C: Linda B 4/14/83
Note FP on page 2.

→ Shoch

FYI:
BICE
DILLON
JOHNSON
Lo
MAU
PACCO

RECEIVED
FEB 2 1983
J. F. SHOCH

XEROX Internal Memo

to	Dick Rush	from	Robin Kinkead ID-HF-G DLOS 141 8*723-6151
copy	Dick Hanson, Jerry Harris, David Canfield Smith, William Verplanck, ID/HF staff.		
on	The Star Optical Mouse - Preliminary Evaluation	date	January 14, 1983

Human Factors has been evaluating a Star optical mouse for the last two months. Here are our initial findings and recommendations - we are enthusiastic about its potential. Most of this memo is devoted to what should be done next.

HF findings

RECEIVED
JAN 31 1983
R. MAU

We have not run any *quantitative* tests on people's reactions to the mouse yet. There is a simple reason for this: it is so clearly better than the machanical ones, and so reliable, that no hard data have been needed. If the device is affordable and produceable, then Xerox should proceed with all possible dispatch.

The physical packaging and the pad need improvement. These improvements lie in the areas of mechanical design and ID, but are addressed here anyway. The main HF finding, based on personal use and observation of just four Star users, is that the mouse controls the cursor the way one expects, that it it more reliable than the mechanical mouse (absence of skipping) but that people will be able to tell the difference between the two. The optical mouse feels lighter and more responsive as you move it. This is not a potential problem.

Design improvements

Pad design:

1. Slipping. The coefficient of stiction of the pad to table top must be much higher than the stiction of mouse to pad. Otherwise the pad moves when you want to move the mouse, giving rise to the same frustrations as skipping in a mechanical mouse. This is a mandatory design feature, but it is not characteristic of the paper or vinyl pads you sent us. We do not feel that taping the pad down to the table top is acceptable, so a high-stiction pad must be developed. This rules out using disposable paper pads, unless the back of the pad pack was high-stiction. Even then there could be problems with pages of the pack slipping on eachother. So we advocate a plastic-laminate pad with only one usable side and a high-stiction bottom coating. We don't know what the coating should be, but we're confident that there is one somewhere.

2. Wear. The top of the pad should be coated to prevent the dot pattern from wearing off. The mouse has a critical depth-of-field which limits the thickness of the top coating to some small dimension - 10 mills or so. Mylar with a slight matte is probably the best coating unless it raises stiction too much.

* NOTE THAT THESE COMMENTS SUPPORT OUR CONCLUSIONS BASED ON SDD TESTING.

3. Resolution. We think there is a great (but un-tested) opportunity to make pads with different dot densities. In particular, half the current density would give 1:1 movement would be very useful for graphics work.

Casework design:

1. Shape. The Star mouse housing was designed (quickly) to cure some mechanical probelms on the older Alto mouse. It has more slope to make it easier to push down on the mouse when it slips, a raised beltline to make it easier to pick up with the sloping sides, and a greater texture to make it easier to maneuver when one's hands are sweaty or slippery. Some have liked it beter. Some have complained. I personally miss the sharp corners of the old mouse which is how I grab it. This Star design works well enough, but it is not striking in appearance and does not proclaim that the internal design is new and imporved. ID feels that a new study of the mouse should be undertaken, at no initial expense, to come up with a housing that does justice to the internals. The Star program team must recommend we do this before we do anything. That's the way the system works.

2. Base. The base of the mouse has to share in the stiction-reducing effort. If is is to be cast polycarbonate, than at a minimum the three running pads must be rounded, without sharp edges. The base should slope slightly upwards, so that there is minimum risk of digging the side of the mouse into the pad. It would be best if we can coat the base with teflon.

3. Cable. You can't win on the cable lenght issue. If it is long enough, then it gets in the way. If it is short enough to stay neat, than someone can't stretch it out to their pad. We recommend a cable which is partially straight and partly coiled. Jerry Harris knows the company that can offer a proprietary, coiled cable design. With a 2' coiled length (6"long when coiled) at the plug end and a 2' straight length to the mouse this cable could be stretched as much as needed without getting into drawers or drooping over the table.

Further research

Frankly, we don't recommend any. The risk of proceding with the basic optical design is so low that research to verify we are right would be an expensive luxury. We will test the mouse informally on more users to see if anything turns up over the next few months.

ok 2/14/83

Jeanne - I think I understand the situation; but what needs to be done? Can you push this? Do you want to draft a letter for me to send?

