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Microsoft Memo

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FROM: Mark Chestnut

SUBJECT: ROM DOS Business Plan

DATE: 5/26/89

Attached is a revised ROM DOS Business Plan. This version includes a forecast for FY 90 and FY 91 as well as revised pricing, based on input received following distribution of the first draft. Please also note the addition of another ROM DOS product, ROM DOS 1.0, which is a copy from ROM (RAM executable) implementation that was developed for Vendex/Headstart and Emerson and is available now.

Please review and forward any comments to me.

BUSINESS PLAN:

ROM DOS PRODUCT LINE

May 26, 1989

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EXECUTIVE SUMMARY

General Overview
Key marketing objectives:

a. Prevent MS competitors from establishing a presence in the ROM DOS market
b. Provide solutions that are superior to competition in functionality and size
c. Build foundation that will allow MS DOS to dominate a significant new market

Product line will consist initially of 3 products:

a. ROM DOS 1.0 - short term, non-strategic product, not ROM executable. Avail. now.
b. ROM DOS 2.0 - ROM executable, based on DOS 3.21. Available 8/1/89.
c. ROM DOS 2.1 - based on current level DOS, ROM executable. Tentative avail. 12/89.

Marketing Summary
Target Markets:

a. Embedded Control
b. Laptop PCs
c. Pocket PCs
d. Diskless Workstations

All 4 target markets are projected to grow substantially over the next 5 years. Embedded control offers the greatest revenue potential - Dataquest projects 26 million units shipped in 1993, and this is a totally new market for MS-DOS.

Strategy for penetrating embedded control market is to have OEM sales focus initially on large manufacturers of embedded control chips that are DOS capable - Intel, NEC, Kanematsu. As embedded control is a huge, diverse market, much additional information is needed to forumulate long-term strategy. A product marketing summer intern has been assigned full-time to the task of gathering this information, and will start 6/89.

MS ROM DOS offers significant advantages over competition (size, functionality, THE industry standard) to laptop, pocket PC and diskless PC markets. OEM sales should aggressively pursue design-ins with OEMs developing such products.

For ROM DOS 2.0, a special price schedule for embedded control OEMs is proposed, with per system royalties ranging from $3 for 250K annual unit commitment to $8 for 6K commitment. For non-embedded OEM's, pricing is higher for ROM DOS 2.0. ROM DOS 2.1 pricing is the same as OEM royalty pricing for current level DOS.

Forecast

ROM DOS 2.0	Units	Revenue
FY 90	350,000	$3,500,000
FY 91	750,000	$4,500,000

ROM DOS 2.1		
FY 90	150,000	$1,000,000
FY 91	550,000	$4,000,000

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I. General Overview

The purpose of the ROM DOS product line will be to clearly establish Microsoft as the industry standard ROM-based operating system supplier for the following markets:

* Embedded Control
* Pocket PCs
* Laptop PCs
* Diskless Workstations

The following are the key marketing objectives for the ROM DOS product line:

1. Prevent MS competitors from establishing a presence in the ROM DOS market

2. Provide solutions that are superior in functionality and size to the competition for the target markets

3. Build a foundation that will allow MS-DOS to dominate a significant new market in the 1990's

The ROM DOS line will consist initially of 3 products:

1. ROM DOS 1.0

* Based on MS-DOS 3.3
* Includes support for up to 512 MB disk partitions
* Stored in ROM, but loads into RAM (RAM executable)
* Available June, 1989

2. ROM DOS 2.0.

* Based on MS-DOS 3.21
* ROM executable
* Targeted for Pocket PC and Embedded Controller markets
* Available July, 1989

3. ROM DOS 2.1.

* Based on current level MS-DOS
* ROM executable
* Targeted for Laptop PC and Diskless Workstation markets
* Tentative availability 1st quarter, 1989

The ROM DOS 1.0 product is a "stop gap" that is being developed to capture some short term business that otherwise would have gone to the competition and is not considered strategic.

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To best address the needs of the embedded control market it is suggested that an additional product(s) be introduced in the 1990 timeframe, which should include the following features:

- Very small kernel size with reduced functionality (possibly DOS 2.11 based)
- A real time kernel that provides preemptive multitasking (DOS would run as a task under the real time kernel)

If a follow-on ROM DOS product with the above features can be brought to market in 1990 to complement ROM DOS 2.0 and 2.1, MS should be very well positioned to dominate the target markets for ROM DOS and achieve the stated marketing objectives for the product line.

