# SELLING PERSONAL COMPUTERS TO LARGE COMPANIES

## VOLUME II

## MARKET FORECASTS AND PRODUCT STRATEGIES

INPUT

# ABOUT INPUT

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INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

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# SELLING PERSONAL COMPUTERS TO LARGE COMPANIES

## VOLUME II
## MARKET FORECASTS AND PRODUCT STRATEGIES

## A MULTICLIENT STUDY

SEPTEMBER 1980

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# SELLING PERSONAL COMPUTERS TO
# LARGE COMPANIES

## VOLUME II
## MARKET FORECASTS AND PRODUCT STRATEGIES

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I INTRODUCTION

# I  INTRODUCTION

- The second volume of INPUT's two-volume multiclient study of the potential market for very small computer systems (purchase value under $15,000) in large corporations includes market forecasts, vendor attitudes and recommended vendor strategies.

- The vendor interview mix, while not randomly chosen, does contain large mainframe companies, minicomputer manufacturers, microcomputer system manufacturers and remote computing services companies.

- This report combines an analysis of interviews conducted specifically for this study with the experience and judgment of the INPUT staff.

- Market forecasts are for the U.S. market only and are in current U.S. dollars.

- The Executive Summary for this entire two-volume study is contained in Volume I.

- Outside sources used are listed in Appendix A, Volume II.

- Definitions of terms are contained in Appendix A, Volume I.

- Appendix B, Volume II is a short catalog of very small computer systems.

- Profiles of typical respondents are summarized in Appendix C, Volume II.

- The vendor questionnaire is provided in Appendix D, Volume II.

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# II VERY SMALL COMPUTER SYSTEMS IN LARGE CORPORATIONS: MARKET TRENDS AND FORECASTS

## II VERY SMALL COMPUTER SYSTEMS IN LARGE CORPORATIONS: MARKET TRENDS AND FORECASTS

## A. PRICE/PERFORMANCE TRENDS

- Product price and system performance are closely related.

    - Forty-eight percent of the responding vendors felt that system prices would stay about the same through 1985, as shown in Exhibit II-I. Thirty-two percent equated price stability with higher performance.

    - Twelve percent of the responding vendors felt that prices would decline during the next five years while performance would increase.

- Those vendors that felt prices would increase attributed the increase to higher software costs and inflation.

    - These costs, it was felt, would more than offset the decline in hardware costs.

- Extending the timeframe from 1985 to 1990 did not change the vendors' perceptions of the changes that will occur.

    - Changes in performance and price will be evolutionary despite rapid changes in technology.

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EXHIBIT II-1

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VERY SMALL SYSTEM PRICE TRENDS,
1980-1990

INPUT
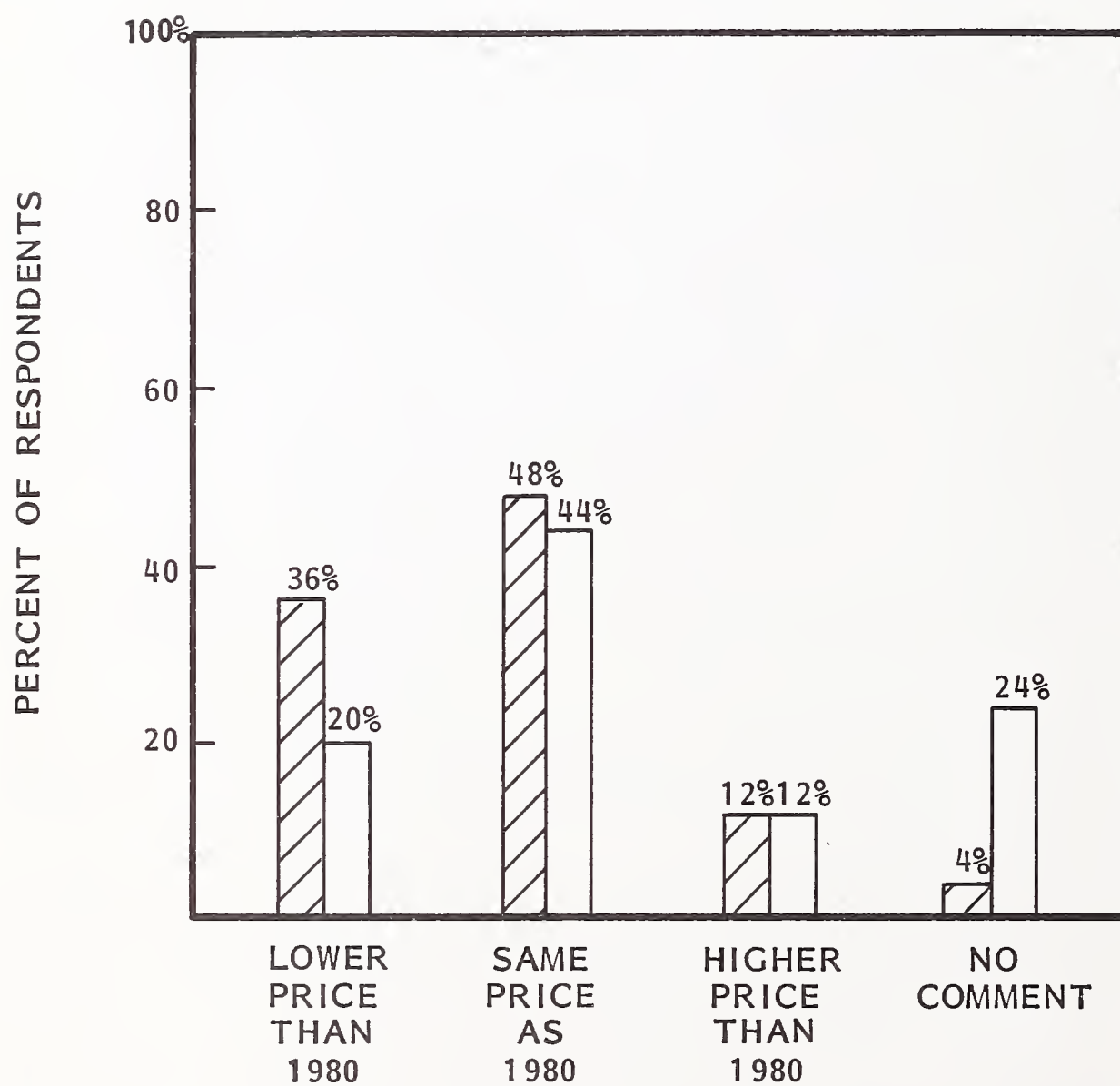
- Those vendors anticipating price decreases projected drops ranging from 10-60% (with the median about 20%) by 1985.

    - One respondent expected an 80% decrease by 1990.

- Although a higher-performance system may be available at roughly the same price, it is not necessarily possible to purchase less performance for less money.

    - Lower-performance hardware may be phased out of production due to the reliability of new equipment, uneconomic production quantities, etc.

- Performance increases will come in three areas:

    - Greater speed.

    - Greater capacity.

    - Greater configuration flexibility.


## B.    PRODUCT AVAILABILITY


- Product availability should be considered in two aspects:

    - Available products capable of handling the proposed applications.

    - Sufficient products available to fill the demand.

- Most applications proposed for very small systems by potential users are similar, if not identical, to applications currently run on larger systems.

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INPUT

- Adequate storage capacity is one concern. Mass storage using eight-inch or five-and-one-quarter-inch Winchester disk drives will provide adequate storage for most of the proposed applications. Some applications, such as modeling, might require large internal memory. Vendors are projecting larger memories for very small systems, with 256KB being the median in a range of 64KB to 1,000KB.

- While 256KB might not be sufficient for large arrays or very large sets of simultaneous equations, it is adequate for the vast majority of applications.

- The second aspect of availability concerns manufacturers' production of sufficient product to cover projected sales.

  - Projected system shipments for the large corporation market in 1980 are less than 10% of the projected total shipments of systems for under $15,000. This rises to about 17% in 1985.

  - Similarly, the projected shipments of systems will only absorb a small portion of the projected mass storage and printer shipments.

  - In sum, the projections for this market will be within the industry's production capacity if the projections for the broader market are met.

## C.    INSTALLATION POTENTIAL

- The respondents with very small systems installed were managers and administrators (66%) or professional and technical employees (34%).

  - Most of the systems were shared with other people. In some cases, these others were secretaries or clerical workers.

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- The primary markets at this time are the managerial and administrative group (M&A) and the professional and technical group (P&T).

    - Over the past eighteen years, including the recession of 1973-1974, these groups grew at a compounded annual growth rate of 2.9% per year, with P&T growing at 3.7% and M&A growing at 2.0% compared with the total work force compounded growth of 2.0% per year.

    - The growth of these employee groups is projected to 1990 in Exhibit II-2 using the same growth rates.

- This primary market currently consists of 17 million private sector employees, shown in Exhibit II-3 by major SIC group.

    - Some of the occupations that are included in the professional and technical group are listed in Exhibit II-4 to illustrate the diversity of the group.

        - Many of the listed occupations are common to large companies, and products directed to these occupations have the broadest appeal.

- A secondary market exists among sales and clerical workers.

    - Most of these workers are currently not involved with computers at all. However, as more very small systems are installed, many of these workers will either have their own system or will share their manager's system.

    - Clerical workers have been growing annually at a 3.0% compounded rate over the last 20 years. Salesworkers have been growing at a 1.9% per year compound rate for the same period.

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INPUT

EXHIBIT II-2

## SELECTED EMPLOYMENT TRENDS
## IN THE UNITED STATES,
### 1970–1990



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**INPUT**

EXHIBIT II-3
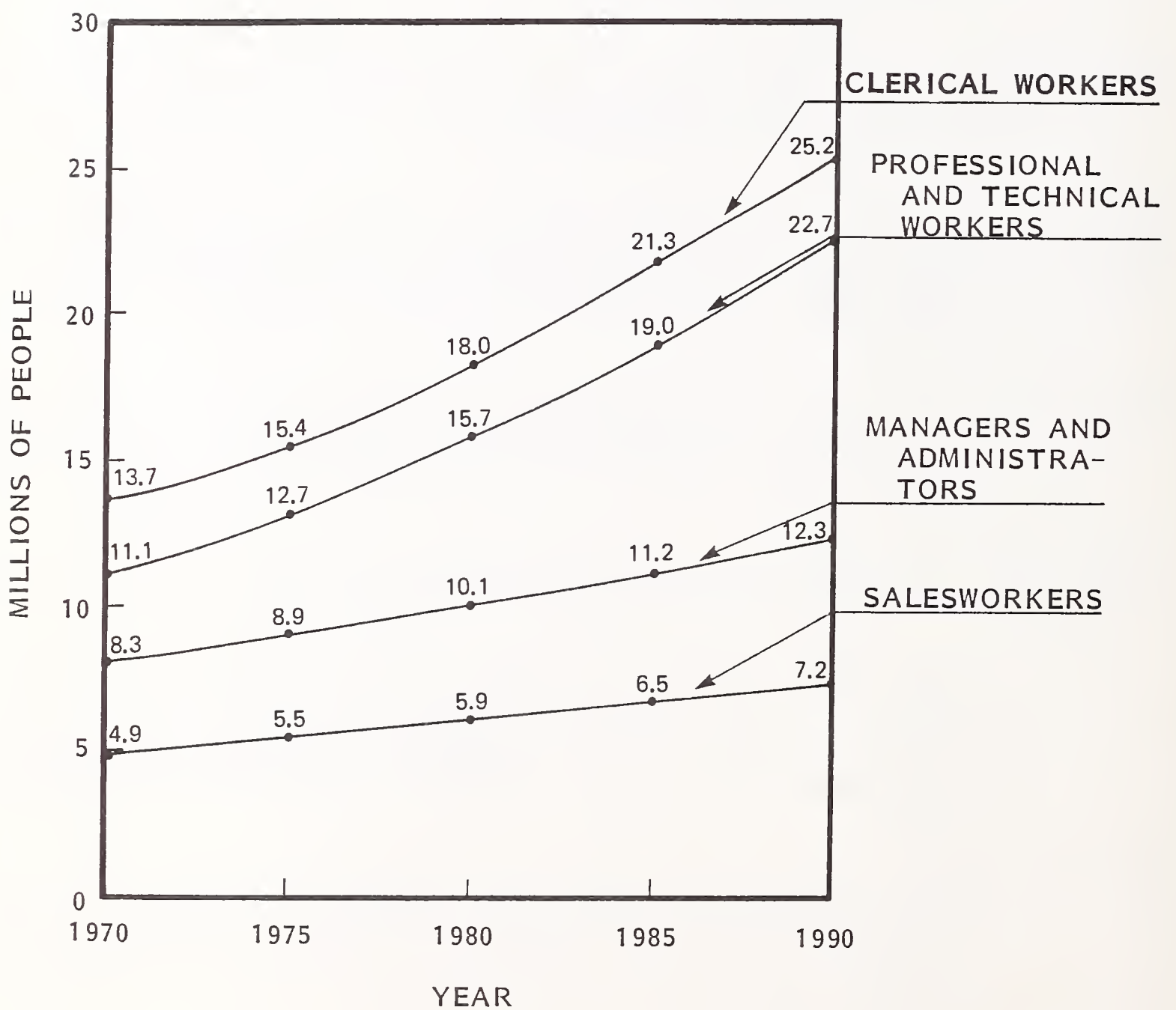
PRIVATE SECTOR PROFESSIONAL, TECHNICAL, MANAGERIAL AND
ADMINISTRATIVE EMPLOYMENT IN THE UNITED STATES, 1978

| EMPLOYMENT GROUP / SIC INDUSTRY | NUMBER OF EMPLOYEES (MILLIONS) | | | P+T+M+A* PERCENT OF TOTAL EMPLOYMENT |
| --- | --- | --- | --- | --- |
| | PROFESSIONAL AND TECHNICAL | MANAGERIAL AND ADMINISTRATIVE | TOTAL PRIVATE SECTOR EMPLOYMENT | |
| 10-14 MINING | 0.1 | 0.1 | 0.8 | 25% |
| 15-19 CONSTRUCTION | 0.2 | 0.4 | 4.2 | 14 |
| 19-39 MANUFACTURING | 1.7 | 1.2 | 20.3 | 14 |
| 40-49 TRANSPORTATION AND UTILITIES | 0.7 | 0.5 | 4.9 | 24 |
| 50-59 WHOLESALE AND RETAIL TRADE | 2.9 | 2.1 | 19.4 | 26 |
| 60 BANKING | 0.1 | 0.4 | 1.4 | 36 |
| 63 INSURANCE CARRIERS | 0.2 | 0.1 | 1.2 | 25 |
| 61, 62 64, 65 OTHER FINANCE INDUSTRIES | 0.2 | 0.4 | 2.1 | 29 |
| 70-89 SERVICES | 3.9 | 1.4 | 16.0 | 33 |
| TOTAL | 10.0 | 6.6 | 70.3 | 24% |

