Interview with Peter Brown re: XEMAG

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Preamble

This is an interview with Peter Brown, conducted via email between June 29–July 7, 2020. He worked for XEMAG, a service company that provided software duplication and copy protection for, among others, the game company Activision.

This work received ethics approval from the University of Calgary's Conjoint Faculties Research Ethics Board, file REB16-1235. Both interviewer and interviewee have agreed to release this interview under a Creative Commons Attribution-ShareAlike 3.0 Unported License.[1]

Interview

(Interview questions appear in *italics*.)

You've had an extensive career with computers and IT, and from 1984 through 1986 you were a manager of software services at XEMAG. Please tell me the backstory of how you started with computers and eventually wound up at XEMAG.

The path to XEMAG started at Osborne Computer. After Osborne declared bankruptcy, the director of software acquisition at Osborne, Bob Moody, joined Dysan and started a Software Publication Division. Bob asked me to join him at Dysan to help start up the Software Publishing Division at Dysan.

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[1] `https://creativecommons.org/licenses/by-sa/3.0/`

The rationale for starting software publishing at Dysan is a whole other story. Basically, Dysan was attempting to establish a new disk format, the 3.25″ disk. To help establish this new format, Dysan designed disk drives and provided the drives to computer manufacturers in the hope that the new format would be accepted, placed in computer systems and accepted as an industry standard. In support of this effort, Dysan was establishing a software publishing group to provide software on the 3.25″ format and allow for simultaneous delivery of computer hardware systems and the most popular software of the day. As it turned out the 3.5″ format became the industry standard and Dysan closed the Software Publishing Group. When the Software Publishing Group was closed, I was asked to join the Dysan Duplication Division and manage software services and duplication engineering.

Dysan had invested significant resources into the 3.25″ format push which helped to place Dysan at financial risk. This over time led to the Xidex acquisition.

When Xidex bought Dysan, Xidex's duplication services (XEMAG) were rolled into Dysan's Duplication Division and I was retained as the Software Services Manager for XEMAG.

What were your responsibilities at XEMAG?

At XEMAG I managed manufacturing processes development. Basically, I managed the programmers that programmed the duplication equipment. At the time, there were many computer disk formats and there was a high degree of change with disk formats. This disk format evolution and variation required programming the duplication equipment.

I also managed the customer mastering administration. We were responsible for ensuring that the disks were properly formatted and duplicatable. Further, we defined the duplication programs, the master disk image(s), the disk labeling and, if required, any package assembly processes.

Another responsibility was managing copy protection engineering where we developed and implemented the packaging of software copy protection products.

Additionally, my team and I supported the duplication process around the clock in the event of a manufacturing glitch or if there were any questions regarding the manufacturing processes.

Just to confirm, I believe XEMAG was responsible for duplication and copy protection for Activision games. Is that correct?

Yes, as mentioned above, I was responsible for the XEMAG copy protection products. I do recall that Activision was one of our customers. I do not recall if Activision used XEMAG's copy protection, or if we implemented their copy protection, or if we used a 3rd party copy protection process specified by Activision.

What other notable companies (both game companies and otherwise) do you recall using XEMAG's services?

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Dysan's Duplication Division, and later XEMAG, provided duplication/manufacturing services for just about all of the computer industry companies at the time. Names like Ashton Tate, IBM, Visicorp, Oracle and Electronic Arts come to mind. There were also a lot of companies that are now gone and have no particular notoriety today.

In terms of company structure, XEMAG was owned by XIDEX, which in turn had merged with Dysan in 1984. Did you see any impact of this ownership in day-to-day operations at XEMAG? For example, were you only using Dysan disks?

In the days of the Dysan Duplication Division, yes, Dysan disks were used in the manufacturing process. At the time of Dysan duplication, only the highest quality disks were used in the duplication process. However, after Xidex managed the duplication process the disk quality was reduced to provide a channel for lower quality disks.

XEMAG had moved its headquarters to a fairly sizable location in Menlo Park in 1984. I presume this was where you worked? Please tell me about the company structure you saw, and how many people you recall being employed there.

I remained in the Dysan Duplication Division which was located on Patrick Henry Drive in Santa Clara. I do recall that XEMAG had a location in Menlo Park. I never visited the Menlo Park site.

