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# CORPORATE PLAN

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CORPORATE LONG RANGE  
OBJECTIVES AND STRATEGY  
FY 69-74

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Prepared by -  
Corporate Planning

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**CONTROL DATA**  
CORPORATION

RECEIVED  
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CORPORATE LONG RANGE  
OBJECTIVES AND STRATEGY  
FY 69-74

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Corporate Planning

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CORPORATE LONG RANGE  
OBJECTIVES AND STRATEGY  
FY 69-74

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CONTROL DATA CORPORATION  
CORPORATE LONG RANGE  
OBJECTIVES AND STRATEGY  
FY 69-74

March 1, 1968

I. INTRODUCTION

A. Purpose

The purpose of these Long Range Corporate Objectives and Strategy is to provide a documented plan which projects the intended results from operating according to this years operating plans {FY 68} for the remainder of the fiscal year and the anticipated results of following the Corporate Objectives and Strategy for next fiscal year {FY 69}\*. These projections both serve as a means for evaluating the shorter range plans and establishing longer range plans for a total of a five year period.

The plan presents general objectives, the assumptions, influencing factors and general strategy to establish direction and intent for future action and guidelines for use in the preparation of other more detailed plans throughout the corporation. The plan represents the current choice of alternatives as corporate goals made by and agreed upon by top management so that these goals can be used as a point of reference and communicated consistently to general management of the corporation.

Please note the Long Range Corporate Objectives and Strategy for FY 69-73 differ from those prepared last year for FY 68-72 in that they represent realistic goals rather than minimum acceptable results. Also the plan includes only those areas of business where we are presently established and/or will develop from internal resources. Additional revenues and capabilities brought about by acquisition are not included in the plan except to the extent of identifying areas of interest.

B. Approach

The documentation was prepared by Corporate Planning with the assistance of the Financial Planning and Budgeting Department. The plan was developed over a several month period with the following as the major source of input material:

- FY 68 Corporate Objectives and Strategy
- FY 69 Corporate Objectives and Strategy
- FY 68 Operating Division Long Range Plans
- FY 68-72 Long Range Division Plans

\* See Appendix A  
Distributed January 15, 1968

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## I. INTRODUCTION

B. Approach {continued}

- Current Product Line Plans
- Market Analysis and Consultant's Reports
- Top Management Meetings on:
  - Business Objectives and Strategy
  - Market and Product Objectives and Strategy
  - Advanced Development and Basic Research Objectives and Strategy
  - Administrative Objectives and Strategy

Decisions relating to the selection of alternatives and other aspects of the plan were made or approved by the president in consultation with other top management.

## II. GENERAL CORPORATE OBJECTIVES

The following are statements of the general objectives of Control Data which must be regarded as overall direction in planning for the future.

A. Growth and Profit

Control Data plans to maximize growth commensurate with profitability. Growth will be measured primarily in terms of the value of equipment shipped and accepted, and secondary in terms of revenues. Profitability will be measured in terms of net profit before taxes and earnings per share after taxes. Profits must grow at a rate equal to or greater than revenues.

The computer industry growth has averaged 19% per year over the five year period from 1962-67. It is Control Data's objective to grow in excess of this average since Control Data is viewed primarily as a computer manufacturer and is evaluated on that basis. Different parts of the business will grow at different rates and times according to market conditions and the allocations of corporate resources.

Growth rate objectives by major kinds of business for FY 69 and order of magnitude objectives for FY 73 are shown in the financial objectives. The objectives also show the proportion of our total revenues by kind of business. It should be noted that the lease portion of the EDP business will require less orders and less values of equipment shipped and accepted than a direct growth ratio in terms of rental revenues may indicate.

B. Markets and Products

Control Data plans to be primarily a fully integrated, major supplier of products and services to the worldwide Electronic Data Processing Market. The market is interpreted in a broad sense to include all products, services, and supplies both

## II. GENERAL CORPORATE OBJECTIVES

### B. Markets and Products {continued}

directly to the computer user and those using similar or identical services and technology. First priority will continue to be placed on deriving primary revenues from the sale of hardware and services to the computer market with emphasis on large dollar value systems. Second priority will be placed on achieving the breadth and depth required for integration and diversification in the market along with exploiting our technological capabilities.

### C. Other

Control Data will continue to assume its share of social responsibilities commensurate with sound business practice. This includes corporate stability in terms of manpower, opportunity for personal employee contribution, and service to the communities where its business enterprises and markets are located. Creativity and innovation in meeting these responsibilities are encouraged.

## III. ASSUMPTIONS

The following are the major assumptions that were made from market and business information sources in preparation of this plan:

### A. General Economic Assumptions

- There will be no major change in the economic environment over the period of the plan.
- The average increase in Gross National Product was assumed to be 4% compounded annually.
- The EDP industry will continue to exist in a free competitive environment assured by the government, but not controlled by the government.

### B. Market Assumptions

- The computer market will continue to grow between 15% and 20% per year compounded annually {compared to 19% average over the five year period 1962-67}. With CDC's small share and the growth of the market no growth limitations are considered. Other CDC markets are growing at different rates, but are adequate for the growth planned.
- Computer performance improvements will continue at a rate comparable to past years at 40% per year in terms of overall systems performance as measured by throughput in terms of computations per dollar for medium and large systems. Product life, in terms of period in production, will increase to on the order of six to eight years for extra large systems and four to six years for

## III. ASSUMPTIONS

B. Market Assumptions {continued}

other systems. Life extensions will come from new technology initially with continuing product enhancements during the life cycle.

