Celebrating The Twenty Fifth Anniversary of the HP-35A Pocket Scientific Calculator

(A Fly on The HP Board Room Wall)

Let's look back to the final design days of the HP-35A just prior to its introduction in January 1972. Here is what a fly on the wall must have heard at a presentation of the HP-35A Pocket Calculator during a management meeting.

Defining The product: The nomenclature for this kind of calculator is very confusing. Names vary from Electronic Slide Rule, Personal Calculator, hand-held Calculator, to Pocket Calculator. The Stone and Adler agency suggested Electro-35 Microcomputer. There may be a registered trademark issue with this name. A descriptive definition is: "a calculator costing less than $400.00, performing at least four functions (+, -, x, ÷) driven by AC/DC power, having a weight of between 1 - 3 pounds, and be a size to fit into a coat pocket without tearing it."

Impact: So called Pocket Calculators were introduced in 1970 by the Japenese, but delivery in the U.S. started in 1971. Presently, it is felt that only the size of the human finger determines the minimum practical size of the keyboard of a calculator. For example, with the BUSICOM, a fatal human engineering mistake has been made. The keys are so small, that a pen with a rubber tip is provided as a standard accessory to depress the keys.

Sales volume is extremely price-sensitive. There will be no real price stabilization until the expected $99.00 level of the household market has been reached, with a manufacturing cost of around $35.00 or with the student market at $49.00, with a manufacturing cost of $15.00. Consequently, in view of this race to the mass market, and the tremendous pace with which new models are being introduced, the profitability of this industry is presently low. The name of the game is; "Who can make the smallest four function calculator at the lowest cost as fast as possible".

The Japanese Ministry of International Trade and Industry, MITI, controls calculator production and has cut Japanese calculator manufacturers production quota figures by 50%. Price dumping is being curtailed by price cartels. Japanese manufacturers hope to circumvent dumping accusations by changing model numbers or offering their units as premimums. All in all, these manufacturers face a problem of a tremendous inventory of overpriced and, in general, obsolete calculators, which already has forced Sharp to close a plant in Japan.

Present Major Manufacturers are:

1. Sharp EL8
2. Busicom LF120
3. Sanyo 081
4. Canon Pocketronic

There are about 12-15 pocket calculators on the market, all of which are not available yet. It is expected, however, that within one year, most calculator manufacturers in the U.S., Japan, or Europe will have a so-called pocket calculator in their product program, bringing the total to about 25-30

different models. *[We now know that HP missed this projection with actual models numbering twice these numbers- rjn*].

U.S. Calculator Industry Resuscitation: It is expected that the U.S. calculator industry is ready to react vigorously to the domination of the Japanese, not only in the World calculator market, but also domestically (70% of market share). The industry does not like to be reminded of another possible "transistor radio" case where this market was almost entirely taken over by the Japanese. Here are the causes of this resurection:

1. The basic technology - MOS/LSI and LED - is in the U.S.
2. Increased concern with Japanese penetration of the U.S. market.
3. Internal Japanese economic problems (inflation, full employment, rise of labor costs, etc) cause some competitive advantages to fade.
4. Undervalued Yen under pressure; 10% import tax on Japanese manufactured products in U.S.

It is estimated that approximately 50 new U.S. designed calculators are on the drawing boards in this country. Monroe and Friden are working on an entirely new line of calculators.

Summary:

1. The first pocket calculator priced at $99 will be introduced early in 1973. Sales will be primarily through department stores, discount houses, catalogs, etc. [Actually Casio, Rapid Data and Digitronix had machines selling for less than $100 by the end of 1972.]

2. For 1975 the main volume in terms of units will come from $99.00 priced calculators. *[Actually competition was fierce in 1974/75. Four function calculator out-of-business-sales prices of $10 to $20 appeared in ads.- rjn]*

HP's Involvement: HP recognizes a need for a more advanced carry-around computational tool than the slide-rule, particularly for the Scientist and Engineering environment. Hence, the birth of the Model 35A, *a Scientific and Engineering oriented, electronic non-programmable calculator* which not only provides answers for log, trig, and math functions, through a single key stroke, but also conforms to all characteristics of a pocket calculator given earlier in the descriptive definition. Based on our manufacturing costs and a 30% selling cost, we believe that such a unit could be sold profitably at $395.00, in the U.S.

