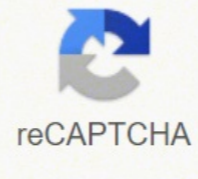


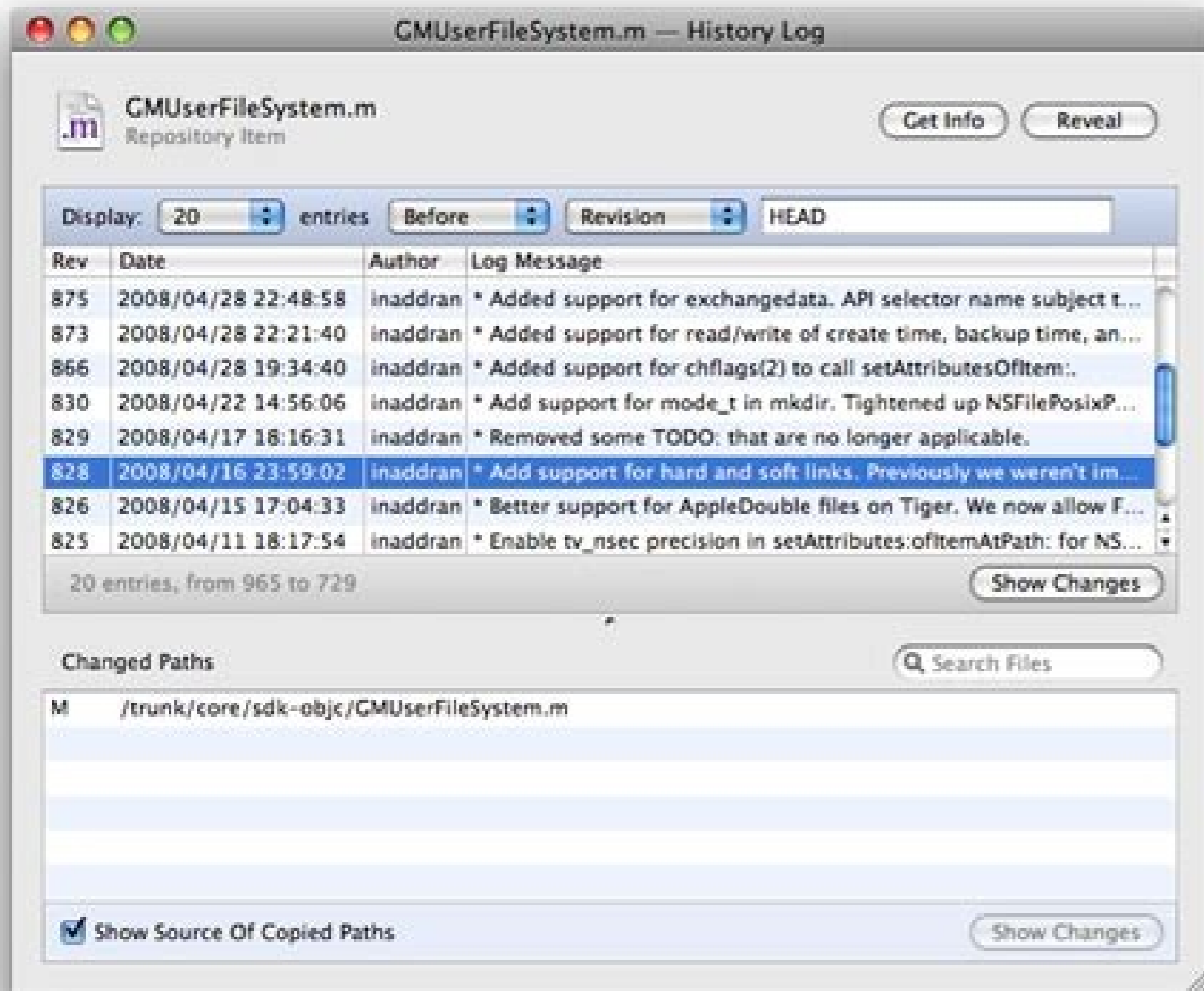


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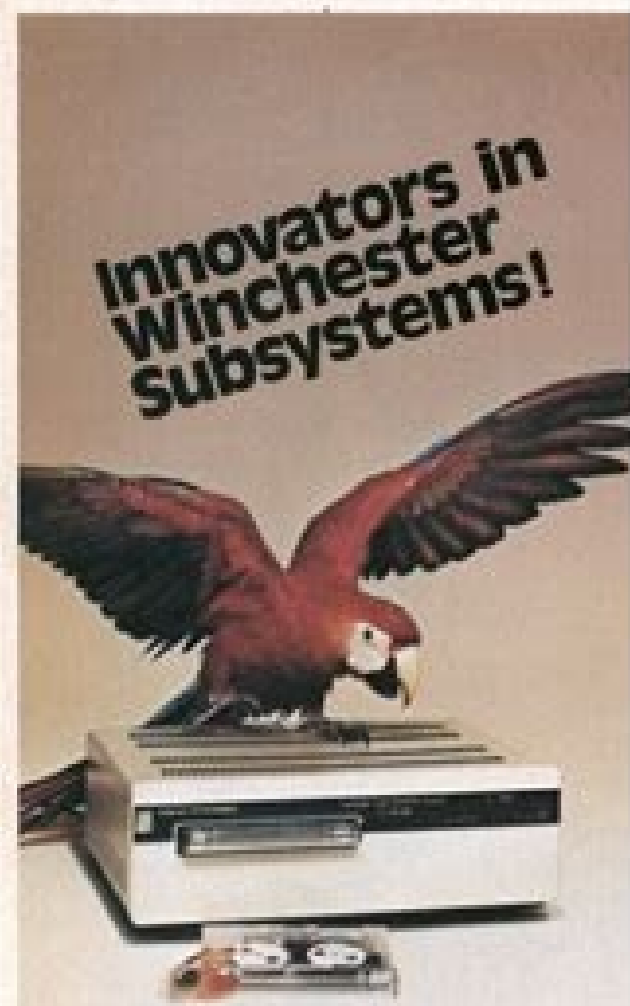


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Circle 400 on inquiry card.



**BYTE Interview**

support things like graphics, the windows that we have on the screen, the mouse, and so forth. We didn't really find an operating system that met our needs, so we felt we had to go build our own. We built the other features on top of this—the support for the windows, the support for graphics, the support for multiple fonts, the support for printing. It's really quite a rich architecture. At least half of the software is in this foundation software.

**BYTE:** How large is that in bytes? How much code is in that foundation software?

**Daniels:** Well, source code is something like 10 megabytes.

**Tesler:** Object code is about half a megabyte.

**BYTE:** That's what's there before you put the application programs in—half a megabyte?

**Daniels:** Yes.

**BYTE:** After you specified the user interface, what list of hardware requirements did you come up with?

**Rosing:** Well, the main list that was specifically user interface would be the bit-mapped graphics display and the resolution of approximately 700 pixels across in the horizontal dimension, the mouse, and the doorless disk drives with the eject button rather than an eject handle. They determined a lot of the hardware design. We had other user-interface considerations, though. We wanted to make the system very easy for its users to service—I presume you've seen it break apart. Servicing really is simple. It took a moderate amount of extra product cost to get that feature in there. And that's a part of the even more global user interface, how people perceive the whole system.

**BYTE:** Why did you choose the 68000 microprocessor and what alternatives did you consider?

**Daniels:** We thought its architecture was very broad and strong and would take us through the '80s, and we wanted that. We wanted something to support the graphics, and we thought that processor gave us what we needed then. The 68000 was a bit of a gamble because it was very

young when we got on it. We were getting one sample at a time from the local Motorola engineer here.