- Based on dollar value of equipment installed, the large computer systems market will continue to grow at rates in excess of the average ranging from 50% in the extra large {6000} system market to 25% for medium to large {3000} systems. The smaller systems market will grow less than the market average. Shared larger systems with remote terminals will begin to take the place of small systems. Very small computers and peripheral equipment will be part of the remote terminal complement on these shared larger systems.

C. Financial Assumptions

- No more than 70% of EDP systems will be lease. Long term non-cancellable leases for five years or more are considered as purchases in the determination of lease ratios.

- No financing constraints are expected. It is assumed that sufficient capital will be available when required as long as Control Data follows good business practices, maintains growth in excess of the industry average and with commensurate profitability.

- All newly constructed facilities will be financed by lease back.

- Capital equipment expenditures will be held to the minimum consistent with operational efficiency. For planning purposes capital equipment increases are estimated to be roughly proportional to the value of equipment and services shipped and accepted.

- No attempt is made to take the effect of inflation, devaluation of money, and increased labor costs into account. It is assumed that pricing adjustments and improved operating efficiency will cover these factors since they are small compared to the effect of improved technology and automation.

## IV. BUSINESS OBJECTIVES AND STRATEGY

Financial Objectives are provided in Section X. The following are the guidelines used in determining the objectives. They are given here in order that they may be used to understand and further break them down for more detailed plans.

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## IV. BUSINESS OBJECTIVES AND STRATEGY

A. Expense Guidelines

The overall objective is to minimize expense overall and charge or to allocate to cost of sales to the extent practical and reasonable because this provides the best control and evaluation of operations. Based on past history and future trends the following guidelines are provided.

1. Marketing - 7% to 8% of orders.
2. Sales and Service - 5.0% to 5.5% of value of equipment and services shipped and accepted of the operations affected.
3. G&A - 2.0% to 2.5% of consolidated value of equipment and services shipped and accepted.
4. R&D - 4% to 4.5% of value of equipment shipped and accepted of the operations affected.

Total expenses will be adjusted to provide the required growth in net profits and earnings per share. The choice of allocations within the approximate ranges shown will be determined by the market and product strategy by kind of business. Control Data's marketing limitations in FY 68-69 require marketing expenses toward the high end of the range with compensation in R&D and G&A to build the marketing organization required to exploit present opportunities.

B. Other Cost of Sales Guidelines

Plans must be made to better report, control, and minimize consistent with fulfillment of objectives, other costs of sales including the following major categories and base factors:

1. Inventory and manufacturing variances based on value of equipment shipped and accepted.
2. Support costs based on EDP systems value of equipment shipped and accepted.
3. Non-capitalized lease systems cost based on value of lease shipments and acceptances.
4. Administrative services based on value of equipment shipped and accepted.
5. Idle equipment depreciation.

C. Gross Profit Guidelines

Minimum gross profit objectives by kind of business are stated in the financial objectives. Kind of business, volume and turnover have been considered in establishing objectives.

## IV. BUSINESS OBJECTIVES AND STRATEGY

C. Gross Profit Guidelines {continued}

Further cost savings brought about by automation, production design, technical innovation and efficiencies should be planned in an effort to exceed the profits used as planning goals.

D. Lease Purchase Guidelines

Continued effort must be made and planned to emphasize purchase and/or long term leases {5 years or more}. Plans are based on lease purchase ratios not to exceed 70% leased EDP systems with all other business purchases. Lease business is desirable, but cash from purchased equipment is required to reduce financing and support the companies growth requirements.

## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

Overall corporate growth rates by kind of business have been set forth in Section II, General Corporate Objectives. From available market research and analysis along with Division Long Range Plans, it is evident that these objectives and more detailed financial objectives of Section X can be met with the resources allocated. Primary emphasis must be placed on stressing and exploiting unique opportunities where corporate capabilities exceed those of competition and potential is greatest. In the general sense, major opportunities exist for exploiting our unique large system and super-computer capabilities along with real-time and communications oriented systems in the EDP systems area.

Other similar opportunities exist for Data Centers where IBM's market is restricted by the consent decree and OEM peripheral equipment through IBM's refusal to sell OEM and our opportunity to lower costs via increased production.

The following are the overall objectives and strategy by major kind of business:

A. Major Market and Systems Strategy for EDP Product Lines

In general, Control Data will maintain an upper product line and a medium product line as the two major product lines for computer systems. The two product lines need not be compatible and will be optimized in different price ranges. A lower product line will continue to be considered for special systems orientation and satellite usage.

Control Data must maintain leadership in large computers for the scientific market segment while expanding our overall capabilities to broaden applications and build a base for future growth in the overall market. The customer and applications base for 3000 systems must be broadened to provide for both large system growth and a base for the new medium product line now under development. In the next few years primary emphasis will be placed on increasing

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## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

A. Major Market and Systems Strategy for FDP Product Lines {continued}

our marketing capabilities while exploiting present product lines, particularly large scale computers and large systems. Continued expansion into commercial and business systems must be planned especially where it is not necessary to hit IBM head-on and our large system technology can be applied.

