The X Group – V1b

Richard J. Nelson

Introduction

I formed the X Group to provide encouragement and support to HP Calculator management to continue with HP Calculators because the "HP User Community", HPUC, was concerned about the future. My discussions with a "new" HP calculator manager at CES were encouraging for a special group of HP enthusiasts providing consulting services to HP. I had outlined a formal structure and back ground of a small group of people for what was to become the X Group. The HP manager was Fred Valdez who explained to me and Jake Schwartz over lunch that he really thought that would be a good idea. He had a Technical Director Position open and as soon as he fills the position I should work out the details with him. That was in January and three months later and the person turned out to be Sam Kim, who as luck would have it, was a PPC member. Sam was, in my opinion, the most qualified HP manager ever to be in a calculator management position. He really understood the HP calculator enthusiast and the technical aspects of calculators. I had worked with all HP Calculator general managers since the beginning of the "Club" in June 1974 and Sam was the best.

Setting the scene

When HP was still in Corvallis, especially during the HP-41 days, I was asked to participate in various projects, especially evaluating new products i.e. beta testing, and in some cases alpha testing. I was also asked to suggest specific people to also perform these tasks.

Getting started

Discussions with HP also raised a question at HPs management (Corporate level) as how to define this special proposed "arrangement". The legal group took a very long period of discussions to arrive at an answer that they could not legally define how such a group could/should operate/coperate with HP.

I had a somewhat similar experience with HP when I started CHHU. HP legal is was slow to arrive at a definitive answer as to the suggested name. I suspect that the slowness in this case was simply due to the low priority of the issue.

I wanted to call the group The **HP** **C**alculator **U**ser's **C**lub - HPCUC. This was unacceptable because the name might suggest that HP was involved – which it wasn't. Instead the **C**lub of **H**P **H**andheld **U**sers – CHHU was immediately suggested, they quickly agreed, and the new Club was formally announced. I had a special relationship with HP Calculator management when I started PPC. I believe part of the reason was that I clearly defined what we were about, and I had a formal set of operational guidelines[(1)] which provided a good working relationship. I have also written about these points in other documents. The X Group was proposed in similar terms.

Meanwhile we were working closely with HP by signing their standard Non-Disclosure forms. See Appendix D. You will notice that the NDA agreement used the term X-Team and not our real name. As we worked with various HP people I/we could identify those who were experienced and knew about the user community, and those who had just read the NDA because of the NDA name mistake. One HP person even used the term X-Men.

A brief history

The X Group was founded in March 2003. It was officially disbanded August 27, 2019 because the new licensing agreement that HP had entered into with two other companies to continue making calculators

would probably not be interested. Besides, we had no long term personal contact with these two companies. In addition, my perspective was that they did not even understand the incredibly complex technology and expertise required to evaluate, design, and test new calculators. In addition they had so few employees that they could not justify any new technical people required. They would just use the two HP technical people, Tim and Cyrille, as consultants. They could also use non-HP specialists/consultants for any specific issues/problems that would arrive.

As HP shrank to less than the number of calculator related people counted on one hand, the primary areas these two companies were working with were the China producers and making sales. Below is a copy of the email I sent to the X Group announcing the end of our activity?

X Group Related Files

I was searching for information to provide a summary of the X Group activities and I was quite surprised at the activity shown by my Directory list. See the next page.

Since HP calculator activity has essentially stopped the purpose and function of the X Group has been served and let's use today **August 27, 2019** as a termination date. I remember writing a summary but I have yet to find it. That has the "official" founding date. I will send another email with additional information – and perhaps a summary if time allows.

One of the important X Group elements was the its secrecy. The intent was to "impress" HP with our activities. This organization was not their normal business type practice and that was the idea. We were to be unique, and as such, we should be – and were – treated as such. Let's keep all of his Confidential until the end of the year. By that time it should be clear that it no longer matters.

Because I see HP at the end of its calculator business I have written my Swan Song article and it is attached. Please keep it Confidential for now. The Title is RIP. Any comments, ideas or suggestions are welcome. I am not sure what I will do with it other than include it on the HHC 2019 Conference Thumb Drive. While I have a website topic of: Is the End Here? I will wait until all the presentations are in and then consider actually adding it (That title) to the schedule.

I noticed one Word file that I will copy starting on page 3. It may bring back a few memories. HP kept using the name X Team, but I think that they eventually changed.

I also noticed an EduCALC internal MEMO that included a date for HP's move to Australia – see page 7. Jake, is that on your CD?

X <> Y,

Richard

A short list of HP-X Group projects

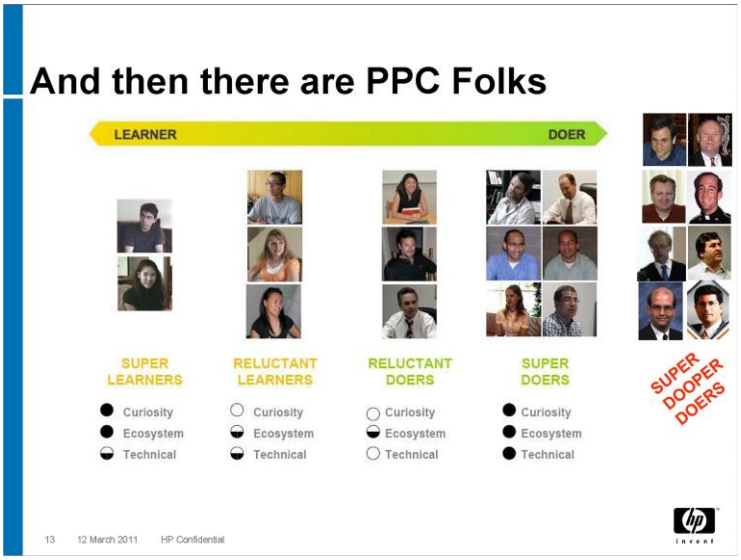
There were 16 years of actively working with HP on many different aspects of designing, evaluating, testing, and supporting HP calculators. This HP activity declined in the last few years. Rather than try to remember all of these projects I will simply provide an early list of projects in Appendix D.

HHC Conferences

Because most the same people who were in the X Group were also Conference Committee members it was easy to have HP and X Group meetings prior to the Conference itself. This

worked especially well when a Conference was held at or near an HP facility. As far as the other attendees were concerned we were privately meeting with HP personal to discuss Conference matters. These meetings were formal and involved significant preparation for both X Group members and HP participants. Because of our NDA agreements there was no subject/topic that could not be discussed – new products, sales data, future plans, etc.

We often had HP HHC speakers and a slide shown by Sam Kim at HHC 2011 shows X Group members in the far right group.



The X Group was not a public group and we wanted to be able work with HP without having to deal with confidential information questions from other users.

X Group Communications

Because all X Group members knew each other personally as close friends we had a high level of trust and we worked well together. We called each other frequently and of course we used email. We (Joseph) tried to set up our own data base/web site, but that didn't work very well from a practical perspective.

HP would set up group Conference calls and I checked with Jake who has the recordings of some 20 calls. These lasted an hour plus usually on weekends. The best data we have ids about 27 meetings total.

The group consisted of selected overlapping interests so that there were at least two Xers who could take on a project. Sometimes it was attending conferences and press events with a formal report. Because we were all very familiar with all of HPs products we could answer questions. Many times an assisting Xer was thought to be an HP employee.

Payment considerations

Most of our work was volunteered simply because we were interested. If, however HP needed one of us for a more formal project HP would offer a contract for work and payment. "As far as I know Gene, Jake and I were the only X Group members who had such "paid jobs" Gene for writing his Machine Aps, Jake for work on a manual and I for Editing HP Solve. From my perspective I wanted to use HP Solve to get certain information more formally into the public record. There are a lot of urban legends regarding RPN and other aspects of HPs activities that I wanted to set the record straight. The additional cost from an

income/tax situation actually was not much of a net gain in that it required a formal tax consultant, 1099s, etc. I was retired and only living on social security

As I have previously mentioned Sam Kim was an exceptional person to work. One day he asked each X Group member to list any HP calculator products that were desired, and he brought (most of) them to an HHC for each X group member.

X Group members - Everyone

The X Group was fairly consistent over its 16 years of existence.

X Group Members

1. Joseph Horn
2. Dave Marsh
3. Wlodek Mier-Jedrzejowiez
4. Richard Nelson
5. Bob Prosperi♦
6. Eric Rechlin
7. Jake Schwartz
8. Namir Shammas♦
9. David Shier♣
10. Gary Tenzer♣
11. Gene Wright

♦ These people joined later.
♣ These people left the group.

Documenting the X Group

There are so many files among us that to compile them into a complete dated history would take a full time month or more. This short compilation is just a small representation of a 16 year activity. Just the large number of HP people that we met and worked with is quite surprising. Of course seeing how HP people work at all levels up close and personal was very educational/informative.

Observations and conclusion

A turbulent calculator market and a shrinking calculator staff was cause of concern for serious HP Calculators users (seriously dedicated customers) to volunteer to consult with HP as a small organized group for all aspects of calculator research, competitor analysis, public events, Alpha and Beta testing, manual reviews and editing, documenting, and brainstorming.

The article is only five pages with 56 pages of X Group documents/appendices to illustrate the volunteer work that was done by 11 members over 16 years.

While talking to Sam Kim regarding the IR printer Input request (Appendix J) I was inspired to write the extensive EduCALC Technical Note #64 which has the most complete IR Printer information I know of. I also learned that HP had a lot of product in a warehouse and was reviewing the IR printer market.

Special thanks to Jake Schwartz and Dave Marsh for sending me some of their files and all of theX Group who received this artile. At the last minute I spoke with Sam Kim and he provided some useful information/dates

(1), See my article Starting A Calculator Club in the excellent UK HPCC driven book RCL 20, ISBN 0-9510733-3-8 © 2002. I list and explain seven major values for organizing and operating a Calculator Club pp 37-46. Many of these values and practices have also been discussed in other documents as well.

Appendix Index

The appendices are in no special order. Because some of the documents also had similar formatted appendices there is confusion as to which may apply. Also it should be noted that most email addresses, etc. have been changed or no longer exists. The same also applies to internet links.

Appendix A – Page 6, 2 pp. HP-X Group Conference Call Summery/Agenda. Jake (and some others) has 27 Audio files recording the calls. Includes a photo/inforation of Aspen/HP-39gII.

Appendix B – Page 8, 2 pp. Initial Comments for HP Calculator Newsletter Issue 2 – Fall 2005. After I assumed the Editorship of HP Solve it became clear that HP was struggling with the newsletter.

Appendix C – Page 10, 2 pp. How May HP Distinguish Itself in The Calculator Market?

Appendix D – Page 12, 1 pp. X Group (X-Team was HP's term) CDA #13441 Form.

Appendix E – Page 13, 2 pp. X Group – HP Projects. This lists 35 specific projects. It is very difficult to assemble a formal list of Xers and HP projects. Besides there is always (my) risk of omitting someone or project. There is also a nice short description of what the X Group is.

Appendix F – Page 15, 18 pp. HP Calculator Recommendations For the Attach Group. HP calculators were merged (downgraded) into the HP Accessories Group. This was a serious red flag for the X Group. It signaled the beginning of the end.

Appendix G – Page 33, 11 pp. Rectro Calculator Request to the X Group.

Appendix H – Page 44, 33 pp. Staying Loyal to HP.

Appendix I – Page 61, 1 page. Typical Formal request for inputs. Each half was originally a single page word file with spaces between the questions to be filled out and returned.

HP –X Group Conference Call Summery and agenda – 110611
Richard J. Nelson

Julia Wills**(1)**, now in her 3rd week at HP, has replaced the KenCo team comprised of Linda Kennedy, and Brittany Conant. "We" had the most contact with Brittany. She will be making a presentation at Ft. Collins in a week or so and she wanted input from the X Group. She didn't want everyone X so only the most active people were asked to participate. As it turned out a UK number wasn't available on a new conference system, – Laura's account - and Wlodek could not participate even though the meeting time was "adjusted" to accommodate him.

Date: Saturday June 11, 2011.
Time**(2)**: 2 PM PDT, 1 hour.
Topics: (1) Low end Scientific
(2) Graphing Calculators
(3) Long Term Educational Solutions
HP: Laura Harich, Julia Wells; both in San Diego.
X Group: Richard Nelson, Jake Schwartz, Gene Wright, Joseph Horn
Here is Julia's email for scheduling the Confernce**(1)**.

"From: Wells, Julia [mailto:julia.wells2@hp.com] **Sent:** Friday, June 10, 2011 8:12 PM **To:** rjnelsoncf@cox.net; genela@comcast.net; jacob.g.schwartz@lmco.com; jakes@pahhc.org; joseph.k.horn@gmail.com; wlodekmj@yahoo.co.uk; Harich, Laura **Subject:** X-Team Conference Call

When: Saturday, June 11, 2011 8:00 PM-9:00 PM (UTC) Dublin, Edinburgh, Lisbon, London. **Where:** Toll Free Dial in from US: 866-409-2889; Conference Code: 936-609-7250"

"Hi Everyone,
Sorry for the delay in sending out the conference call information. I am looking forward to speaking with all of you tomorrow at 2pm PDT. I would like to spend a few minutes going over the current product line and then transition to hearing your thoughts on potential opportunities - specifically low-end scientific calcs, graphing calcs and long-term educational solutions. I expect to leave most of the talking up to all of you, as I want to take in as much as I can!

Please feel free to forward to any members I accidentally left off of the meeting request.
Thank you in advance for your time and I look forward to speaking with all of you tomorrow!
Regards,
Julia"

Everyone introduced themselves and we followed the agenda.

(1) **Low end Scientific**: Laura "defined" a low end scientific as < $ 20, preferably < $ 15, intended for use K→12. I think that we were disappointed that the definition was based on cost rather than a function set**(3)**. A high end scientific over laps with a graphing calculator. I asked for this definition because of the wp-34s activity. Low end examples given are the 300s, 10s (the 30s is on its way out). Gene suggested that a run of perhaps 1,000 HP-30b machines could be made without keyboard notations for repurposing usage. Perhaps Eric could sell them similar to HP-41

(2) blanknuts. I suggested Eric could also provide a 30b overlay for "normal" use and then the user community could repurpose the machine easily. Laura and Julia were not very encouraging because of all the internal effort it would require even though it would be to just omit the production step(s) of keyboard notations. While it wasn't mentioned during the call Gene is now the source for HP to send out repurposing cables for Cyrille. He charges for the postage and packaging. Cyrille supplies the cables in "bulk" to Gene.

Gene pointed out that the WP-34s is more powerful and many times faster than the HP-35s. This surprised them and since the 35s sales are starting to show signs of softening, the idea of a "new" scientific machine based on the 30 platform is also something to think about.

(2) **Graphing Calculators**: Aspen is the future with its introduction in China in (late?) 2010 and world wide in 2011. I suspect that Tim will be talking about it at the Conference. Joseph is actively bug hunting the hardware and he finds it quite nice with its high resolution gray scale screen. From an education perspective it follows in the tradition of 38/39/40 series machines and from the photo on the right you will note its model number (at present).

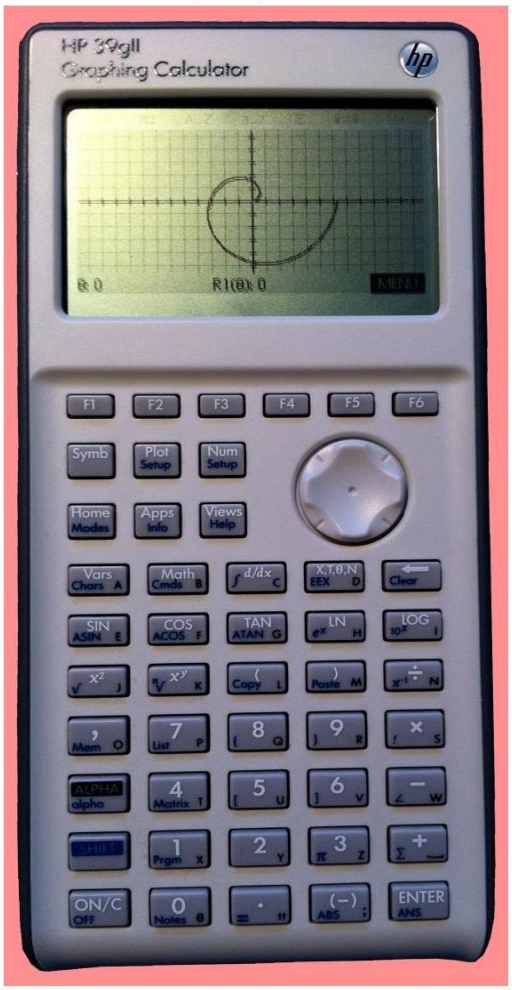


Fig. 1 – Aspen uses Aplets.

Because of the "different" operating system (Aplet comp-atible) there will be a new Data Stream 410 (vs. the 400) version that is intended to work with the 39/40 series machines.

A question that was raised is the advisability of using (rechargeable) Lithium Ion batteries in future machines. The accepted daily/weekly recharging of cell phones was used as the example that it would be acceptable. This greater capacity power source opens the door to greater possibilities for future machines.

Another question raised is the need for a color graphing display. We tended to favor the past HP policy of questioning the added ability compared to the significantly increased cost in terms of the math class room. Of course a high resolution color display is always able to perform much better and it is only a question of the cost.

The need for a new high end HP-50g replacement is once again being discussed and the thoughts are that it should be

Initial Comments For HP Calculator Newsletter Issue 2 - Fall 2005
Feature Story

RJN 240910 Note: I was Editor of HP Solve at the time of a proposed newsletter major change – starting with Issue 30 - and I proposed to be made a technical Editor in that I would still assemble and format the "new" newsletter rather than write a lot of articles as I had done when before it was decided to change its orientation. No one really knew the process I had developed to fit HPs website software anyway.

After reading the first three paragraphs I started thinking, this is a modern, slick, approach that is vague, impersonal, and very professional. What does this mean to the reader?

The reason for this reaction is that the author is not known, the reason for writing the article is not known, and there are quotes from a person that we don't have a clue as to who it is. We might guess that it may be an "Educator."

When I get to the next paragraph "HP to the Rescue" I am really put off because the text is so Conventional (smooth, slick, and almost sickening because it is just like everything else that you may read from Corporate America). This is not necessarily bad; it is just conventional, what is expected, and not very engaging.

Here is the problem. The writing is too formal. It is too authoritarian. It is big stuffy corporate HP.
IF I were to write such an article one approach I might take would be this.

1. The authors name is on the article. The email to contact this person is at the end of the article. This is a real person. Perhaps this person is a teacher at XYZ school in Podunk ID, a small town of 35,000 people. Let's call her Jane Doe. Perhaps her (small) photo is near the beginning. Jane is visiting a large university on a student's field trip and she meets Professor Jack Smedly, a finance professor at UT State. It is because of her casual conversation with Jack that she is writing the article. Perhaps there is a photo of Jane and Jack at the college with students in the background.

The first paragraph then reads.

One of the frustrations that I have is that my students come into their upper level classes without a good grounding in how to use their calculators. This seems to be an equally common issue with those who use finance or scientific machines.

The second paragraph follows.

