

MEMOREX vs. IBM COMMUNICATIONS ISSUE SUMMARY

I. INTRODUCTION

Since 1969 IBM had been developing the 27RN programmable Communications Control Units (CCU's). Although many competitors already had CCU's they were not impacting IBM's leasebase of ~~non-programmable~~ 2701, 2702 and 2703 (270X's) Transmission Control Units (TCU's). In April 1970 Memorex announced its 1270 TCU's and in 1971 began adversely impacting IBM's leasebase. This caused IBM to expedite their 27RN program. They panicked at a loss of 10% of their leasebase. This caused them to rush to market with an incomplete product, the 3705, ^(27RN during the development stages) without its full software support, NCP. The 3705 was marketed at a price less than the 1270 and it was effectively made available only on a two year lease under the Extended Term Plan (ETP), thus locking customers into IBM for two years at the outset. These actions, ^{entire part of IBM} were a series of blatant predatory actions by a monopolist intended to reacquire the relatively small market share IBM had lost to Memorex and others. Such actions, ^{are proscribed by Section 8 of the Sherman Act} are unlawful when done by a company with IBM's market power.

A. IBM MONOPOLY PRACTICES

The objective of the communications issue team is to prove that IBM, ^{engaged in a series of} used monopolistic practices in the communications area, specifically with the IBM 3704 and 3705 Communication Control Units and their associated support software. The

3704/05 machines were announced by IBM in pertinent part to restrict the erosion of IBM's leasebase which had been occurring as a result of the success of Memorex's 1270 program. These machines are both "fighting machines" and "paper machines". They are "fighting machines" because they were announced as a low price, low profit machine. They were announced to prevent IBM from losing their monopolistic share of the market. They are "paper machines"

based on the fact that they were announced with capabilities that were promised to their prospective users, but were never fully delivered. IBM made promises to these customers

and the customers made plans based on these promises. They had no way of knowing that the promises were false and that their misplaced trust in promises were used by IBM to disrupt the marketplace and severely impact competition, and they were not fulfilled,

hence a "paper machine". Another key factor involved in paper machines is precipitous announcement, which, in general, means to announce a capability before it can reasonably be determined that it is deliverable on schedule as promised. IBM announced the 3704 and 3705, or 27RN and 27RL as they were known during their development, at a time when they knew, or undoubtedly should have known, that the necessary software support could not be available when promised.

In addition, as part of their monopolistic tactics, IBM introduced with the 3705 a lease plan called the Extended Term Plan or ETP. Basically ETP is a two-year contract with

The 3705 was priced 50% below a comparable by equipped 2703 TCU
IBM would have had a portion of the functions
were shut with only a portion of the functions
from your bargain for.

(NLP software support with the associated TLANE - soon to become VMAS - ODSIS method)
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to take advantage of the full capabilities

They had no way of knowing that the promises were false and that their misplaced trust in

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a penalty for cancellation. Because of this cancellation feature, banks treat the duration of the lease as ^{only} equal to the number of months rent that would need to be paid upon cancellation, and for this reason banks will not loan money on these contracts. In other words, PCM's, such as Memorex, who were forced to offer similar contracts to their customers, were unable to use them to finance their ongoing business because the banks viewed them as not being fundable. The penalties which must be paid, ^{upon cancellation} are substantial enough to offset any savings that a competitor could offer, and, ^{therefore,} ~~this~~ ^{were sufficiently discouraged} discouraged customers, from cancelling in order to do business with a PCM. As a consequence, once the customer signed an ETP contract, he ^{was} in effect locked into IBM for at least two years. In summary, the ETP has two major elements: one, because of the cancellation clause, a competitor cannot take a similar contract to the bank and sell it. IBM puts the PCM in a position where he can't compete because he has to deal with a commercial bank, (i.e. obtain short term loans at premium rates), while IBM uses their enormous cash reserves to capitalize their ^{own} ongoing business. The second factor is that the penalty clause in the contract forces the competitor to reduce his price to the level where it provides the required reduction below IBM's product prices. ~~plus the cost of the penalty cancellation.~~ The result of all this is that unless he is willing to accept little or no profit by offering a similar plan

priced below IBM's ETP, in effect, the competitor is locked out of this marketplace once the customer has signed an ETP contract.

