Integral Personal Computer

HP-UX Technical BASIC Getting Started Guide

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1 Introduction

About This Guide

This guide will show you how to get started using HP-UX Technical BASIC on the Integral Personal Computer. It provides specific step by step procedures for starting the BASIC interpreter, entering a program and then running the program.

This guide is not a substitute for a tutorial on how to program in BASIC. It assumes you already have some experience programming in BASIC.

To get the most out of this guide, you should already have your Intergral PC set up and be familiar with the Personal Applications Manager (PAM) and the general operation of the system. If you need to review, we suggest you use the Tutor program provided with your system or read the appropriate sections of the user's manual. Later in this chapter, the section "Before You Start" will help you get ready.

This guide is not comprehensive. It should be used in conjunction with the following manuals provided with the Integral PC and the BASIC interpreter:

- *HP-UX Technical BASIC Reference Manual*
- *HP-UX Technical BASIC Implementation Guide*
- *HP-UX Technical BASIC Quick Reference Guide*

Depending on your application, the *HP-UX Technical BASIC I/O Programming Guide* may also be needed.

About HP-UX Technical BASIC

HP-UX Technical BASIC is an easy to learn, yet powerful language that allows you to utilize the advanced computational and graphics capabilities of your Integral PC. It is similar to Series 80 BASIC but it was developed to run on the HP-UX operating system.

With HP-UX Technical BASIC on the Integral PC you can:

- Plot and digitize on the internal graphics display.
- Access external disc drive units.
- Access up to 8 megabytes of random access memory (RAM).
- Control the enhanced features of the internal display and printer.
- Use peripheral printers and multi-pen plotters.
- Control intrumentation and other I/O devices.
- Interface with real time control instrumentation.
- Perform advanced matrix and string operations.
- Use the full Extended Roman Character Set.
- Access the internal clock.
- Perform on-event branching.

Before You Start

Before you read further in this guide, we suggest you do the following:

1. If you have not done so previously, unpack and set-up your Integral PC. Follow the instructions on the set-up card included with your computer.
2. Start the Tutor program and review the following:
   - How to highlight and start a program.
   - How to shuffle windows.
   - How to use the `format_disc` and `copy_disc` friendly utilities.
   - How to use the Copy (f5) function key.
3. Scan through the other manuals provided with the BASIC interpreter to familiarize yourself with their contents. In particular, read "How to Use This Manual" in chapter 1 of the reference manual included in this binder.
4. Read the `README` files on each disc for important last minute information.
5. Check to be sure your Integral PC meets the minimum hardware requirements listed in the next section.
6. If you have ROM BASIC, follow the instructions in the *ROM Installation Guide* to install the ROM.

Hardware Requirements

HP-UX Technical BASIC is distributed in two forms: on discs and in read-only memory (ROM) modules. The syntax is identical in both forms. The requirements for both forms include, as a minimum, an Integral PC with the HP-UX 5.0 operating system. Note, however, that the disc-based version also requires one of the following plug-in memory modules:

- HP 82925A 256K Memory Module
- HP 82927A 512K Memory Module
- HP 82916A 1M Memory Module

2 Starting BASIC

This chapter describes how to start both the disc-based version of BASIC and ROM BASIC. If you want to make a working-copy of the BASIC discs, follow the procedure described below in "Copying Your Discs."

After you have gained some experience with HP-UX Technical BASIC, you may want to use the optional `.bsc_config` file described in the *HP-UX Technical BASIC Implementation Guide.*

Copying Your Discs

Before you use your BASIC discs for the first time, we recommend that you make a working copy of each disc provided with BASIC. To make a copy of a disc, use the following procedure or refer to the Integral PC owner's documentation for more information.

To format and initialize a new disc:

1. Write-enable a blank disc.
2. Select the PAM window.
3. Insert the HP-UX utilities disc.
4. Highlight the `format_disc` program and press Start (f1).
5. Press the Help (f7) function key and follow the instructions in the `format_disc` window.