*PROFESSIONAL, TECHNICAL, MANAGERIAL AND ADMINISTRATIVE

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INPUT

EXHIBIT II-4

SELECTED PROFESSIONAL AND TECHNICAL OCCUPATIONS

| PROFESSIONAL | TECHNICAL |
|---|---|
| ACCOUNTANT/AUDITOR | BLOOD BANK SPECIALIST |
| CREDIT ANALYST | COMPUTER PROGRAMMER |
| ECONOMIST | DENTAL HYGIENIST |
| EDP SYSTEMS ANALYST | DIETETIC SPECIALIST |
| ENGINEER | DRAFTSMAN |
| LAWYER | ENGINEERING TECHNICIAN |
| LIBRARIAN | LICENSED PRACTICAL NURSE |
| NURSE | MEDICAL LIBRARIAN |
| PERSONNEL/LABOR | PHYSICAL THERAPY ASSISTANT |
|   RELATIONS SPECIALIST | PILOT |
| PURCHASING AGENT/BUYER | SCIENCE TECHNICIANS |
| REAL ESTATE APPRAISER | SOUND REPRODUCTION |
| SCIENTIST |   TECHNICIAN |
| STATISTICIAN | SURVEYOR |

INPUT

- Clerical workers make up 53% of the work force in insurance companies and 71% in banks.

● The interviews for this study were conducted at company sites where there were large aggregations of employees. Some interviews were held at corporate headquarters and others at major subsidiaries or divisions.

- The market potential is the number of employees of the type interviewed working for large companies at sites similar to those where the interviewees worked.

● This determination was made using data from the Census Bureau updated with later data from the Bureau of Labor Statistics.

- There are 4,100 establishments with over 1,000 employees in the U.S. If it is assumed that 500 of these belong to the Fortune 500-1,000 industries and that 300 are miscellaneous independent companies, then the 3,300 remaining are assumed to belong to the top Fortune 500/50 groups. As this is 80% of the total, then 80% of the employees in these establishments are employed by Fortune 500/50 companies.

- There are 7,300 establishments employing between 500 and 1,000 people. This study assumes that 50% are part of the Fortune 500/50 groups.

- There are 17,000 establishments employing between 250 and 500 people. This study assumes that 25% belong to companies in the Fortune 500/50 groups.

● Taking 80%, 50% and 25% of the employees in the respective groups and multiplying that total by the percent of professional, technical, managerial and administrative employees (24%) in the work force results in about 3 million professional, technical, managerial and administrative employees in large companies.

INPUT

- This represents the total current potential market for very small systems in large corporations.

## D.   MARKET FORECAST

- Respondents' interest in obtaining a computer system for themselves or their department, shown in Exhibit II-5, must be modified by the constraints that also emerged from the interviews, especially the resistance on the part of EDP directors.

    - The percentages reported in Exhibit II-5 represent those respondents who showed interest in a very small system (under $15,000).

    - Price is a minor constraint (within the bounds of the study) since one-third of the respondents indicated that they expected to pay between $5,000 and $10,000 for their system, while more than one-third were willing to pay between $10,000 and $15,000.

- The recession, the constraints on capital spending imposed by many companies and, most importantly, the resistance from the corporate EDP group that the would-be purchaser is likely to encounter will reduce the number of people who can buy a system.

    - Assume that 60% of those who want a system in two years can buy it and that 80% of those who want it in five years can buy it.

    - Further assume that only 90% of these people can actually get the paperwork through and obtain funding.

    - Each cell in the two-year columns of Exhibit II-5 must be multiplied by 54% and each five-year cell by 72% to determine the percentages of respondents that can actually buy.

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EXHIBIT II-5

RESPONDENTS INTERESTED IN ACQUIRING A VERY SMALL COMPUTER SYSTEM

| INTEREST LEVEL | VERY SMALL INDIVIDUAL SYSTEM | | VERY SMALL SHARED SYSTEM | |
|---|---|---|---|---|
| | WITHIN TWO YEARS | WITHIN FIVE YEARS | WITHIN TWO YEARS | WITHIN FIVE YEARS |
| OVERALL | | | | |
| - HIGH INTEREST | 8% | 17% | 10% | 24% |
| - MEDIUM INTEREST | 12 | 16 | 15 | 19 |
| MANUFACTURING | | | | |
| - HIGH INTEREST | 8 | 12 | 15 | 24 |
| - MEDIUM INTEREST | 10 | 19 | 17 | 23 |
| BANKING | | | | |
| - HIGH INTEREST | 10 | 29 | 23 | 29 |
| - MEDIUM INTEREST | 20 | 10 | 13 | 13 |
| INSURANCE | | | | |
| - HIGH INTEREST | 7 | 18 | 13 | 20 |
| - MEDIUM INTEREST | 11 | 15 | 15 | 17 |

INPUT

- Some of the remaining respondents who could buy a very small system won't because of the lack of software and the necessity of having to do programming or spending additional funds to get it done. Consequently, assume:

    - That 50% of those who could buy and have a high interest in buying will buy in two years, and that 65% will buy in five years.

    - That 25% of those who could buy and have a medium interest in buying will buy in two years, and that 35% will buy in five years.

- Multiplying the appropriate cells by the new percentages and summing the high and medium interest levels results in Exhibit II-6, showing the percentage of buyers in each group.

- The percentages then must be combined with the number of people of the type interviewed (professional, technical, managerial and administrative employees (P+T+M+A) ), in large corporations to determine the number of systems to be shipped in the next two years, as shown in Exhibit II-7.

    - The growth of the eligible employee population was projected for 1985 and then multiplied by the five-year interest figures to determine the number of systems to be purchased from 1983 through 1985.

- Spreading the shipments out during the respective time periods and adding them to the estimated installed base at the end of 1980 (85,000 units) yields a 3% penetration level for the end of 1980, growing to 16% by the end of 1985.

- During the five years from the end of 1980 to the end of 1985, the installed base will have a compound annual growth rate of 48%, as shown in Exhibit II-8.

- The purchase value of the installed base was determined by the dollars spent by the respondents and by the amounts that they expected to spend for their very small systems.

INPUT

EXHIBIT II-6

## PERCENT OF RESPONDENTS
## EXPECTED TO BUY VERY SMALL COMPUTER
## SYSTEMS WITHIN TWO TO FIVE YEARS

| INDUSTRY | VERY SMALL INDIVIDUAL SYSTEM | | VERY SMALL SHARED SYSTEM | |
|---|---|---|---|---|
| | TWO YEARS | FIVE YEARS | TWO YEARS | FIVE YEARS |
| OVERALL | 3.8% | 11.9% | 6.3% | 17.0% |
| MANUFACTURING | 3.6 | 10.2 | 6.4 | 17.0 |
| BANKING | 5.4 | 16.1 | 8.0 | 16.9 |
| INSURANCE | 3.5 | 12.3 | 5.5 | 13.7 |

INPUT

EXHIBIT II-7

DETERMINATION OF ESTIMATED NUMBERS OF VERY SMALL SYSTEMS SOLD TO LARGE CORPORATIONS

IN THE U.S. BY 1982 AND 1985

| INDUSTRY | 1980 ESTIMATED P+T+M+A* EMPLOYEES IN LARGE CORPORATIONS (THOUSAND) | ESTIMATED PERCENT WHO WILL BUY VERY SMALL SYSTEMS WITHIN 2 YEARS | ESTIMATED NUMBER OF VERY SMALL SYSTEMS TO BE BOUGHT WITHIN 2 YEARS (THOUSAND) | 1985 ESTIMATED P+T+M+A* EMPLOYEES IN LARGE CORPORATIONS (THOUSAND) | ESTIMATED PERCENT WHO WILL BUY VERY SMALL SYSTEMS WITHIN 5 YEARS | ESTIMATED NUMBER OF SMALL SYSTEMS TO BE BOUGHT BETWEEN 1982 AND 1985 (THOUSAND) |
|---|---|---|---|---|---|---|
| MINING | 40 | 3.8% | 1.5 | 45 | 11.9% | 5.4 |
| CONSTRUCTION | 60 | 3.8 | 2.3 | 75 | 11.9 | 8.9 |
| MANUFACTURING | 1,015 | 3.6 | 36.5 | 1,225 | 10.2 | 125.0 |
| TRANSPORTATION AND UTILITIES | 230 | 3.8 | 8.7 | 275 | 11.9 | 32.7 |
| WHOLESALE AND RETAIL | 180 | 3.8 | 6.8 | 220 | 11.9 | 26.2 |
| BANKING | 100 | 5.4 | 5.4 | 120 | 16.1 | 19.3 |
| INSURANCE CARRIERS | 100 | 3.4 | 3.4 | 120 | 12.3 | 14.8 |
| OTHER FINANCIAL | 15 | 3.8 | 0.6 | 20 | 11.9 | 2.4 |
| SERVICES | 1,295 | 3.8 | 49.2 | 1,555 | 11.9 | 185.0 |
| TOTAL | 3,035 | 3.8% | 114.4 | 3,655 | 11.9% | 419.7 |

*PROFESSIONAL, TECHNICAL, MANAGERIAL AND ADMINISTRATIVE

INPUT

EXHIBIT II-8

MARKET FORECAST -

VERY SMALL COMPUTERS (UNDER $15,000) IN LARGE

CORPORATIONS, 1980-1985

| ITEM | 1980 (BASE) | 1981 | 1982 | 1983 | 1984 | 1985 | AAGR |
|------|-------------|------|------|------|------|------|------|
| INSTALLED BASE (THOUSAND) | 85 | 125 | 185 | 275 | 400 | 600 | 48% |
| SHIPMENTS (THOUSAND) | — | 40 | 60 | 90 | 125 | 200 | 38% |
| VALUE: INSTALLED BASE ($ MILLION) | $850 | $1,150 | $1,600 | $2,300 | $3,300 | $4,800 | 41% |
| VALUE: SHIPMENTS ($ MILLION) | — | $ 300 | $ 450 | $ 700 | $1,000 | $1,500 | 38% |

INPUT

- The average price of a very small system in the installed base in 1980 is estimated at $10,000. By 1985 the estimated average very small system price in the installed base will be $8,000.

- The average price of very small systems shipped during the 1980-1985 period is estimated to be $7,700.

- These projections do not include the migration of some of the respondents who expressed high interest in sharing very small systems with others, but do not want the responsibility of having their own system.

  - As the very small individual systems become more common, the marketplace becomes more aware of their capabilities; as the vendors solve the reliability and maintenance problems, a portion of the "shared system" buyers will migrate toward their own individual system.

- In addition, other groups within the corporation will also purchase very small systems.

  - Clerical workers in finance departments, for example, are good candidates for individual systems.

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INPUT

# III VERY SMALL COMPUTER SYSTEM IMPACT ON ALTERNATIVE COMPUTATION METHODS

# III    VERY SMALL COMPUTER SYSTEM IMPACT ON ALTERNATIVE COMPUTATION METHODS

## A.    EDP DEPARTMENTS

- Thirty-four percent of the respondents using very small systems reported that funds to buy them came from their department's budget for corporate data processing services.

    - These funds were allocated for several types of activities, but the two most impacted by the very small systems were:

        . Development of new applications.

        . Production running of the applications implemented.

- Some of the reasons given by respondents for not using the central system were:

    - "Speed to get applications up and running - very small system takes four to five months versus years on the main system."

    - "Time not available on 370."

    - "Couldn't get real-time access on the central system."

INPUT

- "Had difficulty with EDP department."

- "370 loaded, needed fast turnaround."

- "Response time was slow."

- Thirty-eight percent of the respondents without very small systems felt that if they were to acquire such a system the money would come from their department's EDP budget.

- Respondent EDP directors see the use of very small systems as a possible way to lighten the burden on the applications programming group by moving some new applications development out to the end users.

  - This trend will accelerate as more software and more on-line storage becomes available on very small systems.

  - Perhaps toward the end of the five-year period, but certainly in the 1985-1990 period, production quantities of 32-bit chips emulating the IBM 370 instruction set will be available. This will make a tremendous amount of quality applications software available for the cost of relatively minor modifications.