1. Upper Product Line {6000/7600}

- a. The price range will continue to be in the area of 40K per month rental and up for average systems.
- b. Eight-bit requirements for the 6000 and 7600 will be met by using peripheral processors and satellite systems for an eight-bit interface.
- c. For the next several years remote terminal satellite requirements will be met by the 1700 and its planned derivatives. In addition, the smallest MPL machine will be oriented to satellite usage, particularly for Data Center usage.
- d. The need for planning follow-on for the 7600 in the coming five-year period is not now obvious. Additional follow-on work will be required to develop peripheral equipment specifically oriented to the upper product line. This work will be primarily in the area of I/O type peripherals, therefore, an allocation of research and development resources, to this type of peripheral equipment, is required. The 7600 life is just starting, and it will take several years before the full capabilities of the systems can be used since present systems are I/O bound in a wide range of job mixes. The 7600 is not expected to make any impact on the 6600 since it will be a step up in that product line. The price on the 6600 should be held, and 6000/7600 derivatives considered for replacement of the 64/65/6600 in 1972. It is anticipated that the 6000/7600 and derivatives will meet our UPL requirements for that period and beyond. Present estimates of 6000 shipments peak out in 1972. Derivatives of the 7600 will have to be carefully planned to pick up shipments beyond that time.
- e. STAR has no relationship to our standard upper product line. It will continue to be considered a special contract for outside sponsored development that will allow study of new organizational concepts. As a matter of policy, we are not promoting or selling STAR machines. No price and no delivery quotations will be made in the foreseeable future. The STAR can be discussed only in the light of a study of new organizational concepts.

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## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

A. Major Market and Systems Strategy for EDP Product Lines1. Upper Product Line {6000/7600} {continued}

- f. ECS - Hardware and software for the 6000 extended core storage must be completed and our position exploited before competition can catch up. First deliveries of the IBM 91 have been made, the IBM 85 is scheduled for third-quarter 1969 delivery and the 88500 is scheduled for delivery soon. ECS will be a primary means for extending 6000 life and expanding applications.

2. Medium Product Line {3000/MPL}

- a. Products will continue to be planned in the 5K to 40K monthly rental class. The MPL will be considered as the second major product line and will be different from the UPL to the extent required to optimize the line in the middle of the price range, provide eight-bit compatibility and IBM data format.
- b. More sales and applications resources will be required in FY 69 and 70 to extend the life of the 3000 and maintain a reasonable rate of shipments. The marketing limitations must be overcome and our image improved in preparation for MPL introduction. The 3000 customer base and the multi-access features of the 3500 will be emphasized.
- c. Goals for introduction of the MPL will include an announcement July 1, 1970, and delivery of the first product MPL 3 and MPL 4 systems by July 1, 1971.

The primary orientation of the MPL will be two-fold to meet the satellite needs of the UPL for both the EDP systems and data center businesses, and to continue the area of established business formerly served by 3000 product line. It will provide for customer growth from smaller 3000 systems with easy transition via emulation. {Where eight-bit I/O is required with 3000 systems, the 1700 will be used as a satellite.} Large 3000 systems and customers will have to transfer to the 6000/7600 by a complete transition.

3. The Lower Product Line {1700}

- a. We will continue to need programmable computers in the price range from 1K to 10K per month both for special systems usage and satellite terminal usage during the period prior to MPL introduction. The 1700 and its derivatives will be the primary product. Plans for an

## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

### A. Major Market and Systems Strategy for EDP Product Lines

#### 3. The Lower Product Line {1700} {continued}

- a. {continued}  
integrated circuit version with increased performance compatible machine should be made. In addition to the fixed program I/O stations consideration should be given to a smaller programmable device specifically oriented to remote terminal usage if the market indicates the needs.

#### 4. I/O Stations

The development of I/O station concepts must continue to be oriented to provide:

- a. A more universal controller capable of use with all CDC product lines at minimum cost and possible usable with other manufacturers product lines.
- b. Capabilities for either remote or local operation.
- c. Better operator and system orientation relieving the CPU of peripheral equipment "housekeeping" chores.
- d. Means for providing eight-bit, USASCII code interface and data storage for use with 3000, 6000, and 7000 product lines.

Developments using present buffer controller {fixed stored program} concepts should continue with added studies of wired and stored program controllers as appropriate to achieving the objectives.

#### 5. Software Objectives and Strategy

The nature of systems software is primarily determined by market needs. Software will be oriented to meet these needs and market and product plans will continue to define the needs. Particular emphasis must continue on the use of software as a means for extending product life. It is noted that about half of EDP systems research and development funds are expended on software developments. It is expected that this proportion will increase.

All EDP product plans will continue to consider and provide for the software needs for the product as it is integrated into our EDP systems. This is particularly true of peripheral subsystems and terminals. Reliability of systems must be improved in business and commercial areas. Time sharing and data management must be emphasized.

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## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

A. Major Market and Systems Strategy for EDP Product LinesB. EDP Products and Supplies Objectives and Strategya. OCR

More of the corporate resources will be allocated to exploiting our leadership in the OCR market. More marketing and service effort will be expended on the present generation of equipment and added R&D effort will be directed toward a new generation capable of reading multi-fonts, using electronic scanning, etc. Plans, including software, will be developed both to sell OCR as subsystems to competitive computer equipment and to make OCR equipment available on-line with all CDC systems.

b. Data Collection

We will plan to update our standard data collection product line and provide for both stand alone off-line and on-line usage. Plans must provide on-line system compatibility and a basis for more general purpose usage in the future. Data collection systems provides good prospects for both data centers business and future sale of computer systems.

