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MARKETING BACKGROUNDER

The Birth of the Calculator Market

I. Market Overview

One of the most innovative electronic products to reach the market was introduced 16 years ago in the form of a 1.8-pound, all-electronic pocket-sized calculator called the Pocketronic -- the brainchild of a joint venture between Texas Instruments (TI) and Canon.

Designed to compete with simple mechanical adding machines, it could handle up to 12 digits and four decimal places, add, subtract, multiply and divide. Priced at slightly under \$400, it was considered a bargain at the time.

William R. Hewlett, co-founder of the Hewlett-Packard Company, was impressed by the invention and was convinced that HP could significantly improve on the concept.

He envisioned HP as a preeminent innovator in calculator technology and the leading developer of high-performance, high-quality programmable calculators for technical, scientific and business professionals and students.

In 1972, just two years after Hewlett's encounter with the Pocketric, HP introduced its first handheld calculator -- the HP-35. The \$395 calculator went beyond the four-function (add-subtract-multiply-divide) capabilities of its predecessors. Quickly dubbed the "electronic slide rule," it performed trigonometric, logarithmic and exponential functions essential for technical professions.

The HP-35 calculator exceeded all expectations; more than 300,000 units were sold in the first three years. Part of the technical achievement of the HP-35 was its innovative and powerful logic method called RPN (Reverse Polish Notation). RPN meant that HP's calculators required fewer keystrokes and were able to handle larger and more complex problems with less memory than other models.

The HP-35 was the first in a line of calculators focused on technical, advanced, application-specific uses for science, engineering and, eventually, business professionals.

Today, the calculator market is divided into three segments:

- 1) simple four-function calculators for basic arithmetic applications:
- 2) desktop/printer calculators and
- 3) professional calculators (some of which are programmable) for scientific and business uses. HP's focus is on professional calculators with superior functionality dedicated to providing solutions for specific applications.

Market Fluctuations: A Leader Emerges

From 1972 to 1976, four-function calculator prices fell by a factor of 10 -- careening from an average of \$195 to just \$19.95. Plummeting prices unseated a number of calculator brands.

The development of liquid-crystal displays (LCDs) combined with low-power-consumption CMOS technology enabled calculators to be powered with smaller batteries. With this technology in hand, Japanese manufacturers were able to bring down prices with comparatively low labor and manufacturing costs. As a result, prices for four-function calculators dropped to only a few dollars.

When the consumer-calculator market went through a shakeout in 1978 and 1979, HP already had built a strong position in the professional-calculator market segment. That position was based on well-targeted products: the HP-35; the first pocket-sized business calculator (HP-80); the first fully programmable handheld calculator (HP-65); and the first handheld calculator with non-volatile memory (HP-25C).

HP's Handheld Computer and Calculator Operation (HCCO)

In the summer of 1976, HP's calculator-development organization, the Advanced Products Division, moved from Cupertino, Calif. to Corvallis, Ore. It later was renamed the Handheld Computer and Calculator Operation (HCCO).

Its current products include:

o The HP-41C calculator. Introduced in 1979, the HP-41C was the first handheld calculator capable of displaying numbers, letters and common symbols, and it became the heart of the first calculator/peripheral system. Owners can choose from more than 2,500 application programs ranging from circuit analysis and navigation to real estate and securities. It has become recognized as the standard for technical professionals and students.

o The Hewlett-Packard Interface Loop (HP-IL).

Introduced in 1982, HP-IL provides data input/output for battery-operated devices. For example, the loop allows a salesperson or scientist to gather information in the field using a battery-operated calculator, then transfer the data to an HP Touchscreen personal computer, HP Portable computer, HP Vectra personal computer or other computer for more extensive analysis.

o The HP-71B handheld computer. Introduced in 1983, the HP-71B offers full BASIC-language programming capabilities and up to 33.5 Kbytes of RAM. The HP-71 provides computational muscle in applications such as electronics, petroleum, packaging, aerospace, utilities and medicine.

o The HP Series 10. This family of calculators has become the premier series of calculators for technical, scientific and financial professionals. The HP-12C calculator, introduced in 1981, is designed specifically for banking, finance, investment and real-estate applications. It features predefined function keys, a "percent of total" key and can figure odd-days' interest and depreciation.

According to a 1984 market-tracking study by SRI International of Menlo Park, Calif. and Field Research of San Francisco, Calif., today's HP calculators are recognized by users for their quality and reliability, variety of features, brand reputation, technical innovation, software availability and expandability.