While visiting UT State I met Jack Smedly, a professor of finance who told me, "In some cases the students aren't using calculators at all in the fundamental business courses." Jack told me of another professor at a nearby school who explained that college professors at their school don't have the time to do remedial calculator instruction. Jack said the situation was the same at UT State.

Continuing,

From my experience while visiting UT State it is clear that many professors require the use of the calculator long after the student has graduated. The calculator remains a viable tool for professionals who

need the portability, low cost, and calculating power that modern calculators provide. In fact, students need to have proficiency on the calculator in order to take many engineering, surveying, financial, and real estate exams.

The next paragraph changes the heading from **HP to the Rescue** to **I think I found a solution**.

After thinking about the situation I came across the HP's website www.hp.com/calculoators/training. You will find . . .

RJN Note: The HP link no longer exists.

Of course the link is active in the "article" so the reader may jump to it immediately if interested.
I won't "rewrite" the article because I think the point is obvious. Have respect for the reader, treat him or her personally, and speak to them "as equals."

As I have said in *Ideas For an HP Teacher's or Student's Newsletter* the distinctive approach of engaging the reader personally helps maintain the positive image of HP. HP does this by "doing" and not by saying as TI does with its slogan "TI Cares." Do not treat the reader as a gullible brainless consumer.
I won't repeat all the points made in the 21 pages of recommendations in *Ideas For an HP Teacher's or Student's Newsletter* except to make a vital point - Value.

RJN Note: This file is on the HHC USB drive. See Appendix C for a summary of related articles.

What I have seen so far is not a newsletter. It may be something similar, but I would not call it a news letter. I am able to slip a newsletter into my book, backpack or briefcase. Call it a web letter or other name, but don't "trick" the readers into thinking something that is simply not true. This is not the actions of a company of quality. You could easily make the "publication" into a newsletter by compiling the articles into a newsletter format. I highly recommend this. Assign a volume and issue number to each for reference. Use a real person as the editor.

If HP Corporate is a major constraint on what may be done with a "newsletter" it may be time for some creative problem solving. There are many solutions to this and I absolutely believe that HP is not getting what it needs from the present approach. It may be justifiable, it may be politically correct, and it may make everyone happy, but I question the return on the investment on what is obviously a lot of money and time spent on the effort. A real newsletter would have this material ***and*** five times as much additional useful stuff of practical use to the reader. Efficiency and usefulness should be the measure of content for the harried modern reader.

RJNNote:. The newsletter soon died with Issue 32 (three issues). I presume that it was for lack of contributors. The selected editor was unable to write articles as required to ”fill” each issue. I was once asked to write an article for a new issue objective, but when I gave them the time required they said that they would do it. They missed their publication date. Editing a newsletter is not as easy as it seems. See *HP Solve* # 31, Pages 7-9, STEM Education for an official historical perspective on the newsletter and intended change. The short RJN article puts everything into perspective. All HP Solve issues and a very nicecomplete index by Jake Schwartz may also be found on the HHC thumb drive.

Richard J. Nelson October 23, 2005

How May HP Distinguish Itself In The Calculator Market?

Richard J. Nelson - March 22, 2005, updated retired email address 5/31/07

0. Authorship and justification: These articles are being written in response to Fred Valdez at a recent HP Handheld Conference **(RJN 240911 probably HHC2004?)** asking how traditional HP machines are distinctive and how users historically view their products. We traditional users recognize that students represent the primary calculator customer in today's market. The traditional HP user (post student in age, and a user for many years) has the experience to help provide a well-studied perspective for HP using new technology, a new business
model, and recently a new CEO.

Special thanks and acknowledgement to Gary Friedman, Joseph K. Horn, Walter P. Little, Wlodek Mier-Jedrzejowicz, Dave Marsh, Jake Schwartz, Gary Tenzer, and Gene Wright.

Some contributions in these articles are intentionally not author identified.

This series of articles is a "living" document with topics added as questions and issues arise regarding the products of the calculator market place. The advanced calculator, like any electronics high tech product category, has a finite life as new technology replaces it. A serious question to ask is, "Will the high end calculator as we know it still be a viable product at the start of the next decade?" Just like the calculator displaced the slide rule before it, other devices are poised to replace it. I called the first programmable calculator, the HP-65, a personal computer, because that is what it was. The cell phone, as a personal product category, is adding functionality that encompasses many of the functions that are ideal for a truly personal (always with your person) computer. Is the "cell phone", because of its widespread use, to be historically recognized as the next chapter in the truly personal computer?

HP has inspired its customers for decades. The recent gap in continuity with major changes in HP calculator group management is another justification for expressing these thoughts. Perhaps some of the historical inspiration HP provided its user community in the past might now be returned.

Comments welcome. rjnelsoncf@cox.net

The articles are listed (in this **#0**) below with a brief description.

 # Title Description *.pdf size # Pages, pp

1. *Staying Loyal to HP* The traditional product quality the long term HP calculator user expects is discussed with ideas for improving service using the current HP business model.
90 KB 26 pp.

2. *Providing Inspiration the HP Way*
This article makes nine very specific suggestions for providing the type of service that HP is famous for.
12 KB 2 pp.

3. *Thoughts on selecting Calculator Colors*
Ten thoughts related to the use of color for calculator cases and keyboards are described. Ten additional professional recommendations for best text legibility are also included from Aries Arditi, PhD. 57 KB 6 pp.

4. *Why Educate?* The scientific, financial, or graphical calculator user is an intelligent customer immersed in education. Providing a little unexpected educational value is one means that HP may distinguish itself. 650 KB 9 pp.

5. *Ideas For an HP Teacher's or Student's Newsletter*
After publishing four newsletters dedicated to HP's calculator products over a ten year period, and inspiring several others with these efforts, I know firsthand how powerful a product driven, and reader driven publication can be to inspire loyalty, and to indirectly build the user base. A properly managed newsletter will write itself and there will never be a shortage of interesting, useful, and inspiring material. 570 KB 21 pp.

6. *Personality Traits of an HP Calculator User*
The special and unusual relationship, some would say passion, that exists between a large number of users and their HP machines is legendary. This article attempts to characterize the personality traits of the traditional HP calculator user in contrast with the more modern student user. These traits are contrasted in terms of the time shift as well as the technology shift over the 33 years since HP created the first scientific pocket calculator. 2 MB 23 pp.

7. *Being Distinctive With an Information Driven Calculator Web Site*
The ideal user support mechanism is the Internet. It is cost effective, comprehensive, and available to just about every person on the planet. The HP Calculator Web Site offers a wonderful opportunity to be distinctive, personal, and enormously productive. A vision for doing so is described and a comparison with the existing web site is made. A Grade of B is given with suggestions for improvement.
212 KB 12 pp.

7b**.** *Form or Function?* This article is referenced by the one above and is included because the argument is made that a high end calculator is a different kind of product and that it must work very well first and look good second, unlike other competitive products. 35 KB 3 pp.

Totals**1**: 4.8 MB 101 pp.

Note 1. *Some articles have graphics which make them large compared to their page count.*

Revised 11/01/2002 Copies to Participant, Functional Manager, Agreement Coordinator and HP Legal

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   HP (name, phone, e-mail): Sam Kim, 360-212-2387, skim@hp.com
   Participant (name, phone, e-mail): _____

2. **HP Confidential Information**.
   (a) Confidential Information, if any, disclosed by HP is described as Future and prototype HP calculator design, product, hardware, software, manuals, packaging, roadmaps, factory information..
   (b) Confidential Information disclosed by HP may be used by the Participant and its Associates, if any, only for the following purpose and subject to the Section 6 obligations: Testing and evaluation of HP calculators - all results of test and evaluation are subject to this CDA.

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   (a) Confidential Information, if any, disclosed by Participant is described as -- Not applicable --. No information disclosed by the participant will be considered confidential by the participant. Any and all information provided to HP may be used by HP and may become property of HP and subject to this CDA..
   (b) Confidential Information disclosed by Participant may be used by HP and its Associates, if any, only for the following purpose and subject to the Section 6 obligations: -- Not Applicable --.

4. **Disclosure and Protection Periods** (a) The **Begin Disclosure Date** is 2/1/2008. (b) The **Disclosure Period** ends on the following date or at the end of the following time period 1/31/2009. (c) The **Protection Period** ends on the following date or at the end of the following time period for all Confidential Information 1/31/2011. (d) If not specified above, the Begin Disclosure Date will be the date information concerning the subject matter of this Agreement is first disclosed, the Disclosure Period will be one month, and the Protection Period will be six months. The Disclosure Period and the Protection Period start on the Begin Disclosure Date.

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         2) Unmarked (for example, orally or visually disclosed) but treated as confidential at the time of disclosure, and described in detail and designated to show its confidential nature in a written message sent to Recipient's Agreement Coordinator within thirty days after disclosure; except that Confidential Information does not include information that satisfies an Exception before disclosure. Confidential Information is only Confidential Information from the time of disclosure until the earlier of the time when an Exception is satisfied or the Protection Period ends.
   (d) **Non-Confidential Information** is all Disclosed Information that is not Confidential Information. If specific Confidential Information satisfies an Exception, the specific Confidential Information becomes Non-Confidential Information from that time forward.
   (e) An **Exception** is satisfied if the specific information: (i) was in Recipient's possession prior to receipt from Discloser (ii) is publicly known or readily ascertainable by proper means, (iii) is rightfully received by Recipient from a third party without a duty of confidentiality, (iv) is disclosed by Discloser to a third party without a duty of confidentiality on the third party, (v) is independently developed or learned by Recipient, or (vi) is disclosed by Recipient with Discloser's prior written approval.

6. **Obligations** (a) During the Protection Period only, Recipient will protect and ensure its participating Associates will protect the Confidential Information by using the same degree of care, but no less than a reasonable degree of care, to prevent the unauthorized use, dissemination or publication of the Confidential Information as Recipient uses to protect its own confidential information of a like nature. Recipient may reassign its employees. Recipient will provide reasonable prior notice to Discloser and will request a protective order if Recipient is required to reveal the Confidential Information under a subpoena, court order or other operation of law. (b) Recipient will comply with all applicable export laws. (c) At the end of the Protection Period, Recipient's obligations end.

7. **Non-Confidential Information; Waivers** (a) Non-Confidential Information is not subject to confidentiality or trade secret obligations, and may be published, disclosed or used for any purpose, except that no license under any patent, trademark, mask work or copyright is granted. (b) Discloser waives all claims or portions of claims that assert the confidentiality of, limitation of use of, breach of duty of care with respect to, or breach of this Agreement with respect to, Non-Confidential Information arising at any time or with respect to Confidential Information arising or continuing respectively after the end of the Protection Period. (c) Any cause of action, whether in contract, tort or other, either arising under this agreement or alleging the confidentiality of Disclosed Information, if litigated, will be litigated to the court; the parties will not request a jury trial; and the parties irrevocably waive any right to a jury trial.

8. **Choice of Law**. Without regard to conflict of law provisions, this Agreement is governed by and will be construed in accordance with the laws of the State of Delaware.

9. **Warranty**. Each Discloser warrants that it has the right to make the disclosures under this Agreement. Each Recipient warrants that its participating Associates will protect Confidential Information in accordance with the terms of this Agreement. **THE PARTIES MAKE NO OTHER WARRANTIES. ANY DISCLOSED INFORMATION IS PROVIDED "AS IS."**

10. **Miscellaneous**. Neither party acquires any patent, copyright, mask work or trademark rights under this Agreement, including under Sections 2 or 3. This Agreement imposes no obligation on either party to purchase, sell, license, transfer or otherwise dispose of any technology, services or products; does not create any agency or partnership relationship; may be added to or modified only in a writing signed by both parties; is the parties' complete and final agreement; supersedes all oral or implied agreements concerning the Disclosed Information; and may be signed in duplicate originals, or in separate counterparts, which are effective as if the parties signed a single original. A facsimile of an original signature transmitted to the other party is effective as if the original was sent to the other party.

HP	**PARTICIPANT**
Hewlett-Packard -- HP Co. (USA)	X-Team
(for example Company, France S.A., Japan, Compaq Computer Corporation)	*(Company Name)*
18110 SE 34th Street	
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Vancouver, WA 98683-9497	
(Address)	*(Address)*
By	By
(Functional Manager's Signature) *(Date)*	*(Authorized Signature)* *(Date)*
Sam Kim	
(Name)	*(Name)*
Director, R&D, HP Calculator Division	Member of X-Team
(Title) ***FAX: 360-212-7387*** *(Entity)*	*(Title)*

X Group - HP Projects

As of March 2003 to 2006 & up dated to September 2010

1. Reviewed and provided suggestions for the Educational "newsletter." Predecessor to *HP Solve.*
2. Prepared articles for the Educational "newsletter."
3. Attended and reported on the 2005 NCTM 2005 meeting in Anaheim Ca. representing HP and giving a talk on HP graphing calculators.
4. Attended and reported on the 2005 mathematical education meeting in Copenhagen, Denmark, representing HP (*Wlodek*).
5. Reviewed, updated, and formatted the 653-page hp 49g+/ hp 48gII graphing calculator advanced *User's Reference Manual*. An expanded update has been produced for the HP50g *(Eric)*.
6. Beta tested and reported hardware and software bugs on the HP 33s calculator, and on the HP300s Smartcalc (*Joe and Wlodek*). And other models – especially *Gene.*
7. Reviewed the 82240B IR printer (with formal report) with regards to providing an updated version.
8. Reviewed and provided a general competitive perspective on the TI-89 Titanium calculator.
9. Reviewed and provided a competitive analysis on HP's financial calculators.
10. Prepared a one-day brainstorming meeting for the next generation of HP calculators in Los Angeles.
11. Coordinated and helped prepare surveys, comments, and observations of various products and user attitudes during several HHC's (User Conferences).
12. Prepared extensive reports on ways HP may be distinctive in the calculator market place.
13. Participated in weekend group (HP-X) conference calls since early 2004.
14. On going reports of retail outlets and the competitive calculator products and product mix.
15. HP49g+ beta testing and bug reporting. Extensive analysis of the non-registering keyboard problem and the continued testing of several attempted fixes.
16. Testing and evaluation of HP's emulators. **On going.**
17. Participation in the updated graphing model roll out.
18. Brainstorming on potential features for the possible HP-19BII+ (whose predecessor, the 19BII, was the flagship financial machine prior to 2007).
19. Edited the HP12c platinum owner's manual to include algebraic examples throughout.
20. Edited and updated the HP12c solutions handbook to work with algebraic for the HP12c platinum.
21. Created learning modules available on HP's website for all HP calculators except the SmartCalc 300s and the new HP 10bII+.
22. Beta tested the HP12c platinum and reported software bugs.
23. Presented Virtual Classroom sessions for over a year for Finance and the Power of the HP graphing calculators.
24. Provided content for every ***HP Solve*** since its first issue *(Richard)*. **On going.**
25. Edit the ***HP Solve*** newsletter starting in January 2010.*(Richard)* **On going.**
26. Worked closely with HP employees on the development of the HP 35s, HP-20b, HP-30b and HP 10bII+ calculators.
27. Beta tested the HP 12c+ changeover.
28. Spent one day after conference with HP employee to work on the early aspects of the HP 20b. *(Gene)*
29. Beta tested the HP 35s calculator.
30. Beta tested the HP 30b calculator and worked closely with HP employees regarding structure of programming environment as well as unique financial functions compared to the competitor's models. *(Gene)*
31. Beta tested the HP 10bII+ calculator and worked closely with HP employees regarding the additional features / functions added to this model. *(Gene)*

32. Tested early emulators for the HP 15c+ that were running on HP 12c+ hardware.
33. Tested breadboard versions of the HP 10s calculator. *(Joseph)*
34. Presented recommendations to HP in 2006 to update the HP 10bII calculator to be feature competitive with the TI BAII Plus.
35. Met with HP calculator marketing and R&D at each annual Winter CES in Las Vegas since the X Group formed. **On going.**

V6c Reviewed by: Richard, Gene, Wlodek & Jake.

X Group Information
(September 2010)

The X Group, formed in March 2003, is composed of four pairs (a primary and a backup) of people with a broad range of HP Calculator expertise. We live in two countries and five US states. How much experience does the X Group have with HP Calculators? Who are these people, and what are their interests? – see separate Bios. Each one of us has been active in the HP User Community, HPUC, for a decade or more. Among the eight X Group members, we have 248 years of cumulative (average of 31 years each) HP calculator experience.

Among us, we own every calculator since the HP Advanced Products Division first started producing handheld calculators in 1972 with the first shirt pocket scientific calculator, the HP-35A. Many machines that were not released are also part of the X Group legacy. The X Group has the most complete library of HP literature, brochures, newsletters, posters, etc. to be found anywhere. Each member participates with a strong desire to insure that HP continues to be the innovative leader in the design and production of the most advanced personal computational products possible. We donate much of our time and when HP needs it we contract with HP on specific projects.

Our X Group contributions range from new product evaluation, writing Training Guides, contributing to the HP Math Library with new algorithms, documenting HP's products, and it's user community for 36 years, suggesting new product designs, finding bugs in products (especially accuracy errors), evaluating proposed designs, providing a connection to the HP User Community, writing Manuals, suggesting promotional materials, and recommending new professional talent.

X Group membership is based on trustworthiness, and a proven long-term desire to improve HP's handheld products, especially calculators. There are no secrets among the X Group. Its members provide a balance of hardware, software, mathematics, and user interface expertise, and are leaders of the HPUC.

We have worked with four General Managers of the HP Calculator Division and all of us are under a general Confidentially Agreement. The existence of the X Group is Confidential to HP only. As far as the HP User Community is concerned we do not exist.

HP Calculator Recommendations For The Attach Group

X Group Recommendations

If HP decides to make a serious commitment/investment to the calculator business it should leverage from its past accomplishments as much as possible while using the essential current business model.
One method of doing this is to divide the calculator product line into two brands. The first brand would be strongly related to HP's traditional design criteria, and the second brand would be machines more competitive with the lower cost models.

The first "traditional" brand would basically be HP product designed while the second "market" brand would essentially be re-badged market driven designs. If the more competitive "market" brand products build profits more resources will be available for "traditional" brand models.

The recommendations in the list are vision-based and intended for the "traditional" product-driven brand.

A) They are relatively easy to implement.

B) They are very low in cost to implement and some recommendations only require a policy decision.

C) They will help make HP calculators more distinctive in the market.

D) They have been used (inconsistently) by HP in the past.

E) They provide a new and different way of performing a feature or function – in keeping with the desire to make the calculator ever more convenient to use in order to extend its life.

F) They provide "brand recognition" value to the calculator line with customers saying; "Obviously, it's an HP."

Each feature, function, or policy is briefly presented in a numbered X Recommendation list, with a corresponding Appendix that discusses the details. Several other very specific related recommendations may be included in the respective Appendices. A Summary and Conclusion may be found on page 4. Not all X Group members agree 100% with all of these recommendations, but we all agree that they should be made. Supporting documents are part of this document and are listed on page 5 under References. These were sent to Dirk Dykson along with this document.