Special data collection and applications oriented remote terminal devices will be considered special devices and developed only for special applications. Industry standards, USASCII codes, and communications systems aspects must be considered in plans. Specials will require pay-back of engineering expenditures as a cost of sales item where standard product modules are not applicable.

c. Supplies

We will continue to expand our supplies business to include business forms, punched cards, etc., in addition to magnetic tape and disk packs. The expansion will be generally in the area of expendable supplies and will not include supply cabinetry and office furniture. The expansion of our capabilities in this area will be primarily by acquisition.

d. OEM

It is our objective to expand the OEM market to the extent practical as long as this can be done as a result of research and development efforts allied to CDC systems requirements. Additional products, as appropriate, may be included in our OEM product line with emphasis on mass memory, high speed printers and OCR.

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## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

A. Major Market and Systems Strategy for EDP Product Linesb. EDP Products and Supplies Objectives and Strategy {continued}d. OEM {continued}

Research and Development for CDC peripheral equipment product lines will take precedence over OEM because the company has so many R&D investment alternatives that funds will probably not be available for distinct OEM product developments, except where CDC requirements are also met or unusually good potential is guaranteed. Customer sponsored R&D for modification of CDC peripheral equipment development and joint development efforts will be accepted. Consideration will be given to allocating surplus R&D if available after CDC's EDP systems requirements are supported.

7. Data Centers Objectives and Strategy

- a. The use of CDC systems in our Data Centers will be extremely important. As a matter of policy, it is our objective to have preponderantly CDC equipment in our Data Centers.
- b. The Data Centers expansion will be primarily oriented toward business data processing applications. IBM is particularly vulnerable to this type of orientation because the consent decree forbids IBM to handle customer data. We must, therefore, seize this opportunity and expand as rapidly as we can.

B. Space and Defense

1. The prime objective is to increase our space and defense business up to the point it represents approximately 15% of the total corporate value of equipment and services shipped and accepted.
2. Areas of prime interest are:
  - a. The segment of the market that used EDP products and systems along with specifically developed equipment or in unique applications.
  - b. The segment that requires militarized versions of computer systems and other digitally oriented systems.
  - c. Broader based large military systems.
  - d. Operations and maintenance activities especially where capabilities provide means for obtaining preference for future programs or capabilities are transferable to commercial business.

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## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

C. Other Businesses

1. CDC will remain primarily a company in the EDP business and recognizes the need to supply systems, supplies, and services.
2. Other market areas will be pursued to the extent that they may supplement the EDP systems business. For example, this may include the instrument business in support of process control systems and/or MODEMS in support of the communications systems business and business supplies, etc.

D. Acquisition-Market, Product and Vertical Integration Objectives and Strategy

1. The business supplies market area will be entered primarily through acquisition.
2. Acquisitions supporting the EDP systems business which can provide new markets, new products, new technology, or can improve present CDC marketing, engineering, systems or manufacturing capabilities are of primary interest. These include, but are not limited to the following:
  - a. Communications products such as MODEMS, teleprinters, voice answer back and remote terminals in general.
  - b. Business supply products such as cards, forms, magnetic tape, etc. both to add new products and provide better geographical distribution.
  - c. Products supporting present systems activities such as instruments in support of process control and {a} above, analog computers and semiconductor manufacturers.
  - d. New product and market areas where growth is projected and which now or potentially will use digital computer products or technology are applicable. Air and water pollution systems are typical examples.
3. Reverse OEM arrangements where CDC procures products, supplies or services from other manufacturers at OEM prices and with adequate top management agreement or contracts.
4. Vertical integration needs in areas such as printed circuits, connectors, and semiconductors, will be sought by acquisition. The direction of research and development in discrete devices is uncertain. It is difficult to get transistors to satisfy the 7600 needs, and it is possible that semiconductor manufacturers will discontinue further advances in discrete components while the 7600 will continue to require transistors in the 1973 to 1975 era. It is desirable to study meeting CDC's specific semiconductor needs by acquisition, and it is necessary to assure a low cost of transistors required for 7600 production.

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## V. MARKET AND PRODUCT OBJECTIVES AND STRATEGY

E. Public Relations, Advertising and Sales Promotion Objectives and Strategy1. Corporate Image

Control Data's corporate image will be directed as follows in order of priority:

- a. CDC is the world's leader in large computers. This image must be broadened to cover all applications of large systems and supplementary smaller systems services and products. This does not mean a deemphasis of 3000 and smaller systems.
- b. CDC is the second largest supplier of peripheral equipment and has the second broadest peripheral line in the industry.
- c. We will work on improving our software image, for example CDC is leading the field in remote batch multi-access software.
- d. Future objectives related to our corporate image must consider the corporate objective of being a broad EDP supplier. This can best be done today by stressing points in a, b, and c above.

2. Guidelines for Future Plans

The following guidelines were established for direction of Public Relations, Advertising and Sales Promotion function in the future:

- a. The need to provide more uniform literature conforming to the corporate image.
- b. To tie the function more closely to corporate product line plans. Sales and Advertising Promotion plans must be a subset of corporate, fiscal, and product line plans.
- c. There is a need for better logical organization of literature, improved procedures for revision, and means for keeping a consistent set of brochures available in accordance with product line plans.