XEROX **Internal Memo**

To

John Shoch

Vice President, OSD
PARC - 97
8 * 923-5835

From

Jeanne M. Pacco

OSD Program Office
PARC - 97
8 * 923-5813

RECEIVED
JAN 28 1983
J. F. SHOCH

Subject

f: Optical Mouse Impasse

Date

January 28, 1983

Copies: Linda Bergsteinsson, Bill Lynch
Filed on: <Pacco>830128-Optical Mouse Impasse

c: Linda B, Bill C.

John,

This is the current status of OPD's position on the mechanical mouse, plus some factual background to help you assess the optical mouse cut-in for Star workstations.

Mechanical Mouse Status

1. Existing inventories and commited orders (1900 units) will cover build activity up to September, 1983.

2. Siemens inventories are 0, with a recent order request for 700 units just submitted to procurement.

3. UMC = $110.30 for Xerox version, P/N 18S80032.

4. UMC = $129.69 for Siemens version, P/N 18S80056.

5. Commercial List Price = $679.35. The mouse is treated like a spare part and, as such, is priced at 525 times UMC.

6. Vendor (Selectron) lead time = 30 weeks.

7. UMC of plastic mouse pad for mechanical mouse = $1.07.

8. Manufacturing should now be ordering additional units to cover 4Q83 build. The material planner is willing to request a small quantity (500), if we expect the optical mouse to be available in that same timeframe.

Optical Mouse Procurement

When would OPD procurement be in a position to issue a purchase order to ED for the optical mouse assembly? The earliest date for a formal purchase order to ED from OPD is June, 1983, yielding a cut-in to manufacturing during 1Q84, and appearing in the field within 30 to 60 days after cut-in. This date assumes the following events and conditions are met:

1. ED releases the optical mouse top assembly drawing into the Xerox P/N collection agency on February 1, 1983. OSD/SDD releases the part into the OPD drawings, an alternate part with purchase quantity hold, by March 15, 1983.

2. OSD/SDD receives preproduction units from ED's vendor by March 1, 1983, and successfully qualifies , including the FCC, EME, UL, etc. requirements testing by June 1, 1983.

3. OSD/SDD resolves and documents an acceptable version of the patterned mouse pad by May 1, 1983. To date, no acceptable solutions have been identified.

4. OSD/SDD completes a test specification by May 1, 1983, or revises the ED test specification provided in March, 1983.

5. OSD/SDD issues the optical mouse with patterned mouse pad subassembly part number into the workstation keyboard drawing structure by May 1, 1983. This issue date assumes Engineering, Manufacturing, and Service concurrence on the alternate part.

6. Procurement obtains vendor (ED) approval on initial purchase requirements at projected UMC of $75 by June, 1983. Actual lead times for the optical mouse are not known, but one can estimate procurement lead times of 6 months.

Alternate Recommendation

As soon as ED releases the optical mouse top assembly part number into the Xerox part numbering system OSD could submit a purchase order to ED for 200 to 300 production units. OSD could use these units in qualification testing, both in OSD and in OPD test environments. This cost to OSD ($15,000 to $22,500 at $75 UMC) should be expensed or capitalized against development. This would be an affordable, interim response to ED's request for a purchase order, encouraging them to complete the design and resolve their manufacturing issues, as well as, a means for us to acquire real production models to evaluate.

Please let me know if you agree with this approach, and if you think this will alleviate the impasse.

Jeanne

3/4/83

John, How's this as a proposed letter to ED
Jeanne

XEROX
Office Systems Division

DRAFT DRAFT DRAFT

Draft #0 !

To
Jim Donahue (?)

From
John Shoch

Subject
Optical Mouse Schedule

Date
March 3, 1983

Location
Palo Alto, PARC-97
Intelnet 8-923-5835

Organization
OSD Vice President

Jim,

We need your help in expediting the phase-in of the optical mouse into our 8010 Professional Information System. Our System Development Department has been working with your technical design folks and have evaluated some engineering models of the optical mouse. The results of these studies has been most encouraging. The projected manufacturing costs and reliability improvements to the mechanical mouse are orders of magnitude more attractive. My compliments on your design groups achievement. The preliminary human factor evaluations, and internal engineering user responses have been most positive. We are anxious to utilize this new technology in our product line.

However we cannot tie this into our 8010 workstation design until we have answers to these key questions.

1. When will development testing be completed?
2. When are the drawings going to be issued?
3. When is the supplier going to be identified, and who is the supplier for the completed mouse assembly?
4. When will prototypes be available from the supplier?

I'm sure you can appreciate our position, we need this information to generate our development support plan defining the qualification of the optical mouse assembly as an alternate to our current mechanical mouse.