Summary List of X Group HP Calculator Recommendations
In no specific order, XR is X-Group Recommendation

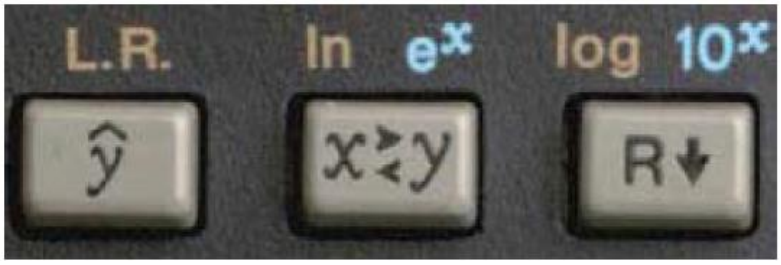
XR1. Always provide a name plate well for the owner's name. See Appendix A and reference 1.

Fig. 1a - HP-48GX sets the standard.

Fig. 1b - HP35s well is much smaller.

Fig. 1c – The HP30b well is great.

XR2. Use the HP-pioneered stylized "x" and "y" variable fonts on all future HP calculators. The X Group will reconstruct these for HP if needed. See Appendix B and Reference 4.



XR3. Prevent percent-change function confusion by providing increased input convenience and both answers. See Appendix C and Ref. 1, and 2.

XR4. Be accurate and professional in the use of such terms as algebraic when describing products. Perhaps Arithmetic or Chain logic would be a better and more honest Entry-system logic description. It is presently inaccurate. See appendix D.

XR5. Re-establish HP's reputation for keyboard reliability, especially on machines of HP's hardware design. The 6 year saga of the HP49 keyboard is remembered by many of HP's users. HP's Keys must be tactile felt when pressed and always register. See appendix E.

XR6. Engage the Customer. HP is famous for its customer relationship and its educational approach of promoting calculators. See Appemdix H and References 5 and 6.

HHC 2005

XR7. Be consistent by having the ON/OFF key in a corner on the keyboard. Newer

models have been inconsistent and this distracts from brand recognition and distinction in the market See appendix G.

XR8. The 5th Generation, Gen5, is eagerly looked for by HP's serious users. It has been 22 years since Gen4 and perhaps Gen5 can't happen. Here is one Gen5 "definition." See Appendix F.

XR9. Always use the highest contrast colors for the keyboard. Change colors infrequently using similar colors on multiple models. See appendix I and Reference 7.

XR10. Be model to model consistent in applications such as the Solver, especially on the finance models. One simpler version could be a subset, but not different. Include finance variables in a general solver. See appendix J and References 9 & 10.

XR11. Always include a computer input/output for all programmable machines of substantial memory. The HP35s suffers this limitation.

XR Summary and Conclusion

XR is X-Group Recommendation

The HP Attach group has recently taken over the responsibility of HP's calculator product line. This responsibility is especially challenging because of the long tradition, ground breaking, and technical leadership HP's calculators have developed. The current super-efficient lean and mean business climate demands new ways of producing calculators, and if a better method cannot be found resources may be best spent in more profitable Attach product categories. HP's calculator line, however, is presently

profitable and other manufacturers seem to have taken a coast-to-the-end minimum R&D approach to maximize their profits.

Because HP has always provided leadership, this stage of life for a highly technical product line may also provide an opportunity to further expand the business. The specific recommendations made in this document promote a vision for making a continuing commitment to the business. Primarily these are:

- Evaluate the current/future importance/effectiveness of brand recognition. This is most critical.
- Divide the product line into traditional and market brands
- Better utilize the two most powerful and effective tools available – Calculator website & Webletter – to more effectively engage the general customer in a more personal and interactive way. The calculator blog is meaningless if it is not active and current. These activities require very calculator-experienced people to be motivating.
- Recognize that Technology, and especially Time are the most vital considerations for a renewed commitment to the business.
- Consider the educational calculator product line as a student/teacher tool for learning and develop a Business-Wizard-like platform upon which the HP calculator product line is built. If the customer/user is provided the hardware tools they will develop the software needed. This has been proven by all four previous generations.
- Review conventional functions to make them faster and more convenient to use. Even the way algebraic entry calculators work may be improved.

These recommendations are based on the X Group's six years of working with HP and its members 232 cumulative years of HP calculator user experience over the full 37 years of HP's calculator business. We have no financial knowledge of HP's calculator business, and we can only represent the customers' view.

Wednesday, October 21, 2009

Joseph K Horn
Silverado California
Mathematics, Bug Hunting

David Marsh
Palmdale California
Embedded Hardware, I/O

Wlodek Mier-Jedrzejowicz
London England
Mathematics, Programming

Richard J. Nelson
Mesa Arizona
User Interface, Efficiency

Eric Rechlin
Houston Texas
User interface, Hacking

Jake Schwartz
Cherry Hill New Jersey
User Interface, Programming

Gary M. Tenzer
Los Angeles California
Finance Models, Real Estate

Gene Wright
Brentwood Tennessee
Finance Models, Applications

References
Note: HHC is HP Handheld Conference.

1. HHC 2008 paper by Richard J. Nelson titled **"If I were King"** Ten commandments were provided that are suggested to be used to form the basic vision and guidelines for all of HP's calculators.

2. HHC 2003 paper by Richard J. Nelson titled *Vital (Automatic) Applications Not Found On Today's Machines.* Ten specific applications were suggested and described.
3. HHC 2003 paper by Wlodek Mier-Jedrzejowicz titled *Vital Functions not Found on Today's Machines.* The concept of a function is described and more advanced examples are provided.

4. HHC 2009 paper by Joseph K. Horn titled *and Harley Coke Mustang Calculators.* The distinctive use of a stylized variable designation on HP's keyboards is a brand recognition method used inconsistently on HP's calculators. This distinctive character set seems to have been forgotten by recent designers.

5. HHC 2005 paper by Richard J. Nelson titled *Why Educate?* discusses the promotional and distinctive advantages of HP Educating its customers.

6. HHC 2005 paper by Richard J. Nelson titled *Ideas for an HP Teacher's or Student's Newsletter* provides extensive detail for the "formula" for defining an HP newsletter.

7. HHC 2004 paper by Gene Wright titled *Calculating Contrast, Analysis and suggestions for color and contrast choices on HP calculators* suggests a simple and easy method to determine the contrast of two colors using their RGB values. A specific "standard" (≥ 200) is suggested. This is an excellent method of quantifying and determining a proper mix of colors for contrast and easier reading.

8. HHC 1995 paper by Richard J. Nelson titled *HP Handhelds: Standards and Support Ideals - HHC 95.* This paper was written before the pervasiveness of the Internet and much of what it advocates is not applicable. The concept of an HP Support Clearing House on page 8 may have some value today. See Appendix F. TI uses it.

9. HHC 2005 paper by Namir C. Shammas titled *Solve in HP Calculators*. This paper compares the various versions of solver methods used in HP calculators in contrast to solvers used in other calculators.

10. HHC 2008 paper by Namir C. Shammas titled *New Root-Seeking Algorithms*. This paper explores new root finding methods that are related to the use of the solver.

Appendix A - Name Plate Well

The HP Palmtops had name plate wells on the back. This inspired Jim Carter of EduCALC to champion the same idea for HP's calculators in the early 1990's. HP, at the time, thought that the idea was a good one and figure 1a shows the HP48GX with a name plate well. Jim offered an engraved name plate to his customers and Richard had 30 of them made "for future models." The name plate idea was mentioned in Richard Nelson's HHC 2008 paper titled **"If I were King"** as commandment three.

The list of all ten Commandments is shown below. See the paper, Reference 1, for additional references and an additional perspective as to why these are needed.

Figure 1b shows the HP35s name plate well which is much smaller and the "standard" name

plate had to be taped to the calculator. This is not a pretty sight. Perhaps the rush-to-meet-schedule policy caused this. The new HP30b (based on the 20b) name plate well is great, and offers a wonderful hope for the future.

HP48GX measurements	HP30b measurements
Height 294 mils.	Height 392 mils.
Width 2.020 inches.	Width 2.144 inches.
Depth 32 mils.	Depth 32 mils.

A name plate well on a quality product allows the owner to show pride in his or her investment. It also shows that HP has given considerable thought to their products and distinguishes its product in the market place. The well protects any label that is attached to the calculator. The effort to modify the plastic tooling to add a well is much easier and lower in cost than most other tooling changes.

Any calculator investment for the future should include standards that define what makes an HP calculator. The customer must also be told why an HP calculator is better and different from other calculators. This builds pride of ownership and brand recognition.

The lack of a consistent HP look for "recent" calculators is quite evident to HP's customers. This recommendation is based on the idea that the HP calculator brand should be easily recognizable and HP calculators should be distinctive.

Ten Distinctive HP Calculator Recommendations

If I had to make a set of HP Calculator Division rules (A sort of Ten Commandments) that every HP calculator employee had to follow with regards to new HP calculator products they would be as follows.

1 **We are HP, no other calculator shall come before ours**
An HP calculator is the machine that all others are compared to. An HP machine is expected to provide the correct answer over the full range of numbers (exponent decades) the machine is designed to handle. Accuracy is preferred over speed, cost, or appearance.

2 **Every HP calculator that supports RPN shall have a double wide ENTER key**
The double wide ENTER key is probably the most distinctive feature to identify an HP calculator. Previous models without this feature clearly demonstrate a lack of "understanding" of the legacy HP calculator product line. This rule shall never be violated.

3 **Every calculator or accessory shall have a standard name plate well**
A quality product as unique as an HP calculator will instill pride of ownership. Providing a means of expression for this is mandatory, and shall be clearly demonstrated with a name plate well in the case.

4 **Every calculator shall have a unique model number**
Modern marketing directs many manufacturers to find distinctive names for their products. Calculators deal with numbers. Numbers have a specific order and to the technical person makes more sense than some cute name such as The Avenger, or Miracle Worker.

5 **Every calculator shall have an AC adapter connector**
An HP calculator is a portable and productive tool. As such it tends to be kept more readily available

for problem solving. If the user starts a long running problem and the batteries die after a day or two of running, valuable time is lost. While the average user may not require this, HP recognizes the serious problem solving situations of all types of users – especially to inspire young students to experiment. The external DC connector shall be reverse polarity protected and marked with the DC voltage, load, and polarity. While it may not be economical for HP to provide an AC adapter, the ability to use one is inexpensive to include and demonstrates a commitment to serious problem solving. An accessory or computer connection may require unusually high power from the machine that could be augmented by an AC adapter. If the user doesn't have batteries on hand the calculator may still be run from the AC adapter or alternate DC (car battery) source.

6 **Keyboard layout/menu shall be organized to operate with minimum keystrokes**
Pressing calculator keys is work and requires time. Pressing three keys instead of pressing five keys represents time savings and improved efficiency. Presenting the keyboard and menus in a logical and visually organized way also aids the mental process of selecting (finding) the required keys to press.

7 **Every model shall have all changes published and referenced to serial numbers**
Silent rolls of hardware updates and other software changes shall be documented (using the HP web site) to assist the customer who buys one machine model on Monday and another on Friday, to be sure they will have the same machine. A company of quality is up front with its customers regarding changes, especially ROM changes.

8 **Thou shall have a top-of-the-line programmable model that looks forward**
The high end machine, presently the fourth generation HP50g, may not provide the necessary profits required for good business, but the high end model points to the future and provides the platform for maximum creativity. The ideas tested in this model will filter down to the mid-range and low end models as technology costs are lowered. The high end model is a general purpose "universal" platform that shall be designed with strong considerations for third party and accessory use.

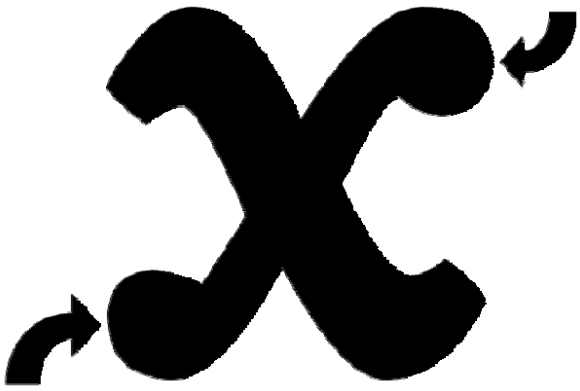
9 **Every math calculator problem (function) shall be solved correctly by every model**
HP calculators are unique in terms of the method of providing the answer. If the machine is a ten digit machine the answer is correct to ten significant digits ± one unit in the last place. There are no hidden or guard digits as are commonly used by TI, Casio, or Sharp. What you see is what you get. Users of competitive machines often think that these "extra" guard digits provide additional accuracy; they do not because HP specifically processes the last digit to be mathematically correct, ±1 unit in the last place.

10 **Thou shall not covet thy competitors' designs**
Business in the market place must return a profit because without profit nothing else happens. Often the term race is used as in the race for new technology, etc. Indeed it is a race, and being in the lead is most desirable. One of the worst things a racer may do is to look back. This action only causes a distraction and impedes progress. When you are the leader all you see in front of you is your vision. If you understand what you are doing with research and standards you are in virgin territory driven by what you know is right. Thou shall not copy your competitors' designs because HP's designs are perfection oriented for providing the very best possible computational tool.

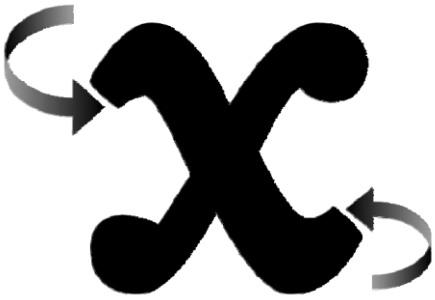
Appendix B – Recognition and the HP Keyboard Font
Joseph K. Horn

From the 1960's through the 1990's, HP used an instantly recognizable font on their keyboards, a font that clearly means "HP" to savvy customers. It has some unique features for all variables (such as *x* and *y*), including a Roman-italic style; rounded ends on the first stroke and flat ends on the second stroke; and heavy strokes of almost equal weight. The result can be seen in this quintessential HP key:

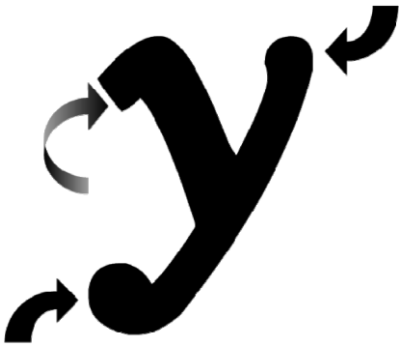
Notice that the first stroke of the x is very heavy and has unique *rounded* ends:



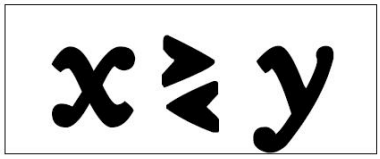
The second stroke is also heavy but it has large square (flat) ends: See next page.

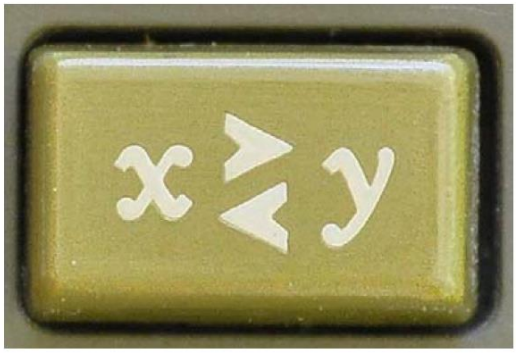


HP's **y** has the same characteristic round and flat ends, Roman-italic style, and two heavy strokes:



Finally, HP's distinctive **x≷y** key uses special arrows, one above the other:





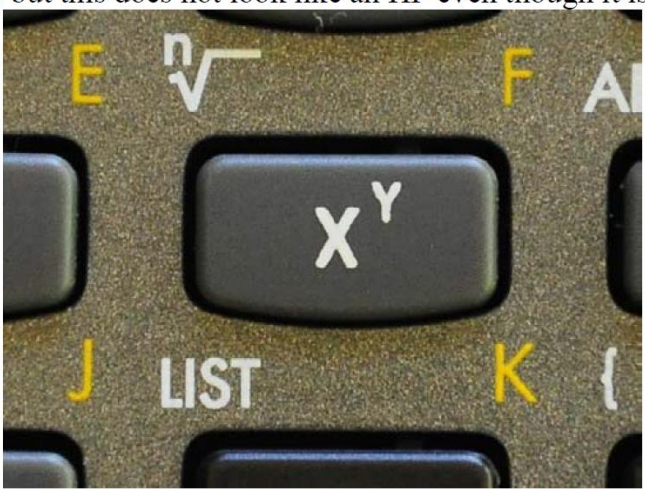
Here are the **x≷y** keys on four older HP calculators. Check out their similarity:

Now look at the following two recent models. Notice the unrecognizable fonts and symbols used:

Although the focus in this article has been on the **x≷y** key, the HP font issue affects the entire keyboard. For example, compare these two **y^x** keys:

This immediately looks like an HP…

… but this does not look like an HP even though it is.



Brand recognition is an important factor in marketing and sales. HP should therefore return to the use of their unique keyboard font. Changing the font on every new model proclaims to the world that the new models are not really HP's at all. If this is done for the purpose of using whatever font is currently in vogue, be aware of the side effects: students will shun them for already being out of style, and engineers will shun them for looking cute instead of professional.

Bring back the HP Font, not because it is better, but because it is HP, and recognized as such.

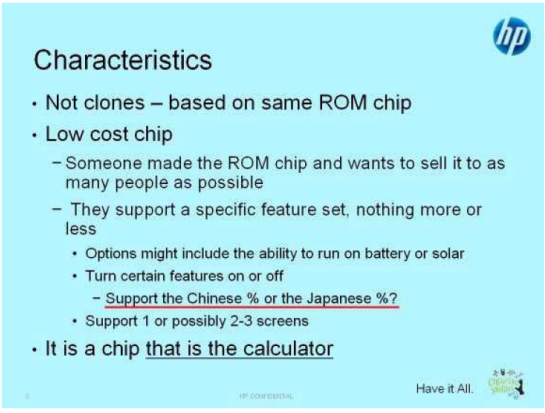
Appendix C – Improve Percent Change Function

Percent calculations are the most common of the statistics functions. It is the one function that most people relate to, and is the most common numeric value used in the Star Trek TV series and films.

This percent change idea was expressed in another HHC paper, One Minute Marvels, by Wlodek Mier-Jedrzejowicz and Richard J. Nelson at HHC 1999. A good description of the "issue" is described in a recent *HP Solve* article at the link below.

http://www.hp.com/large/calculator/august09/hp-48-one-minute-marvel.pdf

Even the "confusion" of percent was illustrated by Tim's HHC 2009 slide as shown at the right.



If HP is to have at least a few models that are designed under its control it would be a big step forward to improve the features of the calculator, especially with respect to making the calculator more convenient to use.

The basic way a calculator works still has lots of features and functions that may be refined to make them work more effectively and efficiently.

If there are two possible results, as in the example of percent change, it would be more convenient to users if both results were presented.