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

The following are areas of interest for which plans must be made during the next five year period:



## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas

The corporation must expend more effort in the area of research and advanced development. This work should be oriented primarily toward CDC's computer systems business needs. Primary needs center around the different major product modules associated with the EDP systems business. The following are guidelines for planning specific programs:

1. Computer Main Frame

It is difficult to determine exactly how technology is moving forward and what the long range objectives beyond the five year period for computer design will be.

There is a continuing need for bigger and faster computers. We are not able to forecast the manner in which this will be achieved except the possibility of close integration of computer logical design with integrated circuit development. This course will represent a large investment with no way of estimating the possibilities of success. Basic decisions must be made in the next few years relative to developing a computer at least four times faster than the 7600.

STAR is considered an experimental machine developed for a single customer. Results of this program will be evaluated after delivery and proof of concepts. The objective of pursuing advanced development and research work will be oriented toward advancing the state-of-the-art in order to maintain cognizance of new technology and be able to reduce the technology to product designs as rapidly as the state-of-the-art will permit.

2. Hardware

The following are areas of interest appropriately identified for future plan development:

a. Semiconductors

CDC must study the field with respect to being self-supporting. The best method may be via acquisition in order to gain lead time and save R&D investment. After an appropriate acquisition we should consider the possibility of investing corporate R&D funds out of proportion to the profits obtained from the semiconductor business until we have an adequate level of effort.

b. Emulator Research

Emulators will be part of CPU designs throughout the foreseeable future and may be a means of satisfying future EDP standards.

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas2. Hardware {continued}c. Thin-Film and Memories

Thin-film, magnetic cores, including plated wire, new technique investigations and construction, and testing of feasibility prototypes is required. Core memories, as required by product development, will be considered part of the product design effort, however, new technology must continue to be developed to be ready for product design.

d. Semiconductor Memories, Registers, Etc.

The amount of effort required will be determined by the ability to acquire a semiconductor manufacturer. CDC must plan to keep abreast of this technology.

e. Outside R&D Vendors

In addition, we should study and explore the potential of purchasing development from appropriate outside vendors and/or consider joint endeavors with non-competitive organizations as a possible means of achieving the required research to keep CDC abreast of the computer main frame technology.

f. Automated Design

Automated design, production and quality control should continue to be pursued both as means for cost reduction and development-to-production time reduction. Some experts predict that in the future all CPU will be custom designed according to the application in a manner similar to our customizing systems configurations now. This provides additional emphasis on staying abreast of the state-of-the-art including automated drafting, printed and integrated circuit layout, numerical machine tool control, etc.

3. Software

Studies relating to machine organization, and the ability of hardware to replace software for future computer developments, will best be achieved by the development of feasibility models which are preferably paid for as a customer sponsored program such as the STAR program. The buffer controller was the reverse concept, that is software replaces hardware. It is not clear which direction the industry is moving.

The following are some specific software areas recommended for advanced research and development along with order of magnitude fund requirements:

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## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas3. Software {continued}a. New Languages - Particularly PL-1

CDC will make no commitments to support a PL-1 compiler, as a specific product. However, minimum effort of a study nature would be valuable in determining the characteristics of a potential machine development with the design optimized for PL-1. In event PL-1 becomes a standard language it must also be determined whether the existing machines can run PL-1 efficiently.

b. Expandable Languages

Expandable languages including "Programs to write Programs" should be studied to determine the feasibility of writing a systems programmers language.

c. Data Management Systems

Effective systems and the study of data management in the computer utility mode of operation must be studied for our participation in the computer utility market. Data management systems are also important to continue sale of commercial computer systems.

d. Standards

The effect of industry standards on software and existing software systems requires study and analysis.

e. Development of Software Techniques

The continuing effort for the development of software techniques, such as text editor systems, on-line debugging, etc. is required to stay abreast of the field.

4. Peripheral Equipment

The I/O problems in large scale computers are a controlling factor in the improvement of system performance. Major emphasis should be placed on the development of peripheral equipment to meet large scale computer needs. The following is a summary by kind of device and recommendations as appropriate:

a. I/O Stations

Development of the hardware and software related to the I/O station development must continue on a priority basis with objectives to reduce the cost of peripheral

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas4. Peripheral Equipmenta. I/O Stations {continued}

controllers, reduce complexity of CPU design by placing control logic in modular units, provide universal controllers for multiple product lines and provide remote terminal equipment. Additional considerations are to provide eight-bit to six-bit system and data base information conversion and interchange, and to retain peripheral equipment independence of product lines. The latter could provide better lease life for peripherals and the ability to place CDC peripherals on competitive systems also.

b. Photographic Storage

There are advantages in digital photographic storage, in applications requiring large permanent file storage. Applications can be similar to security service files, library files, and other permanently recorded information. Three dimensional, laser, and interference techniques appear to be capable of providing the required technology. CDC should begin doing basic research work as required to understand the system and information handling problems, including file research, handling, storing, etc. At this time, it appears that the photographic technology is best left with other more specialized companies such as Kodak, Itek, etc.