- Roughly 30% of both groups of respondents (users and non-users of very small computers) obtained, or felt that they could obtain, new funds for a very small computer system.

  - After the very small system is in use, the user's or user department's spending with the central EDP group is likely to be cut back. This is indicated by the similarity between the types of applications expected to be run on the very small systems and those that utilize the corporate central system.

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- The net effect of the broad introduction of very small systems into a large company will be either to reduce the money spent with the central EDP group or, as is more likely, to reduce the rate of growth of spending with the EDP department.

## B.   TURNKEY SYSTEMS

- Most of the turnkey systems vendors selling systems for under $15,000 at this point in time are directing their efforts toward small businesses where they can maximize their investment in general accounting software across the broadest market potential.  They have tended to avoid the large corporations for four reasons:

    - Large corporations require specific applications software that might be difficult to sell to a broad market.

    - These companies prefer to deal with "name" vendors with substantial financial resources rather than turnkey vendors without "presence."

    - Some systems lack the communications skills necessary for networking.

    - Turnkey vendors frequently operate in a local or regional area, while many large companies prefer national coverage.

- However, this is an applications-driven market in which purchasers will buy the system to run a specific application.  They will buy the software (and the system) from whomever sells it.

    - A few respondents bought systems on this basis and felt that the turnkey vendor should be physically close to the user's development center.

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INPUT

- One turnkey system addressed a very specific problem. This system was purchased only because the turnkey vendor went directly to the potential end user and made him aware of the applications software.

- Turnkey system vendors support the idea of very small systems in large corporations. These vendors supply the software and sometimes the hardware, and can go directly to the ultimate user with their products.

- As more turnkey vendors develop applications for the under $15,000 system, they will be one of the driving forces in this market.

  - As the capabilities of the very small system increase at the lower end of the price range, turnkey vendors will deliver the software only and will find it unprofitable to go directly to the end user personally.

## C.    REMOTE COMPUTING SERVICES

- Although only one small system user said that the money for his very small system came directly from his department's outside computing services budget, 17% mentioned outside services generally, and interactive services specifically, as part of their justification for the very small system.

- Some of these comments were:

  - "Substantially reduced outside T/S expense from $35,000/year."

  - "T/S was not well accepted by our engineers - too impersonal."

  - "Our own system is more flexible than an outside service."

  - "Our outside service was not meeting our department's specific needs."

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INPUT

- "Letters on a T/S system are expensive - 500 letters cost $400 and 1,000 letters cost $800. Much less on our own system."

• The advent of the very small system seems to be most threatening to remote interactive services.

  - Currently that threat is mitigated by the applications nature of the market. Remote computing services vendors have been selling specific end user applications in specific vertical markets for a long time. These programs and services are not yet available on very small systems.

  - Those RCS vendors selling more general applications will be impacted earlier than those with specific packages and services.

• Some RCS vendors have been considering offering their applications on hardware specifically for a particular user, either at the user's site or at the vendor's site.

  - These systems are currently much more expensive than the systems considered in this study.

  - Some computer services companies that are considering offering applications on systems within the $15,000 price range plan to offer these systems to small businesses rather than large corporations.

  - One such services vendor felt that there are enough small businesses to keep him busy for a long time, and that his company was not interested in the large corporations.

• Very small systems in large companies will be an increasingly serious challenge to the RCS vendor.

INPUT

- Ten percent of those respondents that use external computer services expressed a high interest in acquiring their own very small system within two years, and 21% would like a very small system within five years.

## D. OFFICE AUTOMATION SYSTEMS

- At the present time, office automation systems (primarily word processing systems) are used in a pooling situation or by an individual secretarial function.

    - None of the respondent users of very small systems used word processing systems in their offices, nor did any seem thrilled with the idea of doing editing on their own very small systems.

    - Many respondents whose secretaries have word processing terminals flatly refuse to install terminals in their own offices, despite a significant potential savings in printout time; they simply won't have a "typewriter" in their office.

    - Even in those cases where the word processing system is capable of doing computing as well as word processing, providing the possibilities of both text editing and general computing, there is still "no interest" among those respondents averse to sharing their office with a keyboard.

- The director of EDP for one large corporation claimed that the people using word processing equipment had been asking if they could do some data processing related to the word processing functions on their system.

- Currently there is minimal conflict between office automation systems and the use of very small computers by executive and professional groups.

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INPUT

- Indications are that very small systems will lead office automation in these offices for awhile. Electronic mail might lead the way into some offices if and when it gains widespread acceptance.

**INPUT**

IV COMPETITIVE ENVIRONMENT

# IV COMPETITIVE ENVIRONMENT

## A. ATTITUDES AND OBJECTIVES OF CURRENT AND POTENTIAL VERY SMALL SYSTEM VENDORS

### I. MAINFRAME COMPANIES

- Most major mainframe companies do sell systems for just under $15,000, but not generally to the large corporations.

    - These systems are sold to small- and medium-sized businesses.

- IBM is the only one of the major mainframe companies to sell a product line deliberately to corporate end users. Since its announcement five years ago, the 5100 series (the latest version of which is the 5120 announced in February 1980) has been sold with applications software geared to the end user with data analysis problems to solve.

    - Software now exists for the 5110 and 5120 that make it useful for small businesses also, but the continued inclusion of APL as well as BASIC for programming new applications helps the system retain the corporate user image.

- Mainframe companies feel that some important characteristics for success in the forthcoming market are:

INPUT

- National sales and support coverage.

- Data compatibility with the host systems.

- Strong communications capability.

- Substantial financial resources.

- The compatibility and "presence" issues are very important and will tend to be stressed by the mainframe companies in their sales efforts.

    - One respondent bought an IBM 5100 because in his company it is "easy to buy IBM." He now has three 5100s - the original new one and two used ones. Next year the company intends to buy three more through a broker for about $7,500 each, less than half of the original price.

- Responding mainframe companies will generally pursue this market through whatever channels and/or markets they see as their strengths.

    - These mainframe vendors feel very strongly that direct sales builds customer loyalty.

    - With salespeople's productivity goals constantly increasing, they cannot afford to sell very small systems directly to end users. They must concentrate on selling them in bulk to the EDP department, which will then sell these very small systems internally.

    - These mainframe companies are willing to grant discounts of up to 25% at the 100-unit level. Beyond that, price is negotiable.

    - Bulk sales of this type involve hardware with minimal systems software. The applications packages and many utility programs, such as statistical packages, will cost extra.

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INPUT

- Some end users will not accept the system from the EDP group, however, unless it comes as a turnkey (or almost turnkey) system.

- Only if sales or manufacturing costs were to increase dramatically in the next few years would these vendors feel a need to change their approach.

## 2. MINICOMPUTER MANUFACTURERS

- Respondent minicomputer companies have used a variety of distribution channels, but they tend to agree that sales to large corporations are made with a direct sales force.

  - For some, the sales team may operate out of a regional store.

  - Small branches of large companies can be reached through other distribution channels.

- These companies are used to giving discounts for volume purchases and quoted discounts up to 40% for 200 systems. Some minicomputer vendors said all quantity prices are open for negotiation.

- As a group, the respondent minicomputer vendors were fairly united (80%) in claiming to have a long-range plan. They felt that nothing within the next five years would change their approach to this market.

  - One vendor felt that a well-defined and accepted communications standard could cause his approach to change, but he refused to comment on how it would change.

  - Another vendor, approaching this market through stores, distributors and OEMs, feels that the current volume isn't great enough to justify direct selling efforts. But once very small computers become "acceptable" to large companies, and department managers achieve true EDP independence, then volume will grow sufficiently to justify changing to a direct sales approach.

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INPUT

- Most minicomputer vendors' system products are currently above the price ceiling used in this study. Many have an entry level product at the $13,000-15,000 price range, but the typical system price will be in the $25,000-35,000 range. There are two major exceptions to this rule:

    - Hewlett-Packard has produced product lines at several levels under the $15,000 limit. These product lines are not from the computer division but from the calculator group.

    - Wang markets a line of products that fall well within the $15,000 range. Wang's products can communicate with each other and some are expandable beyond the $15,000 limit.

- Wang and HP approach the market from different directions.

    - Wang's primary thrust is through the office automation path, even though several of its products are general-purpose systems.

    - HP's path is through the technically oriented professional. HP provides technically oriented software and appropriate peripherals to particularize its general-purpose systems.

3. COMPUTER SERVICES COMPANIES

- The computer services companies that have specialized in particular industries and those that have been providing service to end users in large corporations have the applications library needed in this market.

    - These services companies have been closest to the corporate end user. They have established relationships and know the end user's peculiar requirements.

- Some have just begun to diversify into user site hardware services, but generally the systems they are using are beyond the $15,000 study limit.

- 30 -

INPUT

- Some major RCS vendors are taking a careful look at the corporate end user market at the top end of this study's price range.

● The services companies responding to this study currently believe that direct sales to the end user in large companies is their most effective approach.

- Later, as the EDP department "accepts" very small systems, the services companies feel that the purchasing process will become more orderly and sales will go through the EDP department.

● The services companies are selling a turnkey service that may be easier to cost justify for two reasons:

- The system is immediately useful.

- The service is expensed and avoids the capital budget loop in the approval cycle.

● The RCS vendors that enter this market will be selling a networking system, not a standalone product, although it could be used in a standalone mode.

● Since the RCS vendors have the programming expertise and the applications knowledge, they can buy the bare-bones system from the manufacturer at high discount levels and offer the end user a turnkey package with a high value added component.

- RCS companies can be expected to discount quantity end user purchases. One vendor that is not currently in the low end of the market is offering 50% discounts at the 100-unit level.

● One services company respondent planning to offer user site hardware services for less than $15,000 felt that there would be enough business in the small business area for a long enough time to warrant avoiding the large company political battles at this time.

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INPUT

- This repondent also felt that if enough services were purchased, the hardware could be offered free.

4.    COMMUNICATIONS COMPANIES

- The dominant force in the communications industry is AT&T. At this time, it would not be prudent for AT&T to make any comment concerning its intentions in the data processing marketplace.

- From the point of view of this study, AT&T has both communications capability and "presence" in the large companies. It could acquire the hardware relatively easily. The only big question is applications software.

  - There are industry-oriented groups within AT&T, outside the straight telephone business, that have been studying particular markets for several years. Software for those markets could be acquired if AT&T decided to enter this marketplace.

- INPUT believes that AT&T will enter data processing markets in which the one-way communication content is very high, such as data entry and electronic mail, as opposed to data base applications, where the primary purpose of the communication is to receive a reply.

- Communications companies are familiar with large corporations, having dealt with them as major customers for many years.

  - Other communications companies are not as constrained as AT&T, and it would be naive to believe that they will not enter this particular aspect of the office automation scene, with its important implications for personal communications.

5.    PERSONAL COMPUTER MANUFACTURERS

- Personal computer manufacturers have relied upon distributors and retail stores to get their products out to the public.

- 32 -

- Some respondents were happy to be able to obtain their system from a store the day after the funds were approved.

- The store was the only place that they could obtain the equipment of their choice.

- However, few respondents indicated that they would like to purchase from a computer store in the future. The use of a computer store as a systems source for the corporate end user received the low rating of 1.5 (with 3.0 representing a highly likely source).

- These vendors will have to seek other ways to reach the large companies in order to achieve a significant market share.

  - One major vendor feels that the large companies can be reached using mass merchandising techniques in concentrated form, since the corporation is a mass market in concentrated form. This vendor has formed a national bid department responsible for making large bids to large companies. An order of 10,000 systems would be discounted to large end users at about the 10% level.

  - Another major vendor is restructuring his entire marketing approach, with the large company market playing a big role in these plans. Communications and office automation are seen as keys to this market, and products will be developed accordingly.

- Some vendors are currently staying out of this market, preferring to concentrate on small businesses, while others have assigned the large companies to a distributor who has products in the corporations - preferably the communications products to complement the very small system.

- Two personal computer vendors have chosen to direct their products to particular segments of the market.

INPUT

- These two manufacturers are not concentrating solely on large corporations but on all technically oriented professions.

- In general, respondent personal computer vendors feel that although stand-alone very small systems can be sold to the corporate user via a multitude of distribution channels, systems that are or may become part of a larger network must be sold directly.

6.    SEMICONDUCTOR MANUFACTURERS

- The semiconductor manufacturers supply the chips for all of these systems on an OEM basis. At this point, they have not shown much interest in the low end of the systems market. However, the possibilities are always under consideration and the prospect of volume sales to prestigious companies makes the corporate market a desirable entry point.

  - They feel that the system should be sold directly to the EDP department with minimum vendor support, installation or training. EDP should take care of these items, enabling the company to buy a common product in volume at the lowest cost.

- Systems should be drop-shipped, with EDP responsible for everything beyond the shipping platform.

  - A spare systems depot should be maintained. A system that fails should be replaced immediately.

  - These systems will become an integral part of the operation of the company, much like the telephone is today.

  - No timeframe was volunteered by the respondents from the semi-conductor companies for this transition.

INPU'

7.    BUSINESS EQUIPMENT MANUFACTURERS

- Business equipment manufacturers have contacts in the large companies and
  are familiar with bulk selling in these surroundings.

  - They have extensive sales and support coverage.

  - Their contacts, however, are mainly with purchasing departments.

- Once very small systems become as easy to use as calculators, and as
  transparent to the user, then the purchasing department may play a larger role
  in system acquisition.

  - During the next few years, purchasing's influence will increase only
    slightly.