ETP also had a "book club" type re-up clause such that the competitor's selling period is restricted to a window of about 90 days at the end of this contract. IBM will notify customers two months before the end of their two-year contract that it is about to expire and will automatically re-up them for another year if there is no response. The customer has two choices: revert to a 30 day MAC basis, which will up his price 15%, or elect a six month extension as opposed to the automatic one-year extension. What happens is that most customers get their notice from IBM, ignore it, and are re-uped for another year. As a result, competitors ~~are~~ ^{continue to be} effectively locked out ~~for~~ longer than 2 years.

B. MEMOREX DAMAGES

Memorex was damaged in three areas by IBM's 3705/3704 program: (1) Our market share was severely restricted. At one point in time, we had in excess of 20% of this market. Today we have in the neighborhood of 10%. IBM was extremely successful in putting the lid on Memorex growth in this marketplace with the 3704/5 programs. (2) Rental prices were eroded. The 3705 was a fighting machine. It came out with a price under IBM's two year ETP contract that was 10% below Memorex's existing

1270 price. In order for us to stay competitive, we had to offer at least 15% savings. In some cases, it had to be even greater than that. However, 15% is usually enough to stimulate interest and enables our salesmen to establish a talking point with prospective customers. Price differential is especially critical in a machine like the 1270. In a disc drive where your're talking about multiples of machines with rentals running up to \$30,000 or \$40,000 a month a 15% savings can be significant, but here your're talking about a single machine. The number of communications controllers found in an average installation are about 1.25 or 1.5, with a typical machine renting for \$2,000 - \$2,500. In these situations a 15% savings is minimal. Memorex initially offered the 1270 at a 30% to 40% savings over IBM machines. The only thing that kept the 3705 from driving us out of the marketplace completely was the fact that we *already* had a large install base and our current users helped us sell ^{some} new customers. (3) The 1270 follow-on program was almost totally wiped out. Indeed, as a result of IBM's 3705 predatory practices, Memorex will probably never again be a major factor in this marketplace again.

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than p. 6.

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C. MEMOREX UNIQUE ISSUES / IBM VULNERABILITY

~~MEMOREX~~

~~3704 and 3705 with their support software are paper~~

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Page 2.

machines. Although this isn't the first time IBM has used paper machines as a competitive tactic, it is the only time in the 70's that they have used them. An example of IBM's previous use of this tactic, currently an issue in the U.S. Government case against IBM, is the System/360 Model 67. IBM delivered System/360-67's, but the Model 67 was not a functioning machine without the associated software, and IBM never delivered adequate software support. As a result, the Model 67 couldn't perform the function that it advertised. We have an exact parallel case for the 3705. The Model 67 was ~~used~~ ^{an issue} in the CDC case, at the conclusion of which IBM agreed to a sizeable settlement. Arguably, IBM acknowledged ~~by~~ this settlement that they've used the paper machine tactic in the past.

8. IBM VULNERABILITY

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Fully regarding these issues,

IBM may be more vulnerable in the 3704/5 communications controller area because they've never had ^{to handle} these particular issues before. They haven't developed their defensive tactics as and since ^{the 3704/5 are} ~~its~~ low revenue producers for IBM, their top management ^{is not as knowledgeable about them.} ~~may not be schooled in it.~~ ^{The 3704/5 acts are} ~~it's~~ well documented and we think the reason that ^{they are} ~~it's~~ well documented is because ~~these are~~ ^{these are} it is a low profile issues. It's not the kind of program that IBM would be wary of getting in trouble over. They were very conscious of potential exposure in the disc file

area. They paid considerable attention to what they did and how they did it, making sure that they couldn't get caught with their hands in the cookie jar. They were much more panicked in the communications controller area because they were poorly prepared and it wasn't as big an area, so they were less careful.

~~MEMOREX UNIQUE~~

as unique to (i.e. it is not an issue in the other cases)
This issue is Memorex unique and that offers a couple of potential advantages. One is that it gives us a good settlement opportunity. Potentially IBM could settle with Memorex without acknowledging any wrongdoing in the other areas. To motivate IBM in this regard, Memorex can demonstrate \$50 - \$70 million worth of damages in this area alone.

