to be able to efficiently *merge* the two appointment books on your PC. If both Appointment Books are in the **.ABK** format, then the Merge utility, provided in the Connectivity Pack, will do the job. Here's how it works:

1. Connect the PC and your HP 95LX using the Connectivity Pack and be sure that the Connectivity Pack software is properly installed on the PC (see pages 90-92 for detailed instructions).

2. Make sure that:

   - Both appointment books are in **.ABK** format. Use the HP Translate utility (discussed on page 139) or a third party translation utility to convert a file to the **.ABK** format.
   - The two appointment books have slightly different names.
   - Both appointment books are transferred to the PC. Merge will not work properly if the two files are on different machines. Use the Filer to transfer (see page 93 for details) the HP 95LX Appointment Book file to the PC, making sure to close and save the latest version of it first.

3. At the *DOS* prompt on the PC, type **APP95**. You will see the main menu with its list of applications.

4. Press ALT–7 to start the Merge utility, and press A*pptBk*.

5. Now specify the two files you are merging:

   - Move the cursor to the **Input file 1** field.
   - Press F3 (**Files**), type in the pathname of one of the two **.ABK** files you are merging, and press ENTER.
   - Press F3 (**Files**), type the pathname of the other **.ABK** file, press ENTER..

6. It is probably a good idea to use the default name for the output file (**MERGE.ABK**) until the after process is completed, when you can then rename the newly merged file. However, if you're suffering memory constraints you may wish to give the output file the same name as one of the input files, which will cause that input file to be overwritten. Press ENTER.

7. Select one of the four methods for resolving conflicts between the two merging files by pressing the space bar until you see your choice and pressing [ENTER]. The four methods:

   - *Query*: The program asks you to individually resolve each conflict. It displays the conflicting entries asking you to select **File 1**, **File 2**, **Both** (i.e. simultaneous appointments), or **None**.
   - *First File*: The program always resolves conflicts in favor of File 1.
   - *Second File*: The program always resolves conflicts in favor of File 2.
   - *Both*: The program always includes both entries in the output file.

8. If you want the program to beep at you whenever it finds a conflict, then use the space bar to make sure that the beep is **Enabled**. Press [ENTER].

9. Unless you're suffering from memory constraints, you should let the program generate its **MERGE.LOG** file as a record of its actions. You can decide later whether it's worth saving. If you have memory constraints, pressing [F4] (**Clear**) will cause Merge to skip the creation of a log file.

10. Press [F6] (**Start**) to begin the Merge operation.

Two problems may arise once the program begins merging the two files:

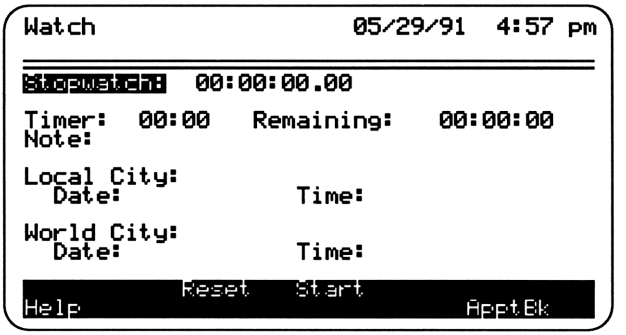
- If there is not enough memory to hold the two files open while processing them, you will see the message **Memory full**. Close down any TSR programs or other "open" applications.
- If the newly merged output file is larger than the maximum allowable size for an Appointment Book (see page 127 for details) then you will see the message: **Warning: Output file may be too large to load.**

If, at any time, you wish to cancel the merge, press [CTRL]–[BREAK].

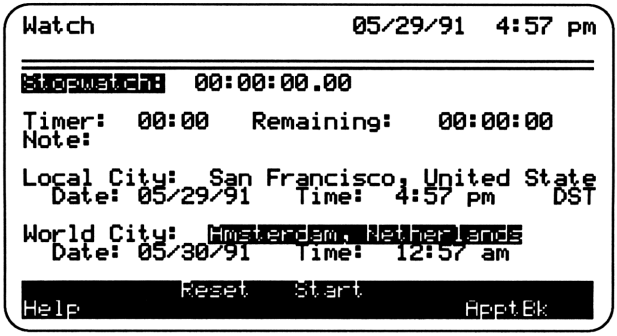
Temporarily Using the Appointment Book in a Different Time Zone

You live in Berkeley, California, but you're en route to Amsterdam to attend a 4-day conference. You want to change your Appointment Book times and appointments temporarily to Amsterdam time (they're now on Pacific Daylight Time).

1. Press [◴], [F9](Watch). You'll see:



2. Press [▼], [▼], [▼] to highlight the Local City field. Currently, the time on the clock at the top of screen reflects the time in Berkeley. The Palmtop assumes that the current time is the current time *in the city listed here* as Local City.
3. Press [F2] (List) to call up a list of cities that the Palmtop knows about.
4. Type ber. Notice that the list searches the list as you type, helping you quickly find your city. But...where's Berkeley? It's not on the list!
5. So use San Francisco instead: press [ESC], type san fr [ENTER], [ENTER].
6. Press [F6] (DST), [N]. You've just told your Palmtop that the current time is Daylight Savings Time and said "No!" when it very sensibly asked you if that means you want it to add a hour to the current time. After all, you've already set the correct time *including the extra hour.*
7. Press [▼] to highlight the World City field, then [F2] (List) to find Amsterdam.
8. Type ams and press [ENTER], [ENTER]. You should see a display like that opposite. It's almost 1:00 a.m. Notice that the time and date on the top line—the "current time" for the Appointment Book—is still set on California time.



9. Now you convert the current time to Amsterdam time: Press ▲, F2 (Edit), type ams, press ENTER, ENTER, Y. Amsterdam is now your Local City.
10. Now make San Francisco your World City—so you know when a good time to phone home might be. Press ▼, F2 (Edit), type san fr, press ENTER, ENTER. Your Appointment Book is now functional in Amsterdam. When you return to Berkeley, just make San Francisco your Local City once again.

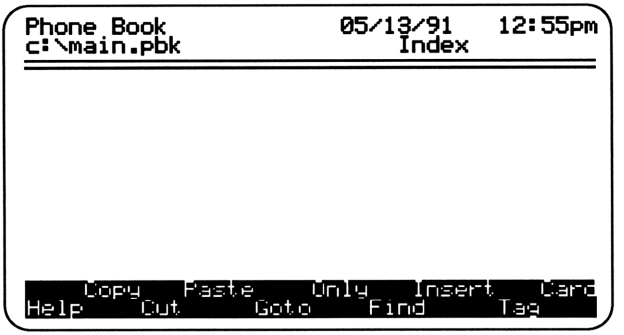
Adding a City to the List

You can add up to eight cities to the list in the Watch feature. You'd like to add Berkeley to the list instead of having to use San Francisco as a workaround.

1. Press ▼ until the Local City field is highlighted, then press F2 (Edit).
2. Press F8 (Insert).
3. Type Berkeley and press ENTER.
4. Type United States and press ENTER.
5. How many hours difference is there between the current time (at the top of the screen) and Berkeley *Standard* Time? You must set the original offset in Standard Time even if it's now in Daylight Time. So if the current time says 2:33 pm San Francisco Daylight Time, the only time differential is that between standard and daylight time: –1 hour. So type **-1**, then press ENTER. You should see −08:00 as the GMT Offset if you did everything correctly.
6. Press F10 (Done) to finish adding the city to the list.
7. If Berkeley is highlighted, press ENTER, Y to make it your local city.
8. Press F6 (DST), Y, since it's actually Daylight Time in Berkeley (and S. F.).

Your Phone Book

Press [Phone]. If you haven't already started a phone book, you will see a blank screen—called an *Index* screen similar to the one below:



(If you've started a phone book previously, the screen will contain some entries.)

Adding New Entries to Your Phone Book

Press [F8] (Insert) to insert a new *card.* The actual complete entries in a phone book are kept in a card file. The Index screen, such as the one above, is merely a synoptic view of the card file.

Type in the name: `Jordan, Michael` and press [ENTER]. Note that you should type in the last name first if you want to alphabetize the entries by last name.

Type in the phone number: `(555) 244-8526` and press [ENTER]. Notice that the next field, the `Address:` field, is a large text area. You may enter the address and any other information you wish. Once you've finished with the address and other information you can either:

- Add another card (by pressing Insert) or
- Return to the index screen, saving your new additions in the process (by pressing Done).

Using Your Phone Book as a Simple Database

Phone Book is a very simple database containing three fields, two of which (Name and Number) are *indexed* and listed in alphabetical order for quick and easy searching (see page 37). Don't overlook the fact that it can be used for information other than names, phone numbers and addresses.

For example, consider using the Phone Book to create a price list for the products or services. In the "Name" field, you would enter the product number or name; in the "Number field," the price; in the "Address" field, the selling points, sizes, or special discount pricing—whatever might be relevant additional information.

The Card view of this price list still labels the fields, "Name" "Number," and "Address," even though you are not using them in that way. You can't change this. However, in the Index view of this price list, there are no labels—all you see is a list of products in alphabetical order and their prices. You can type in the first few letters of the product name, see its price, and then, if necessary, highlight it and look at the Card view to see the additional background information. Call this file something like, PRICES.PBK, to distinguish it from your regular phone books.

Creating a Subset of a Large Phone Book

There's a limit as to how large a Phone Book can be (see page 127). But, long before you reach this limit, you may wish to create smaller, more targeted subsets of a large ungainly Phone book. Here's how you do it:

1. Open the large "master" Phone Book.
2. Either highlight a single name that you want in the subset Phone Book or create a list of records based on a search text (see page 37).
3. Press F9 (TAG).
4. Repeat steps 2 and 3 with each name that you wish to put in the new Phone Book. If you make a mistake, press F9 (TAG) again to untag a particular name.
5. Press MENU, F*ile*, X*tract*, then type in a filename (8 characters maximum) for the new subset Phone Book, and press ENTER.

Merging Two Phone Books into One

When you leave the office with your HP 95LX, you may add or edit entries in your Phone Book while on the road. Meanwhile, back at the office, you may get other amendments made to the phone book on your desktop PC by a secretary or colleague. Upon your return you want to be able to efficiently *merge* the two phone books on your PC. If both are in the **.PBK** format, then the Merge utility, provided in the Connectivity Pack, will do the job. Here's how it works:

1. Connect the PC and your HP 95LX using the Connectivity Pack and be sure that the Connectivity Pack software is properly installed on the PC (see pages 90-92 for detailed instructions).

2. Make sure that:

   - Both phone books are in **.PBK** format. Use the HP Translate utility (discussed on page 139) or a third party translation utility to convert a file to the **.PBK** format.
   - The two phone books have slightly different names.
   - Both phone books are transferred to the PC. Merge will not work properly if the two files are on different machines. Use the Filer to transfer (see page 93 for details) the HP 95LX Phone Book file to the PC, making sure to close and save the latest version of it first.

3. At the *DOS* prompt on the PC, type **APP95**. You will see the main menu with its list of applications.

4. Press ALT–7 to start the Merge utility, and press A*pptBk*.

5. Now specify the two files you are merging:

   - Move the cursor to the **Input file 1** field.
   - Press F3 (**Files**), type in the pathname of one of the two **.PBK** files you are merging, and press ENTER.
   - Press F3 (**Files**), type the pathname of the other **.PBK** file, press ENTER..

6. It is probably a good idea to use the default name for the output file (**MERGE.PBK**) until the after process is completed, when you can then rename the newly merged file. However, if you're suffering memory constraints you may wish to give the output file the same name as one of the input files, which will cause that input file to be overwritten. Press ENTER.

7. Select one of the four methods for resolving conflicts between the two merging files by pressing the space bar until you see your choice and pressing [ENTER]. The four methods:

   - *Query*: The program asks you to individually resolve each conflict. It displays the conflicting entries asking you to select **File 1**, **File 2**, **Both** (i.e. simultaneous appointments), or **None**.
   - *First File*: The program always resolves conflicts in favor of File 1.
   - *Second File*: The program always resolves conflicts in favor of File 2.
   - *Both*: The program always includes both entries in the output file.

8. If you want the program to beep at you whenever it finds a conflict, then use the space bar to make sure that the beep is **Enabled**. Press [ENTER].

9. Unless you're suffering from memory constraints, you should let the program generate its **MERGE.LOG** file as a record of its actions. You can decide later whether it's worth saving. If you have memory constraints, pressing [F4] (**Clear**) will cause Merge to skip the creation of a log file.

10. Press [F6] (**Start**) to begin the Merge operation.

Two problems may arise once the program begins merging the two files:

- If there is not enough memory to hold the two files open while processing them, you will see the message **Memory full**. Close down any TSR programs or other "open" applications.
- If the newly merged output file is larger than the maximum allowable size for a Phone Book (see page 127 for details) then you will see the message: **Warning: Output file may be too large to load.**

If, at any time, you wish to cancel the merge, press [CTRL]–[BREAK].

Searching for Information

Once you have a collection of information loaded into your HP 95LX, you want to be able to find it easily and quickly. Four of the built-in applications have a method for automatically searching for data. Lotus 1-2-3 includes this functionality as a part of its database (/D*ata*) feature, which is discussed on pages 70-74. The other applications which allow searching are discussed below:

Using the Memo Editor to Search for Text in a .TXT Document

1. Open the document you wish to search using the Memo Editor. Make sure the cursor is at the beginning of the file (CTRL–◀)
2. Press F7 (Find).
3. Type in the text you want to find. The search is not case-sensitive; it treats upper and lower case identically.
4. Press ENTER, to begin the search.
5. To find another occurrence of the search text, press ENTER again.

Searching the Appointment Book

You can search for the occurrence of a particular text in all daily appointments and to-do lists (and their notes) within two years (before or after) the current day:

1. Make sure you are in a daily view. (If the label above F10 says Daily, press F10 to move to the daily view.)
2. Press F7 (Find).
3. Type the text you want to find (39 characters maximum). The search is not case-sensitive; it treats upper and lower case identically.
4. Press F5 (Prev) to search backwards in time. You will see the daily view or to-do list that contains the search text—although it may be hiding in the note for that day or to-do list. Keep pressing F5 (Prev) until a message reports that no match is found.
5. Press F7 (Next) to find any occurrences of the text after the initial date. Repeat until you see the message reporting that there are no more matches.

Finding Information in a Phone Book file

To search the alphabetical index for a name, begin typing the name. For example, to find Meredith in the current Phone Book, type M and you'll see the cursor move to the first entry beginning with M.... Notice up in the second line of the display that you've started a Goto procedure—simply by typing. Continue by typing e and you'll see the cursor move to the first entry beginning with "Me..." This narrowing down of the search as you type continues until you either press ENTER or ESC ESC after which you can use the arrow keys to move the cursor.

To search for information that isn't indexed:

1. Move to the Card view: Press F10 (Card), if necessary.
2. Press F7 (Find).
3. Type the text you want to find (39 characters maximum). The search is not case-sensitive; it treats upper and lower case identically.
4. Press ENTER to begin the search *forward* from the current card. To search backwards (alphabetically) from the current card, you can press F5 (Prev) instead of ENTER.

You can also automatically search your Phone Book and create a list of records that contain a particular bit of text. This might be useful in making smaller subset Phone Books (see page 33), or similar database uses. Here's how to do it:

1. Move to the index view: Press F10 (Index) if necessary.
2. Press F6 (Limit).
3. Type the text (39 characters maximum) that you want to find. The search is not case-sensitive; it treats upper and lower case identically.
4. Press ENTER. Beginning with the first record in the file, a index list is displayed that *only* includes records that contain the search text. You can highlight and tag the entries on this list just as you would on the complete index list.

Notice the difference: The F6 (Limit) procedure *filters* the index—by displaying only records containing a particular text. The F5 (Find) procedure actually *moves* the cursor to the next occurrence of a particular text.

2. Analyzing Information

The HP 95LX offers a sophisticated financial calculator that you can use by itself or in combination with the industry-standard spreadsheet, Lotus 1-2-3. The three primary number-crunching areas of the HP 95LX are:

- The built-in menus and templates in the Calculator
- The Solver component of the Calculator that allows you to build your own custom calculation menus and templates and plot functions and graph data
- Lotus 1-2-3 and the built-in spreadsheets

Calculator Basics

The Calculator Menu

Arith: The main area of the calculator where you actually do basic arithmetic—[+], [−], [*], [/], [+/−], [1/x], [√x]—and memory operations—[STO], [RCL], →M, RM, M+, M−.

TVM: Used for Time Value of Money calculations, involving the variables: N, I%YR, PV, PMT, FV, P/YR, and B/E. Also does interest rate conversions (Iconv) and amortization tables (Amort).

Solve: Used to create custom equation menus and templates as well as for graphing functions.

Math: Extends the basic calculator by adding these special functions (see pages 43-44 for details of each):

RND	IP	FP	ABS			
LN	E^X	LOG	10^X			
→DEG	→RAD	→HR	→HMS			
XCOORD	YCOORD	RADIUS	ANGLE			
Cx,y	Px,y	N!	SEED	RAN#		
PI	SIN	COS	TAN	ASIN	ACOS	ATAN

Bus%: Calculation templates for the following four business percentages:

$$\%CH = \left(\frac{NEW - OLD}{OLD}\right) \times 100$$

$$\%TOTAL = \left(\frac{PART}{TOTAL}\right) \times 100$$

$$MARKUP = \left(\frac{PRICE - COST}{COST}\right) \times 100$$

$$MARGIN = \left(\frac{PRICE - COST}{PRICE}\right) \times 100$$

List: Used to create and edit lists of numbers; the List feature automatically sums the numbers in the list.

Conv: Used to calculate conversions between units in five areas: **Currency**, **Length**, **Area**, **Volume**, and **Mass**.

File: Used to save, retrieve, or insert Solve equation files (**.EQN**)—the only kind of files created by the Calculator.

View: Used to show all the displayed numbers in full precision instead of in whatever display mode has been selected.

Options: Used to select a display format for all values (**Format**), Angle units (**Degrees**, **Radians**, or **Grads**) and to select which arithmetic syntax to use (**Algebraic** or **RPN**).

Print: Immediately prints to an attached printer (see pages 90-91 for connection details) one of the following: the current **Calcline**, the contents of the 10 storage **Registers**, the contents of the history **Stack**, or the **Data** associated with the currently-selected feature.

Erase: Erases one of the following sets of data: the current **Calcline**, the contents of the storage **Registers**, the contents of the history **Stack**, or the **Data** associated with the current feature.

Quit: Quits the Calculator application and makes its system RAM available to other applications.

Comparing the HP 95LX Calculator to the HP 19Bii

The Calculator application on the HP 95LX was designed to approximate the functionality of HP's top-of-the-line business and financial calculator, the HP-19BII. But because of the HP 95LX's vastly greater memory, its much larger display, and the availability of Lotus 1-2-3, the interface with the user is quite different between the two machines.

Here's a summary of the key differences between the two machines:

- The 95LX's larger display allows more detailed menus and variable specification, shows up to 10 list items at a time instead of just one, and allows much extensive plotting and graphing.
- The 19Bii allows you to name, store, and recall SUM lists. The HP 95LX offers no way to name, store or retrieve lists—only use a temporary, "current" list. In many cases, it may suffice to enter the list of data into the built-in _STAT template and then save the modified spreadsheet with a different name (see page 67). Lists saved in this way can be used in most (but not all) of the same ways that SUM lists are on the 19Bii.
- There is no dedicated bond calculation menu on the HP 95LX as there is on the HP 19Bii, although you can create your own fairly easily, by creating a Solve equation (see pages 58-59).
- The HP 95LX has no menu dedicated to calendar arithmetic—the calculation of the number of days between dates, the date a given numbers days into the future, etc. However, the functions you need to do these calculations are available to you if you write Solve equations (see page 60).
- The Cash-Flow (CFLO) lists—and associated functions—used by the 19Bii to work out the profitability of uneven cash-flows have been moved to their own dedicated 1-2-3 spreadsheet (see pages 50-52).
- The Statistical calculations made on SUM lists in the 19Bii are now accomplished by the 1-2-3 template, _STAT (see pages 67-69).
- Solver has no depreciation functions (SOYD, DDB, etc.) but instead relies on accessing these functions in Lotus 1-2-3 (see pages 61-62).
- While the conversion feature on the HP 95LX is much easier to use than its counterpart on the 19Bii, it doesn't have built-in conversions for temperatures like the 19Bii.
- The Solver in the HP 95LX has a few functions that allow it to import data from 1-2-3 spreadsheet cells and to use that data in a Solve equation. Similarly, a result can be exported to a 1-2-3 cell to be manipulated via Lotus @ functions. See pages 63-66 for an example of these "communication" functions.

The Calculator's Registers

The basic calculator uses four sets of registers—where all the crunching goes on:

- The *Calcline* is the main register, containing the "current value." It is called the X-register in RPN mode or the (0) register in Algebraic mode.
- The *History Stack* is comprised of four registers, including the Calcline, that contain the current value and the three previous results (or numbers that haven't yet been used in a calculation). This Stack is the "workbench" of the calculator. In the display you will see the three previous-result registers labeled (1), (2), (3) in Algebraic mode and Y, Z, T in RPN mode.
- The *Storage Registers* are ten registers (labeled Reg0 to Reg9) that you can put numbers into for later use. Reg0 is also known as the M register for use with M+, M−, RM, and →M operations (see below).
- The *Data Registers* are created by built-in Solver equations and other Calculator features and by your Solver equations. They are variable in number and are usually controlled by the function key menu at the bottom of the display. Data registers are usually labeled with descriptive names and phrases.

Using the Storage Registers

To use any of the storage registers—Reg0 to Reg9—you use the STO and RCL keys (N and M keys when the Calculator is active). Some examples:

Store the Calcline value in Reg6:	STO 6
Recall a value from Reg4 into the Calcline:	RCL 4
Add the Calcline value to what is already stored in Reg2:	STO + 2
Subtract the Calcline value to what is already stored in Reg8:	STO − 8
Multiply what is already stored in Reg5 by the Calcline value:	STO × 5
Divide what is already stored in Reg3 by the Calcline value:	STO / 3

Reg0 (the M register) has a set of shortcuts built onto the basic Calculator menu (Arith):

→M	is a shortcut for STO 0
RM	is a shortcut for RCL 0
M+	is a shortcut for STO + 0
M−	is a shortcut for STO − 0

Modifying the Way Numbers are Displayed

To change the number of decimal places displayed in the Calculator:

1. Press MENU, O*ptions*, F*ormat*.
2. Choose one of four formats:
   - Fix: Displays a value in standard form, rounded to a particular number of decimal places.
   - Scientific: Displays a value in scientific notation, rounded to particular number of decimal places
   - Engineering: Displays a value in scientific notation.
   - All: Displays a value in standard form, including all numerically-significant digits (i.e. no trailing zeroes to the right of the decimal) up to 15 decimal places.
3. Choose how many decimal places you want displayed (0-15). You won't need this step if you selected the All format.

No matter what display format is currently selected, you can view the number in the Calcline *as if* it were in All mode, simply by pressing MENU, V*iew*.

Modifying the Amount of Data Displayed

You can control which registers are visible to you while you are doing arithmetic.

- Pressing MENU, A*rith*, F3 (Calc) will display only the Calcline, but not the History Stack nor the storage registers.
- Then press F2 (Stack) and you will see the Calcline, the History Stack, and the first five storage registers (Reg0 through Reg4).
- Finally press F2 (Stack) once again to display all 10 storage registers, but not the History Stack.

Your display selections are only visible in the basic (Arith) Calculator screen. The Math menu screen will always display just the Calcline and the History Stack.

RND Rounds the number in the Calcline to the number of displayed decimal places. Remember that the number of decimal places displayed is different than the number of decimals actually present in the actual stored value. RND makes those numbers equal.

IP Chops the rightmost Calcline number so that only the integer part (the part to the left of the decimal) remains.

FP Chops the rightmost Calcline number so that only the fractional part (the part to the right of the decimal) remains.

ABS Takes the absolute value of the rightmost Calcline number.

LN Finds the natural logarithm (base *e*) of the rightmost Calcline number.

E^X Raises *e* to the power represented by the rightmost Calcline number.

LOG Finds the common log (base 10) of the rightmost Calcline number.

10^X Raises 10 to the power represented by the rightmost Calcline number.

PI Places 3.141592653589793—an approximation of π into the Calcline. It will be displayed according to the current display format.

SIN Finds the sine of the angle represented by the rightmost Calcline number, interpreting the units of angle measure according to whichever trig mode is currently set (Degrees, Radians, or Grads).

COS Finds the cosine of the angle represented by the rightmost Calcline number, interpreting the units of angle measure according to whichever trig mode is currently set (Degrees, Radians, or Grads).

TAN Finds the tangent of the angle represented by the rightmost Calcline number, interpreting the units of angle measure according to whichever trig mode is currently set (Degrees, Radians, or Grads).

ASIN Finds the principal angle whose sine is represented by the rightmost Calcline number, interpreting the units of angle measure according to whichever trig mode is currently set (Degrees, Radians, or Grads).

ACOS Finds the principal angle whose cosine is represented by the rightmost Calcline number, interpreting the units of angle measure according to whichever trig mode is currently set (Degrees, Radians, or Grads).

ATAN Finds the principal angle whose tangent is represented by the rightmost Calcline number, interpreting the units of angle measure according to whichever trig mode is currently set (Degrees, Radians, or Grads).

→DEG Assumes that the rightmost Calcline number is a radian value and then converts it to the equivalent degree value.

→RAD Assumes that the rightmost Calcline number is a degree value and then converts it to the equivalent radian value.

→HR Assumes that the rightmost Calcline number is in the hours (degrees)-minutes-seconds format (H.MMSSss) and converts it to the equivalent decimal hours (degrees) format.

→HMS Assumes that the rightmost Calcline number is in the decimal hours (degrees) format and converts it to the equivalent hours (degrees)-minutes-seconds format (H.MMSSss).

XCOORD Either stores the value in the Calcline as the x-coordinate of a rectangular complex number ($x + yi$) or calculates what x and y values must be if the polar coordinates (RADIUS and ANGLE) have previously been stored.

YCOORD Either stores the value in the Calcline as the y-coordinate of a rectangular complex number ($x + yi$) or calculates what x and y values must be if the polar coordinates (RADIUS and ANGLE) have previously been stored.

RADIUS Either stores the value in the Calcline as the r-value of a polar complex number (r **cis** θ) or calculates what the r and θ values must be if the rectangular coordinates (XCOORD and YCOORD) have previously been stored.

ANGLE Either stores the Calcline value as the θ-value of a polar complex number (r **cis** θ) or calculates what the r and θ values must be if the rectangular coordinates (XCOORD and YCOORD) have previously been stored.

X Stores Calcline value as the x-value in combinations and permutations (x things taken y at a time).

Y Stores Calcline value as the y-value for calculating combinations and permutations.

Cx,y Calculates the number of *combinations*—different sets containing y items that can be taken from a larger group containing x items. Requires that values for x and y be entered previously.

Px,y Calculates the number of *permutations*—different arrangements of y items that can be made from a larger group containing x items. Requires that values for x and y be entered previously.

N! Calculates the factorial of the rightmost Calcline number.

SEED Stores the non-zero number in the Calcline as the seed number initiating a random number sequence. If the number in the Calcline is zero, it will use a number from the system clock instead.

RAN# Enters a random number between 0 and 1 into the Calcline.

Financial Calculations

The Time Value of Money

The Time Value of Money (TVM) equation computes the effect of compound interest on a debt or investment. It applies only when the payment each period is *uniform*; if the payment varies, use the _CFLOW template (see pages 50-52).

$$0 = PV + \left(1 + \frac{I\%YR \times S}{P/YR \times 100}\right) \times PMT \times \frac{1 - \left(1 + \frac{I\%YR}{P/YR \times 100}\right)^{-N}}{\frac{I\%YR}{P/YR \times 100}} + FV \times \left(1 + \frac{I\%YR}{P/YR \times 100}\right)^{-N}$$

N is the total number of periods during the loan or investment;

I%YR is the nominal rate of interest (APR or ROI);

PV is the present value of the investment or loan;

PMT is the amount of the periodic payment;

FV is the future value of the loan or investment after N periods (FV is generally opposite in sign to PV);

P/YR is the number of periodic payments per year;

S is a variable that accounts for the effect of payments made at the beginning of each period (*S* = 1), vs. the end (*S* = 0).