- Companies selling programmable calculators have an end user applications
  expertise in very specific markets that most other vendors are missing.

  - One calculator vendor plans to enter both the small business market and
    the corporate market, capitalizing on his applications knowledge, sales
    and support coverage and corporate contacts.

- Another calculator vendor who sells through 6,000 office dealers feels that the
  required "hand holding" is too expensive, and he will only enter the market if a
  good applications niche is found.

  - His current product line is more expensive than many personal
    computers, but it is "user-friendly," easily understood, and so still sells
    to end users who need a simple tool to increase their productivity.

- These vendors will continue to maintain a low profile in the market and will
  slowly upgrade their products to full-fledged very small computer systems.

INPUT

## B.    MARKET SHARE FORECAST BY VENDOR TYPE

- Potential users would like hardware, software and support to come from the system's manufacturer, but in the application-driven market end users will obtain the system that can run the appropriate application package.

    - The system will be obtained from the most convenient source.

    - Eventually most systems will be obtained from the EDP department, with software coming from another source.

- Even though the EDP department might be the source of the system from the vantage point of the end user, only sources outside the user company are considered in this market share forecast.

    - Systems will be obtained from EDP departments as bulk sales become increasingly common.

- At this early stage in the growth of the market, it is difficult to forecast market share since all of the possible different types of vendors have not yet appeared.

- During the next five years, system manufacturers will retain over 50% of the sales, as demonstrated in Exhibit IV-1.

    - Bulk sales by microcomputer vendors will become apparent by the end of 1982 and will continue to increase.

    - Minicomputer vendors currently have the major part of the system manufacturers' portion. They will probably lose ground to the personal computer companies unless they become microsystem vendors themselves.

INPU

# EXHIBIT IV-1

## MARKET SHARE BY VENDOR TYPE,
## 1980-1985 FORECAST



| YEAR | 1980 | 1985 |
|------|------|------|
| | ($ MILLION) | |
| MAINFRAME MANUFACTURERS | $185 | $850 |
| MINICOMPUTER MANUFACTURERS | 430 | 1,100 |
| MICROSYSTEM MANUFACTURERS | — | 950 |
| DISTRIBUTORS | 45 | 350 |
| TURNKEY SYSTEM VENDORS | 95 | 700 |
| COMPUTER SERVICES COMPANIES | — | 500 |
| COMPUTER STORES | 70 | 250 |
| OTHERS | 25 | 100 |
| TOTAL | $850 | $4,800 |

INPUT
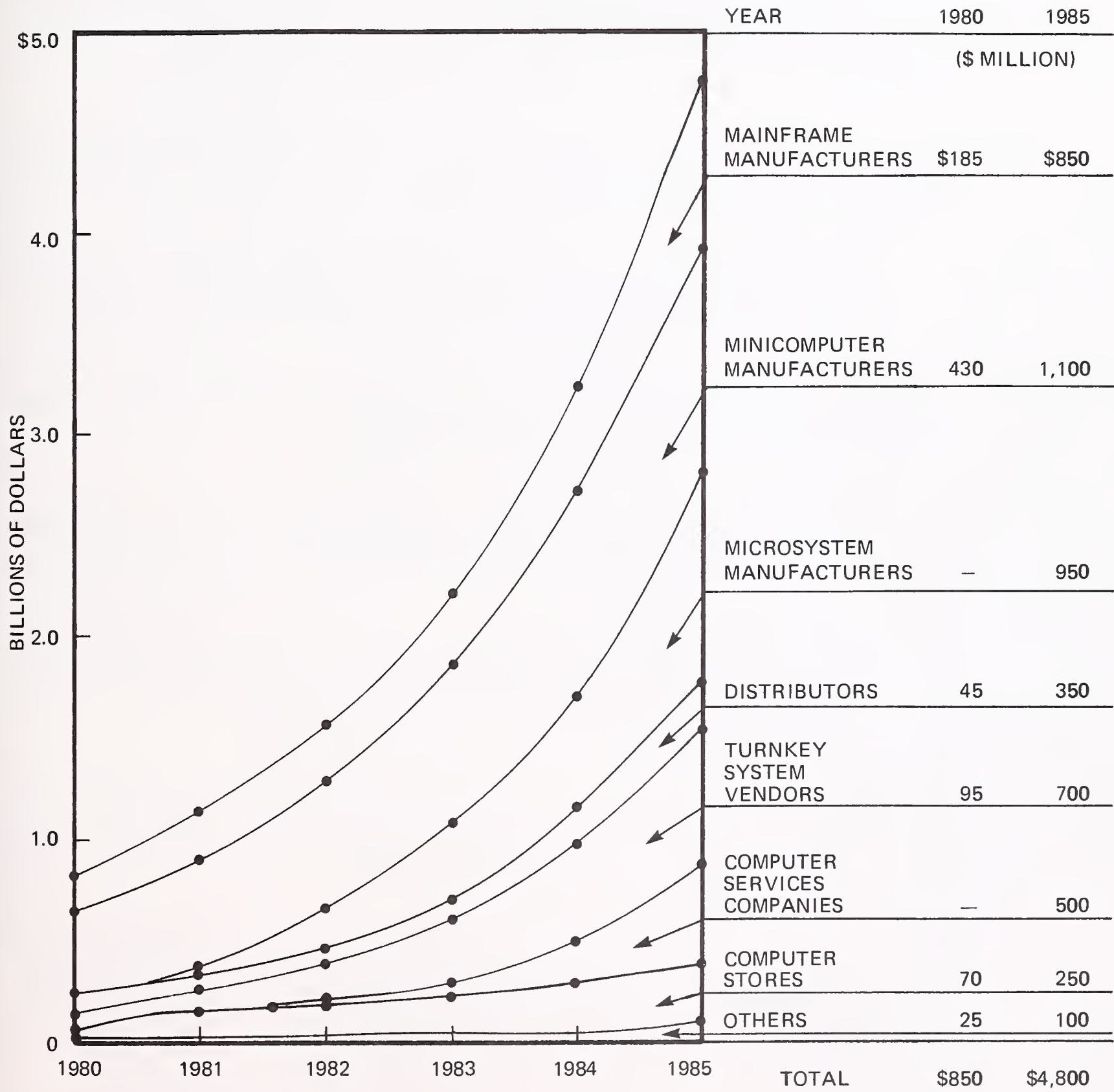
- Mainframe companies will retain a fairly constant share of the market due to their "presence" in the large companies, the desire by the companies to limit the number of vendors they must deal with, and the vendors' reputation, especially for support and service.

- Computer store sales to large corporation end users will increase until the very small systems are available through the manufacturers and distributors, with software supplied by a software manufacturer or through a software publisher.

- Distributors will sell in small quantities to large corporations. Certain distributors will deal in the secondary market.

  - Large corporations will use the secondary market to obtain compatible systems if the original very small system has been rendered obsolete.

- Computer services companies are cautiously investigating the use of mini/micro systems as part of their service offerings.

  - Software product companies are converting some of their programs to minicomputer systems, which are beyond the dollar limits of this study.

  - As the use of very small computer systems increasingly impacts the services companies (especially the RCS companies), efforts will be directed toward systems selling for less than $15,000.

  - The RCS companies that have been servicing large corporations will offer very small systems along with specific application programs in their traditional market niches.

  - The software product companies will convert their applicable software to the very small systems. This activity will increase dramatically once a chip compatible with the IBM 370 is available.

INPUT

- Computer services companies will begin to have a share of the large corporation market toward the end of 1982.

    - This share will increase as more applications become available through these sources.

- Turnkey system vendors will retain a generally constant percentage of the market, as there will always be a need for special applications in particular industries or departments.

INPUT

# V RECOMMENDED PRODUCT OFFERINGS

# V    RECOMMENDED PRODUCT OFFERINGS

## A.    ROLE OF TECHNOLOGY

- Although respondent vendors generally concur that technology will play a strong role during the next ten years, they don't agree on which aspects should receive funding, as Exhibit V-1 illustrates.

    - Only 12% felt that the role of technology is flattening out and that it will not be as significant in the 1980s as it was in the 1970s.

    - Thirty-six percent felt that software should get the bulk of development funds because that area will be fundamental to success in the 1980s.

- Packaging improvements for these very small systems will be the key that opens executive doors.

    - Aesthetic and status considerations must have a high priority in design trade-offs.

    - Investment in minimizing the computer or technology "look" will pay off.

INPUT

EXHIBIT V-1

VENDORS' COMMENTS ON THE ROLE
TECHNOLOGY WILL PLAY IN LARGE
CORPORATION/VERY SMALL SYSTEM MARKET DEVELOPMENT

- "Software development is the key to the future."

- "Strong role - but need for software compatibility prevents making full use of hardware."

- "Hardware will predominate until talent is reallocated to software."

- "Strong role in packaging."

- "Printer technology development is a must."

- "Increasing role in the support and service areas."

INPU

- At least one system packaging should be compatible with dark oak (executive) furniture.

- Flat panel displays that can be recessed in a desk drawer would find easy acceptance.

- Eliminating the keyboard or reducing it to the size of a touch-tone pad is desirable.

- A touch-sensitive screen is also acceptable for indicating functions and processes as long as words do not have to be spelled out.

- Mass storage can be built into the desk if it consists of small Winchester disks. Bubble memories and other solid state memories certainly do not have to be visible.

- If a printer is necessary, it will be the major problem unit. It can, however, be located outside the office, if an aesthetically pleasing, quiet, hard-copy device cannot be designed.

- In summary, a system to be sold to a senior executive must fit the senior executive's world.


## B.  PRODUCT CHARACTERISTICS


- Respondent users showed little imagination in describing the very small system that they would require for their applications.

- Respondent vendors project that 1985 hardware will be extensions of products that exist today in a more limited fashion.

INPUT

- Few vendors would project to 1990. They felt that 1985 was far enough.

● The goal should be to develop a product line of compatible systems that will provide users with an easy growth path as their requirements grow.

- The compatible product line will also satisfy a multiplicity of users within an organization, so that the corporation will find it easy to do business with a single vendor.

- The entry level system should have all of the system basics (CPU, memory, display, hard-copy devices and mass storage), yet be priced low enough so that a close-to-maximum system would still be under $15,000.

I. HARDWARE

● CPUs will increase in speed and word size. Sixteen-bit CPUs will become more common. Toward the end of the first five-year period, 32-bit chips, emulating the 370 instruction set, should be hitting the marketplace in fully configured systems.

● Memory sizes are projected to increase to 256K bytes by 1985.

- One vendor strongly believes that 512K bytes will be typical in the under $15,000 system.

● Color CRT displays with graphics capabilities will be standard. Some systems will have flat panel displays using various technologies, as vendors experiment with the new medium.

- Although a standard size (25 lines x 80 characters) will be accepted, a full-page display should be an option so that a compatible workstation can be configured to meet different requirements.

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INPU

- Multiple display systems will be available under the $15,000 price ceiling.

  - Some sharing of very small systems is more likely in the early part of the coming five years then in the latter part.

  - Sharing between a manager/executive and a secretary is a likely occurrence throughout the period.

- Small Winchester disks will be the most common mass-storage device.

  - Two to 30 megabytes will be the most common range, although larger capacities will be available.

  - At some point, costs will stabilize between additional storage and communications.

  - Bubble memories will slowly replace rotating storage; by 1990 the latter will have disappeared on very small systems.

- Printers drew more than their share of comments from respondent vendors when discussing devices that need improvement, especially on very small systems.

  - The remarks from the vendor respondents gave no indication of a particular direction printer technology would follow.

- Currently printers add inordinately to the cost of a very small system.

  - While 12% of respondent vendors project prices dropping and quality increasing over the next few years, these vendors are not projecting much change in technology.

- Those vendors that feel printers for very small systems will be entirely new speak about optical printers, ink jet printers and color printers.

INPUT

- "We have just scratched the surface of printer technology."

- They expect that the new technology printers will be common on very small systems by 1990.

- Printers have been the least reliable system devices in the past. All vendors interviewed promised better quality printers in the future.

    - "Development of a reliable, quality printer at a price in line with very small system prices is the way to make a million dollars."

- Color plotters and digitizers will become common on the very small systems during the next five years.

    - Every product line should include a range of plotters and digitizers.

    - Although digitizers and plotters are comparatively new input/output devices on very small systems, they will become more popular as part of the approaching graphics wave. They are an important part of a management workstation.

- Respondent vendors generally agree that packaging will change: although units will still be called "desktop," they will be smaller and more powerful.

2.  COMMUNICATIONS

- Over 25% of the vendors interviewed had no comment to make when asked about communications changes that might enhance very small systems' inter-linking.

    - The comments indicate that there is less certainty about the future in communications than in other product areas where the vendors feel that they have more control.

- 46 -

INPUT

- Some of the smaller vendors feel that AT&T and IBM will set standards that the small vendors will have to adhere to in order to "fit" within the company network.

- Vendors generally feel that the very small systems will require a communications interface.

  - EDP directors and users said that eventually most of the very small systems will be used in a network to access corporate data some of the time.

- The setting of communications standards on a higher level than those set now will provide more freedom to users, enabling them to acquire the precise system needed with greater confidence that it will be able to communicate with other systems after some relatively easy "adjustments."

  - The feeling is that users will be free to do their "own thing" and that there will be no typical communication configuration.

- Very small systems will be able to communicate to each other, to the host and to outside services with equal ease.

  - Forty percent of respondent vendors also feel that there will be a standalone market.