D. FUTURE SYSTEMS

The communication controller is critical to data base/data communications. IBM views the future, the 1980's, as being centered around remote computing. Terminals in a central office or branch location will be used to communicate over some sort of communication facilities with hierarchies of data bases. The central data base will be supported by a series of satellite data bases. Terminals will communicate from all over a company or all over the country with data bases. "Distributed computing" will move some intelligence

(i.e. CPU functions) out to the remote terminal, permitting them to do more without interfering with the central computer. This is important because to enlarge a computer installation you must add multiple applications. As the number of applications increase they start to interfere with each other causing a slow down in response because of the increased burden on the CPU. That interference can be reduced by moving some of the CPU's intelligence to the remote location. Decentralization, of course, produces some duplication of hardware because of the added overhead introduced in the remote location and a typically lower percent of utilization. However, application development accelerates because of the close proximity between the end user and his computing capability. But, with the entire facility tied together through one central location the remote user has limited freedom of choice regarding the hardware he uses. What he does is still very dependent upon what happens in the central facility. In other words this enables IBM to exclude PCM's from the marketplace, because users are more apt to use IBM peripherals. That's the IBM view of data base/data communications, and that's where they're headed in the 1980's. This can be carried a step further by tying in the communications capability with satellites. IBM is a major partner in Comsat. Through their Satellite Business System subsidiary, IBM's future systems are tied to the Satellite Business System through the communication controller making

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it the key link in their data base/data communication system. Because of their importance, IBM will attempt to integrate communication controllers within the body of the main computer as their next step. If they do that, of course, we're out of business in the communication controller area. So, among the primary relief that we seek is to have the court enjoin IBM from including this function as a part of the CPU.

II

ENVIRONMENT

It's important to know how the various pieces fit together and where the communication controllers are in the total environment. Figure 1 shows the major hardware components across the top, and below each the various generations of IBM and Memorex hardware and software associated with it.

A. CENTRAL PROCESSING UNIT

Under the Central Processing Unit, CPU, the hardware is the IBM System/360 or System/370 operating with 360 software, and the System/370 operating at its full potential, with System/370 software. The software associated with these Central Processing Units consists of two major categories of programs. System Control Programs and user written problem programs. This discussion is limited to the System Control Programs that are provided by IBM. Without these

System Control Programs, the computer doesn't work. They're known as operating systems. Operating systems are built in modules. These program modules control access to the various input/output devices that are attached to the central processor, and are called access methods. Input/output devices include disc files, card readers, printers, TCU's and terminals. One of the control program modules is a communications control program. The CPU transfers data to and from the Access Method module. The Access Method provides the commonality between a communication control unit and a disc control unit. This function is vital to CPU operation since both deal with raw data in a much different format.

The access methods associated with communications include BTAM which was IBM's first communication control program module. BTAM stands for Basic Teleprocessing Access Method. It was introduced in 1964 along with System/360, and IBM's first transmission control units, the 2701 and 2702. They followed this up with an access method called QTAM, or Queued Teleprocessing Access Method. Finally in 1969 IBM announced an access method called Telecommunications Access Method, TCAM. TCAM was touted as the communications access method that was going to combine all the best features of, and make up for all the shortcomings of its predecessors.

It would be the only access method that anybody would ever need from there on out. But System/370 came along, and IBM was having problems migrating customers from System/360 to System/370. In order to force migration, IBM had to provide customers with some reason to move. The System/370 didn't provide any particular benefits over System/360 because it was essentially a souped-up 360 with little added function. IBM attempted to overcome this by developing System/370 "exclusively", (i.e. things that only System/370 could do because it had features that were only made available with System/370 machines). One of these exclusive features was Virtual Memory, which removed the memory size restrictions previously placed on the programmer by making the system appear to have unlimited (virtual) memory. To support virtual memory IBM announced a new communications control program, or access method, called VTAM (Virtual Teleprocessing Access Method) which would run only on the virtual System/370's.