The TVM menu lets you input values for any of the above variables, in order to: **(i)** solve the TVM equation for *N*, *I%YR*, *PV*, *PMT*, or *FV*; **(ii)** construct and print amortization tables; **(iii)** compare nominal vs effective interest rates.

1. Press MENU, T*VM*.
2. Enter the number of payments per year and press F5 (P/YR).
3. Are the payments made at the *beginning* of each period (like rent) or at the *end* of each period? Press F4 (BEGIN) until the appropriate mode is selected.
4. Enter values for four of the five remaining variables by typing the value and pressing the appropriate function key.
5. Solve for the remaining variable by pressing its function key. Keep in mind that you can compare *two* scenarios (press ◀ and ▶ to oscillate between them).

Creating Amortization Tables

The Calculator itself has no built-in storage place to receive an amortization table. Because amortization is an iterative process, you will probably find it most useful either to print the table as it is created or to store the results in a 1-2-3 spreadsheet.

To print out the amortization table for a fixed-term, fixed-rate, fixed payment loan:

1. Enter the values in the main TVM screen and solve as usual.
2. Press F2 (AMORT) to move to the amortization menu.
3. Make sure your printer is properly connected (see pages 90-91) and then press MENU, P*rint*, D*ata*. You should see PRINT in the upper-right hand corner of the display.
4. Type the number payments you want to amortize as a group, and press F2 (GRP). If you don't type a number, pressing F2 (GRP) will use the number of payments in a year as a default. The amortization for the first group will be printed.
5. Type in the number of *groups remaining* to be amortized and press ↑–F2. For example, if the loan period is 15 years and you are using groups of 12 payments (i.e. you're amortizing each year as a group), then after printing the first group in step 4 above, you only have 14 groups more. Thus, in this case, you would type 14 and press ↑–F2.
6. When the printing has finished, press MENU, P*rint*, D*ata* again to turn the printing off.

To send an amortization table to a 1-2-3 spreadsheet:

1. Open the 1-2-3 spreadsheet and move the cursor to the upper left-hand cell of the range where you want to begin receiving the amortization data. Note that the table will be eight columns wide and with two more rows than the number of groups in your amortization. Press ⊞, T*VM*.
2. Enter the values in the TVM screen and solve for the missing variable.
3. Press F2 (AMORT) to move to the amortization menu.
4. Press F10 (1-2-3). You will see the current spreadsheet. Confirm that the cursor is located in the upper left-hand cell of the target range and press ENTER. You will see 1-2-3 in the upper right-hand corner of the display.
5. Type in the number payments you want to group onto each line in the table, and press F2 (GRP). If you don't type a number, pressing F2 (GRP) will use the number of payments in a year (*P/YR*) as a default. The amortization for the first group will be printed.

6. Type in the number of *groups remaining* to be amortized and press ⇧–F2. For example, if the loan period is 15 years and you are using groups of 12 payments each (i.e. you're amortizing each year as a group), then after printing the first group in step 4 above, you only have 14 groups more. Thus, in this case, you would type **14** and press ⇧–F2.
7. When you've finished sending the data to 1-2-3, press F10 (1-2-3) again to break the connection.

The HP 95LX's amortization menu allows you to make adjustments to the interest rate and the monthly payment in the "middle" of an amortization—to help with Adjustable Rate Mortgages and Graduated Payment Mortgages. Here's what you do if you want to adjust a variable somewhere along the way:

1. Decide where you will send the output—either to 1-2-3 or to your printer (or neither, if you just need one or two values). Connect the printer or open the target worksheet to an available range of cells. **Note:** you cannot print *and* send to 1-2-3 at the same time.
2. Press ⁄, T*VM*, and run the initial scenario for the adjustable loan using the beginning interest rate, payment, PV and the total number of payments for the entire loan.
3. Press F2 (Amort) and then *either* F10 (1-2-3), ENTER *or* MENU, P*rint*, D*ata* to initiate the output connection.
4. Type in the number of payments to be made under the initial values of the loan—until either the interest rate or payment changes. Then press F2 (Adj). The amortization for the first set of payments will be output to the printer or to the spreadsheet.
5. Press F3 (Adjust) and then enter the adjusted values for the next portion of the loan. Only change those values (interest rate, payment, etc.) that have changed. Press ESC when you've made the changes.
6. Type in the number of payments to be made under the newly-adjusted conditions—until another change is scheduled or until the end of the loan—and press F2 (Adj).
7. Repeat steps 5 and 6 as needed until the loan is fully amortized (or at least up to the agreed terminal balloon payment).
8. Turn off the output connection to 1-2-3 or to the printer.
9. Press *either* F10 (1-2-3) *or* MENU, D*ata*, P*rint*.

Interest Rate Conversions

Often you need to compare two different quoted interest rates. Some quotes (those for loans) are *nominal* rates; others (those for investments) are effective rates. Furthermore, different compounding periods are used on different investments so that an effective rate is often not directly comparable with another effective rate. The TVM menu offers a small utility calculation to convert between the various kinds of interest rates/rates of return:

1. Press [MENU], [T]*VM*, [F3] (ICONV).
2. Type in the number of payments or compounding periods per year for the nominal rate and press [F3] (P/YR).
3. Type in the nominal interest rate and press [F4] (I%YR).
4. Notice the three equivalent interest rates that are calculated—you can change any of these rates and watch the others (including I%YR) change:
   - EFF% gives the effective annual rate after compounding.
   - CONT gives the equivalent nominal rate if the compounding was continuous.
   - 360/5 gives the nominal rate based on the 360/365 method.
5. Press [ESC] to switch back to the TVM screen. Notice that the rate stored in I%YR will be the same rate stored in that variable when you switch back to the main TVM screen. Of all of the various interest rates, only the I%YR is used in TVM calculations.

Unit Conversions

Conversions work similarly in most categories. As an example, convert 95.48 liters to pecks:

1. Press [MENU], [C]*onv*, [V]*olume* to move to the volume conversion menu.
2. Type 95.48 and press [F5] (LITER). You will see the equivalent measures in each of the other built-in units.
3. Press [F10] (MORE), and see that 95.48 liters is equivalent to 10.84 pecks.

Currency Conversions

If the yen:dollar exchange rate is 158.80:1 , how much is ¥1,000,000 in U.S. dollars?

1. Press [MENU], [C]*onv*, [C]*urrency* to move to the currency conversion menu.
2. Press [F2] (Edit), [F10] (More) to move to the currency edit screen.
3. Type in `158.80` and press [F4] (Yen).
4. Press [ESC], type `1000000`, and press [F4] (Yen).
5. Press [F10] (More) to view the equivalent U.S. dollar amount: `6,297.23`.

Adding and Changing Currencies

You can add up to five currencies to those already listed; you can rename of any of those now listed (so you can customize up to 14 currencies). To add a currency:

1. Press [MENU], [C]*onv*, [C]*urrency*, [F2] (Edit), [F10] (More)
2. Using the arrow keys, highlight a line without a currency; press [F2] (NAME).
3. Type the name of the new currency and press [ENTER]. Type in the proper conversion rate and press [ENTER]. Press [ESC] to return to the main currency conversion menu.

To change the name of an existing currency:

1. Press [MENU], [C]*onv*, [C]*urrency*, [F2] (Edit).
2. Use the arrow keys to highlight the currency to be changed; press [F2] (NAME).
3. Type in a new name, [ENTER], then an exchange rate and [ENTER]. Press [ESC] to return to the main currency conversion menu.

Setting Currency Exchange Rates

1. Press [MENU], [C]*onv*, [C]*urrency*, [F2] (Edit).
2. Type a new exchange rate and press the function key for that currency. Repeat this for all desired currencies, including those on the second screen (More).
3. Press [ESC] to return to the main currency conversion menu.

Using the Built-In 1-2-3 Templates

There are five 1-2-3 templates that come built into your HP 95LX—_CARLOAN, _CFLOW, _EXPENSE, _HOMEBUY, and _STAT. A ***template*** is a 1-2-3 worksheet that already has its formulas, macros, labels, and cell formats set up and ready for you to enter specific data. In general, to use a template:

1. Start 1-2-3 by pressing [123] and, if necessary, save the current file ([MENU], [F]*ile*, [S]*ave*, [ENTER], [Y]*es*.
2. Retrieve the template: press [MENU], [F]*ile*, [R]*etrieve*, type in **c:** followed by the template's name.
3. Enter the appropriate data
4. Invoke the macros which execute the special functions.
5. Save the worksheet under a new name, if desired, so that you can modify the data later, play "what-if," and so forth.

Of the built-in worksheets, only _CFLOW and _STAT really add to the analytical features of the machine. _CFLOW is described below; _STAT is described along with other Lotus database functions on page 67. You cannot delete or move the templates—they and their directory are built-in—but you may *copy* a template, modify anything you want and then save that file under a new name.

Uneven Cash-Flow Analysis (Using _CFLOW.WK1)

The TVM menu (see p. 45) can deal with finance problems that involve a smooth, level PMT cash-flow happening once every period. Often, you'll run into situations where the periodic cash-flow amounts vary—sometimes quite often—like this:

month	0	1	2	3	4	5	6	7	8
Cash-Flow $	(22,000)	400	400	400	750	0	0	0	45,000

The _CFLOW template is designed to help you analyze the Net Present Value (NPV) and internal rate of return for a series of *uneven* cash-flows (the cash-flow *amounts* may be uneven, but their *occurrences* must still be regular—once per period). Here's how you'd use it to analyze the series of cash-flows shown above:

1. Press [1²3], [MENU], [F]*ile*, [R]*etrieve* and type `c:\cflow` [ENTER] to open the template. It opens at cell **B44**, where the cash-flow data entry begins.

2. Press [ALT]–[E], type `y` and press [ENTER] to clear any data previously entered.

3. Enter the data into the cash-flow list. Monies received (dividends, income, etc.) are *positive*; money paid out (loan payments, investments, etc.) are *negative*.

   Enter month 0: [–][2][0][0][0][▼]

   Enter months 1–3: [ALT]–[G], [4][0][0][ENTER][3][ENTER]. The macro ([ALT]–[G]) lets you quickly insert a group of equal cash-flows.

   Enter month 4: [7][5][0][▼].

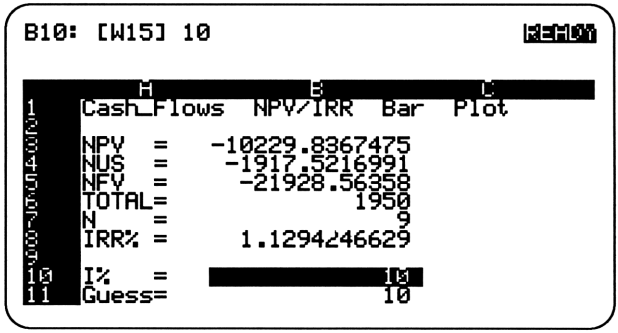
   Enter months 5–7: [ALT]–[G], [0][ENTER][3][ENTER].

   Enter month 8: [4][5][0][0][0][ENTER].

4. Review the cash-flow list and edit as necessary. There are 5 macros to help you:

   - [ALT]–[C] displays the cash-flow whenever it isn't in view.
   - [ALT]–[D] deletes a specified number of cash-flows, starting at the current cell and going downward.
   - [ALT]–[I] inserts a specified number of *zero* cash-flows, starting at the current cell and going downward.
   - [ALT]–[G] enters a group of consecutive, equal cash-flow amounts, starting at the current cell and going downward. These entries *overwrite* any previous data in the cells they use.
   - [ALT]–[E] erases the entire cash-flow list in column B.

5. Analyze the cash-flow list: Press [ALT]–[N] (`NPV/IRR`) You will see:



In this display, you'll see these values:

NPV	is the Net Present Value—the value of all cash-flows in the investment discounted at the user-specified periodic interest rate (I%=10).
NUS	is the Net Uniform Series—the size of *uniform* cash-flows that would be equivalent to the NPV of the current list of *uneven* cash-flows.
NFV	is the Net Future Value—the future value of the NPV at the end of the current cash-flow scenario—assuming that it is invested at the user-specified periodic interest rate (I%=10).
TOTAL	is the raw sum of all of the cash-flows (with no discounting).
IRR	Calculates the Internal Rate of Return—the periodic interest rate at which the NPV of the cash-flows equals zero.
I%	is the periodic interest (discount) rate that the you specify that the NPV calculation use. Because you haven't yet specified any rate, the default rate of 10% is used.

6. Modify the periodic interest rate (I%) to better reflect reality. The periods used in this scenario are *months* and a monthly discount rate of 10% is not realistic. This is why all the analytic measures (NPV, NUS, NFV) are negative. Divide 10% by 12 to get a proper monthly rate: 0.833%. Now enter 0.833 as I%, by pressing [.][8][3][3][ENTER].

7. Much better: At a discount rate of 10% per year, This cash-flow scenario has, a positive NPV and is equivalent to receiving $63.98 at the end of each of the next eight months—with no initial investment at all. The IRR is 1.1294246629% per month or 13.55% per year. This is the breakeven point: as long as the actual discount rate (I%) is less than the IRR, the investment's IRR will be positive.

Plotting the Cash-Flow Scenario

If you want to see a visual display of the current cash-flow scenario in _CFLOW, you have three choices:

- Display a bar graph of the cash-flows: press [ALT]-[B].
- Display a plot of the NPV versus I%: press [ALT]-[P]. The macro asks you to enter a starting value for I% and the increment between each point on the plot.
- Use the Graph feature of Lotus to design your own display (see pages 76-79).

After finishing view a graph or plot, press [ESC] to return to the main worksheet.

Using the Solver

If you would like to create a calculation template—similar to the TVM or business percentage calculations—for some equation of your own choosing, then you need to learn how to write Solver equations. The equations you write can be as simple as A+B=C or as complex as those included in this book (see pages 58-62).

Creating and Naming Solver Equations

As an example, create and name an equation for gas mileage.

1. Press [📖], [MENU], [S]*olve* to open to the current Solve catalog (if any).
2. Type in the equation: MPG=Miles/Gallons
3. Press [ENTER]. You have created the equation. Now name it...
4. Press [◀] to move to the name section in the Solve catalog.
5. Type in a name, GasMileage and press [ENTER].

Using Solver Equations

Your 350-mile trip uses 11.9 gallons. How far can it go on 15 gallons? To find out, use the GasMileage equation from above.

1. Make sure that the Solve catalog containing the GasMileage equation is being displayed (see page 54 if you have trouble).
2. Highlight the GasMileage equation (either the name or the equation itself will work) and press [F9] (Solve). You will see you customized calculation template and menu.
3. Enter data into all variables but one: Press [3][5][0], [F3] (Miles), [1][1][·][9], [F4] (Gallon).
4. Solve for the remaining variable: Press [F2] (MPG). Answer: 29.41 mpg.
5. Change a variable and solve for a different variable: [1][5][F4] (Gallon), [F3] (Miles). Answer: 441.18 miles.

Editing Equations

1. Make sure the Solve catalog containing the equation you wish to edit is displayed.
2. Highlight the desired equation. If you highlight the name, you will be able to edit the name. If you highlight the equation itself, you can modify it, as well.
3. Press F2 (Edit).
4. Make the changes that you want. The arrow keys work just as in Memo Editor.
5. When you've finished, press ENTER.

Equation (.EQN) Files

Each equation you enter goes into a particular Solve Catalog; each Solve Catalog is stored as an .EQN file. An .EQN file is a text file (which you can edit in the Memo Editor or other text editor—in addition to the editing offered with the Solve feature). Like any other file, an .EQN file can be transferred between a PC and the HP 95LX using the Filer and Connectivity Pack (see page 93)—so you can type in equation on a desktop PC and then transfer it to the Palmtop to use!

Suppose a particular .EQN file contains three separate equations (Name1, Name2, and Name3). The file would look like this when viewed in Memo Editor or other text editor:

{Name1 | *Equation text of the first program* }
{Name2 | *Equation text of the second equation* }
{Name3 | *Equation text of the third program* }

Each individual program is contain within brackets, {}, and the *name* of each equation is separated from its *equation* by the vertical bar, |. Neither of these delimiters is visible when you view a single equation within the Calculator Solver.

A single .EQN file can contain up to about 38 kB—a lot of equations! You can therefore feel quite free to include in each .EQN file all equations you might want access to during one Solver session.

Rules and Limitations on Solver Equations

1. *Equation names* can contain up to 38 characters (including spaces)—although only the first 12 characters will show up in the Solve Catalog.
2. A single equation cannot exceed 2279 characters (that's five completely full 12-line screens). A single equation can have up to 256 different variables.
3. *Variable names* can be up 15 characters, but the following characters are forbidden: space, +, −, *, /, ^, (,), <, >, =, ., ,, :, ;, !, {, }, [,], and |. Also, variable names cannot *begin* with a numeral, nor can they be identical to any Solver function or operator name (see page 150 for a complete list).
4. Variable names are case sensitive; function names are not.
5. Because only the first 4 to 6 characters in a variable name appear on the menu when you use a Solver equation, don't name two or more variables with names that begin with the same 4 to 6 characters. Otherwise, you could be confused when choosing selections from the menu.
6. The *order* in which the variables are mentioned in the equation is the order that they will appear in the calculation template and in the menu.
7. Constants (numbers) cannot have digit separators (e.g. the comma in 345,692) or other characters.
8. You *can* use spaces and line breaks (the ▶| key is used to start a new line) to display an equation in a way that makes it easier to understand. But you must *not* put spaces or line breaks in the middle of variable names or function names.
9. You *can* add comments to an equation at any point in an equation. The comment must *begin and end* with an exclamation point (!). It's a good idea to not insert them into the middle of a name or large function expression.
10. When in doubt, use parentheses. Of course, you must have the same number of closing and opening parentheses.
11. If you use the *same variable name* in two or more Solver equations, the value stored in that variable will be used in *both* equations. Sometimes this is a good thing; at other times, it leads to confusion. However, if you use the same variable name in a Solver equation as a variable in one of the *built-in* calculation templates (TVM, Business Percentages, etc.), the values *will not be shared* between them.

Using Hidden Variables

When you get proficient with writing Solver formulas, you may wish to put together more complex calculation templates (see pages 58-62 for some examples). To aid you in your efforts, you can use two functions that allow you to create intermediate, hidden variables—to shorten the amount of typing you need and to minimize confusion in complex equations. The two special functions are Let and Get—abbreviated as L( ) and G( ).

For example, suppose you need to use the following expression over and over in a long equation: `(BeginValue-EndValue)/#ofValues`. To save yourself a lot of typing, you can assign that expression a name—say, `v`—with the Let function. To do this, on the first time you need the expression in the question, *instead of typing just the expression, you type this:*

```
L(v,(BeginValue-EndValue)/#ofValues)
```

Then, each time you need to use the expression thereafter, you can simply use the variable name, `v`, as in `A+v/2`. *Or*—if you don't want `v` to appear on the menu—you can use the Get function, as in `A+G(v)/2`.

Using the Typing Aids for Solver Functions

Most of the Solver functions are contained in the menus at the bottom of the equation editing screen. They are used to shorten the typing involved in creating equations. An example:

1. Move to a Solve Catalog, put the cursor over on the equation side, and press ENTER to display the equation editing screen.
2. Press F6 (Fin) to bring up a menu of financial Solver functions.
3. Press F8 (SPPV). You will see `SPPV( , )` inserted at the cursor. The cursor is now waiting for you to enter the first argument for the SPPV function (the periodic interest rate). To find out what arguments each function expects, look at the table on page 150.

Combining Two or More Equations

Sometimes sets of shorter equations share some variables, and it would be convenient to have access to them all on a one single menu. You can do this, by using a special function—the "If Solving" function. For example, you can combine these three short related equations into one calculation group:

$$D = \frac{m}{V} \qquad n = \frac{m}{Z} \qquad PV = nRT$$

Use the If-Solving function to do it:

```
IF(S(D),D-(m/V),
    IF(S(m),(m/Z)-n,
        P*V-n*R*T
    )
)=0
```

("IF Solving for D, solve D-(m/V)=0,
("or, if Solving for m, solve (m/Z)-n=0,
("otherwise, solve P*V-n*R*T=0.")

Notice three important things about the structure:

- The commas between the component sections are mandatory.
- The ending parentheses (one to close each IF(S...) function) are required.
- You must rearrange each short equation so that it's set to equal zero, and then you put a =0 added to the end of the expression.

When you press F9 (LEVEL) to use this combined equation, all of the variables appear on the same display (in the order they first appeared in the equation).

- You can solve for D only after both m and V are known;
- You can solve for m only after both n and Z are known;
- You can solve for P, V, n, R, or T only when four of them are known;
- You cannot solve for Z at all—it is strictly an input, given the logic of the If Solving functions used. You can fix this by adding a IF(S(Z),... function into the solving progression, if you need to.

Be careful when using combined equations that you are able to solve all the variables you need. And—as always—be sure to test a newly-written equation with known data and solutions before trusting it.

Supplemental Solver Equations

The Calculator on the HP 95LX contains no built-in templates or menus in three important areas: *bonds*, *calendar math*, and *depreciation*, so here are some Solver equations to remedy this shortcoming. For each equation there's a description of the variables used, followed by the equation listing itself. The listing contains no spaces or line breaks (although it could), so as to match the input screen exactly.

Bonds

Entry-only Variables (in the order they appear on the menu):

CalendarType:	One of four payment calendars describing when interest dividends are paid. Enter a 1 for annual payments made on an *actual calendar basis*; 2 for semiannual payments made on an actual calendar basis; -1 for annual payments on a 30/360 calendar basis; and -2 for semiannual payments on a 30/360 calendar basis.
SettlementDate:	The date you buy the bond—input in the current date format established in the Setup menu (see page 104).
MaturityDate:	The date when the principal amount is to be repaid.
Coupon%:	Face amount of yearly interest paid by the issuer.
CallPrice:	The value of the bond (on a $100 basis) at the maturity date—or at an optional earlier "call" date. You can ignore this value unless you're using a call date.
CapGainTaxRate%:	Your current tax rate for capital gains (as a %).
Taxable%CapGain:	Percentage of your capital gains subject to tax.
Commission%:	Percentage commission paid to buy the bond.

Solution Variables:

Yield%:	Yield-to-maturity (or yield-to-call) of the bond.
CurrentPrice:	Purchase price (or current market value) of the bond.
AccruedInterest:	Amount of interest accrued at settlement date that is due to the seller in addition to the price of the bond.

Equation: **Bonds**

```
0*(if(CalendarType=0,1(CalendarType,2)
,0)+1(e,.01*(fp(100*SettlementDate)+ip
(100*MaturityDate)))+1(z,sgn(ddays(g(e
),SettlementDate,1)))+if(g(z)=0,1(z,1)
,0)+1(f,if(1(t,abs(CalendarType))=1,g(
e)+.000001*g(z),g(e)-g(z)*(6-.000001))
)+if(g(f)>=13,1(f,g(f)-12+.000001),if(
g(f)<1,1(f,g(f)+12-.000001),0))+if(g(z
)>0,1(d,g(e))+1(e,g(f)),1(d,g(f)))+1(p
,if(CalendarType<0,ddays(SettlementDat
e,g(d),3)/360*CalendarType,ddays(g(d),
SettlementDate,1)/ddays(g(d),g(e),1)))
+1(n,10000*(fp(100*MaturityDate)-fp(10
0*g(d)))*g(t)-if(g(z)<0 and g(t)=2,1,0
))+1(a,g(p)*Coupon%/g(t))+if(CallPrice
=0,1(CallPrice,100),0)+1(i,Coupon%/g(t
)*(1-CapGainTaxRate%/100))+0*Taxable%C
apGain+Commission%+1(y,Yield%/100/g(t)
)+1(c,CallPrice+Taxable%CapGain/100*Ca
pGainTaxRate%/100*(CurrentPrice-CallPr
ice+Commission%/100)))+if(s(AccruedInt
erest),AccruedInterest-g(a),if(g(n)<2,
(g(c)+g(i))/(1+(1-g(p))*g(y)),g(c)/(1+
g(y))^(g(n)-g(p))+sigma(k,1,g(n),1,g(i
)/(1+g(y))^(k-g(p))))-g(p)*g(i)-Curren
tPrice*(1+Commission%/100)+0*Yield%)
```

Example: With all capital gains taxable at a tax bracket of 33%, for a 10% after-tax yield-to-maturity, what price (and accrued interest) can you pay on 7/28/90 for a 7% bond (semiannual coupons, 30/360 basis) maturing on 9/9/99? The commission is 0.15% What's your yield-to-call if the bond is callable at 88.125 on 3/9/95?

Highlight **Bonds** in the Solve catalog and press F9 (**Main**).

Type: 2 +/−, **Solver**, 7.281990 **Settl**, 9.091999 **Matur**, 7 **Coup**, 100 **Face**, 33 **Redp**, .15 **Comm**, 10 **Yield**.

Press: **Curre**... Result: `CurrentPrice=65.72`

Press: **Accru**... Result: `AccruedInterest=2.70`

Type: 88.125 **Call**, 3.091995 **Matur**.

Press: **Yield**... Result: `Yield%=11.02`

Calendar Math

Preparation: Press MENU, O*ptions*, F*ormat*, F*ix*, 6 before using CalendarMath

Entry-Only Variables:

Calendar: Sets one of three calendars: Enter **1** for actual calendar (with leap years); **2** for 365-day calendar (no leap years); **3** for 30/360-day calendar.

Date1: Sets a beginning date

Solution Variables:

today: Returns today's date in the current date format.

Date2: The destination date a given number of days from Date1

#ofDays: The number of days between two dates.

Equation: **CalendarMath**

```
if(S(today),cdate-today,0*(Date1+Date2
)+if(s(Date2),Date(Date1,#ofDays)-Date
2,ddays(Date1,Date2,Calendar)-#ofDays)
)=0
```

Example: What date is 190 days after November 29, 1991?

Highlight CalendarMath in the Solve catalog and press F9 (Calc).

Press MENU, O*ptions*, F*ormat*, F*ix*, 6 to display 6 decimal places.

Type: 1 Calend, 11.291991 Date1, 190 #ofDay

Press: Date2... Result: 6.061992 (June 6, 1992)

Example: How many days are there between April 6, 1995 and March 11, 2003?

Type: 4.061995 Date1, 3.112003 Date2

Press: #ofDay... Result: 2,896.000000

Example: What date was 75 days before today's date on a 30/360 calendar?

Type: 3 Calend, today, STO Date1, 75 +/- #ofDay

Press: Date2... Result: varies depending on today's date

Entry-Only Variables:

BasisValue: Cost of the depreciable item.

SalvageValue: Value at the end of the item's useful life

ClassLife: Official length of item's useful life (according to IRS classification categories)

Factor%: Percentage of accelerated cost recovery for Declining Balance calculations.

Year#: The year in the life of the depreciating item that you are calculating the depreciation for.

Solution Variables:

StraightLine: The amount of straight-line depreciation for the item in the year being investigated, using the straight-line method.

DecliningBal: The amount of depreciation for the item in the year being investigated, using the declining balance method.

MACRS: The amount of depreciation for the item in the year being investigated, using the rules of MACRS.

SOYD: The amount of depreciation for the item in the year being investigated, using the sum-of the year's digits method.

SLResidValue: The undepreciated value of the item remaining after the year being investigated, using the straight-line method.

DBResidValue: The undepreciated value of the item remaining after the year being investigated, using the declining balance method.

MACRSResidValue: The undepreciated value of the item remaining after the year being investigated, using the MACRS rules.

SOYDResidValue: The undepreciated value of the item remaining after the year being investigated, using the sum-of-the-year's digits method.