**BYTE:** Do you think the 68000 will be the dominant processor in the next few years? Is it going to overcome the 8088, the 8086?

**Rosing:** I would speculate that for high-end applications with very computer-intensive, graphics-intensive needs, the 68000 will become dominant.

**Daniels:** But the 8086 has such an installed base going already. I think that alone would carry it. . .

**Tesler:** You mean numbers of actual units with the 68000 in it, or the number of different products?

**BYTE:** Both of those questions.

**Tesler:** Well, we're putting 68000s in the units we'll sell, so that will mean more units with 68000s. We expect to sell a lot of machines.

**BYTE:** You've got a 68000 machine with a lot of memory in there, and not too much special-purpose hardware. Why did you decide to do it that way instead of using some versatile hardware chips, like the NEC 7220, for video display?

**Daniels:** We're very much boosters of bit-mapped graphics, and in fact hardware support for bit-mapped graphics is pretty small. All you need is sort of a shift register. We thought the flexibility that would give us in graphics and the things we could do in user interface with bit-mapped graphics was well worth the price.

**BYTE:** But doesn't the 7220 have bit-mapped graphics itself?

**Rosing:** Well, there were a couple of practical considerations. The NEC 7220 didn't exist when we designed Lisa, although we knew it was planned. The second consideration was that the 7220 cost more than the TTL [transistor-transistor logic] hardware needed to implement the equivalent functions. And the third consideration was this: because we were able to interleave the memory and display cycles, we were able to essentially get data out of the memory at very little penalty. Using a 7220 would actually cost considerably more in terms of system

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