Thanks, Jim, for your cooperation

~~C. A. Miller~~
~~L. B.~~
~~J. Pacco~~

Jim - This was a draft we prepared but did not send. As you can see, ED is going to be the supplier (like an outside vendor, not the traditional role of ED doing work for us). There are some details to work out.

re 4/4 c: Pacco
① Yes, we should get it @ the intro no. price.
② I would like to offer the optical mouse as an option (extra cost) as soon as feasible.
We can sell both mech. & optical.

XEROX
Office Systems Division

To
John Shoch

Date
March 30, 1983

From
Jeanne Pacco

Location
Palo Alto, PARC-97
Intelnet 8-923-5813

Subject
Comments on Optical Mouse Business Plan

Organization
OSD Program Office

John, thank you for forwarding me a copy of the subject plan from ED. It's most encouraging to learn that ED appears to be working aggressively to get this design produced. Here are some of my comments on the overall plan and approach.

1. OSD/OPD demands for the optical mouse are small compared to the volumes projected in the business plan. If Xerox Corporation can realize revenue, by selling direct to other OEM sources, or by licensing the manufacture of the mouse by outside sources, it would be prudent to do so. IF Xerox/ED retains exclusive rights to the LSI chip, we still maintain a competitive advantage in the marketplace.

2. The amount of the transfer cost to internal Xerox users is an area that Finance should clarify. It is my understanding that intra-company transfer costs are UMC plus a standard corporate markup percentage, much less than 100%. There have been numerous communications stating that the internal charge from ED to OSD will be $75 for each mouse assembly. The business plan clearly states that the 1983 UMC is $37. Shouldn't our cost be around $40-$45 by corporate policy?

3. The 1983 OSD demand case, 2,000 to 3,000 units, will not be filled with the optical mouse because of sufficient inventories, and committed purchases of the mechanical mouse. Also, we can expect that the time to qualify production models in SDD, document the changes to the 8010 drawings, and release this package to Manufacturing yields a field introduction date of 1Q84.

SDD is moving forward to issue the optical mouse into our product structure as an alternate mouse assembly. They are also investigating various surface coatings for the special mouse pad, since the original ED pad design is unacceptable. I believe that if ED gets the approval to offer this product to the large market they target, the bottlenecks that have been encountered by OSD/SDD will be eliminated. This shouldresult in achieving the planned introduction date (1Q84) with greater confidence.

I will continue to monitor this activity to ensure that the optical mouse is expeditiously phased into our product structure. Thank you for encouraging ED to document their strategy in the business plan. This is the first official word from ED containing schedule, UMC, and price information that I have seen.

c: L. Bergsteinsson, F. Schneider, J. Elkind, W. Lynch

XEROX
OFFICE SYSTEMS DIVISION

To:	Jim Donohue, ED	**From:**	John F. Shoch VP, OSD; Palo Alto Intelnet: 8*923-4770 8000 Mail: Shoch:OSBU
Subject:	Optical Mouse Business Plan	**Date:**	April 3, 1983
Copies:	Arnold Miller, ED George Pake, Bill Spencer, Parc		

Jim,

After our many discussions on the optical mouse, I was delighted to receive your recent business plan describing possible external sales. By now you should have received my verbal agreement; let me summarize my view of the situation:

1. I have long argued that when we have a genuine sustainable advantage in the technology of a subsystem or component, we should use that component in our own systems, but not make the technology available to others. In general, we can do better selling systems incorporating new technology, rather than just selling the components. When, however, that technology (or an alternative) becomes available to others, we should turn 180 degrees and actively make that technology available (if it seems to be a viable business).

2. The Xerox optical mouse has some technical advantages. It is now clear, however, that the "mouse" business has matured to the point that several other vendors are approaching the stage where they could offer products of similar functionality. Thus, I now endorse your proposal to sell mice.

3. What now remains is the challenge of building a business around this product. ED now becomes a regular Profit/Loss operation, and not just a cost center. As you think about marketing mice on an OEM basis let me encourage you to consider using some of the other component OEM expertise in the company -- for example, you might successfully use Diablo's sales force and experience to help establish contacts, define terms and conditions, and sell the mice.

4. Jerry Elkind has pointed out that this appears to be a one-product business, with development investment going to zero after 1983. This may be the right strategy -- getting into the business quickly, and then getting out quickly. But if you want to be in it longer, and stay competitive in 1984 and 1985, you will probably need to do further

development beyond the end of this year.

5. As a by-product of this effort, I certainly hope that OSD will be able to get optical mice for Star sooner, and cheaper. At a minimum, I would expect that we could offer this mouse as an option on Star *before* any of our workstation competitors (DEC, Apple, etc.) come to market with the device. (We will probably offer it as an extra-cost option until we exhaust our inventory of mechanical mice, and then cut over.)