Equation: **Depreciation**

```
0*(BasisValue+SalvageValue+ClassLife+F
actor%+Year#+StraightLine+DecliningBal
+MACRS+SOYD+SLResidValue+DBResidValue+
MACRSResidValue+SOYDResidValue)+IF(S(S
traightLine),(BasisValue-SalvageValue)
/ClassLife-StraightLine,IF(S(SLResidVa
lue),SLResidValue-((1-Year#/ClassLife)
*(BasisValue-SalvageValue)),IF(S(Decli
ningBal),(BasisValue*Factor%/100)/Clas
sLife*(1-(Factor%/100)/ClassLife)^(Yea
r#-1)-DecliningBal,IF(S(DBResidValue),
DBResidValue-(((1-Factor%/100/ClassLif
e)^Year#)*BasisValue),0*(L(b,(BasisVal
ue-SalvageValue)/ClassLife)+L(f,IF(Cla
ssLife<11,2,IF(ClassLife<21,1.5,0)))+L
(c,1-G(f)/ClassLife)+L(a,BasisValue*G(
f)/ClassLife)+L(y,if(ClassLife>20,0,ip
(1+LN((BasisValue-SalvageValue)/BasisV
alue/G(f))/LN(G(c)))))+L(r,max(BasisVa
lue-SalvageValue-SIGMA(n,1,min(Year#-1
,G(y)),1,G(a)*G(c)^(n-1))-max(0,Year#-
1-G(y))*G(b),0)))+IF(S(MACRS),min(G(r)
,max(G(a)*G(c)^(Year#-1),G(b)))-MACRS,
IF(S(MACRSResidValue),MACRSResidValue-
G(r)+min(G(r),max(G(a)*G(c)^(Year#-1),
G(b))),IF(S(SOYD),(BasisValue-SalvageV
alue)/(ClassLife*((ClassLife+1)/2))*(C
lassLife-Year#+1)-SOYD,IF(S(SOYDResidV
alue),SOYDResidValue-(((L(d,sigma(n,1,
ClassLife,1,n))-(Year#*ClassLife-SIGMA
(k,1,Year#-1,1,k)))/G(d))*(BasisValue-
SalvageValue)),0))))))))=0
```

Example: Calculate the depreciation in the third year for an asset costing $40,000, with a life of 5 years and a salvage value of $10,000 using the MACRS and SOYD methods.

Highlight **Depreciation** in the Solve catalog and press F9 (**Solve**).
Type: 40000 **Basis**, 10000 **Salvage**, 5 **Class**, 3 **Year#**
Press: **MACRS**... Result: MACRS = 4,400.00
Press: F10 (**More**), **SOYD**... Result: SOYD = 6,000.00

Using 1-2-3 and the Solver Together

Perhaps the best feature in the HP 95LX is the cooperation between the Solver in the Calculator and the spreadsheets of Lotus 1-2-3. Used separately, the Solver and 1-2-3 each have their advantages. The Solver is best suited to smaller, quicker calculations and "what-iffing." The spreadsheet is essential if you are using, analyzing, or organizing much data. But in the HP 95LX, the line is easily blurred: the Solver can make use of Lotus functions and data capabilities, and a spreadsheet cell can be driven by the Solver to let you create a "solver" worksheet.

Using Lotus functions in Solver equations

There are seven Solver functions that can communicate with the currently open 1-2-3 worksheet and its functions:

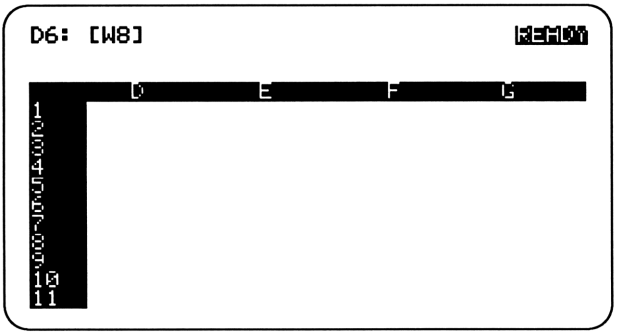
STOCELL	Evaluates its expression and stores the result in a designated cell in the current worksheet, without causing the worksheet to recalculate.
RCLCELL	Retrieves the value of a designated worksheet cell into the Solver equation.
CALCCELL	Moves a list of Solver variables into specific worksheet cells, performs a calculation using Lotus functions, and returns the result to the Solver equation.
LENGTH	Returns the worksheet rows in a given range to the Solver.
WIDTH	Returns the worksheet columns in a given range to the Solver.
CPCOL	Returns the current column number of the 1-2-3 cursor.
CPROW	Returns the current row number of the 1-2-3 cursor.

There are two aspects of these functions which can be confusing:

- How worksheet cells are referenced in the functions;
- How the master function, CALCCELL works.

Cell References

You reference cells via three values—*range, row-in-range, column-in-range*. For example, the reference (D6,2,4) refers to the cell in the 2nd row and the 4th column of the range whose upper-lefthand cell is D6 (i.e., it refers to G7):



The row and column numbers are not required; a missing number is assumed to be 1. The upper-left cell in the designated range is row 1, column 1 (this is different than in Lotus functions, where the upper-left cell in a range is row 0, column 0).

Using CALCCELL

CALCCELL needs two kinds of information:

- a list of Solver variables, values, or expressions and the spreadsheet cells into which you're putting them;
- the cell (*range*, *row*, *column*) whose value will be brought back into the Solver as the result of the CALCCELL function.

For example, suppose you have a Solver equation that uses variables named Basis, Salvage, Life, and Year#. Then here's how you'd use the 1-2-3 function, @DDB, to find the double-declining depreciation allowance (DDB) of an asset in any given Year# of its useful life:

1. Set up a small section of a worksheet that provides:

    a) cells in which to input the Solver variables (or expressions).

    b) a cell with the necessary @DDB formula referencing the cells that receive the Solver variables.

2. Open the Solver equation and use CALCCELL and the 1-2-3 cells you just set up:

```
CALCCELL(BASIS, cell1),
        [SALVAGE, cell2],
        [LIFE, cell3],
        [YEAR#, cell4],
          formula cell (with @DDB(cell1, cell2, cell3, cell4)
        =DDB
```

3. Press F9 (CALC) to initiate the calculation template.

4. Enter values into the four variables in the input list.

5. Solve for DDB by pressing its function key. The CALCCELL will load the values of the variables into the spreadsheet, where the DDB is calculated, and the retrieve the result back into Solver, where you'll see it on the Calcline.

Using the Calculator to Backsolve for a 1-2-3 Formula

Normally in a spreadsheet, a *formula cell* is calculated after values are entered into every cell it references. But with the Solver's *backsolving* capability, you can calculate the value that a referenced cell must have in order to produce a given result in the formula cell.

1. Open a 1-2-3 worksheet containing a formula cell and the cells it references.
2. Enter values for all but one of the referenced cells.
3. Move the cursor to the formula cell.
4. Press ⌨, MENU, S*olve* (and ESC a few times) to show the solve catalog.
5. Press F8 (1-2-3), F8 (FORM), ENTER.
6. Type the value of the desired result into the formula cell; press F9 (VALUE).
7. Press F10 (SOLVE) to display the current worksheet.
8. Move the cursor to the one referenced cell without a value, and press ENTER. The cell's value is calculated, displayed in the solve 1-2-3 screen, and placed in the worksheet.

Creating and Using a "Solver" Worksheet

A "normal" worksheet treats the formula cell differently than its referenced cells. You can work backward from a formula's desired result to solve for any cell value referenced by it, but backsolving is still a special operation. By contrast, the Solver offers either input *or* output status for *any* variable—automatically. Wouldn't it be great if you could create a 1-2-3 spreadsheet with that same flexibility?

You can: You can create a "Solver worksheet" with simple data cells for *all* variables, including the one normally thought of as "the answer." Then, in an additional cell, you enter the formula that relates all of the variables—written as an expression equal to zero, as are many Calculator Solver equations.

To set up a "Solver" worksheet:

1. Reserve a set of cells for each of the variables in the expression and one extra one below them for the formula cell.
2. Create your formula cell by typing an expression that is equal to zero and entering it into a cell.
3. Make the cursor is still in the formula cell, and press [▦], [MENU], [S]*olve*, (and pressing [ESC] one or more times) in order to display.
4. Press [F8] ([1-2-3]), [F8] ([Form]), [ENTER] to designate the formula cell.
5. Type [0] and press [F9] ([VALUE]) to set the Solver formula cell equal to zero.

To use a "Solver" worksheet:

1. Make sure the Calculator is open to a solve catalog display (press [▦], [MENU], [S]*olve*, and then [ESC] one or more times), and then press [F8] ([1-2-3]).
2. Press [123] and open the "Solver" worksheet.
3. Enter values into all but one of the variable cells.
4. Move the cursor to the unknown variable's cell, and press [▦], [F10] ([SOLVE]), [ENTER]. The result is displayed in the Calcline. Press [123] to return to the worksheet and see the result entered there as well.

Statistics and Databases

Between the standard database features of Lotus 1-2-3, the ready-made statistics of the built-in _STAT template, and the database features of the Phone Book (see page 33), the HP 95LX has an impressive array of data-handling capabilities.

Using the Built-In _STAT Template

In this example, use the following data, used to establish a relationship between the rental floor areas of commercial buildings and the rental income they generate:

Building	Rental Floor Area (ft^2)	Gross Rental Income
1	2,650	$22,000
2	2,500	$21,500
3	2,700	$24,000
4	1,500	$14,500
5	2,100	$19,000
6	2,600	$23,000
7	2,650	$24,000
8	2,700	$24,500
9	2,000	$18,000
10	2,900	$27,000
11	3,750	$34,000

1. Open the _STAT template: press [123], [MENU], [F]*ile*, [R]*etrieve*, type `c:\stat`, and press [ENTER].

2. Press [ALT]–[E], [Y]*es*, [ENTER] to clear any leftover data.

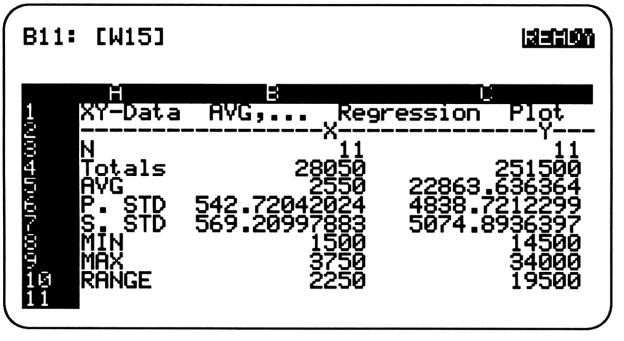
3. Enter your data beginning with row `44` (the cursor should already be there). If you have only one variable, use just column `B`; if you have two variables, use column `B` for the independent (x) variable and column `C` for the dependent (y) variable. In this case, put the floor area in `B` and the income in `C`.

4. Review the data and edit it if necessary. For small simple errors, just type in the correct value again and press ENTER. Keep in mind that there are five macros available to help you:
   - ALT-X Displays the raw data whenever it isn't in view.
   - ALT-D Deletes a specified number of data pairs, starting at the current cell and going downward. Because you have entered two columns of data, it is paired data. You cannot delete one of the items in a pair without deleting the other.
   - ALT-I Inserts a specified number of blank rows, starting at the current cell and going downward. Default is one row.
   - ALT-G Enters a group of consecutive, equal data-pairs, starting at the current cell and going downward. The entries *overwrite* any previous data in the cells they use.
   - ALT-E Erases all statistics data.

   After you finish editing, you should see these column totals:

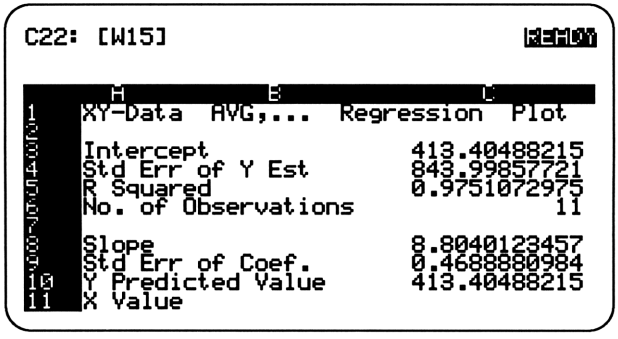
   Cell B43: 28050 Cell C43: 251500

5. Look at descriptive statistics: Press ALT-A (AVG, . . .). You will see:



N	is the number of data pairs.
Totals	is the column totals.
AVG	is the average for each variable
P. STD	is the *population* standard deviation (σ_n) for each variable.
S. STD	is the *sample* standard deviation (σ_{n-1}) for each variable.
MIN	is the minimum value of each variable.
MAX	is the maximum value of each variable.
RANGE	is the range of values from the minimum to the maximum.

6. Analyze the data: Press ALT–R (Regression). You will see:



The macro has calculated a two-variable linear regression:

Intercept is the *y*-axis intercept for the regression line.

Std Err of Y Est is the standard error of the estimated *y* values.

R squared is the reliability of the regression (between 0 and 1).

Slope is the slope for the independent variable.

Std Err of Coef is the standard error of the *x* coefficient (the slope).

Y Predicted Value is the predicted value for the y-variable for the given value of the x-variable. Since no x-value is given yet, x is assumed to be equal to zero.

X Value is a value for the independent variable (i.e. floor space) that you enter in order to predict a corresponding y-value (i.e. rental income), based on the current regression.

7. Enter a different x-value. How much income can you expect from a building with 2985 square feet of floor space? Press 2985 ENTER. The predicted y-value is **26693.381734** or about $26, 690 of rental income.

8. Plot the regression line. Press ALT–P. The plot is good enough to give you a visual estimate for how good the fit is. Of course, the r-squared value (see above) gives you a calculated estimate of the same thing.

9. If you want to save the data, press MENU, F*ile*, S*ave*, type in a new name, and press ENTER.

Databases in 1-2-3

A *database* in 1-2-3 is a range of related rows and columns. Each row is a *record* and each column is a *field.* Some special rules apply to 1-2-3 databases:

- The *first* row must contain the field names (i.e. label data).
- All rows in the database range below the first should contain data records. Don't leave blank rows.
- Each field (i.e. column) must be either *all label data* or *all value data.*
- Don't use the same field name twice in the same database.
- A database can contain up to 256 fields and 8,191 records.

Databases can be sorted and searched for information (as well as statistically analyzed as in the _STAT template). Indeed, when creating databases, it is a good idea to save three or four rows above the database for a *criteria range* that can be used for any searching you need to do. To create a "blank" criteria range, copy the first row of the database (which contains the field names) to a blank row of cells a few rows above the database. This row will be the first row in the criteria range. Leave the next two or three rows blank until you have an actual search to do.

To sort a database:

1. Open the worksheet containing the database. Make sure it meets the requirements listed above.
2. Press MENU, D*ata*, S*ort*, D*ata-Range*.
3. Type in the range of the database, *not including the first row* which has the field names and press ENTER.
4. Press P*rimary-Key*.
5. Move the cursor to any cell in the field (column) that you want to base the sort upon, and press ENTER.
6. Choose ascending (A) or descending (D) order by typing the appropriate letter and pressing ENTER.
7. Whenever you have records with the same values in the primary sort field, you may wish to add a secondary sort field as well—to act as "tiebreaker." Press S*econdary-Key* and repeat steps 5 and 6 if you need a secondary sort.
8. Press G*o*.

To search a database:

1. Open the worksheet containing a database with a criteria range (see pages 72-73). Make sure it meets the requirements listed above.

2. Prepare the criteria range:

   - In the second row of the criteria range, enter your search criteria below the relevant field names (see below for more information about writing search criteria).
   - Be sure to erase anything below the first row in the criteria range that doesn't belong with your current criteria.

3. Press [MENU], [D]*ata*, [Q]*uery*. You will see three ranges listed. If all three are proper for the current search, you can skip ahead to step 5. Otherwise, proceed to step 4.

4 Change the ranges as follows (do just the ones you need) :

   Input—Press *Input*, type in the range of the database, including the first row—which contains the field names—and press [ENTER]. This range will remain as the default until you change it—handy for later searching.

   Criteria—press [C]*riteria*, and type in the range of cells corresponding to the criteria range you created in step 2. This range will be the default until you change it—handy for later searching.

   Output—if you wish to extract (copy) the records you find during the search to a separate list, you must designate an output range. If you just wish to have the found records highlighted, you can skip the output range. If you want the output range, press [O]*utput*, type in the range (making sure that it is currently blank), and press [ENTER].

5. If you have designated an output range, press [E]*xtract*. If you simply desire to have the information highlighted, press [F]*ind* and then step through the matching records using the arrow keys, or [ENTER] to end the viewing.

Writing Search Criteria

The search criteria determine exactly which records will be found. There are several different categories of criteria:

1. Simple searches that seek to match a particular label or value in one field exactly (e.g. "find all records whose `state` field is `IN`").
2. Simple searches that seek to match a *part* of a label in one field, using wildcard characters to stand for the rest of the label (e.g. "find all records whose `surname` field begin with M").
3. Simple searches based on a formula involving one field (e.g. "find all records whose `income` field is greater than $20,000").
4. Compound searches that match two or more fields *simultaneously* (e.g. "find all records whose `state` field is `IN` **and** whose `income` field is greater than $20,000").
5. Compound searches that match *any of* two or more fields (e.g. "find all records whose `state` field is `IN` **or** whose `income` field is greater than $20,000").
6. Complex searches involving one or more combinations of the above categories.

Below is an example database and criteria range that will be used to illustrate how to execute these various categories of searches:

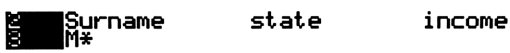
	A	B	C
1	Surname	state	income
2			
3			
4	surname	state	income
5	Washington	WI	$34,000
6	Adams	IN	$21,500
7	Jefferson	OR	$15,000
8	Madison	IN	$29,500
9	Monroe	NY	$26,000

The criteria range is `A2..C5`; the database (i.e. input) range is `A6..C11`.

Some sample criteria:

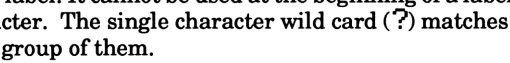
1. Find all records whose **state** field is **IN**.

2. Find all records whose **surname** field begins with **M**.



The asterisk (*) is a wildcard character that matches all characters to the end of the label. It cannot be used at the beginning of a label, followed by an actual character. The single character wild card (?) matches any one character but not a group of them.

3. Find all records whose **income** field is greater than $20,000.



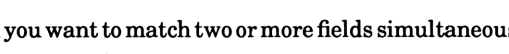
4. Find all records whose **state** field is **IN and** whose income field is greater than $20,000.

When you want to match two or more fields simultaneously, make sure that the criteria are on the *same* row.

5. Find all records whose **state** field is **IN or** whose income field is greater than $20,000.

When you want to match *either* of two or more fields—but not necessarily both—make sure to include each criterion in a separate row.

6. Find all records whose **surname** field does not begin with **A and** whose **state** field is **IN or** whose income field is greater than $20,000.



Putting a tilde (~) character before a label means to search for all labels *except* the ones indicated by the label.

Data Tables in 1-2-3

A data table shows the results as you *vary* one or two input variables in a formula—essentially, a *sensitivity analysis*. There are two kinds of data tables in 1-2-3:

To study the effects on formula(s) of varying **one** variable in (each) formula:

1. Open the worksheet containing a formula or formulas whose variable you wish to explore. Be sure that each variable in the formula has its own input cell.
2. Reserve a clear area of the worksheet for the data table. You'll need a minimum of two columns (an extra column for each additional formula other than the first one) and a row for each different value of the variable you use.
3. Enter the formula in the first row of the table (or a cell reference to the formula) at the top of the second column.
4. Enter the input values of the variable you want to explore into the first column of the data table, beginning with the second row.
5. Press MENU, D*ata*, T*able*, 1 to indicate you're using the first kind of table.
6. Type in the entire range of the data table and press ENTER.
7. Type in the cell reference to the input cell (not in the data table) of the variable under examination and press ENTER.

To study the effect in one formula of varying **two** of its variables:

1. Open the worksheet containing the target formula containing the two variables you wish to explore using a data table. Be sure that each variable has its own input cell (this is normally the case).
2. Reserve a clear area of the worksheet for the data table.
3. Enter the formula (or a cell reference) in the upper left cell of the table.
4. Enter the input values of the first variable you want to explore into the first column of the data table, beginning with the second row.
5. Enter the input values of the second variable into the first row of the data table, beginning with the second column.
6. Press MENU, D*ata*, T*able*, 2 to indicate you're using the second kind of table.
7. Type in the entire range of the data table and press ENTER.
8. Type in the cell reference to the input cell (not in the data table) of the first variable under examination and press ENTER.
9. Type in the cell reference to the input cell of the second variable under examination and press ENTER.

Plotting and Graphing

The Solver *plots* equations or expressions; Lotus 1-2-3 *graphs* data.

Plotting Functions with the Solver

Example: Plot $x^4 + 3x^3 - 7x^2 + 4x - 10 = 0$ and find all real solutions for x.

1. Open the solve catalog: Press [Alt], [MENU], [S]*olve* (and [ESC], if necessary).
2. Press [▶], type the equation: `x^4+3*x^3-7*x^2+4*x-10=0` [ENTER] (if you've already entered the equation, just highlight it in the Solve catalog.
3. Press [F10] (GRAPH) to display the function plotting screen.
4. Reset the function plotting data to their defaults: press [MENU], [E]*rase*, [D]*ata*.
5. Plot the equation using *autoscaling* (which sets values for the bottom and top boundaries of the plot so the curve appears on the screen): press [F3] (AUTO).
6. Use the arrow keys to move the cursor near to the leftmost intersection of the curve with the x-axis. Press the space bar, which finds the root (i.e. solution) of the plotted function in the vicinity of the cursor. Result: `X=-4.75`.
7. Use the arrow keys to move the cursor near to the righthand intersection with the x-axis, and press the space bar. Result: `X=1.71`. The other real solution.

Then, if the plot display is not quite right, you can zoom or move the cursor around:

- Move the cursor one pixel at a time: [Shift]-[◀], [Shift]-[▶], [Shift]-[▲], [Shift]-[▼].
- Move the cursor around the plot in jumps: [◀], [▶], [▼], [▼].
- Zoom in (more detail) by a factor of 5: [+].
- Zoom out (less detail) by a factor of 5: [−].
- Center the plot around the current cursor position: [*].
- Zoom in by a factor of 5 and autoscale: [Shift]-[+].
- Zoom out by a factor of 5 and autoscale: [Shift]-[−].
- Center the plot around the current cursor position: [Shift]-[*].
- Designate an area on the plot and then zoom on that area to fill the screen:

  Move the cursor to one corner of the "zoom-box" and press [(];
  Move the cursor to the opposite corner of the "zoom-box" and press [)].

Graphing Data from 1-2-3

You can use the built-in graphing capability of Lotus 1-2-3 to make five different kinds of graphs based upon data stored in the worksheet. The five types are:

- Bar Graph — Compares related data at a given point in time.
- Line Graph — Shows changes in a value over a period of time.
- Pie Chart — Shows relative sizes of components of a whole.
- Stacked Bar Graph — Compares related data at two or more points in time.
- XY Graphs — Shows correlations between two types of numeric data —very similar to the function plot in the Solver.

The following examples assume that you have data already stored in up to *six* data ranges (though you may not need that many for most of your graphs). Each data range is usually just one column.

To create a **Bar** graph:

1. From the open worksheet containing the data you plan to graph, press [MENU], [G]*raph*, [T]*ype*, [B]*ar*.
2. Press [X], and type in the range that contains the *labels* for the *x*-axis data, and press [ENTER]. These labels will show up below each bar.
3. Decide how many data ranges the graph will contain. One data range will result in a simple bar graph—one bar for each label. Two data ranges will result in two bars (each with different shading) for each label—allowing a before/after kind of comparison.
4. Press [A], and type in the first data range, and press [ENTER]. If you have a second data range, press [B], type in the range, and press [ENTER]. Proceed like this to include up to six (through data range **F**) columns of data.
5. Press [V] to view the graph. If you want to see more detail, press [+], and then use the arrow keys to scroll around. Press [−] to return to the smaller size. Press [ESC] to remove the graph from the display.
6. If you want to add enhancements to the graph—explanatory text, titles, "colors," grid lines, and so forth—see page 79.
7. To save the graph for later use or printing, see page 79.
8. When you finish, press [Q]*uit* at the Graph menu to return to the worksheet.

To create a **Line** graph:

1. From the open worksheet containing the data you plan to graph, press /, *Graph*, *Type*, *Line*.
2. Press X, and type in the range that contains the *labels* for the *x*-axis data, and press ENTER. These labels will show up at intervals below the *x*-axis.
3. Decide how many data ranges the graph will contain. One data range will result in one line—one point for each label. Two data ranges will result in two lines (each with different point-markers). Three ranges yield three lines, etc.
4. Press A, and type in the first data range, and press ENTER. If you have a second data range, press B, type in the range, and press ENTER. Proceed like this to include up to six (through data range F) columns of data.
5. Press V to view the graph. If you want to see more detail, press +, and then use the arrow keys to scroll around. Press − to return to the smaller size. Press ESC to remove the graph from the display.
6. If you want to add enhancements to the graph—explanatory text, titles, "colors," grid lines, and so forth—see page 79.
7. To save the graph so you can view it at another time or to print it, see page 79.
8. When you finish, press *Quit* from the Graph menu to return to the worksheet.

To create a **Pie** chart:

1. From the open worksheet containing the data you plan to graph, press /, *Graph*, *Type*, *Bar*.
2. Press X, and type in the range that contains the *labels* for the slices of pie, and press ENTER. These labels will show up next to each piece.
3. Press A, and type in the data range, and press ENTER. Pie charts use only one data range plus shading instruction data in the B range (see next step).
4. Press B, and type in the range containing the coloring/shading instructions for each piece of pie. Unique to pie charts, you have *eight* shadings available (numbered 1–8). If you would like one of pie pieces exploded slightly for emphasis, add 100 to its shading number and include it in the B data range.
5. Press V to view the graph. If you want to see more detail, press +, and then use the arrow keys to scroll around. Press − to return to the smaller size. Press ESC to remove the graph from the display.
6. If you want to add enhancements to the graph—explanatory text, titles, "colors," grid lines, and so forth—see page 79.
7. To save the graph so you can view it at another time or to print it, see page 79.
8. When you finish, press *Quit* from the Graph menu to return to the worksheet.

To create a Stack-Bar graph:

1. Open the worksheet with graph data; press /, *Graph*, *Type*, *Stack-Bar*.
2. Press X, and type in the range that contains the *labels* for the *x*-axis data, and press ENTER. These labels will show up below each bar.
3. Decide how many data ranges the graph will contain. One data range will produce a simple bar graph—one bar for each label. Two data ranges will result in bars with two sections stacked up on each other at each label (the A data is on the bottom section, B on top). Three ranges yields three-section bars, etc.
4. Press A, and type in the first data range, and press ENTER. If you have a second data range, press B, type in the range, and press ENTER. Proceed like this to include up to six (through data range F) columns of data.
5. Press V to view the graph. If you want to see more detail, press +, and then use the arrow keys to scroll around. Press - to return to the smaller size. Press ESC to remove the graph from the display.
6. If you want to add enhancements to the graph—explanatory text, titles, "colors," grid lines, and so forth—see page 79.
7. To save the graph so you can view it at another time or to print it, see page 79.
8. When you finish, press *Quit* from the Graph menu to return to the worksheet.

To create an XY plot:

1. From the open worksheet containing the data you plan to graph, press /, *Graph*, *Type*, *XY*.
2. Press X, and type in the range that contains the *data* you want to use as your independent variable.
3. Decide how many dependent variables the plot will contain. One dependent variable range will result in a single plotted line. Two dependent variables will result in two plotted lines, and so forth.
4. Press A, and type in the data range for the first dependent variable, and press ENTER. If you have a second dependent variable, press B, type in the range, and press ENTER. Proceed like this to include up to six (through data range F) dependent variables.
5. Use V to view the graph. For more detail, press +, and use arrow keys to scroll around. Use - to return to the smaller size; ESC to remove it from the display.
6. If you want to add enhancements to the graph—explanatory text, titles, "colors," grid lines, and so forth—see page 79.
7. To save the graph so you can view it at another time or to print it, see page 79.
8. When you finish, press *Quit* from the Graph menu to return to the worksheet.

