The Future and HP Calculators

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This is the third and last in a series of articles commenting on the HP milestone that HHC 2009 attendees experienced in terms of learning about the changes occurring in HP's calculators. The factors of time, corporate memory, and outsourcing were discussed in the previous two commentaries. I will focus on the future in this final installment.

One of the most popular topics for HHC presentations is ideas for future machines. Feature wish lists and applications improvements are usually of great interest and HHC 2009 was no exception. I describe HP's calculator involvement over the last 37 years in terms of three epochs.

- **Epoch 1** (1970) APD Cupertino, Corvallis – Tom Osborne *(The beginning - Product Driven)*
- **Epoch 2** (1997) ACO Melbourne – Chris Wallin (*Rebirth - Product Driven, products unrealized)*
- **Epoch 3** (2001) San Diego, Ft. Collins – Fred Valdez *(Resting on laurels - Market Driven)*

Each epoch represents a birth or rebirth of the business. Technically HP didn't "leave" the business because HP has continuously made and sold calculators since the beginning. I also list the person I believe is most responsible for the "birth." The question that only time can answer, is how to describe the integration of stand alone calculators into the Accessories group in mid 2009. I have also provided, in italics, a rough summary of the type of products that resulted from each "birth."

In terms of the new leading edge products, that I call generations, I classify the 37 years of products as follows.

- **January 1972** - HP-35A made calculations possible for everyone.
- **January 1974, Gen1 –** HP-65A added programmability, sharing, equalizing.
- **July 1979, Gen2 –** HP-41 added alphanumeric, expandability, interfacing.
- **August 1982, Gen3 –** HP-75/71 added numerical accuracy, computer language.
- **June 1986, Gen4 –** HP 28 ⇒50 added symbolic math, more memory, more speed, I/O four less.
- **Hopeful ??, Gen5 –** 23 years and counting. A new HP generation is much needed.

Now that we have an overview of the past, and knowledge of the present constraints, let's explore what is possible for the future, assuming that HP will make an increased investment in calculators. What we must first realize is that HP either uses designs that they buy or they create designs of their own using their in house R&D resources. We can only focus on the latter. In terms of epoch 3 products these are represented by such machines as the HP 33s, HP 35s, HP 20b and its follow-on. None of these are in the Gen5 advance-the-high-end machine category.

Recently we have seen HP concentrate on their financial product line. We have seen these models playing catch up with the competition in terms of adding scientific functions to the basic finance machine. The marketing question to ask is: "Why buy two machines if one will do?" TI understands this very well.

I have no knowledge of HP's calculator business in terms of costs or potential investment. Let's assume that the new managers decide to be conservative (because of the high stakes) and go ahead (because calculators are still profitable) with an increased but still modest R&D investment. This seems

reasonable, especially for non-engaged calculator managers. Sam Kim, as HP's previous new product director, was very engaged with calculators as we have seen at HHC 2007 and 2008.

I will inspire the future more from my perspective rather than what I think HP's management would, could, or should do. After all, I don't know these people very well. With the above constraints in mind I can only approach the future with the vision of HP's past leadership. A vision is usually based on a set of beliefs so perhaps it is good to start with a short list of basic calculator customer/user beliefs.

1. The customers need for personal problem solving hasn't changed since long before the HP-35A.
2. The calculator is a tool and quality tools are admired, respected, taken care of, and trusted.
3. Quality tools by their very nature cost more.
4. In terms of mature technologies, the quality of a calculator is as much, or more, in the software than in the hardware.
5. The hardware, however, must be functionally robust. Keys must be reliable with tactile feedback when they register.
6. Technical Problem solvers want a tool that they can depend on and they want to be educated as to why HP's calculators are the very best.
7. An HP calculator will provide the correct answer over its full dynamic range. This characteristic will dominate over speed, aesthetics, cost, or the competition.
8. Quality tools by their nature are designed with function over form, i.e. they are product driven not market driven.
9. The value of a handheld personal calculator is its low cost and its time saving convenience.
10. The calculator's functionality still has a great deal of potential in terms of well thought out features and functions. HP will regain its leadership by increasing the calculator's value.
11. Applications software is too expensive for HP to develop, but the necessary basic functions will be provided to enable customers to develop a full suite of programs such as image viewers, eBook readers, and data bases.
12. New advanced products will be distinctively calculators, not cell phone look a likes.
13. A new product must meet specific requirements of completeness or it is not released for production even if it has to be delayed.
14. Customization is one HP's greatest contributions to calculators and it should be emphasized.
15. The customer wants to become a believer in HP and HP should support that belief.
16. A traditional timeless (quality) archetype case design should be followed for brand recognition.
17. New models every year are not required and certainly teachers do not want them.