Again, I'm glad we got a plan pulled together; good luck with the business!

JFS/jh
file: Mouse.Optical

bc: Carter
Strassmann
Titsworth
Petre
Campbell
Bayer
Rabinovitch
Schmeltzer
Bergsteinsson
Facco
Lynch
Weaver
Ekind

XEROX

Internal Memo

c: I. Rabinovitch
thru Shoch mail

To
John Shoch

PARC

MAY 9 1984
J. F. SHOCH

From
Louis G. Karagianis

XSIS-Pasadena
8*844-1426

Subject
3 Button Optical Mouse

Date
May 7, 1984

John, re your inquiry on the optical mouse, the original price for the 3 button optical mouse was developed in October, 1983, and offered for sale as part of our 1108 option package. It was incorporated into the 1108 Sales Manual in November, 1983, and is still available--at the same original price, $320.00. This is an incremental price to the standard 1108. We merely keep the 2 button mouse for spares.

If our customers do not choose to select the optical mouse, they are provided with the standard two button mouse configuration as provided for in the standard Star.

Thus far, we have sold over 100 optical mouse devices.

LGK:jr

c: L. Bergsteinsson
R. Melville

c: Jim Donohue, FYI

John Stock

JUN 2 [illegible]

XEROX

OFFICE SYSTEMS DIVISION

Operations

To: Distribution

Date: June 15, 1984

From: Joe Picariello

Location: Palo Alto

Subject: Optical Mouse Status

Yes, the Optical Mouse is still alive and very well. Please find the summary of the customer survey on the optical mice built recently by ED. Although we were unable to get all the feed back yet, the 30 responses were overwelmingly positive.

It is my recommendation that the present XCN cut-in date of July 1984 be held. My discussions with EDM has gotten "verbal" commitment to support an initial build in the short run shop (Gary Porter) until Shugart is in full swing (September - October). I have asked D. Preston for a written reply based on the G. Ballard projection of late November cut-in. I have been Guaranteed that the September delivery of optical mice for use in the Carnation installation kits is absolute. I believe the earliest cut-in should be pursued especially for spares.

Effective as of July we have a new part number for the optical mouse. I will however ask field engineering to initiate a change (CR) request to eliminate the cursor drift symptom. The investigation of the problem through the change mechanism will detail the fix and the cost for C.C.B. consideration. This is a standard procedure with any part or product that exhibits a problem which may or may not ultimately be fixed. The fix depends on what it costs to remedy. It is obvious that the symptom will not result in customer dissatisfaction. In fact with the symptom the customers are more than pleased with the optical mouse.

The pad is also an item for CR consideration, but I will leave that up to the group that feels an XCN is appropriate.

I consider the optical mouse acceptability issue closed and will direct our Manufacturing resources to provide the product as quickly as possible (July 1984) to the field.

J. Picariello

c:
Sr. Staff
J. Pacco
B. English
B. McNown
M. Nagel
D. Preston

XEROX
Office Systems Division
Customer Service
Field Engineering
OSD

To: Joe Picariello

From: Bob Auld
OSD Customer Service
PARC 97
8*923-6016

Subject: Optical Mouse Field Test

Date: June 8, 1984

SUMMARY

80 Optical Mice were distributed to various customer and internal users along with the attached questionnaire. Due to the critically of this information the test was limited to two weeks and to date we have been able to collect 30 responses. The following is a high point summary of these responses:

- On a mechanical mouse comparison scale of 1 to 5; **80%** rated the **Optical mouse** 5 **[Much Better]** ; **17%** rated it 4 **[Somewhat Better]**; and **3%** rated it 3 **[About the Same]**. No responses showed ratings of 2 or 1 [Somewhat Poorer or Much Poorer].

- **20%** of the responses indicated they had observed the Optical mouse **cursor movement problem**. None indicated that this problem was significant or in any way interfered with normal operation.

- **90%** Related **significant problems** with the **mechanical mouse**. Among the problems related most centered around "sticking", dirt build-up on the ball, and frequent replacements for failure.

- **43%** Felt the **Grid Pad** should made more durable, washable, or in decorator colors.

The majority of comments were extremely positive. Below are quotes from the questionnaire that are typical of the all of the responses:

"Much easier to move"
"Excellent response"
"The Optical Mouse glides much better and gets to where I want it much faster"
"Lighter and more responsive"
"Natural extention of my finger tips"
"Has a better feel to it...lighter"
"Have been enjoying use of my Optical mouse"

If you have any further questions please don't hesitate to contact me. I will keep you advised of the feedback on the remaining responses as soon as I get them. Looks like we gots a winner!

Bob