To copy a disc:

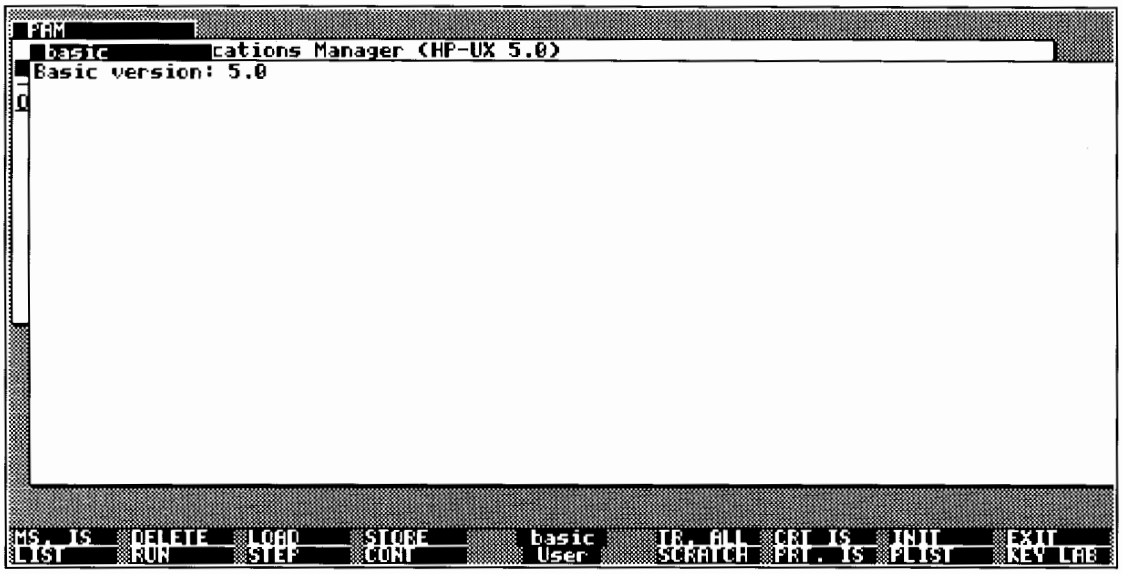
1. Remove the blank disc and re-insert the HP-UX utilities disc.

2. Highlight the `copy_disc` program and press **Start** ((f1)).
3. Press the **Help** ((f7)) function key and follow the instructions in the `copy_disc` window.

Starting BASIC From a Microflexible Disc

To start BASIC from a microflexible disc:

1. Select the `PAM` window.
2. Insert the BASIC disc. (The `PAM` window will then be updated.)
3. Highlight `basic` (the BASIC interpreter) and press **Start** ((f1)).
4. The `basic` window should appear as shown below.



Starting BASIC From a Fixed Disc

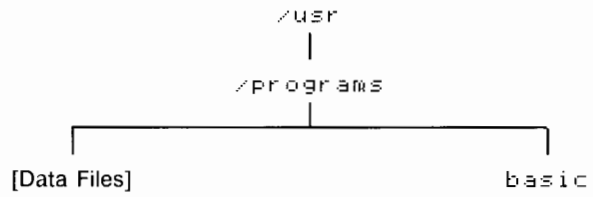
To start BASIC from a fixed disc, first use the procedure below to copy the master BASIC disc to your fixed disc.

To copy BASIC to a fixed disc:

1. Use the `makefolder` utility to make a folder on the fixed disc, if necessary, to hold the BASIC interpreter and your BASIC programs. For example, to make a folder called `programs` on the `/usr` disc, go to the `PAM` window and type in:

   `makefolder /usr/programs` (Return)

2. Insert the BASIC disc. Highlight `basic`.
3. Press the Copy (f5) function key.
4. When prompted for the destination, type in `/usr/programs`.
5. Use the Copy (f5) function key to copy the remainder of the files on the BASIC disc to the `/usr/programs` folder.
6. Check to be sure all files are in the same folder. The file structure in our example is shown below.



After the BASIC disc has been copied to your fixed disc, use the following procedure to start `basic` on your fixed disc.