Saving and Printing Graphs

You don't actually save a copy of the graph—just its *settings*. If you change its data values or location in the worksheet, it will be different than when you "saved" it. To save a graph for repeated viewing within a worksheet:

1. Move to the graph menu and press [N]*ame*, [C]*reate*
2. Type in a short name for the graph and press [ENTER]. You can save many different graphs within the same worksheet.
3. Press [MENU], [F]*ile*, [S]*ave*, [ENTER], [Y]*es* to resave the worksheet with the graph name.
4. To retrieve a named graph, press [MENU], [G]*raph*, [N]*ame*, [U]*se*, type in the name of the graph you want to view and press [ENTER].

To save a graph for printing, go to the graph menu, press [S]*ave*, type in a name and press [ENTER]. That file is assigned a .PIC extension (to print it, you must import it into a program that can print .PIC files—no built-in Palmtop tool can do this).

Enhancing Your Graphs

- *Labeling points or bars.* For all graph types except the XY plot, the X-range data are used to put labels below each point or bar ("one size fits all"). To put the labels onto the graph, or to use different labels for different ranges, use the [O]*ptions*, [D]*ata-Labels* feature. You'll need a range of labels to match each data range to be labelled. Leaving a label blank in this range omits it on the graph.
- *Formatting points and lines (*XY *and* Line. A line in these graphs can display symbols for each point, connect the points with lines, both or neither. You can format all lines or a single range only. Use [O]*ptions*, [F]*ormat.*
- *Adding grid lines to a graph.* You can add either horizontal or vertical grid lines or both—or remove all gridlines— by using the [O]*ptions*, [G]*rid* feature.
- *Adding a legend to a graph.* To use a legend to identify data ranges, either create a legend range with one cell for each data range or type in each legend after you designate the data range (A–F) it belongs to. Use [O]*ptions*, [L]*egend.*
- *Changing axis scaling and labelling.* For each axis, you can control the range, the numbering format, and whether the scale is shown (e.g. (Thousands)). On the x-axis, you can skip some labels to avoid crowding. Use [O]*ptions*, [S]*cale.*
- *Adding titles (up to 39 characters each)*—an overall title, subtitle, or titles for each axis. Use [O]*ptions*, [T]*itles.*

3. Sharing Information Between Applications

The HP 95LX gives you a *limited* ability to move data between your built-in applications:
1) Use the Clipboard to cut and paste information;
2) Save information from one application in a file format that can be understood by another application.

Using the Clipboard

The Clipboard is a reserved "holding" (storage) area that you can sometimes use to transfer data from one place to another. Data transferred between applications via the Clipboard can end up only as *text* (a *label* in 1-2-3 terminology)—even if it began as a number in the Calculator or an appointment in the Appointment Book.

Using the Clipboard is usually quite intuitive. Use the following procedure:

1. *Select* ("markout") the text. Sometimes the selection is simply the current record or field. Sometimes you must select the fields or range of data you want copied by "tagging" or "marking" it using function keys. In 1-2-3, you select the range destined for the Clipboard much like you select any range of data.
2. *Cut* or *copy* it. Cutting text deletes it from the current file at the same time that it stores a copy in the Clipboard file. Copying text does not disturb the original text in the file, but merely makes a second copy for the Clipboard. Either cutting or copying will overwrite anything that was previously stored in the Clipboard.
3. *Move* to the new place that you wish to insert the Clipboard text—either in a new file or in a different part of the old file.
4. *Paste* the text.

The Limitations of the Clipboard

Each built-in application has its own data structure, which places special limitations on what and how much data can be copied and pasted: These limitations are:

- In the **Filer** and **DataComm** applications: The Clipboard is not available.

- In the **Appointment Book**: The Clipboard isn't available in the World-Time, Stopwatch, or Timer features, nor while you're looking at any Insert or Edit screen, or at the Calendar view.

  You may cut/copy any appointment (and attached note and alarm) from any appointment view, but you may only paste into a *daily view*.

  You may paste the text of an appointment (including its start time) into: a note for another appointment; any file in the Memo Editor; a To-Do list; a 1-2-3 cell.

  Pasting an appointment or To-Do item into an appointment slot *doesn't overwrite* anything already stored in that appointment slot; it simply creates a *simultaneous appointment*. However, pasting any *other* kind of data from the Clipboard into an appointment slot will overwrite whatever is already there.

  Alarm information doesn't transfer via the Clipboard, unless the appointment is pasted back into an appointment slot.

- In the **Phone Book**: You can cut/copy only one whole record at a time (everything stored on a card constitutes a record).

  You can paste to other phone books, to the Memo Editor, and to the *notes* of appointments or to-do lists (not to the items themselves).

  You can paste to a 1-2-3 spreadsheet. This paste will produce a single column of three cells, beginning with the target cell—one each for the Name field, the Phone Number field, and the Address field.

  You can paste the text of a single column of three 1-2-3 cells or the text of three lines of a Memo Editor file (separated by ENTERs) into the Phone Book. Each line or cell corresponds to one of the three Phone Book fields.

- In the **Memo Editor**: Anything you create in the Memo Editor can be cut/copied to the Clipboard.

  Anything that can be cut/copied to the Clipboard from other applications can be pasted into the Memo Editor.

- In **Lotus 1-2-3**: To find the Clipboard functions, press and hold the CTRL key. You'll see the F2 and F4 keys labelled COPY and PASTE. You can only *copy* cells, not cut them.

Like other range-related functions in *Lotus*, you must first press CTRL-F2 (Copy) and then select the range. In the other applications, you select the material you wish to copy *before* choosing Copy.

You may use the Clipboard to copy one range of cells to another (instead of using the Copy Range feature on the 1-2-3 menu), but the cells will be *pasted as labels*, no matter how they may have been formatted before being copied. If you want the formatting retained, don't use the Clipboard to copy cells. If, nevertheless, you find yourself needing to *recreate* the formatting quickly, you might be able to use the Data Parse feature (see pages 84-88).

You can use the Clipboard to paste a range of cells into the Memo Editor (see below), or into the Phone Book (see above). Remember that each *row* of cells copied will produce one *line* of text when pasted into another application. The spaces between the cell items are translated into spaces in the resulting paste.

- In the **Calculator**: As with Lotus 1-2-3, the Clipboard functions can be found by using the CTRL key—CTRL-F2 (Copy) and CTRL-F4 (Paste).

  You may copy the right-most number from the calculator line, remembering, of course, that the Clipboard copy will no longer be a numerical value but a textual numeral—a label. You may paste this numeral into a cell in 1-2-3, or into the Memo Editor.

  You may copy a whole Solver equation to the Clipboard and paste it into an equation list, where it can be edited. This can save a lot of retyping when you reuse large sections of complex Solver formulas. Unfortunately, you cannot copy *part* of a Solver equation, only the whole thing.

Transferring Spreadsheet Data to a Text Document

1. Open up the memo to which you want to add the spreadsheet data. Then switch to 1-2-3 and open the spreadsheet and move the cursor to upper left cell of the range you wish to copy. Make sure that you're in READY mode.
2. Press CTRL-F2 (Copy). You'll be prompted to give the range you wish to copy. Type in a range (e.g. c39..e41) and press ENTER.
3. Press ☰ to return to the memo you are writing, and move the cursor to the spot where you want the upper left-hand cell to appear.
4. Press F4 (Paste) to insert the spreadsheet data. Remember that this data is merely text—no longer having any "spreadsheet-like" connection to the spreadsheet from which it was copied. Tidy up the appearance of the newly-copied text by adding or deleting spaces until the columns line up.

Using ASCII Files to Transfer Data

The other way to move data between applications in the Palmtop is via files that are readable by more than one application. These are text-only ASCII files. For example, when you save a Phone Book file, it has a suffix, .PBK, to remind you that it has the data structure unique to Phone Book. But you can also transform a Phone Book file to an ASCII file (with a .TXT suffix) by "*printing*" it to a file.

Normally, when you print a file, the output goes to a temporary "print" file, which is then routed to the printer. Use the same procedure to create an ASCII-formatted text file—but it will remain stored on disk instead of being sent to the printer:

1. In the open file you wish to save as an ASCII file, press [MENU], [P]*rint*, [F]*ile*.
2. Some applications will need you to specify whether you want to "print" all or just a portion of the original file to its ASCII version. The Phone Book application, for example, allows you to choose one of the following to "print:" just the currently selected record ([O]*ne*), just the currently tagged records ([T]*agged*), or all the records in the current file ([A]*ll*). Make any selections you need to.
3. Type in a name for the new ASCII file, and press [ENTER].

Importing Data into a 1-2-3 Spreadsheet

The Clipboard always transfers data as text—even between two spreadsheet cells, but Lotus 1-2-3 has a special File Import feature for more sophisticated transfers. But first you must prepare the ASCII text file of data that you're importing:

- Prepare a delimited file, then import the data into individual spreadsheet cells.
- Prepare a columnized (nondelimited) file, then import the data into large spreadsheet cells, and finally *parse* (translate) the data into discrete spreadsheet cells according to rules you prescribe.

Delimiting a File

For 1-2-3 importing purposes, there are two kinds of text files—*delimited* and *nondelimited*. In a delimited text file each data item is separated (delimited). Every "label" data item is enclosed in " " and every item is separated from others by any one of four designated characters (delimiters): **,** *(space)*, **:**, or **;**.

Example: `"Some data:",234,886,945,4550987,"The end"`

Notice that commas are used to separate each data item. The text also includes spaces and colons—normally delimiters—but they're *within the quotation marks* and thus part of the label data. Be sure to review a delimited file before importing. Do not include commas in any non-label items, nor extra spaces or tabs between items (they would be treated as extra delimiters).

Columnizing a File

1-2-3 will import any kind of nondelimited text, and it's often unorganized, so that when it goes into a rigidly structured spreadsheet, it's a jumble. Even nondelimited text should be organized *before* it's imported. One method is to columnize text, so that each item is in the same column as the corresponding items in other records:

```
XXXXXXX    XXXXX    XXXXX    XXXX     XXX      XXXX
XXXXX      XXXXXXX  XXXXX    XXXXXXX  XXXXX    XXXX
...        ...      ...      ...      ...      ...
```

Each group of X's represents an individual data item. Each column represents the same kind of data. Each column begins at the same place and, although item lengths can vary within a column, no column interferes with its neighbor.

Carriage Returns and Tabs

You either delimit or columnize a text file—not both—but in either case, before you import from a text file, be sure to:

- Replace all tabs with an appropriate number of spaces. This is usually only a concern in columnized files. Tabs can result in unpredictable spacing during an import, messing up an otherwise well-planned effort.
- Eliminate all carriage returns (represented in Memo Editor by the character ◄┘) except those at the end of each record.

Transferring Data from the Phone Book

They demonstrate how you might transfer data from the Phone Book (a kind of database, after all) into a 1-2-3 spreadsheet. The basic procedures shown below work for any application that can create a ASCII text file of its data. Create a short phone book file, with the following three records:

Johnson, George	*Fronmeyerhof, Jessica*	*Toff, Abraham*
(213) 555-6790	*(503) 555-0117*	*(714) 555-5068*
455 NW Tujunga Ave,	*3922 SE Holgate*	*78 E. Gardner*
Santa Monica, CA 90405	*Portland, OR 97206*	*Claremont, CA 91711*
06/09/62	*12/17/57*	*04/06/48*

1. Open the Phone Book application and save any currently open phone book file (MENU, File, Save, ENTER, Yes). Then press MENU, File, New to begin a new Phone Book.
2. Press F8 (Insert) and enter George Johnson's data; press F8 (Insert) and enter Jessica Fronmeyerhof's data; press F8 (Insert) and enter Abraham Toff's data.
3. Press F10 (Done), then MENU, File, Save, type `Imprt`, and press ENTER to save the new Phone Book as `IMPRT.PBK`.

(cont.)

If you're using a delimited text file:

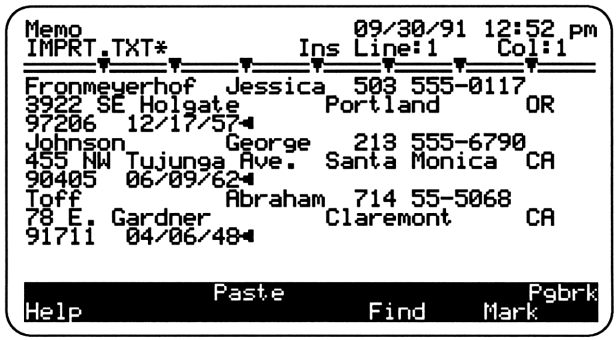
4. "Print" the Phone book records to a text file (`delimprt.txt`): Press MENU, *Print*, *File*, *All*, *Card*, type `delimprt` and press ENTER.
5. Move to the Memo Editor, save any currently open files, then open the `delimprt.txt` file you just created, and prepare and delimit the text:
   - Eliminate all carriage returns (◄) except those between records.
   - Decide how many data items you want to include with each record. Use the following: *Last name, first name, area code, phone number, address, city, state, zip code, birthdate.* Each record will have nine items. Notice that you can change the number of items in a record by delimiting the text file (Phone Book only has three fields per record).
   - Put quotation marks around each item except the birthdate (they're label data). Insert a comma between each item within a record.
   - Make sure there are no extra spaces between items (there are quite a few between the name and phone number in the original file). When you've finished, the file should look something like this:

```
Memo                              09/30/91 12:52 pm
DELIMPRT.TXT*          Ins Line:1     Col:1
═══════╤═══╤═══╤═══╤═══╤═══╤═══╤═══╤═══╤═══╤═══
"Fronmeyerhof","Jessica","503","555-0117
","3922 SE
Holgate","Portland","OR","97206",12/17/5
7◄
"Johnson","George","213","555-6790","455
 NW Tujunga Ave.","Santa
Monica","CA","90405",06/09/62◄
"Toff","Abraham","714","555-5068","78
E.
Gardner","Claremont","CA","91711",04/06/
48◄
                  Paste                   Pgbrk
Help                              Find    Mark
```

6. Resave the file, ugly as it is: Press MENU, *File*, *Save*, ENTER, Y.
7. Open a 1-2-3 worksheet and move the cursor to the cell that is to be the upper-left-hand corner of the imported data.
8. Press MENU, *File*, *Import*, *Numbers*, type the complete pathname of the delimited text file (`c:\dat\delimprt.txt` in this case); press ENTER.
9. Inspect the newly imported cells. You should see 3 rows and 11 columns of data. The birthdate did not end up in one cell, but three cells (month, day, year)—because the slash marks in the date format were interpreted by 1-2-3 as *delimiters* between the numbers. In fact, just about any character other than a numeral will act as a delimiter in the middle of a string of numbers when you use the Import Numbers (delimited file) option.

If you're using a columnized text file

4. Open the `imprt .pbk` file from the Phone Book, if its not already open (see page 85 for how it was created).
5. "Print" the Phone Book records to a text file (`imprt .txt`): Press (MENU), (P)*rint*, (F)*ile*, (A)*ll*, (C)*ard*, type `imprt` and press (ENTER).
6. Move to the Memo Editor, save any currently open files, and then open the `imprt .txt` file that you just created, to prepare and columnize the file:
   - Eliminate all carriage returns (◄┘) except those between records.
   - Decide how many data items you want to include with each record. Use the following: *Last name, first name, area code, phone number, address, city, state, zip code, birthdate.* Each record will have nine items and thus, you will have nine "columns" in the file.
   - Eliminate any commas that you don't want to see in the spreadsheet—such as the one between last and first names and the one between city and state.
   - Using spaces only, adjust each data item so that it lines up with the corresponding data items in the other records. All last names should line up under each other, all first names should line up under each other, and so forth. When you've finished, the file should look something like this:



Notice that the small size of the HP 95LX screen causes you to make some mental adjustments when it comes to aligning "columns." Each record wraps into three lines. The first line has four columns, the second has three and the last one has two columns. The consistency of columnized text can be seen in the fact that the city, for example, is always in the second column of the second line of each record (and these columns line up with each other). It doesn't really matter that there are other intervening lines in the *display* because, in terms of data items and records, they're not really "in the way."

7. Resave the file (MENU, File, Save, ENTER, Y), and open a 1-2-3 worksheet and move the cursor to an area with plenty of room. Leave the cursor in the cell that you want to be the upper-left-hand corner of the imported data.
8. Press MENU, File, Import, Text, type the complete pathname of the text file being imported (`c:\dat\imprt.txt` in this case), and press ENTER.
9. Inspect and adjust the import. You've actually imported data into just three cells (three rows, one column). Each cell contains one record—all the information in one long string of text characters, so parse the data into separate cells:
   - Move the cursor to the upper-left-hand cell of the imported data that you wish to parse. Press MENU, Data, Parse. You will see a prompt-box displayed, showing an *input column* and an *output range.* Ignore it for now.
   - Press Format-Line, Create. Lotus created and inserted a *format-line* in the cell, shifting the imported data down a row in the process.
   - Examine the format-line. 1-2-3 has looked at the first data entry and decided how to break the long string into separate data items. Each letter that you see in the format-line represents the beginning of a new data item—as 1-2-3 interpreted it. These five letters each stand for a data type:

     D indicates the beginning of a *date* item.
     L indicates the beginning of a *label* item.
     S indicates the beginning of an item you wish to be *skipped.*
     T indicates the beginning of a *time* item.
     V indicates the beginning of a *value* item.

     You'll also see some > and * characters. A > is a placeholder for a character in a data item. A * is a placeholder for a space that *might turn into a character* in a data item if one of the records needs more room for that item.
   - Edit the format-line. Press Format-Line, Edit. You'll see the cursor at the beginning of the format-line. You're in overwrite mode so that you only need to move the cursor to an error and type the correction. Make the following corrections and press ENTER when you're done:
     - Change the V over the area code to L.
     - Change the V over the beginning of the address to L.
     - Change the *L combinations over the address to >>.
     - Change the V over the zip code to L.
   - Press Input-Column, and type in the range (example: `a85..a88`) that includes the imported data and the format-line. Remember that, despite appearances to the contrary, it occupies only one column.
   - Press Output-Range, and move the cursor to the upper left-hand cell in the range where you want the parsed data to go. Make sure to allow adequate number of columns and rows, so that you don't overwrite pre-existing data.
   - Press Go to execute the parse. You may need to adjust the column width in some cells to see all of the data.

Moving Values from the Calculator into 1-2-3

You can move information from the Calcline into a cell in 1-2-3. There are two ways to do this, depending upon how you want the information interpreted.

To move a number from the calcline to 1-2-3 as a *label*, use the Clipboard:

1. With the Calcline showing, press CTRL–F2 (COPY).
2. Open the 1-2-3 worksheet and move the cursor to the desired cell.
3. Press CTRL–F4 (Paste).

To move a number from the calcline to 1-2-3 as a *value*:

1. Make sure the 1-2-3 worksheet is open.
2. Open the Calculator and, with the Calcline showing, press STO, @. The open worksheet is displayed.
3. Move the cursor to the desired cell and press ENTER.

Importing Data into the _STAT *Built-In Worksheet*

You can import data into the _STAT template just as you can into any other 1-2-3 spreadsheet. You will want to import a delimited file (see page 84) that puts a comma between each pair of numbers (i.e. *field*)—if using two variables— and a carriage return between each "row" of data (i.e. *record*). Thus, the data in the example on page 67 might have been imported into _STAT from the following text file :

```
2650,22000◄
2500,21500◄
2700,24000◄
1500,14500◄
```

etc.

4. Communicating with Other Devices

The HP 95LX can communicate with a wide range of devices via its serial port. It can download and upload information to other PCs and to an increasing number of compatible printers, modems, and pagers. It can also be terminal to networks and electronic services, such as Dow Jones and CompuServe, or a node on a local network (as either client or server). To use of any of these features, you need the ***Connectivity Pack*** (HP part # F1001A), which includes software on disks and:

- The serial cable with a 4-pin end (for the HP 95LX) and a 9-pin end (for the serial port on the PC).
- A 9-pin to 25-pin adapter in case the PC serial port requires a 25-pin connector.

Making the Connection

Besides those provided in the Connectivity Pack, you may need other adapters to make the proper connections a particular device. You may need an adapter that does one or more of the following:

- Adapts one style and size of connector to the other;
- Changes the gender of a connector without changing pin configurations;
- Changes the pin configurations—connecting receive and transmit lines—without changing the gender of the connection (called a *null modem adapter*).

The external connection end of the HP 95LX cable is *a female 9-pin connector that uses pin 2 to transmit, pin 3 to receive and pin 5 as a ground* ("a 9-pin female (2–3–5)"). You must make that compatible with the target device, so check these things about that device:

- The size of the connector ends (i.e. number of pins and their arrangement).
- The *gender* of the connectors: Male (with pins) vs. female (with holes).
- The signals carried by each pin. Only three signals are important to the HP 95LX—the transmit signal (TX), the receive signal (RX) and the ground (GND).

Three of the most useful adapters for the HP 95LX are these:

- Connects a 9-pin female (2–3–5) with a 25-pin female (3–2–7)—common for computer serial ports. This is the adapter you get in the Connectivity Pack.
- Connects a 9-pin female (2–3–5) with a 25-pin male (2–3–7). This is a common adapter for modem connections.
- Connects a 9-pin female (2–3–5) with a 25-pin male (3–2–7). This is a common adapter for serial printer connections.

Of course, your equipment may not match these examples. To figure out exactly what adapter(s) you need, do the following:

1. Read the manual for the device you're trying to connect to. Note which pins (or signal lines) are used to transmit, receive, and act as signal ground; note the size (9-pin, 25-pin, etc.) and gender of the serial connector on the device.
2. Evaluate what kind of device you are connecting to: A modem is a *communications* device—which sends on pin 3 and receives on pin 2. You want the Transmit line (pin 2) from the HP 95LX to match with the Receive line in the modem (and vice versa). Note that everything matches up perfectly *without swapping pins*. Unfortunately the 9-pin to 25-pin adapter included in the Connectivity Pack (type A above), swaps pins. This means that, if you use this adapter to get a 25-pin connection to a modem, you must use a *null modem adapter* to switch the pins back the way they are in the HP 95LX. Of course, you can use a single Type **B** adapter instead of the Type **A** adapter plus a null modem adapter. Computers and printers are *terminal* devices—that send on pin 2 and receive on pin 3. Again, you want the Transmit line on the 95LX to match with the Receive line on the other device and vice versa. Here you need to swap pins—which the Connectivity Pack's Type **A** adaptor does. The only modifications you may need to add to connect to a printer are gender changers that don't swap pins. Alternatively, a single Type **C** adapter will do the trick for printer connections.
3. Take the information you've gathered in steps 1–2 to your computer dealer or electronics store and look for an adapter that has one end with a 9-pin male (2–3–5) and the other end configured to connect properly with the your device. Be sure to notice the pin configuration of the transmit and receive lines as well as the gender of both ends of an adapter. You may need to use a combination of size-and-style adaptors, gender changers, and null modem adapters, to accomplish the task. Whatever you do, ***don't*** use a *cable* (even if it has the adapters you need on the ends). The added length of signal travel through the cable may result in poor transmission quality.

Installing the Connectivity Pack Software

1. Make sure you see the *DOS* prompt on your PC. It should be *MS-DOS 3.10* or later or its equivalent.
2. Insert 5.25" *Disk 1* (or the only 3.5" disk) into drive **A:**, and type **a:** ENTER..
3. If using *DOS 4.x* or lower, type **install** and press ENTER. If using *DOS 5.x* type **loadfix install** and press ENTER.
4. Follow the screen instructions; the default answers are usually what you want.
5. Wait for the installation to finish completely; remove the disk from drive **A:**.
6. Reboot the system by holding down CTRL and ALT and press DEL. This activates the changes made during the installation.
7. Test it by typing **app95** ENTER. You should see the main menu screen, titled **HP-95LX Applications**. If this doesn't work, try typing **cd c:\cpack**, ENTER, and then **app95** ENTER. See page 138 if you still have problems.

Testing the Connectivity Pack Linkage

1. On the PC, type **app95** at the *DOS* prompt (see page 138 if you have trouble)
2. Press ALT–2 to launch the Filer.
3. Press ALT–F2 (Set); set these settings:

```
Interface:  1 (COM1)
Baud:       19200
Dial:
Type:       Pulse
```

   (Press ENTER, ALT–F10, R*emote-Set*, C*onfig*, and change settings, as appropriate. Press ESC when you're done to return to the main Filer screen.)
4. On the HP 95LX, press ▭, ALT–F2 (Set) to confirm that its settings are as those above. If not, press ENTER, MENU, R*emote-Set*, C*onfig*, and change them as needed. When finished, press ESC to return to the main Filer screen.
5. Attach the Connectivity Pack cable—the 4-pin end—to the HP 95LX and the 9-pin end to the PC's **COM1** serial port (or to an adapter connected to that port—see pages 90-91).
6. On the Palmtop, press F7 (Split), F6 (Remote) to initialize the connection. You'll soon see one side of the split screen listed as **Remote**. The Connectivity Pack is working. Notice the PC's message: it's in Server mode—so the HP 95LX is in Client mode. You can reverse these roles by initiating the connection from the PC instead of the HP 95LX. If you don't connect successfully, you may have plugged the cable into a port on the PC other than **COM1**. Try another port. Or press ALT–F10, Remote-Set, Config, Interface, 2.

Transferring Files: A PC and the HP 95LX

1. Establish the Connectivity Pack linkage, making sure that the Filer is running on both the PC (IBM-compatible) and HP 95LX and that there's a split screen.
2. Using the HP 95LX (the client), find the files you wish to transfer. Use the ◀ and ▶ keys to switch back and forth between the Local and Remote Filer screens as needed, and the ▼ and ▲ keys to highlight files and directories within a screen. Highlighting a directory and pressing ENTER makes that directory the current one.
3. Highlight each file you wish to transfer and then press F9 (Tag) to mark it.
4. Move to the other screen (▶ or ◀) and display the directory in which you want to put the transferred files.
5. Switch back to the screen with the tagged files, and press F2 (Copy)
6. Make sure transfer is as you wish and then press ENTER.
7. Once you've finished with the file transfer (and any others you may want to do), press F7 to toggle off the split screen and then press ALT–F6 (Discon) to disconnect the remote PC.

Transferring Multiple Files

You can transfer a group of files at once, as long as they're located in the same directory. All you need are a few *file-tagging* commands. To select multiple files, use the arrow keys to highlight each one in turn and press F9 (Tag). You will see a little diamond (◆) to the left of each tagged file. If you have a lot of files to tag, it may be easier to use one of the following shortcuts:

ALT–F3 Tags the highlighted file and all following files in the current directory.
ALT–F4 Tags the highlighted file and all preceding files in the current directory.
ALT–F5 Tags all files in the current directory.

Notice that Tag (F9) works as a toggle (pressing F9 when a highlighted file is untagged will tag it; pressing F9 when the file is already tagged will untag it). Normally, the Palmtop erases all tags automatically after any file operation (copy, move, delete, or print) is completed. But just to be sure, you can always untag all files in the current directory by pressing ALT–F9.

Using DOS Connect*: The HP 95LX as a Remote Disk Drive of Your PC*

DOS Connect is an application, included in the Connectivity Pack, that uses the drives of the HP 95LX as additional disk drives of your PC. Using **DOS Connect** you can work on your PC, retrieving files from the HP 95LX just as you do from the PC's own hard disk. To set up **DOS Connect** the first time you use it:

1. Using the Connectivity Pack, connect (see pages 90-92) your HP 95LX running the Filer to the PC running the Filer in the **APP95** program.
2. Copy the file **DCS95.EXE** (found in the Connectivity Pack) from the PC to the HP 95LX.
3. Disconnect the two machines: press [ALT]–[F6] ([Disconn]).
4. Move to the directory containing the PC's **CONFIG.SYS** file. Note its path.
5. Press [ALT]–[5] to open the Memo Editor, then [ALT]–[F10], [F]*ile*, [O]*pen*, type in the pathname for the **CONFIG.SYS** file, and press [ENTER].
6. Make sure that the file contains the line **LASTDRIVE=G** (if you have a lot of drives attached to your PC, you may want to "increase" the letter to "H" "I", "J", etc.). You can increase the letter as far a "Z" if you have 26 drives attached. Using the LASTDRIVE statement to reserve too many excess drives that you never use costs some memory. On the other hand, you want to be sure you've allotted enough drives. If you are attached to a local area network, read page 101 before you change the LASTDRIVE statement. Resave the file: [ALT]–[F10], [F]*ile*, [S]*ave*, [ENTER], [Y].
7. Reboot the PC to establish the change in the **CONFIG.SYS** file.

