Appendix I

A Comparison With the HP-41C/CV

Contents

This appendix defines the differences between the HP-41CX and the HP-41C/CV so that you can quickly learn to use the HP-41CX if you are already familiar with the HP-41C/CV. If you have experience with the HP-41C or HP-41CV, then you already know much about the operation of the HP-41CX.

Programs written for the HP-41C/CV (including plug-in modules) are fully compatible with the HP-41CX. Programs written for the HP-41CX, however, are not necessarily compatible with the HP-41C/CV.

An Overview

The HP-41CX computer is based on the HP-41CV (which is like an HP-41C but with five times as much main memory space). It includes all the functions and memory space from the HP 82182A Time Module and the HP 82180A Extended Functions/Memory Module, plus additional alarm, stopwatch, extended memory, and other functions. The catalogs operate slightly differently compared with the HP-41C/CV, and the initial memory allocation is different: 100 registers for data storage. A point-by-point comparison is given below, including page references to explanations of features in this manual.

Cataloguing the New Functions

The HP-41CX functions are catalogued such that all new functions (functions not in the HP-41C/CV) are listed in catalog 2, the external-functions catalog, leaving catalog 3, the standard-functions catalog, unchanged from the HP-41C/CV. They are categorized in this way for consistency with previous products: the standard function set remains unchanged, and the time functions and extended functions are in catalog 2, as they are when they are supplied by the time module and extended functions/memory module. Therefore, all time and extended memory/extended functions in the HP-41CX use the XROM numbers (*external ROM numbers*; see appendix H) from the original modules for identification to the computer. The ROM identification number for all extended memory/extended functions is 25; the ROM identification for all time functions is 26. (Do not use a plug-in ROM module if it duplicates one of these identification numbers.)

The Owner's Manual

The owner's manual has also been completely rewritten for the HP-41CX. Many explanations in the previous literature (for the HP-41C/CV and for the two modules) have been changed, updated, and clarified. To this aim, some terminology used in this book is new, especially in the areas of programming, memory, and alarms. (See the table "Equivalent Terms" at the end of this section.) The printing conventions for shifted and nonkeyboard functions have also been changed. (See the inside of the front cover.)

Memory Configuration

The allocation of memory in the HP-41 computers is shown below.

Memory Configuration

Device	Main Memory			Total Extended Memory
	Total	Initial Configuration		
		Data Storage	Uncommitted*	
HP-41CX	319	100 (R_{00}–R_{99})	219	124
HP-41CV	319	273 (R_{00}–R_{272})	46	0
HP-41C	63	17 (R_{00}–R_{16})	46	0

* Memory for program instructions, alarms, and User function assignments are all drawn from the uncommitted registers. See section 12 for more information.

Catalog Operation

While an HP-41CX catalog is listing its contents, pressing any key besides $\boxed{\text{R/S}}$ and $\boxed{\text{ON}}$ will *speed up* the listing. (With the HP-41C/CV, this would *slow down* the listing.)

All the catalogs are summarized in section 9 under "The Catalogs."

Catalogs 1, 2, and 3

The display for catalog 1 now shows the number of bytes for each program (page 171). The display for catalog 2 is quite different, being broken up into function groups. (See "Time Functions" and "Extended Memory and Extended Functions" in appendix I.) Catalog 3 remains the same.

New Catalogs: 4, 5, and 6

The HP-41CX has three new catalogs. They all use power at the same rate as a running program, even when stopped, unlike catalogs 1, 2, and 3. They therefore will automatically terminate in 2 minutes (1 minute when the battery power is low) when they are stopped.

The new catalogs blink at the end of the listing when you try to use $\boxed{\text{SST}}$, just as they blink at the beginning of the catalog when you try to use $\boxed{\text{BST}}$. (In the HP-41C/CV, $\boxed{\text{SST}}$ at the end of the listing terminates the catalog function.)

Catalog 4: The Extended Memory Directory (Page 206). A listing of all files in extended memory can be accessed with either $\boxed{\text{CATALOG}}$ 4 or $\boxed{\text{EMDIR}}$. $\boxed{\text{CATALOG}}$ 4 is *not* programmable, however, while $\boxed{\text{EMDIR}}$ is. The $\boxed{\text{EMDIR}}$ function is essentially the same function as in the extended functions/memory module, *except* that now $\boxed{\text{R/S}}$ will start and stop it, $\boxed{\text{SST}}$ and $\boxed{\text{BST}}$ will step through it, and a printer will only print it in Trace mode.

Catalog 5: The Alarm Catalog (Page 255). A listing of all alarms in memory can be accessed with either $\boxed{\text{CATALOG}}$ 5 or $\boxed{\text{ALMCAT}}$. $\boxed{\text{CATALOG}}$ 5 is *not* programmable, however, while $\boxed{\text{ALMCAT}}$ is. The $\boxed{\text{ALMCAT}}$ function is essentially the same function as in the time module, *except* that if there are no alarms in memory, the display shows **CAT EMPTY**.

Catalog 6: User Key Assignments (Page 168). A listing of all User key assignments for functions and global labels is given in order of keycode. Pressing ▓ $\boxed{\text{C}}$ will cancel a particular key assignment.

Time Functions

Part V ("Time Functions in Detail") contains all of the time functions in the HP-41CX: "Clock and Date Functions" (15), "Alarm Functions" (16), and "Stopwatch Operation" (17). In addition to the set of time functions included in the time module, there are more alarm operations, especially alarm-clearing procedures, and one extra stopwatch function:

- A repeating message alarm can be cleared from memory by pressing ▨ C to acknowledge it while the alarm is going off. (Page 255.)