XEMAG had a VP General Manager that reported into Xidex corporate. That is about all I remember.

I would assume that XEMAG had separate production and distribution facilities. Please tell me what you know about those.

We shipped from our duplication manufacturing facility. So, both disk duplication and package assembly were performed at the same facility. I'm not sure if final product was ever drop shipped to our customers' distribution channel. It most likely was shipped to the customers' distribution facilities.

Did you do any networking with people from other duplication and copy protection companies, either normally or perhaps at trade shows? Tell me about the contacts you had with people from other companies.

As you can tell from the back-story section, I was a technical opportunist. My interests were in the rapidly changing computer industry and emerging technologies. I did not consider the duplication industry the cutting edge and chose to stay and assist the Dysan Duplication Division with the development of key processes and then I was compelled to stay long enough to experience the corporate takeover by Xidex (which, at the time, I felt would invaluable experience for the future).

More specific to your question, at the time, there was very little industry specific trade shows. As I recall, the only real trade show was the West Coast Computer Faire. This trade show was generally for computer enthusiasts and not for any specific computer discipline. Additionally, while at Dysan, we felt that we were the best in the industry. Being a disk manufacturer, we knew more about disks than any other disk duplication

service and developed our own duplication technology for the majority of the disk formats.

The advertisements I've seen for XEMAG promote disk duplication and copy protection. What other services did they provide for clients? For example, did they also handle packaging and other production services?

Yes, the other basic service was package assembly. Dysan/XEMAG provided services from duplication to palletizing final product. In some cases, we also coordinated materials from our customers' supply chain, ordering print services as required.

What kind of disk duplicators were used?

Dysan had mostly custom-developed disk duplicators for standard formats and straightforward duplication. Due to limitations of the Dysan equipment, other equipment that had broader programmable capabilities was also used. The primary vendors were Formaster and Trace. There was extensive use of third party disk autoloaders (I do not recall the manufacturer).

How were the duplicators programmed or otherwise configured for a production run? What sort of computers were used for that task?

The Dysan duplicators were Intel-based CPUs. As mentioned in the prior response, we also used Formaster and Trace equipment.

During the disk mastering process, my team would define the manufacturing build process. The process would include specifications for the program disk or program name to be used to setup the duplication equipment, the master disk image, the labeling specifics and any package assembly processes.

The duplication/assembly sequence was:

1. Insert the program disk into the duplication equipment. In the case of Trace equipment there were program files that would be loaded from a central controller.

2. Load the disk image.

3. Load blank disks to be duplicated.

4. Run the disk duplicators until the order quantity was complete.

5. If needed, run the disks through the disk labeler as specified.

6. If needed, add the disks to the customer packaging as defined in the manufacturing build process.

In terms of copy protection and duplication, which computer platforms, operating systems, and disk formats did XEMAG support while you were there?

We supported all computer formats: Apple, Commodore 64, Commodore Amiga, IBM, Radio Shack TRS-80, just to name a few.

My understanding is that some XEMAG copy protection relied on "fat tracks" where several adjacent tracks had the same data perfectly aligned with each other, a feat that would have been next to impossible to duplicate with consumer disk drives.

Yes, fat tracks were one of the copy protection methods. Basically, copy protection would utilize technology not readily available in the consumer market. We would modify disk formats, burn laser holes at specific disk locations and/or verify the presence of hardware dongles. In the case of fat tracks, the disks would require a two-step process. First, run the disks through duplication equipment that would add the fat track with a drive that could micro step inside and outside of the specified track location, and then run the disks through the image duplication process skipping around the fat track.

How did you stay abreast of software crackers? Did you have people who would study others' copy protection, or did you examine copy programs and hardware that was on the market, or perhaps even have (unofficial) contacts with crackers?

The copy protection process was at a very early stage in the early '80s. We did know of message boards that would communicate methods to get around copy protection. Additionally, as I recall, there were some programs marketed that could be used to copy "copy protected" disks by patching around the code that detected the unique copy protection method. Basically, we knew that as soon as a new copy protection scheme was embedded into a popular product it would be cracked. The copy protection was mostly a deterrent.