To use **DOS Connect** after it has been set up:

1. Connect the HP 95LX and the PC using the serial cable from the Connectivity Pack. If possible, power the HP 95LX with an AC adaptor while using **DOS Connect** (it uses a lot of power and will decrease your battery life).
2. On the HP 95LX, make sure all System Manager-compatible applications are closed, highlight the DCS95.EXE program in the Filer and press [F4] ([RUN]). The HP 95LX will be the *server*.
3. On the PC, move to the directory containing the **DC95.EXE** file and type **DC95** and press [ENTER] to run the program. The PC will be the *client*. You will see information on the screen pertaining to the connection. Most important is the mapping of the drives. Since you're working from the client's (PC's) perspective you need how it refers to each HP 95LX drive. Note that drive **C:** on the HP 95LX is now called something else (**E:**, **F:**, etc.) by the client.

4. You can now use your PC normally. You may run programs on your PC with compatible files located on your HP 95LX. When you make changes in these files and re-save them, they will be re-saved back to the HP 95LX. One warning: You may not be able to run an application that uses all of the available memory without quitting the **DC95** program.
5. When you've finished using the connection, close all HP 95LX files that you may have opened. Then quit out of any TSR programs you launched after you launched **DC95** (quit them in reverse order of their launching). On the PC, type **dc95-u** and press ENTER. On the HP 95LX, press ESC, Yes.

Loading Your Favorite Spreadsheets

You can create your own spreadsheets on the HP 95LX, but you'll probably want to transfer your favorite spreadsheet (example: **MYFAVE.WK1**) from your PC to the Palmtop. You have a choice: Either use a direct Palmtop-PC connection (see below) or use a Palmtop-modem-modem-PC connection (see page 97). In either case, you will need the Connectivity Pack (HP Part #F1001A).

1. Attach the cable from the Connectivity Pack to your Palmtop and to the serial port of the PC. Install the Connectivity Pack software on the PC.
2. Open the Filer application on your Palmtop: *press* ☐. Then, with the PC on, and select Remote from the bottom menu on your Palmtop: *press* F6.
3. Split the Filer screen so that you can see the current directory listings for both the Palmtop (Local) and the PC (Remote): press F7 (Split).
4. In the left window on your split screen, highlight the destination directory (wherever you want to put **MYFAVE.WK1** when it's transferred); press ENTER. Then move to the right window—press ▶.
5. Using the Palmtop, find and highlight MYFAVE.WK1 in the PC window. Press F2 (Copy). At the top of the display, you should see a message indicating that the highlighted file in the right window (MYFAVE.WK1) is going to be copied into the current directory showing in the left window.
6. Make sure transfer is as you wish and then press ENTER. Once you've finished with the file transfer, press F7 to toggle off the split screen and then press ALT–F6 (Disconn) to disconnect the remote PC.

Moving Name and Address Files to the Phone Book from a PC

First you need to *translate* the files from their current format (four different types are supported) to the HP 95LX's **.PBK** format (see below). Once you get that done, then you *transfer* the translated files from the PC to the Palmtop (see page 93).

To translate other formats—Lotus *Metro*, Borland *Sidekick Plus*, Central Point *PC Tools Desktop*, or the generalized *Conventional Data Format 1* (where fields are enclosed in quotation marks and separated by commas, and where records are separated by carriage returns)—into the HP 95LX **.PBK** format:

1. Make sure that you've loaded the Connectivity Pack software properly on your PC (see pages 92-93 for details).
2. On your PC, type **app95** at the DOS prompt and press ENTER. You will see the main menu screen.
3. Press ALT-8, P*honeBk*. You will see the Phone Book translation screen.
4. Specify the format of file you want to translate by pressing the space bar until you see your choice, and then pressing ENTER.
5. Press F3 (**Files**), type the name (and path) of the file you want to translate, and press ENTER.
6. Using the space bar, specify the target format to translate into—**HP 95LX** in this case, and press ENTER.
7. Press F3 (**Files**) and type in the name of the target file, and press ENTER.
8. Press F3 (**Files**) and type in the name of the *log file*. A log file provides a record of the translation showing you all of the untranslatable components, incomplete records and other idiosyncrasies that occurred during translation. Using the log file allows you to identify data that wasn't handled properly by the utility. Be sure to use a name different than either the source file or the target file. Press ENTER when you've finished.
9. Press F6 (**Start**) to begin the translation. Should the translated file be too large for the Phone Book to read, you will see the message, **Warning: Output file may be too large to load**. To cancel the translation, press CTRL-BREAK.
10. Press Q*uit*, ALT-2 to quit the Translate utility and open the Filer to be prepared for copying the newly-translated files over to the HP 95LX.

Using a Modem

Modems communicate between computers over the telephone lines. The HP 95LX can work with any modem that can use *software handshaking only*. During use, *all* modems periodically check that a certain wire to the terminal (usually called DTR) is "on." Some modems, often the *battery-powered* ones, also use the DTR to tell them when to power up and power down. And although AC-powered modems don't use the DTR for power decisions, they'll hang up or "stop listening" if the DTR line is off or disconnected. This use of the DTR is called *hardware handshaking*.

The HP 95LX doesn't even have a DTR line—just the three lines, RX, TX, and GND (see discussion, pages 90-91). So, to use the HP 95LX with a modem, you must be able to tell the modem to *ignore its DTR line*. Most AC-powered modems have switches that can be set to "Ignore DTR" (check the modem manual), but you can't disable the DTR line on most battery-powered modems without defeating their power conservation. However, a few battery-powered modems use the RX line (data signals from the terminal) for instructions as to when to power on and off. This is *software handshaking*—the *only* kind supported by the HP 95LX.

The First Time You Connect with a Modem

1. Set up the modem: Test the cable connection (see pages 90-91) and configure the modem to ignore the DTR (and any other dedicated handshake) line.
2. Press [→], [MENU], [S]*ettings*, [C]*onfig*. Find out exactly what the host system's communication settings are in each of these areas and change the settings to match: *Baud Rate*, *Stop Bits*, *Parity*, *Bits/Character*, *Required Terminal Emulation* (if any), *Flow control method*, *Duplex*, *Access phone number*.
3. Choose how the HP 95LX should handle incoming data:
   Do you want the data to wrap onto a 40-character screen?
   Control characters: Filter them out? Change to other characters? Neither?
   What character translation file are you using (if any)?
   What logon script file are you using (if any)*?*
4. Press [Q]*uit*, [MENU], [C]*onnect*. The modem will initiate the connection with the host and run any logon script file you have included with it.
5. Once you're connected, do whatever you need to do. When you've finished your work, log off from the host, and press [CTRL]–[F7] ([Hangup]).

For example, to use the HP 95LX to access the CompuServe Information Service (assuming that you already have an account number and password):

1. Make sure the modem is properly set up (see pages 90-91 and 97).
2. Press [→], [MENU], [S]*ettings*, [U]*se*.
3. Use the arrow keys to highlight COMPUSRV.DCF, and press [ENTER].
4. Press [C]*onfig*, [D]*ial*, [N]*umber*; type the local access number for CompuServe.
5. Press [ENTER], [Q]*uit*, [Q]*uit* to enter the number and quit the menus.
6. Press [MENU], [C]*onnect* to dial CompuServe.
7. Proceed with your usual logon procedure (giving account number and password, etc.). You may wish to automate this with a script file (see below).

Script Files

A script file is a text file that contains special delimiters and character sequences that can be understood by a modem *as if you were performing them interactively.* When you include the name of a script file in your communication settings, the script is executed as soon as a connection is established with a host.

For example a script for logging onto CompuServe might, in English, go something like this: *"Wait for CompuServe to answer the phone, say hello, and ask for the ID number. Enter the ID number. Wait for CompuServe to ask for the password, then enter the password. Wait for acknowledgment that access has been secured, go to the HP 95LX Forum."*

But in the language and characters understood by Datacomm, the script would look something like this:

```
^^^^^^^{Enter  ID:}<your ID number goes here>|{Enter
password:}<your password goes here>|GO HPSYSTEMS 14
```

Transferring Files with a Modem

To transfer files using XMODEM protocol:

1. Set the configuration settings needed by the host system except: *always* set 8 bits/character (press [S]*ettings*, [C]*onfig*, [P]*ort*, [C]*har*, [8]).
2. Connect to the host (see page 98): Press [MENU], [C]*onnect*; log on, as needed.
3. On the host, run a program that uses XMODEM protocol.
4. Tell the host program to: Send (if you're downloading to the HP 95LX); *or* Receive (if you're uploading to the host).
5. On the 95LX, press: [MENU], [T]*ransfer*, [X]*MODEM*, [R]*eceive* (if downloading) *or* [MENU], [T]*ransfer*, [X]*MODEM*, [S]*end* (if uploading). Enter the filename(s).
6. Once the transfer finishes, any key clears the screen. Then [CTRL]–[F7] (Menu).

To transfer files using Kermit protocol:

1. Set the configuration settings needed by the host system—except as follows: If Parity is None, set 8 bits/character (press [S]*ettings*, [C]*onfig*, [P]*ort*, [C]*har*, [8]); If Parity is Even, Odd, Mark, or Space, set 7 bits/character.
2. Connect to the host (see p. 98): Press [MENU], [C]*onnect*. Then log on, if necessary.
3. Run the communications program on the host that can use the Kermit protocol.
4. Execute the host Kermit-Server command to place the host into server mode.
5. On the HP 95LX, press: [MENU], [T]*ransfer*, [K]*ermit*, [G]*et* (if downloading) *or* [MENU], [T]*ransfer*, [X]*MODEM*, [S]*end* (if uploading). Enter a filename(s).
6. Once the transfer is complete, press any key to clear the screen, and then press [MENU], [T]*ransfer*, [K]*ermit*, [L]*ogout*, [CTRL]–[F7] (Menu).

To upload ASCII Text files without a protocol:

1. Set the configuration settings needed by the host system.
2. Connect to the host (see page 98): Press [MENU], [C]*onnect*; log on, as needed.
3. Redirect the host's input from the keyboard to the serial port (i.e. **<COM1**).
4. If necessary, press [MENU], [T]*ransfer*, [T]*ext*, [O]*ptions* to set the Throttling and Pacing for the transfer mode (characters are transferred at the Throttling rate until a newline character is sent, at which point the next line of characters is not sent until the Pacing conditions are met).
5. On the 95LX: [MENU], [T]*ransfer*, [T]*ext*, [S]*end* (if uploading). Enter the filename(s).
6. After the transfer: [A], [MENU], [T]*ransfer*, [K]*ermit*, [L]*ogout*, [CTRL]–[F7] (Menu).

Loading Spreadsheets Via a Modem Connection

1. Attach the cable from the Connectivity Pack to your Palmtop and to the local Hayes-compatible modem. You may need a null modem adapter to modify the cable connector at the modem end. Make sure the Connectivity Pack software is installed on the PC. (If it isn't, see page 99 for various ways to transfer files using the Datacomm application.)

2. Open the Filer on your Palmtop (press [📁]). Change the configuration settings:
   - Press [MENU] [R]*emote-Set* [C]*onfig* [I]*nterface* [ENTER]. to select `Com1` as the communication port.
   - Press [B]*aud* and select the appropriate baud rate for the modems involved.
   - Press [D]*ial* and then select `Pulse` or `Tone`.
   - Press [D]*ial* [N]*umber* and type the phone number of the remote computer, using only numerals, spaces, parentheses, commas, and hyphens.
   - Press [Q]uit [Q]uit to leave the menus.

3. Make sure the PC is turned on, and that its modem configuration matches what you've just set on the Palmtop. Select `Remote` from the bottom menu on your Palmtop: Press [F6].

4. Split the Filer screen so that you can see the current directory listings for both the Palmtop (`Local`) and the PC (`Remote`): Press [F7] (`Split`).

5. In the left window on your split screen, highlight the destination directory (where you're going to put `MYFAVE.WK1` when it's transferred); press [ENTER]. Move to the right window: press [▶].

6. Using the Palmtop, find and highlight `MYFAVE.WK1` in the PC window. Press [F2] (`Copy`). At the top of the display, you should see a message indicating that the highlighted file in the right window (`MYFAVE.WK1`) is going to be copied into the current directory showing in the left window.

7. Make sure transfer is as you wish and then press [ENTER].

8. Save the modem configuration settings (if you haven't previously): Press [MENU] [R]emote-Set [S]ave, type `MODEM` and press [ENTER].

9. Once you've finished with the file transfer, press [F7] to toggle off the split screen and then press [ALT]–[F6] (`Discon`) to disconnect the Filer, and finally [ALT]–[F7] to hangup the modem/phone connection.

Other Devices

Transferring Files Between Two HP 95LXs: The Infrared Port

You can use the infrared port on the HP 95LX is to exchange files between two HP 95LXs (or an HP 48 and a HP 95LX). HP's infrared printer will not work with the HP 95LX (although there is a utility program available on CompuServe—see page 136—that prints *sideways* on that printer). To transfer a file between HP 95LXs:

1. On both machines, press [▭], [MENU], [R]*emote-Set*, [C]*onfig*, [I]*nterface*, [3] *(Infrared)*, then [Q]*uit*, [Q]*uit* to return to the main Filer screen.
2. Set the two HP 95LXs with their infrared ports facing each other, separated by less than 8" (the infrared port aligns with the third row of keys from the top).
3. On one machine (it will be **Local** —Client mode), press [F7] (**Split**), [F6] (**Remote**) to initiate the connection. The other is **Remote** (Server mode).
4. Find the files you wish to transfer (on either machine in this scenario). Use the [◀] and [▶] keys to switch back and forth between the **Local** and **Remote** Filer screens as needed, and the [▼] and [▲] keys to highlight files and directories in a screen. Highlighting a directory and pressing [ENTER] makes it current.
6. Highlight each file you wish to transfer and then press [F9] (**Tag**) to mark it.
6. At the other screen ([▶] or [◀]), display the destination directory for the files.
7. Switch back to the screen with the tagged files, and press [F2] (**Copy**)
8. Make sure the transfer is as you wish and then press [ENTER]. Once you've finished with the file transfer(s), press [F7] to toggle off the split screen and then press [ALT]–[F6] (**Disconn**) to disconnect the remote HP 95LX.

The HP 95LX as a Node on a Local PC Network

- For a OS/2 LAN Manager network, change the setup to **LASTDRIVE=Z**. *All* drives must be accommodated by the **LASTDRIVE** statement.
- In a Novell network, count your drives carefully. The **LASTDRIVE** statement should accommodate only directly connected drives and the HP 95LX drives—no network drives. The network drives are assigned letters, starting with the letter following the one designated in the **LASTDRIVE** statement. Check with your network administrator to see if this affects your LOGIN drive.
- For other networks, check with your network administrator before changing anything in your PC's **CONFIG.SYS** file.

Non-PC-Compatible Systems

At this writing, there is no "Connectivity Pack" available for the Macintosh or Amiga computer families. You can transfer files between the HP 95LX and any system running a Kermit terminal emulation program (available for the Mac and most platforms). Even if you can communicate with non-PC compatible systems you need to translate files between the HP 95LX formats and other formats. The Connectivity Pack comes with translation utilities for three common PC personal information manager applications—Lotus *Metro*, Borland *Sidekick Plus*, and Central Point *PC Tools*. And developers are now creating new translators for other applications and machines (see page 136 for how to find out the latest).

Printing Indirectly (a Parallel Printer Solution)

Many printers have parallel ports, but no serial ports. The HP 95LX is not easily connected to such printers. You have two alternatives:

- Create a subdirectory on your PC to collect the "files-to-be-printed" that you upload from the HP 95LX via the Connectivity Pack (see page 93). These files should be saved as ASCII text files (see page 83) or you can save worksheet files as .WK1 files if you have a copy of Lotus 2.2 on your PC. Once on your PC, you can open the files, format them differently if you wish and then print, using your word processor (or Lotus) and whatever printer drivers you have loaded into the PC. This method is quite straightforward but not all that convenient, compared to the printing you can do directly (see the next page).
- You can run a terminal emulation program (such as Kermit) on your PC, configured to receive data from the serial port (which is connected to the HP 95LX) and then to send it directly to the PC's printer. In this configuration, you would execute the print job directly from the HP 95LX and the print data would be sent through the PC, using Kermit, to the printer. This method requires a sophisticated understanding of Kermit and communications programs, but once set up, can be almost as convenient as direct printing.

Printing Directly to a (Serial) Printer

1. Prepare the HP 95LX. Press [Shift]-[Setup] (Setup), [P]*rinter*. You'll either designate an existing .PCF file ([U]*se*) or manually set the configurations ([C]*onfig*). Each configuration sets:
   - The type of printer driver (three choices are offered)
   - The communication port: Always set this to COM1.
   - The baud rate: Set it to your printer's transfer rate.
2. Prepare the printer. There are some settings that you cannot change on your HP 95LX, so you must adjust your printer instead. Use your printer's manual and make these settings (once you've made these changes, you may have to turn off the printer and back on again to get the changes to take effect):
   - 8 bits per character • 1 stop bit • No parity
   - Enable XON/XOFF software handshake; disable hardware handshake
   - Set the baud rate to match the HP 95LX setting
   - Set the emulation mode to the printer driver you selected on the HP 95LX.
3. Connect the HP 95LX and the printer. You may need a kind of adapter not provided with your Connectivity Pack (see pages 90-91 to decide).
4. With your printer on, open the file to be printed and use one of these procedures:
   - Text files (.TXT, .EQN, .PRN, .BAT, etc.): Press [MENU], [P]*rint*, [P]*rinter*.
   - Worksheets (.WK1):
     1. From the open worksheet, press [MENU], [P]*rint*, [P]*rinter*.
     2. Press [R]*ange*, type in the range you wish to print, and press [ENTER].
     3. To change any of the options—margins, page length, borders, etc.—press [O]*ptions*, make those changes, and [ESC] back to the printer menu.
     4. Position the paper in the printer at the top of a page and press [A]*lign*.
     5. Press [G]*o* to print the range on the printer.
     6. Press [P]*age* to advance the paper to the top of the next page.
     7. Press [Q]*uit* to finish the print job.
   - Phone Book (.PBK) information:
     1. From the index screen of an open .PBK file, tag the records you wish to print (unless you want to print all records or just the highlighted record).
     2. Press [MENU], [P]*rint*, [P]*rinter*.
     3. To indicate the subset of records you wish to print, press one of the following: [O]*ne* or [T]*agged* or [A]*ll*.
     4. To print the index listings only or the entire card, press [I]*ndex* or [C]*ard*.
   - Appointment Book (.ABK) information:
     1. From the .ABK file, press [MENU], [P]*rint*, [P]*rinter*, then [A]*ppts* or [T]*odos*.
     2. To include/omit attached notes, press [P]*rint–Notes* or [W]*ithout–Notes*.
     3. Type the earliest date of the information to be printed and press [ENTER].
     4. Type the latest date of the information to be printed and press [ENTER].
     5. Either press [O]*ne-Day-Per-Page* to print one screen per page, or [M]*any-Days-Per-Page* to print continuously on each page.

5. Optimizing Your Work

Adjusting Global Settings

Your HP 95LX allows you to customize its operation in many ways. Some settings are global—they affect all applications; others affect just one application. The SETUP utility makes *global* changes, most of which you can make at any time.

Adjusting the Volume

1. Press ⇧ SET UP, S*ystem* V*olume.*
2. Press ◀ or ▶ to decrease or increase the volume setting.
3. Press ENTER to save the setting, or ESC to cancel the change.

Adjusting the Display Contrast

1. Press ⇧ SET UP, S*ystem* C*ontrast.*
2. Press ◀ or ▶ to decrease or increase the volume setting.
3. Press ENTER to save the setting, or ESC to cancel the change.

Adjusting the Date Format (Except for 1-2-3)

1. Press ⇧ SET UP, D*ate* F*ormat.*
2. Press the key(s) corresponding to the new date format you want:

Press 1 for	19-SEP-91	Press 4, D for	91-09-19
Press 2 for	19-SEP	Press 5, A for	09/19
Press 3 for	SEP-91	Press 5, B for	19/09
Press 4, A for	09/19/91	Press 5, C for	19.09
Press 4, B for	19/09/91	Press 5, D for	9-19
Press 4, C for	19.09.91		

Adjusting the Time Format (Except for 1-2-3)

1. Press [/] [SET UP], [T]*ime* [F]*ormat*.
2. Press the key or keys corresponding to the new time format you want:

Press [1]	for	09:15:47 pm	Press [3], [D]	for	21h15m47s
Press [2]	for	09:15 pm	Press [4], [A]	for	21:15
Press [3], [A]	for	21:15:47	Press [4], [B]	for	21.15
Press [3], [B]	for	21.15.47	Press [4], [C]	for	21,15
Press [3], [C]	for	21,15,47	Press [4], [D]	for	21h15m

Setting the Currency Symbol

Just as with the time and date formats, there are two places to control international punctuation and currency conventions—the Setup utility and in 1-2-3's Global Default menu. Press [/] [SET UP], [I]*nternational*. For all built-in applications *except 1-2-3*,* the International defaults are set here:

1. Press [I]*nternational*, [C]*urrency*.
2. Type the currency symbol you prefer: $, £, ƒ, ¢, ¥, I⁄, K$, etc.
3. Press either [P]*refix* or [S]*uffix* to select the position of the currency symbol with respect to the numerical amount.

*To change these formats for the 1-2-3 application, press [123], [MENU], [W]*orksheet*, [G]*lobal*, [D]*efault*, [O]*ther* [I]*nternational*. You have the same choices for 1-2-3.

Setting the Punctuation

By punctuation, the HP 95LX means three things:

- The decimal point (or *radix)*. It can be either a period (.) or a comma (,).
- The arguments separator (the mark that separates items in a list). It can be a comma (,), a period (.), or a semicolon (;).
- The thousands separator (which separates each group of three digits to the left of the decimal)—always different than the radix mark. It can be a comma (,), a period (.), or a blank space.

1. Press ⇧SET UP, I*nternational*, P*unctuation*. Then select one of the eight punctuation combinations, as shown below. The first of the three punctuation marks in the parentheses declares the decimal point; the second mark declares the arguments separator; the third declares the thousands separator.

Press A for (. ,) (U.S. standard)	Press E for (. ,)
Press B for (, .)	Press F for (, .)
Press C for (. ;)	Press G for (. ;)
Press D for (, ;)	Press H for (, ;)

Setting the Language

The HP 95LX comes equipped with a common international character set (what DOS users know as *codepage 850*). To change the language by which the HP 95LX communicates with you:

1. Close all built-in applications, except Setup. This means that you have to enter each application and pressing MENU, Q*uit*. Be careful: Save any changes to open files in other applications before quitting the application. Remember that quitting an application is entirely different than merely leaving it by pressing a different application key (see page 114).
2. Press ⇧SET UP, I nternational L anguage.
3. Select a language from the list using the arrow keys and press ENTER (if you bought your Palmtop in the United States, you probably have English as your only choice).

Customizing 1-2-3

Because of its independent origins outside of the Palmtop the 1-2-3 application has a wide range of default settings that you can manipulate to suit your needs. The settings explained below are those that will apply to each new spreadsheet you create *unless* you specifically choose to alter them in a particular circumstance. So try to choose settings that will apply to *most* of your new spreadsheets. Press [123].

Setting the Column-Width Default

Set the width of all columns in the spreadsheet except those you individually set:

1. Press [123], [MENU], [W]*orksheet*, [G]*lobal*, [C]*olumn-Width*.
2. Type a number from 1 to 240 (the character width you want for each column), and press [ENTER].

Setting the Label Prefix Default

Set the label alignment for all future entries (it doesn't affect current entries) except those that you have individual aligned differently.

1. Press [123], [MENU], [W]*orksheet*, [G]*lobal*, [L]*abel-Prefix*.
2. Select one of three options:

[L]*eft*	Labels aligned to left edges of cells.
[R]*ight*	Labels aligned to right edges of cells.
[C]*enter*	Labels centered in cells.

Setting the Protection Default

When global protection is enabled, you can make no changes to cells, *except* those that have been specifically unprotected (with [MENU], [R]*ange*, [U]*nprot*).

1. Press [123], [MENU], [W]*orksheet*, [G]*lobal*, [P]*rotection*.
2. Press either [E] to enable or [D] to disable the global protection.

Setting the Cell Format Default

This default defines the way each cell in the spreadsheet displays numerical data, unless it has been differently specified in particular (using R*ange* F*ormat*). Remember that the active cell format for the current cell is listed in the top line of the display between parentheses—(W9), (C2), (D1) are examples.

1. Press 123, MENU, Worksheet, Global, Format. You will see a menu with the format categories shown below.

2. Press the keys corresponding to format options you want (in the list below, *n* stands for the number of decimal places you want displayed.

   Fixed: Press F, type *n*, ENTER where *n* can be from 0 to 15.
   Example: 5.678904 in **F2**: 5.68

   Sci: Press S, type *n*, ENTER where *n* can be from 0 to 15.
   Example: 89765.392 in **S2**: 8.98E+04

   Currency: Press C, type *n*, ENTER where *n* can be from 0 to 15.
   Example: 89765.392 in **C2**: $89,765.39

   , (Comma): Press ,, type *n*, ENTER where *n* can be from 0 to 15.
   Example: 89765.392 in **,2**: 89,765.39

   General: Press G. The normal default setting, it displays all digits except trailing zeroes after the decimal point. If cell width, it displays in Scientific Notation to the greatest precision possible.
   Example: 5.6789040 in **G**: 5.678904

   +/-: Press +. Rounds the number to a whole number and then prints that number of plus signs (if a positive number), minus signs (if a negative number), or periods (if the number rounds to zero).
   Example: –5.67 in **+/-**: ------ (six minus signs)

   Percent: Press P, type *n*, ENTER where *n* can be from 0 to 15.
   Example: 0.2358 in **P2**: 23.58%

   Dte: Translates the integer portion of a number (between 1 and 73050) into a date with one of five formats...

   Press D, 1. *Example:* April 6, 1992 in D1: 06-Apr-92
   Press D, 2. *Example:* April 6, 1992 in D2: 06-Apr
   Press D, 3. *Example:* April 6, 1992 in D3: Apr-92
   Press D, 4. *Example:* April 6, 1992 in D4: 04/06/92
   Press D, 5. *Example:* April 6, 1992 in D5: 04/06

Time: Translates the decimal portion of a number into a time with one of four formats...

Press /, T, 1 *Example:* 5:40:32 pm in D6: 05:40:32 PM
Press /, T, 2 *Example:* 5:40:32 pm in D7: 05:40 PM
Press /, T, 3 *Example:* 5:40:32 pm in D8: 17:40:32
Press /, T, 4 *Example:* 5:40:32 pm in D9: 17:40

Text: Press T. Displays formulas exactly as entered, unlike the other formats, where all formulas are converted to the values (or other *returns*). Numbers are displayed in General format. This is often a helpful format during spreadsheet development.

Hidden: Press H. Makes the data in the cell invisible.

Setting the Recalculation Default

You can control when—and in what order—1-2-3 recalculates formulas, and how many recalculation iterations it performs each time it recalculates formulas.

1. Press 123, MENU, W*orksheet*, G*lobal*, R*ecalculation*.
2. Press one of the following:

N*atural*	Before recalculating a formula, recalculates any other formulas on which that formula depends; also recalculates cells containing functions (e.g. @NOW or @CELLPOINTER) whose values can change.
C*olumnwise*	Recalculates formulas column by column, starting with A1.
R*owwise*	Recalculates formulas row by row, starting with A1.
A*utomatic*	Automatically recalculates formulas affected by a change in cell contents—in the order (Natural, Columnwise, or Rowwise) you've currently selected.
M*anual*	Recalculates formulas only when you press F9 (CALC). Whenever any entries have changed since the last recalculation, you'll see the CALC indicator in the bottom line of the display.
I*teration*	(then type a number from 1 to 50, press ENTER). Sets the number of repetitions of the calculation cycle initiated each time a recalculation is initiated.