The basic concept of providing both answers if there is any confusion in the problem may also be applied to simple functions such as conversions. Suppose that you wish to convert inches and millimeters. How many? Let's say the problem is 3, for our example. That is all that you need to input. The IN/MM function would return:

3 in = 76.2 mm *and* 3 mm = 0.118 in
OR
3 in is 76.2 mm *and* 3 mm is 0.118 in

The method of implementation would vary with the display capability of the machine. Since even the low end machines have two line displays it may be possible to show both values. Being able to chain the result is another consideration. The higher end machines may display the labeled answers and still have the unlabeled values on the stack – in the order that the menu shows, as illustrated above.
Labeling the conversions saves the user time. Why should you have to press an extra ENTER to copy the input value when you use the conversions (on the Gen4 models) so as to know/remember the value that was converted.

See reference 2 for additional descriptions and details for this concept.

Appendix D – Algebraic Hierarchy

Many present HP data sheets as posted on the HP web site are inaccurate in their description of an HP calculator being algebraic. See the RPN Tips article in *HP Solve*, Volume 4, page 3 for a technical description of the four basic calculator types.

http://h20331.www2.hp.com/Hpsub/downloads/HP_0508_Calc_eNL_sm.pdf

While parenthesis are used for an algebraic expression the primary difference in calculator usage – as described by the user interface or logic system – is that the calculator recognizes the algebraic hierarchy. The easiest algebraic hierarchy "test" to remember and use is the simple problem 1 + 2 x 3 =. If you press these keys on any calculator you will either get 7 or you will get 9 for an answer. If the answer is 7 the machine recognizes the algebraic hierarchy that multiplication is to be performed before addition so 2 x 3 is calculated before adding 1. If the addition of 1 + 2 is performed first and then multiplied by 3 to get 9 as an answer there is no hierarchy, and the machine is considered as an adding machine type of calculator. The market place appears to be "confused' on this issue. HP should provide leadership and be technically correct in its presentation of its products. This is trivial to do, it costs nothing, and it makes HP more distinctive in the market place. Are these "Entry-system logic" designations correct/accurate?

	HP Quick Calc	HP EasyCalc 100	HP OfficeCalc 100	HP CalcPad 100	HP OfficeCalc 200	HP PrintCalc 100	HP CalcPad 200
	Starting at: $ 5.99* Pre-configured Models »	Price: $7.99* Buy Online »	Price: $14.99* Buy Online »	Price: $19.99* Buy Online »	Price: $19.99* Buy Online »	Price: $24.99* Buy Online »	Price: $29.99* Buy Online »
Display	LCD: 1/3D 1/2B 46.14 x 19.20 x 1.1 150L Display Area: 41.5 mm×13 mm	12-digit LCD Digit size: 12 x 3.1 mm Area: 56.6 x 16.3 mm	10-digit LCD: 1/5D 1/3B 130 × 35 × 1.1 AT Display Area: 126 × 28.5 mm		14-digit LCD: 1/5D 1/3B 130 × 35 × 1.1 AT Display Area: 126 × 28.5 mm	12-digit + prompts LCD Digit size: 16 x 4 mm Area: 75 x 24 mm	12-digit LCD Digit size: 13.5 x 4.5 mm Area: 76 x 18.5 mm
Entry-system logic	Algebraic	Algebraic	Algebraic	Algebraic	Algebraic	Algebraic	Algebraic
Financial functions			Mark-up, Tax calculations, Percentage, Grand total (GT)	+, ÷, —, X, =/enter	Mark-up, Tax calculations, Percentage, Grand total (GT)	Cost, Sell, Margin keys, Tax calculations, Percentage, Grand total function (GT) Currency rate conversion*	+, ÷, —, X, =, %
Dimensions (w x d x h)	4.65 x 1.73 x 0.59 in (118 x 44 x 15 mm)	5.32 x 2.88 x .70 in (135 x 73 x 17 mm)	5.34 x 5.28 x 1.08 in (135.5 X 134 X 27.5 mm)	5.35 x 4.37 x 0.71 in (136 x 88 x 18 mm)	8.19 x 6.26 x 1.34 in (208 x 159 x 34 mm)	3.78 x 1.71 x 7.88 in (96 x 43.5 x 200 mm)	6.10 x 4.06 x 0.75 in (155 x 103 x 19 mm)
Weight	1.62 oz (46.0 g)	.18 lb (82 g)	4.94 oz (140 g)	0.20 lb (90 g)	9.24 oz (262 g)	9.8 oz (200 g)	0.29 lb (130 g)
Battery	G10 /LR54/L1130 x 1 (0.015 mWz)	Solar with battery back-up	Solar with battery back-up	USB-powered	Solar with Battery back-up	4 AA batteries or optional AC adapter	Solar-powered with battery backup and automatic shutoff USB-powered
	Starting at: $ 5.99* Pre-configured Models »	Price: $7.99* Buy Online » » Contract Pricing » Find a reseller	Price: $14.99* Buy Online » » Contract Pricing » Find a reseller	Price: $19.99* Buy Online » » Contract Pricing » Find a reseller	Price: $19.99* Buy Online » » Contract Pricing » Find a reseller	Price: $24.99* Buy Online » » Contract Pricing » Find a reseller	Price: $29.99* Buy Online » » Contract Pricing » Find a reseller

HP's reputation is that its calculators always provide the correct answers and that they are mathematically rigorous. Calling an arithmetic (or adding machine) entry system something it is not only makes HP look foolish as well as being incorrect.

Appendix E – Return to a reliable keyboard design

A small number of HP calculator users operate their calculators purely by touch. Some are blind, some work in dark or cramped conditions, some enter numbers by touch while looking at an instrument. All these users absolutely require that a calculator keyboard provide tactile feedback, and be reliable – one keystroke enters one number or carries out one action.

Other users expect the same tactile feedback and reliability even when they do not operate their calculator just by touch. For example, when they press the key labeled "7" they do not expect a 7 to be entered until the key has clicked. Once the key has clicked they expect exactly one 7 to be entered. A single digit 7 must always be entered, and more than one 7 must never be entered. The keyboard must be dependable and reliable.

Obviously this is important for people designing bridges or preparing large business deals. Yet it is just as important to students who want to pass an exam – rather than fail because they calculated 77% of a number instead of 7% of that number.

HP recognized this need for reliable and tactile keyboards on all their calculators, whether advanced technical models, or business models, or student models, for 25 years, from their very first handheld calculators in 1972, right through to 1999. HP calculators were even known for "the HP click." But from 1999 onwards, the look and price of some calculators became more important than their reliability.

It seemed to become acceptable for some HP calculators to have unreliable keyboards, so long as the calculator looked impressive; it was as though calculators had become items of jewelry instead of being tools. The user had to look at the display every time a key was pressed, in case the key failed to carry out its action, or performed it twice. The worst example of this approach came with the HP49G advanced calculator, introduced in 1999. This calculator was to replace HP's top of the range workhorse calculators, the HP48G series. The feature set was extremely powerful, the design was controversial, but the keyboard was a disaster. With this model, and related graphical models, what a key would do when pressed changed from a certainty into a game of chance. Although 99 keystrokes out of 100 worked, the one in a hundred meant that errors were bound to occur. Long-time users of HP calculators were outraged, whereas new users came to assume that HP products – and not just calculators – were unreliable. The calculator team was at that time a new group, and it appeared that they had lost the knowledge of how to make a reliable HP keyboard. Over the following three years, components were redesigned, the internal programs used to detect keystrokes were changed, a key press timer was made available to users, all to little effect. It was not until the fourth and final year of the HP49G product lifetime that the keyboard reliability came close to that of previous models. Then in 2003 the HP49G was replaced by the HP49g+ and the story was repeated – it took much of the three year lifetime of the product for keyboards to become highly dependable.

When the HP49g+ was replaced by the hp50g in 2006, the keyboard clicks and general feel were from its first day much closer to the former HP reliability. Yet even here there is a problem – at times the user presses a key, gets tactile feedback thanks to a good key click – but then nothing happens. It is only when

the user presses a second key – sometimes the same key out of frustration – that the actions of both keys are carried out. Yet again 77 can be entered where 7 is intended. This is rare, but still means that HP's top of the range model is not totally reliable.

Meanwhile, the same problems exist in other ranges of HP models. On the least expensive models, users almost expect unreliability, even on HP calculators. Unfortunately, a few of the mid-range non-graphing models also have this problem to some extent, for example the HP-20b. If HP wants to retain or regain its standing as a producer of high-quality calculators, then the lesson of the HP49G must be remembered – keyboard reliability is a "key" factor in calculator design.

Appendix F – Engage the customer

The current business environment is to reduce human involvement, utilize computers/servers and to extensively use the internet to provide customer information, product specifications, photographs, newsletters (really web letters), testimonials, etc.

It is no longer possible for the public to call HP and talk to a person about calculators. An outsourced technical support firm does provide a limited human connection to answer specific calculator related questions regarding HP calculators, but HP presently does very little to engage the calculator customer. Engaging the customer is possible if HP believes that this is beneficial. The X Group believes that engaging the customer and making the calculator more personal would put HP ahead in all calculator business areas.

A program where this could be started would be to improve *HP Solve* making it interactive, and establishing a teacher's information clearing house. The latter is described on the last two pages of an HHC 1995 paper titled *HP Handhelds: Standards and Support Ideals - HHC 95* Behind the standards explored is the concept of formal and informal customer support. The latter is now being provided by the many websites that support HP calculators – hpcalc.org, hpmuseum.org, etc. – but the customer will usually prefer to go to an HP website as the reputable authority.

A strong argument may be made that the user just uses a web search engine to search for what is needed and uses the first few sites that are returned. They don't care about the source. If indeed this is true, especially for younger (student) potential customers, the whole idea of brand recognition is to be discounted or discarded. Brand loyalty/recognition is a vital question and one that must be completely researched and understood because it may invalidate much of what is recommended (the implied assumptions) in this document.

HP Solve, however, is a different issue because HP is providing this publication and it may be one of the most powerful and useful tools for engaging the customer. Reaching the HPUC is a very important aspect of the decision for additional investment in calculators. A separate near future report/proposal will address this issue.

From the users-need perspective very little has changed since the first days of calculators 37 years ago. There are two elements, however, that have greatly changed. The first is technology. Everyone uses small boxes with keys and displays every day of their lives so their marvel and wonder is gone.

The second is the most challenging element of all – Time! Modern life moves at a much faster pace and everyone wants to be "connected" and continuously stimulated. The Internet provides an incredible

resource at very low cost. If HP's calculator website or "newsletters" are to be used as cost effective tools for the promotion and support of HP's calculators they must effectively compete. The competition is not only other similar activities, but the competition is also against the clock.

If the customer doesn't get what they want from HP's website they have hundreds of other sites that are just a click away. The calculator content that HP provides is a separate issue, it is the way that the content is provided that is the critical issue. Just like a non-responsive keyboard is useless so are broken or missing links on the website. William Lou worked for several months and gave $50,000 to vendors to fix broken website links, and the job was not complete. Broken links have a negative effect on engaging the customer.

Progress has been made, and the most recent issue of *HP Solve*, V15, has 13 primary links and they all work. The X Group will check and report broken links if a response can be expected. Let us know.

Appendix G – Always Place ON and OFF On Same Key;
Always Place ON Key in A Corner

A consistent feature of all HP calculators whose firmware was designed by HP has been that the ON and OFF functions are located on the same key, so a user does not have to search to turn a machine off.

Starting with the HP41 in 1979 and leading up through the Voyager-series units (ending with the 12C Platinum), the ON key acted as a toggle for ON and OFF. Thereafter, with the Pioneer (10B through 42S), Clamshell (18C through 19BII, Charlie (48SX through 50g) and Student-series (38G through 40gs) machines, the OFF is a shifted function above the ON key. Both approaches are efficient. However, with the HP6S, 8s and 10s, the OFF function is positioned elsewhere from ON, as shown in figure 1. For consistency and for better ease of use, it would be a small step in the right direction if all future machines coupled the ON and OFF functions on the same key.

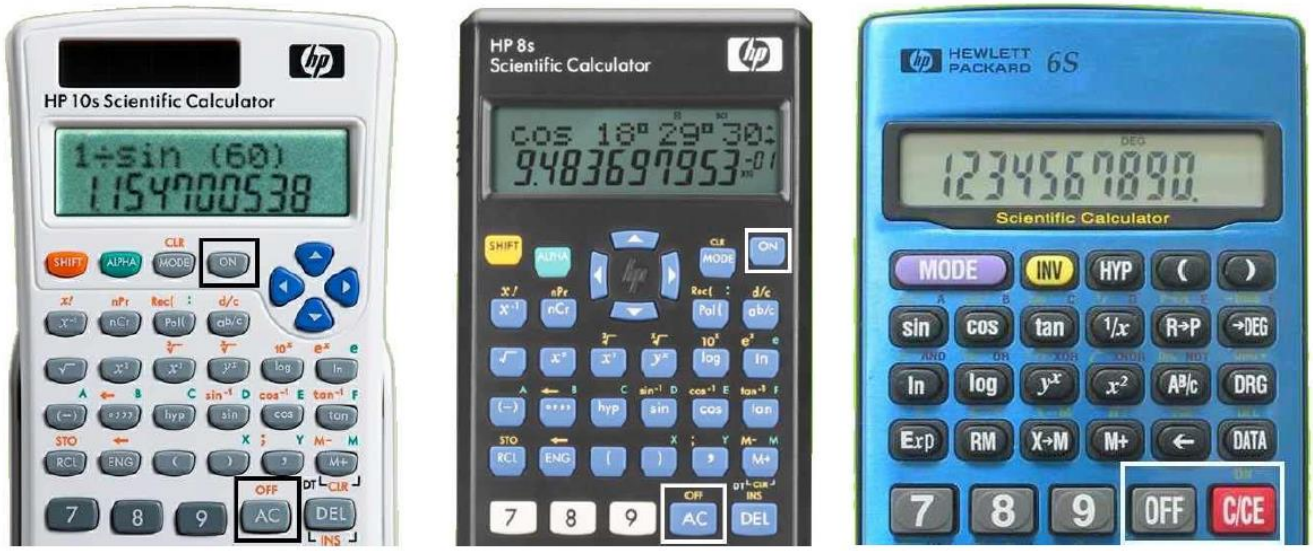


Figure 1. Three examples of HP calcs with ON and OFF on different keys, which is inconsistent with 95 percent of all the other units offered by HP. This is not necessarily a good trend for ease of use.

Likewise, starting with the HP35A and leading up to the present-day units, the vast majority of the calculators had their ON keys (or ON switches) located in a corner of the keyboard. Over the past ten

years however, the units which were primarily re-badged machines placed their ON keys in various places. Examples would be the HP 6S, 10S and SmartCalc 300S. Consistency with the others is preferred.

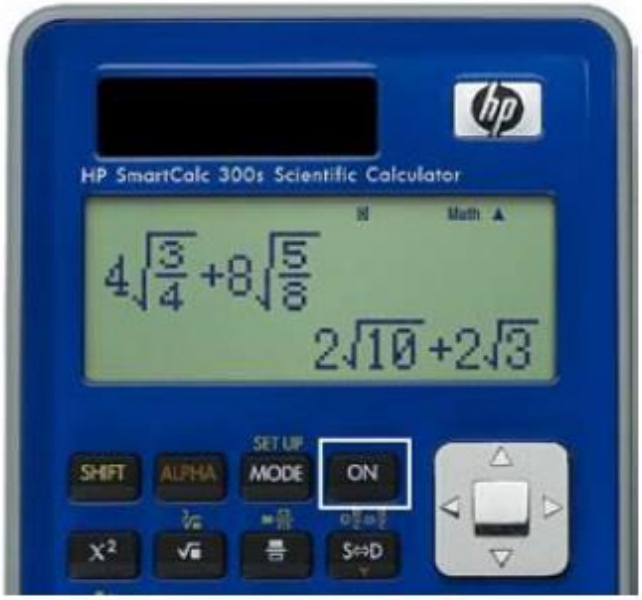


Fig- 2. SmartCalc 300S showing ON key embedded in top row.

Appendix F – A Possible Gen5?

A minimal Gen5, high end, calculator might be an HP50g with a touch screen and a constraint geometry system as developed by Saltire. The Business Wizard, BW, would have been a Gen5 machine, but its appearance was very palmtop, PDA, or cell phone like, and does not project "calculator" very well. The BW concept was to develop a platform from which most of HP's "traditional" line of calculators could be built. One constraint is the necessary (and expensive) software development tools which puts constraints on the user/GUI interface. The marketing thrust for the Business Wizard was that it would be a new product category to keep HP in the "calculator" business when others have left. Very Low cost, disposable, calculators will always be needed; the high end is very questionable and presents a special challenge.

The possibility of a Gen5 machine will be based on perceived development cost vs. sales – and the latter is traditionally low. Complexity and cost support for high end machines requires a serious long term commitment. One advantage of a Gen5 machine is that it may serve as a testing platform to benefit midrange and low end machines. Aside from these considerations the following additional recommendations are made.

1. Retain the customizability of Gen4.

2. Add a fast automatic full triangles application (including area, and the two ambiguous cases) for eventual use on midrange models. Present solver versions are still a bit slow and do not include the area, but additional confirmation/evaluation testing should be done. The X Group can do this.

3. Include the necessary hooks and programmability for the user community to develop the many needed applications such as an eBook reader and photo viewer from files stored on a memory (SD?) card.

4. Enlist the X group early in the design phase. Perhaps the X Group could also enlist others in the HP User Community, HPUC, to provide inputs as a sort of "open platform" project.

5. Make this a calculator, but have its capability to be everything that the student needs.

Appendix I – Use high contrast colors

Colors, as described by most people, are usually described based on the human eye response rather than by wave length or frequency. There are well over a dozen standards in common use. Which system is used will depend on the industry, and one of the most common for calculators is the pantone color system.

Computer usage of color has created digital color representations and software systems such as Paint Shop Pro or Photoshop will have numeric values for their colors.

Using a digital representation of color with an eight bit limit for the three colors; red, green, and blue Gene Wright has suggested the following representation.

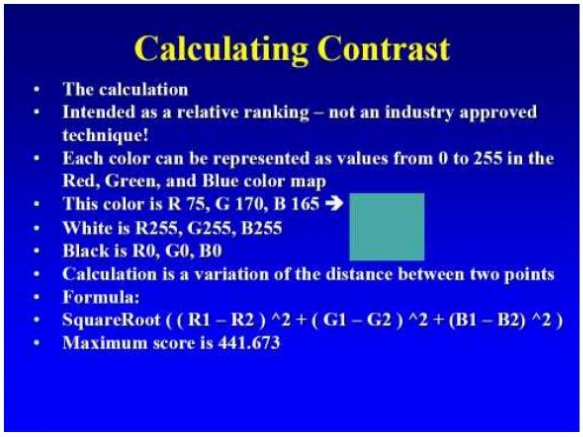


Fig. I1 – Mathematical formula to calculate contrast.