VTAM was the only telecommunications access method that allowed users to take advantage of the virtual system. The TCAM program that IBM had announced two years earlier was, therefore, made obsolete.

IBM reasoned that their customers would want to write all new applications under VTAM and take advantage of virtual

systems, but would not want to rewrite existing programs. Since users don't have programmers sitting around waiting for IBM's next announcement to go to work, when VTAM was announced IBM's customers were left with two choices: either increase their programming staff to rewrite all the tele-processing programs they'd written over the past ten years, or don't rewrite them. ~~IBM~~ ^{IBM} addressed this problem by allowing users to maintain all their old applications (BTAM, TCAM) and run them on the virtual system, but they could only run them through VTAM. ~~IBM~~ ^{IBM} implemented this by providing a compatibility interface between VTAM and TCAM and/or BTAM. Users who decided to use VTAM, but wanted to maintain their existing programs were forced to support duplicate access methods and provide the ^{considerable amount of} additional real memory required by them.

B. CHANNEL

The channel interfaces all the input/output devices to the CPU. It provides a path for data transmission between the CPU and the various I/O device control units. In all the larger systems, it is a separate independent box with its own channel programs. In some of the smaller systems it is integrated within the CPU and steals CPU cycles to operate. The channel is actually a small special purpose computer for transferring data to and from the CPU.

C. COMMUNICATION CONTROL UNIT

The Communication Control Unit is attached to the channel, and through the channel to the CPU. It interfaces the CPU to a variety of data transmission facilities permitting it to control multiple communication lines and remote terminals, indicating their status, assembling characters and checking data for transmission errors. It is referred to as a Communication Control Unit, a Communication Controller, a Terminal Control Unit, and sometimes a Multiplexer. The 2701 and 2702 were IBM's first Transmission Control Units and were announced with System/360 in 1964. This was IBM's first venture into integrating communications with the computer. Their announcement was followed one year later by the 2703 which attached more lines at lower cost per line and provided more function. In July 1970, Memorex announced two low cost Terminal Control Units as replacements for these machines - the 1270 Model 1 to replace the IBM 2702 and 2703. *and the 1270 model 1 to replace the 2702* The 2701 had capabilities which the 2702 and 2703 did not have. There were many installations that had a 2702 or 2703 in addition to a 2701. Memorex combined most of these capabilities *of all 3 of these models* in a single machine which helped reduce the cost further. IBM was getting thrashed by the two Memorex 1270 Terminal Control Units and they reacted by announcing the 3705 and then the 3704 Communication Controllers. The Memorex 1270 Terminal Control Units and IBM's 270X Transmission Control Units were hardwired machines. They were wired at the factory

to perform specific functions and that was all they could do. The new units that IBM announced, the 3705 and 3704, were programmable units, small specialized computers. They required a control program to function. The hardwired machines did not require programming. Programming provided the 3704 and 3705 a larger degree of flexibility. Potentially, it allowed them to do more things. IBM announced two types of control programs for the 3704 and 3705: the Emulation Program, which allowed the 3704 and 3705 to look like one of IBM's 270X units, and the Network Control Program which had many added functions. When using the Emulation Program, the 3704 and 3705 operated on either the System/360 or System/370. But, since they were emulating the 270X, they couldn't do anything that the 2701, 2 or 3 couldn't do. The difference was that the 3704 and 3705 did it at a much lower price (i.e., a predatory price cut). The Memorex 1270 Model 1 was priced 30% to 40% below IBM's 2703. IBM's 3705 running in emulation mode was priced 10% below a comparable Memorex 1270 Model 1 on a two year ETP contract. The net effect was a 50% price reduction from the IBM 2703 to the IBM 3705 running in emulation mode. This forced Memorex to reprice and reconfigure the 1270 product line. ~~While the 3704 and 3705 Communication Controllers didn't offer any more capabilities than Memorex did, it had a different pricing structure designed to result in a lower price.~~ Memorex responded by announcing the 1270 Models 4, 5 & 6, which were nothing more than price cuts to enable the same Memorex machines to compete with the 3705's. V The natural

