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1371/1372 REMOTE/LOCAL CONTROLLER BUSINESS PLAN

COMMUNICATIONS GROUP
MEMOREX CORPORATION

1371/1372 TERMINAL CONTROLLERS

BUSINESS PLAN

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1. MANAGEMENT OVERVIEW

The Memorex 1371 and 1372 are terminal controllers which provide the communication link and message control to allow multiple terminals (either display stations or printers) to connect to an IBM S/360 or S/370 through a single access port. In the 1371 remote controller, the access is via a telecommunciations line. In the 1372 local controller, the access is via an IBM local channel. Additionally, the 1371 will connect to an IBM System 3 in a remote manner. The 1371 and 1372 are functional replacements for the IBM 3271 and 3272, respectively and will support as attached devices the Memorex 1377, 2089, and 2087 and the IBM 3277, 3289, 3286, 3287, and 3288. The 1371 and 1372, designed and built by Trivex, Inc., are purchased by Memorex on an OEM basis.

The 1371 and 1372 will be sold into the same market in which the 1377 has experienced such rapid success. This market, which is a subset of the Editing CRT Terminal market, is growing at an annual rate of 25% (conservative) with a currently installed base in the U.S. of 375,600 display stations and printers with a total value of \$1.6 billion. The controller segment of this market consists of an additional 42,000 units with an approximate value of \$336 million. Competition is coming from a number of different vendors with varied backgrounds and strengths.

Memorex market strategy is to use the 1371 and 1372 as bridge products to secure a foothold in the full line 3270 terminal system market until we can deliver the future Memorex-built controller products - the 2074 and 2076 - in 3Q79. The marketing strategy for the 1371 and 1372 is to use the leverage of the 1377 success, of the 2089 introduction, and the superior Memorex distribution and service organizations to capture 1.3% of the controller market by 1980. 1371 and 1372 will also provide leverage for further 1377 and 2089 sales activity.

Product activity as of September 1, 1978, includes 88 1371s and 77 1372s shipped with a backlog of 189 1371s and 129 1372s pending. As of this same date, 40 domestic cities have been opened by Field Engineering for supporting the products. It is planned that 80% of all Memorex service branches will be activated by the end of 1979.

Sales, Service, Engineering, Manufacturing, and Quality Assurance organizations have all prepared and submitted plans for continued support of the products. As the 1371 and 1372 are manufactured by Trivex, Inc., it has been generally assumed that drop shipping to Memorex customers directly from Trivex, as opposed to shipping from the Cupertino facility, would be more advantageous.

To better help management evaluate this prospect, a dual nature business plan will be presented. Financial results based on a "drop ship" plan or "not drop ship" plan will be presented side by side.

The total financial results for the Memorex ship program over a ten-year period show revenue, profit, and cash of \$17.3 million, \$2.5 million, and \$2.5 million, respectively. The maximum cumulative negative cash exposure of \$1.7 million occurs in 3rd quarter 1979. The ROI of the programs is 23.0%. The total financial results of the drop ship program over the same ten-year period show revenue, profit, and cash of \$17.3 million, \$2.4 million, and \$2.3 million, respectively. The maximum cumulative negative cash exposure and the timing are \$1.7 million and 3rd quarter 1979, respectively, the same as the Memorex-ship program. The drop ship ROI is 22.6%.

The major risks faced by Memorex in executing this program include the single source nature of the product and dependence on the success of the 1377 and 2089 programs. Also, IBM's new line of 3270 systems (i.e., 3274, 3276, and 3278) will negatively impact the market for the "older" family (i.e., 3271, 3272, and 3277).

Finally, the timely introduction of the Memorex 2074 and 2076 in 3Q79 will have an inhibiting effect on 1371 and 1372 sales activity. These risks have been considered in the financial forecast.

2. PRODUCT

The 1371 and 1372 controllers are discussed in this section in terms of their basic functional specifications, structure and organization, product compatibility, life cycle, product family relationships, and other considerations.

BASIC FUNCTIONAL SPECIFICATION

The 1371 and 1372 are functional replacements for the IBM 3271 and 3272 respectively. As such, they are charged with the function of executing commands and orders originating from the application program in the host CPU.

There are four types of commands executed by a controller:

- 1. Write commands, which are used to transfer data and orders from the host CPU to the terminals attached to the controller.
- 2. Read commands which transfer display station buffer data, keyboard key data and for 1371's only, status information.
- 3. Control commands, which cause certain printer or display station operations.
- 4. Sense command, for 1372's only, which transfers to the host CPU a byte of sense data that reflects certain device control or check conditions.

There are two types of orders available. One type is executed as it is received by the controller and is used to position, define, and format data being written into a storage buffer, to erase certain types of data in the buffer and to reposition the display cursor. The second type are print format orders which are initially stored in the buffer as data and executed only during a print operation.

Another major function of the 1371 and 1372 is to maintain the integrity of the communications protocol. In the 1371 remote controller the only protocol supported is IBM's Bisynchronous Communication (BSC) protocol. (Synchronous Data Link Control (SDLC) protocol is not supported on the 1371.) In the 1372 Local Controller, IBM 360/370 channel protocol is observed.

As the 1371 and 1372 must complement the 1377, only the 1920 character buffer models (equivalent to the IBM 3271 Model 2 and 3272 Model 2) are supported.

Other exceptions to total IBM feature compatibility are two features which are not supported by the 1371 and 1372:

- 1. The Extender Character Set/APL feature (not supported by the 1377).
- 2. ASCII transmission code (only EBCDIC is supported).

Enhancement features beyond those required for IBM compatibility are three:

- 1. Diagnostic programs are resident within the 1371 and 1372 for fault detection and isolation. The controllers will not go on-line after power up until the initial diagnostic program has cycled successfully.
- Other internal programs which supply a variety of status information on all devices connected to the controllers and on 1371/line and 1372/channel communications. This information can be called from the host CPU or from any display station attached to the controller.
- 3. Local Display Print capability wherein the 1371 and 1372, in conjunction with the Memorex 1377 display station, will allow the display station operator to print the contents of the display buffer without host CPU intervention. The operator may request the output to appear on the first available printer with a higher port number (Priority Print) or assign it to a particular printer attached to the same controller (Assign Print).

1371/1372 STRUCTURE AND ORGANIZATION

In hardware terms, the 1371 and 1372 both consist of a metal frame with top and side panels, a power supply, a backplane with a card cage, a control panel, and four or five types of printed circuit boards. They are:

- 1. A processor board with program storage for execution of commands and orders and other processor tasks.
- 2. A buffer memory board which stores messages going between the host CPU and the devices connected to the controller.
- 3. A communications interface board (a remote interface for the 1371 and a local interface for the 1372).
- 4. A device adapter controller board which controls the transfer of data between the controller and its attached devices.
- A device adapter expander board which allows additional devices to be attached (optional).

The basic 1371 and 1372 with only the required device adapter controller board can support the attachment of up to eight devices. Additional devices may be attached by adding a device adapter expander board which allows the connection of eight additional devices. Three expander boards can be added for a maximum of 32 devices supported by each 1371 or 1372 controller. Devices are connected to the controller by a coaxial cable which may be up to 2000 feet in length.

PRODUCT COMPATIBILITY

The 1371 is line interface compatible with the IBM 3271 - Model 2. The 1372 is channel interface compatible with the IBM 3272 - Model 2. Both the 1371 and 1372 are device interface compatible with the Memorex 1377 display station and 2089 printer and the IBM 3277 display station, 3284 printer, 3286 printer, 3287 printer and 3288 printer. Memorex will not support the connection of other independent IBM-compatible devices.