To start BASIC from a file on your fixed disc:

1. Open the folder containing `basic`. For example, type in `/usr/programs` (or use the function keys to open the appropriate folder).
2. Highlight `basic` and press Start (f1). You may also type in `basic` Return in the PAM command line if your current working directory contains the `basic` program. (Note that syntax for invoking `basic` does not include options or arguments.)

After the `basic` window appears, `basic` is ready for you to input a command or statement.

Starting ROM-Based BASIC

ROM BASIC can be invoked by entering the following command: `basic` Return.

3 Entering BASIC Statements

This chapter is an orientation chapter. It will show you how to enter, store and retrieve a program file.

Immediate Execute Statements

Not all applications require writing a BASIC Program. For simple calculations you may want to execute the BASIC statements from the keyboard.

Most BASIC statements can be executed one at a time, simply by typing in the statement then pressing (Return). Do not include a line number or the statement will be entered into the program memory instead of being executed immediately.

For example, to calculate the number of seconds in a given number of days, first assign the number of seconds in one day to the variable S using a LET statement, type in:

```
LET S=24*60*60 (Return)
```

To find the number of seconds in three days simply type in 3*S (Return). The result will be displayed immediately.

```
LET S=24*60*60
3*S
 259200
```

To find out if a particular BASIC keyword is immediately executable from the keyboard, refer to the keyword dictionary in the *HP-UX Technical BASIC Reference Manual* (located in this binder). A solid box next to the heading "Keyboard Executable" indicates that the keyword is immediately executable.

Entering A BASIC Program

This section will discuss how to enter, store and fetch a program file.

If you are writing your first BASIC program, you may need the *HP-UX Technical BASIC Quick Reference Guide* or the *HP-UX Technical BASIC Reference Manual* at your desk.

A program file may be created using either a system editor (such as `vi` or `ed`) or the BASIC editor. If you use a system editor you will store your file as an HP-UX (ASCII) text file then load it into BASIC program memory using the BASIC `GET` command. If you use the BASIC editor you may store your file as either an HP-UX text file using the `SAVE` command or as an HP-UX Technical BASIC *program file*, using the `STORE` command.

Using the BASIC Editor

If you have never used the `vi` or `ed` editors, getting started will be easier if you use the BASIC editor.

Unlike the system editors, the BASIC editor provides automatic line numbering (using the `AUTO` command) and immediately checks the syntax of each statement after it is entered. Syntax error messages are displayed by the BASIC editor after each erroneous program line or command is entered. For example,

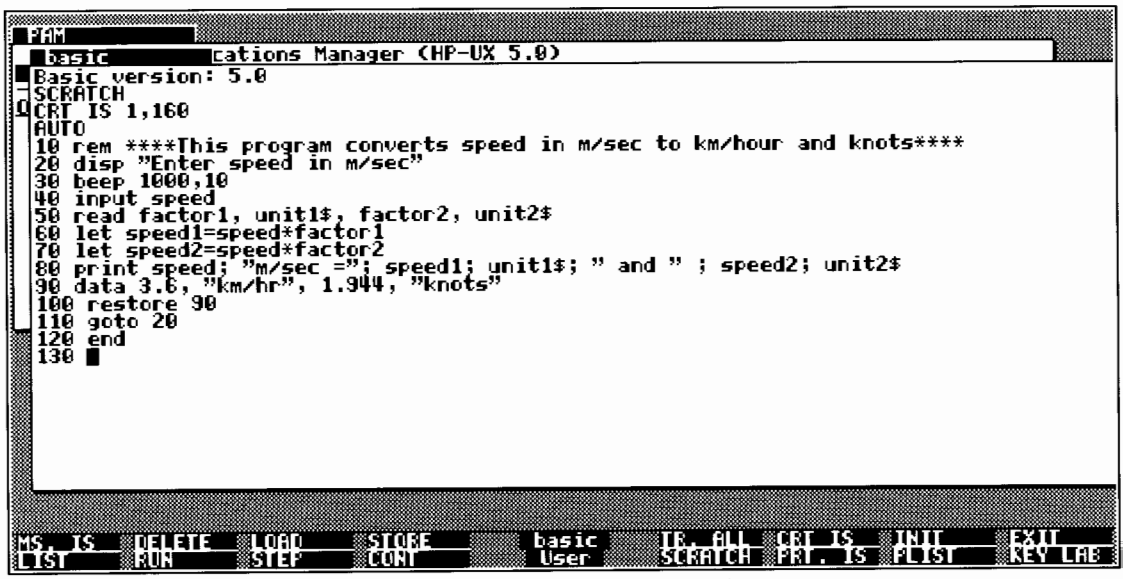
```
10 print "No end quote

Bad string
```