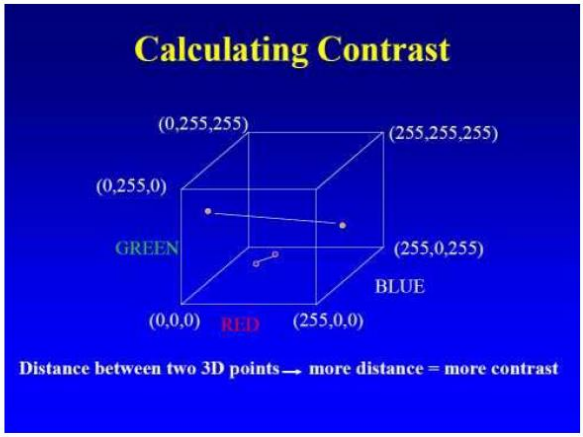
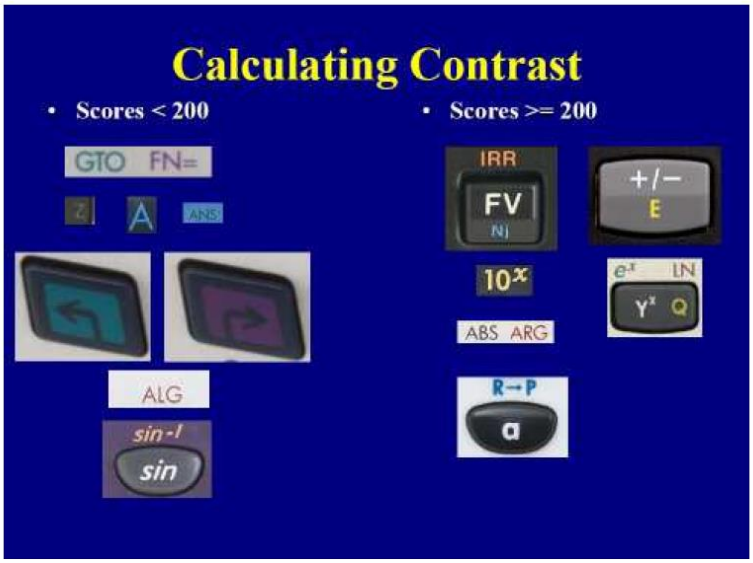


Fig. I2 – Color space used for the contrast formula.

The acceptable value to be 200 or higher was determined, by survey, as being suitably readable for calculator keys. The highest possible contrast value is black on white with a calculated value of 441.673.



The acceptable value to be 200 or higher was determined, by survey, as being suitably readable for calculator keys. The highest possible contrast value is black on white with a calculated value of 441.673.

Appendix J – Be Consistent in applications use

Calculators have become more sophisticated in their problem solving capability. The more elaborate features are sometimes called environments and are akin to running general interest applications programs in the context of the general calculator usage. Examples are Unit Conversions, List Processing, and the Solver.

The Solver is a powerful application and HP has tinkered with it on various models since its first use in the HP-34C in July of 1973. The performance of these variations has been analyzed by Namir C. Shammas in his HHC 2005 paper, see Reference 9. The solver found in the finance machines does not take advantage of the finance variables used in the specialized finance solver in most of HP's (newer) models. The HP 17-BII and HP-19BII are the only two machines where the full capability of the machine is used most effectively. The general solver must be able to call the finance solver variables in order to solve more elaborate and complex finance problems.

Another example of inconsistency in applications is the handling of complex numbers. The HP-15C is famous for its complex number handling capability. The form and format of calculations involving complex numbers should be consistent across the HP brand of "traditional" calculators.

These examples of inconsistency are interpreted by the customer as a casual approach to HP designed calculator computational tools. Basic math doesn't change, why should the way you solve problems on an HP calculator change except to be more efficient and convenient?

Retro Calculator Information Request to X Group

What does retro mean in terms of legacy HP calculators? Is a retro model remembered fondly because the user had one, and became very familiar with it? Is a retro model remembered fondly because the set of functions particularly matched the needs of the user? Is a retro model remembered fondly because of some exceptional feature such as its form factor, or battery life? Or, is a retro calculator one that sold very well and it built a reputation that became legendary among calculator users?

Sam Kim asked the X Group for inputs regarding future retro calculators from HP.

Executive Summary – The HP15C, 16C, and 42S are clear recommendations. The HP-21S & 71B are close seconds. See email **15** for cost information from Jake.

First the recommended models. NO is an emphatic NO, not a default NO.

Model	Richard[1]	Gene[2]	Eric[3]	Jake[4]	Joseph[5]	Wlodek[6]	Gary[7]	Dave[8]
HP-10C	NO	YES						
HP-11C	NO	YES						
HP-15C	YES	YES	YES	YES	YES	YES	YES	
HP-16C	YES	YES	YES[3]	YES	YES	YES	YES	YES
HP-20	NO	YES						
HP-21S	YES	YES		YES				
HP-22	NO	YES						
HP-27S	NO	YES				YES		
HP-42S	YES[1a]	YES[2]	YES	YES	YES	YES		YES
HP-01	YES	NO	YES					
HP-19bII	NO	NO		YES[4]			YES?[7]	
HP-41	YES[1b]	NO						
HP-71B	YES[1c]	NO		YES	YES	YES[6]		
HP-67CX	NO	YES			YES			

1a. A program checksum MUST be added to the HP-42 to make the programmability and compatible HP-41 software seriously useful.

1b. The HP-41 is very slow and anyone using a current machine would soon tire of it. The microprocessor has been redesigned by Monte Daklrymple (HHC 2004). Perhaps it could be used; It is much faster and compatible.

1c. The IEEE Math capability of this machine was/is supreme for the serious math user.

2. Put the 42s into the 17b2+ silver case. Everything maps properly. Give it a USB or other PC interface and load programs, etc.

3. There's nothing like it on the market. I REALLY want this to come back.

4. 19b2 solver in SOME machine or form factor. How about just putting the 19b2 solver in the 17b2+ ?

6. NaN and Inf would be wonderful. So would the ability to create a complex result automatically from a real, without the need to start from a complex in advance. SQRT(-2.0) should be able to give a complex result, without requiring that you specify SQRT((2.0, 0.0))

7. Solver: **Financial machines with solvers lacking the financial functions are a joke**.

Survey Question Suggestions

1. If a retro version of the HP-xyz were made, what improvements would you like it to have over the original model?

2. What are the three primary features you liked about your retro calculator choice?

3. Did you buy this retro model? Is it still being used. If not, why?

4. Would you expect a retro calculator to be more or less expensive than today's equivalent machine?

RAW DATA – Provides valuable insight and context.

# #

0. From: Richard Nelson **To:** Richard Nelson (BCC to X Group)
Sent: Tuesday, September 16, 2008 12:58 PM
Subject: Fw: Question for X-Team - Survey of Retro Calculators

Hello Everyone X,
I received the email below from Sam. Red text mine. He is asking for inputs. Here is a question. Should we answer individually or should we, as a group, make up the list? I think that we could have a better affect if we answer as a group, but it doesn't matter.

Let me know your preference.

Obviously the HP-42S and HP-15C has to be on the list.
X < > Y, Richard

From: Kim, Sam (R&D - Calculators) **To:** Richard Nelson
Sent: Tuesday, September 16, 2008 10:51 AM
Subject: Question for X-Team - Survey of Retro Calculators

Dear Richard –
We've been getting a steady stream of requests for retro calculators to be reintroduced.
We'd like to have some data around this and will be launching an online survey.

Could you forward this email to the X-Team and ask them the following:

• What are the top 10 to 20 calculators that should be listed on the survey? (we'll have an "Other" field for folks to fill in as well)

• What is the reasonable price range for the above models that folks would declare that they're willing to pay?

I'd welcome any other input from the X-Team, including specific questions that should be asked and structure of the survey itself. Ideally, the survey should be launched in the next couple of weeks or so.
Thanks! Sam

# #

1. From: Gene Wright **To:** Richard Nelson
Cc: % Jake ((H)) Schwartz ; % Wlodek Mier-Jedrzejowicz ; % Eric Rechlin ; % Jake ((((W)))) Schwartz ; Gary M. Tenzer ; Dave Marsh

Sent: Tuesday, September 16, 2008 1:20 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators
Hey Richard,
Models and why:

15c: Does this need an explanation? :-) And, given that I have a 12c+ running the 15c ROM, probably not worth going into it.

16c: Same thing. Specific computer science applications not easily replicated elsewhere. 12c+ runs the 16c ROM.

42s: Put the 42s into the 17b2+ silver case. Everything maps properly. Give it a USB or other PC interface and load programs, etc.
Now... beyond those.

21s: Lots of very good, specific statistics material was on this machine that is not replicated elsewhere.

19b2: The reason for this is primarily the solver on this machine was VERY VERY good. The 17b2+ solver is very BAD comparatively. The 19b2 solver had the financial functions directly included (PV, FV, N, etc) and the 17b2+ does not. The 19b2 had trig functions, etc. that worked in the solver, the 17b2+ does not. I'm not sure a machine needs the flip out side keyboard, but the solver in the 17b2+ stinks alot compared to the 19b2 solver.

Let me repeat that. **The 17b2+ solver really really STINKS.** It does not work like every other earlier solver from HP did.

So, the list of models:
10c, 11c, 15c, 16c (sure, why not list all of these?) 20s, 21s, 22s, 27s, and 42s (If you do the 21s, might as well do the 20s and 22s. If you do the 42s, might as well do the 27s).

19b2 solver in SOME machine or form factor. How about just putting the 19b2 solver in the 17b2+ ?
Models I don't think should be suggested: 41c? 67? ... Sorry, as much as I'd like to see a new 67, without a huge increase in functionality, what's the point? I'm afraid recreating the technology behind the 41c would require too much effort from HP.So, machines before the 11c/15c timeframe don't make much sense to me. I also don't see HP recreating an LED model of any sort.

14B? Why? Fix the 17b2+ or buy a 20b. :-) Perhaps this model?? ——————————>

Gene

\# #

2. From: Eric Rechlin **To:** Gene Wright ; Richard Nelson
Cc: % Jake ((H)) Schwartz ; % Wlodek Mier-Jedrzejowicz ; % Jake ((((W)))) Schwartz ; Gary M. Tenzer ; Dave
Marsh
Sent: Tuesday, September 16, 2008 3:11 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

I don't have a whole lot extra to add from what Gene said, but here's what I think:

1. 16C. There's nothing like it on the market. I REALLY want this to come back.

2. 15C. Not much different from the 35s in functionality, so it's hard to really distinguish itself, but it's a different form factor, and it would be cheap to make on the 12c+ assembly line.

3. 42S. To be honest, I'd rather see it with an RPL stack (instead of just RPN), but likely HP would run the old ROM under emulation so I guess no changes are possible. The 50g is just so big and power hungry I would like a powerful scientific model that is small and less battery consuming.

I don't see the 19BII being a very high priority as a retro calc. I don't think there's a lot of demand for something that would have to be so expensive (hinged design, big LCD, etc). I think it would make a lot more sense to produce a 17bII++ (same case but ARM7 platform) that adds the math functionality of the 20b and at least some of the extra functions from the 19BII.

Perhaps wishful thinking: the HP-01. I probably couldn't afford a new one, though.
As far as price, that depends on several factors. I would assume HP would no longer multiple-injectionmold the keys, so the printed-on labels would hurt the maximum price they could charge.

Another issue
is the printed manual. If HP will ship them with the full spiral-bound printed manual, that adds to the value over any other alternative. But if HP makes them as true to the original as possible, with no disadvantages (like battery life) and maybe some advantages (faster?), I could definitely see them charging a premium, but I doubt they would be able to charge as much as the prices when new (after adjusting for inflation). For a non-expandable, programmable model, that means they could probably attract a lot of buyers at the $100 price point.

But the good thing is that because these aren't really competing against anything, but are rather "retro" models for collectors and people who appreciate the quality of older HP calculators, there's no real reason to price differentiate between them. In other words, HP could charge $100 for each of the 10C, 11C, 15C, and 16C. A lower price isn't going to make someone buy a 10C over an 11C or a 15C, because there are much better values out there for the price conscious. Instead, a fixed $100 "retro calculator" price could just mean that collectors would buy all four.

As for me, I'd probably just get the 16C. I have zero interest in a 10C or an 11C, though I have some interest in a 15C. But a 42S would be a great replacement for my 35s.

But overall, I don't enough interest in retro models to bring back anything that would need new tooling to manufacture. The Voyager series is a no-brainer, because all it needs is a new silkscreen (or whatever) for printing the labels and a need to make sure to burn each with the right ROM. The 42S and 27S could

be made on the 17bII+ hardware, but would need a new circuit board (ARM 7 based?) as well, though they could just base that on the 20b board with a separate display driver chip and a separate RAM chip Page 5 of 12 (maybe get both in one somehow?). The rest of the Pioneer series could be made on the 17bII+ with just the additional tooling of a new display. So all of those are feasible, and even if they don't sell much, the investment into each model would be minimal. I bet HP could produce ALL of those models for $100k invested, with much of that investment (the high-end ARM 7 board) being useful for new products too.

I have one (maybe crazy?) idea that I haven't seen anyone mention before. There's lot of good software for the 48 that nobody ever bothered to port to the 49/50. I'd do it, but there are other things I'd rather be doing. What about making a custom ROM for the 50g that emulates the 48GX? Then people could run all their old 48 software on it. A special file on the SD card could emulate the 16 ports of a 2MB RAM card, and you'd just have to deal with the key labels not matching up. Even better, what about a 48gxII? That would be a 48gII with an SD card slot, 48GX-approximating key labels, Meta Kernel preloaded into simulated port 1, and a 48GX ROM revision R. Basically a 50g but with backwards binary compatibility with the 48 and an extra key (I'd imagine the Apple's EEX and +/- keys would both do ENTER, but there would still be one leftover key).

Anybody think this is a good idea? It would be much cheaper than actually trying to bring back the 48GX, but maybe it would have little interest among buyers. Maybe it would be more feasible to just take whatever the development costs would be and pay someone that much to take the time to convert a bunch of 48GX software for the 50g, though. I'd rather see the conversion effort, too.

Unfortunately, any other models are probably impractical. Anything from the 70s, the 41 included, would take new tooling of everything, and I doubt whatever they come up with would be a faithful enough approximation to get any collectors to buy it (Do you really think a new 41 would be compatible with the application packs or a new 65/67 would be compatible with magnetic cards? Would anyone buy a Classic if it didn't have an LED display?). And the other models from the 80s (the 71 and 75, and the Clamshell series) would not only take all new tooling and new LCDs but aside from perhaps the 19BII, they would have zero appeal to anyone but the most hard-core collectors.
Regards, Eric Rechlin
# #
3. From: jakes@pahhc.org **To:** Gene Wright
Cc: Richard Nelson ; % Wlodek Mier-Jedrzejowicz ; % Eric Rechlin ; % Jake ((((W)))) Schwartz ; Gary M. Tenzer ;
Dave Marsh
Sent: Tuesday, September 16, 2008 5:07 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

Gene Wright wrote:
Models and why:

15c: Does this need an explanation? :-) And, given that I have a 12c+ running the 15c ROM, probably not worth going into it.

16c: Same thing. Specific computer science applications not easily replicated elsewhere. 12c+ runs the 16c ROM.

42s: Put the 42s into the 17b2+ silver case. Everything maps properly. Give it a USB or other PC interface and load programs, etc.   Now... beyond those.

21s: Lots of very good, specific statistics material was on this machine that is not replicated elsewhere.

19b2: The reason for this is primarily the solver on this machine was VERY VERY good. The 17b2+ solver is very BAD comparatively. The 19b2 solver had the financial functions directly included (PV, FV, N, etc) and the 17b2+ does not. The 19b2 had trig functions, etc. that worked in the solver, the 17b2+ does not. I'm not sure a machine needs the flip out side keyboard, but the solver in the 17b2+ stinks a lot compared to the 19b2 solver.
Let me repeat that. **The 17b2+ solver really really STINKS**. It does not work like every other earlier solver from HP did.

So, the list of models:
10c, 11c, 15c, 16c (sure, why not list all of these?)

Jake: I agree with most of Gene's choices, however...

20s, 21s, 22s, 27s, and 42s (If you do the 21s, might as well do the 20s and 22s. If you do the 42s, might as well do the 27s).

Jake: The 20s and 22s use different LCD displays from the 27s and 42s, so that might be a stretch. Neither is better than a 35s in any way I can think of...For the same reason that Gene does NOT advocate the 14B (below), I believe the 20S and 22S might not make much sense.
19b2 solver in SOME machine or form factor. How about just putting the 19b2 solver in the 17b2+ ?
Models I don't think should be suggested:

41c? 67? ... Sorry, as much as I'd like to see a new 67, without a huge increase in functionality, what's the point? I'm afraid recreating the technology behind the 41c would require too much effort from HP. So, machines before the 11c/15c timeframe don't make much sense to me. I also don't see HP recreating an LED model of any sort.

14B? Why? Fix the 17b2+ or buy a 20b. :-)

Jake: Perhaps this model? (HP67CX picture removed...but it was sure a good rendering by Dave Hicks!

Jake: I think the 41 would be amazing, but to do it might require an astronomical amount of work and probably wouldn't be really worth it...sad, though.
Jake: Does anybody think the 71B should be in this bunch, or is that one off limits?
Jake
# #
4. From: Eric Rechlin **To:** Richard Nelson ; % Jake (W) Schwartz ; % Jake (H) Schwartz
Cc: Gene Wright ; Dave Marsh ; Gary M. Tenzer ; % Wlodek Mier-Jedrzejowicz ; % Joseph K. Horn
Sent: Tuesday, September 16, 2008 6:16 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators
In case my last email was too long for anyone to read, here's something more specific, also with a few more thoughts.

I don't think there is a lot of demand for retro models, specifically. What there is demand for is models with a specific level of functionality at a specific quality. It just so happens that some old models meet these criteria, but current ones do not.

People want a programmable scientific horizontal calculator, and thus the 15C. Peple want a super-highend (but still compact) scientific, and thus the 42S. Others want simple base conversions and bitwise operations (so a 16C) or IEEE 754 math (so a 71B). And of course, everyone wants the impeccable mechanical quality, the unparalleled accuracy, and the long battery life that HP calculators used to be known for. It's great that thanks to the 12c+ we get can get any Voyager essentially for free. And it's great that with the 17bII+ industrial design and 20b/12c+ platform we can get any Pioneer without a whole lot of extra effort (assuming the ARM7 can do a good job emulating the slower Saturn chips) -- just the $10k or so for a new display for the non-dot-matrix Pioneers and the necessary engineering to get sufficient memory and display driving circuitry for the dot-matrix Pioneers. These are worthy of bringing back.
But for anything else, we need to look to the future and take a different approach. Look to the past for ideas, inspiration, and lessons learned, but look to the future for implementation. Don't get me wrong, I think it's absolutely WONDERFUL that HP is doing this survey. But I am also trying to be realistic.
Regards, Eric Rechlin

# #

5. From: jakes@pahhc.org **To:** Eric Rechlin
Cc: Richard Nelson ; % Jake (W) Schwartz ; Gene Wright ; Dave Marsh ; Gary M. Tenzer ; % Wlodek Mier-Jedrzejowicz ; % Joseph K. Horn
Sent: Tuesday, September 16, 2008 6:28 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

Hi,
I fundamentally agree with Eric. If we had our druthers, I bet we'd ask for a revised 15C or 42S with, say, 64K of RAM and perhaps offline storage.