Setting the Zero Default

The Zero default specifies whether a zero, a label of your choosing, or nothing at all is returned to cells that contain either the number zero or a formula that evaluates to zero.

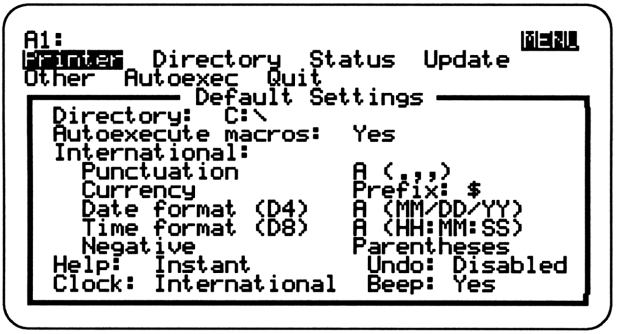
1. Press 123, MENU, Worksheet, Global, Zero.

2. Press one of the following:

No	Displays a zero in cells whose value is zero.
Yes	Displays nothing in cells whose value is zero.
Label	(then type a label and press ENTER). Displays your label in cells whose value is zero.

*Changing the 1-2-3 Configuration File (*123.CNF*)*

Press 123, MENU, Worksheet, Global, Default to see the Default Settings screen:



Each of the settings on this screen can be changed using the menu items listed (many of them are available under Other). These settings are all stored together in a configuration file, 123.CNF, which the machine reads each time you open the 1-2-3 application. So, whenever you make changes here that you want to apply to *future* sessions as well, make sure you press Update. This *saves* the changes to 123.CNF. Otherwise, the changes will apply only to the current session.

The HP 95LX uses Lotus 1-2-3 version 2.2, so all Lotus 1-2-3 macro commands are supported by the Palmtop. However, the smaller screen size of the Palmtop means that commands that cause the screen to scroll are interpreted differently.

Take a look at an example. On a PC that has a full 80 character x 25 line screen, the {PGDN} command scrolls the display down 22 lines (the 3 Control Panel lines at the top don't scroll)—one full screen's worth. On the HP 95LX, {PGDN} also moves the display down one full screen's worth—11 lines.

To use a macro created for a full-size PC screen on the HP Palmtop, you need to add an extra {PGDN} instruction every time you encounter one in the macro. That is, *two HP 95LX* {PGDN}*s equal one PC* {PGDN}.

Besides {PGDN} three other screen scrolling commands are affected: {PGUP}, {BIGLEFT}, and {BIGRIGHT}. These move the display up one screenful, left one screenful, and right one screenful, respectively. As with {PGDN}, you can usually double each of these commands to make a pre-existing PC macro compatible with the HP 95LX's smaller screen.

Customizing the Filer

Normally, when you view files from the Filer (by highlighting a filename and pressing ENTER), only the first 40 characters of a line are visible. For files created for the HP 95LX, the lines are only 40 characters wide anyway. But for files created on a desktop PC (usually 80 characters wide), you'll see only the first half of each line *unless you activate the line wrap feature*, so that each 80-character line is displayed as two 40-character lines:

Press MENU, O*ptions*, W*rap*, Y*es* to activate line wrapping; or MENU, O*ptions*, W*rap*, N*o* to deactivate line wrapping.

Customizing the Appointment Book

Adjusting the Daily View

- You may choose to see just the appointments you've scheduled, without any of the "empty" hours. Just press [MENU], [S]*ettings*, [T]*imeline*, [A]*ppts-Only*.
- You may choose which hour should be the first one shown at the top of the daily screen each time the Appointment Book is opened. Press [MENU], [S]ettings, [F]irst-Hour, then type the time you want to begin your day and press [ENTER].
- You may make the time interval shown in the daily view either 60 minutes (the normal default), 30 or 15 minutes. Just press [MENU], [S]*ettings*, [T]*imeline*, and then select the desired interval.

Turning the Sound of Alarms On/Off

- Press [MENU], [S]*ettings*, [A]*larm*, [E]*nable* to turn on the alarm sounds.
- Press [MENU], [S]*ettings*, [A]*larm*, [D]*isable* to turn off all alarm sounds. Note that the alarm message will still flash on the screen, but no sound will occur.

Changing the Default Leadtime between Alarm and Appointment

1. Press [MENU], [S]*ettings*, [L]*eadtime*.
2. Type in a leadtime between 0 to 30 minutes and press [ENTER]. Changing the default doesn't affect the alarms already set in your Appointment Book.

Enabling/Disabling Carry-Forward

1. Press [MENU], [S]*ettings*, [C]*arry-Forward*, [E]*nable* to cause each future To-Do task to be carried forward until checked off or deleted—unless you specifically change this when you enter a particular task.
2. Press [MENU], [S]*ettings*, [C]*arry-Forward*, [D]*isable* to prevent unaccomplished To-Do tasks from being carried forward to the next day—unless you specify that you want a particular task carried forward when you enter it.

Customizing the Memo Editor

The Memo Editor allows you set the tab interval and right-hand margin as you see fit. But remember that whenever you change the tabs or the margins, the Memo Editor preserves these settings and uses them on *all documents*—until you change the settings again. So, although a tab character stored in a document may have originally indented to one position, its indentation later will depend on the *current* tab interval setting—not on the setting when that tab was inserted.

Setting the Tab Interval

1. Press MENU, S*ettings*, T*abs*. You'll see the current tab setting in the prompt.
2. Type a number between 1 and 40 and press ENTER.. Since there are 40 spaces across the screen, you may set tabs at intervals from 1 to 40 characters (the usual default is 5). After you press ENTER, you'll see a tiny tab-marker dot (·), spaced at the interval you set, on the double-line border above the text area.

Setting the Right Margin

Like Filer, the Memo Editor can be adjusted to accommodate text files created on a wide variety of other computers. You just set the right margin at anywhere from 40 to 240 characters. Unlike Filer, however, the Memo Editor can be scrolled to the right (using ▶ and ⇧END) or left (◀ and ⇧HOME) to view long lines.

1. Press MENU, S*ettings*, W*rap*. You'll see the current right margin in the prompt.
2. Type a number from 40 to 240 and press ENTER.

Customizing the Calculator

The calculator only has one customizable feature—the choice of Algebraic or RPN arithmetic syntax (i.e. whether, to press 2+3- or 2ENTER3+ when adding 2 and 3). Press ON, MENU, O*ptions*, A*lgebraic / RPN* to toggle between the choices.

6. Running/Controlling Programs

The Two Control Programs

Your HP 95LX comes with *two* control programs:

- $SYSMGR, the *System Manager*, which runs all of the built-in applications and any other programs that are *System-Manager-compliant* (see page 121).
- COMMAND — the DOS program used by all IBM-compatibles. The HP 95LX uses a modified DOS version 3.22, including these standard DOS commands:

  BREAK, CHDIR, CD, CHKDSK, CLS, COMMAND, COPY, CTTY, DATE, DEBUG, DEL, DIR, EXIT, MKDIR, MD, PATH, PROMPT, RMDIR, RD, REN, RENAME, SET, TIME, TYPE, VERIFY, VER, VOL.

Normally, $SYSMGR is in charge. When you turn on your machine, the System Manager takes control of your operations. The built-in application keys are active and you have access to any other programs that have a .EXM extension. To gain access to the standard COMMAND program (the DOS prompt), you must tell the Palmtop to quit using $SYSMGR. You may request that it quit $SYSMGR only temporarily or actually *switch the default* to COMMAND.

Switching Temporarily to COMMAND *(DOS) Control*

You must switch to *DOS* control to execute commands from the *DOS* prompt or to run any *DOS*-based program on the built-in RAM disk or a RAM expansion card. But first you must quit all applications (and any attached applications), *except the Filer*. You must open each application, press MENU, Q*uit* (be sure to save changes in each document to disk). See page 119 for a macro to simplify this process. Once you exit all applications except the Filer, press MENU, S*ystem*. You'll see the *DOS* prompt: C> (see pages 144-145 for a list of the *DOS* commands available). To return to the *System Manager*—necessary to use the Appointment Book, Phone Book, Calculator, etc.—type exit at the *DOS* prompt and press ENTER, ENTER.

Switching the Default to DOS Control

Normally, the *System Manager* is the default control program. Before you even consider changing the default control program to the *DOS*-based COMMAND program, be sure you understand the function of the special *DOS* file CONFIG.SYS and exactly how it works in your Palmtop (see pages 124-125). There are two good reasons to "boot up" to *DOS* instead of the *System Manager*:

- You primarily use your Palmtop to run *DOS*-based programs that you've loaded into RAM on one of the two available disks (the internal C: disk or the optional, external A: card-based disk). You probably prefer to use *DOS*-based programs that you're already familiar with to manage appointments, phone books, databases, etc., instead of using the built-in applications of the HP 95LX (or you don't use these information management applications very often).
- You want to do some customized boot-up initializing (using CONFIG.SYS and/or AUTOEXEC.BAT files) before switching to the *System Manager* and working primarily under its control for the duration of the session.

Keep in mind that changing the default means that your HP 95LX will "boot up" to the *DOS* prompt—none of the application keys will be active until you switch to the *System Manager* (see below). To change the default:

1. Gain access to the *DOS* prompt by quitting all applications except the Filer and pressing MENU, S*ystem*.
2. Create a CONFIG.SYS file (if one doesn't already exist), and add the following line to it: SHELL=COMMAND /P.
3. Reboot the machine by pressing CTRL, ALT, and DEL—all simultaneously.

Switching Temporarily to $SYSMGR *(System Manager) Control*

If the *DOS* COMMAND is your default control program (see previous section), you can switch to the *System Manager* by typing $SYSMGR and pressing ENTER. But you cannot return back to *DOS* simply by "exiting" the *System Manager* (there is no way to "exit" the *System Manager*—even when the default control program is *DOS*). To return to *DOS*, you must invoke it through the Filer's S*ystem* command (after quitting all other open applications)—just as if you were switching only temporarily to *DOS* control (see page 114).

Navigating on the Palmtop

Switching Between System Manager Applications

To move between built-in applications, just press the appropriate application key (▭, ⇔, ◷, ✎, ▤, 123, ▦, or ⌂ SET UP). Whenever you switch like this, the document you leave behind is *not* re-saved to disk. It is temporarily moved to a holding area until you switch back to its application again. When you do, the document is displayed exactly as you left it. This is very convenient, but remember that to permanently save documents, you must still press MENU, F*ile*, S*ave*.

Using a System Manager Application

- **To select features using menus:** Press MENU to bring up a menu, then press the first letter of the menu item you wish to invoke. Each item you choose will either accomplish some task, such as giving you access to a particular screen, or lead you to a submenu where other choices are offered. The ESC key is used to cancel your current menu and move you back to the previous menu.
- **To select features using the function keys:** Every built-in application except Lotus 1-2-3 uses the bottom two lines of the display to *label* the current functions of keys F1 through F10. These labels change as you change screens and features. The labels *printed* above the function keys apply *only* to 1-2-3.
- **To move around within a particular screen or feature:** Use the arrow keys and/or ENTER. When your input is required, pressing ENTER will move you to the next "entry field." But be careful: Pressing ENTER without previously entering information may automatically enter a default value. When in doubt, use the arrow keys to advance to the next field without affecting input.

Quitting a System Manager Application

Whenever you *quit* a built-in application (to run a *DOS*-based program or to free up some system memory), changes in the current document open in that application will be lost *unless you save it first*. The applications remind you of this: `Save changes before exiting? (Y/N)`. You press Y, ENTER to re-save.

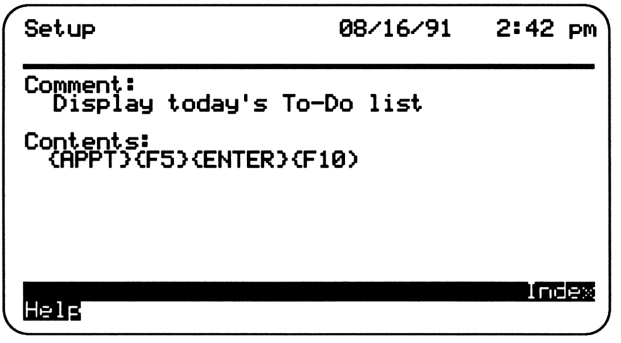
Custom Navigation with Macros ("User Keys")

The HP 95LX can redefine each of the ten function keys with a *macro*—a series of keystrokes that the machine records and then "replays" whenever its key is pressed. These macros are similar to those in *Lotus*, but they allow no "If-Then" kinds of operations. Also, they cannot be nested, nor can they turn the machine off, print the screen, set caps lock or scroll lock. But look what they can do:

Example: Create a macro to bring up "today's" To-Do list with one button.

1. Press [↑][SET UP], [C]*har*, to see a list of the currently stored macros.
2. Note an available slot, press [ENTER],, type `Display today's To-Do list` in the `Comments` field, and press [F10] (`Index`). Make sure that you see the new macro's description in the list.
3. Press [ESC], [Q]*uit* to exit Setup.
4. Press [↑][CHAR], then the function key to which you assigned the new macro. For example, suppose you've assigned the macro to [F2]. You should hear a two-toned beep that signals the start of *Learn Mode*, in which every keystroke (from now until you press [↑][CHAR]–[F2] key again) is recorded as a part of the macro.
5. Press the keys to see today's to-do list: [◴] moves to the Appointment Book; [F5] (`Goto`), [ENTER] selects the current date; [F10] (`Index`) displays today's to-do list.
6. Press [↑][CHAR]–[F2] again to quit *Learn Mode*.
7. Test the macro by initiating it from various applications and levels of menus within applications. For example, press [123], [MENU], [W]*orksheet*, [C]*olumn* and then initiate the macro by pressing [CHAR]–[F2]. Does it work? Try another location. Think of potentially difficult or complicated locations. This macro should work from anywhere within the System Manager.
8. Test it when Appointment Book (the destination) is in various menu levels. For example, suppose the Appointment Book is set to Calendar View. Will the macro work as intended? Try it: Press [◴], then [ESC][ESC] to display the calendar view. Then switch out to another application, say, the Phone Book ([✆]), and initiate the macro (press [CHAR]–[F2]). Result: Hmm... you get the daily view, not the To-Do list. Your macro needs a little fixing to account for this possibility.
9. Repeat the test using the Appointment Book is located at other screens (the City list within the Watch feature, for example) and see what happens.

1. Return to Setup: Press C*har*, F10 (Macro). You are now in User Mode and can directly edit the macro. You should see this:



   Note that each keystroke in the macro is surrounded by brackets; this macro currently consists of four keystrokes.

2. You can remedy the problem—not knowing where an application will be located when a macro switches to it—by including keystrokes in the macro that move to a *known* screen in the application before doing anything else. In this case, two ESC's will take you from *any screen* in the Appointment Book to the Calendar View. So, edit the macro: Move the cursor to the opening bracket of {F5} and type {ESC}{ESC} Then, at the end of the macro, type {F10} (since you're now moving from the Calendar View.)

3. Now, while you're at it, are there any other niceties you want to add to this macro? How about switching the daily view format to Appts-Only, so that you see only a list of the scheduled appointments—no empty timeslots. That way, you can easily display the To-Do list and then, when you're finished looking at it, you can just press F10 (Menu) to see today's appointments as well.

   To add this feature to your macro, you'll need to include these keystrokes after you've moved to Calendar View: MENU, S*ettings*, T*imeline*, A*ppts-Only*, ESC. To insert it into your macro, you can type it in as you did above or you can use this shortcut procedure: Move the cursor to the opening bracket of {F5}. Press F6 (Alt), MENU. Pressing F6 (Alt) *before another keystroke* tells the machine that you are adding it to the macro and to therefore *not execute it immediately*. You continue inserting the keystrokes: S, T, A, F6 (Alt), ESC. Notice that because the alphabetic characters aren't normally other commands, you don't need to press F6 (Alt) first as you must before MENU or ESC.

4. Now go retest the edited macro. You should find it works well.

Example: Create a macro that will exit to DOS after saving all open files.

Each built-in application needs the same basic sequence: return to its "main screen," save an open file if it exists, and quit. This macro systematically performs these operations on each of the resident applications, before moving to the DOS prompt.

1. Quit Setup, move to any application, and press: ⇧CHAR–F1
   MENU F S ENTER F6 MENU Q
   123 ESC ESC ESC ESC ESC ESC ESC ESC MENU F S `Tempsave.WK1` ENTER
   B ESC MENU Q Y, MENU F S ENTER Y MENU Q
   MENU F S ENTER Y MENU Q, MENU F S ENTER Y MENU Q
   ESC ESC ESC Q Q MENU Q, ⇧SET UP ESC ESC Q Q Q
   *[other applications go here]**
   MENU, ⇧CHAR–F1

As written via the above keystrokes, the macro leaves you at the *Filer* menu after closing all other applications;** it does not actually invoke *DOS*, because, in *Learn Mode*, you would have entered *DOS* and thus been unable to end the macro. So you need to go to User Mode and edit the macro to add the command to invoke DOS: Press ⇧SET UP C, make sure that the macro assigned to F1 is highlighted and press F10 (Macro). You can now type in a description of the macro: `Close all and exit to DOS`. Then move the cursor to the end of the macro listing and insert `S` (for the S*ystem* command that takes you to DOS). Now press F10 (Index), ESC, Q to quit Setup.

*The macro created above assumes that you have no other *System Manager*-compliant applications (those with a `.EXM` suffix) assigned to other keys. If you do have them assigned, then you must do the "save-and-quit" procedure for each those applications as well; insert those keystrokes where it says "other applications go here."

**Whenever you use this macro, the current 1-2-3 spreadsheet that you were using is saved as `Tempsave.WK1` and the previous contents of that file moved to `Tempsave.BAK`. If you have no current spreadsheet open when you execute this macro, a *blank worksheet* is stored as `Tempsave.WK1`, moving the previously saved version to `Tempsave.BAK`. If you were to initiate the macro again without renaming any files, then both `Tempsave.WK1` and `Tempsave.BAK` will contain blank worksheets and any previously saved worksheets that you had stored in them will be lost. This means that you must, as soon as possible, *rename any spreadsheets saved by means of this macro.* For more about keeping your data safe, see page 130.

Installing and Running DOS-based Programs

You can run *DOS*-based programs (those with .EXE, .COM, or .BAT extensions) either from the Filer, or from the *DOS* prompt—which is accessed via the Filer menu as well (see page 114).*

Running DOS Programs from the Filer

Before you can run a program from Filer, all other applications—including the built-in applications—must be quit. An error message will pop up to remind you of this, if you try to execute a *DOS* program while others are still loaded (see pages 114 and 119 for more information about quitting all built-in applications).

To run a *DOS* program from the Filer:

1. Move to the directory containing the program, using F5 (Goto), if necessary.
2. Highlight the program file (one with a .EXE, .COM, or .BAT extension).
3. Press F4 (Run).

Running DOS Programs from the DOS Prompt

Before you can even gain access to the DOS prompt, you must quit all other applications—including the built-in applications. See page 114 if you need help doing this. Then—for example—here's how you'd run a program called doit.exe, located in the \tools subdirectory of your c: drive:

1. Locate the program you want to run and note its *pathname.* In this case, the pathname is c:\tools\doit.exe.
2. If you don't see the *DOS* prompt, press ☐, MENU, S*ystem*.
3. Type the pathname of the program, with no extension: c:\tools\doit, and press ENTER.

*It is *strongly recommended* that you run TSR (Terminate and Stay Resident) programs only from the DOS prompt—not from the Filer. See further details on page 125.

Installing and Running System-Manager-Compliant Programs

The eight built-in applications (*Setup, Filer, Datacomm, Appointment Book, Phone Book, Memo Editor, Lotus 1-2-3*, and the *Calculator*) have been *attached* to their keys via ROM instructions. However, you can attach up to eight additional *System-Manager*-compliant programs (any program with an .EXM extension*) to keys of your choice—so that you can access them just like built-in applications.

Attaching System-Manager-Compliant Programs to Keys

To see how this is done, try attaching the two games HP included in the US release model of the HP 95LX: *TigerFox* and *Hearts & Bones*.* You will find two versions of the *TigerFox* game—a *DOS*-executable version (TF.COM), located in the root directory of the C: drive; and a *System Manager*-compatible version (TFOX.EXM) located in the "hidden" _SYS subdirectory. *Hearts & Bones* comes only in a *System Manager* version (HB.EXM), located in the _SYS subdirectory.

1. Before beginning this attachment procedure, it's best to quit all built-in applications and save all pending files to disk.
2. Then press (≡) to move to the Memo Editor. Here, you must create a special text file, called apname.lst, that the System Manager reads when it attaches the built-in applications to their keys upon start-up. The apname.lst file contains up to eight lines (one line for each .EXM program you can attach). Each includes the following three items, in order, and separated by commas:
   - The *pathname* for the .EXM version of the program.
   - The *keycode* for the key to which you want to attach the program.
   - The *name* of the program, which the *System Manager* will use when communicating with you about it. The name is enclosed in quotation marks.

   Thus, the format of each line is: pathname,keycode,"name"

***Warning:** Never attempt to attach a *DOS*-based program (any with an .EXE, .COM, or .BAT extension) to a key—*only* .EXM programs—or else you may crash your system and lose data.

**These games are not available on machine versions with second language options—only on the US version, whose serial number begins "ABA...."

Once you have the proper pathnames and keycodes, typing this file is a snap. The pathnames for the two games are: `c:\_sys\tfox.exm` and `c:\_sys\hb.exm`. The keycodes are a bit trickier. In the appendix of this book (page 143) is a complete list of HP 95LX keycodes. Usually, the only keycodes you need are the [ALT] and [CTRL] versions of the built-in application keys:

[ALT]-[▭]:	AB00	[CTRL]-[▭]:	AE00
[ALT]-[⇔]:	AF00	[CTRL]-[⇔]:	B200
[ALT]-[◴]:	B300	[CTRL]-[◴]:	B600
[ALT]-[✎]:	B700	[CTRL]-[✎]:	BA00
[ALT]-[≡]:	BB00	[CTRL]-[≡]:	AE00
[ALT]-[123]:	BF00	[CTRL]-[123]:	C200
[ALT]-[▦]:	C300	[CTRL]-[▦]:	C600

3. Type a line in `apname.lst` file for each program—to attach *TigerFox* to [ALT]-[⇔] and *Hearts & Bones* to [ALT]-[◴]:

```
c:\_sys\tfox.exm,AF00,"TigerFox"
c:\_sys\hb.exm,B300,"Hearts&Bones"
```

4. Save the file: Press [MENU], [F]*ile*, [S]*ave*, type: `c:\_dat\apname.lst`, and press [ENTER]. The file *must* be in the `_dat` subdirectory; that's where the *System Manager* expects to find it.
5. Do a warm re-start of your system (so that the *System Manager* will read your newly-created list of attached programs): Press [CTRL]-[ALT]-[DEL].

Running System-Manager-Compliant Programs

To run a *System Manager*-compliant program, you just press its "hot-key"—just as with the built-in programs:

1. Press [ALT]-[⇔] to see the first screen of *TigerFox* (described in Appendix G of the User's Manual. Play at your own risk (it can be addictive!), then [ESC] to quit.
2. Press [ALT]-[◴]. You'll see the setup screen for *Hearts & Bones* (not described anywhere in the User's Manual, but described here on pages 151-52. You can also press [F4] to read "on-line" about the rules and procedures of the game. This game can be even more addictive than *TigerFox*—watch out!
3. Press another "hot-key" to open a built-in application, Then another.* Switch back to *Hearts & Bones* by pressing [ALT]-[◴]. You will return to exactly the same setup that you left—just as you would in any of the built-in applications.

*You may have trouble opening an application because of memory limitations. If so, you will be given a chance to close one or more applications, so that you can open the one you requested most recently. See the discussion about memory (page 127) for more details.

System Peculiarities

A Big Screen vs. a Little Window

Most *DOS*-based programs are designed for full-size screens (80 characters by 25 lines)—not the 40-character-by-16-line-screen of the HP 95LX. So when you run a *DOS* program on the HP 95LX you see only a portion of the full-sized screen. But the entire 80 x 25 screen *is* there—and there are two ways you can see it:

- Move the large screen so that it appears in the smaller HP95LX "window." This is called *cursor tracking* because you move the screen by moving the cursor; the cursor is always in the window.
- Move the smaller window around the larger screen regardless of where the cursor is. You do this with ALT–arrow key combinations:

ALT–▶	moves one character right	⇧ ALT–▶	moves to the far right
ALT–◀	moves one character left	⇧ ALT–◀	moves to the far left
ALT–▲	moves one line up	⇧ ALT–▲	moves to the top
ALT–▼	moves one line down	⇧ ALT–▼	moves to the bottom

Incompatible Programs

Because the HP 95LX runs MS-DOS 3.22, it can successfully run many *DOS* programs (though some will function differently due to the smaller screen size). However, some things will prevent a program from running at all:

- A program that won't run on a monochrome display won't run on the HP 95LX.
- You can't run any program that attempts to access, adjust, or rearrange the *program code* of any built-in application. For example, several Add-In programs for Lotus 1-2-3 that were developed for desktop PCs accomplish their tasks by "optimizing" the copy of the 1-2-3 program that is loaded into RAM. But because the 1-2-3 code on the HP 95LX is "read-only" (ROM) and *cannot* be changed, these Add-In programs crash when they attempt to change or move the code ("well-behaved" programs aren't supposed to change other programs' code, but not all popular programs are "well-behaved").
- If a program needs more RAM, you'll need a plug-in RAM card (see page 129).

Booting Up vs. Power On

Unlike a standard PC, which boots the system each time the power is turned on—the HP 95LX preserves its state while the power is off so that, when you turn it back on, you're exactly where you were when you left off. That is, the Palmtop *does not boot* the system unless it detects that data has been corrupted while the power was off. If you want to re-boot the system, you must close all applications and press CTRL-ALT-DEL. This is called a *warm start*. Whenever you do actually boot the system, control is given to the *System Manager*.

The HP 95LX's "smart" ON key is usually very convenient. But if you find yourself longing to modify the boot-up procedure so that you can take better advantage of DOS, there are two files you can use:

- AUTOEXEC.BAT is an optional *batch* file that directs *DOS* to perform a series of short tasks each time a *PC* is booted (i.e. started up).
- CONFIG.SYS is an optional file that "teaches" *DOS* what to expect about its operating environment—in particular, what devices are attached, where to look for important files, and which system defaults must be changed.

Neither of these files exist until you create them. When you boot your HP 95LX, the built-in *DOS* goes looking for a CONFIG.SYS file. If it finds one *and* if that file tells it to use a different control program (\$SYSMGR vs. COMMAND.COM—see page 115), then it will give control over to that program. Otherwise, it will choose \$SYSMGR (the *System Manager*) by default.

An AUTOEXEC.BAT file is a file that will run automatically upon boot-up *if* the *DOS* COMMAND control program is in charge. Thus, to use the customizations offered by CONFIG.SYS and AUTOEXEC.BAT, you *must* boot-up in *DOS* instead of the System Manager. The trick is to create a CONFIG.SYS file that changes the default control program to DOS's COMMAND.COM:

1. Press ☰ to move to Memo Editor.
2. Type `shell=command.com /p` and press ENTER.
3. Save the file: Press MENU, F*ile*, S*ave*, ←←←←←←, type `config.sys`, and press ENTER.

4. Press CTRL–ALT–DEL to reboot the machine. You will be prompted to enter a new date and time (which you probably don't need to do).
5. Press ENTER, ENTER and you'll be at the *DOS* prompt.*

Once you have this `config.sys` file, you can create an `AUTOEXEC.BAT` file (using Memo Editor) that initiates certain TSR programs, perform various DOS tasks, etc.—and then switches control back to the *System Manager*. That is, what you include in your `AUTOEXEC.BAT` file is up to you, but you should end it with the `$SYSMGR` command so that you'll have access to the built-in applications.