HP is continually expanding its line of add-on devices for its calculators. These add-on devices include memory-expansion modules, printers and plotters, modems, magnetic-card readers and disc drives for mass storage, and optical wands for reading bar codes.

HP calculators are sold in college bookstores, mail-order catalogs, department stores, computer shops and catalog showrooms. HP offers a wide range of product-support materials, including handbooks and modules designed to answer specific technical, scientific and business-application needs of professionals and students. A technical-support group is available to answer customer questions by phone.

II. The Business Consultant

The Business Consultant is the most recent technological innovation from HP. This calculator is designed to meet the needs of business professionals by providing a new, simplified interface, algebraic-data entry and built-in programs for finance, general business, statistics, summing and number lists, mathematics and time/appointments.

It features softkeys and menus to provide problem-solving capability without the need for programming, a major contribution to the professional-calculator market.

In addition, the Business Consultant features formula-solver capability that allows users to create their own equations then solve them for any unknown variable. By using the formula-solver feature, professionals in marketing, manufacturing, sales, small business and finance will be able to develop customized solutions for their individual applications.

III. Market and Competition

In 1976, according to Creative Strategies International, the worldwide calculator market -- including professional, desktop/printing and four-function specialty -- totaled \$1.5 billion.

Growth in the worldwide calculator market has leveled off since the boom of the mid-1970s. But according to industry sources, the worldwide market for calculators in 1986 is projected to be more than \$2 billion. The U.S. share of that market is estimated to be approximately 35% of the low-end (four-function) segment and approximately 50% of the desk-top/printer and professional segments. From 1986 to 1990, the market is expected to grow at a rate of 4% per year.

Major companies in the calculator market include HP, TI, Sharp, Casio and Canon. Within the four-function segment, Casio and Sharp are worldwide market leaders and TI is a U.S. market leader. Canon traditionally has been a leader in the desktop/printing segment, although TI also is heavily involved in that area as well.

Within the professional segment, HP and TI are market leaders, with Sharp considered to be a serious contender.

IV. HP Corporate Overview

HP is an international manufacturer of measurement and computation products and systems used in industry, business, engineering, science, medicine and education. The company employs 84,000 people worldwide and had revenue in its 1985 fiscal year of \$6.5 billion.

HP's more than 10,000 products include integrated instrument and computer systems, test and measurement instruments, computer systems and peripheral products, handheld calculators, medical-electronic equipment and instrumentation and systems for chemical analysis.

Located in Palo Alto, Calif., HP has plants in 24 U.S. cities, most of which are in California, Colorado, the Northeast and Pacific Northwest. The company also has research and manufacturing facilities in Europe, Japan, Latin America, Canada and Southeast Asia. HP's worldwide sales organization includes sales and support offices in 100 U.S. cities and more than 275 sales and support offices and distributorships in 75 other countries.

V. HCCO Management Background

Daniel Terpack, general manager of HP's Portable Computer Division, joined HP's corporate marketing staff in 1965. He then served as parts manager, field engineer and account manager in HP's Eastern Sales Region. Terpack became marketing manager for HP's New Jersey Division in 1970, and in 1977 was named marketing manager for the Corvallis Division. In 1980, he became general manager of the Personal Computer Operation, which was elevated to full division status in 1981.

Terpack received a bachelor's degree in electrical engineering from Princeton University in 1963 and a master's degree in business administration from Stanford University in 1965.

Ernst R. Erni is the operations manager of HP's Handheld Computer and Calculator Operation.

Erni began his career with HP in 1973 at the Advanced Products Division in research and development. In 1976 he moved with that division to Corvallis. Erni became manager of the Personal Printer Operation in March 1983 and operations manager of the Handheld Computer and Calculator Operation in September 1984.

Erni holds a bachelor's degree in electrical engineering from from the Federal Institute of Technology, Zurich, Switzerland, and earned a master's degree in the same field from Stanford University in 1964.

Carmen West, marketing manager of HP's Handheld Computer and Calculator Operation, has worldwide responsibility for marketing strategy and programs for handheld computers and calculators.

West joined the Advanced Products Division of HP in January 1976. In the same year, she moved with that division to Corvallis, where she since has held a number of marketing positions, including sales, product marketing and marketing-communications manager.

West received a bachelor's degree in mathematics from the University of Vermont in 1965 and a master's degree in business administration from the University of Tennessee in 1975.

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