With regard to suggested prices, one "gimmicky" suggestion which might actually work would be to have the prices be the same as they were originally when they were first released.
What was the 42S back then? $120? On the other hand, the 15C was probably more than that, so maybe if they did the 15C+ and a 42S re-release, perhaps the 42S would have to cost more than the 15C, simply because the hardware would be a bit more capable. One thing that would be for certain - the keyboards of these machines would have to be top notch....whatever that is right now - like that of the 17BII+ Silver.
Jake

# #

6. From: Gene Wright **To:** jakes@pahhc.org
Cc: Eric Rechlin ; Richard Nelson ; % Jake (W) Schwartz ; Dave Marsh ; Gary M. Tenzer ; % Wlodek Mier-Jedrzejowicz ; % Joseph K. Horn
Sent: Tuesday, September 16, 2008 6:59 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

41c: I agree... would be beyond HP's resources to do any plug-ins, etc. If you're just going to emulate the basic 41c, then why bother. Just do the 42s.

42s: Agree with Jake. The 42s with 32K or 64K of ram AND SOME FORM of offline storage to a PC. Has to be a way to push that off the machine.
Voyagers: All available using the 12+ platform. 15c+ and 16c+ paramount.
Pioneers: I agree that the 20s and 22s are probably not worth doing. But, that's similar to allowing the 12c+ platform to do the 10c and 11c. Why? Well, if you can, why not? :-)
The Pioneer list should be the 21s, 27s, 42s, I think.
PLEASE FIX the 17b2+ solver. I personally don't think the 71b with its one line display would be worth doing. Sorry! Gene

# #
7. From: Joseph K. Horn **To:** Richard Nelson ; % Jake (W) Schwartz ; % Jake (H) Schwartz
Cc: Gene Wright ; Dave Marsh ; Gary M. Tenzer ; % Eric Rechlin ; % Wlodek Mier-Jedrzejowicz
Sent: Tuesday, September 16, 2008 7:50 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

Hi, Richard!

> Does anybody think the 71B should be in this bunch, or is that one off limits?
I'd love it, of course, but there's no way it's gonna happen. :-(
My wish list for retro models is small:

15C (with the 15C look-and-feel, but more power under the hood).

42S with the best 41 "modules" built in.

67CX (see http://www.hpmuseum.org/item/product2.htm). 1000CX (modernized of course).
With a 50g in hand, I'd have no use for any other models.

Sam also asks for input regarding the survey itself. I think a good question to ask would be, "If a retro version of the HP-xyz were made, what improvements would you like it to have over the original model?"

This would allow people to ask for a "15C look and feel" calculator with powerful additional features that modern users would probably expect, such as more memory, faster CPU, better programmability & customizability, and even more functions in deeper menus just to annoy Jake. ;-)
-Joe-
# #
8. From: Wlodek Mier-Jedrzejowicz **To:** % Jake (W) Schwartz ; % Jake (H) Schwartz ; Richard Nelson
Cc: Gene Wright ; Dave Marsh ; Gary M. Tenzer ; % Eric Rechlin ; % Joseph K. Horn
Sent: Tuesday, September 16, 2008 10:21 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

Hi Richard,

We are still missing too much information! Is their plan to emulate some retro models on current platforms? To modify current platforms somewhat? To tool up from scratch, even for an HP-71B or an HP-41CXXX?

> I will make a table that includes all of your model numbers. The HP-71B? That would be interesting. IEEE math?

Yes - implement the HP-71B code on the Saturn emulation running on the Arm processors?
NaN and Inf would be wonderful. So would the ability to create a complex result automatically from a real, without the need to start from a complex in advance. SQRT(-2.0) should be able to give a complex result, without requiring that you specify SQRT((2.0, 0.0))

> Conclusion?? Which machine has the best solver?

Too many different solvers! Work with programs _and_equations? Allow long variable names, not just single letters? Search for a symbolic solution before a numeric one?

Several of us want the solver of the 17B, 17BII, 19B, 19BII, 27S (and the palmtop 95LX, 100LX, 200LX)

for its ability to be fully programmed, including the LET and GET commands, which were misprogrammed or dropped on later models.

My personal favourite would be an HP27SII with this solver, and with RPN added the way it was on the 17BII and the 19BII. Many thanks and X<>T, Wlodek

# #

9. From: Wlodek Mier-Jedrzejowicz **To:** jakes@pahhc.org ; Gene Wright
Cc: Eric Rechlin ; Richard Nelson ; % Jake (W) Schwartz ; Dave Marsh ; Gary M. Tenzer ; % Joseph K. Horn
Sent: Tuesday, September 16, 2008 10:30 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

Hi,

Good comments from Eric and from Jake. Sam has simply not told us what his constraints are. I can see two developments. 1/ old models implemented on the current platforms - who would make us nice 15C and 16C overlays? ;-) 2/ ideas from old models to implement on future ones - such as NaN and Inf from the 71B.

If a 42S is done could we ask for extended memory to come back? That provides an excellent basis for files and hence I/O. The return of the HP-41's extended alpha capability (PPC module and Devel module functions) and a clock would be welcome too, with a beeper that even the senior members of X could hear ;-) Thanks, sorry for repeating the obvious, Wlodek

# #

10. From: Gary M. Tenzer **To:** Gene Wright ; jakes@pahhc.org
Cc: Eric Rechlin ; Richard Nelson ; % Jake (W) Schwartz ; Dave Marsh ; % Wlodek Mier-Jedrzejowicz ; % Joseph K. Horn
Sent: Wednesday, September 17, 2008 12:26 AM
Subject: RE: Question for X-Team - Survey of Retro Calculators

I don't have much to add but I would clearly like to see the 16c and 15c brought back in the 12c package. I never liked the 19BII hinged case but, I agree with Gene about the solver; it was fabulous. **Financial machines with solvers lacking the financial functions are a joke**. G

# #

11. From: Schwartz, Jacob G **To:** Joseph K. Horn ; Richard Nelson ; % Jake (H) Schwartz
Cc: Gene Wright ; Dave Marsh ; Gary M. Tenzer ; % Eric Rechlin ; % Wlodek Mier-Jedrzejowicz
Sent: Wednesday, September 17, 2008 5:43 AM
Subject: RE: Question for X-Team - Survey of Retro Calculators

Hi Joe,

I really like your thinking regarding the question about "how would you improve it?"...makes sense. This is consistent with Eric's assertion that perhaps we want boxes *at least* as capable as those older machines.

As for deeper menus - that got me laughing! - and since the 15C keyboard is basically "full" - if one could add menus to the beast, it would be utterly logical. My biggest gripe is throwing away "prime real estate" directly on the keyboard and using menus instead. It still makes me scratch my head that the 18C (on the right-hand keyboard) had over 25 keys with not even a single shifted function on them. Same with the current 17BII+: 18 keys with no shifted functions at all? Gimme a break! :-) :-) I'll be venting on this

subject a lot more at the conference, so get your earplugs
ready <grin>   Thanks, Jake

\# #

12. From: Joseph K. Horn **To:** Richard Nelson ; Gene Wright ; jakes@pahhc.org
Cc: Eric Rechlin ; % Jake (W) Schwartz ; Dave Marsh ; Gary M. Tenzer ; % Wlodek Mier-Jedrzejowicz
Sent: Wednesday, September 17, 2008 2:54 PM
Subject: Re: Question for X-Team - Survey of Retro Calculators

Hi, Richard!

> The 42S makes sense, but its greatest defect, not having a check sum, must be corrected. I agree that a checksum is important, but my main beef with the 42S was its horrible LCD. It had such poor contrast that I could barely read the darn thing except in very bright light. A lousy display shouts "This product is cheap junk!" which should be anathema to HP calculator designers.

-Joe-

\# #

13. From: Wlodek Mier-Jedrzejowicz **To:** Richard Nelson
Cc: Jacob G Schwartz ; Jake Athome Schwartz ; Gene Wright ; Gene Wright ; Horn Joe ; Eric Rechlin
Sent: Thursday, September 18, 2008 6:21 PM
Subject: Re: Retro Results you missed Wlodek's earlier comments

Hello Richard,

Thank you for this neat summary.

I am writing to you, Gene, Eric, Joe and Jake only, as I have already made my views clear in previous emails, sent to everybody.

But as the list does not reflect what I wrote in my earlier emails, I'll repeat it to you and Jake, Eric, Joe and Gene who have been especially enthusiastic.

First, YES to the HP42S. Especially if it gets checksums. Someone said it needs proper I/O. So, Input as well as Output. I commented that it should have HP-41 Extended Memory and related functions restored, as files in Extended Memory are a natural way to perform I/O. I also asked for other extended functions, especially the alpha control facilities, such as those also in the PPC ROM and the Devel ROM.

Second, YES to the HP-15C and the HP-16C. As these can be implemented on the new HP-12C, all we are really asking for is HP-15C and HP-16C keyboard overlays - these need to include a clear way to display the prime (unshifted) key functions.

Third, YES to the HP-27S. This has an excellent mix of business and scientific functions, but is missing RPN. Adding RPN and thus producing an HP-27SII, like the HP-17BII and the HP-19BII, would also give us a model with the excellent solver that included full programmability and the LET and GET functions. Put it on an HP17BII+ and, again, provide a keyboard overlay.

Related to the, above _a_ model with that solver, including LET and GET would we wonderful. The same solver was on the palmtop HP-95LX, 100LX and 200LX, but I doubt that HP would bring those back. Your table lists the HP-21S, and that has a nice feature set, but you list the HP-22 and HP-27 with no suffix. If you mean the HP-22S, it hardly seems worth it, since most HP-22 features were copied to the HP-32S when it was upgraded to the HP-32SII. Only the programs were dropped. If you mean the HP-27S, then I have already expressed enthusiasm!

Sure, I would love an HP-01 - actually, they should go to Jim Donnelly, get the HP-02 prototype, and

build that. Equally I would be delighted with the HP-41 -faster as you say, the HP-19BII, the HP-71B, and the HP-67CX. But all these would require extensive hardware development and despite asking you several times to check with Sam, we do not know if he means to develop hardware or only to put retro software on current platforms.

I'm happy for you to default me to NO on all the others. But there is a difference between this kind of "no", and the emphatic "NO!!!" that some people have given to some models.
Thanks, Wlodek
# #
14. From: David Marsh **To:** Richard Nelson
Sent: Friday, September 19, 2008 4:50 PM
Subject: Contact

Hi Richard,

As far as the retro calcs are concerned, I'm only REALLY interested in the 16C and perhaps the 42S.
I very much regret not being able to make the conference- I hope it all goes well!
Dave
# #
15. From: jakes@pahhc.org
To: wlodekmj@yahoo.co.uk
Cc: % Joseph K. Horn ; % Jake (W) Schwartz ; % Gene Wright ; % Gary M. Tenzer ; % Eric Rechlin ; % Dave
Marsh ; Richard Nelson
Sent: Saturday, September 20, 2008 9:27 AM
Subject: Re: Final Recto Calculator Results
Wlodek Mier-Jedrzejowicz wrote:

>Hello Richard,

>Maybe the very fact that we said so little about pricing means that we expect to pay a premium and are
>willing to do so. Jake's idea that they all have the same price is nice, but we aren't asking HP for charity ;-)
Not all having the same price; the same price as it was at their INTRODUCTION. Therefore, the 15C would be $135, 16C would be $150, 27S would be $110, 42S would be $120, etc. It was just a passing thought. I would expect that if the 12C+ development costs are behind them now, then the cost of a 15C and 16C could be under $100 while doing the work to get the 17BII+ under the ARM7 and doing 27S and 42S machines in that case with that hardware might have to cost somewhat more. If they were priced based on their capabilities, perhaps the 16C and 27S would be cheaper and the 42S and 15C would be more expensive. Jake
# #

Staying Loyal To HP

February 23, 2005

Authorship This is written in response to HP's comments at the HHC 2004 Conference asking how traditional HP machines are distinctive and how users view their products. We recognize that students represent the primary market but the traditional HP user (post student in age, and a user for many hears) has the experience to help provide a historical perspective for HP as it works under new technology, a new business model, and recently a new CEO. Not all contributors to this paper are listed - by their own request.

Richard J. Nelson

Contents

Inspiration

This is being written because of an email received from a long time HP User who has strongly supported HP for many years. There are other reasons to write this, but first read the email regarding the new (at the time) TI84 silver calculator.

Subject: New TI calculator -- that's it... I'm jumping ship...

As much as I love HP, it is hard to stay "loyal" when TI (who has always made inferior products) starts to innovate, provide I/O, and has really worked on the user interface. (It's not unlike staying loyal to Leica when companies like Minolta are doing the real innovative things.)

http://www.84silver.com/

-GF

P.S. - The camera analogy seemed apropos, since we seemed to have turned into the digital camera club of late. :-)

Executive Summary

As HP moves from a re-birth mode to an operational mode it must re-establish some of the traditional values that made it famous in the scientific and financial calculator community if it is to be viewed as a company of quality. This paper addresses the traditional HP calculator vision in contrast to compromises that have been made in producing its current product lineup. In particular the concept of product leadership verses sales leadership is addressed. Recognition is made of the technology changes that have essentially made calculators commodity products. Suggestions are provided to increase the service and educational support that fall within the current business model by improved use of the Calculator web page and awarding a small group of teachers, students, and traditional users as most valued professionals who evangelize HP's calculators.

The executive summary will be written last. Other points/ideas:
1. Explain reliability as an important traditional value.
2. Explain why "passionate" matters. Examples are authors writing books, third party suppliers, etc.

Introduction

I know Gary and I know that he will always have a fondness for HP because of his long history of using HP machines. But Gary, like all realistic users, must choose the tools they use to take advantage of what the latest technology has to offer. Another perspective, an e-mail received a few days before this was completed and reviewed may be found in Appendix E.

If the current HP calculator group is to leverage from their good traditional/historical reputation it is imperative that a clear vision be followed. During the first two years of the current management team the vision was simple - survive! A crisis often requires that normal practices and policies be suspended. The current calculator group has said that there is a gap in their history that they would like to fill but marketing justification will always provide pressure to deviate from the product vision. The question is, what is HP's vision for their calculator products?

What is important is that there be a clear and obvious product vision of leadership to provide product features and services that distinguish HP from TI, Casio, and Sharp. The argument that unless you keep your schedules, in spite of engineering set backs, you will not stay in business, just doesn't make much sense when the customer is sensitive to the traditional HP vision that included quality and reliability. The brutal reality of the banker is that you either carry your weight or you get out of the business. What is the business? Is the business settling for a few "crumbs" that fall from TI's table? Is the business providing a leading edge product of defined accuracy, reliability, and quality that is the best of its class?

How much longer will HP retain a decreasing customer loyalty when customers buy HP machines that don't work (HP49g non-registering keyboard) or that can't be easily used because the display is not readable (HP 33S display)? Neither of these two "defective" models would have been possible when compared to the machines of the past. Additionally, if they had happened, HP would have recognized the problem, stopped production, fixed the problem, and then continued to supply their customers. Companies of quality do not knowingly ship products that are below their quality standard.

Customers have long memories when they buy products that fail to meet reasonable expectations. In the electronics business features and functions are always being improved and HP products must keep up. In a world of Internet price comparisons and an increasing worldwide manufacturing specialization, is brand loyalty an obsolete concept for products under $500? What is required to rebuild HP calculator customer loyalty?

HP's Traditional Vision

The first step in attempting to understand HP's vision is defining what traditionally makes an HP calculator different and better than the others. This vision, like a mission statement, is something that HP must put into words. In the early days (long before the Internet) HP (and the other companies that joined in the scientific calculator business that HP created) advertised their products in the print media, with videos, and with extensive product literature that was available by telephone or written request. HP used to sponsor school presentations and HP attended industry conferences so their name was continually before the public. At the corporate level the Calculator Division was so visible that comments like "The tail wagging the dog" were heard. Calculators were the first HP consumer products and news about HP's calculators could affect HP's stock.

HP calculator literature was plentiful from any stationary store or other retailer and loyal customers savored every new piece. I supported HP Calculators at one of the largest Mail Order (and walk in) dealers, EduCALC. During those ten years (1987 TO 1998) I watched HP change from having a dedicated sales support person we saw twice a month to having a territory support person we saw once or twice a year - usually at new product line roll outs. The cost of supporting such a person in the early days of the HP-35 was $200 per hour to well over $500 per hour at "the end".

Clearly HP was moving from selling through individual dedicated retail "resellers" to selling through the big chain stores. While this sales approach builds volume the chain stores helped "kill" the HP calculator product line. The large chains limited the number of SKUs (to two or three) they would put on the shelf. I asked several high level managers what the future would hold as HP was being forced to reduce their support staff. I was told that they would have to use technology to sell calculators. The Internet became a dominate media for selling calculators during that time and EduCALC added that avenue to the many others it utilized for making its sales. The most famous avenue was the million catalogs that EduCALC published each year. Presently the primary presence HP has before the public is through chain resellers and the Internet.

One of the guidelines (part of Jim Carters vision) that EduCALC used was to sell all accessories related to the machines they sold for HP, TI, Casio, Sharp, and others. They were all in the catalog, with photographs we took ourselves, and customers related to the EduCALC catalog showing calculators, as did the early public related to the (now seemingly ancient history) Sears catalog. The EduCALC catalog was the "wish book" of calculators and it provided technical information not found elsewhere - that was my job as Technical Support/New Product Department Head.

What literature is available from HP today? Is it possible to get a complete list of functions found on a current HP machine? Is there such a list? Is there an accuracy statement for each/all models? We exist in a new world today and we can never go back to the "glory" days of the past. That is very clear. While technology has changed, people haven't. Selling is still an emotional experience, but the customer, however, has much more cost and availability information available to him or her because of the Internet. People qualities like wonder, pride, curiosity, and competitiveness are still the same human traits that HP has traditionally appealed to. What follows is a list of features that are vital to an HP calculator. Many of them are what makes an HP calculator distinctive in the market place.

HP's Distinctive Features

1. Consistency One of the most important characteristics of any person or company is that of consistency. We are naturally more comfortable with what we know and expect. We go to a specific place of business and buy products freely because we know that if we make an error we may return the product without hassle. If we do not have this service we will buy fewer products and we will have to spend considerable resources to be sure that the decision is correct. This approach hinders the emotional aspect of business. Making it difficult for the customer to make the purchase is not the optimum approach for increasing sales. Here is a vital question to ask about the calculator business. What is the ratio of emotion to reason that applies to the decision of a student buying a calculator - ignoring the policy of a department or school to specify a particular brand or model (for their own convenience)?

Consistency also applies to the products as well as the business policy. Here is where the vision aspect comes to play. A very fundamental part of the vision is the classical form-Vs-function philosophy. Marketing will tend to favor form; engineering (at least traditional HP engineering) will tend to favor function. After all, a calculator is ***expected*** to provide the correct answer with the convenience of portability and ease of use. A calculator is ***expected*** to work under all conditions of environment (lighting, temperature, position, etc.) because of its primary reason for its existence - personal portability.

In the beginning the HP machine was designed to be functional first and styled afterwards. When there was conflict between marketing and engineering, marketing often felt ignored. Marketing wants flash and glamour; after all, math is stiff, unyielding, uninteresting, and unexciting to most people. In the early days marketing was allowed opinions on the taper, texture, and colors used on the machine - as long as the engineering/technical requirements were met. Like all things in life there is the promise of what you deliver and the measure of what you deliver. Which is more important, what a company says or what a company does? Which is more important the fluff or the stuff, the sizzle or the steak? Of course you can't be held liable for promises that you don't make. Is it so costly in our modern society for "mistakes" (promises not kept) that it is far safer to never make promises? Is this such a dominating factor that a company of quality cannot profitably exist?

