

The "Personal Computer": A Fully Programmable Pocket Calculator

This 11-ounce battery-powered marvel has the computing power of an advanced scientific pocket calculator and is programmable as well, so it can adapt to any number of specialized uses.

by Chung C. Tung

AN ENGINEER OR SCIENTIST in need of an on-the-spot answer in the laboratory, a pilot making an in-flight course correction, a surveyor running a traverse in the field, a businessman estimating returns-on-investment during a conference, a physician evaluating patient data—it isn't difficult to think of everyday examples of people whose professions require certain types of calculations over and over again. Were one available, a computer or programmable calculator would obviously be of great assistance to such people. Unfortunately, you can't carry one of those around in your pocket, can you?

You can't, unless it's battery-powered, weighs only 312 grams, and measures only $8.1 \times 14.7 \times 3.4$ cm, like the HP-65 Pocket Calculator. This new computing device is a combination of electronic calculator and general-purpose small computer. It offers the convenience and easy operation of a calculator, but its programmability makes it versatile enough to fit the needs of a wide variety of disciplines, including science, engineering, finance, statistics, mathematics, navigation, medicine, surveying, and many others.

Although the HP-65 is designed to operate in a logical, easy-to-learn way, it is capable of sophisticated computations. It has 51 built-in mathematical functions and data-manipulation operations, a four-register operational stack, nine addressable data registers, and five user-definable

keys. It can run programs that have as many as 100 steps. There are two program flags and four comparison tests for program branching.

Perhaps most significant is that within its small package the HP-65 contains a tiny magnetic card reader and recorder. Users can store their programs on magnetic cards for later use, or they can take advantage of hundreds of preprogrammed cards containing programs commonly used in various disciplines.

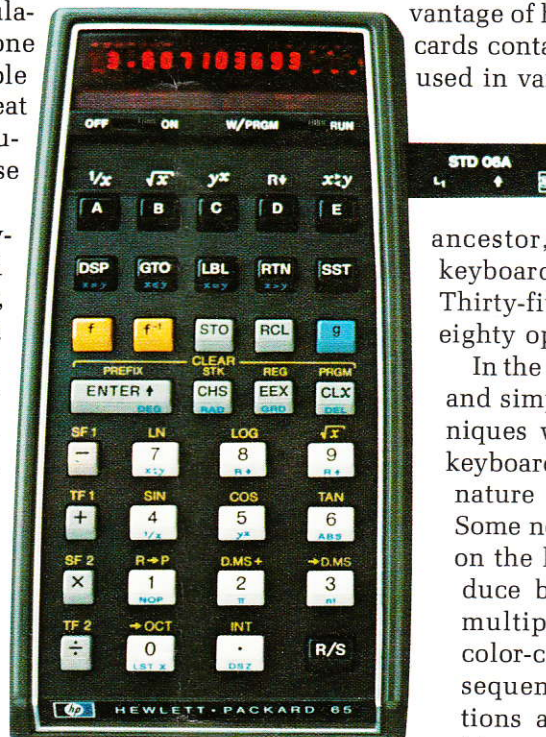


Fig. 1. The first fully programmable pocket calculator has 51 preprogrammed operations, a 100-step program memory, five user-definable keys, and a tiny magnetic card reader-recorder. After a program card is read it can be placed in the window above the keyboard to show the new functions of the user-definable keys.

Keyboard Design

The HP-65 inherits its size and shape from its ancestor, the HP-35. However, its keyboard layout is quite different. Thirty-five keys control more than eighty operations (see Fig. 1).

In the interests of logical operation and simplicity, many different techniques were used in designing the keyboard layout. Keys of the same nature are grouped into clusters. Some nomenclature has been placed on the lower side of the keys to reduce busyness. Nomenclature for multiple-keystroke operations is color-coded to make the keystroke sequences associative. All functions are classified as immediate (+, -, ×, ÷), direct, inverse, or miscellaneous, and are grouped and color-coded accordingly. Key sizes, colors, value contrast, and nomenclature have all been chosen to guide the user.

Arithmetic operations (+, -, ×, ÷) and data entry keys are in the same locations as on the