Now that I have my new product line budget, constraints, and vision in place I need a plan and a commitment to start to take leadership of what is thought of as a growth limited commodity product category. To do this I will also need the help of a "secret weapon" to be described later. The internal "rebirth" will be a two pronged effort – to build HP's traditional markets and to then leverage these successes into the educational market. Products like Casio's Classpad and TI's Nspire must be addressed.

Because calculators are now profitable with minimum R&D effort, the first decision I would make would be to divide the product line into two brands. It will be marketing's task to give them suitable names, but for our purposes lets call the product driven brand "*Traditional*" and the market driven brand "*Regular*."

These brands are similar to Sears tool brands – Craftsman and Sears. Everyone knows what the Craftsman brand stands for – since 1926[(1)]. The world must know once again what the HP *traditional* brand stands for.

The *regular* (market driven) brand machines, most of what now exists, will continue. The R&D budget will heavily favor new product development that will slowly rebuild HP's reputation for excellence.

The first new *traditional* brand machine will be an RPN version of the HP 10 Quick Calc. It will be priced at a slightly higher price compared to the price of the *regular* brand Quick Calc. Even if this is a "loss leader" it will be used to give the market a message that HP is serious. It will be tool box tough and work under all conditions of use. By having a mass market product that effectively "teaches" RPN much like the HP-12C "taught" RPN, the long term calculator customer market will be cultivated. Immediately the millions of RPN users of the world will buy one because it will be in their discretionary income price range. Many will want several to have one in the car, tool box, brief case, etc.

The second new machine will not at first be recognized as a specific machine, but rather as a basic platform from which many other machines may be built. It will utilize a standard library of HP well-thought-out functions. This library will be the first project of an expanded R&D effort to gather all of the comments, suggestions, and complaints of the present implementations of such functions as the random number generator, solver, and integrator. The internet is full of information to bring these applications to perfection. To better build the machine of the future Symbolic math functions will be made more rigorous and they will include constraint geometry. An automated triangles program will be perfected so as to become standard on all mid range and high end models.

Traditional brand case design will be HP archetypical. The hardware aspect of large memory or high end future machines must include an I/O capability. PC based software will also be developed to allow the home and professional computer world to pass data back and forth from Excel, Word, and JPG file sources. SD card memory is working well and will be used until a new technology replaces it.

Once a general purpose platform is in place various new models can be easily released to replace the aging models that have kept the doors open while this three year development program was undertaken.

In a sense the design of the calculator will become programmable and all it takes is a specification of what the machine has to do and the time to market is then very short. This approach also allows machines, especially for exam taking models, to be subsets of more powerful versions. This eliminates the requirements of exam takers having to master two different machines.

Along with a revitalized product development program will be a more sincere customer support program. While the "total customer experience" sounds good the idea must be based on customer engagement. The focus of this program will be to make the calculator personal again and actively engage the customer.

Five major relatively inexpensive changes will be made.