What are the technical requirements that define an HP calculator? How may I know this if I am a freshman high school student? This is a question answered by the vision (which implies standards) for the product. What is more important, copying a competitor's keyboard layout or studying the most efficient keyboard layout possible? Certainly the former is easier and doesn't require you to technically justify your choices. The latter is task oriented and once the layout is complete it should not change until a new well-justified layout improves it. This is part of consistency. It is also part of the next critical traditional aspect of HP calculators, quality.

2. Quality This is one of the most obvious distinctive features of traditional HP calculators. In most of the first two decades HP machines were advertised to last a lifetime. Key notations were double injection molded so they could not rub off. Today you see photos on web pages of HP48 and HP49 Enter key notations that are hardly readable. This is a clear sign that HP's vision of quality has changed. How can you be responsible if you do not specify or imply that the key notations will remain useable after a year of use?

Quality is also a part of consistency. If I buy a machine today should I expect it to be the same as a machine I purchased a month ago? Is this a reasonable expectation for a company of quality? Can you imagine a trial use of an HP machine for a regional sales force that is successful and then company buys many more machines for their national sales force at a later time and the machines are different? Would you expect this from a company of quality? This is exactly the HP case today. Again, we don't understand the vision because we have no way of knowing. We can, however, know the reality of performance by holding the two machines in our hands however. A company of quality does not make fundamental changes in machine architecture without informing the customer. Is it reasonable for a customer to buy two machines of the same model and expect them to give the same answers? This is the product vision the customer sees today. Contrast this with the traditional HP product vision that dictated the recall of all machines because they didn't give the correct answer to the LN of 2.02 if the antilog of the answer was taken.

The concept of vision is vital for a company of leadership and quality. Is the current calculator product line produced with the same quality as the traditional HP calculator product line? It has been said that most American companies that loose their founders usually loose the values the founders practiced. I remember when HP, for example, won a contract for instrumenting the Los Angeles Airport for monitoring aircraft noise levels. When the city became too demanding on the requirements - after much of the equipment was installed - HP simply removed their equipment and didn't charge them - at a multi-million dollar loss. When the US Government demanded that HP continue to make special rugged versions (Mil Spec) of their instruments, HP said that they were rugged enough and Mil specs make them too costly and stopped supplying Mil spec instruments (during David Packard's Government tenure?). While these decisions were surely based on business values they were also based on corporate values of quality.

HP did not like litigation and HP did not want the their good name tarnished. When your name(s) is the Company name you take it personally. HP is now a giant corporation compared to its size in those days and big business is not very personal, the stakes are too high. Calculators, however, are very personal, and they must be treated differently. Is there is room for a vision of quality for calculators, even in the face of low cost consumer out source manufactured products? I believe there is, otherwise I wouldn't waste my time writing this. The vital question is, however, does the current calculator group management believe that there is. After finishing the discussion of the important considerations of interest to the traditional HP calculator customer I will provide specific recommendations I believe are possible using the current business model. See appendices B and C.

3. Accuracy The early machines provided ten digits over a 198 decade range of numerical computation. This technical specification was justified by HP's literature as adequate because most of the constants of science were not known to ten-digit accuracy. HP's unique display policy of a what-you-see-is-what-you-get answer is in stark contrast to all of other calculators which maintained an additional internal (usually three) guard digits. This difference is often incorrectly cited as a reason that TI, Casio, and Sharp machines are more accurate. This issue was debated in the user community and a famous paper written by a numerical methods consultant (to many calculator and computer companies) discussed the idea that 10 clean digits are better than 13 dirty digits. HP had a defined calculator accuracy policy and when I visited the TI calculator group years ago in Texas I saw with my own

eyes that the engineers often had an HP calculator to check numerical values. While HP hasn't been openly obvious in publishing its accuracy policy the informed user could find an HP document that specified that the answer was correct to ten digits plus or minus one digit in the tenth place over the full dynamic range of the machine. HP does not follow the include-the-guard-digit practice that the other companies do. The idea that trig functions are limited to a specified range of numbers much smaller than the dynamic range of the machine is not what an HP calculator user is used to.

HP (and TI and others) participated in a Calculator session at a Wescon Conference that I chaired in which they presented their improved accuracy algorithms in a paper by Dennis Harms, *Making 2^3 equal to 8.* Today, HP calculators provide 12 digits over a dynamic range of 998 decades. The internal value of π is 31 digits of accuracy and traditional users expect an HP machine to give the correct answer. HP calculators must be mathematically correct - and explain why - even when the user community challenges their actions.

An early RPL example was the unit management system. You cannot add 25 degrees to 30 degrees on an HP calculator and get (what is normally expected) 55 degrees. Temperatures cannot be added in this way because of how they are defined. This was a surprise to the user community and while there was quite a bit of discussion regarding this, HP calculators are correct. HP provided leadership by doing the process correctly. Ideally, what should be done, in my opinion, is to provide a flag that allows temperatures to be added if the user desires. Dr. Wickes, one of HP's RPL founding fathers, even went to the extent of providing alternate solutions for those who wanted their machine to behave in a non-mathematically correct manner. This example illustrates another feature of HP's calculators, Usability.

4. Usability Here is an area that the current "vision" - in quotes because we can only guess - deviates with the traditional vision, which we know because we have been told and you may verify it from historical documents found on the Internet. If the primary reason for existence for a calculator today is a specialized portable math tool - at the moment cell phones are poor calculators, but the so called smart cell phone/PDA combinations are not because they may (poorly?) emulate an HP calculator - it must have the usability expected by the traditional HP calculator vision.

This means that responsibility must be returned to engineering with marketing not changing good engineering practice just because the other companies are doing it. A leader has no interest of what is behind them because they are focused on the goal, the vision. At the corporate level HP has often been criticized as being weak in the marketing of their products. They need to be more like the other giant corporations in their marketing practices. This works for most products, but I believe that a mathematical tool is different because it involves an area of human activity that that is very mental, very rational. Buying a calculator has an emotional component, but it is first and primary an easily used tool that must be dependable because it is performing operations that the user either can't do himself or cannot spend the time to do.

Traditional HP calculator users expect their displays to be readable. They expect their keyboards to provide a traditional feel that was established in 1972 and practiced up to the 90"s They expect to be able to read the key notations under all lighting conditions. I have a Nokia cell phone that I will use as an example of "modern" thinking that is contrary to what a reasonable human being expects. I cannot tell you the model number of this machine because Nokia doesn't provide it anywhere on the outside of the package. Other users have told me that the model number is inside the case under the battery. In order to tell you the specific model number (which I must do for fairness) I will have to open the machine and remove the battery - a practice that causes me concern because I may loose something in memory. I know that the back slides off because I have had an earlier Nokia model and it looks familiar. There is a small cutout that seems to be a release "button" at the bottom. I press it only to realize that the back is very smooth and there is no friction between my fingers and the back to slide it off. I am convinced that I understand how it should work so out comes the pocketknife. The blade is the only way I may apply a horizontal force to slide the back off. Once I am vindicated in guessing how the back comes off I see a battery pack with "zero" clearance around it. Again a tool is required to get the battery out to find in very small writing that the model number is 82001M. I had to have some knowledge of electricity to recognize where the tiny battery leads

were in order to avoid shoring the battery terminals. I believe that all of this "guessing" was required because marketing wanted a sleek "pretty" looking case.

Now that we are actually able to identify the example product I want to mention the point relevant to usability. The keyboard is silver in color. Each key has a number and associated letters of the alphabet. Here is where the form Vs. function vision comes to play. Is the keyboard to look good or is it to be useable? The latter is clearly NOT the case with this machine. The numbers are red but very small. The letters are even smaller and are blue. The contrast is not an issue here, the size is. This is an example of where Nokia either didn't think about what a keyboard notation is supposed to do or they just followed what others do. If I were to specify how the notations should be done I would put two characters on each key in the largest font size that would fit. One would be a digit and the other the first letter of the series of letters associated with the key. With this scheme I will be able to read the keyboard without having to put on my reading glasses. I do not consider my Nokia phone keyboard very useable. HP calculators are expected to be useable. Gene Wright presented a quantitative measure of measuring contrast of HP keyboard notations and he provided a minimum contrast value for readability. He showed many examples of HP's current keyboard notations that the majority of the audience agreed were not useable. Traditional HP vision requirements would say that marketing may choose any color scheme their research determines is important as long as the minimum contrast values are met so the machine has maximum usability.

5. User Customizability This is a unique HP feature that is seldom mentioned when HP calculators are described, yet it is one of the most power features offered in the calculator market place. This outstanding capability becomes ever more important as more features and functions are added to calculators. Detailing all of the ways an HP49g+ may be customized would require several pages. Simply stated, no other machine provides an inherit ability to put any feature or function on any key or shifted key. This is the ultimate in user ease of use.

6. Sales Support In years past you could walk into an HP dealer - recognized because they had a sign - authorized HP Dealer - and ask a person questions about any HP model. today you can't even ask, "which financial model is the most popular?" even if you could find a sales person. How does a parent decide which machine he or she should buy for their student children? The cost of a high end machine is expensive enough to warrant a few answers.

7. Technical Support This has always been a difficult subject. Customers want endless handholding and person to person assistance. Market pressures have always been the limiting factor for the amount of technical support provided. See Appendix B and C for suggestions of improving technical support.

Appendix A - Staying Loyal To HP: The Traditional HP Vision — What Should It Be Today? page 1 of 4

Whenever a manager (leader) makes a decision there are two aspects or sources of information that is used. The first is the facts of the matter. These include legal, technical, internal corporate culture (vision?), and internal politics just to mention a few. The second, and equally important, part of decision making is judgment. This is far more complex and is an intangible quality that natural leaders have.

What drives the decision making for a calculator manufacturer? Like any product there are market considerations.

(1) What does the customer need?

(2) What does the customer want?

(3) What should the customer use?

How you arrive at the answer to each of these questions is what defines you.

If you are TI you believe that a calculator should be what you can produce, at the lowest price, and your sales strategy is based on convincing the customer that he or she needs what you offer (1). You believe that the

customer wants (2) what you tell them they should want; you "sell" them. If you are TI you are less sensitive to (3) because this aspect requires "extra" resources to become an expert on the subject(s) that the product is being used for.

Question (3) is where TI made a brilliant comeback when they returned to the calculator business. They failed twice with their high-end models before they had a working machine by thinking with the traditional mindset — until they redefined their market. They decided that they would sell to the teachers and let the teachers sell the schools and the students. This selling of technology in the math classroom took about three years for the "educational" aspect of the program. At first they "redefined" their product line directing each model to a class (age) group. Initially this was a joke to those of us in the business. The initial selling was solely based on cost. When a school bought machines for each student the prices were so low that the seller only made a few pennies per machine. In a few years, however, as TI released new models, they arranged the functions on each model to better match the requirements of the class group. By this time they has developed a formal connection with teachers and teacher feedback became their primary means of research. All of this is history and because of this "marketing" TI owns the student calculator market. In many ways this approach is form over function. TI takes the "easy' approach to selling calculators relying mostly on emotion and politics to sell products.

HP, on the other hand, created the scientific calculator because HP has traditionally been a product driven company, not a market driven company. HP has tried to change this and even split the company to make this easier. HP does not have the resources to take on TI in the student market. HP, traditionally, has focused on (3) which implies that the best tool for the job defines the best product. This is function over form.

While TI (and Casio and Sharp) have used the conventional emotional approach to selling their products there is one aspect that can't be ignored. It is the primary reason that traditional HP customers are so loyal. Math is a very rational aspect of life. It is cold and doesn't depend on how people feel at the moment. If you calculate incorrectly the bridge falls or the car crashes. Science is very dependable in doing what it does. The math tool used to understand and apply science must also be very dependable in doing what it does.

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What does this mean in practical terms? There is no pat answer. It is a value judgment. It is working in that gray area between black and white. It is the little decisions that are carefully thought out and researched. It is not a rush to market with an unproven product because an arbitrary schedule demands it. It is a belief that you have rationally evaluated each aspect of the design, you have challenged it, and you have a rational reason for each decision. And you have documented this so the vision and the culture may live on.

This means that when you have solved a problem that you don't change for change sake. This means that you make a product that the student will use throughout high school, buy the advanced model for college, and essentially use for the rest of his or her life. Calculators beyond college fall into the traditional category because computers are used in professional life, not calculators - unless you redefine your market and integrate the HP scientific calculator into the personal machine of choice - the PDA or Cell phone.

The vision accepts reality and looks to the task, the problems to be solved by a calculator, under the conditions of a high technology society. The HP calculator vision should require that corporate understands the vision and supports it. Corporate must accept the reality that math is what it is, and the traditional kind of leadership is what is desired. This vision is product leadership, not sales leadership. If you have a consistent reliable quality product line sales will take care of its self. The users of a math tool will naturally want to use a tool that they know is correct and easy to use. An ever-increasing aspect of today's complex computational tools is education in their use. See appendix B for ideas for addressing this aspect of being the very best - at a reasonable cost and remaining competitive.

To bring this leadership vision into focus let's look at the triadic nature of math problems.

(A) What is the Problem?

(B) How does the problem solving tool work?

(C) Why is the problem important?

In the past calculator manufacturers focused on (B). They may dabble in (A) because to sell a calculator you must at least mention the problems it solves.

During the three decades that I have worked with thousands of calculator users I have learned one very clear lesson. Calculator users want examples. They also want to know about the subject that the problem is related to. In the past calculator manufacturers drew a distinct box around (A) and (B) to specifically exclude (C) because they did not see themselves as being in the education business.

My suggestion is to reconsider this practice because of two aspects of problem solving.

a. The math and the math solving tools are becoming more complex with an ever steeper learning curve.

b. Calculators are mostly electronic which inherently disconnects complexity and price. They are more of a commodity.

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This means the value added for the customer is not the hardware but the service and support. HP may distinguish itself by expanding to fully include the tridatic nature of math problem solving. See appendix B for details on improving the educational service for HP calculators. Table A1 shows a few important vision parameters.

Table A1 — Vision Parameter Example Table

#	Traditional HP Vision	Market Driven Vision
1	All answers possible are correct.	All answers within the specified parameters are usually correct.
2	The keyboard is always readable.	The keyboard is only readable under optimum lighting.
3	The display is clear and easily readable.	The display provides minimal information.
4	The keyboard is consistent and well thought out.	The keyboard is adjusted to meet competitors changes.
5	Quality is specified and adds to the machine cost.	Quality is a relative thing that is limited due to the policy of having the lowest price.
6	Math is abstract and difficult.	Math is necessary and here is the easy way.

I have been listening to HP customer observations and critiques of HP calculators for 33 years (Oh my, that is 1/3 of a century) starting with the very first scientific calculator, the HP-35A in 1972. It was this machine that set the precedent for the HP tradition and vision. Here are a few examples.

1. The traditional pre-pocket-calculator view of keys was that they had to be spaced a certain distance to work well. HP violated this tradition by spacing the keys closer. In addition they designed the keys to provide tactile feedback so the user could feel the key perform the task of registering. The shape of the key allowed maximum key notations and the actuating force required a firm press. Vision 4 (in table A1) was followed. Key registration was not an issue - except for a few "new" designs (the E series machines come to mind as HP's worst reliability and keyboard designs, which I suspect were made as cost reduction efforts). The basis for these designs was good engineering, not marketing requirements to copy what others were doing. HP wasn't

interested in fads or flash. HP was interested in providing a reliable tool for serious engineering users. Read this sentence again. HP was so committed to this concept that when the famous log of 2.02 error was found they recalled all the HP-35's sold and replaced the six bit programming error ROM code. In those days gold was used on the circuit boards (up to the HP-45, which was the last machine to use gold on the circuit boards when introduced in May 1973).

The market has changed and so has HP. The traditional HP vision, however, of offering the best tool possible with the current technology, has changed. Where may I find a quality policy regarding HP's machines? Does it exist? The modern approach in the market place is that a calculator is a consumer product, and consumer products are obsolete in a very short time so the product doesn't have to last very long. While this may be true in general, is that the vision HP should follow?

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2. An HP tradition is doing it right. While right is a judgment value it was one that the company preached and practiced. Perhaps this is only possible when the names of the company founders is in the name of the company. Carly wanted to make HP in her image. But what was her image? It was more flash and less substance. To her credit she used her pulpit to say that copying music and videos without paying for them was wrong, but what technical basis did she offer for HP's vision? HP was among a few solid stable companies that actually stood for quality and decisions based on sound engineering. When other companies offered alphanumeric displays on their machines they were poor renditions of characters. HP did not come to market with an alphanumeric display until they could do it right, and the HP-41 was the result. Vision 3 was followed.

3. HP's accuracy statement applied to the full range of the machine for all functions. This instills confidence in the user because the answer is correct for all problems, not just for those listed in the Owner's Manual. Vision 4 has always been fulfilled - except for very recent low-end models?

4. Vision 6 has been traditionally addressed with Owner's Manual examples with humor. HP attempted to make math less dry and boring by using clever names for characters that solved example problems. Many early HP calculator users remember this fact years later.

Appendix B - Staying Loyal To HP: Working With Traditionalists

HP should work with their most loyal customers because their primary customers, students, are too variable, to impressionistic, and too focused on their "growing up" issues to be depended upon for very much participation Besides, a leadership company provides inspiration by its published policies and actions. This is what a company focused on the objective - supplying the best students math tool possible - does. This is just the opposite of what TI does. TI is market driven; it is not driven by the principles of supplying the best machine. If TI thinks that pink will sell machines they will make pink calculators. This is OK for a fad product; it is not OK for a professional quality math tool.

HP Traditionalists expect function over form, an HP is simply the best, the most accurate, and provides the most complete set of student math functions available. An HP will cost a little more (up to a 20% premium) but when you own an HP you own the most trusted and respected tool possible. How many mass-market consumer products can the average person say that they own the best? This pride of ownership is what traditional HP customers have felt and the traditional user knows has been HP's strength. The first step is for management to believe in this vision as described in appendix A.

Since there is a "gap" in HP's history the present management has a very good attitude towards their loyal customers. This is a major change from what has been practiced in the past. The primary recommendation here is

to further expand this concept. Perhaps a program may patterned after Microsoft's MVP, most valued professional, program. The suggestion is to include three groups with an average membership of 6 or 7 members..

1. Teachers
2. Students
3. Traditional Users

The idea is to promote those customers that provide evangelism for HP's calculators. NDA's are required. There would be low-key published "rules." to be asked to join and membership is awarded and "renewed" each year following a year of activity that qualifies for the award. This insures that all members of the group are active participants.

There are numerous ways that HP could support these special advocates. The benefits of belonging to a group are not costly and could include:

1. **Special Mailing List** Being on a mailing list to receive the latest information first. A reasonable length of time could be chosen, perhaps three days or even longer. An announcement planned for a Monday could be made to the special groups on the previous Wednesday. This gives three business days and a weekend for them to enjoy the advanced information. This group could even enjoy information that they are asked NOT to release before the up coming date. This kind of information is the type that if a few did not follow the rules it would not be serious issue.