c. Magnetic Memories

There appears to be a future need for trillion-bit memories and the hardware and software required to use these memories in information and system for configuration structures. An immediate need is for investigation into the very large drum technology and similar head or track storage devices. Laser magnetic recording techniques also need to be studied. Feasibility models are required to determine system parameters and maximum limitations of these types of devices. In addition, magnetic surface and material studies should be conducted.

d. Punch Cards

It is expected that the punch card equipment market will taper off in the next ten-year period; however, studies are required for speed improvement dramatically reduced cost and increased reliability, to maintain our product lines over that period of time. OCR unit record readers

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas4. Peripheral Equipmentd. Punch Cards {continued}

will take over this market on an evolutionary basis in the latter part of the ten-year period. Minimum efforts to keep abreast of punched card equipment advanced development requirements should be planned.

e. Printers and Graphic Reproduction

Studies should be continued in two major areas: 1} to develop a low-cost, low-speed device suitable for remote terminal usage and, 2} to investigate non-impact printing methods. It is desirable to consider the acquisition of a typewriter manufacturer or the negotiation of a joint venture in order to determine the best means for meeting remote terminal printer requirements.

f. Graphics {non-alphanumeric, but including line diagrams and similar reproductions}

Control Data's effort should be directed to printing and alpha-numeric reproduction only {d above}, other graphic requirements such as the storage and transmission of pictures can best be solved by acquisition. There is no interest in entering photo typesetting, and no interest in the office copying equipment markets and technology.

g. OCR

OCR equipment is of high priority since in the next ten-year period, OCR equipment will be replacing punch cards. This means that the potential market includes an OCR equipment for every computer installation. It is anticipated that this will be a highly competitive market and IBM is expected to make an all-out effort to exploit the market. It is desirable to develop a complete product line and build feasibility models which can be used to test advanced techniques. It was agreed that Rabinow Labs should plan to buildup to meet these development needs.

h. Displays

At present our primary product line in the display area is the CRT type. There is a need to study improvements in this device to reduce the cost and improve the reliability. The potential of using electro-magnetic deflection is one of the areas requiring study.

The potential of using gas tube storage both for small and large displays appears to be very good and will be supported. No other satisfactory means appears to be appropriate for large displays.

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas5. Space and Defense

Control Data needs to develop sufficient capabilities to pursue some specific areas from the diversified technology within the corporation. This requires more selectivity by market procedures and plans. In addition, product development funds are required in order to develop military oriented products to be competitive. Several areas appear to be appropriate for advanced development. These include:

a. Automated Design

Means must be planned for participating and transfer of applicable technology from CDC's continuing automated design projects to the Space and Defense Systems organizations to speed equipment prototyping and provide capabilities for meeting special military digital equipment designs in minimum time and minimum cost {see VI, 2, d above}.

b. Radar

Radar product development is required and studies as appropriate to determine the nature and scale to the market requiring small computers in conjunction with small radars.

c. Systems Analysis

Simulation and emulation techniques as related to military and government planning need to be studied by a systems analysis group and coordinated closely with existing commercial work. There is a need to obtain systems engineers and orient them into areas of CDC interest, and experience where the growth appears greatest. This is particularly true as "force" is discontinued and the world politics become more important. This will increase the need for intelligence information and systems analysis required to adequately use the information.

d. Automated Special Computer Design

Automation of special digital computer development for the space and defense market should be studied so that Control Data's reaction to special military needs is optimized.

e. Government Contracts

CDC is interested in pursuing contracts leading to government sponsored advanced computer design.

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development Areas5. Space and Defensef. Militarized Peripheral Equipment

Militarized peripheral equipment has a good future potential and a study should be planned to determine requirements to militarize Control Data's peripheral products. It is possible some of these equipments meet requirements.

g. Computer Organization

Computer organization studies are desirable in order to determine government versus commercial computer organization. This must be a practical approach including feasibility model work.

b. Remote Terminals

Remote terminals are expected to be a large part of the total large scale system dollars in the future. The market for terminals has not been opened up yet, although the large post office systems order for data collection and the large Allstate order for CRT displays is indicative of future potential. A focal point within operations, must be established for a systems concept study to determine the hardware and software requirements, establish the required standards to minimize special software and equipment, and recommend specific future developments.

7. Application Study

It would be desirable to develop software and special products as required to lead market exploitation, however, the corporation cannot afford to follow this kind of work in the general sense. We must, therefore, plan to do the minimum of study and advanced development to be ready to pursue opportunities as they occur via cost of sales work and exploit the market as it becomes well-defined.

Programs must be planned to keep aware of opportunities and activated to study the opportunities as they arise. In addition, plans must be made to standardize and/or generalize and/or improve special products developed from these costs of sales projects.

8. Other Business Areas

Corporate Basic Research and Advanced Development efforts should be limited to business areas related to EDP. We will get into and provide growth for other business areas via acquisition. Some additional candidates for future study are:

## VI. BASIC RESEARCH AND ADVANCED DEVELOPMENT OBJECTIVES AND STRATEGY

A. EDP Products and Systems Basic Research & Advanced Development AreasB. Other Business Areas {continued}

- a. Individual recognition and verification as required for future systems such as fingerprint analysis, voice recognition, etc.
- b. Remote terminals specialized by application.
- c. The broad area of information storage and retrieval systems for medicine, education, libraries, etc.
- d. On-line, multiple-access systems security methods.
- e. Others as opportunity is determined.