- Based upon users' actions and EDP directors' comments, the standalone systems will be easier to sell, at least during the next two years.

  - Problems will arise when the standalone users find a need to communicate: either their system will not support communications or the central system won't be able to support all of the different communication schemes that an unmanaged multitude of very small systems will require.

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INPUT

3.    SOFTWARE

● All three groups - EDP directors, potential and current users, and vendors - agree that good communications and a solid set of applications programs will provide a foundation for success in this market.

   - Application programs must be very specific to the using groups selected as target markets.

● Since end users require very specific software that vendors feel is impractical to provide economically, customization will possibly come from several sources:

   - The user.

   - The EDP department.

   - An outside software consultant.

   - A computer services company.

● In all cases the customization will either be a newly written program or a modification of a packaged program.

   - Newly written programs may occasionally make sense, but they also may negate the justification for the very small system.

      . If the system was justified on the grounds that the application would be up and running quickly, custom programming may extend the time required.

      . If the system was justified on low cost, custom programming may cost several times the cost of the system.

INPU

- All respondent vendors agreed that users will have to do their own customization if there is to be a payoff for all parties in the market.

- Vendors (systems, software and/or service) will provide very high-level, professionally/managerially oriented inquiry languages and application packages that are parameter-driven and menu-programmable.

  - Twenty-eight percent of respondent vendors said that English language-type statements would be used as the base for the inquiry language.

- However, it is still unclear who will supply, and who will invest in, parameter-driven, menu-programmable application packages.

  - Once 32-bit, 370 instruction set chips become available, a tremendous amount of applications software will also appear. But it remains uncertain who will do the conversions and make the modifications necessary for the programs to run on very small systems.

- Software publishing houses have recently made the trade press.

  - These companies collect software written by individuals, perform some quality control functions and package the software for distribution to the end user via a number of channels, notably stores and mail order houses.

  - This fledgling industry has many growing problems: as in any new industry, the first few years will witness mergers, drop-outs and acquisitions.

  - There will be an acute need for applications packages for very small systems.

  - The software publishing business needs a supplier with applications knowledge, end user contacts, a positive image and an excellent

- 49 -

INPUT

reputation, especially in the large corporations. The major problems revolve around obtaining distribution rights to existing programs and finding the optimum distribution channels for the selected markets. Packages must be made "user-friendly," and self-help, instructional sections must be added for the very small systems user.

- Users expect vendors to supply complete (but not necessarily complex) systems software.

    - This hasn't been true in the past. The personal computer language processors that handle basic functions have been vendor-supplied, but most of the utilities and operating systems have been produced by software houses and sold to users separately.

    - However, this is now changing. Some personal computer vendors are supplying systems software, utilities and some application packages for basic business functions.

## C.    SUPPORT SERVICES

- Support services include system installation, hardware maintenance, software troubleshooting and user training.

- Current users of very small systems have taken whatever has been available in these areas, realizing that they are pioneers.

    - Current users have frequently installed the system themselves, modified or corrected their purchased software packages themselves, and hauled the system to the supplier if there was a hardware failure.

    - Potential users expect "telephone company service": one phone call to the supplier and everything wrong will be corrected. If the EDP

- 50 -

INPUT

department sponsored the system, the potential user will expect the EDP department to be responsible for the service.

. However, only three responding EDP directors envisage a support service role for their departments.

1. SOFTWARE TROUBLESHOOTING

- Since software (unlike hardware) doesn't "wear out" or deteriorate with use, the handling of maintenance is a cleaner problem.

- Users expect software suppliers to maintain the programs.

    - Telephone inquiry and reporting is accepted as the first line of action.

    - Telephone communication between the user and the vendor is usually all that is required. The vendor will resist making an on-site visit, and it rarely will occur.

2. TRAINING

- Vendors would prefer the most economical training methods: self-teaching manuals and self-teaching systems.

    - As this will not always be acceptable to users, additional training should be available for a fee.

    - Large corporations buying very small systems in quantity can exercise considerable leverage. The initial users will probably receive on-site training by the vendor either free or for a small fee per student. The user's company will offer additional training.

- Training in the use of specific application packages will be part of the package itself, first with manuals and then with a training mode built into the package.

- 51 -

INPUT

- Users who have problems in the middle of using the program should have a "help" mode available to them.

3.   HARDWARE MAINTENANCE

- "Field service" would be a misnomer for the maintenance of very small systems, because few of them will be serviced on-site in the field.

  - Depot maintenance will be the closest to on-site service that will be generally available, unless users do it themselves.

- Vendor-operated service centers or customer service depots will be the primary source of service when internal diagnostics routines indicate that something is wrong.

  - Initially, users will use an 800-number "hotline" to the vendor's remote diagnostic center, where attempts will be made to diagnose over the telephone.  This could include connecting the system directly to the vendor's diagnostic equipment via the telephone lines.

  - If all else fails, users can take the faulty system to a depot for service. The depot may lend the user a spare system to use during the interim period. (This is more likely to occur at a user-maintained depot than at a vendor-maintained one.)

- On-site maintenance will be available at a very high fee.

  - Again, a large corporation placing a multimillion dollar order has the leverage to obtain an on-site field service person.

4.   INSTALLATION

- Drop shipment to the customer (where the customer does the physical installation in-house) will become the norm in the very small computer market, or so most vendors hope.

INPUT

- Sixteen percent of respondent vendors still think they will be required to do the installation.

● For single-unit systems, installation rarely requires more than plugging in the unit.

  - Some cabling connections may be required for multiple-unit systems, but explicit manuals should reduce problems to a minimum.

  - However, one user that reported having difficulty attaching the printer cable properly had to call in a field service person to make the printer operable.

● Vendors will tend to provide less and less face-to-face support even though users will be buying systems based upon the vendor's reputation for support services.

INPUT

# VI MARKETING APPROACHES

# VI    MARKETING APPROACHES

## A.    MARKETING ORGANIZATION ALTERNATIVES

### I.    GENERAL DISCUSSION

- The vendor's reputation and support are very important criteria when selecting a new system.

- It is more efficient to sell to people who believe beforehand that you are the company with whom they should be doing business.

    - Exhibit VI-I provides a quick measure of the potential corporate very small system user's image of computer vendors.

    - Seventeen percent of the respondents couldn't recall any brand of personal or very small business computers. One respondent, when asked to name a few very small business system vendors, answered, "All those in Computerworld." When pressed for specifics, he couldn't supply one name; IBM didn't even come to mind.

- Accurately determining a company's market position or a specific product's position in the potential customer's eyes is important when designing a marketing program.

INPUT

EXHIBIT VI-1

VENDOR NAME RECALL BY RESPONDENTS
NOT USING VERY SMALL COMPUTER SYSTEMS

| BRAND | NUMBER OF MENTIONS | | |
| --- | --- | --- | --- |
| | VERY SMALL BUSINESS COMPUTER VENDOR | PERSONAL COMPUTER VENDOR | TOTAL |
| NOTHING COMES TO MIND | 61 | 85 | 146 |
| IBM | 117 | 21 | 138 |
| TANDY | 3 | 90 | 93 |
| WANG | 62 | 18 | 80 |
| DEC | 47 | 13 | 60 |
| APPLE | 3 | 56 | 59 |
| TEXAS INSTRUMENTS | 16 | 39 | 55 |
| HEWLETT-PACKARD | 32 | 18 | 50 |
| DATA GENERAL | 17 | 3 | 20 |
| BURROUGHS | 17 | 1 | 18 |
| COMMODORE | 0 | 17 | 17 |
| HONEYWELL | 10 | 5 | 15 |
| OTHER (LESS THAN 10 MENTIONS) | 56 | 32 | 88 |
| TOTAL | 441 | 398 | 839 |

INPUT

- A Commodore sales representative may have a difficult time convincing a business prospect that the system and support expected by a business client will be available from a "strictly personal computer vendor."

- It is less expensive to do thorough market research before designing a marketing program than afterwards.

  - Determine the target audience as precisely as possible and then measure the position of all potential competitors in the market.

- Image building and company positioning should precede product positioning and announcements.

- The next step beyond image and product positioning in building a marketing plan is to measure the total product resources against the desires of the prospective customers.

  - The respondents in this study stated their requirements for very small computers very clearly, as outlined in Exhibit VI-2.

  - Vendors need to offer problem solutions to users in the form of applications software.

    . Both EDP directors and potential end users suggest that vendors reach this market by selling application packages directed to solving specific end user problems.

    . The second most frequently mentioned advice from users was to get to know their needs. This means getting close enough to the users to determine their specific job-oriented problems, as well as their organizational problems, so that the product or service offered will justify itself on its own merits and mesh appropriately with the total system.

INPUT

EXHIBIT VI-2

## SELECTED ADVICE TO VENDORS FROM
## POTENTIAL VERY SMALL SYSTEM USERS

| ADVICE | NUMBER OF MENTIONS |
|---|:---:|
| • SELL APPLICATIONS AND SOLUTIONS | 34 |
| • KNOW THE USER'S NEEDS | 33 |
| • PROVIDE GOOD SERVICE AND SUPPORT | 28 |
| • SELL AN EASY-TO-LEARN AND EASY-TO-USE SYSTEM | 16 |
| • SELL THROUGH DP DEPARTMENT | 14 |
| • DEVELOP A GOOD REPUTATION AND BE FINANCIALLY STRONG | 13 |
| • SHOW USERS HOW TO ACHIEVE GOOD COST/BENEFIT RATIOS | 10 |
| • PROVIDE GOOD, UNDERSTANDABLE, INFORMATIVE DEMOS | 10 |
| • HAVE VERY KNOWLEDGEABLE SALES REPRESENTATIVES | 10 |
| • KEEP THE PRICE AS LOW AS POSSIBLE | 10 |

INPUT

- Vendors would do well to heed all of the advice proffered by users, especially:

    - Provide good demos.

    - Have knowledgeable sales representatives.

- Both of these items may be the first contact between the prospect and the vendor. If either fails, that may be the last contact.

    - Sales reps must have specific knowledge of the types of problems users need to solve. They must thoroughly know which of their own products will provide the solution. Talking computerese to these first-time users will only confuse them and turn them off.

    - Product demonstrations must also pertain directly to users' problems. The demo must be at their level, in their language.

- The main area of disagreement in advice between respondent users and EDP managers concerned the role of the EDP department in selling very small computers to the company.

    - Selling through the EDP department to end users is of only average importance to users themselves, but it was the second most important item mentioned by EDP directors.

## 2. NATIONAL ACCOUNT PLAN

- A national account marketing approach is a direct sales technique that concentrates on selling to and through the corporate headquarters of major U.S. corporations.

- There are three elements essential to a successful national account program:

**INPUT**

- <u>Named Accounts</u> - each corporation in the program must be specifically named and assigned to an account coordinator and/or team leader. Depending upon the specific implementations and pervasiveness of the program, all subsidiaries, divisions and branches can be included in the list of named accounts. If programs tried to account for all of the above-mentioned groups, there would be little left for the rest of the sales force, so programs usually only include corporate headquarters along with divisions and branches in the company's main line of business.

    - The important point is to avoid sales jurisdiction problems by specifically naming what is and what is not included in the program, and to make the entire marketing organization aware of the program.

- <u>Team Concept</u> - the national account manager for a named company should be the team leader for a small sales group dedicated to a specific account or small number of accounts. This small sales group should include a sales representative and technical members representing all of the vendor's major, pertinent product lines.

    - Sales members might represent:

        - Large systems.

        - Minisystems.

        - Personal systems.

        - Terminals.

    - Technical members might include experts in:

        - Systems design.

INPUT

- Communications.

- Systems software.

- Applications programming.

- <u>Account Coordination</u> - large companies would much prefer to deal cooperatively with a sales team than to be called on in a haphazard fashion by different sales representatives who may or may not be aware previous sales activity. An important aspect of good account coordination is the placement of team members close to the division or branch where specific activity may take place while keeping aware of the activity taking place at corporate headquarters.

● The major mainframe vendors have used versions of this approach; it is especially effective for direct bulk selling into a coordinated network environment.

- Team sales personnel assigned to branch locations can also be attuned to the end users' needs, selling directly to them if necessary.

● End users' interest can be stimulated by appropriately placed and directed media messages coordinated with sales campaigns toward corporate management or EDP departments.

3. END USER DIRECT SELLING

● End user direct selling is most effective when the product is an end user application directed toward specific departments rather than the whole company. For example:

- Trademark registration renewal programs can be sold directly to the legal departments more effectively than a forecasting program, which can be used by many departments.

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INPUT

- This approach can be coordinated within an industry-oriented marketing organization.

    - Since end users are geographically dispersed, regional and local vendors can attempt to sell directly to the end user.

### 4. MASS MERCHANDISING

- Mass merchandise vendors are those that have products low enough in price to appeal to the consumer market.

    - When the product is also useful in a business environment, vendors generally modify the mass merchandising approach accordingly.

    - Businesspeople are as vulnerable to advertising as consumers, but they are often restricted from buying in the same manner unless they use their own funds.

    - One mass merchandiser set up a national bid department to interact with corporations wishing to purchase large quantities of systems. The discounts will not be great, but the individual prices are very low.

    - Mass merchandisers selling an undifferentiated product are oriented toward purchasing agents.

### 5. OTHER DISTRIBUTION CHANNEL USAGE

- Most distribution channels will do some business with the corporate end user.

    - Activity across many channels will be most prevalent during the next three years while corporate officers explore ways to deal with very small systems throughout the organization.