Memorex did not respond with these price cuts until February, 1974 because

result of these price cuts was an erosion in the rental collected by Memorex. The 3704 and 3705 were intended to be able to operate in what IBM termed the Network Control Program ("native") mode within one year of announcement. The Network Control Program mode was exclusive to System/370, thus encouraging migration to the 370, or vice-a-versa, requiring 370 customers to migrate to the 3704/05 in native mode. Thus, the full advertised capabilities of the 3704 and 3705 were available only on System/370, using System/370 software and the Network Control Program. In summary, the 3704/05 could either look like previous generation hardware performing the same functions for less money, or provide great promise of added new function and features, but only on System/370 and ultimately only using VTAM. That was one of the ways they forced users into System/370.

D. MODEMS

The next element in the chain, working outward from the CPU, is called a modem. A modem is actually the device that interfaces to the telephone line. It takes digital data signals and changes them into analog signals for transmission along the communications line. There is a modem at the other end of the line that takes the analog signal, and changes it back to a digital signal that allows the remote terminal to understand it.

E. LINE CONTROL

When data is transmitted across the communications line, there

has to be some standard form of transmission codes that both the terminal and the communication controller recognize. These code conventions are called line controls. The first standard type of line control to be developed was asynchronous. Asynchronous line control, sometimes called start/stop, is used primarily for low speed communications gated by operator keying speeds. Each character is bounded by start/stop bits that identify where it begins and ends. Special control characters are also provided to tell the terminal and the communications controller unit what type of operation is being performed. It became apparent that asynchronous line controller was not adequate for high speed data transmission. This led to the development of binary synchronous line control. Binary synchronous line control transmits a binary data stream with the terminal and the communication controller at each end of the line synchronized so they're both talking at the same rate, thus eliminating the need for start/stop bits at the beginning and ending of each character. With the start/stop bits out of the character stream, transmission could be faster. It soon developed that binary synchronous wasn't the end of the road either. It's control capabilities couldn't handle the complexities of full duplex (simultaneous transmission in both directions) data transmission. In addition, it didn't provide IBM with exclusivity. So IBM announced a new line control technique that they called Synchronous Data Link Control (SDLC) to overcome these shortcomings. Synchronous Data Link Control is only supported by the 3704 and 3705. It's only available on virtual System/370, and it happens to be the

primary transmission method of IBM's new terminal products. So, to take full advantage of IBM's new terminal products which are very attractively priced and offer a lot of function, you must use SDLC. This is the system IBM established for coercing people into using their hardware.

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From pp 7-9.*

F. FUTURE SYSTEMS

III CHRONOLOGY

Prior to Memorex's announcement of the 1270 in July 1970, many competitors had developed superior products to compete with IBM's 270X's. However, their impact on IBM's lease base had been slight. Memorex's 1270 began impacting IBM's 270X lease base immediately. Although IBM had had its 270X replacement products under development since 1969, they had not been in any particular rush to get a product to market until 1971. In 1971 they perceived Memorex's impact and the documents show they started to panic.

The Telecommunications Access Method (control program for the TCU located in the CPU)

IBM ~~has~~ announced ^(TCAM) in 1969. TCAM was designed for System/360. IBM announced System/370 in 1970 after the announcement of TCAM - slightly before the announcement of our 1270. They began shipping System/370's and TCAM in the early part of '71. They still weren't worried at this point in time about PCM competition in the communication controller area. One of the reasons for this was that their 2702 and 2703 base only had about 1,300 units in it. It wasn't big, and they didn't expect anybody to attack it. Memorex used the 1270 to displace IBM's 270X machines. The 1270 was successful because it offered better price (40% price reduction), improved function, it supported more types of terminals at higher speeds, and was software compatible with the IBM TCU's. The