## VII. ADMINISTRATIVE OBJECTIVES AND STRATEGY

The following are the objectives and strategy to be used as guidelines for long range planning in the administrative area including training, manpower and personnel, facilities, etc.

A. Control Data Institute

Control Data considers the satisfaction of the computer industry's training needs as one of the corporation's major objectives and looks upon the future marketing potential for training as a large and profitable business. It is believed that the EDP industry must assume responsibility for the specialized training needed to supplement academic education provided by business schools as well as universities and colleges. Personnel shortages are one of the major factors limiting the growth of the EDP market.

1. The primary objective for CDI is to profitably train people for employment in the computer industry. No major changes will be made in CDI's charter in the foreseeable future.
2. Emphasis is to be placed upon the training of both customer engineers and programmers in CDI. AIA will not be integrated into CDI in the foreseeable future and will offer services to train programmers on a revenue producing basis.
3. While the current thinking is to continue CE and programmer training at the trade school level, as the primary scope of CDI, the following areas are of interest with respect to future planning:
  - a. Management training in the use and understanding of computers similar to IBM schools which are on a revenue producing basis. IAT will also do similar work and, in addition, provide seminars on a paid



## VII. ADMINISTRATIVE OBJECTIVES AND STRATEGY

A. Control Data Institute3. a. {continued}

basis in areas of advanced technology. Internal CDC management training is the responsibility of the Corporate Personnel Organization, and should be considered only to the extent techniques can be shared with CDI.

- b. Home study programs in the computer field, at the trade school level, should be planned for.
  - c. Plans should be made to provide higher level programmer-analyst training for CDI trade level training graduates and graduates of the universities and colleges who wish to pursue this kind of work as a profession.
  - d. Government supported training of minority and unemployed groups will be considered and sought on a contract basis.
  - e. Technical training for salesmen.
  - f. No future plans should be made to orient CDI to achieve a degree-granting level even though the above implies some areas of advanced training.
- 4. The next fiscal year should be spent primarily in getting present institutes into efficient and profitable operation, and planning for the location and timing for new centers as appropriate. No plans should be made to open new institutes during the next fiscal year beyond the one now approved with the possible exception of acquisitions if they become available. Expansion of existing institutes and plans for new ones should be made beyond FY 69.
  - 5. Government supported work should be sought only where contracts or programs are in line with CDI's primary objectives of profitable training for trade school level maintenance and programming personnel.
  - 6. CDI should consider the use of computer aided instruction as appropriate to profitable operation where applicable, but not as a responsibility for development of the application for other purposes.
  - 7. Projections for Control Data Institutes including both manpower and facilities requirements are a division responsibility, the information required for corporate facilities and manpower plans should be sought from the divisions as it relates to training needs of those divisions.

## VII. ADMINISTRATIVE OBJECTIVES AND STRATEGY

B. Personnel and Facilities

1. The Vice President of Administration and Personnel is responsible for preparing long range plans annually as a supplement to the Corporate Long Range Plans, using as a basis the product line plans and the plans of operating groups.

The following table indicates order of magnitude facility and manpower projections based on the financial objectives contained in this plan for use until more definitive projections and plans for meeting the manpower and facilities requirements are made.

End of Year	FY68	FY69	FY70	FY71	FY72	FY73
Manpower * X000	21.5	28.6	35.3	44.8	59.5	75.0
Facilities ** {sq. ft. X000,000}	4.3	5.7	7.6	8.8	11.8	15.0

- \* assuming \$16,500 revenues per employee in thousands of employees  
 \*\* assuming 200 sq. ft. per employee in millions of square feet

2. During the next fiscal year emphasis should be directed toward using present plant facilities more efficiently. No more feeder plants, either in Minnesota or elsewhere, should be planned for the next two years. During the next two years at least three potential future plant sites should be surveyed to be ready for expansion. The need to consider transplanting or developing skills and specialists in geographical areas, other than the Twin Cities, must be considered part of the planning. The goal for optimum plant size should be 1500 employees with a maximum of 2000.
3. It is difficult to provide guidelines for optimum plant size which are applicable in all circumstances. The previous policy of planning to limit growth at approximately 10,000 employees in the Twin Cities area is still valid.
4. We must decide and make plans and establish policies as to the degree of the social problems Control Data is willing to take on. This is particularly important with respect to the choice of areas for locating new plant sites. The advantages and disadvantages of both under-developed and suburban areas should be considered in planning for new plant locations.

C. Philosophies for Salaries and Benefits

We will continue to plan to be competitive with respect to salaries and benefits in total, and these programs continue to be reviewed



## VII. ADMINISTRATIVE OBJECTIVES AND STRATEGY

C. Philosophies for Salaries and Benefits {continued}

on an annual basis. The following are guidelines for planning in the future:

1. We will study the advantages of changing our compensation philosophy from at or above the market to leading the market as it affects turnover rates and the ease and reduced cost of recruiting personnel. Specific changes are suggested in some salaries in the Customer Engineering Organization. Action should be limited to the best people, and the possibility for incentive type benefits should be considered.
2. The relationship of our retirement plan to our overall benefit plan should continually be reviewed in light of the new Corporate Long Range Plans.
3. Organizational planning is the responsibility of line management. Top management will establish organizational concepts. Corporate Administration and Personnel will provide consultation recommendations, and will arrange for approval of organization changes with respect to conflicts and overlapping authority and responsibility.