INPUT

- Standalone systems can be sold in units or low quantities through any distribution channel. However, the typical end user's reluctance to seek out a distribution channel makes direct selling - where the vendor approaches the user - the most effective method.

- Many appropriate systems are currently only available through specific channels. If users decide that a particular system is the one to acquire, they presently have no choice but to go to the channel through which it is sold.

- As very small systems become more common in large companies, respondent EDP managers indicate that standalone usage will decrease.

● The long-term role of turnkey system vendors selling very small systems in the large company market is not clear.

- They will have an important role in this applications-driven market during the next five years.

- Turnkey software will be in demand beyond 1985.

- Software publishers selling software only will become a major source for turnkey software.

- It is questionable whether the margins on very small systems would be sufficient in the long term for the turnkey systems vendor to produce a quality software package and sell the system profitably.

● End user companies will buy the first group of systems from the manufacturer. The user's personnel will receive full training and become thoroughly familiar with the system.

- When the end user company goes to buy the next group of systems, the distributors will be asked to bid.

**INPUT**

- Distributors can frequently grant larger discounts than the systems manufacturer, and the second buy is more price-sensitive than the first, since less support is required.

6.   USING THE EDP DEPARTMENT

● Whether or not the EDP department buys the system, it will be consulted and will provide a degree of support to the end users.   Therefore it behooves vendors at every level to make the EDP department aware of the products and services they offer.

- The EDP department's involvement will increase over the next few years as everybody begins to understand how the very small systems can best be used and integrated into the corporate information stream.

. EDP departments are the only group that will have the authority to make quantity purchases of very small systems.  Since that is the most efficient way to sell, all vendors should make it a point to become familiar with the workings of these groups in large companies.

B.    INDUSTRY AND/OR DEPARTMENTAL STRATEGIES

● Almost three-quarters of the respondent vendors feel that different marketing strategies are necessary for different departments.

- If vendors are selling specific applications software directly to the end user department, they must formulate a unique approach emphasizing those qualities of their product that are tailored to the user's needs.

- Even if the EDP department makes a quantity purchase for distribution to the end users, somebody must sell to (or educate) the end users so

INPUT

that they will place requests for the systems with the EDP department. The vendor as well as the EDP group has a vested interest in seeing the system distributed throughout the company.

- One vendor indicated that different strategies might be required along industry lines, but that if applications are specific to a department within an industry (which is very likely in some areas), then the strategies will mirror the application.

  - Those vendors whose marketing departments are organized along industry lines will certainly find different approaches by industry as well as by department.

INPUT

# VII RECOMMENDED STRATEGIES FOR VENDORS OF VERY SMALL COMPUTERS

# VII RECOMMENDED STRATEGIES FOR VENDORS OF VERY SMALL COMPUTERS

## A. INTRODUCTION

- Several interrelated needs became apparent during the course of this study that must be considered by any strategy formulated this early in the development of the market.

    - The confusion that exists among EDP directors, end users and vendors must be cleared away.

    - The education of the above players must be part of any plan.

    - The need to do in-depth experimental work in order for all to gain experience has to be considered.

- All three require a short-term investment to ensure a long-term payoff in a growing market.

- Vendors become confused as they see a fragmented market driven by diverse requirements while at the same time encounter resistance on the part of their usual entry point, the EDP director.

INPUT

- EDP directors have no idea whether these "little toys" can alleviate some of their problems, have no time to find out, and feel that other problems deserve higher priority.

- Users know little about computers, are getting "negative vibes" from the EDP department, but must have a better resolution to some of their data processing problems.

- All product and marketing programs directed toward the end user in a large corporation with under-$15,000 systems should include funding for an extensive "Beta" test site in order to determine:

  - Which products are useful and which are not.

  - How each product would be used by each type of user.

  - How the very small system should integrate with the network and the central computer system.

  - What applications are appropriate for these systems.

  - What kind of software customizing will be tolerated by the typical end user.

  - How to allay the fears of the EDP director concerning the corporate data base.

- A cooperative test program, entered into openly, would generate payoffs for all three members of the triangle.

- All marketing plans should budget funds for informative, low-key education programs directed toward the EDP director's fears and problems and the end user's apprehensions and specific applications.

INPUT

-   These should be a combination of active and passive elements. The passive elements could include case history ads in specific journals pertaining to the function of the targeted end user. The active portion should consider in-house seminars (conducted during lunch periods, immediately following work or in the early morning before work) aimed at providing hands-on experience with the system. Different groups could be reached at separate seminars, with EDP attending all sessions.

-   In developing strategies for this market, each vendor or potential vendor must assess its resources in light of the needs of the market. It should then construct a program around the company's strengths while gradually building up the weak areas.

## B.     MAINFRAME MANUFACTURERS

-   The major strengths of a mainframe manufacturer include a "presence" in the large company and a working relationship with the EDP management. Their major weakness is usually a lack of contact with the ultimate end users: they rarely know the users' specific needs, problems with corporate EDP or special applications.

-   Many mainframe companies do not market a system selling for less than $15,000.

-   Mainframe manufacturers should:

    -   Acquire or develop a product line that provides growth within the $15,000 limit and includes a communications capability compatible with the mainframe.

INPUT

.   The product line can be a development of the intelligent terminal product line or an outgrowth of a small business system product.

- Build an end user library of applications that are menu-driven, self-teaching and "user-friendly."

- Sell to both the EDP department and the end user stressing the support and service that can be provided.

- Capitalize on a good reputation in specific end user market segments such as engineering, manufacturing, etc.


## C.   MINICOMPUTER MANUFACTURERS

- As the minicomputer system is smaller than the mainframe, it is frequently located in a user department and is nearer to the ultimate end user. Minicomputer manufacturers can use this advantage to get to know the end user better.

    - Since a large portion of minicomputer systems have been sold to users through turnkey vendors, minicomputer manufacturers should consider acquiring turnkey vendors in specific marketing areas.

- The main thrust has to be to acquire an applications base. The software will most likely have to be modified to fit the "user-friendly" atmosphere that is required.

- Most minicomputer manufacturers have developed a microprocessor that is compatible with the minicomputer system. When packaged for the end user in a large corporation, this microprocessor will have an applications base available from the minicomputer product line.

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INPUT

- This will reduce the software investment required to get started.

- Sales should be directed toward the end user, but the EDP department must be kept aware of the systems that are available.

    - As the EDP group assumes a more active role, it will most likely have a "preferred" vendor list based upon communications compatibility with the central system. In order to make the list, minicomputer manufacturers must make EDP aware of available systems and their capabilities.


## D. COMPUTER SERVICES COMPANIES


- Computer services companies, especially RCS vendors, have two distinct advantages:

    - They are very close to the corporate end user, with whom they have built up a rapport over the years.

    - They have an end user applications base in specific market segments that they have been selling as the mainstay of their service.

- Users are used to paying for the service on a monthly basis. If a very small computer system were part of the service, then the system could be acquired without interfacing with the capital budget committee.

- Offering a very small computer system for use at the customer's site is one extension of user site hardware services that is being tried by some RCS companies. In this arrangement the user has access to:

    - The services company's application base.

INPUT

- The RCS vendor's communications network and, through that network, to larger computer systems if the need should arise.

- Computer services companies should consider acquiring a software manufacturer as a means of increasing their applications base.

- Rather than moving into the sale of hardware, computer services companies should consider becoming a software publishing house.

  - A software publishing house acquires rights to programs written by others, converts them to a range of systems, packages them for the level of user in the target market, and distributes the package to other channels such as computer stores, etc.

- A direct-to-the-end-user market will develop in the large corporations.

  - Applications packages will become available when very small systems are marketed that use the IBM 370 instruction set. In addition to converting these programs to run on very small systems, vendors will have to add a self-teaching front end and adopt a menu-driven format.

  - A services market might develop for converting some of a large company's applications programs in this fashion for use in-house.

## E.    SEMICONDUCTOR AND MICROCOMPUTER MANUFACTURERS

- Semiconductor and microcomputer manufacturers should:

  - Develop an upward-compatible systems product line that will include basic systems software.

INPUT

- Develop or sponsor applications programming efforts that are end user-oriented.

- Establish contacts with both the EDP departments and the purchasing departments of large companies.

  . Start them both thinking in terms of bulk purchases, standard-ized products, in-house depot servicing and the use of the very small system as both a standalone and a communicating system.

- Consider the acquisition of a software manufacturer in order to obtain an applications base.

- Develop marketing programs that make it advantageous for the EDP department both to buy in bulk and sell internally to the end users.


## F. COMMUNICATIONS COMPANIES

- Communications companies have a rapport with top management and EDP management in large companies.

  - Managers of large companies are used to dealing with communications companies for complex systems, but they are not used to dealing with them for much beyond communications services.

- Communications companies that wish to enter the very small systems market in large companies should consider selling in bulk to the EDP department and letting EDP sell to the end user.

- A product line can be developed, acquired and packaged for resale or lease to the end user.

INPUT

- Leasing or renting the system involves the advantage of a shortened or eliminated approval path.

• Applications will have to be acquired before a strong entry to the market can be made.


## G. OFFICE PRODUCTS COMPANIES


• Companies that used to manufacture mechanical calculators have switched to electronic calculators, many of which are programmable.

    - These programs are oriented toward very specific end users and provide a good base from which to build a computer applications portfolio.

• Office products companies have sold to large corporations for many years. They have established relationships that are a valuable asset.

    - Their contacts are with purchasing departments and, to some extent, with end users. These contacts must be extended to include the EDP director.

• The calculator companies have an electronics manufacturing base, a dealer network and an extensive service organization in place.

    - These assets are important when selling to the standalone market. The dealer network is less useful when selling a networking product.

    - These companies should build their own very small system product line and start the applications base by converting the calculator program library.

INPUT

- Copier manufacturers have the same assets as calculator companies except that the former must acquire applications programs.

- Word processing companies have a "presence" at the end user level. They must convince end users to accept the system into their office.

  - If the word processor system had a data processing capability, it would be easier to do the convincing.

  - In the long term, an applications base and an expandable system are still required in this market.

INPUT

APPENDIX A: SOURCES

# APPENDIX A: SOURCES

- <u>Statistical Abstract of the U.S.,</u> Bureau of the Census, Washington, DC, 1979.

- <u>Occupational Employment in Manufacturing Industries - 1977,</u> Bureau of Labor Statistics, Washington, DC, 1980.

- <u>Occupational Employment in Selected Non-Manufacturing Industries,</u> 1978, Washington, DC, Unpublished.

- "The Fortune Directory of the 500 Largest Industrial Corporations," <u>Fortune,</u> May 7, 1979, pp. 268-295.

- "The Fortune Directory," <u>Fortune,</u> July 16, 1979.

- <u>User Site Hardware Services from Remote Computing Companies,</u> INPUT, Palo Alto, 1980.

- <u>1980 Field Service Annual,</u> INPUT, Palo Alto, 1980.

- <u>Turnkey System Opportunities, 1979-1984,</u> INPUT, Palo Alto, 1980.

INPUT

# APPENDIX B: CATALOG OF VERY SMALL SYSTEMS

# APPENDIX B:  CATALOG OF VERY SMALL SYSTEMS

- The following is a succinct catalog of very small systems.

  - There are dozens of companies offering small systems for under $15,000, but the large majority sell only to small businesses.

- The eleven companies included in this catalog are major companies selling very small systems to large corporations.

  - Included also are some companies that might not be selling directly to large corporations, but whose products are found there and who are planning to sell to large companies in the future.

## A.  APPLE COMPUTER, INC.
10260 Bandley Drive
Cupertino, CA 95014
(408) 996-1010

## I.  BACKGROUND

- Apple Computer, Inc., was founded in 1976. In 1977 the company introduced its Apple II system, which had been sold (until early this year) primarily through independent distributors, franchises and a small number of company-owned stores.

INPUT

- Its acquisition of Compushop in March 1980 increased its warehousing facilities from one (located in Sunnyvale, CA) to three (adding facilities in Richardson, TX and Charlotte, NC).

2.  CURRENT PRODUCTS

- Introduced in 1977, the Apple II replaced the initial system, which had been designed primarily for the hobbyist market. The maximum selling price remained below the $2,000 level until the 1979 announcement of Apple II Plus, with an extended BASIC in ROM. The enhancement alone did not increase the price, but it allowed optional packages, such as Applesoft II, a firmware card with Auto-Start in ROM to be added, thus making turnkey software resident in ROM available to the user once the APPLE II was turned on.

3.  FUTURE PRODUCTS

- The Apple III, a small business computer system, was unveiled at this year's NCC at Anaheim, CA. Demonstration units were installed in Apple dealers and franchise stores by June 1980. Initial delivery of the Apple III is not expected before the third quarter this year.

- The unit, based on a 6502A microprocessor, offers up to twice as much ROM (96K) as its predecessor. A 96K unit, including a black and white monitor and software designed for professional and management-level users, is expected to sell at a price of about $4,400. Another unit designed for word processing applications will be priced from $5,400 to $7,800.

- The company can be expected to offer a great deal more software over the next two to five years, and will probably approach the business market segments with communications capabilities for office-of-the-future usage.

INPUT

**B.    BURROUGHS CORPORATION**
World Headquarters
Burroughs Place
Detroit, MI 48232
(313) 972-7000

### 1.    BACKGROUND

- The Burroughs Small Systems Group engineers and manufactures small- and very small-scale computer systems and business minicomputers as well as standalone workstations, document management systems and data preparation equipment. The Small Systems Group has four manufacturing facilities in the U.S. and two in Scotland.