2. Marketing Summary

A. Market Opportunity

The market potential for ROM DOS is large, as all four target markets - embedded control, laptop PC's, pocket PC's and diskless workstations - are expected to grow substantially over the next several years.

1) Embedded Control

The embedded control market offers the greatest unit volume potential. Dataquest forecasts explosive growth for embedded controller shipments:

Year	Projected Units Shipped
1988	5,000,000
1989	10,000,000
1992	26,000,000

The CPU's for a large percentage of current embedded products are not capable of running DOS. However, several manufacturers (Intel, NEC, Kanematsu) either have products now or plan to in the future that are DOS-capable. The market opportunity for just these three companies is significant. Both Intel and Kanematsu project sales as high as 1 million units per year within 1-2 years for their embedded products, and NEC volumes are also expected to be high.
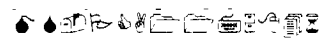
2) Laptop PC's

The market opportunity for laptop PC's is also significant. Dataquest forecasts the following unit shipments for laptop PC's:

Year	Projected Units Shipped
1988	1,000,000
1989	1,625,000
1990	1,850,000

ROM DOS will have its greatest appeal at the low end of this market. High end laptop PC OEMs are likely to prefer RAM executable DOS to ROM DOS because:

    a) DOS executing from ROM is slower than from RAM
    b) ROM DOS may have compatibility problems with products like the CD
       ROM Extensions (though we hope to solve these)
    c) High end laptop OEMs position their products as offering equivalent
       performance and functionaltiy to desktop PC's, and so may not view
       ROM executable DOS as being consistent with that positioning

For the high end OEMs, the primary benefit of ROM DOS vs. conventional DOS is "instant on" - turning the system on and booting up almost immediately. This benefit, however, can be achieved by storing DOS in ROM and copying to RAM, with no performance or functionality trade-offs.

It appears that the better opportunity for ROM DOS in the laptop market is with low end OEMs. The low end is less concerned about functionality/performance and would prefer ROM DOS because it frees additional base memory for applications - which, particularly for 8088/86 based laptops, would be a significant benefit.

3) Pocket PC's

Although the first DOS-capable products have yet to ship, it appears that pocket PC's are a good potential market for ROM DOS. Unlike laptop PC's, pocket PC's will for the most part require ROM executable DOS as many will ship without disk drives and will want to make maximum base memory available to applications.

Recent market trends suggest that pocket PC's could become very popular. Companies like Sharp and PSION are today shipping large numbers of Pocket Organizer-type products (non-DOS machines). According to MSKK, Sharp shipped 1.6 million units of their product in 1988. PSION shipped about 300,000 units in 1988, mostly in Europe.

In addition, there is a clear market demand for very small, lightweight machines capable of running DOS. NEC's recently introduced Ultralite, which weighs 4 pounds, is very compact and runs DOS, and has been very well received. Several other OEMs are also planning on introducing Ultralite-type machines.

The first DOS-based pocket machines are expected to ship later this year by the following OEMs:

    Europe: PSION, DIP
    United States: Atari (OEM for DIP), Poqet, Telxon
    Japan: Casio, MCI, Kyocera

Based on the success of the non-DOS pocket machines and the market trend toward smaller, lighter machines, it seems likely that there will be an emerging market for ROM DOS in pocket systems, and that this represents a significant opportunity.

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4) Diskless Workstations

This is also a potentially significant market for ROM DOS. International Data Corporation reports 51,000 units shipped in 1987 (actual), and projects the following unit shipments for diskless workstations:

Year	Projected Units Shipped
1988	102,000
1989	178,000
1990	284,000
1991	427,000
1992	597,000

The advantage of ROM executable DOS for diskless workstations is that the workstation will have "instant on" and will not have to wait for DOS to download from the server each time it boots up, plus making additional RAM available to applications. Current major suppliers of diskless workstations are Novell, 3 COM, NCR and Televideo.

B. *Strategy for Penetrating Target Markets*

1) Embedded Control

Microsoft should emphasize the following in differentiating our products to embedded controller manufacturers:

* fully compatible DOS
* occupies only 45K of ROM
* MS is THE industry standard DOS

The first two points are critical in differentiating MS ROM DOS from DRI. According to PSION, which has evaluated the product, DRI's ROM DOS is large (fits into 96K of ROM), and, if shrunk to a smaller size, has significant compatibility problems. MS, however, offers the advantages of a smaller, fully compatible ROM DOS.