LIFE CYCLE

The 1371 is projected to have a revenue life of 5.5 years and the 1372, 6.5 years. The difference is based on the more stable environment of the 1372 local controller vs. the more dynamic and competitive nature of that of the 1371 remote controller. The introduction of the 2074 and 2076 will contribute to the relative shortness of the products' lives.

PRODUCT FAMILY RELATIONSHIPS

The product family relationships of the 1371 and 1372 are discussed in this section relative to both current and future products.

Relationship to Current Products

- 1. 1377: The 1371 and 1372 are products to which the 1377 attaches. All inhabit the same market.
- 2. 2089: Same as above.
- 3. 1270: The 1371 represents the Memorex's presence "on the other end of the line." Although they exist in separate markets, the units offer complementary support to one another.
- 4. 1380: Same as above.

RELATIONSHIP TO FUTURE PRODUCTS 1371 and 1372 are

- 1. 2074: Although the 2074 is incompatible, for all practical purposes, with the 1371/1372 they provide a vital bridge for the 2074 by establishing a Memorex presence in the controller market.
- 2. 2076: Same as above:
- 3. 2078: If the 2078 is equipped with a "B" type interface as currently planned, it will be compatible with the 1371 and 1372 and be sold in the same market.
- 4. 2087: Same as above.

OTHER CONSIDERATIONS

The design of the 1371 and 1372, along with the hardware and software to implement it, are the sole proprietary property of Trivex, Inc. Memorex has no access to the schematic drawings or firmware code and can consequently make very limited modifications of the products. It is understood, therefore, that no RPQ's will be processed.

Memorex's choice of Trivex, Inc., as the sole vendor of the 1371 and 1372 is based upon the fact that Trivex was the only vendor that could supply both a remote controller and a local controller which were 1377 compatible within the time frame and in the quantities deemed necessary by Memorex. As the products are viewed as required for Memorex market position and as a bridge to future products, this decision is deemed justifiable.

3. MARKET

The market for the 1371 and 1372 Terminal Controllers is discussed in this section in terms of background, the market, its growth and the competition that will be faced.

BACKGROUND

The 1371 and 1372 are the first Terminal Controller Products in the Communication Group's strategy to fully penetrate the IBM 3270 Terminal System market.

This market consists of three segments: Displays, Printers, and Controllers. According to the International Data Corporation (IDC) report on the data communications equipment market of August 1977, the size and value of the market segments are as shown in Table 3.1.

In May 1977, IBM announced a new line of display stations, printers, and controllers for 3270 family. These products offer advanced user features, a lower display station price and future oriented communications capabilities (SNA/SDLC Support). They are generally incompatible with the older line of products. (The "new" 3274 controller can support a limited number of "old" display stations and printers, however).

The 1371 and 1372 will not be competing in this "new" unestablished sub-market. It will be up to the 2074 and 2076 to maintain a Memorex presence there. Instead, the 1371 and 1372 will rely on the established "old" 3270 compatible market.

GROWTH

According to IDC's August 1977 report the 3270 compatible terminal market is growing at a rate of 30% per year. It is estimated that the arrival of the "new" IBM line of products will account for no more than 5% of that growth for the new unit shipment life of the 1371 and 1372 (i.e, 1978 and 1979).

COMPETITION

Competition in the IBM 3270 compatible terminal market consists of system vendors and plug-compatible vendors. System vendors are those who provide controllers and device systems which are 3270 compatible only at the controller-to-communications interface, but not the controller-to-device interface. Plug-compatible vendors are IBM 3270 compatible at both interfaces.

Within the system vendors sub-market are two types of systems. Those that are designed to be exclusively IBM 3270 compatible and those that are intelligent, user programmable distributed processing systems which also emulate the 3270 system. The latter, represented by Four Phase, Raytheon, Incotern, (Honeywell) and Harris are not considered in further analysis as they compete in a fundamentally different market place than the 1371 and 1372. They have also not been considered in the market sizing of the above discussion.

IBM 3270 compatible controllers are fundamentally the same in terms of features. Self-diagnostics and maximum device attachability are notable exceptions.

The competition faced by the 1371 and 1372 is summarized in Table 3.2.

SEGMENT	#UNITS INSTALLED	VALUE IN \$M
DISPLAY STATIONS	342,000	1,368
PRINTERS	33,600	235
CONTROLLERS	42,000	336

TABLE 3.1 IBM 3270 - COMPATIBLE TERMINAL INSTALLED BASE - 1978

TABLE 3.2 - MPETITION

VENDOR	CONTROLLER	REMOTE/ LOCAL	BSC/ SDLC	MAX. ATTACH. DEVICES	SELF-DIAG.
IBM*	3271 3276 3274-1C 3272 3274-1B	R R R L	Both Both Both	32 8 32 32 32	No Std. Std. No Std.
COURIER	2710 2711 2721 7601 7611	R R L R R/L	Both Both Both Both	8 32 32 8 32	Std. Std. Std. Std. Std. Std.
TELEX/TCI	TC271 TC272	R L	Both -	32 32	No Z local is ve No S IBM controller
COMPUTER OPTICS	7271 7272	R L	Both	32 32	Opt. Opt.
GTE	IS/7801 IS/7802 IS/7801 A	R L R	BSC BSC	26 26 5	No No No
SYCOR	291 292 296	R L R	Both Both	16 16 8	Std. Std. Std.
TTY	40/4	R	BSC	24	Std.
TRIVEX*	712 722 712M	R L R	BSC BSC	32 32 8	Std. Std.

^{*}PLUG COMPATIBLE VENDORS

4. MARKETING STRATEGY

The marketing strategy for the 1371 and 1372 is discussed in this section in terms of marketing objectives, marketing share/shipment forecast, pricing andproduct allocation.

MARKETING OBJECTIVES

There are five key marketing objectives:

- ı. Position for 2074 and 2076 controllers The 1371 and 1372 are transitional products which will allow Memorex to secure a foothold in the full line of IBM 3270 compatible system market. When the Memorexbuilt 2074 and 2076 are ready in 3Q79, the 1371 and 1372 will provide an installed base, an experienced sales and service force and an established presence in the market.
- 2. Exploit the family selling effort Controllers, display stations and printers are often sold together as a system. The 1377 and 2089 will aid in selling the 1371s and 1372 and conversely, the controllers will aid the display station and printer sales effort. Sales effort and expense per unit will be minimized.
- 3. Control existing accounts By providing a more complete product line through the offering of controllers, we aid the salesmen in account Anytime a competitor is proposing in markets where we lack products, we are vulnerable to his proposing the replacement of our installed products by using the "1" vendor concept.
- 4. Capture new accounts Many prospects view the product line completcan now offer to these potential users as complete a communications equipment line as there is in the industry. ness as a criterion of committment. With the 1270 and 1380, Memorex equipment line as there is in the industry. The combination of the very successful 1377, the high quality 2089 and 1371 and 1372 will greatly aid in new terminal account penetration.

5. Increase site AUP An additional objective is to increase site AUP. This will provide a direct benefit to both the customer and Memorex in terms of service, quality and sales coverage. The 1371 will augment the remote site AUP where 1377s and 2089s will be residents and 1372 will do the same for local (CPU) sites where 1270s, 1380s and LSS products are involved. project My

MARKET SHARE/SHIPMENT FORECAST

The forecast of the 1371 and 1372 terminal controllers is based on the actual number of units orderd from Trivex for the new units shipment life of the product.

The 1371 and 1372 market share/shipment forecast is shown in Table 4.1.

PRICING

The pricing strategy in the 3270 market is to base the price of the 1371 and 1372 relative to IBM's equivalent offerings while being sensitive to supply and demand considerations. Currently, the demand has pushed Memorex to the high side of IBM. The 1371 and 1372 pricing is shown in Table 4.2.

PRODUCT ALLOCATIONS

The general product allocations for the 1371 and 1372 are shown Table 4.3.