    - The Program Products Division is responsible for the development of line-of-business applications software. The OEM division provides additional marketing assistance to the Small Systems Group.

### 2.    CURRENT PRODUCTS

- While Burroughs does not have a configured system that falls below the $15,000 price ceiling set for this study, its B90 series, which includes the B91 and the B92, is targeted at the low end of the minicomputer marketplace, with a minimum configuration priced slightly less than $18,000.

### 3.    FUTURE PRODUCTS

- Assuming that hardware prices continue to decline, a minimally configured B91 will easily fall below the $15,000 price ceiling within the next two years. Since all software pricing is unbundled, the minimum hardware price today can be expected to include an operating system by 1982.

    - In addition, Burroughs can soon be expected to announce a freestanding business system at or below the $15,000 level to be used as a management workstation.

**INPUT**

- The company currently approaches the large-company market with direct salespeople. This approach will probably continue unless either the cost of manufacturing or the cost of sales rises dramatically for the company over the next two to five years.

## C.    DATA GENERAL CORPORATION
Route 9
Westboro, MA 01581
(617) 366-8911

### 1.    BACKGROUND

- Since 1969, Data General has shipped more than 75,000 computer systems. In 1979, Business Week ranked Data General first out of 683 major U.S. computer companies surveyed on the basis of the portion of revenues invested in research and development. The company maintains more than 80 field sales offices in the U.S., six field sales offices in Canada and more than 70 overseas.

### 2.    CURRENT PRODUCTS

- Data General was the first minicomputer manufacturer to design computer hardware and software systems that were totally compatible and expandable. The configurations mentioned in this profile all incorporate the 6031 single diskette subsystem, the 6052 CRT and the 6043 Receive-Only printer. Each of the following systems can be configured with these peripherals at a cost of $15,000 or less. (Note that the cost of software is not included.)

    - CS/20  64K - $13,145*.

    - Nova 3/4 - 32K - $13,590*.

    - Nova 3/12 - 32K - $14,590*.

**INPUT**

-       Nova 4/C - 32K - $9,890; 64K - $10,590*.

-       Nova 4/S - 32K - $12,890; 64K - $13,490*.

        *Prices are approximate

3.   FUTURE PRODUCTS

• Data General currently places heavy emphasis on the distributed network capability of its entire family of systems. The company foresees a shift in its markets from inquiry/response and data base applications to dedicated mini-computer networks operating independently from host processors.

• Due to the variety of user requirements for languages, discrete applications and continuance of data sharing, the company is aiming its development efforts at software. The company believes that modular software that is easy to use, maintain and modify is the key to success in dedicated, no-host minicomputer networks.

• The very fact that the company stresses the importance of networking and software suggests that Data General is aiming future products at end-users in larger companies. While the company talks about dedicated systems, little of its software is designed for use by specific end users or user departments.

D.   **DATAPOINT CORPORATION**
9725 Datapoint Drive
San Antonio, TX 78284
(512) 699-7151

1.   BACKGROUND

• Datapoint was incorporated in 1968 as Computer Terminal Corporation. Its first product, the 3000 Series interactive CRT, was introduced the following

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INPUT

year. In 1972 the company changed its name to Datapoint to reflect the broader scope of business first demonstrated by its successful introduction of the Datapoint 2200 dispersed processing system in 1971.

- The company marketed its products primarily through distributors until it established its own direct sales force in early 1979. Today, Datapoint has more than 50 sales offices in the U.S. and more than 25 sales representatives in other countries. TRW Datacom-International, Inc. (of Los Angeles and Isleworth, Middlesex, England), is the company's master distributor for international sales.

2. CURRENT PRODUCTS

- Datapoint now has a family of 11 compatible dispersed data processors. The company's ARC system - introduced in 1978 - allows total integration of any of the 11 Datapoint processors.

- While most of the company's systems can be used as standalone workstations, two - the 1500 and the 1800 - are priced at less than $15,000 in minimum configurations.

    - The 1500 is priced at $5,950 with a 32K processor, screen, keyboard and diskette data storage; it can be upgraded to 60K, built-in communications and 1MB disk storage.

    - An 1800 with 60K user memory, keyboard, 80 x 24 video display screen, 4 MB dual-drive diskette and communications interface is priced at $12,500.

3. FUTURE PRODUCTS

- Datapoint has energetically promoted the integration of word processing, data processing and communications as well as the use of electronic mail and

INPUT

message systems. The company is in a solid position to approach large-company managerial and professional individuals and departments for its existing product lines. With low-end products such as the 1500 and 1800 systems (both of which are field-upgradable as the user's requirements grow) and the company's image as a leader in network systems, this position will not easily be disturbed.

## E. DIGITAL EQUIPMENT CORPORATION
146 Main Street
Maynard, MA 01754
(617) 897-5111

### 1. BACKGROUND

- Digital Equipment Corporation was founded in 1957. Its first Programmed Data Processor (PDP), the PDP-1, a high-speed, 18-bit small computer with 32K of addressable core memory, was delivered in December 1959 at a price of $120,000. PDP-2 and PDP-3 prototypes never reached the production stage.

- The first PDP-4 was delivered in 1962 with slower memory at a price of $65,000.

- The PDP-5 has been acknowledged as the first commercially available business minicomputer. The 12-bit machine (the forerunner of the PDP-8) was introduced in 1963.

- The PDP-8 was announced in 1965 just as the competition introduced systems comparable in price/performance to the PDP-5.

### 2. CURRENT PRODUCTS

- Digital has since announced the PDP-9, -10 and -11 series, as well as the PDP-12 and PDP-14 in 1968 and 1969 respectively. There are several DEC

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minicomputers that can be configured as complete freestanding workstations, which include (prices are approximations):

-    PDP-8/E - (8K CPU) tape drive, CRT and 30 cps printer - $14,865.

-    PDP - 11/03 - (16K + dual floppy disk, DECWRITER II) - $10,000.

-    Datasystem 150 (32K) - $10,900 or (60K user memory) $11,600.

-    DECstation 78/40B - $7,995; 78/70D - $12,400 (both 16K).

-    DECstation 88/50-D (32K) - $11,500, includes VT-100 CRT (88/50-L costs the same, but with LA180 printer added - $14,400).

3.    FUTURE PRODUCTS

●    DEC approaches large companies on a departmental level through its OEMs. The primary focus remains on direct sales. Individual sales to managers and professionals are handled through DEC stores. DEC has a large but fragmented software base which it must protect, and from which it can draw when approaching departmental users.

F.    **HEWLETT-PACKARD**
Desktop Computer Division
3404 East Harmony Road
Fort Collins, CO  80525
(303) 226-3800

1.    BACKGROUND

●    Hewlett-Packard's Desktop Computer Division is responsible for the 9800 series, including all of the products described in this profile. The company is a leading manufacturer of laboratory test equipment, analytical instrumentation, and data processing equipment.

INPUT

- The company's products are sold by more than 125 sales offices in over 35 countries worldwide. Its desktop computers made their debut with the introduction of the HP 9831 in March 1977, an outgrowth of the 9800 series calculators.

2. CURRENT PRODUCTS

- Hewlett-Packard has five low-end minicomputer systems that sell in minimum configurations for less than $15,000. HP desktop computers are designed for three broad markets: scientific, business and data acquisition.

- The company supplies software applications packages for each system that allow a user to perform sales analysis, computation for inventory control, matrix mathematics, statistical analysis, accounts receivables, structural analysis and computer graphics.

- They also provide a programming education package for those wishing to write their own programs.

- The HP-85 is designed for business and/or scientific applications; it is priced at $3,250 for the 16K version and $3,645 for the 32K version.

- The HP-45 is primarily intended for business analysis. This 64K machine includes a 24-line CRT and is priced at $12,500 in a minimum configuration.

- The HP-35 is available with a single-line display for data acquisition control, at a price of $8,700 for the 64K system. With a full CRT display for scientific applications, the price rises to $9,900 for the 64K system.

3. FUTURE PRODUCTS

- Neither the HP-85 nor the HP 9800 series desktop computers are upgradable to the company's larger minicomputer systems. With the utilization of one of three communications interfaces, they can be attached to an HP network.

**INPUT**

- While programs are not specifically designed for downloading to the desktop lines, data can be accessed. Although the desktop models cannot be considered distributed data processing network nodes, they do have their place in the large company environment, generally in technical applications.

- The company is making a greater effort to provide applications packages for other business-oriented disciplines as noted earlier. The promotional literature for the newer HP-85 is a case in point. Illustrations of the system's graphics capabilities portray market research forecasts and sales performance charts as opposed to the heavy scientific emphasis in brochures for earlier product lines.

- Hewlett-Packard's direct sales force is in a good position to penetrate business-oriented user departments within the large companies that have already accepted the company's scientific-oriented desktop systems as well as its larger business minicomputer systems.

## G. INTERNATIONAL BUSINESS MACHINES CORPORATION
General Systems Division
4111 Northside Parkway
Post Office Box 2150
Atlanta, GA 30301

### 1. BACKGROUND

- IBM entered the market for minicomputer systems with the November 1976 announcement of the Series/1. When first introduced, the Series/1 was offered with minimal systems software and virtually no applications software. IBM has since made over 73 software and 20 hardware announcements. Users' reactions to the Series/1 and other IBM minicomputer systems have been quite favorable.

INPUT

2.    CURRENT PRODUCTS

●    Series/1 minicomputers are offered in component fashion.  Depending on the
     processor selected, a user can configure a vast array of peripheral products to
     build a system for any specified need.  A minimum 16K configuration with
     diskette, 20 x 84 display and keyboard can be priced as low as $12,400.

●    IBM 5110 systems replaced the earlier 5100 system.  The 5110 is available in
     16K, 32K, 48K and 64K versions.  Each is also offered with either APL or
     BASIC languages or both.  The desktop unit includes the keyboard, a 204K
     built-in tape cassette and a built-in 5" CRT.  Prices range from $9,875 for a
     16K, single-language version to $17,125 for a two-language, 64K system.  A
     separate option is the 5103 printer, which is priced at $3,200 for the 80 cps
     model, and $3,700 for the 120 cps model.

●    The IBM 5120 is an updated version of the 5110, with a 9" display, detached
     keyboard and two built-in 2.4 MB diskette drives.  Like the 5110, it is offered
     with either APL or BASIC or both.  Prices range from $9,160 for the 16K
     MOSFET memory, single-language model, up to $13,175 for the 64K MOSFET
     memory, dual-language version.

3.    FUTURE PRODUCTS

●    With its 5120, IBM is finally approaching departmental users with a total
     package that can be specifically configured to fit the narrower application
     needs of large companies.  IBM's literature is careful to state that the
     application depicted in the brochure is typical of that being performed on IBM
     systems, but does not necessarily represent a product that is currently
     available from the company.

●    The BRADS II (Business Report/Application Development System II) is a set of
     specialized tools that allow non-programmers to enter, store and sort infor-
     mation on the 5120, to design reports, develop applications, and re-use the
     data available from the IBM 5120 accounting applications.  The BRADS II

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INPUT

provides the flexibility needed to build applications for various departments such as sales, personnel, financial planning, accounting, production and security services.

## H.    TANDY CORPORATION
P.O. Box 2932
Fort Worth, TX  76101
(817) 390-3700

### 1.    BACKGROUND

- The Tandy Corporation acquired Radio Shack in 1963 as part of an integrated strategy aimed at a profit center concept of operations little used in retail merchandising.  Through Radio Shack, the company introduced its TRS-80 in August 1977.  The merchandising expertise of the Tandy Corporation coupled with the talents of Radio Shack dealers provided the main stimulus for the skyrocketing of the new product; initially designed for personal and hobbyist uses, the general business public was quick to realize potential benefit in small, standalone applications.

### 2.    CURRENT PRODUCTS

- The TRS-80 is available in two discrete models.  The Model I is the low-end of the product line.   The Model II is designed primarily for business and professional users.  The TRS-80 Model I is a 4K system that uses cassette tape for external storage, priced at $499.  With the addition of the expansion interface, the TRS-80 can be expanded to 64K.

- The TRS-80 Model II is available in a 32K configuration for $3,450.  It can be expanded to 64K with a memory add-on priced at $499.  The current top-of-the-line Model II, "Deluxe 2 Megabyte Business System," is priced at $8,737 and includes a 64K CPU, 3 disks, a desk, Line Printer III and stand, and a 12-inch B & W monitor.

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**INPUT**

3.   FUTURE PRODUCTS

● In January 1980, Tandy made two significant announcements; the first alerted the public to the availability of annual maintenance contracts, and the second was the establishment of the Tandy leasing subsidiary. In keeping with users' proclivities to bring TRS-80s to work, the company moved to assure the success of such endeavors.

● Tandy is also in the process of setting up OEM relationships around the country for systems referred to as Tandy rather than Radio Shack computers. Combined with last year's establishment of more than 50 computer repair centers in the U.S., the company is aiming directly at the large- and small-company markets for very small computers. Reports of extensive software developmental efforts currently underway also lend support to their solid competitive position for the next five to ten years.

I.   **TEKTRONIX INCORPORATED**
Information Display Group
P.O. Box 500
Beaverton, OR  97077
(503) 638-3411

I.   BACKGROUND

● In 1946, Tektronix introduced the world's first commercially available oscilloscope. The company maintains over 47 field offices for sales and service of its more than 700 products for U.S. markets.

● The company is a corporate-resident of 17 foreign countries, providing sales and service to more than 60 nations. The company is one of the foremost leaders in the design and manufacture of graphics terminals and, more recently, complete standalone computer graphics systems.