2. **Special Promotions** New machines, incentive programs, and other promotions are offered to this group first.

3. **Participate in surveys** This group is used as a resource for research, opinions, etc.

4. **Use of Logo** The logo designed for this program could be used on web sites or business cards as a recognition of being awarded membership by HP.

Appendix C - Staying Loyal To HP: What Made (Makes?) HP Calculators Great

Wlodek Mier-Jedrzejowicz

1. HP calculators do what the user needs.
2. HP go their own way if necessary.
3. HP do the above against a long and distinguished background and history.

To expand these.

1. HP calculators were designed not against a marketing background, but against an engineering background. They provided functions and functionality that users found they needed, even if at first the users did not realize that they needed them. Typically:

   a/ You do not appreciate the robustness of an HP calculator, and do not realize you need it until you drop it or run a car over it. Then you realize that HP did the right thing.

   b/ If you accidentally store from level 1 of the stack on an RPL calculator into a variable, the UNDO feature of the RPL calculators lets you recover the stored item *and* restores the previous contents of the variable - something you do not know you need till you make that mistake!

   c/ The old shift key colors are clear and easily distinguished, which is what the customer needs - not pastel colors designed to whet the appetite (really! they appeal because they look like the colors

of favorite food items).

d/ HP scientific calculators for a long time did not have hyperbolic functions - because the users did not need them. If the functions were rarely needed, they could be calculated using exp and 1/x. Do HP still do this? Maybe, but more often they use focus panels to choose features and colors that potential customers like, not that real customers need. The poor color choices on recent models are a good example.

2/ HP go their own way. Examples: Designing the HP-35 with transcendental functions, when everyone else was just providing the basic arithmetic functions. Designing business calculators, beginning with the HP-80, when everyone else assumed that just the basic functions were all that business users needed or would understand. Putting SOLVE and INTEGRATE functions in calculators when everyone else left those for computers.

Sticking with RPN.

Do HP still do this? They *call* themselves HP Invent, and maybe they do, for example HP Solve and the graphic calculators' CAS are powerful and idiosyncratic HP features.

3/ Work against a background of history, including reliability and continuity. This is probably the main reason why we in The Group stay with HP. Well, they still *have* a history, but they are only rarely aware of it. Advertising the HP33S as the most powerful RPN calculator is a good example of not knowing their own past. Is it enough that *we* know the past, and try to hold HP to it? I had planned to expand on all that, but have not done so yet. Maybe some of these points can be merged with your text? I'll read yours now and think about it :-)

Appendix D - Staying Loyal To HP:
A Current Loyalty Example 2/20/05 page 1 of 1

Hello Richard,

Thank you for your gracious and thoroughly informative message of February 7. Please pardon the delay in my response. I work in the tax section of a bank trust company and our hours at this time of year approximate those of working farmers. In the interim, I have looked over the HHC 2004 materials and can see there is no reason to worry about 'focus'. The list of HHC 2004 conference attendees also speaks volumes. In particular, Roger Hill's name took me back to my first programmable calculator -- a TI-59. At the time, AES seemed more accessible than RPN. As a subscriber to LRN, I watched with chagrin, and then growing admiration, as Roger's HP-41 calendar program ultimately outperformed the TI-59 version. I saw the result as a combination of programming skill and hardware capability. My impression of the latter led to the purchase of an HP-41CV. But, I then tried to use it as a tax calculator at work. I even bought some HP-41 tax software. But, ultimately, that proved to be an inadequate solution and the 41 went into storage.

In May 1981, I bought an Osborne 1 and joined the user group. As a member, I learned much and became able to assist new users. Early in 1983 the Osborne 1 began to look like a dead duck next to the IBM PC. Our user group helped to launch a national letter writing campaign directed at a small Texas supplier of add-on memory. We got the memory and perhaps one more year out of our Osbornes. Moving back to the present, last night, my wife and I bought a sewing machine that seems more capable than the Osborne.

About 2 years ago, my wife asked me to organize my 'old stuff' in the basement. I found both the 59 and 41 -- both had suffered moisture damage and neither worked. I replaced the 41 with Internet help. During that effort, I also found the book RCL 20. I found the stories in RCL 20 inspiring and now play with my new 41 whenever I can. I have not tried any graphical calculator; and, so far, I have not developed a warm relationship with my PDA. But, I intend to join the Listservs you suggested and this seems like an opportunity to sync the PDA to the Listserv traffic. That would be the first use for the PDA that did not feel like work.

A new HP calculator. While I have no idea what is really happening, it seems clear that HP must be persuaded there is a global market. And, input from HHC people seems likely to hold persuasive value. While I would not have anything of technological value to offer, I am still interested in attending HHC 2005. I made a mistake in trying to turn my first HP-41 into a business production tool. But, that failure came in significant measure from lack of user savvy. I am trying to improve my HP-41 user savvy and am having a lot of fun. Thinking about a new machine, I wonder how HP will assess the need for user savvy as it looks at the global market.

Once again, thank you for your kind and informative response. I hope this message puts me into a clearer focus.

John McClurg
PPC #9289

Jake Schwartz' comments in red below:

From: Dykson, Dirk F
To: Richard Nelson
Sent: Saturday, January 16, 2010 4:25 AM
Subject: RE: The Next step

Ok, so I've now read your manifesto cover to cover. Very engaging reading although I must admit I had to skim through the RPN section as my RPN understanding is not advanced. Your writing is thoughtful and engaging and the material you put together made for an easy, thought provoking read. So, are you surprised I read it? I can tell you that I'm glad I took the time to do so.

As you may or may not have expected, a few of your words haunted me. The words that had most impact on me were included in your synopsis of Datafile going quarterly:

"I am not inspired by HP's commitment. We got a serious dose of HP reality in Fort Collins and now we even more seriously wonder about the future of HP Calculators. Should HP coast with minimum R&D to the end?"

I've heard you say comments similar to this before, but reading this had greater impact on me for some reason. As the business manager responsible for Calculators, I take personal ownership for the business. Perhaps I shouldn't do so, but this is inexplicably deeply personal for me. Is this how HP Calculators (I) am viewed from the outside? Do others perceive that I believe we should coast on minimal R&D effort? What was the dose of reality that occurred there in Fort Collins? Did I give you a sense of lack of commitment?
It has seemed clear that HP does not have an overall plan to extend calculators beyond perhaps the financial machines, and without any near-term interest in significantly improving the scientifics. Also, it seems that Cyrille does all the technical planning for the group, without peer-review by any people who know about machines before. There seem to be no plans beyond the current machine or possibly the one beyond that – no longer-range plan to improve how they work or what they do over a class of machines. Also, it seems that the sole purpose of the 20b/30b is to simply beat TI, rather than set the standard. The hardware platform chosen for the 20b series seems to represent a lowering of the bar with respect to a much more limited LCD display (as compared to the 17BII + and even the 35s) and RAM memory (as compared to the 17BII+). Even the 15-dollar. Smartcalc 300s has a 4K-pixel display versus the 400-pixel limitation of the 20b/30b platform. The menuing system of the 20b/30b mimics the TI system and is far inferior to that of the 17BII+ in that it requires significantly more keystrokes to reach functions in question (and even the 17BII+ can be improved in that area quite a bit by adding more functionality directly to the keyboard). There does not seem to be a commitment to a long-range plan to improve things.

The other words that troubled me were earlier in the book.

"Managers who think in terms of mice, keyboards, and home servers, however have a different perspective than experienced Calculator managers have; some of which were considered duplicate positions and these 'old timers' have had to move on.

you go on to say in "the future and hp calculators":

"can a non-calculator management team muster the interest and support..."

You may not realize or remember, but I began my first tour with calculators at least 2 years before Sam Kim even joined the team. I put my blood, sweat and tears into saving this business in 2002 with Fred's vision and a tag team effort between Edmund and me of blowing up roadblocks and absolutely, steadfastly refusing to hear the word no*. I have a vested interest in not only salvaging what's left of HP Calculators amidst the chaos of the latest re-org, but of making it once again a great business. I'm not concerned with mice and keyboards, but instead I'm wholly focused on the success of Calculators. Not only that, but I'm an insider with more history and knowledge of the business than anyone who remains. That has to be at least somewhat encouraging?

- as a test, I would encourage you to reach out to Fred Valdez on this topic. Ask him which 2 hp employees had the greatest impact on saving HP's Calculator business (after his visionary leadership of course). Even unaided by suggestion, I feel confident he would share Edmund's name and my name.

I think we all are grateful for Fred sticking his neck out to keep HP calculators alive. However, as for "vision", I would question the motives for "rebadging" machines with no HP "DNA", especially those with poor-quality workmanship (like keys which break when pressed a bit too hard like in the early 49g+, keys whose labeling wears off quickly like in the 49g) and in

machines with completely different user interfaces from one model to the next, like in the 6s, 30s, 9s, etc.). Also, let's face it…the "Strategic Touch Model" simply means that HP outsources the hardware, and I believe one of the most important lessons learned was that HP "quality" was almost impossible to specify in spec documents and as a result, none of the machines between 2000 and 2005 seemed physically reliable. They knew in Corvallis how to make reliable and durable machines and those requirements were not imposed on the Far-Eastern manufacturers either accidentally or intentionally. "Cheap" and "good" don't seem to mix well.

ok, so now to more specifics...

The Future and HP Calculators

1. What is Wing's Epoch? What is mine shaping up to be and what should it be?
Wing's Epoch started out with Sam involved in R & D. Sam has a long history with HP machines, having been a user since the 1970s. He seemed to understand the ins and outs of the machines through the HP41 series and perhaps up to the HP48SX. When we would discuss with him various technical aspects of why we thought those 1980s and 1990s HP machines had specific advantages and special features, he could directly relate to them. Wing seemed only to know about the 12C of the Voyager series and not much else. We never got the impression that he "cared" about the calculators; only the bottom line. When we would gripe to him about certain technical concerns we might have, they would be over his head. The fear that those involved do not appreciate some of the subtle things that HP calculators from Corvallis brought to the table makes us worry that the baby is being thrown out with the bathwater. Cyrille was not around to appreciate the great things in the Pioneer series (32S, 32SII, 42S, 17B, 27S, 21S, etc.) which could make usage more convenient on the current crop of machines, nor does he seem to be interested in anything associated with the past, bad or good.

2. "None of these are in the Gen-5 advance the high end machine category". Do you feel the same way about 20b/30b/60b? really?
It appears that the potential "60b" (which I believe Cyrille has been calling the "40b" lately) adds I/O and computer-developed applications, but removes the everyday-user's keystroke programming. Also, the machine seems to have much more limited storage than, say a 40gs student graphing machine. It seems that the 20b hardware platform was not made to really scale up significantly. And again, the LCD is "crippled" compared to past high-end financial machines such as the 17BII+ and 19BII.

3. "these models playing catch up with the competition". 20b/30b do much more than catch up. This is a whole new platform with expansive future capabilities that can be added. 20b/30b specifically go beyond the competition head to head, so your comments don't make sense to me.
It is a new platform, yes, but appears to be designed to be inexpensive and not very expandable. There is no denying that it is at least an order of magnitude faster than anything before it, but the memory limitations appear to be significant.

4. in comment #6 you mention that users want to be educated as to why HP Calculators are the best. Aside from newsletter (you and I already agree here), how do we educate them?
For one thing, Gene Wright has suggested that much more can be done on the HP web site, with regard to short items to address specific training needs. There are features of the machines – such as the Solver – which never seem to get the promotion that they deserve, either on the packaging (which understandably is limited by HP corporate policy) or on the web site.

5. Not sure I agree with item 7 in today's environment. I think you are under-estimating the power of speed, aesthetics, cost and competition.
But what good are these things (speed, etc.) if the accuracy of the answer may not be trusted in many cases? Generating accurate answers should be on the short list of top-priority capabilities.

6. on item 8, are you saying that form is irrelevant? What about roll-n-click button press, 35s look/feel, double-wide enter key, or 10bII single key, single function mentality?
I believe what Richard is saying here is that additional functionality is more valuable (to "us") than more options of colors for a faceplate or for a hard plastic cover. It is understood here that it depends upon the target market. However, adding the trigonometric and other scientific functions to the 20b was felt to improve it much more so than making the user interface a duplicate of the TI Business Analyst.

7. "functionality still has a great deal of potential"...tell me more

For instance, the 35s left out many functions critical to users interested in complex arithmetic, which were formerly included in mid-range HP calcs of the earlier era. It only scratched the surface there. In addition, the base arithmetic and conversion capabilities of the 35s were changed from its predecessors to make it much less convenient to use. In fact the full base-arithmetic and conversion capabilities of the HP16C machine from the early 1980s never survived into ANY successor machine from HP, including the top-of-the-line models. (This was the incentive for the creation of the HP16C Emulator Library for the HP48, which Rick Grevelle and I created in 1993.)

8. item 12? I TOTALLY AGREE!

9. "customization is one of hp's greatest contributions"...tell me more. do you mean programmability or something more?
There have been numerous ways HP calculators in the past permitted their users to change the settings on their machines to tailor them toward their specific needs. Besides allowing programmability, there have been (1) key assignments which overrode existing functions on the keyboard (along with keyboard overlays which the user could mark with his/her own nomenclature); (2) Expandability via plug-in memory devices with either pre-programmed software or memory expansion devices for storage of users' own programs and data;and (3) User-selectable mode setting via user and system flags, among others. Many (but not all) of these survive in the hp50g and could be useful even in the lower-end machines.

10. what does the "quality archetype" look like? i.e. tell me more.
The earlier units were done in multiple series, with each series presented in several models which looked similar for consistency. The "Classic" series (HP35/45/55/65/67/70/80) had 7, the "Woodstock" series (21/22/25/25C/27/29C) had 6, the "Kittyhawk" series (91/92/97) had 3, the Spice/Spike series (31E/32E/33/33C/37E/38E/38C/34C) had 8, the Voyager series (10C/11C/12C/15C/16C) had 5 (plus the recent 12C Platinum), etc. etc. Since 1999, there have been the hp6s, 30s, 9s, 10s, 33s, two incarnations of the 10bII, two incarnations of the 17BII+ and all were completely different from each other. From the outside, it appears that chaos has taken over in the "look and feel" department.

11. on HP 10 quick calc...is this the quick calc + RPN + improved quality?
Yes…but I personally think the Quick Calc seems to be of relatively good quality as it is. However, somehow if a version came out with RPN as an option, I bet this differentiator would tickle the fancies of anyone who was already an RPN "zealot".

12. next gen constraint geometry...is this basically classpad + something better?
Yes. Brian Maguire has been demonstrating at the past few conferences many of the advances that Saltire Software has been making in the area of Geometry in handhelds.

13. "once a general purpose platform is in place..." - what about 20/30/60? also, I know it's the wrong platform because constraint geometry likely belongs on a grapher, but what does it look like to put it on a 60b with I/O capability? Is this just a mis-match? I guess you likely need the screen size to really due this justice, but I'm just curious.
Personally, I think that geometry only works effectively on a larger-screen device like the 50g. I am not sure why something with a screen that large cannot be physically thinner, though. True, it uses standard-sized AAA batteries, but so many handheld devices on the market today are so much thinner and more convenient as a result.

14. on page 4 of 5, I have lot's of questions: item 1, who drives this? the UC? item 2-4, I would like to understand what it looks like to have you do that as part of a newsletter effort...could that work? item 5 really has to be hp :(
It would be really great if item 5 (all kinds of enhanced support) was done by HP, but it can't be done by Cyrille in his spare time…it would have to be done by dedicated people who really know the machines inside and out.
15. TI secret weapon = ?
I think that TI's "secret weapon" has been dedicating sufficient resources to provide the teachers with all the tools they would need to utilize TI calculators in the classroom; namely hardware, lesson plans, display devices, training, etc etc. to be a complete solution that schools may adopt.

16. tell me more about your comments 1-4 at the bottom of page 4 of 5.
Making the machines programmable both from the keyboard (for advanced everyday users who like to generate, debug and use their own simple applications) and also via computer (using software development kits, for professional applications which end users may download and use a la iPhone applications) is important. This allows the machines to be completely customizable to users' needs. The more flexible the machines are, the more kinds of users will gravitate to them.

17. page 5 of 5 you say, "the next machine must be dedicated to the education market". What does that mean? what does this look like?
If the machine can be customized in many ways, then applications for education will be able to be developed. Since new students
and therefore, new potential customers are entering the education market each year, having units which serve the educational needs means that the customer base may continuously expand. In addition, more customizability means that a machine which a student acquires may serve him or her long after graduation and on into any technical professional field.

What is Missing in Datafile and HP Solve?
I really like what Bruce Horrocks has to say here. I LOVE the idea of an annual prize for the best blogger (as voted by the UC?). I also really like the idea of the journalism school. What if the annual prize is that the best blogger receives a dedicated column/blog in HP Solve for the following year? or that HP Solve links to that persons blog with much fanfare in each publication for a year, etc, etc. I'm definitely interested in your ideas here.

HP Solve Web Letter
regarding the 30b overlay, I certainly don't have a bias against overlays...in fact I think they are critical and I want to figure out how I can better support them. "lack of forward thinking and planning for the packaging..." tell me more?
Overlays help enhance the customizing of the 30b. Now that it allows a user to assign his personal programs or functions to any key, he would certainly benefit if an overlay for the entire keyboard could be available for the user to mark where his functions have been placed. The HP-supplied overlay only fits over the top four rows of the machine, marked to identify where the "hidden" programming functions reside. Perhaps an arrangement with that same overlay maker to offer full-keyboard versions which could be marked with pen or pencil would be advantageous. They would have to be relatively low cost, of course, and be simple to attach and detach from the keyboard. Just a thought. In my opinion, overlays worked well in the HP41 series and the HP48 series. The fact that sales lagged for the HP48 ones may be related to their relatively high cost.

as for Objective and target audience of HP Solve, it is very clear in my mind:
Objective: to create/facilitate 2 way communication with our customers and user groups
Target Audience: this gets tricky, but there are a few distinct groups I care most about here and unfortunately I believe they have very different needs (in no particular order):
Math Educators/students
Science Educators/students
Engineering Educators/students
Engineering professionals
Business Educators/students
Business professionals

We clearly need to discuss this further, but this should get you started :)

thanks,
Dirk

p.s. please do not share my words publicly. you are welcome to share them with the X group or to a few select others with my permission (Bruce Horrocks comes to mind, but let's discuss first)

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Examples of formal requests for inputs on various products (vertical spaces removed to fit)

040505 Strictly confidential.

New IR printer idea's:

Current comments of existing product (82240B – HP IR thermal printer):

- portability
- reliable
- sturdy
- dual power source (battery, external)

What other features/functions are a 'must have'?

Key features that the users find most important?

What new feature suggestions do you have?

Many thanks for any idea's that you may be able to supply.

Regards, Tony

New high end finance idea's:

Current comments:

- Trig functions
- More statistics features
- Bigger screen (4 line)
- Graphing capability

What other features/functions are a 'must have'?

Key features that the users find most important?

What new feature suggestions do you have?

Many thanks for any idea's that you may be able to supply.

Regards, Tony