## VIII. INTERNATIONAL

Control Data is committed to being a worldwide company with integrated worldwide management for the major management functions of the corporation. Of the 57,600 computer systems estimated as installed as of the end of 1967, about 17,500 are outside the U.S. This international market is growing more rapidly than the domestic market {25% to 30% compared to 15% to 20% per year} and potentially will continue in an effort to catch up technologically and economically. The major part of the market is for medium and small systems {with the exception of France}.

It is Control Data's objective to continue growth in the international markets at least equal to the market growth. The U.S. governments policy to restrict foreign investments to 65% of the average of the years 1960 to 1965 severely limits CDC's financial support of overseas subsidiaries. Plans must, therefore, be made to obtain financing overseas adequate for growth and commensurate profitability. Except for France and special opportunities, the major market is expected to be for medium sized computers. Plans should be made to establish systems and support in key locations to meet these market needs. The follow-on MPL will provide means for accelerating this market in the 1972-73 era building on the base now established and being built in the next two to three years. The major strategy is then to establish a firm, profitable base for future exploitation.

IX. CONTROL DATA PLANS

The planning function in Control Data provides one of the primary means for implementing the concept of participative management. By means of the corporate plans top management's objectives and strategy are communicated to the General Manager level where in turn applicable portions

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IX. CONTROL DATA PLANS {continued}

are to be communicated to the Director and Manager level of management. As a result, detailed plans are developed by the responsible management at the level responsible for implementing the plans both to obtain approval for operations over the next fiscal period via operating plans for the fiscal year, and to provide an input to corporate plans by means of division, staff and service organization long range plans, and mission plans. The Policies and Procedures for Planning {1:14:00} have recently been revised to provide a system of plans that reflects participative management principles, and provides feedback between the levels of management.

The system of corporate plans provides an integrated set of plans by organizational structure on a fiscal year cycle, and in addition, provides for mission plans to be incorporated in the system and the cycle. Mission plans provide means for looking at all aspects of a particular mission throughout the company such as market area and product line plans. The following points are presented in an effort to clear up questions about some of the administrative aspects of our plans:

A. Control and Review of Plans

By definition, plans in Control Data Corporation provide guidelines, direction and means for approval for programs or projects in accordance with the intent stated in the plans. Relatively small deviations are anticipated in the routine conduct in the day-to-day business. Plans will not be rewritten or revised except on the established schedule, or by specific direction of cognizant management.

Major changes in direction from the approved plans will be documented and approved as a deviation from the plans. It is not necessary to update or revise fiscal year operating plans as provided in the Planning Book, except by addendum for the December meeting. Then only major changes will be considered. An example of an appropriate update would be the addition and/or deletion of R&D projects which have been initiated or redirected in the period since the plan was written.

It is a management responsibility to review operations according to the plans on a routine basis. Operating plans and product line plans are now reviewed on a monthly basis and changes communicated by the responsible personnel. In the future product line plans will be completed by September 15 with a major revision on March 15. Deviations from the initial plan between completion and revision dates will be documented and approved as a result of the monthly reviews, and made an addendum to the plan.

Corporate Development will provide a central point of coordination and control for all mission plans to assure minimum duplication of effort, adequacy of plans, report plan schedules, and determine if plans are in accordance with Corporate Objectives and Strategy.

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IX. CONTROL DATA PLANSB. Relationship of Market and Product Line Plans

1. The corporate plans will be the basis for next year's short range product line plans. Financial Objectives in Corporate, Marketing, Operations, and Product Line Plans must be in agreement and differences reconciled.
2. Product line plans have two prime purposes:
  - a. To show the present product line development status by means of consolidating division operating plans and applicable extensions of established programs.
  - b. To provide short range detailed future direction and long range direction in terms of the broad needs required to meet corporate objectives. The product line plans will be used as a basis for establishing both all related product developments and manufacturing cost targets. The direction for industry and applications emphasis will come from the marketing section of product line plans. Marketing plans will be formalized and definitive so that they may be used both for direction of the field sales effort and as an input for future hardware and software developments. Integration of the market plans into product line plans is considered a part of the product line planning responsibility with the coordination and concurrence of marketing. Product line plans will be reviewed and revised on a continual basis in order to ensure that the intent of the plan is being met.
3. Corporate Planning will be responsible for maintaining a file of all current, approved plans down to the division level, for the timely reporting of progress in the development of plans, and for planning coordination.

C. Use of This Corporate Long Range Plan

The Corporate Objectives and Strategy for five years {FY 69-73} has two major uses:

1. To forecast the results of operating according to the FY 69 Corporate Objectives and Strategy as an input to the final preparation of operating plans and budgets for FY 69. The forecast is valuable in evaluating the shorter range plan and assessing the impact that is actual and implied commitments have.
2. To provide direction for the development of long range plans by division, service and staff organizations.

Copies of this plan in complete form will be distributed only to a limited number of members of top management who are in turn responsible for communicating applicable portions to the general management under their direction. The critical nature of balancing

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IX. CONTROL DATA PLANS

C. Use of This Corporate Long Range Plan {continued}

the "need to know" with the implications of improper disclosure, purposefully or accidentally, outside the company, must be properly considered in communicating this information.

X. FINANCIAL OBJECTIVES

To be distributed on April 1, 1968.