Running TSR Programs

Normally, when you quit a DOS programs, the memory blocks it occupied are made available to other programs and files. A **TSR** (**T**erminate and **S**tay **R**esident) program is a *DOS* program that stays resident in memory even *after you quit* (terminate) it. TSR programs need special considerations on any PC, due to the different way they're treated in the memory. And on the HP 95LX, this is further complicated by the memory-swapping tricks of the *System Manager*.

In general, if you wish to have a TSR program available while you're working with System Manager-compliant programs, you should boot DOS first (see page 115), run the TSR, and then switch to the *System Manager*. Launching the TSR in an `AUTOEXEC.BAT` file is one method to accomplish this, but even this approach won't allow all TSRs to run alongside the *System Manager* as they do on your desktop PC. Problems can arise—usually when the TSR attempts some memory-shifting of its own or when the *System Manager* intercepts messages (keystrokes, internal commands, etc.) meant for the TSR.

Running the TSR *before* starting the *System Manager* is the best way to let them operate properly. Remember to back up your files (see p. 134) before you attempt to run a new TSR alongside the *System Manager*. If there's a crash, you may have to do a *cold start* (CTRL–⌂–ON), which will erase most of your `C:` disk (not good).

*While in *DOS*, you cannot run the built-in applications (`.EXM` programs). To return to the *System Manager* from DOS, type `$SYSMGR` ENTER at the DOS prompt.

7. MEMORY MANAGEMENT

All About RAM

ROM ("Read-Only Memory") doesn't lose its data when power is removed; RAM ("Random-Access Memory") does. Your HP 95LX offers some of each:

- *ROM*: permanent, unerasable, unchangeable ("Read-Only") Memory—where all the "built-in" files and applications come from.
- The system RAM: The "working space" used by the machine for all processes—is erased during a system reset or a hard reset (see below).
- *The built-in RAM disk*: An internal storage disk, which you can change—erased during hard resets (cold starts) but not during soft resets (warm starts).
- *Plug-in RAM card*—external RAM storage which you can change—not vulnerable to erasure under either system resets or a hard resets (see below).

You never need to worry about ROM; if it doesn't work, it's not your fault—send your machine in for service. RAM is what you need to be aware of. First, the good news: *Unlike standard desktop PCs, when you turn off the HP 95LX, its batteries keep power supplied to the RAM—only the display gets shut down.* As long as you have batteries, your Palmtop's RAM will not be lost for lack of power. *However*, you do need to understand when and how to adjust the amount of RAM you use.

Restarts (Resets)

You'll need a ***warm restart***—also called a *system reset* or *soft reset*—each time you reconfigure system RAM or whenever it becomes "corrupted." You trigger a warm restart manually by pressing CTRL-ALT-DEL. The restart is *warm* because the power to the RAM disk remains uninterrupted and so all the information stored on it is unaffected. However, the *system* RAM is initialized (i.e. erased) and *DOS* is re-booted and it selects either the *System Manager* (\$SYSMGR) or the standard *DOS* COMMAND.COM as the control program. Also, it is during this process that you can reapportion the relative sizes of system RAM and the RAM disk.

A ***cold restart***—also called a *hard reset*—resets the HP 95LX to its factory-new memory configuration. You can manually trigger a cold start by pressing CTRL–⇧–ON (but you should do this *only* as a last resort). A cold restart resets *all* of the Setup settings to their defaults, *and it erases the RAM disk* (then reloads the files copied from the _sys subdirectory to the _dat subdirectory—see pages 13-14). It also initializes system RAM and boots *DOS* to the *System Manager*.

How Much System RAM is Available?

The HP 95LX comes with 1 megabyte of ROM and a RAM total of 512 kbytes. The ROM contains Lotus 1-2-3, DOS 3.22, and the built-in applications. You can divide the RAM area into two parts—*system RAM* and the internal *RAM disk* (the built-in C: drive). Your main need for system RAM is when you open a file: a *copy* of that file is placed in system RAM; any changes you make affect only that copy—not the original—until you explicitly *Save* these changes to disk.*

The least amount of system RAM you can configure is 202kB; the greatest amount is 498kB (which limits your RAM disk to little more than the SETUP.ENV file in the _dat subdirectory). After accounting for a little "overhead," *this effectively means that you can have anywhere from 106-480kB of system RAM* ***available*** *for running programs.* Here are the system RAM needs of various processes:

- Boot directly to the System Manager: 96kB. This includes memory used by the underlying DOS operating system, the System Manager, and memory reserved for the Filer and Setup applications in case they're needed.**
- Launch DataComm (by pressing ⇨): 19kB.
- Launch Appointment Book (by pressing ◴): 17kB, plus the space for the .ABK file being opened.
- Launch Phone Book (by pressing ✆): 11.5kB, plus the space for by the .PBK file being opened.

*So keep in mind that when you do a system reset or quit an application, the system RAM is cleared; any data there is lost *unless you have saved it* to disk—either the built-in RAM disk (C:) or a plug-in RAM card (A:).

**Use the Filer if you run low on memory and need to save an open file to a different (remote) disk. Setup contains the User-key macros, which should be available at all times.

- Launch Memo Editor (by pressing [Memo]): 15kB, plus the space needed for the text document being opened (the first 1.5kB of the document doesn't require extra RAM; it is "absorbed" in the 15kB of the program).
- Launch Lotus 1-2-3 (by pressing [1-2-3]): 65kB, plus the space needed for the spreadsheet being opened.
- Launch the Calculator (by pressing [Calc]): 24kB, plus the space needed for the Solve equation list being opened.
- Go to DOS prompt from the Filer: 2kB, on top of the 96kB originally used to load DOS, the System Manager shell, and reserved space for Filer and Setup.
- Boot directly to the DOS prompt: 18kB.
- Launch the System Manager from the DOS prompt: 78kB, on top of the 18kB used to boot DOS originally.

Now, each of the built-in applications—*except for 1-2-3*—must be able to load its program code *plus* its currently opened data file into 64kB of memory. Thus, the size limitations of single data files are:

- .ABK files: 44kB
- .PBK files: 47kB
- .WK1 files: limited only by available system RAM
- Text files (for use by Memo Editor): 50kB
- .EQN files: 38 kB

Allocating System RAM

Allocate as much memory to the system RAM as you can, without limiting your internal RAM disk to too small a size. Until you generate enough data files to make it unworkable, allocate about *one third* of the RAM to the *disk* and *two thirds* to the *system memory* and (if you have a lot of data, consider getting a RAM card). To change the allocation of memory between the RAM disk and system RAM:

1. Quit all applications except Setup. Remember to save any files that you've changed since you last Quit.
2. Press [S]*ystem* [M]*emory*.
3. Press [◀] or [▶] to change the allocation of the RAM between disk and system. Notice that they move in 8kB increments.
4. Press [ENTER] when you have the allocation you want.
5. Press [ENTER] again to reboot the system (or [ESC] to cancel the changes.

The RAM Requirements of Running DOS Programs

Note that there are three ways to run a DOS program: from the Filer; from the DOS prompt after boot-up; and from the DOS prompt reached via the Filer. The method you choose affects the amount of system RAM available to your program, because each method uses a different amount of system RAM for overhead:

- Boot up to DOS, then run the program: 18kB.
- Run the program from the Filer: 96kB.
- Move to the DOS prompt from the Filer, then run the program: 98kB.

Using Plug-In RAM Cards

The HP 95LX can use any plug-in RAM cards—up to 2MB in capacity—that conform to the PCMCIA 1.0 and JEIDA 4.0 standards. There are several suppliers who are selling cards compatible with these standards, including HP itself (128kB and 512kB cards are available as of this writing). The HP cards are specially designed for low-power consumption; most of the others are not. In fact, some are downright power hogs. The batteries for the HP cards should last around a year; other cards have been wearing out their batteries in a few weeks. *Caveat emptor!*

Anytime you insert a plug-in card into the A: drive, the *System Manager* automatically looks for an a:\apname.lst file in that disk's root directory and attaches (to hotkeys) any unattached .EXM applications listed there. So if you have System Manager-compliant applications stored on a plug-in RAM disk—and nowhere else—be sure to include the apname.lst file in the root directory of the plug-in disk. With a plug-in card inserted (in the A: drive) at system reset (warm restart), *DOS* boots up the A: disk (the plug-in card) first, looking for a CONFIG.SYS file. If it finds one, it will use it—instead of the CONFIG.SYS file on the built-in C: disk—to choose one of the control programs.*

*Thus, if you put a config.sys file—with the shell=command.com /P statement in it—only on the A: disk, when you reset the system with the card inserted, it will start-up at the DOS prompt. If you reset the system *without* the card inserted, then it will start-up in the *System Manager*. This can be a handy way to switch between operating systems, when you want to run larger DOS-based programs. See chapter 6 for more discussion on these topics.

Avoiding Data Loss

Common Dangers

There are a number of situations that can lead to a loss of data—most of which are avoidable by use of some good work habits. Here are the main dangers:

1. Don't confuse *switching out* of an application with *saving* the current file. When you switch out of one built-in application by opening another one, the file you were working one is *not* saved to disk. It is saved in system RAM, until you switch back in. However, should a system reset (warm restart) occur before you switch back in, all system RAM will be purged—your file along with it.
2. Don't ever remove the main batteries and the backup battery *at the same time.* You will interrupt the power to the RAM—both system RAM and the RAM disk. ***You can lose even your stored data!*** *Be sure that the backup battery is functioning before removing the main batteries!*
3. Don't ever attempt to attach a *DOS*-based program (`.EXE` or `.COM`) to a hotkey by means of the `apname.lst`. You will probably lose all of your data stored on the RAM disk as well as the information held in system RAM.
4. Always save all open documents and *backup your RAM disk* (see p. 134) before attempting to run a *DOS* program for the first time on the HP 95LX. While most programs will run perfectly well, a few—particularly TSR-style programs (see page 125)—may actually crash your system, necessitating a ***cold restart***.
5. You may lose the data in an open file if, while you're working on it, you exhaust available system RAM. If you have a PC handy, you should be able to open the Filer, attach the Connectivity Pack and save the file temporarily to a directory on the PC. At that point, you can expand the system RAM by closing down a few applications and then move the file back over to the HP 95LX.

Avoiding Battery Problems

HP has designed the 95LX so that it uses power at a much slower rate than the typical laptop, notebook, or competitors' palmtops. You'll generally get from 2-8 weeks on a pair of the AA main batteries—even longer if you use an AC adapter while at your desk. The typical backup battery will stay fresh for about 1 year; the typical card battery (that protects the RAM on a plug-in card), about the same.

Normally, when the main battery gets low, the HP 95LX will beep at you, flash a quick message (that disappears rapidly) and turn itself off. If you turn it back on, it will flash the message, and turn itself off again. Don't panic! Check to be sure that the backup battery is healthy (make sure no `BACKUP BATTERY LOW` message is showing), then change the main batteries; everything will be normal once again.* Don't put this off—the backup battery is designed to work like the "bubble-gum" spare tire on your car: it's just functional enough to get you to the service station where you can get the regular tire fixed.

Occasionally, you will see that your main batteries are draining faster than they customarily do. Often, this is because you have been using your *serial communications port* frequently—with the Connectivity Pack for printing, or with a modem. The serial port is powered up automatically each time you enter either the Filer or the DataComm applications. Leaving these applications open unnecessarily will drain your batteries faster than normal.

Also, occasionally a DOS program you've run will power up the serial port and then fail to turn it off again when it's finished—thereby draining your batteries faster than desired. Other DOS programs may simply expect the serial port to be powered up already—as it usually is on a desktop PC. In those cases, you will have to turn it on "manually." A special *DOS* command has been included in the HP 95LX just to control the power to the serial port: `serctl /o` turns it off; `serctl /w` turns it on.

If you find yourself having problems with the serial port being on too much, you might construct a one-line batch file containing the `serctl /o` command that you can execute from the Filer when you need it.

*Some early units had a problem with the way this procedure worked: When the main battery gets low on one of the afflicted units, the system will beep, but the beep ends up draining the rest of the battery. If you replace the batteries, the system undergoes a warm restart—which it doesn't normally do when you replace the batteries. If you machine is behaving like this, contact HP Corvallis Service Center (503) 757-2002.

Protecting Your Data from Misuse

Because the HP 95LX is so portable, it's very easy to leave it somewhere—or have it stolen. Apart from the direct replacement cost of the machine, there may be two other dire consequences:

- You lose all of the files stored on the machine that haven't been backed up.
- Someone else potentially gains access to your files—not a good thing if you have lots of confidential information stored there.

The HP 95LX has two types of password protection—one that requires a password to turn it on and one (in 1-2-3) that restricts access to 1-2-3 files. Each has its advantages and disadvantages.

Setting a System-Wide Password

1. Make sure all of your files on the RAM disk are backed up, as a precaution.
2. Close all open *System Manager*-compatible applications.
3. Press [▭], [MENU], [S]*ystem* to get the DOS prompt.
4. Type `password` and press [ENTER]. You are prompted to enter a password.
5. Type in your password, carefully—you won't see the characters in the display. A password may be up to 12 characters long and the case *does matter*; uppercase and lowercase are different characters. Press [ENTER] when you've finished.
6. You are prompted to verify the password. Type it in again and press [ENTER].
7. Decide how you want the password to work—every single time you turn on the machine or only when you set it manually before you turn it off. If you do nothing at this point, the password protection will only be active when you turn off the machine by pressing [ALT]–[OFF] (instead of [OFF]). If you want to make it active automatically *every time* you turn it off, it turns itself off, or a system reset occurs, type `password /a` and press [ENTER].
8. Test the password by turning off the machine (try both [ALT]–[OFF] and [OFF]) and turning it back on again. When its active, you will see a scrambled display with a small prompt box telling you to enter the password. Do so and press [ENTER] to gain access to your machine.

Changing Your Password Protection

To change your password, proceed just as if you are setting a password for the first time (see page 132). Before you can enter (and then verify) the new password, you are required to enter the old password and press ENTER.

To change how the password is implemented, move to the DOS prompt and enter one of the following:

`password /a` activates it every time you turn on the machine.

`password /m` activates it only when the machine is turned off via ALT–OFF.

`password /d` deactivates the password altogether. You will have to enter the old password before this command takes effect.

Password Protection in 1-2-3

To save a sensitive spreadsheet file so that a password must be used to open it:

1. With the file open that you want to protect, press MENU, F*ile*, S*ave*.
2. If the file is new, type in a filename, followed by a space and a **P**. If the file already has a name, add the space and **P** to the end of the name. Press ENTER. You will be prompted to type a password.
3. Type in your password, carefully—you'll see only little boxes in the display. A password can be up to 15 characters long and the case *does matter*—uppercase and lowercase are different characters. Press ENTER.
4. You're prompted to verify the password. Type it in again and press ENTER.
5. If the file has previously been saved without the password, press R*eplace* to save the file with its password.
6. To change or delete the password, open the file and press MENU, F*ile*, S*ave*, ←, ENTER. The old password is deleted. Start at step 2 above to enter a new password. Don't forget to R*eplace* the file, to record the change or deletion.

Backing Up Your Data

The easiest way to back up all of your files is to use the Connectivity Pack and back up the files to a directory on your desktop PC (or onto floppy disks). To do this, you can either use the Filer or the **DOS Connect** program in the Connectivity Pack.

Using the Filer to Back Up Files to a PC

1. Using the Connectivity Pack, make the connection (see pages 90-93 for details) between your HP 95LX running the Filer and the PC running the version of Filer contained in the **APP95** program .
2. Press F7 (Split) on the HP 95LX. The display will split into two copies of the Filer directory listing on the HP 95LX.
3. Press F6 (Remote). One of the sides of the display will be labeled Remote and will show the current directory listing on the PC. Move to the directory in which you keep the backup files.
4. Move the cursor back to the Local (95LX side) of the display (◀ or ▶ should do the trick), press MENU, O*ptions*, D*irs*, Y .
5. Move to the directory containing all of the other files and directories that you want to backup. Often this will be the root directory for either the built-in disk or the plug-in RAM card.
6. Press ALT–F5 (All) to tag all the files and directories. Or use the other file-tagging keys to select just the files and directories you want to backup.
7. Press F2 (Copy), ENTER. You probably want to replace files with the same name, if asked. It make take some time but the files will be copied.
8. When the copying is finished, press ALT–F6 (Viscon), F7 (Full) to return to a single view of the HP 95LX Filer.
9. Press MENU, O*ptions*, D*irs*, N*o* to guard against accidental directory erasures.

Using DOS Connect *to Back Up Files to a PC*

1. Connect the HP 95LX and the PC, using the serial cable from the Connectivity Pack. If possible, power the HP 95LX with an AC adaptor while using **DOS Connect**. The connection with DOS Connect causes a significant power drain and will erode your battery life.
2. Make sure that you've set up **DOS Connect** properly (see pages 94-95).
3. On the HP 95LX, make sure all System Manager-compatible applications are closed, highlight the DCS95.EXE program in the Filer and press F4 (Run). The HP 95LX will be the *server*.
4. On the PC, move to the directory containing the **DC95.EXE** file and type **DC95** to run the program. The PC will be the *client*. You will see information on the screen pertaining to the connection. Most important is the mapping of the drives. Since you'll be working from the client's (PC's) perspective you need to know how it addresses each HP 95LX drive. Note that drive **C:** on the HP 95LX is now called something else (**E:**, **F:**, etc.) by the client PC.
5. You can now use standard DOS commands to copy the files from HP 95LX (acting like another PC disk drive) to the PC directory containing the backup files. The **XCOPY** command is a good one for selecting all the files in a directory (e.g. **xcopy f:\data*.* c:\cpack\hp95bak**). If you want to back up only certain files—not all of them—use the **ATTRIB +A** command to set the archive bit for those files you want to backup. Then add the **/M** switch to the **XCOPY** command (**xcopy f:\data*.* c:\cpack\hp95bak /m**).* However, you accomplish the backup, you should consider putting the procedure into a batch file that you can run after *DOS Connect* is launched.

*The **ATTRIB** command isn't available in the ROM version of MS DOS on the HP 95LX, so you must either load it into RAM on the 95LX or execute it from the PC during the **DOS Connect** session in order to "mark" the files you want to copy.

8. TROUBLESHOOTING

Using the Built-In Help

1. Press [F1] ([HELP]) whenever you need to find out what your current options are. The help is "context-sensitive," showing you the help screen relevant to wherever you are in the current application.
2. Each help screen has a series of highlighted words—links to related help topics. Use [▼] to cycle through these words to the one you want and press [ENTER].
3. Press [←] to go back to the previous Help screen and [ESC] to leave the Help screens altogether and return to your application.

For More Help

- For help with Lotus 1-2-3: ***Lotus in Minutes on your HP 95LX*** is a quick tutorial. ***An Easy Course in Using Lotus 1-2-3*** is a more complete tutorial on the program in general. See the back of this book.
- For help with DOS: ***An Easy Course in Using DOS*** is a complete tutorial on the operating software, requiring no prior knowledge. See the back of this book.
- With the popularity of the HP 95LX soaring, new products and new discoveries are occurring daily. At this writing, there are two primary sources of up-to-date information to which you can subscribe:
  - *The Palmtop Paper* is a newsletter devoted to palmtop computers in general and the HP 95LX in particular. For further information, call 800-373-6114.
  - *CompuServe*'s HP 95LX Forum is an on-line source of answers and downloadable goodies—some free, some not. Contact CompuServe at: 800-848-8990. Subscribers: To get the HP 95LX Forum, type **GO HPSYSTEMS 14**.

Running the Self-Test

1. Close all open files; quit all open applications; press [OFF] to turn off the machine.
2. Hold down the [ESC] key, press [ON], and then release the [ESC] key.
3. Press the space bar, and then [ENTER] to begin the series of self-tests. Don't press any keys as it cycles through the tests (except when you do the Keyboard test).

Finding "Lost" Files

- Files may get stored—or moved inadvertently—to different directories (or disks) than you expected. See pages 12-13.
- A file may get replaced inadvertently by another file with the same name. The filename is there but the contents you expected to find are not.
- They aren't lost—just hidden from view. This can happen if you've used the **ATTRIB** command in DOS—*not* built-in—to hide files from view. You'll need to use **ATTRIB** again to make the file visible again.

Problems with Programs

- Always be sure to backup your files on the C: disk before attempting to run a newly-installed program for the first time. You may need to reinitialize the disk if the program crashes the system. See pages 134-135.
- Never attempt to attach a DOS-based program (.EXE, .COM, or .BAT extension) to a hotkey using the APNAME.LST file.
- You *cannot* run *System Manager* applications from the Filer using the F4 (EXIT) procedure. This is used exclusively to run DOS-based programs.
- Exit TSRs in the reverse order of loading: last in = first out. See page 125.
- Close all System-Manager applications before running a DOS program. You can run most DOS programs that don't use graphics or need extended memory. Occasionally, a program may leave the serial port unable to receive. The only known cure is a cold restart (press CTRL-⇧-ON; don't reformat your disk).

Screen "Freezes" or System Crashes

- First, try a warm restart: Hold down the CTRL and ALT keys, and press DEL. You will lose any data in any open files that hasn't already been saved to disk.
- If the warm restart doesn't work, hold down the CTRL and ⇧ keys and press ON. Respond N*o* to reformatting your disk. As in a warm restart, you will lose any data in any open files that hasn't already been saved to disk. As soon as you can, make sure to backup the files you keep on the C: disk. Then do a true cold restart, reformat the disk, and restore your files back onto the disk.
- If all else fails, hold down CTRL and ⇧ keys and press ON. Answer Y*es* to the question about reformatting. You will lose all files stored on the C: disk as well as any open files (hope you kept a backup)! For recurring crashes, run the self-test and/or call the Corvallis Service Center (503-757-2002).

Problems Opening, Moving, or Copying files.

- You *cannot* open a file from the Filer. Highlighting a file in Filer and pressing [ENTER] doesn't open a file, it allows you to *view* its ASCII form. You are unable to modify it in any way.
- To open a file, you must first open the application that created that file. Then, from within the application, you must open the file (pressing [MENU], [F]*ile*, [O]*pen* or [MENU], [F]*ile*, [R]*etrieve*) that you need.
- You can only have one file open at one time in one application (although you can have multiple applications open at once, each with an open file). This means that when you attempt to open a second file, you will be asked if you want to overwrite the current file or if you would prefer to save it first. If you choose to overwrite it, you will lose all changes that haven't already been saved to disk.
- When using the Filer to move files or to copy files using the Split screen (see page 92), the copied or moved files will end up in the directory open on the other side of the screen *unless you specifically say otherwise.* It is easiest if you open the target directory explicitly before moving or copying files into it.
- Don't use the **/V** switch (Verify) on the DOS **COPY** command. There's a bug in its implementation in Rev. A of the HP 95LX. Similarly, don't use the *DOS* **VERIFY** command, either, if you have Rev. A. These problems affect you only if you're using DOS commands instead of the Filer.

Problems Installing or Starting the Connectivity Pack

- If you're using DOS 5.0, you may get the error message, **Packed file corrupt**, during installation of the Connectivity Pack. Try the command **LOADFIX A:INSTALL** instead of just **INSTALL**.
- If the Connectivity Pack won't start up after you've followed all of the proper set-up and installation procedures (see pages 90-92), then:
  1. Make sure you've connected the serial port to **COM1** on the PC.
  2. On the PC, type **path** and press [ENTER]. Make sure that the MS-DOS **PATH** statement includes the directory where you installed the Connectivity Pack (usually **C:\CPACK**). If necessary, edit the **AUTOEXEC.BAT** and include the directory in the **PATH** statement.
  3. On the PC, type **set** and press [ENTER]. Make sure that there is a MS-DOS **PIMS** variable that includes the directory where you installed the Connectivity Pack (usually **C:\CPACK**). Furthermore, in the **AUTOEXEC.BAT** file the **PIMS** variable must come before any line that runs a program.

Problems with the **Translate** *Utility in the Connectivity Pack*

The Translate utility can translate between the HP 95LX and three other formats: Lotus *Metro*; Borland *Sidekick Plus*; and Central Point *PC Tools Desktop*. The file to be translated must be located on the PC, not on the HP 95LX.

You can also translate any file in the Conventional Data Format into the Phone Book (**.PBK**) format. For example, dBASE files can be saved in CDF format and then converted to the Phone Book. However, the dBASE CDF file has an end-of-file marker (a la CTRL-Z), that will prevent successful completion of the translation. You need to remove the end-of-file (EOF) marker from a CDF file before you attempt to translate it. Some text editors will allow you to remove the end-of-file marker—and **DEBUG** can be used as well. A handier solution may be found using the small utility **STRIP.EXE**, downloadable from the HP 95LX Library on CompuServe. Or, finally, the **/A** switch on the *DOS* **COPY** command can do the trick (see page 144).

Problems Connecting to a Printer or Other Devices

Read pages 90-91. Try the CompuServe forum or Corvallis Customer Support.

9. REFERENCE

Display Characters

Below are the uppercase, lowercase, foreign, punctuation, and special symbols that you can display on the HP 95LX.

Key	N	◆	CHAR	◆CHAR
A	a	A	ª	ª
B	b	B		
C	c	C	ç	Ç
D	d	D	ð	Ð
E	e	E	æ	Æ
F	f	F	ƒ	ƒ
G	g	G	¤	¤
H	h	H	¥	¥
I	i	I	~ accent*	
J	j	J	$	$
K	k	K	¢	¢
L	l	L	£	£
M	m	M	µ	µ
N	n	N	ı	ı
O	o	O	º	Ø
P	p	P	þ	Þ
Q	q	Q	ª	ª
R	r	R	´accent*	
S	s	S	ß	ß
T	t	T	` accent*	
U	u	U	¨ accent*	
V	v	V	∫	∫
W	w	W	º	º
X	x	X	°	°
Y	y	Y	^accent*^	
Z	z	Z	¶	¶

Key	N	◆	CHAR	◆CHAR
◆	*Func*	`	´	`
⏱	*Func*	~	¨	~
✎	*Func*	!	¡	¡
☰	*Func*	#	¯	#
123	*Func*	$	¤	$
⌨	*Func*	&	¤	&
(	(	|	¦	¦
)	)	\	)	\
1	1	<	«	1
2	2	>	»	
3	3	?	¿	
4	4	;	4	;
5	5	:	5	:
6	6	'	6	'
7	7	[	¼	[
8	8	]	½	]
9	9	{	¾	{
0	0	*Func*	0	*Func*
,	,	,	¸	¸
@	@	@	@	@
.	.	*Func*	·	*Func*
=	=	_	=	_
+	+	±	+	±
–	–	^	–	^
*	*	"	×	"
/	/	}	÷	}

*You use these keys in combination with a second character to generate accented characters. For example, the keystroke sequence: CHAR I N creates the character ñ. See the table on the next page.