customer could move his 270X out, move the 1270 in, and not change any programs. Memorex started penetrating this base dramatically in the latter part of 1971, so that by the end of '71, IBM went into a panic. We had achieved in about three months over 10% penetration of their 270~~3~~ install base. IBM's Forecast indicated that Memorex would displace up to 30% of this base within the next year and a half. They were working on future system, FS, and on DB/DC at this time. If they lost the transmission control units, they lost the key to DB/DC. Regardless of the amount of revenue or the number of units in the install base, they couldn't afford to lose these transmission control units. Not only were the TCU's vital to their future plans, but they were losing in their big, leading edge accounts. In short, while they perceived the loss of market share as severe, their biggest concern and real fear was the accompanying loss of account control. When IBM saw the impact, they analyzed their 270X line to see if it could be put on the FTP plan, permitting them to reduce the prices and retain their base. What they decided was that even though the 270X program was a 40% profit program, in order for them to retain the base, they would have to offer an FTP price that was below the current prices of the 1270. Memorex's reaction would be to lower the price of the 1270 and IBM would then have to lower their prices further to the point that the 270X would end up being unprofitable. IBM decided that wasn't the way to go. They had to announce a new product, the 3705, with its added function to retain their market share. One of IBM's pre-announcement estimates indicates that considering impact against their 270X base profit/revenue, the 3705 program would end up being about a 5% profit program. IBM

finally responded in March of '72 by announcing the 3705. IBM had to get the new 3705 boxes installed - to shut Memorex off. They knew from their experience with disk drives that if they announced with a 12 month lead time, customers would order and install Memorex 1270's ^{in the} interim. They needed a short delivery schedule. The 3705 was announced with a very short, four-month, delivery schedule. The 3705 hardware had been developed for some time. Software was the problem. Their sales strategy at announcement was to sell the NCP function, tell the people they could have it in a year, and sell ^{the} Emulation Program as an interim. They would tell customers that since the 3705 was a programmable machine, it was different and they would want to learn how to work with it. That is how IBM got the 3705 installed. Then they locked customers in with the ETP. Even if they didn't deliver NCP at the end of that first year, they had the customer ^{in the fold} for two years because he had signed an ETP contract. ^{as a practical matter,} He couldn't get out.

The time between the announcement of TCAM in mid '69 and its first customer shipment was in excess of 18 months. As this indicates, telecommunications access methods or control programs are very complex and difficult to write. IBM knew that from their experience with TCAM, before the announcement of the 3705. The 3705 with its two sets of software, the Emulation Program and the Network Control Program, were announced as a package in March of '72. First customer shipment of the 3705 Emulation Program ~~was~~ ^{announced to} ~~would~~ take place the third quarter of '72. Network Control Program capability wouldn't be available until a year after announcement, in March of '73. Actual first deliveries of NCP

began in November of '73, an eight-month slip. They delivered the first 3705 hardware four months from announcement, on schedule. NCP couldn't run without the proper communication control program (access method) in the CPU. The two had to interact. When IBM announced the 3705 the only communications access method they had was TCAM. Many key IBM people stated at that time that TCAM

couldn't do what was needed for the 3705 to function as they were promising it. IBM recognized that but felt they had to announce

the 3705 under emulation mode to stem the tide towards the 1270. *It was hoped that they could subsequently back-fill with an improved version of TCAM.*

Then IBM announced virtual memory systems, VS, for System/370 in mid '72. The interesting thing about VS was that System/370 at this point in time was comprised of five models, the 135, 145, 155, and 165 and 195. The 135 and 145, which were announced three or four months after the 155 and 165, already had virtual memory capability that IBM had never told anybody about. When they announced virtual memory, they advised users that the 135 and 145 had virtual memory and all they had to do was load the proper system control programs for them to run as virtual machines. Those programs were available immediately. IBM announced virtual systems and shipped them on the same day. But, VTAM still wasn't announced. They announced virtual systems and the virtual control program for discs, but they hadn't announced VTAM, even though back in March their people had been telling them TCAM couldn't do the job and they needed a new system control program for communications in order to make the 3705 work.

When Memorex shifted their attack from the high end to the low

(designated the 27RL before announcement)

end of IBM's install base, IBM announced the 3704^a to protect this portion of the market. The low end represented the new customers that were building the base for future expansion, so IBM had to safeguard it. At the same time, February of 1973, they finally announced VTAM, superseding TCAM. As pointed out earlier, VTAM was needed to promote the System/370 migration and exclusivity that IBM wanted. It is very interesting to note that VTAM was announced just prior to the first scheduled shipments of NCP. What IBM had told their customers was that they could get NCP in March and run it under TCAM, but TCAM was not going to be supported on virtual 370's and in order to run NCP, they were going to need VTAM. However, VTAM ^{was} not going to be ^{made} available until early '74. In effect, they were saying to users, don't go to NCP until early '74, thus slipping effective 3705 native mode operations even further.