	1978	1979
MARKET SIZE	42,000	52,000
MEMOREX MARKET SHARE	1.1%	1.3%
MEMOREX UNIT SHIPMENTS	482	702

TABLE 4.1

MEMOREX MARKET SHARE/SHIPMENT FORECAST

	MAC	1 YR.	2 YR.	<u>3 YR.</u>	PURCHASE
<u>1371</u>	230	220	190	160	6050
3271	169	N/A	144	N/A	5240
% IBM	136%	-	132%	-	115%
3276*	135	N/A	114	N/A	5080
% IBM	170%	-	167%	-	119%
3274-1C	391	N/A	333	N/A	14790
% IBM	58%	-	57%	-	41%
<u>1372</u>	270	250	225	190	6800
3272	193	N/A	164	N/A	5970
% IBM	140%	-	137%	-	114%
3274-1B	4%	N/A	417	N/A	18770
% IBM	55%		54%	-	36%

^{* 3278} FUNCTION REMOVED

TABLE 4.2 1371 and 1372
LIST PRICES

	FOG	BSD	<u> A&A</u>	<u>EUMEA</u>
1371	69%	6%	25%	ø
1372	70%	ø	30%	Ø.

TABLE 4.3 PRODUCT ALLOCATION

5. SALES

BASIC ASSUMPTION

The Sales Plan requirements are predicated upon quality production models, competitive pricing and product availability commencing the second quarter 1978.

PRODUCT ANNOUNCEMENT

Marketing will provide Sales with a complete announcement package, ready for distribution by January 31, 1978. The product literature will include:

- 1. Product Overview cover sheet announcing the product and the plug compatible product to which it attaches and replaces.
- 2. Specification sheets describing the remote and the local controllers presented in a standard Memorex brochure format.
- 3. Sales Brochure quality brochure which describes the key features, functions and benefits of each model.
- 4. Marketing Guide a detailed guide to assist the Sales Representative in prospect identification, systems definition and the implementation of sales strategies.
- 5. Sales Manual Pages describes and identifies standard features, optional features and pricing schedules for both models.

PRODUCT SALES AIDS

Marketing will provide Sales with the following sales literature and sales aids:

Sales Literature

- 1. Sales Brochure listed above.
- 2. Specification Sheet listed above.
- 3. Product Description Manual to describe the functions operations and diagnostics of the remote and local controllers.
- 4. Sales manual pages listed above.
- 5. Installation and Maintenance Manual for use by Field Engineering for proper installation and maintenance of both controllers.

Sales Aids

- 1. Slide Presentation 35mm slides and script which will be combined with the current 1377/2089 slide presentation located in each regional office.
- 2. Desk Size Flip Charts to be combined with the 1377/2089 flip chart pages for a complete terminal products systems presentation.
- 3. Special Product Staffing by regional 1377 Customer Support Representatives.

STATUS

Although the product literature package sales aids was not complete at announcement time, market demand was such that sales goals were exceeded for 1978.

SALES TRAINING PROGRAM

The Sales Training Program will consist of:

- 1. Product definition and specification availability.
- 2. Communications Systems Concepts Course.
- 3. Total Terminal System Products Concepts.
- 4. Target Plug Compatible Market (PCM).
- 5. Competitive analysis of IBM target products, detail feature, functions and benefits over competition.
- 6. Selling strategy over IBM.
- 7. Product announcement will be made by regional field representatives using literature supplied by Product Sales.
- 8. The 1371/72 controllers will be incorporated into the present sales education programs.
- 9. Customer Support Representative Product Training scheduled for early second quarter, 1978.

STATUS

FOG sales education now has the manpower resources to provide the above key information in class education.

CUSTOMER ALLOCATION PLAN

- Initial quality production units will be assigned delivery priorities based upon:
 - A. IBM replacement versus new system
 - B. Regional priority authorization
 - C. Revenue criteria
- 2. Any customer delivery conflicts will be resolved by cognizant Field Sales Management and/or Headquarters Sales Support (FOG).

CITY OPENING SCHEDULE

The schedule for city openings will be predicated upon the following criteria:

- 1. Early production shipments will be targeted to installed 1377 base and major cities during 1978.
- 2. The balance of the shipments will be targeted to existing 1377 customer sites in zone A maintenance locations.

- 3. The number of service and sell locations opened during 1978 are predicated on the following assumptions:
- A.
- Fully trained Field Engineering support
 Three units of any mix required to open a service location.
- All sales locations will support the 1377 and 1372 controllers. 4.

1371 CITY OPENING SERVICE LOCATIONS

1.	San Francisco	12.	Detroit	23.	Richmond
2.	Los Angeles	13.	Lansing	24.	Philadelphia
3.	Dallas	14.	Columbus		Manhattan
4.	Houston	15.	Indianapolis	26.	Long Island
5.	Riverside	16.	Jacksonville		Greenwich
6.	South Bend	17.	Atlanta	28.	East Hartford
7.	Chicago North	18.	Pittsburgh		Boston
8.	Chicago South	19.	Akron		Providence
	Milwaukee	20.	Newburg		Portland
10.	Peoria		Washington, Federal		Spartanburg
11.	Kansas City		Washington, D.C.		

1372 CITY OPENING SERVICE LOCATIONS

1.	San Francisco 1).	Chicago North	19.	Washington, Federal
2.	Santa Clara I	l.	Chicago North		Manhattan
3.	Denver 1	2.	Milwaukee	21.	Long Island
4.	Los Angeles 1	3.	Omaha		Boston
5.	Dallas 1	ł.	Detroit	23.	Providence
6.	Houston 1.	5.	Lansing	24.	Portland
7.	Toledo 1	5.	Birmingham	25.	Charlotte
8.	South Bend 1	7.	Jacksonville	26.	Philadelphia
9.	Dayton 1	3.	Pittsburgh		•

- A. In addition to the above 38 listed cities, 58 more service locations will be opened during 1978 as additional 1377/2089 sales are received.
- B. Based upon the 1371/1372 sales forecast, the number of cities and service locations to be opened during 1978 are as follows:

1978 CITY OPENING SUMMARY

LOCATIONS		<u>A</u>	M	<u>J</u>	<u>J</u>	<u>A</u>	<u>s</u>	<u>o</u>	<u>N</u>	<u>D</u>	TOTAL
Service											
	1371 1372	12 8	9 6	9 6	5 4	5 4	5 2	5 2	5 2	5 2	60 36
Cumulative With Overlap		15	11	. 11	7	7	5	5	5	5	71
	1371 1372	10 6	10 4	5 4	5 3	5 3	5 3	5 3	5 3	5 3	55 32
Cumulative With Overlap		12	10	7	6	6	6	6	6	6	65

COMPENSATION PLAN STRUCTURE

- Sales Compensation for the 1371 and 1372 controllers is calculated on the current Factor X Revenue formula for lease, purchase and install transactions plus IB incentive.
- 2. No special compensation incentives are being considered at this time.

SALES FINANCIALS/FORECAST

Sales Expenses - are 10% of revenue for the periods indicated in the financial analysis section. With no capital assets being required, the order forecast committed to by EPG Sales is depicted below.

1978/1979 SALES FORECAST*

1978			1979				
	2 QTR	3 QTR	4 QTR	1 QTR	2QTR	3 QTR	4 QTR
1371	27	. 51	76	107	84	-	
1372	24	55	69	94	95	22	_

FORECAST SUMMARY

	1978	1979	TOTAL
1371	154	191	345
1372	148	211	359
			
COMBINED TOTAL	302	402	704

^{*}Forecast 1371, 1372, and 1377 availability driven.

SALES SUMMARY

Major risks associated with the 1371/1372 controller program involves product availability from Trivex, competitive pricing, product quality, IBM actions and other competitive actions.