The following section will provide an introduction to the screen editing capabilities of the Integral PC and the following BASIC keywords:

- `CRT IS`
- `AUTO`
- `LIST`
- `DELETE`
- `REN`
- `STORE`
- `SAVE`

To create a BASIC program using the BASIC editor:

1. Start `basic`. (For more information refer to chapter 2.)
2. Type in `CRT IS 1,160` to set the display line length to 160 characters. This will cause an end-of-line sequence to be sent to the display window after every 160 characters and will disable the word wrap function in the `basic` window. Note that because a BASIC statement must be entered on a single line, you will not be able to edit a statement that has wrapped around to two lines in the window. Setting the line length in the display to 160 characters will solve this problem.
3. Type in your program. (Preceed each line with a line number or use the `AUTO` command to automatically provide line numbers.) To familiarize yourself with the BASIC editor, enter the following program. Type in each line shown below, followed by (Return). At this point you may ignore any typing errors you make until we discuss the editing keys later in this section.



4. Stop the automatic line numbering by backspacing over the last line number and pressing (Return).

5. List the contents of the program memory by pressing the LIST ((f1)) function key. The program lines will be listed on the display.

6. Delete unwanted lines by using the DELETE ((Shift)(f2)) function key or by typing in the DELETE command. For example, to delete the first line in the example above, type in:

   ```
   DELETE 10 (Return)
   ```

   This will delete line 10.

7. Insert or append new lines by entering a line number followed by the statement. For example, to put the line we just deleted back in, type in:

   ```
   10 REM ****This program converts speed
    in m/sec to km/hour and knots**** (Return)
   ```

   Unless you want to replace an existing statement, be sure the line number is unique otherwise the editor will replace the existing statement with the new statement.

8. Use the cursor movement keys in combination with the keyboard editing keys located in the numeric keypad to move around the screen and make corrections to program lines.

   As an example let's change line 30. Use the arrow keys to move the cursor over the comma in the BEEP statement. To insert characters press the (Shift)(Insert char) once to get into the insert mode, then type in your text. (To get out of the insert mode press (Shift)(Insert char) again.) For this example, type in (Shift)(Insert char) 0 (Return) to change the pitch of the beep. To delete a character, move the cursor over the character then press (Shift)(Delete char). After you have changed the line on the screen, press (Return) to enter the line.

9. Use the REN command to renumber the program lines. For example, type in REN (Return). This will renumber the program lines and all references to line numbers. (By default the renumbering starts at line 10 and increments by 10.)

10. To save the program use the STORE command to store the program as a BASIC program file, or the SAVE command to save the program as an ASCII text file. (If you plan on editing the program using a system editor, save the file as an ASCII text file.) For example, to store the sample program as a BASIC program file named SpeedCalc type in,

```
STORE "SpeedCalc" (Return)
```

- For a summary of all program entry and editing keywords, refer to chapter 7 of the *HP-UX Technical BASIC Reference Manual*.
- For a description of the typing aids on the BASIC user menu, refer to the *HP-UX Technical BASIC Implementation Guide*.

Using a System Editor

If you have some experience using the `vi` or `ed` editors you may want to create your BASIC programs using these editors. Both of these system editors are provided with your computer.