DRI will attempt to minimize the compatibility advantage by arguing that this is irrelevant to a single, custom developed application environment for embedded control. This overlooks the fact that these incompatibilities could also affect some of the DOS development tools that would be used to create the single application. One of the primary advantages of using DOS as the OS for embedded control is the widespread availability of good DOS tools (and programmers who know how to use them). The message that MS can deliver to customers is thus as follows: MS can insure that the entire set of tools is fully compatible with our ROM DOS, while it is doubtful that DRI can offer that same degree of insurance.

MS also has the advantage of offering a smaller DOS that occupies considerably less ROM - about 40K less. This should be a significant advantage to embedded

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control OEM's as it will cost them less to produce an MS-DOS based system than a DR DOS based system.

The final point of differentiation, emphasis of MS as THE industry standard DOS, is consistent with how we have previously competed with DRI and others for OEM DOS business. With ROM DOS, it is also essential that MS offer much lower pricing than our standard OEM prices, since a product like the Intel Wildcard sells for as little as $50 in quantity, and since DRI is pricing their ROM product aggressively. The pricing proposed in the next section should accomplish this, and should allow us to position MS ROM DOS as delivering much greater value than DRI's product (for the reasons discussed above).

In attacking the embedded control market in the next few months, it is suggested that MS focus on the large manufacturers (Intel, NEC, Kanematsu) who currently (or will soon) supply DOS-capable systems for embedded control. Our existing OEM sales force should work to aggressively sign these customers to ROM DOS licenses, emphasizing the MS ROM DOS benefits outlined above.

For the longer term, additional investigation is needed to better understand what is required to become the industry standard OS supplier to the embedded control market. At this point, it seems clear that if DOS is to displace the proprietary OS's currently used for embedded control, we must plan to offer the following additional capabilities:

* A very small kernel (perhaps DOS 2.11 level, which is 24K)
* Modular design, making it easy for OEM to strip unneeded parts of DOS
* A real time operating kernel with preemptive multitasking

To get the additional information needed to formulate a long-term strategy, a summer product management intern, Rich Freedman, will be assigned the task of conducting a comprehensive investigation of the embedded control market beginning in June of this year. Additional information that we will be getting includes:

* Information from the large embedded controller suppliers (NEC, Motorola, National Semiconductor, etc.) on their plans and objectives for this market, and their operating system needs for embedded control

* Perspective of small OEMs who integrate these embedded controllers into their products (small OEMs are the primary customers for embedded controllers today)

* Determination of the appropriate channel strategy for small OEMs

* Determination of the appropriate plan for developing or acquiring real time kernel. NEC has a real time kernel now and MSKK is negotiating with them to get distribution rights. While this appears to be the best available avenue, additional investigation of other possible sources is needed.

* Determination of the appropriate plan for developing a smaller, more modular ROM DOS

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2) Pocket PC OEMs

ROM DOS offers three very compelling advantages to this market:

- Full application compatibility
- FEPROM Support
- THE industry standard DOS

The applications compatibility issue is very important here. DRI's ROM DOS has
major compatibility problems, and these types of systems will run multiple
applications, so MS has a huge advantage (this was a major reason why PSION
selected MS over DRI). The FEPROM issue is also significant. FEPROM is an
emerging technology that can be used as a mass storage replacement, and is
expected to be implemented in many pocket and laptop PC's. MS is developing a
linked file system, which we intend to patent, which will provide outstanding
support for FEPROM. DRI currently plans to offer device driver support for
FEPROM, which is a technically inferior solution to the MS approach (this was
another factor in PSION choosing MS over DRI).

It seems that the best approach is for our OEM sales force to work with pocket PC
OEM's and get them to license ROM DOS on a per system basis. Given the
advantages that the MS ROM DOS product offers, plus the importance to the OEMs
of including the industry standard DOS in their products, gaining the commitment
of the pocket PC OEMs should be a relatively straightforward process.

3) Laptop PCs

The advantages of MS ROM DOS are largely the same as for pocket PC's. In
addition, MS offers to laptop PC OEMs the advantage of having the current (4.01)
level DOS in ROM, which is superior in functionality to DRI's 3.3 level product.

The attack strategy for laptop PC's should also be largely the same as for pocket
PCs: use the existing MS OEM sales force to sell the OEM on the benefits that MS
ROM DOS offers and gain the OEM's commitment to license the product.

As stated previously, ROM DOS is not necessarily a good solution for many laptop
PC's. However, for those OEM's (particularly with low-end products) who insist on
implementing ROM executable DOS in their products, MS will have a solution to
offer that is superior to that of our competition.