1. Product Quality - must meet high Memorex standards at installation and continue to perform at a level equal to IBM's.

- 2. IBM Actions it must be anticipated that IBM will actively respond to erosion of customer revenue. As a result, IBM can be expected to:
 - A. Increase customer protect strategies.
 - B. Respond with price reductions if 3271/72 controller base is significantly impacted.
 - C. IBM will offer 3 year contracts to keep 327X devices installed.
- 3. Other Competitors Actions:
 - A. Aggressively pursue systems business. Delivery lead time is extremely critical.
 - B. Undercut IBM pricing schedule to successfully penetrate IBM's customer base.
 - C. Fight for their share of an expandable market demand.
- 4. The announcements and availability of the new 2074, 2076 and 2078 product line will impact the pricing/revenue of the 1371/1372 products in 1979, in those cases of lease renewal and new business. The expected erosion will be approxmiately 20% to 30% of the current list price.

MAJOR ASSUMPTIONS/DEPENDENCIES

Memorex must devote valuable resources to insure the early success of the 1371/1372 controllers in the US marketplace. It is assumed that the essential engineering, manufacturing, sales and service resources will be provided on a dedicated and timely basis to achieve early market penetration and acceptance. In order for the Sales organization to meet the budget goals, the following assumptions/dependencies apply:

- 1. The eventual success of the 1371/72 program will depend upon availability of 1377's. If 1377 deliveries exceed 120 days, late deliveries will impact the forecast for 137X products.
- 2. Attain complete specified test objectives in pre-production models.
- 3. Receive early product acceptance from targeted 1377/2089 base.
- 4. Availability of sales aids and literature at time of the product announcement.
- 5. Train CSR Sales and Service personnel to successfully sell and install into the IBM customer base and counter IBM strategies.
- 6. Have minimal product problems and where problems do exist, resolve these situations quickly and on a priority basis.
- 7. Quickly establish a credible controller reputation and position in the market.
- Meet sales revenue and profit goals.

It must be re-emphasized that the continuing success of the 1371 and 1372 products during 1979 is predicated upon reasonable product availability. Reasonable means 60 day delivery. Also of major importance is the availability of the Memorex devices which attach to the 1371 and 1372, i.e. the 1377 and 2089. As they are often sold together. The interdependence of sales efforts can not be overlooked.

MAJOR MILESTONES

Meeting or exceeding major milestones will contribute significantly to the early success of the 1371/1372 controller program. These milestones include:

- 1. Conducting initial Sales/Service Training classes 1 QTR 1978 with all required sales literature and aids available.
- 2. Offer competitive pricing schedule.
- Secure orders to support forecast 2 QTR.
- 4. Respond effectively to customer problems, particularly with initial product shipments with a coordinated feedback system.

6. SYSTEMS ENGINEERING

BASIC ASSUMPTIONS

- 1. Standard support items are the only ones listed, as billable S.E. Services are not a burden to the program. Billable Services are revenue producing.
- 2. There will be minimal activity in new users at a central CPU site, therefore little S.E. involvement will take place. Most new business will occur at the remote site, where there are few software considerations.
- 3. S.E. time will be part of the 10% cost of sales.

SYSTEMS ENGINEERING TRAINING PROGRAM

The S.E. Training Program will consist of the following:

- 1. Continuing S.E. Education.
- 2. IBM's 3270 Operation and Design Independent Study Program.
- 3. IBM 3270 reference manuals.
- 4. IBM classes applicable to 3270 systems, access methods, and operating systems.
- Configuration examples.
- 6. Competitive equipment analysis of IBM target products, detail feature, functions, and benefits over competition.
- 7. Manuals, specification sheets, sales pages, and any flashes will be made available to S.E.'s.
- 8. Complete hardware training will be given to S.E.'s

STANDARD S.E. SUPPORT

The following are standard or optional areas of support available to our sales persons or our customers, when needed.

- 1. Proposal Process
- 2. Order Assurance
- 3. <u>Installation Planning</u> May include working with Field Engineering on unit location, power cables, modems, etc.
- 4. <u>Consultation</u> includes any non-billable customer education, sysgen, application, and reference material consultation.
- Participate in Equipment Selection This is an optional area of support and is done at the discretion of the S.E. and salesperson.

New business (first time users) could use the S.E. in all of the above functions.

Add-on business may use the S.E. on a consulting basis working during the install cycle.

Replacement business should not use any S.E. support.

SYSTEMS ENGINEERING EXPOSURES

- 1. There will be an exposure in the area of application support. There will be one S.E. in each region who has expertise in this area.
- 2. There will also be an exposure in the area of access methods. This is now being addressed by sending S.E.'s in each region to IBM classes.

POSSIBLE UPPERS

- 1. Multiple unit sales in one customer location will decrease S.E. time involvement.
- 2. Education in 1270 and 1380 has already made the S.E. knowledgeable in some of these areas.

7. SERVICE

o Service Commonality with existing products

The 1371 and 1372 Controllers will provide a path to the Host for the 1377, 2087 and 2089. The 1372 resides on channel and is in an environment similar to the 1270 while the 1371 is in a terminal atmosphere, down-line from the 1270 or 1380.

o Major service advantages/disadvantages versus competition

The product family of 1371, 1372, 1377, 2087, and 2089 will provide maximum exposure to every phase of a particular product environment. This exposure will increase our proficiency, giving us a clear service advantage over competition.

o Service Specifications

The following performance parameters are based on data received from Trivex and our own historical data base of performance on similar products (no travel).

	CI	<u>DCI</u>	<u>CM</u>
1371	.104	2.0	.208
1372	.073	2.0	.146

Geographic Support Plans

We are planning on opening at least 79 domestic service locations by year end 1979. A minimum 30 day notification will be necessary to open a service location. This 30 day notification should allow sufficient time to arrange workloads, complete training, and stock spares.

Spare Parts Plan

A spares complement has been identified for both the 1371 and the 1372. Redundant components will not be shipped when a service location opens for both products. Stock levels will be adjusted based on usage.

Service Training Plans

Training for the 1371 and 1372 will take place in the field. The course takes approximately two days to complete and contains three filmstrips, two audio cassettes, student and administrator guides, and manuals. The course is currently available to the Branch Offices.

o Service Financials

The Field Engineering total program (years 1978 thru 1982) average cost per unit per month is approximately:

1371 \$53.12

1372 \$45.03

o Service Summary

Major risks to the program include significant EC's that might impact spares on hand, premature decision to drop ship, and CI significantly greater than that projected in the Service Financials.

8. ENGINEERING

PRODUCTION DESCRIPTION

The 1371/1372 Display System Control Units will provide a physical and logical interface between an IBM 360/370 (or equivalent) or IBM System/3 (via a BSC line) and the family of IBM clustered 3270 display stations and printers, and their Memorex counterparts which require the IBM 3270 type "B" device adapter and a buffer size of 1920 characters or less. The 1371 will be the remote version, predominately utilizing transmission lines and modems, while the 1372 will be the local version, utilizing direct cable connection to the mainframe selector or block multiplexor channel.

The 1371 and 1372 Control Units are required to be a cost-effective functional equivalent to their IBM counterparts, the 3271 Model 2 and 3272 Model 2, respectively.