The NCP slipped by 6 months. One of the reasons for the additional delivery slip was that NCP had exceeded its memory specifications. B. O. Evans, President of IBM's System Development Division, indicates in a memo that NCP was in trouble because it had exceeded its memory requirements dramatically, and he said they were in especially deep trouble on the 3704 because they couldn't fit it in the box. NCP required more memory than was available on the largest mode of the 3704. The 3704 was announced as the entry level machine that was going to run NCP, but it wouldn't fit. They finally managed to shoe horn it in, but it still can't handle the maximum number of lines or perform most of the NCP advanced functions. ~~In effect,~~ ^{still} NCP ^{effectively} doesn't run ^{effectively} for the 3704.

The significance of all this is that

A If IBM had announced NCP in 1972 with a two year delivery schedule, there would have been few takers. ^{Customers would not have been depressed and as a consequence looked into IBM's early products' function and they would have been able to compare to competitors' in the marketplace.} Under EP, the 3705 didn't run as well as the 1270 or offer its function. It didn't support as many lines, and didn't have the throughput rate of the 1270. When they announced NCP, they announced it with a one year availability, then they slipped it and made it two years with VTAM and then before VTAM was shipped, they slipped the VTAM schedule twice. IBM was in trouble with VTAM, and the two slips, ten months and six months, put first deliveries out in mid-1975. Before first customer ship, there were sixteen months worth of slips. Added to the 9 month initial delivery schedule, that is over two years before VTAM was available. Three years after the initial announcement of the 3705, IBM effectively delivered the capability that is required to make it run in NCP mode and provide the added function that they had promised everybody. Looked at in light of the TCAM schedule, which was 18 months, that seems pretty reasonable because VTAM was more complex than TCAM.

The first VTAM slip was ^{as a result of IBM underestimating the amount of memory required} ~~because of memory~~. IBM blew the VTAM memory requirement specifications by a factor of ten. The VTAM that they delivered took three to five times the amount of memory they had specified, three to five times as much memory as TCAM. Aside from the additional memory required, with three to five times the number of instructions VTAM had to go a lot slower too, and it did. Performance was a problem. VTAM was so slow it wasn't usable. IBM had to do something. That is why they slipped it and every time it slipped, they chopped sections of it out for release in later versions of VTAM. The VTAM they ^{Finally} released in mid-1975 contained only a small portion of the function promised,

with the rest, ^{supposedly} to follow in later releases. VTAM operated anywhere from twenty to fifty percent slower than TCAM and TCAM was slow ^{to begin with.} ~~It~~ ^A ~~was~~ ^{VTAM's} objective had been to improve upon what TCAM offered, but it couldn't even provide the functions ^{available} in the enhanced versions of TCAM. Users who had waited for VTAM were left sitting there two years later with nowhere to go.

When IBM announced their new terminals in mid-1973, they announced SDLC along with them. But SDLC was only available under NCP. Customers who had any doubts about NCP, and were considering the Memorex 1270 were told that they better stick with the 3705, and wait because SDLC would be available in 1974. That is another story entirely because those terminals and SDLC never ^{materialized.} ~~happened.~~ They were all deferred out to 1975 and SDLC still hasn't been shipped. IBM finally ended up putting a switch on almost all of their new terminals that allows them to operate in either async or bisync mode as well as SDLC mode, so they could begin shipments without waiting for SDLC. They are shipping these terminals now, but they are all operating like other async or bisync terminals. They're not using SDLC.