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1. *Brand recognition is vital. Sears recently had its reputation threatened and Sears responded by David Figler, a vice president of the company, making a clear and very public statement regarding the guarantee and support that Craftsman tools have stood for. See the link for details.* http://consumerist.com/5183468/ . *The customer's comments that follow the warranty description also illustrate my point.*

1. Set a rigorous standard when writing the product "brochure." Write it with the goal that the Internet user will be inspired enough to print it. Provide complete specifications along with beautiful photographs of the product, real photographs, not software generated or heavily digitally processed photos. Make the presentation technical with an educational element that will command the readers attention with humor, product views not normally seen (show details that will make a teckie's heart soar), and convincing application oriented arguments why HP's *traditional* brand is the machine you must have.

2. Greatly expand the *HP Solve* webletter to make it more interesting and informative with an editor who will personally engage the readership. Use a larger variety of regular applications oriented "columns." Make the publication self standing so that it may be printed and read in the traditional newsletter manner.

3. Expand and revitalize what is called the HP Calculator Club, and make it a real club with the idea that the member/customer is to be engaged and active – to the extent that their limited time allows.

4. Create an automated programming library. You gain access to this library through your club membership. The library supports all *traditional* brand programmable (even macro programmable) models. Features of the library include a list of authors, applications, program of the week or month, and personal recognition of the contributors. The accepted (moderated if possible) programs will be entered into standard (self checking) forms. All programs will have checksums. Models with I/O will be able to down load the programs. A particular emphasis of the library will be to encourage student problem solving programs.

5. Calculator support will be of two types – formal and informal. The latter may be in the form partnerships with independent websites. The informal (HP sanctioned, but not responsible) support will provide a more rapid response to user questions and issues. This is part of the "secret weapon." HP must establish a personal relationship with these people to encourage them to be unified and productive in their enthusiasm of HP's calculators.

Once the new development program is in place a decision must be made as to what model is to be released first. Here is where the market driven mind must take over from the visionaries who have been driving the program so far. A critical element is the product feature/benefit mix that is designed to have a parallel educational element. At this point the educational commitment requires a serious review. an important part of the educational market support is the use of the "secret weapon" that TI has been using for many years.

There are certain historical success elements that can be used to decide the character of the new machines based on the universal platform that has been developed. Once again we have to look at a few additional vision beliefs.

1. Programmability is only used by a tiny portion of users (<0.5%).
2. Programmability popularity is limited by the nature of the programming "language" and its support.
3. One of the most successful machines in terms of the programs written for it was the HP-41, Why?

The first machine based on the new platform must be programmable. It must be programmable in a simple focal[(2)] like language.

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2. *FOCAL is a1968 computer programming language. See a description at the link: http://en.wikipedia.org/wiki/FOCAL_(programming_language) The FOCAL language I speak of is the result of an HP contest by Henry Horn of HP calculator newsletter fame to name the HP-41 programming language. See http://en.wikipedia.org/wiki/Focal_(HP-41)*

4. Programmability provides the applications that make the calculator more convenient, and it is the bridge to the next generation

The exact function/price mix of the new *traditional* brand machines is to be based on market studies of what is needed, and not what is presently being offered by others.

I previously mentioned a "secret weapon." In the second article of this trilogy I mentioned the unique relationship that HP has with its active and shrinking user community. The loyalty these users have to the HP brand is amazing. They spend considerable personal resources each year to attend an HHC in the hopes that they may contribute to the creation of, and continuation of, better HP computational tools. The HP "secret weapon" would be to develop a low key formal program to engage these users to help with the "rebirth" of HP calculators. Certainly the informal aspect of support would be well received by these people and they would be happy to participate in building it.

Are the ideas I suggest here unique or original? Not really. Anyone who has taken the time – oh I forgot, no one has the time any more – to really study HP's user community will find that these ideas have been talked about for decades by many users. Why don't other manufacturers in the market place think in these terms? What is the key element? In simple terms it is vision, quality, and leadership. HP has been there and the others haven't. Does HP have the resources to venture into excellence once again?

Here is the critical question. Can a non-calculator management team muster the interest and support to make the required investment for a new generation of HP calculators?

All HHCers eagerly await the answer.

I am always interested in hearing from you at rjnelsoncf@cox.net

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