Exceptions to functional equivalence are specified below:

- 1. The basic 1371 and 1372 will support eight (8) devices. A maximum of three (3) device adapters, each of which will support eight (8) devices will be addable.
- 2. The standard line interface of the 1371 will support both 1200 BPS internally clocked and 1200 to 19.2K BPS externally clocked communications. No options will be required.
- 3. The Extended Character Set feature for APL and Text programs will not be supported by the 1371 and 1372.
- 4. The 1372 will support the copy feature as specified for the IBM 3271.
- 5. The 1371 and 1372, in conjunction with the Memorex 1377 Display Station, will support a Local Display Print feature which will allow the display station operator to print the contents of the display buffer without host intervention. The operator may request the output to appear on the first available printer with higher port number (Priority Print) or assign it to a particular printer attached to the same controller (Assign Print).
- 6. The 1371 and 1372 will provide self-contained diagnostic capability for off-line self test and fault isolation. also the units will provide status information concerning themselves and the other clustered devices while in on-line mode.
- 7. The 1371 will not support ASCII transmission code, or SDLC.

In all other respects, the 1371 and 1372 are to be functionally equivalent to the IBM Model 2 as specified in the "IBM 3270 Information Display System Component Description."

PRODUCT LINE CAPABILITY

The introduction of the 1371 and 1372 Display system Control Units serve to unify the 1377 and 2089 into one complementary product line. Also they will serve as a bridge to more advanced controllers planned for the future in developing full coverage of the IBM 3270-compatible market. It will provide the following benefits:

- Enhance the prospects of 1377 and 2089 sales.
- 0 Provide current 1371 and 2089 users the possibility of one vendor terminal system support.
- Aid in opening the door for Memorex peripheral equipment sales.
- Provide a bridge to the marketing of more advanced Memorex-produced
- Help establish Memorex as a full-line, full-time communications equipment 0 vendor.

ADDITIONAL COMMENTS

Both 1371 and 1372 will be U.L. approved. Additionally, approval must be granted by CSA, TVDE, BSI and other foreign regulatory bodies. ARA Andulla Megan

HARDWARE ENVIRONMENT

The 1371 and 1372 must be entirely hardware compatible with the IBM 3271 Model 2 and the 3272 Model 2. Refer to the "IBM Information Display System Component Description" manual. Additionally, the Memorex 1377 and 2089, among other IBM 3277 and 328X "B" interface units, define the hardware environment.

SOFTWARE ENVIRONMENT

The 1371 and 1372 must be entirely software compatible with the IBM 3271 Model 2 and 3272 Model 2. Refer to the "IBM 3270 Information Display System Component Description" manual.

TECHNICAL DESCRIPTION

Refer to the "IBM Information Display System Description" manual.

PERFORMANCE REQUIREMENTS

Refer to the "IBM 3270 Information Display System Component Description" manual.

ENGINEERING FINANCIALS

The Engineering expenditures for the program totals \$253K with the following detail by year.

TABLE 1 ENGINEERING EXPENDITURES						
Yea	r	Volidation		on for Syst	for System 3	
Investment	1978	1979	1980	1981	1982	
Expense	123K	60K	30K	20K	20K	
Capital	NONE	NONE	NONE	NONE	NONE	

Basic Assumption: Engineering support extends through 1982 on this program, especially spares support and test.

RISKS

- 1. OEM Vendor offers exposure to MRX due its small financial size.
- 2. Vendor may not be able to require quantities of controllers.
- 3. Vendor may go out of business.
- 4. Vendor represents single source due to unique microcode.

TABLE 2 — ENGINEERING MILESTONES

MILESTONES

EVENT	DATE
Design Tested	1-78
Pre-Production Unit Installed	4-78
Product Release	5-78
FCS	5-78
IBM System 360/370 Design Compatibility Test Complete	7-78
System 3 Test Completed .	2-79

9. MANUFACTURING

Manufacturing Concept

The 1371/72 Terminal Controller will be an OEM product that may be drop shipped the scheduled date is open at this time. Manufacturing will support receiving, inspection, system test and configuration and shipment of the terminal controller to our customers. Final systems test and shipping shall be the only manufacturing efforts required to support the 1371/72 Terminal Controller.

Product Cost

As shown below, the 1371/72 product cost will total approximately \$3297/\$4235.00 per unit or \$4,388,594 total to support through 2nd Quarter 1979.

<u>ITEM</u>	<u>1371</u>	<u>1372</u>
D/L Hours/Unit 1371 - 2.4 D/L Hours/Unit 1372 - 2.8 D/L, QC, \$/Unit Material + 2% Frt (\$/Units) Overhead 280% TOTAL Actual 560	\$ 24.00 3206.00 67.00 \$ 3297.00	\$ 28.00 4129.00 78.00 \$ 4235.00

Manufacturing Financials

Start-up expenses include salaries and expensed equipment up to first customer shipments.

	<u>1978</u>	<u>1979</u>
Manufacturing Engr. Hours	612 Hrs.	936 Hrs.
Manufacturing Engr. Salaries	\$11,073.00	
Manufacturing Expense Tooling	-	•
Technician Training	2,597.00	•
Other Overhead Expenses	27,383.00	39,316.00
TOTAL	\$37,223.00	\$50,389.00

Capital Equipment

Initially, only test equipment required to support the 1371/72 Terminal Controller is as shown below:

*Includes Packaging Material

ITEM	COST	BUDGET YEAR
Test Aids	\$ 3,000	1978
Channel Exerciser	7,000	1978
EIA Exerciser	5,000	1978
Scopes & DVM's	10,000	1978
A/C Power Supply Tester	3,000	1978
Terminal Simulator	4,000	1978
Terminal Simulator	10,000	1979

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Power Requirements

All units tested at Cupertino will require 115V 60Hz, 208V 50/60Hz and 240V 50Hz.

Test Procedures

Test Procedures shall be generated and provided to Manufacturing by Test Engineering.

Packaging

The packaging for the 1371/72 Terminal Controller shall be designed to meet the testing defined in Corporate Standard CS-105 and 106 (transportability). Memorex shall reserve the right to test the packaging for compliance. The shipping packaging shall contain the standard Memorex logo and require international markings.

Manuals

All applicable service and operation manuals shall be supplied within the packaged unit.

Manufacturing Capacity

It is estimated that with the existing floor space will accommodate 25-1371/72 Terminal Controllers per week.

Spares/Field Return PCB's

Spares will be screened at the system level prior to shipment. All field return PCB's will be screened at the system level prior to returning to Trivex for repair.

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10. QUALITY ASSURANCE

FOREWORD

This outline is basically the least amount of "coverage" that Q.A. will strive for with each newly released product. However, for the Trivex, "A Catch-Up" situation exists, that precludes doing the job Q.A. insists on. The narrative explains the Trivex Q. A. plan in some detail.

I. PRODUCT DESCRIPTION

- A. Hardware
- B. Software
- C. Assumptions

II. QUALITY GOALS

- A. Insure Memorex Workmanship Standards.
- B. Provide Product Assurance consistant with MRX Total Quality System.
- C. Validate Vendor Quality with Q.A. Spec for Supplies (GC/QA3200).
- D. Insure product has been tested to conform with all Corporate Standards, (viz CS101-CS107).