Accented Characters

Character	Keystrokes	Character	Keystrokes
â	CHAR Y A	ì	CHAR T ⇧ I
ä	CHAR U A	ñ	CHAR I N
à	CHAR T A	Ñ	CHAR I ⇧ N
á	CHAR R A	ô	CHAR Y O
ã	CHAR I A	ö	CHAR U O
Ä	CHAR U ⇧ A	ò	CHAR T O
Á	CHAR R ⇧ A	ó	CHAR R O
Â	CHAR Y ⇧ A	õ	CHAR I O
À	CHAR T ⇧ A	Ö	CHAR U ⇧ O
Ã	CHAR I ⇧ A	Ó	CHAR R ⇧ O
é	CHAR R E	Ô	CHAR Y ⇧ O
ê	CHAR Y E	Ò	CHAR T ⇧ O
ë	CHAR U E	Õ	CHAR I ⇧ O
è	CHAR I E	û	CHAR Y U
É	CHAR R ⇧ E	ù	CHAR T U
Ê	CHAR Y ⇧ E	ú	CHAR R U
Ë	CHAR U ⇧ E	ü	CHAR U U
È	CHAR T ⇧ E	Ü	CHAR U ⇧ U
ï	CHAR U I	Ú	CHAR R ⇧ U
î	CHAR Y I	Û	CHAR Y ⇧ U
ì	CHAR T I	Ù	CHAR T ⇧ U
í	CHAR R I	ÿ	CHAR U Y
Í	CHAR R ⇧ I	ý	CHAR R Y
Î	CHAR Y ⇧ I	Ý	CHAR R ⇧ Y
Ï	CHAR U ⇧ I		

Special Graphics and Other Characters

Character	Keystrokes*	Character	Keystrokes*
☺	ALT-001	┐	ALT-170
☻	ALT-002	▒	ALT-176
♥	ALT-003	▓	ALT-177
♦	ALT-004	▓	ALT-178
♣	ALT-005	▌	ALT-179
♠	ALT-006	┤	ALT-180
•	ALT-007	╡	ALT-185
◘	ALT-008	╢	ALT-186
○	ALT-009	╖	ALT-187
◙	ALT-010	╕	ALT-188
♂	ALT-011	╜	ALT-189
♀	ALT-012	╛	ALT-190
♪	ALT-013	┴	ALT-193
♫	ALT-014	┬	ALT-194
☼	ALT-015	├	ALT-195
►	ALT-016	─	ALT-196
◄	ALT-017	┼	ALT-197
↕	ALT-018	╞	ALT-200
‼	ALT-019	╟	ALT-201
▬	ALT-022	╚	ALT-202
↨	ALT-023	╔	ALT-203
↑	ALT-024	╩	ALT-204
↓	ALT-025	╦	ALT-205
→	ALT-026	╠	ALT-206
←	ALT-027	═	ALT-213
∟	ALT-028	╬	ALT-214
↔	ALT-029	╧	ALT-215
▲	ALT-030	╨	ALT-216
▼	ALT-031	╤	ALT-217
⌂	ALT-127	┘	ALT-218
		┌	ALT-219
		█	ALT-220
		▄	ALT-222
		▀	ALT-223

*Hold down the ALT key while pressing the three-digit number.

Key Codes

These are the hexadecimal key codes that you must include in the APNAME.LST file in order to attach a .EXM application to a hot key (see page 121).

Key	N	⇧	CTRL	ALT
A	1E61	1E41	1E01	1E00
B	3062	3042	3002	3000
C	2E63	2E43	2E03	2E00
D	2064	2044	2004	2000
E	1265	1245	1205	1200
F	2166	2146	2106	2100
G	2267	2247	2207	2200
H	2368	2348	2308	2300
I	1769	1749	1709	1700
J	246A	244A	240A	2400
K	256B	254B	250B	2500
L	266C	264C	260C	2600
M	326D	324D	320D	3200
N	316E	314E	310E	3100
O	186F	184F	180F	1800
P	1970	1950	1910	1900
Q	1071	1051	1011	1000
R	1372	1352	1312	1300
S	1F73	1F53	1F13	1F00
T	1474	1454	1414	1400
U	1675	1655	1615	1600
V	2F76	2F56	2F16	2F00
W	1177	1157	1117	1100
X	2D78	2D58	2D18	2D00
Y	1579	1559	1519	1500
Z	2C7A	2C5A	2C1A	2C00
MENU	C800	C900	CA00	CB00
🗀	A800	A400	AE00	AB00
⇔	AC00	2960	B200	AF00
🕘	B000	297E	B600	B300
✎	B400	0221	BA00	B700
▤	B800	0423	BE00	BB00
123	BC00	0524	C200	BF00
%Σ	C000	0826	C600	C300
(	0A28	2B7C	----	8000
)	0B29	2B5C	----	8100

Key	N	⇧	CTRL	ALT
1	0231	333C	----	----
2	0332	343E	0300	----
3	0433	353F	----	----
4	0534	273B	----	----
5	0635	273A	----	----
6	0736	2827	071E	----
7	0837	1A5B	----	----
8	0938	1B5D	----	----
9	0A39	1A7B	----	----
0	0B30	----	----	----
,	332C	332C	----	3300
@	0340	0340	0300	7900
.	342E	----	----	3400
-	0D3D	0C5F	----	8300
+	4E2B	0625	9000	----
−	4A2D	075E	8E00	----
*	372A	2822	9600	3700
/	352F	1B7D	----	----
←	0E08	0E08	BREAK	0E00
DEL	5300	5200	9300	----
▶	4D00	4F00	7400	----
◀	4B00	4700	7300	----
▼	5000	5100	9100	----
▲	4800	4900	8D00	----
ESC	011B	PRTSC	011B	----
▶|	0F09	0F00	9400	A500
F1	3B00	5400	5E00	6800
F2	3C00	5500	5F00	6900
F3	3D00	5600	6000	6A00
F4	3E00	5700	6100	6B00
F5	3F00	5800	6200	6C00
F6	4000	5900	6300	6D00
F7	4100	5A00	6400	6E00
F8	4200	5B00	6500	6F00
F9	4300	5C00	6600	7000
F10	4400	5D00	6700	7100

MS-DOS Command Set

From the MS-DOS prompt:

BREAK [ON | OFF]

CD [*d*:] [*path*]

CHKDSK [*d*:] [*path*] *filename* [/F] [/V]

- /F: Allows fixing of errors found
- /V: Displays all file and subdirectories on disk

CLS

COMMAND [*device*] [/P] [/E:*nnnnn*] [/C *command*]

- /P: Prevents **EXIT** from returning you to System Manager
- /E: Sets the size of the environment to *nnnnn* (from 160 to 32768)
- /C: Causes new command processor to execute *command* and then return to old command processor

COPY [/A][/B] [*d1*:] [*path1*]*sourcefile* [/A] [/B] [*d2*:] [*path2*] [*targetfile*] [/A] [/B]

- /A: Copies *sourcefile* as ASCII text, up to the end-of-file marker; appends an end-of-file marker to *targetfile*
- /B: Copies *sourcefile* as Binary, including any end-of-file markers; appends nothing to *targetfile*
- /V: Verifies the copy of the file

CTTY *device*

DATE [*mm-dd-yy*]

DEL [*d*:] [*path*] *filename*

DIR [*d*:] [*path*] [*filename*] [/P] [/W]

- /P: Shows directory one page at a time
- /W: Lists only file names and subdirectories, three names to a line

DISPCTL {[+C | -C] [+K | -K]}

- +C: Enables cursor tracking while under MS-DOS control
- -C: Disables cursor tracking while under MS-DOS control
- +K: Enables (ALT)–arrow key movement while under MS-DOS control
- -K: Disables (ALT)–arrow key movement while under MS-DOS control

ERASE [*d*:] [*path*] *filename*

EXIT

FORMAT *d*: [/V] [/P] [/R:*ss*] [/E] [/Q]

- /V: Prompts you for a volume label
- /P: Formats a plug-in card as a "pseudo-floppy" (without PCMCIA information). Can't affect drive **C:**.
- /R: Formats a plug-in card with *ss* sectors allocated for the root directory (at 16 files per sector). Default is 4.
- /E: Sets all data sectors to zero during formatting. Does not allow for any possible data recovery after formatting.
- /Q: Suppresses all prompts and outputs during formatting

MD [*d*:] [*path*] *directoryname*

PASSWORD [/A] [/M] [/D]

- /A: Makes password active every time machine is turned on.
- /M: Makes password active only when machine is turned off using (ALT)–(OFF)

PATH [[*d1*:] *path1*[;[*d2*:] *path2* ...]]

PROMPT [*text*]

REN [*d*:] [*path1*] *filename1 filename2*

RD [*d*:] [*path*] *directoryname*

SERCTL {/O|/W|/I}

- /O: Turns off power to serial port
- /W: Powers up and activates the serial port
- /I: Powers up and activates the infrared port and sets 2400 baud

SET [*name*=[*value*]]

TIME [*hh*[:*mm*[:*ss*[.*xx*]]]]

TYPE [*d*:] [*path*] *filename*

VER

VERIFY [ON|OFF]

VOL [*d*:]

In CONFIG.SYS *files:*

BREAK={ON|OFF}

BUFFERS=*n* where $1 \le n \le 99$

DEVICE=[*d*:] [*path*] *filename* [*parameter1* ...]

FILES=*n* where $5 \le n \le 255$ (default is 20)

LASTDRIVE=*d* where *d* is a drive from **A** to **Z** (default is **F**)

SHELL=[*d*:] [*path*] *filename* [*parameter1* ...]

STACKS=*n*,*s* where *n* is the number of stack frames, $8 \le n \le 64$ (default is 9) and *s* is the size (in bytes) of each stack frame, $32 \le s \le 512$ (default is 128)

In Batch files:

ECHO [ON|OFF|*message*]

FOR %%*variable* **IN** (*set*) **DO** *command* where *variable* can be any single character except 0-9; *set* is a series of file names or a file name with wildcards; *command* is a single MS-DOS command or executable file.

GOTO *label* branches to :*label*

IF [**NOT**] *condition command* where there are three kinds of *condition*s:

ERRORLEVEL *number* is true if the last program finished with exit code ≥ *number*

string1==*string2* is true if the two strings are identical

EXIST [*d*:] [*path*] [*filename*] is true if *filename* exists

PAUSE [*message*] where *message* can have up to 121 characters

REM [*message*] where *message* can have up to 123 characters

SHIFT

Lotus Function Set

@@(*location*)
@ABS(*x*)
@ACOS(*x*)
@ASIN(*x*)
@ATAN(*x*)
@ATAN2(*x*,*y*)
@AVG(*list*)
@CELL(*attribute*,*range*)
@CELLPOINTER(*attribute*)
@CHAR(*x*)
@CHOOSE(*offset*,*list*)
@CLEAN(*string*)
@CODE(*string*)
@COLS(*range*)
@COS(*x*)
@COUNT(*list*)
@CTERM(*interest*,*future value*,*present value*)
@DATE(*year*,*month*,*day*)
@DATEVALUE(*string*)
@DAVG(*input*,*field*,*criteria*)
@DAY(*date number*)
@DCOUNT(*input*,*field*,*criteria*)
@DDB(*cost*,*salvage*,*life*,*period*)
@DMAX(*input*,*field*,*criteria*)
@DMIN(*input*,*field*,*criteria*)
@DSTD(*input*,*field*,*criteria*)
@DSUM(*input*,*field*,*criteria*)
@DVAR(*input*,*field*,*criteria*)
@ERR
@EXACT(*string1*,*string2*)
@EXP(*x*)
@FALSE
@FIND(*search string*,*string*,*start number*)
@FV(*payments*,*interest*,*term*)
@HLOOKUP(*x*,*range*,*row offset*)
@HOUR(*time number*)
@IF(*condition*,*x*,*y*)
@INDEX(*range*,*column offset*,*row offset*)
@INT(*x*)
@IRR(*guess*,*range*)
@ISAFF(*name*)
@ISAPP(*name*)
@ISERR(*x*)
@ISNA(*x*)
@ISNUMBER(*x*)
@ISSTRING(*x*)
@LEFT(*string*,*n*)
@LENGTH(*string*)
@LN(*x*)
@LOG(*x*)
@LOWER(*string*)
@MAX(*list*)
@MID(*string*,*start number*,*n*)
@MIN(*list*)
@MINUTE(*time number*)
@MOD(*x*,*y*)
@MONTH(*date number*)
@N(*range*)
@NA
@NOW
@NPV(*interest*,*range*)
@PI
@PMT(*principal*,*interest*,*term*)
@PROPER(*string*)
@PV(*payments*,*interest*,*term*)
@RAND
@RATE(*future value*,*present value*,*term*)
@REPEAT(*string*,*n*)
@REPLACE(*original string*,*start number*,*n*,
new string)
@RIGHT(*string*,*n*)
@ROUND(*x*,*n*)
@ROWS(*range*)
@S(*range*)
@SECOND(*time number*)
@SIN(*x*)
@SLN(*cost*,*salvage*,*life*)
@SQRT(*x*)
@STD(*list*)
@STRING(*x*,*n*)
@SUM(*list*)
@SYD(*cost*,*salvage*,*life*,*period*)
@TAN(*x*)
@TERM(*payments*,*interest*,*future value*)
@TIME(*hour*,*minutes*,*seconds*)
@TIMEVALUE(*string*)
@TRIM(*string*)
@TRUE
@UPPER(*string*)
@VALUE(*string*)
@VAR(*list*)
@VLOOKUP(*x*,*range*,*column offset*)
@YEAR(*date number*)

Lotus Macro Command Set

/
{~}
{{}
{}}
{*subroutine* [*arg1*], [*arg2*], ..., [*argk*]}
{ABS}
{APP1}
{APP2}
{APP3}
{APP4}
{BACKSPACE [*number*]}
or {BS [*number*]}
{BEEP [*tone number*]}
{BIGLEFT}
{BIGRIGHT}
{BLANK *location*}
{BORDERSOFF}
{BORDERSON}
{BRANCH *location*}
{BREAK}
{BREAKOFF}
{BREAKON}
{CLOSE}
{CONTENTS *target location*, *source location*, [*width*], [*cell format*]}
{D [*number*]} or {DOWN [*number*]}
{DEFINE *location1*, *location2*, ..., *locationk*}
{DELETE} or {DEL}
{DISPATCH *location*}
{EDIT}
{END}
{ESC} or {ESCAPE}
{FILESIZE *location*}
{FOR *counter*, *start number*, *stop number*, *step number*, *subroutine*}
{FORBREAK}
{FRAMEOFF}
{FRAMEON}
{GET *location*}
{GETLABEL *prompt*, *location*}
{GETNUMBER *prompt*, *location*}
{GETPOS *location*}
{GOTO}
{GRAPH}
{GRAPHOFF}
{GRAPHON [*named graph*], [*nodisplay*]}
{HELP}
{HOME}
{IF *condition*}
{INDICATE [*string*]}
{INSERT} or {INS}
{L [*number*]} or {LEFT [*number*]}
{LET *location*, *entry*}
{LOOK *location*}
{MENU}
{MENUBRANCH *location*}
{MENUCALL *location*}
{NAME}
{ONERROR *branch location*, [*message location*]}
{OPEN *filename*, *access type*}
{PANELOFF [*clear*]}
{PANELON}
{PGDN}
{PGUP}
{PUT *location*, *column offset*, *row offset*, *entry*}
{QUERY}
{QUIT}
{R [*number*]} or {RIGHT [*number*]}
{READ *byte count*, *location*}
{READLN *location*}
{RECALC *location*, [*condition*], [*iterations*]}
{RECALCCOL *location*, [*condition*], [*iterations*]}
{RESTART}
{RETURN}
{SETPOS *offset number*}
{TABLE}
{U [*number*]} or {UP [*number*]}
{WAIT *time number*}
{WINDOW}
{WINDOWSOFF}
{WINDOWSON}
{WRITE *string*}
{WRITELN *string*}

Lotus Macros Used in the Built-In Templates

_CFLOW

```
I:      IB7000: {BREAK}{WINDOWSOFF}
NT:     IB7002: {GOTO}B44~/rncT~{BS}
CT:     IB7003: {IF @CELL("type",B44)<>"b"}.{U}{END}{D}
          7004: ~
\C:     IB7006: {I}/wtc{GOTO}A41~{D 3}{R}/wtb/wgrm/rncT~A1~
\N:     IB7008: {I}/wtc/wgra{NT}{HOME}{GOTO}B10~/wtb
\F:     IB7010: {I}/rncTT~~{\C}/reA44.A8192~/df{BS}.{IF@CELL
                 ("type",B44)<>"b"}{U}{END}{D}
          7011: {L}.{L}~0~1~8192~{GOTO}TT~/rndTT~
\S:     IB7013: {I}{GETNUMBER "Size of List? ",A44}{IF
                 @ISERR(A44)=1}{\F}{QUIT}
          7014: /dfA44.A8192~0~1~A44~
\E:     IB7016: {I}{GETLABEL "Erase all? (Y)es or (N)o: ",
                 IA}{IF IA="Y"#OR#IA="YES"}{\C}/reB44.B8192~
IA:     IB7018: y
IB:     IB7020: 1
CR:     IB7022: {I}{IF@CELLPOINTER("row")<44#OR#@CELLPOINTER
                 ("COL")<>2}{QUIT}
CL:     IB7024: {IF @ISERR(IB)=1}{LET IB,1}
          7025: {IF @ABS(IB)>8192-@CELLPOINTER("row")}
                 {BEEP} {PANELON} Exceeds limit {WAIT
                 @NOW+@TIME (0,0,2)}{BREAK}{QUIT}
          7026: {IF @ABS(IB)<1}{QUIT}
\D:     IB7028: {CR}{GETNUMBER "Enter # flows to delete: ",
                 IB} {CL}/m{ESC}{D IB}{LET IA,
                 +@CELLPOINTER("ADDRESS")&".B8192"}{IA}
\I:     IB7030: {CR}{GETNUMBER "Enter # flows to insert: ",
                 IB}{CL}/m{LET IA,+@CELLPOINTER("ADDRESS")
                 &".B8192"}{IA}~{D IB}~0~/c~.{U}{D IB}
\G:     IB7032: {CR}{GETNUMBER "Enter cash flow amount: ",
                 @CELLPOINTER("ADDRESS")}~{GETNUMBER
                 "Number times it occurs: ",IB}{CL}/c~.{U}
                 {D IB}~{D IB}
\B:     IB7034: {\C}/grgotfCash Flow Diagram~txPeriod Number
                 ~tyCash Flow~ss4~qtbg.{L}{CT}cvq{\C}
\P:     IB7036: {I}{GETNUMBER "Enter init. interest rate: ",
                 IA}{IF @ISERR(IA)=1}{LET IA,0}
          7037: {GETNUMBER "Enter the increment %: ",IB}{IF
                 @ISERR(IB)=1}{LET IB,2}
          7038: /dfA15.A40~IA~IB~+IA+25*IB~{GOTO}B14~+B3~
                 {\N}/dt1A14.B40~B10~/grgtlxA15.A40~aB15.
                 B40~otfNPV as Function ofI%~tyNPV~ss2~qvq
? :     IB7040: {I}{PANELOFF}/dfA44.A104~0~1~60~/rnd\0~
```

_STAT

```
I:     IB7000: {BREAK}{WINDOWSOFF}
?:     IB7002: {GOTO}B44~/rncT~{BS}.{IF @CELL("type",B44)
                <>"b"}{U}{END}{D}{R}~
S:     IB7005: /rncX~B44.B8192~/rncY~C44.C8192~/wgra{CALC}
\X:    IB7007: {I}/wtc{GOTO}A40~{D 4}{R}/wtb/wgra{CALC}
\A:    IB7009: {I}/wtc{HOME}{GOTO}B11~/wtb/wgra{CALC}
\R:    IB7011: {I}/wtc{GOTO}B44~drx{BS}.{U}{END}{D}~y{BS}{R}.
                {U}{END}{D}~oA12~ic{ONERROR\X}{PANELON}
                gOP{ESC}{EDIT}~{GOTO}A12~/m D13.D17~C13~
                /mA13.C17~A14~/cA1.C1~A12~{D 2}Intercept~
                {D4}/re.{R 2}~{D}Slope~{GOTO}C21~+C19*C22
                +C14~{D}/wtb
\F:    IB7013: {I}/rncTT~~{\X}/reA44.A8192~/df{BS}.{IF
                @CELL ("type",B44)<>"b"}{U} {END}{D}
       7014: {L}.{L}~1~1~8192~{GOTO}TT~/rndTT~
\S:    IB7016: {I}{GETNUMBER "Size of List? ",A44}{IF
                @ISERR(A44)=1}{\F}{QUIT}
       7017: /dfA44.A8192~1~1~A44~
\E:    IB7019: {I}{GETLABEL "Erase all? (Y)es or (N)o:",IA}
                {IF IA="Y"#OR#IA="YES" }{\X}/reB44.C8192~
IA:    IB7021: y
IB:    IB7023: 0.4
IC:    IB7025: 0
CR:    IB7027: {I}{IF @CELLPOINTER("row")<44#OR#@CELLPOINTER
                ("COL")<2#OR#@CELLPOINTER("COL") >3}{QUIT}
       7028: {LET IC,+@CELLPOINTER(êCOLë)-2}
CL:    IB7030: {IF @ISERR(IB)=1}{LET IB,1}
       7031: {IF @ABS(IB)>8192-@CELLPOINTER("row")}
                {BEEP}{PANELON} Exceeds limit{WAIT@NOW+
                @TIME(0,0,2)}{BREAK}{QUIT}
       7032: {IF @ABS(IB)<1}{QUIT}
       7033: /wgrm/rncX~B1~/rncY~C1~
CC:    IB7035: {IF @ISERR(@CELLPOINTER(êCONTENTSë))=1}/re~
SR:    IB7037: {LET IA,+@CELLPOINTER(êADDRESSë)&ë.C8192"}
\D:    IB7039: {CR}{GETNUMBER "Enter # items to delete:
                ",IB} {CL}/m{ESC}{D IB}{L IC}{SR}{IA}~{L
                IC} ~{S}
\I:    IB7041: {CR}{GETNUMBER "Enter # items to insert: ",
                IB}{CL}/m{L IC}{SR}{IA} ~{D IB}{L IC}~{S}
\G:    IB7043: {CR}{L IC}{GETNUMBER "Enter x: ",
                @CELLPOINTER("ADDRESS")}~{CC}{R} {GETNUMBER
                "Enter y: ",@CELLPOINTER ("ADDRESS")} {CC}
                ~{GETNUMBER "Enter frequency: ",IB}{CL}{L}/
                c{R}~.{U}{D IB}~ {D IB}{S}
\P:    IB7045: {\R}/wtc{GOTO}D44~+B44*$C$19+$C$14~/c~.{L}
                {U}{END}{D}{R}~{GOTO}B44~/grgtxg.{U}{END}
                {D}{R 2}~cofasblqtfGraph of X,Y Data and
                Trendline~laX,Y Data Points~lbTrendLine~
                ss2~qvq{R 2}/re.{END}{D}~/grgq{GOTO}A40~
                {GOTO}B44~/wtb
?:     IB7047: {I}{PANELOFF}/dfA44.A104~1~1~60~/rnd\0~
```

Solver Function Set

ABS(*x*)
ACOS(*x*)
ALOG(*x*)
ANGLE(*x* ;*y*)
ASIN(*x*)
ATAN(*x*)
CALCCELL(*input list* ;*output range* ; *row* ;*col*)
CDATE
COMB(*x* ;*y*)
COS(*x*)
CPCOL
CPROW
CTIME
DATE(*date* ;*n*)
DDAYS(*day1* ;*day2* ;*calendar*)
DEG(*x*)
EXP(*x*)
EXPM1(*x*)
FACT(*x*)
FP(*x*)
FV(*n* ;*i%yr* ;*present value* ;*payment* ; *pmts/yr* ;*mode*)
G(*x*)
HMS(*x*)
HR(*x*)
IDIV(*x* ;*y*)
IF(*condition* ;*algebraic1* ;*algebraic2*)
INT(*x*)
INV(*x*)
IP(*x*)
ITEM(*range* ;*row* ;*column*)
I%YR(*n* ;*present value* ;*payment* ; *future value* ;*pmts/yr* ;*mode*)
L(*x* ;*algebraic*)
LENGTH(*range*)
LN(*x*)
LNP1(*x*)
LOG(*x*)
MAX(*x* ;*y*)
MIN(*x* ;*y*)
MOD(*x* ;*y*)
N(*i%yr* ;*present value* ; *payment* ; *future value* ;*pmts/yr* ;*mode*)
PERM(*x* ;*y*)
PI
PMT(*n* ;*i%yr* ;*present value* ; *future value* ;*pmts/yr* ;*mode*)
PV(*n* ;*i%yr* ;*payment* ;*future value* ; *pmts/yr* ;*mode*)
RAD(*x*)
RADIUS(*x* ;*y*)
RAN# or RAND
RCLCELL(*range* ;*row* ;*column*)
RND(*x* ;*y*)
S(*variable*)
SGN(*x*)
SIGMA(*counter variable* ;*start value* ; *end value* ;*increment* ;*algebraic*)
SIN(*x*)
SIZES(*range*)
SPFV(*i%* ;*n*)
SPPV((*i%* ;*n*)
SQ(*x*)
SQRT(*x*)
STOCELL(*expression* ;*range* ;*row* ; *column*)
TAN(*x*)
TRN(*x* ;*y*)
USFV(*i%* ;*n*)
USPV(*i%* ;*n*)
WIDTH(*range*)
XCOORD(*radius* ;*angle*)
YCOORD(*radius* ;*angle*)

Hearts & Bones

The object of the *Hearts & Bones* game (found in the U.S. version of the HP 95LX) is to reach all of the Hearts without stepping on any of the Bones. To play, make sure that you have properly installed ("attached") the game (see pages 121-122), then press the appropriate "hot-key" to launch it. You'll see the basic "board:" a grid of 9 rows and 15 columns, in which eight visible Hearts—and an unknown number of invisible bones—are scattered.

You press F1 to start play. Note the "square" cursor in the upper left-hand square. You'll also see numbers in several squares—varying with each particular board.

You move the cursor by using the number pad: Imagine that the current square is the 5 key and press the number key corresponding to the square you wish to move to. Thus, 6 moves the cursor to the square directly right; 3 moves it to the square diagonally down and to the right; 2 moves it to the square immediately below, etc.

Every square containing either a number or a Heart is a "safe" square; if you move there, you're safe—the game continues. The numbers in these safe squares are your clues about where Bones may be hiding. Each number tells you the number of adjacent squares (*including the diagonals*) that contain the dreaded Bones. The idea is to venture out from safe squares to "gather" Hearts, without moving the cursor to any blank square containing Bones.

Thus, whenever you move to a blank square, one of three things will happen:

1. A number from 1 to 7 will be displayed. You have found a safe square and an additional clue. Proceed.
2. The square will reveal its Bones—along with all the Bones in the setup. Game over. Press F1 to start over.
3. The number 0 is displayed, and each of the as-yet-unrevealed neighbors of the square will reveal its number. If any of the neighbors is also a zero, then all of *its* neighbors will be revealed, and so forth until no more zeroes are found. Finding a 0 square gives you a bonus that can speed up your effort considerably. The starting square is always a 0 square.

Whenever you suspect a blank square contains Bones, you may *mark* this square so that you can visually remind yourself what you've learned and so that you don't accidentally move there later.

To mark a square, the cursor must be in an adjancent square. Then press ENTER, which is the default "Mark" key. You'll be prompted to press a direction key to indicate which square should be "marked." Once a square is marked, you cannot move onto it, but you may "un-mark" a square by using the marking procedure on it. Thus the "Mark" procedure is a toggling process.

You gather Hearts by moving to the squares containing them. In any particular board, of course, some Hearts will be easier to get to than others. Once you've gathered all eight Hearts in a particular board, a new board (with one more Bones square than the previous board) is created and play continues. However, you can ***double*** your score if, before gathering the last Heart on a board, you reveal *every safe square*. So in addition to eight points for the eight Hearts you gathered, you can be credited with a ***bonus*** of eight additional Hearts—for a maximum of 16 Hearts per board.

You can adjust the game to your tastes and ability:

- Pressing F2 increases the number of Bones in the board by one; pressing ⇧–F2 decreases the number of Bones by one.
- Pressing F3 allows you to change the movement and "marking" keys, if you prefer to use others.
- Pressing F4 displays the electronic version of the rules.

A separate high score is saved for each number of Bones you start with (i.e. in your first board). Also saved are your choice of movement keys and Mark keys—all stored in the file C:_DAT\HEARTS.CNF.

Index

By the way, if you liked this book, there are many others that you—or someone you know—will certainly enjoy also. Here are descriptions of a couple of them:

LOTUS *In Minutes* on the HP 95LX Palmtop PC

Here's a quick and easy way to get up-to-speed on the basics of Lotus 1-2-3. This great little book is both a quick reference and a short tutorial course on the commands and procedures of Lotus 1-2-3, as they work in your HP 95LX. And the book's examples cover "real-world" situations, including common mistakes, so that you'll see firsthand how problems occur—and how to correct them.

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ISBN 0-931011-35-3

9 780931 011351 50900