IV CONCLUSION

IBM knew they couldn't sell the 3705 against the 1270 as a "me too" type machine ^{with} a price cut. ~~And~~ Their strategy was to sell the function of NCP even though they knew TCAM was not satisfactory to support the function they had promised with NCP. IBM's customers could have gone to TCAM and used NCP with TCAM, but if they did they knew that any programs they wrote under TCAM,

unless they ran TCAM and VTAM together, would have to be rewritten under VTAM. So, most ^{customers} decided to wait and write them under VTAM. Major programs that could not wait were written under BTAM or TCAM.

Communication systems are the hardest of any application type to install or change. They are the hardest applications to install on a computer because they require the interaction of tens to hundreds of people who are not computer oriented. The education of all these people makes initial implementation and any change very slow.

If IBM had announced the 3705 with all of its function coming three years down the road, it wouldn't have done what they had to do, which was to stop 1270 immediately. The 3705 wouldn't have stopped Memorex if IBM had been realistic in their appraisal of when they could provide the functions they had committed to their customers.

RD

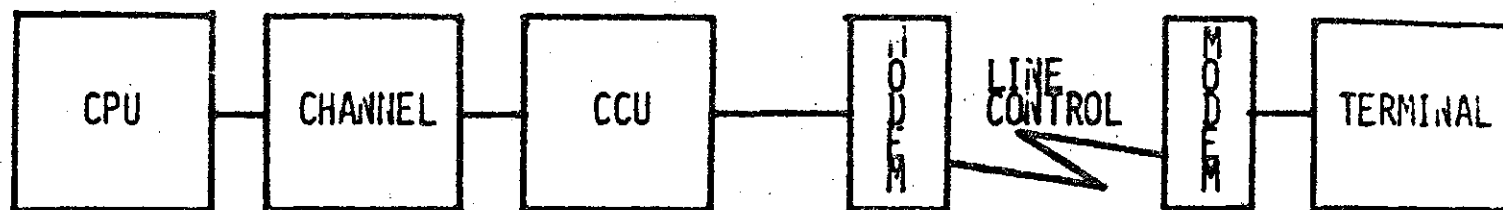
At the time Memorex made the decision to abort its RD efforts on the follow-on technology, the hardware to all intents and purposes had been fully developed. Memorex had four or five working machines in various stages of manufacture as engineering prototypes which were to be shipped to customers. They ran the IBM Emulation Program successfully. The problem that killed the program was the amount of cash required to develop and maintain the NCP. The estimate was 3-1/2 million dollars over and above all other development expenditures which totaled about a million and a half. The 3-1/2 million dollars estimate is based on the

fact that the Memorex 1370 was as compatible as it could be to the 3705, but still not capable of running IBM NCP without some modifications to accommodate its improved function. That is what we estimated it would cost us to maintain and support the IBM NCP program.

A recent survey by DataPro based on calls to a large number of IBM communications users indicates that 80% of IBM's 3705's are ^{still} running in emulation mode today. In other words, only 20% of IBM's 3704/05 customers have implemented the NCP, and it has been available now (supposedly) for three years. What this really says is that ^{these customers were sophisticated enough to} people recognized ^{that} NCP that was available in 1973 was no good without the right access method support.

In the second half of 1975 Memorex began marketing an OEM ~~IBM~~ CCH product, the 1380. Thus far the 1380 is not very successful, nor is it anticipated to be so. Also in the second half of 1975 IBM announced the 3705 II, which was a further price cut. Recently IBM announced ^{yet additional} price cuts on the memory portions of their 3704/5's. We have not yet evaluated the full impact of these three matters. We intend to do so.

III ENVIRONMENT



HARDWARE

				ASYNC		
IBM S/360, 370	2701	1270-2			2741	1240
	2702/3	1270-1			2740	1242
	3704/5*	1270-4,5,6		BISYNC	1050	1280
IBM S/370	3704/5	----		SDLC	2780	1242-S*
					36XX	----
					3790	----

SOFTWARE

IBM S/360, 370

BTAM

QTAM

TCAM

IBM S/370

VTAM

+TCAM

+BTAM

*EMULATION

PROGRAM (270X)

NETWORK

CONTROL

PROGRAM

IV. HIGHLIGHTS

MEMOREX 1270

TCAM

S/370

IBM 3705

EP

NCP

IBM 3704

VS

VTAM (OS/VS1)

SDLC