III. DOCUMENTATION REQUIREMENTS (Not listed in order generated.)

- A. Product Functional Objectives/Product Requirement Statement.
- B. Product Build Quantities
 - 1. Proto Types
 - 2. Pre-Production Units
 - 3. Production quantities per month for greater than one year.
 - 4. Production quantities per year for life of product.
- C. Design Validation Test (DVT) Plan
- D. Acceptance Specs
 - 1. Final Electrical Acceptance Spec (FEAS) (5.7)
 - 2. Final Mechanical Acceptance Spec (FMAS) (5.7)
- E. Function, performance, and maintainability specs. (DP1028) (5.3)
- F. Product Validation Test (PVT) plan.
- G. Software Validation Test (SVT) plan.
- H. Beta Site Test plan

- I. Miscellaneous Drawings
 - Schematics, block diagrams, assembly drawings, artwork drawings,
 PCB assemblies....
 - Theory of operation, diagnostics, software listings....
- J. Draft Contract and Final Contract
- K. Procurement Specification and MFI (Machine Feature Index)
- L. Quality Assurance Business Plan (includes PVT, SVT, Expenses, Capital Eq., overview of Q.A. Plan/goals, pre-production product review, etc).
- IV. TASKS BEFORE FIRST CUSTOMER SHIP (FCS) (PA oversees that they "happen")
 - A. Surveys, Source Inspection Plans (Vendors, OEM Contractors)
 - B. Audit Quality Plan, generate reports
 - C. Reliability Studies, Maintainability Studies
 - D. RCVC Inspection Plan and Procedures
 - E. In Process Plan and Procedures
 - F. Manufacturing Assembly Plan and Procedures
 - G. Manufacturing Test Plan and Procedures (PCB, Assembly, Final)
 - H. Personnel Requirements
 - I. Test EQ Requirements -- M.E. Flowcharts, etc.
 - J. Floor Space Requirements
 - K. Design Reviews
 - L. Documentation Reviews (III above)
 - M. DVT
 - N. PVT
 - O. Software Validation Test
 - P. Beta Site Test
 - Q. Spares Plan
 - R. Corrective Action
 - S. Contract Review
 - T. Drop Shipment Consideration
 - U. Dual Sourcing
 - V. Investigate Training
 - W. Make or Buy Reviews

V. TASKS AFTER FCS

- A. Customer Audit
- B. Field Feedback Analysis
- C. Surveys of OEM Vendors, etc.
- D. Program Review
- E. (Drop Ship Considerations)

VI. PHASE OUT CONSIDERATIONS

- A. After last shipment what about "Final TST EQ?"
- B. Can future spares be Manufacturing by MRX, OEM?
- C. Do REFURB Centers handle spare repair after "Last Customer Ship."

VII. SCHEDULE OF ABOVE (SEE CHART I)

VIII. COSTS

- A. Expenses (Chart II)
- B. Capital (Chart III)
- C. Explanations

IX. RISKS AND SUMMARY

- A. Trivex shipments are becoming very poor quality and are requiring RTV (Return To Vendor) to the extreme that we cannot meet our shipments.
- B. Quality if we drop ship
 - 1. No CPU test
 - 2. No ESD test
 - 3. No HYPOT test
 - 4. No IBM compatibility auditing
 - 5. General quality control

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I. PRODUCT DESCRIPTION

- A. Hardware: The Trivex Company furnished Memorex with two products for our customers:
 - 1. 1371 A Remote Controller which is used between the "Host Computer" and up to 32 peripheral devices made up of MRX 1377 Display Terminals and 2089 Impact Printers. Between the controller and the Host is generally a telecommunications link (with modems) and a 1270 or 1380 at the Host location.
 - 2. 1372 A Local Controller which is the same as above except it is within 200° of and is directly connected to the Host, via Bus and Tag cables.
- B. Software: It is contained within both units and is totally controlled by Trivex, (as is the hardware). Memorex has been successful in having Trivex implement some changes to both.

C. Assumptions:

- 1. That Trivex will not drop ship.
- 2. That REFURB will be done in the Field (viz Philadelphia with Dallas and Chicago later).
- 3. See text for others.

II. QUALITY GOALS

- A. Trivex does not comply with MRX workmanship standards.
- B. The "Total Quality System" (TQS) has not yet been implemented for the Communications Group (CG). However, Trivex as an OEM doesn't comply with our TQ's.
- C. The Communications Group does have a released procedure number <u>CG/QA</u>
 3200 "Q.A. Spec for Suppliers," which must be followed for OEM, (as well as other contracts and purchases). This too cannot be complied with, as the Business Team formed "After the Fact."

III. DOCUMENTATION REQUIREMENTS

- A. "Product Requirement Statement" has been completed and approved.
- B. No Proto's or Pre-prod's planned. Capitalize for T.E., D.E., etc., (as per AFE's).
- C. No Validation Plan (a "Validation Plan" was agreed to, i.e., DVT and PVT combined). Presently doing an EMI (VDE) evaluation per (unreleased) plan.

- D. FEAS and FMAS are pending from D.E. (use IBM Spec's for reference).
- E. None of the Functional, performance or maintainability specs to be released (or written).
- F. PVT has been planned in a written document <u>but</u> hasn't gotten approval. The plan is to:
 - o Complete the PVT Plan.
 - o Complete the PVT reports of all tests completed.
 - o Review reports and sign off successful ones.
 - o Review reports and "disposition" failures.
- G. SVT has no plan, and would be futile as the contract wouldn't allow such a plan to have "any teeth." (Mascot has been moded to chk 1371/72.)
- H. Beta Site N/A (Almost 200 units now in customers' offices, domestically and in Canada and Australia.)
- I. Drawing:
 - 1. Original Manual is Trivex with Memorex cover, to be replaced with a Memorex publication.
 - No schematics or block diagrams can be released.
- J. No control of contract at this time.
- K. MFI's have been reviewed and released. A "corrected" release is pending.

IV. TASKS BEFORE FCS

- A. Surveys Have been made and Trivex is unacceptable, but they are improving, and discrepancies are being worked off. Customer Survey is due.
- B. Audit Plan Will be written by September 27.
- C. Reliability and Maintenance Studies have been made and will be released in a report by Development Engineering and/or P.A.
- D.-G. The Receiving Inspection, In Process, Manufacturing Assembly and Test Plans and Procedures are in place. If drop-ship consideration goes away, they will be refined for smoother flow and efficiency.
- H.-J. Personnel, test equipment and floor space, has been established.

 If drop ship is no longer considered, Manufacturing Engineering and
 Test Engineering will review these areas as in D to G above.
- K.-L. Design and Documentation Reviews Not/appl. with Trivex.

- M.,N.,DVT Is to be combined with PVT and is presently in the hands of Product Assurance. Meanwhile the tests go on per the rough (unreleased) draft of the VT, (Validation Test), Presently, we need corrective action for the failed packaging drop test and the failed ESD and EMI tests.
 - O. SVT Trivex controls the microcode. However, Mascot (diagnostic in the Host CPU) has been modified and has been reviewed by P.A. and T.E.
 - P. Beta Site Not/Applicable.
 - Q. Spare Plan Spares to the Field go through Manufacturing for "Test Bed" testing, including on-line tests. Spares returned from the Field are also to be routed through Manufacturing to "weed out" the approximately 50% good PCB's that come back with the bad.
 - R. Corrective Action Via Quality Engineering (viz Bruce Watts), Design Engineering (viz Jim Sorensen), and Purchasing (viz Jim O'Neill).
 (1) Trivex has authorized small changes to be done by us. (2) Other changes have been incorporated into Trivex's System. (3) A recent trip also accomplished further system improvements.
 - Contract Review None until "drop ship" accepted or until March 3, 1979.
 - T. Drop shipment is still being investigated, as per costs...it is about even. As per quality...it's a tremendous risk.
 - U. No dual sourcing is being considered. However, this product is to be replaced with MRX 2074/76.
 - V. Training has been accomplished. Further training can be obtained by using the "Field Engineers Tapes."
 - W. Make or Buy Buy Trivex then make 2074/76.

V. TASKS AFTER FCS

- A. Customer audits are pending, but have not been scheduled.
- B. Field feedback analysis has been received from Canada. Re: Damaged Shipments. Corrective action is underway.
- C. Surveys of OEM (Trivex). Several have been accomplished, with the most recent (the 10th and 11th of August). Also investigating drop shipping.
- D. Program Review The Business Team is accomplishing this.
- E. Drop Ship As above, still under consideration.

VI. PHASE OUT CONSIDERATIONS

A. TEST EQUIPMENT

With the Last Customer Ship (LCS) the <u>REFURB</u> Centers should be handling all the REFURB units. It is assumed they will not be needing any additional equipment so all excess test equipment for 1371/22 will be moved to 2074/76 product or salvaged.