4) Diskless Workstations

The MS advantages and attack strategy for this market are the same as for laptop
PCs.

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C. Pricing

1) ROM DOS 1.0

This is a short-term, non-strategic product and should be priced on a case by case basis.

2) ROM DOS 2.0

Two schedules are proposed for this. Schedule A would be for embedded controller OEMs only, and Schedule B for everyone else.

Schedule A
(Embedded Controller OEMs)

Annual Unit Commit:	6K	25K	50K	100K	250K
Per System Royalty:	— $8	$7	$6	$4.50	$3

The above pricing would be based on a two-year unit commitment. It is suggested that, at the lowest commitment level, a large percentage of the total two year dollar commitment be made due on signing.

Schedule B
(All Other OEMs)

Annual Unit Commit:	6K	25K	50K	100K	250K	500K
Per System Royalty:	$30	$25	$20	$15	$11	$8

3) ROM DOS 2.1

Since ROM DOS 2.1 is equivalent to DOS 4.01, the pricing should be exactly the same as the current OEM pricing for DOS 4.01.

4) FEPROM

It is possible that, as this technology becomes more widely used, it may be appropriate for MS to license the FEPROM file system driver as a separate product, a la MS CD ROM Extensions. For the short term, however, our FEPROM technology should be used to differentiate our ROM DOS offering, and to leverage OEM commitment to MS ROM DOS.

D. Product Content

ROM DOS 2.0 and 2.1 will be shipped as a Binary Adaptation Kit (BAK) and will include the following specific deliverables:

1) The product in object form.

2) Machine-readable documentation.

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3) Adaptation notes, which provide the information necessary for the OEM to adapt the product to the OEM's specific hardware.

Source code will be made available to OEMs upon execution of a source license agreement and payment of the appropriate source fee.

3. Forecast

ROM DOS 2.0

	Units	Avg. Royalty	Revenue
FY 90	350,000	$10	$ 3,500,000
FY 91	500,000	$ 9	$ 4,500,000

ROM DOS 2.1

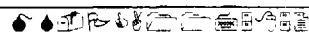|	Units	Avg. Royalty	Revenue
FY 90	50,000	$20	$ 1,000,000
FY 91	200,000	$20	$ 4,000,000

4. Timing and Availability

The following summarizes the planned releases and dates for ROM DOS 2.0 and 2.1 in 1989:

ROM DOS 1.0, Final	June 1
ROM DOS 2.0, Final	July 31
FEPROM file system driver, Final	July 31
ROM DOS 2.1	Q1 1990 (tentative)

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5. Product and Marketing Risks

There are a number of risks that are associated with the ROM DOS product line. The following is a discussion of these risks and suggestions for minimizing them.

A. Schedule Slips

MS has committed to a July delivery date, and it is critical that this not slip. DRI has a product that is shipping today, and they are leveraging this advantage to the fullest extent. If the July date slips, we are in grave danger of losing customers like PSION to DRI.

The DOS development group has given the ROM DOS project top priority. To date the project is on schedule, and development is prepared to assign more resources to the project as needed. MSKK has also offered that one full-time engineer can be made available to work on the project.

B. Cannibalization of Standard OEM DOS Business

By offering ROM DOS 2.0 at reduced pricing, there is always the risk that some OEMs who would otherwise license DOS 4.01 will instead want to license ROM DOS 2.0 to take advantage of the 35% lower pricing. To minimize this, OEM sales should sell the customer on the significant benefits that 4.01 offers over and above 3.21. In addition, ROM DOS 3.21 should be positioned as being a great solution for specific niche markets (embedded control, pocket PC's, etc.), but a solution that is clearly inferior to DOS 4.01 for general purpose PC's.

C. DRI's Competitive Response

DRI cannot be expected to sit and do nothing while MS enters this market. They have demonstrated that they are able to react quickly, and they have the advantage of already being to market with a product. DRI is likely to change its ROM DOS product offering to remain competitive with MS over time, and they also have the advantage of starting with a DOS that is already modular in design, which gives them the ability to change their product fairly easily.

It is critical that MS pay very close attention to DRI, particularly over the next few months. Between now and July, we must not allow DRI to sign any significant OEM licenses for ROM DOS, to prevent them from gaining a foothold in this market. It is important that we stay very close to those OEMs who have indicated any degree of interest in ROM DOS, inform them of our plans, sell them on the benefits of our products, etc. After we have shipped our first product, we must continue to monitor DRI closely, and adjust our plans as appropriate to maintain our competitive edge.

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