To create a BASIC program file using a system editor:

1. Start the `vi` or `ed` editors from PAM (or another shell).
2. Enter your program. Each BASIC statement should have a line number.
3. Save your file on a microflexible disc or on the electronic disc.
4. Start `basic` (if it is already started, simply shuffle the windows until `basic` is the active window).
5. Type in: `GET` *filename*. (The filename must be either a complete path name or the name of a file in the current working directory.) The BASIC interpreter will attempt to load each line with a line number as a program line. It will also display the commands found in the file on the BASIC window, but it will not execute the commands. If a syntax error is found, the illegal line is printed followed by an error message.
6. To list the program, type in `LIST` (Return) or press the LIST ((f1)) function key.

BASIC Statement Syntax

The exact syntax of BASIC keywords is diagrammed for each keyword in the dictionary section of the *HP-UX Technical BASIC Reference Manual*, Vol. 1 (located in this binder). For general information on how to use the keyword dictionary, how files are named, the use of spaces, and the BASIC metacharacter (~), refer to chapter 1 of the reference manual.

Using the Machine-Specific Features of the Integral PC

The Integral PC has a number of machine-specific features that may be used in BASIC. In the section on using the BASIC editor we have introduced several of the typing aids available on the function keys, and we have also given an example of how to use the screen editing capabilities of the BASIC editor. These are just two examples of machine-specific features. Other HP-UX systems running HP-UX Technical BASIC will have similar capabilities but they will not be exactly the same.

For a description of these machine-specific features and how to use them from HP-UX Technical BASIC, refer to the *HP-UX Technical BASIC Implementation Guide* in the back of the second binder.

4 Running a BASIC Program

How to Run a BASIC Program

After your program has been entered or loaded into the BASIC program memory, you are ready to run it.

To load and run a program:

1. Mount all external disc files that the program uses. If you are using peripheral microflexible disc drives, use the `mount_disc` utility from PAM to mount the discs before running your program. If you have more discs than available disc drives, try consolidating the files your program needs onto one disc or copying some of them to the electronic disc.
2. Start BASIC and use the `GET` or `LOAD` command to enter your program file into BASIC program memory. For example, if your program file is an HP-UX ASCII text file named `/usr/programs/SpeedCalc`, type in:

   ```
   GET "/usr/programs/SpeedCalc" (Return)
   ```

3. Press RUN ((f2)) to start program execution.

The program will run in the BASIC window. If the program contains a BASIC graphics instruction the program will automatically create a graphics window. If the program requires input from the keyboard, it will prompt with a question mark.

Handling Error Conditions

Error messages during program execution will be sent to the standard error device, usually the display. If your program issues an error message and then stops, try the following:

- Write down the error message and line numbers, if given. (Once the error messages roll off the top of the display memory the messages will be lost.)
- Look up the error messages in chapter 6 of the reference manual (Vol.2).
- List the program, or parts of it.

How to Stop, Suspend, and Exit BASIC

Shuffling windows will not stop or suspend the programs. Use one of the following procedures to stop, suspend or exit BASIC.

To do this	Take this action	The effect is
To stop a BASIC program	Press (Stop) key or the **Stop** function key ((f8) on the `basic` system menu). Be sure to shuffle the windows, if necessary, so that the `basic` window is the active window.	The message `<RESET>` will be displayed on the screen and the BASIC menu labels will appear at the bottom of the screen. The BASIC window will remain active. The reset conditions are given in the appendix to the *HP-UX Technical BASIC Reference Manual.*
To exit BASIC	First stop execution of any program that may be running. Then press **EXIT** ((Shift)(f8)).	Once the message `Exiting Basic` has been displayed, the BASIC window will be dead. Press (Stop) to eliminate the window.
To suspend execution of a BASIC program	Press (Break).	The program will be suspended* and the message `<PAUSE>` will be displayed on the screen.
To continue program execution after a (Break)	Press **CONT** ((f6)).	The program will continue execution.
To suspend the display output	Press (Cntrl)(S) (simultaneously).	The output to the display will be suspended. (Program execution will continue until the ouput buffer is full and then it will be suspended.)
To resume output to the display	Press any key except (Break).	Output to the display will resume.

* If the program is in the middle of accessing an I/O module, the `<PAUSE>` will be delayed until the I/O operation ends.