- There are programmable alarm-clearing functions CLALMA (*clear alarm by Alpha*), CLALMX (*clear alarm by X*), and CLRALMS (*clear all alarms*). (Page 258.)

- The programmable function RCLALM (*recall alarm*) will recall the parameters of an alarm to the stack and Alpha register. (Page 252.)

- The minimum repeat interval for an alarm is 1 second instead of 10 seconds. (Page 250.)

- The stopwatch can be activated and the stopwatch pointers set with the programmable function SWPT (*stopwatch and pointers*). (Page 274.)

Those functions taken from the time module are listed in catalog 2 under −TIME 2x (*time functions, revision 2x*). The new time functions are in catalog 2 under −CX TIME (*HP-41CX time functions*).

Extended Memory and Extended Functions

The HP-41CX includes extended memory, extended memory functions, and extended functions, most of which are from the extended memory/functions module, and some of which are completely new. These capabilities are:

- 124 registers of *extended memory* for program, data, and text (ASCII) files.

- Functions for creating and operating on files in extended memory (*extended memory functions*).

- Functions that manipulate flags, data, and Alpha strings (*extended functions*).

- New conditional tests for branching (*extended functions*).

- Miscellaneous additional functions (*extended functions*).

The functions taken from this extended functions/memory module are catalogued in the HP-41CX in catalog 2 under the header −EXT FCN 2x (*extended functions, revision 2x*). The new, HP-41CX extended memory functions and extended functions are listed in catalog 2 under −CX EXT FCN (*HP-41CX extended functions*).

Extended Memory Functions

Section 13 ("Extended Memory") and section 14 ("The Text Editor") cover extended memory and the manipulation of files in extended memory: that is, the extended memory functions. The particular functions listed below are those new to the HP-41CX: the new extended memory functions.

The Text Editor is a major innovation in the HP-41CX. The function ED (*editor*) redefines the keyboard and display so that you can call up a text file and watch the contents of a record as you work on it, instead of having to manipulate text via single operations in the Alpha register. The keyboard for the text editor is reproduced on the backplate of the HP-41CX. This keyboard includes the Alpha character set. (The backplate on the HP-41C/CV shows only the Alpha keyboard.)

The other new extended memory functions are:

- ASROOM (*ASCII room*) and EMROOM (*extended memory room*), to return the amount of memory space left in an ASCII (text) file (page 222) or in extended memory (page 208).

- EMDIRX (*extended memory directory by X*), to recall the name and type of a certain file, and make it the current file (page 207).

- RESZFL (*resize file*), to change the size of a text or data file (page 213).

Extended Functions

The extended functions in the HP-41CX fall into the three general categories outlined below. Some of these functions were part of the extended functions/memory module. Those that were not are called the HP-41CX extended functions, as indicated below. They are listed in catalog 2.

Functions That Manipulate Flags, Data, and Alpha Strings. The HP-41CX includes functions from the extended functions/memory module to manipulate flags, data, and Alpha strings in and between registers. All functions for manipulating data are in section 12, "Main Memory." Functions to manipulate flags are in section 19, "Flags." Functions to manipulate Alpha data are in section 21, "Alpha and Interactive Operations."

Conditionals. The conditionals are new extended functions, allowing you to compare the value in the X-register with the value in any other data register. See section 20, "Branching."

Miscellaneous. The miscellaneous extended functions taken from the extended functions/memory module are:

- PASN (*programmable assign*) and CLKEYS (*clear key assignments*) in section 9, "The Keyboard and Display."

- SIZE? (*memory size?*) and PSIZE (*programmable size*) in section 12, "Main Memory."

- PCLPS (*programmable clear programs*) in section 18, "Programming Basics."

- GETKEY in section 21, "Alpha and Interactive Operations." This function halts program execution until a key is pressed, and that key's keycode can be used to branch to a particular subroutine.

The new, HP-41CX miscellaneous extended functions are:

- ΣREG? (*statistics registers?*) in section 11, "Numeric Functions."

- CLRGX (*clear registers by X*) in section 12, "Main Memory."

- GETKEYX (*get key by X*) in section 21, "Alpha and Interactive Operations."

New Terminology Used in This Manual

Many terms and names used in this manual are not the same as those used in previous literature for the HP-41 and its modules. If you are used to the previous terms, refer to the following list.

Equivalent Terms

HP-41CX	HP-41C/CV, Modules	Comments
Alpha execution	display execution	
Alpha name	display execution name	
bypassed past-due alarm	unactivated past-due alarm	
conditional alarm	noninterrupting control alarm	To emphasize the difference be-tween conditional and control alarms.
control alarm	interrupting control alarm	
current file	working file	
flags: user (00–10) control (11–29)	general-purpose user (00–10) special-purpose user (11–20)	User flags are strictly those de-fined by the user; control flags are defined by the HP-41. How-ever, you can alter any of the user and control flags (but not the system flags, 30–55).
input cue	prompt	Avoids confusion with the PROMPT function.
keyboards: Alarm Catalog Alpha Normal Stopwatch User	modes	These particular conditions are characterized by redefined keyboards.
modes: Regular Split Delta Split Recall (splits) Storage (splits)	operations	These conditions define a mode of operation rather than a particu-lar operation or function.
registers above R_{99}	extended storage registers	Avoids confusion with registers in extended memory.
text files	ASCII files	
uncommitted registers	program registers, program memory	This part of memory stores more than just programs.
GTO	■ GTO	All shifted functions are gold. See inside front cover.