B. SPARES

- 1. SPARES will continue to move through the plant by using the PVT units for "Test Beds," (there is one local and one remote (PVT) an option will be to REFURB other units (capitalized) and in use elsewhere (T.E., D.E., etc.) and ship them. They would be replaced with the "slightly damaged" but functional PVT units.
- 2. After "LCS" SPARES handling will be moved to the REFURB Center at Philadelphia, PA.
- 3. Per the contract spares and repairs should continue to be handled by Trivex for five years -or- until approximately May, 1983.

VI. REFURB ASSUMPTIONS FOR 1371/72

C. DISCONTINUED UNITS MIX

- o MIX OF CATEGORIES:
 - A. Field Transferrable
 - B. REFURB at Philadelphia, PA, or Santa Clara
 - C. Salvage to Santa Clara

	%	Α		<u>B</u>		<u>C</u>		TALS
1978	50%	(241)	40%	(193)	10%	(48)	100%	(482)
1979	40	(473)	40	(473)	20	(238)		(1184)
1980	30		45		25	Δ	e d f	(. 0
1981	20		55		25	Win		
1982	20		55		25			
1983	20		55		25			

D. ASSUMPTIONS FOR CATEGORY A

- 1. Units transported from "Customer1" (discontinue) to "Customer 2" (new customer) via padded van. (No packaging required.)
- 2. Average distance 600 miles (some customers in the same building), single cost = Customer 1 to Customer 2.

- 3. 75% of the units will be in functional and transferrable conditions.
- 4. Service call at Customer 1 includes test and cleanup.
- 5. Service call at Customer 2 not included. (In installation charge.)

E. COST CALCULATION FOR CATEGORY A

ı.	Cost of Transportation	\$200
2.	Service call to "Customer 1" (1 hour)	\$ 40
3.	Change one PCB every four units	\$ 25
	·	$$\overline{265}$ per unit

F. ASSUMPTIONS FOR CATEGORY B

- 1. Storage for discontinues. (From this inventory units will be selected as customer orders are received.)
- 2. Transportation Two trips (From customer to center, from center to second customer.)
- 3. 25% fo the units will be found functional and transferrable.
- 4. Special Test Equipment needed.

\$7K - Channel Simulator (@ Dallas and Chicago) \$6K - PWR Sup. TSTR (@ Dallas and Chicago and Phily). \$7K - Misc. (scope, DMM, etc.)

G. COST CALCULATIONS FOR CATEGORY B

1. Cost of transportation \$400

2. Service Call to Customer 1
(Customer 1 has movers pick up unit.)
N/A

3. At REFURB Center

o Pull all BRD's, and "wash" in solution. o Clean, wash, paint (as required) cabinet. o Adjust power supplies o Reinstall and test PCB's. o Update as required.

TOTAL LABOR = 4 HRS x \$12.00/HR W/O OVERHEAD = \$ 48

Costs of Material = 3 PCB's for 4 units	\$ 75 per unit
Misc. Parts Paint	\$ 25
Storage cost and special test equipment (+20K)	\$550

H. CATEGORY C

1. All "25%" of the discontinueds that will not be picked up by new customers will be returned to Santa Clara for salvage.

11. FINANCE

This section is a financial summary of the analysis in Appendix A based on assumptions detailed in Appendix B. The results are presented in terms of ROI summary, revenue, profit, cash, best/worst analysis, drop-ship comparison, and net cash cost to terminate.

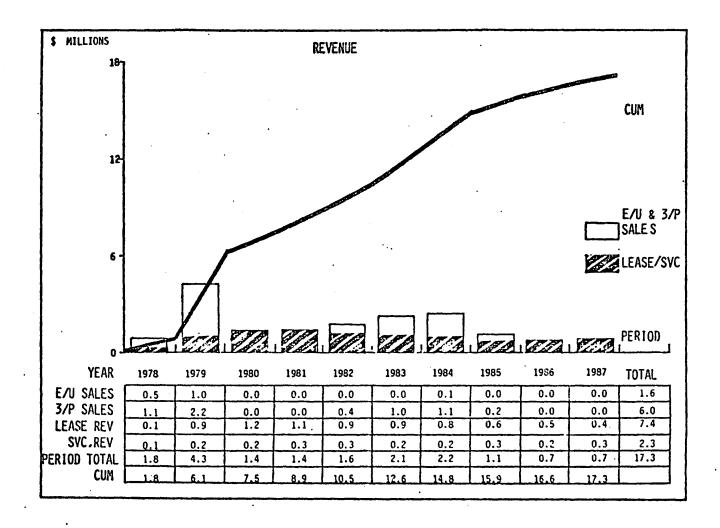
ROI Summary

35,300

Based on shipments of 1,184 new units during the initial two years, the 1371/72 Remote/Local Controller program will yield an after tax ROI of 23.0% over a ten year period. The marginal ROI reflects the strategy for this program to be an interim investment to immediately enter the controller market while developing the Memorex-built controller.

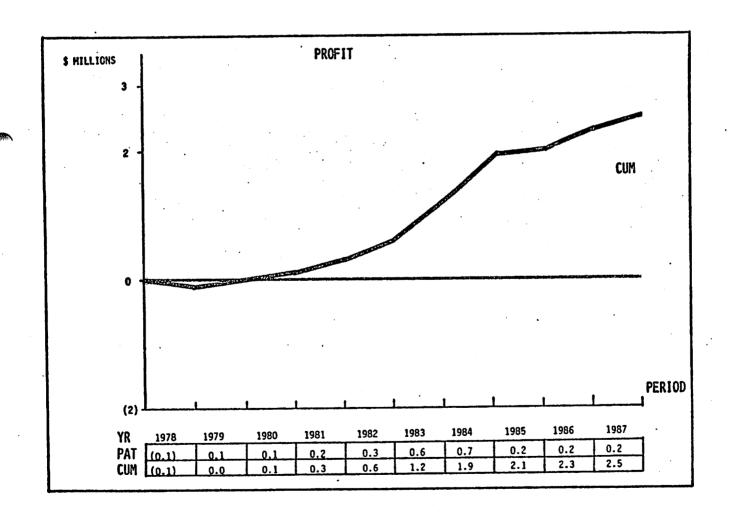
Revenue

Period revenue distribution is bimodal. The first peak reflects original 3rd party sales. The second peak reflects residual revenue from the original 3rd party sales. Revenue accumulates to a program total of \$17.3 million.



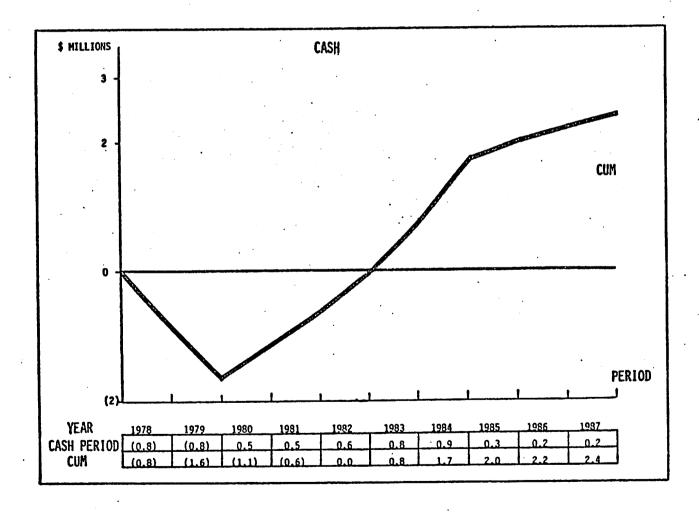
Profit After Tax

Cumulative profit reflects start-up costs and low volume until the total program units are shipped by the end of 1979. It then grows slowly until 1982. The sudden acceleration during 1983 and 1984 reflects profit realized from residuals. Profit for the remainder of the program grows steadily to a total of \$2.5 million.