We did not engage with the crackers. We would change the code for the next generation of product. The code was always the weak link in the process. The code required periodic updates and new encryption approaches as we leapfrogged from new protection scheme to cracked copy protection scheme to new protection scheme.

Did you develop or oversee the development of any new copy protection techniques while at XEMAG? Tell me about those.

Yes, while at XEMAG, my team worked with the disk engineers to develop the laser burn approach. Basically, disks prior to insertion into the floppy disk sleeve would be laser burned at a specific disk location. My team would then write the detection code and prepare copy protection packages to be provided to customers for their evaluation.

Handling unprotected master disks containing as-yet-unreleased software must have been like guarding the Crown Jewels. What security procedures were in place to manage them?

Yes, master disks were carefully handled. Our mastering lab was separate from the offices and manufacturing floor. The mastering lab was always behind locked doors. Retrieval of master disks was limited to manufacturing supervisory staff and needed to be checked out and then checked back in. Additionally, the duplication facility had 7x24 security.

Walk me through how one of XEMAG's clients would have gone through the copy protection and duplication process from start to finish.

The copy protection process had three basic approaches.

1. Dysan/XEMAG would provide a signature disk and detection source code to the customer. The customer would then add the detection code to their program and verify that the detection process worked properly. In some cases, the customer would also provide encryption processes to lock down the primary programs.

2. The customer would request copy protection and Dysan/XEMAG would add programs to the master disk that would run the detection software and if the signature was properly detected the program would then load encrypted executable programs into memory and decrypt them to allow the full function of the product.

3. The customer would contract a copy protection process from a 3rd party. In this case Dysan/XEMAG would work with the 3rd party to build the production processes required to support the copy protection scheme.

The Dysan/XEMAG preferred approach was having the customer install the detection code into their program. This would allow the customer to periodically recheck that the signature was still present and did not require XEMAG/Dysan to modify customer product.

The most expensive approach was the 3rd party copy protection. It added a per-disk license fee and required Dysan/XEMAG to program the duplication process. The license fee was usually paid directly by the customer to the 3rd party. Dysan/XEMAG would also charge programming time.

In all cases, evaluation disks were sent to the customer for testing and production approval.

Do you recall any clients having "stop-the-presses!" moments where they had to urgently supply an update to their software at the last second? Tell me about some of those.

Yes, from time to time customers would request a production halt. Most of the time bugs or product faults would be found after a production run and we would rerun the order with new master disks. It was no big deal and was part of the process, although the customer would be billed for a partial or full production run. So, there was more drama on the customer side.

Seeing the duplication and copy protection process from your point of view is rare. Did you retain any source code or reference manuals from your work there?

No, I did not retain any material; it was considered company IP.

Tell me a story of something out of the ordinary that happened at XEMAG.

Basically, the disk duplication industry was driven by two factors. First, the duplication quality and second the manufacturing cost. Being that the majority of the

disk duplication services were using the same equipment, the capital costs for setting up and running a duplication services were similar between the duplication service providers.

However, Dysan had developed disk duplicators and had an advantage. So, in an effort to drive cost down Dysan/XEMAG developed fast autoloaders that could cycle disks into and out of duplication drives in a quarter second. The industry autoloaders would take about 4 seconds per disk load and ejection. Additionally, Dysan/XEMAG increased duplication drive speeds up to eight times normal speed. This turned out to provide reduced costs that could be passed on to the customer and allow Dysan/XEMAG to increase its customer base.

This fast loader/fast drive was code named "Lickity Split" and shuffled disks faster than the eye could see.

What were you most proud of accomplishing during your time at XEMAG?

I had a great team of engineers and administrative staff. Dysan/XEMAG measured several quality factors. Some of these factors were related to the specifications provided by the disk mastering team. I am proud to say that mastering specifications were rarely the cause of quality issues and that my team was seen as one of the key strengths of the duplication processes.

How did your time at XEMAG come to an end?

I spent a lot of time with one of our customers, Electronic Arts, while working through various copy protection schemes and working to maintain high levels of quality. While working with EA, I became aware of an opening for a Technical Services Manager who would be responsible for product mastering, specifying and overseeing the generation of software development tools and the development of fast DOSs to support game platforms/formats. This was of real interest to me and I joined EA.