**INPUT**

2. CURRENT PRODUCTS

- Tektronix entered the field of desktop, microprocessor-based systems in October 1975 with the introduction of its 4051 Graphic Computing System. The 4051 was originally priced at $6,995 for an 8K CPU, a storage-cube graphic display, keyboard and magnetic tape cartridge unit all housed in a desktop cabinet.

  - At that time, the 4051 could expand to a maximum of 24K. With associated peripheral additions, the high-end price was $16,300. Today the basic 8K configuration is priced at $5,995, expandable to 32K for an additional $1,900.

  - The 4051 intelligent terminal mode now also permits data sharing with a host computer at up to 2400 baud.

- Tektronix has also introduced the 4052 with a standard 32K CPU that can be expanded to 64K. The standalone unit can optionally be provided with an asynchronous communications interface capable of terminal mode operation at up to 9600 baud.

  - The 4052 is low-end priced at $9,800. A 64K version, including the 9600 baud communications interface, is priced at $13,200.

3. FUTURE PRODUCTS

- The company is heavily committed to providing state-of-the-art computerized graphic systems as well as displays and other graphics-related peripherals. The company has targetted the technical (i.e., scientific and engineering) user in companies of all sizes as its market.

INPUT

- There is no indication that the company has saturated this market potential, and there is no significant reason for it not to continue in this vein. For this reason, it is unlikely that business professionals and non-technical business managers in large companies will be pursued during the next five years.

J. **TEXAS INSTRUMENTS INCORPORATED**
Digital Systems Division
P.O. Box 1444
Houston, TX 77001
(512) 258-5121

1. BACKGROUND

- Texas Instruments is primarily known as a leading manufacturer of semi-conductor products for the electronics industry. The company also manufactures a broad line of process control equipment, instrumentation, digital watches and calculator products, and computer peripheral equipment.

- With the shipment to date of more than 225,000 data terminals, the company has gained a broad base of experience in marketing to large companies, both to DP departments and end users. Its computer systems first hit the market in 1974.

2. CURRENT PRODUCTS

- Texas Instruments announced the 16-bit TI 980B general-purpose scientific minicomputer with options from 16K to 128K bytes of internal storage in the first quarter of 1974. A minimum standalone configuration priced at $10,470 would include the 8K word CPU plus an 8K memory add-on module, and the 733 ASR twin-cassette Silent 700 Data Terminal Kit, which includes the terminal and interface.

INPUT

- The TI 990 series was first introduced in October 1975. The first fully configured 990 product for less than $15,000 is the FS 990/4, which is priced at $14,045 in single-unit quantities, and is marketed primarily to OEMs.

- In early 1979, the company announced two new models in the 990 series: the Model 1, which is a desktop, single-user system for data entry and/or standalone business applications; and the Model 2, which is a multi-user system available in either desktop or cabinet enclosures.

    - The Model 1 is based on the TI TMS 9900 microprocessor. It contains a standard 64K byte main memory, CRT console and two diskette drives, and is fitted with 2 EIA asynchronous ports. The Model 1 is priced at $9,450.

- The Model 2, priced at $13,200, is based on the newly announced 990/5 processor. The multi-user system price includes 64K bytes of main memory, 2 CRT terminals, diskettes and asynchronous ports. An internal printer priced at $1,100 is also available for the Model 1.

- The 99/4, Texas Instruments' personal computer selling for about $1,000 without a printer, is just beginning to be used in the large business environment. A unique approach to building an applications base is available within the TI system product lines. Application programs can be written on the 990 series in any of the available languages, and burned into a ROM chip, which can then be used on the 99/4. Existing applications programs can be modified to fit the 99/4 facilities and then burned into a chip.

3. FUTURE PRODUCTS

- Texas Instruments has not announced expansion of the 99/4 product line due to its slow acceptance in the home market. As the large company market grows, it can be expected to broaden this product line and to develop an integrated marketing approach to large companies designed around all of its product lines.

**INPUT**

- With an estimated installed base for terminals in excess of 200,000, and an excellent distributor network, Texas Instruments is certainly in a good position to convert business users to very small computer systems capable of retaining communications with host systems.


K. **WANG LABORATORIES, INC.**
One Industrial Drive
Lowell, MA 01851
(617) 851-4111


I. BACKGROUND

- WANG Labs, one of the first companies to manufacture and market programmable calculators in the U.S. market, is currently a forerunner in the manufacture and sale of small and very small computer systems to the large-company marketplace. The company's "Integrated Information Systems" approach underlies the success of its efforts.

- The emphasis that WANG places on integrating technologies to accommodate word processing, telecommunications and data processing capabilities into a single system allows its sales force to approach any large company at various levels.

2. CURRENT PRODUCTS

- WANG manufactures and markets several systems based on its 2200T microprocessor. Initially called the 2200 series, WANG's systems range from $4,800 to $13,300.

- The PCS-II, which was priced at $4,800, included a CRT with rebuilt keyboard, the 2200T processor and a minidiskette.

INPUT

- The PCS-III is priced from $6,500 to $10,500 and replaces the PCS-II.

- The WCS-15, also based on the 2200T processor, includes a CRT with an in-built keyboard and two 256K diskettes. It is priced at $12,500 with 24K main memory and at $13,300 with 32K main memory.

- WANG's SVP uses 16K to 64K main memory, and is priced from $12,000 to $20,000 depending on the peripherals included.

- The MP and LVP systems are priced above the $15,000 ceiling considered in this study, but these systems are also based on the 2200T processor.

- A user can upgrade an SVP system to the higher performance system with the addition of memory modules, interface hardware and appropriate systems software.

- WANG's VS systems are not based on the 2200T, and users cannot grow 2200 systems into VS systems. VS system prices start above $20,000.

3.   FUTURE PRODUCTS

- WANG systems, despite the company's novel approach to the market, are primarily viewed as word processors (at least at the low end of the product line). This image actually acts in the company's favor.

- While many vendors of mini- and microsystems are having difficulty identifying specific "data processing" applications within large companies for their products, WANG has pursued the line of least resistance: notably, the company understands the fact that a word processor crosses applications categories that a data processor cannot.

INPUT

- The provision of data processing and telecommunications capabilities on these same systems can be underplayed until it becomes more appropriate to stress user advantages available through the purchase of additional software and peripheral equipment.

APPENDIX C: RESPONDENT PROFILES

## APPENDIX C: RESPONDENT PROFILES

- These respondent profiles should provide a glimpse at some of the uses of very small systems, and also some of the problems involved in their acquisition and use. These are just four examples from the research for this study.

## RESPONDENT A: PROFILE

INDUSTRY: Discrete Manufacturing

DEPARTMENT: Inventory and Production Control

DEPARTMENT SIZE: 16 people

TITLE: Manager, Inventory and Production Control

APPLICATIONS:  Broad-load planning
               Forecasting
               Inventory netting
               Graphic models (planned)

APPLICATIONS SOURCE: Self-programmed

SYSTEM: Apple II Plus - 48K originally, now 64K - $3,500

INPUT

COMMENTS: "Simplicity of system and program development cycle was much better than using System 3. Save three days a week work effort with it. The Division general manager approved the recommendation to purchase and we got it within one day of the approval. DP manager got one for himself when he realized how much CPU time could be available for other users."


## RESPONDENT B: PROFILE


INDUSTRY: Insurance

DEPARTMENT: Actuarial

DEPARTMENT SIZE: 35

TITLE: Actuary

APPLICATIONS:     Policy performance measurement
                  Modeling and forecasting

APPLICATIONS SOURCE: In-house development

SYSTEM: IBM 5100 (3) - 48K, $20,000 for first new, $10,000 each for two used

COMMENTS: "Thirty-five people share the three machines doing research-oriented work requiring little input-output but a lot of calculations and quick reaction cycle. A task force of three looked into using timesharing versus our own system. Final approval came from the head of the department."

INPUT

## RESPONDENT C: PROFILE

INDUSTRY: Insurance

DEPARTMENT: Marketing/sales

DEPARTMENT SIZE: 21-50

TITLE: Agency Manager

APPLICATIONS:    Sales proposals
                Word processing (minor use)

APPLICATIONS SOURCE: Distributed by home office

SYSTEM: WANG PCS-2

COMMENTS: "Home Office sent us the system. The size was determined by our current sales. We are charged one-half clerical person per year for the system. It is a standalone for use by the sales agents. Next year, the home office promised that we might have communications for policy status inquiry. Some word processing is done on the system but it is pretty much tied up with sales proposals."

## RESPONDENT D: PROFILE

INDUSTRY: Banking

DEPARTMENT: Cash Management

DEPARTMENT SIZE: 23

INPUT

TITLE: 2nd Vice President

APPLICATIONS: Bank wire transfer

APPLICATIONS SOURCE: Outside consultant

SYSTEM: HP 9831

COMMENTS: "Bank wire transfer is not correlated with a DP function, but a special service provided to our customers. A committee including a DP representative examined various equipment and recommended the HP 9831 to the Project Planning Committee who authorized the expense. I am unhappy with the system because I had been told it would last for five years but now after two years we are using it to 100% of capacity. It is just not expandable enough and too slow."

INPUT

APPENDIX D: VENDOR QUESTIONNAIRE

# THE MARKET FOR SMALL COMPUTERS IN LARGE CORPORATIONS

## VENDOR QUESTIONNAIRE

INPUT is studying the current and future use of small computers in headquarters and in large divisions of major United States corporations. The important issues under study are:

● Will a market develop.

● What types of systems will be available at what price levels.

The market will be shaped by the actions taken or not taken by the major vendors in the information industry. We would appreciate your assistance in exploring this topic. At the conclusion of the study you will receive a summary.

For this study two categories of small computers are defined:

I.     Under $10,000

II.    Between $10,000 and $15,000

The study emphasis is on small systems used by a single person or by a very few people. Users are executives, professionals and scientists. We are not considering process control or shop floor automation in this study.

INPUT

# THE MARKET FOR SMALL COMPUTERS IN LARGE CORPORATIONS

## VENDOR QUESTIONNAIRE

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la.   Do you think this is a major market now?

        1. Yes

        2. No

lb.   If not, will it be a major market in 5 years?

        1. Yes

        2. No

lc.   If not, why not?

ld.   What types of vendors can best take advantage of this market?

**INPUT**

2a.    How is your company planning to go after this market?

    1.    Marketing/sales

    2.    Distribution channels

        -    Stores

        -    OEMS

        -    Mail order

        -    Distributors

        -    Other

    3.    Manufacturing

    4.    Customer support

        -    Field service

        -    Training

        -    Installation

        -    Software

        -    Other

INPUT

2b.    How does this approach differ from your company's approach towards the
       small business market?

3a.    What products and/or services do you now sell to executive and professional
       users in large companies?

ITEMS                                    TYPICAL UNIT COST

Systems


Hardware



Software



Services



3b.    Are they available in quantity at lower cost?        1. Yes
                                                            2. No

INPUT

3c.    Please describe your discount schedules to large end users?

3d.    Under what circumstances can a large company be granted OEM status for these kinds of products or services?

4.     Towards what specific end users in large companies are you targeting products and services, especially applications software?

5a.    How do your product and service offerings to end users in large companies differ from your offerings to small businesses?

5b.    Any changes in five years?

**INPUT**

6a.     How do you think other companies are approaching this market?

6b.     Any changes in five years?

6c.     What industry conditions do you think will make them alter their approach to this market?

6d.     What industry conditions do you think will cause your company to change its approach to the end users in large companies?

**INPUT**

7a.  What do you think some technical specifications of small end users systems will be by 1985?

   1. Memory size

   2. I/O peripherals

   3. Mass storage

   4. Communications interfaces

   5. Physical size

7b.  By 1990?

   1. Memory

   2. I/O peripherals

   3. Mass storage

   4. Communications interface

   5. Physical size

INPUT

8a.     How will prices of small systems change by 1985?



        By 1990?




8b.     What do you feel will be the ratio of peripheral prices to system prices in a
        typical system?

        By 1985?




        By 1990?




8c.     How much of a discount might be available for large purchases?  (100, 500,
        1,000 units)

**INPUT**

9a.    For what applications will these small systems be used?

9b.    Will the system be used as a workstation?

10a.   What degree of software customization will required for this market?

10b.   What can end users expect from future hardware and software that will allow
       them to be productive without becoming programmers?

11.    What do you think will be the typical means of providing customer support
       to these end users?

            1. Installation support

            2. Training

            3. Field service

            4. Programming questions

INPUT

12a. Do you feel there will have to be different
marketing strategies for different types of
end users in large companies?                    1. Yes
                                                 2. No

12b. If yes, please describe the strategies by end user type?

13a. Within a large corporation do you feel these systems will be:

1.      Standalone
2.      Linked to each other
3.      Linked to the central system
4.      Linked to the central system and to each other
5.      Linked to systems outside of the company
6.      Other arrangements _____

13b. Why?

13c. How will small systems be used in conjunction with central systems?

14. What communications changes are likely to occur during the next 5 and 10
years that will enhance the likelihood of these small systems being linked
to each other?

INPUT

15. From where in these large end user companies do you feel the push to small systems will come?

16. What do you think the future role of the EDP manager is?

17a. Who will be the vendors in this market?

17b. What will succeed? (Strategies, products, services, etc.)

17c. What will fail?

18. What will be the role of technology in this market?

19. Please send me product specifications and price lists for this market.

THANK YOU!!

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INPUT