In general, we believe that this product provides a faster, more accurate, in many instances a more economical and certainly a more exciting alternative to the slide rule and the tables.

Estimated Potential Market For the 35A: The total universe is estimated to be around 3,000,000 customers broken down as follows.

- Accredited Engineers and those doing peripheral Engineering work 1,005,000 or 33.5%
- Scientists 420,000 or 14.0%
- Math and Engineering Oriented Students 120,000 or 4.0%
- Other occupations, Economists, Architects, Draftsmen, etc. 1,455,000 or 48.5%

How Do We Propose to Reach This Market? Our fly hears a big discussion of selling through distribu were tried. Direct marketing launched the product augmented by their present sales force. Eventually a new sales force came and went and presently distributors and a few direct retailers sell calculators.

Life Cycle: The estimated life cycle of the model 35A is 24-30 months. The contribution (sales) should be about $15-18 million, subject to competitive pressures and our ability to keep the price up.

This represents sales of at least 45,000 units. If we assume selling 30,000 in the U.S., this represents a 1% penetration. The model 35A frames the spectrum of scientific and engineering calculator requirements at the high end as well as the low end. We will cause our competitors to consider a counter move. Companies like WANG, Tecktronics, Monroe and CDC will consider the calculator market as a diversification. For example, it is known that SYSTRON-DONNER has a scientific pocket calculator on their drawing boards.

Our effort to protect our technological advances as much as possible through:

- Maximum patent protection.
- Proprietary clauses with outside suppliers.
- Maximum security.

Despite these efforts a major competitor for model 35A is expected within 4-6 months after our introduction.

Medium and Long Term Plans.

1. Engineering of accessories to the Model 35A.
2. Investigate future improvements of the present Model 35A.
3. Determine through extensive market research if HP could profitably enter the business oriented pocket market. Our engineering efforts are pocket market. Our engineering efforts are presently directed to a simple 4-function machine with additional features such as a percentage and a 1/x key and one or two storage registers. [*This idea never happened because the Japanese could build them at a lower cost. A slim line series made in Japan was investigated after the plant moved from Cupertino California to Corvallis Oregon. The project was abandoned. rjn*]

   Investigations are also underway to evaluate the market for a business unit with a learn mode allowing for the execution of a number of standard Business and Statistical programs. The advantages of entering the business are:
   a. Bring volume of common parts up and overall manufacturing costs down.
   b. Insure continuity of our pocket calculator program.
5. Investigate the market for specially designed pocket calculators for professionals such as the Surveyor, Civil Engineer, Machine Tool Engineer, etc.

Finally, there is no reason not to consider diversifying the Advanced Products Department into selling other low-cost HP manufactured products through direct marketing, and exploring the use of direct mail to sell instrumentation accessories, computer software and other products which cannot be sold economically through our present sales force.

HP is often spoke of as a company that does poorly when the subject of marketing comes up. Our fly on the wall gave us a clue of what happened in the beginning of what we are here today to celebrate. I have tried to contrast HP's marketing understanding and projections with what really happened. An internal Company Confidential HP Document titled "Summary of Model 35A Pocket Calculator Presentation To the Board of
Directors on 17 September 1971" by Alex Sozonoff had an attached memo dated October 5, 1971. The memo was to:

Bill Terry	Bill Hewlett	Ray King	Paul Staft
Tom Osborne	Tom Whitney	Ralph Lee	Bob Boniface

All of these people are historical figures in the decision making process that created the Hewlett-Packard Pocket Calculator product line. This presentation attempted to provide a glimpse of the past, for it is only the past that gives us a look to the future. In today's business climate it may seem that these concepts are outdated. HP has a reputation of being "the best", of being mathematically rigerious, and of leading the scientific world in computational products. Let us all work to insure that this will continue.

Richard J. Nelson
London, September 20/21 1997