Cash

Cash is used for start-up costs and for building the lease base and spares inventory levels with a maximum cumulative outflow of \$1.6 million in 1979. From that point cash flow becomes positive, reaching breakeven in 1982 and growing to a program total of \$2.4 million.



BEST/WORST CASE ANALYSIS

A best and a worst case have been analyzed to bracket the expected performance results of the program. The two variables most likely to vary in this program are unit volume and pricing.

- Unit volume is more dependent on the production capability of Trivex than on the market demand. The inconsistent production of Trivex programs to date indicates a major downside exposure for units. No upside is predicted.
- o Price increase is dependent upon competitive pricing in the market. If the market holds strong, an upside exists.
- o The rate of price erosion is dependent upon competitive pricing and the influx of replacement models into the market place. Delay in the introduction of competitive models will retard the erosion.

Table 11.1 summarizes the effect of the best or worst case and compares this to the base case.

Table 11.1 1371/72 Best/Worst Case Analysis (\$ Millions)

Best Case			
	Base Case	Best Case	Over Base Case
Revenue Profit Cash ROI	\$ 17.3 \$ 2.4 \$ 2.4 23.0%	\$ 18.7 \$ 3.2 \$ 3.1 28.4%	\$ 1.4 \$ 0.8 \$ 0.7 5.4%
Worst Case			
•	Base Case	Worst Case	Under Base Case
Revenue Profit Cash ROI	\$ 17.3 \$ 2.4 \$ 2.4 23.0%	3.4 (0.1) (0.1) N/A	13.9 2.5 2.5 23.0%

Best Case

- Price increase of 5%.
- o Price erosion cut by one half.

Worst Case

o Volume down 80% (Trivex effectively goes out of business).

Best/Worst Case Summary

- There is more exposure on the downside than on the upside. Best case results increase ROI by only 5% while worst case results show a negative return for the program.
- The major exposure to the program is the capability of Trivex to produce the desired volume. The worst case indicates that Trivex productivity terminates the progrm from a financial perspective.

Drop Ship Alternative Analysis

In addition to the business plan base case method of shipping the Trivex units to Memorex before shipping to the customer, the alternate method of shipping the units directly to the customer was considered and analyzed.

Criteria used for this comparison were:

- o Financial results of the alternatives
- Product quality and Memorex reputation
- Audit of test procedures
- o Order and feature control
- Customer list confidentiality
- Timely delivery and shipping cost
- o Facility usage
- o Use of human resources

Table 11.2 summarizes the financial results of the base case (no drop ship) and the alternate (drop ship) method.

Table 11.2 1371/1372 Controllers Drop Ship Alternative Comparison (\$ Millions)

	Base Case No Drop Ship	Alternative <u>Drop Ship</u>
Revenue	\$ 17.3	\$ 17.3
Profit After Tax	\$ 17.3 \$ 2.5	\$ 2.4
Cash After Tax	\$ 2.5	\$ 2.3
ROI	23.0%	22.5%

The financial results indicate that the 'no drop ship' program (the base case) is marginally more attractive than the 'drop ship' program. However, the results are too similar to make any significant financial differentiation between the alternatives. Other criteria must be used.

The importance of product quality and the Memorex reputation are strong arguments in favor of the base case. The programs-to-date results indicate that Trivex is not producing to Memorex quality. In addition, under the current situation Memorex is unable to audit the test procedures used by Trivex. Without bringing the units to Memorex for test, it would be very difficult to assure Memorex quality. Although this procedure appears more costly at a cursory glance, the alternative method would result in large expenses in the field to correct problems that could have been caught in-house. Additionally, no CPU test would take place with the drop ship alternative.

Order and feature control are essential in a customer configured product such as the 1371 or 1372. Upon receipt of an order, customer service would not be able to use normal procedures to assure that a proper match is made between order and product. Extra effort would therefore be involved in assigning serial numbers and tracking orders. More important, however, is the fact that flexibility in taking care of cancelled orders or special quick orders would be greatly hampered. Non-conformance Report items would be very limited also. The net result is a higher cost and lower flexibility.

In order for Trivex to ship Memorex units directly, Memorex would have to give Trivex, a competitor, the names and addresses of Memorex customers receiving the units. To the extent that Trivex is viewed as a small company, this might not be of major concern; should they be acquired by a larger competitor, however, this would become injurious.

Delivery of the product would most likely be more timely and less costly if a drop ship plan were in effect. Both shipping and handling would be reduced. The time gains, however, would be negated by possible down time at the customer site while the unit is being CPU tested or configured.

Facility usage would be reduced by drop shipment. The space currently used by the 1371 and 1372 would be reduced, but not eliminated. This is because returned PCBs from the field will be screened at Memorex before being sent to Trivex for repair. Refurb activity would still take place at Memorex to the extent that it was economically feasible.

The use of human resources is not a major factor in this analysis since the manufacturing personnel involved in either the 'drop ship' or 'no drop ship' program are minimal.

1371/72BP16

Net Cash Cost to Terminate

The cost to terminate the 1371/1372 program, while substantial, is not as high as would be a program in which Memorex built the product. However, the cost to Memorex of losing a foothold in the controller market and the damage to the Memorex name and image could be great. Marketing estimates that up to 20% of future CRT and Printer orders could be based on the availability of these controllers. These factors are not quantified here.

The 'cost to terminate' results reflect the following factors:

- All capital is committed by 4th quarter 1978.
- o The capital required for this program could be used for the 2074/76 program also.
- Spares inventory would not be written off since the existing units in the field would still need servicing.
- o The only cost beyond the unrecovered cumulative negative cash flow would be the cost of reissuing price lists and write off of sales aids.
- Once units are leased, the term of the lease will be honored by Memorex.
 Termination will not pull product out of the lease base.

•			NET	CASH COS	CT REVIEW	MINATE			•	
				1371/72	CONTROLLER		•			
		(Amour	le in Thousends	of U.S. Dollars)						
PERIOD: >-	1978 Ist Half	1978 2nd Half	1979 1st Half	1979 2nd Half	1980	1981				
CUMULATIVE NET CASH FLOW	(77)	(71)	(1280)	(1639)	(1104)	(595)				<u> </u>
TANIMART OF TROS										
Marketing Sules Service	5	5	10	10	10	10			-	
Manuracturing										
Quality Assur.										
Engineering Legal		 								
Other Total										
Net Cash Investment Costs To Terminate	(82)	(776)	(1290)	(1649)	(1114)	(605)		1	_L	
LESS RECOVERIES										
Future Net Revenues	6	1204	3210	4013	3970	3409				
Disposition of Assets				· .			<u> </u>	<u> </u>		
Other Income					ļ		<u> </u>			
Total Recoveries	6	1204	3210	4013	3970	3409	L			
Net Cash	(76)	428	1950	2364	2856	2804	T	7	Τ	

12. RISKS/ISSUES

137/1372 Consoller

The major issues and risks of the 2087 Matrix Printer program are discussed in terms of the Business Risks, Competitive Actions, Quality/Maintainability and Opportunity Loss.

BUSINESS RISKS

The business risks associated with the 1371/1372 Program are product availability, 1377/2089 availability and market success, product obsolescence and customer acceptance.

Product Availability Since the controllers are acquired from a single source, Trivex, Inc., one of the major risks is product availability. Because our requirements are large in comparison to their production capability, there is a major product availability exposure.

1377/2089 Success Since the 1371 and 1372 are sold in conjunction with the CRT and printer, we are dependent upon their continued sales and timely delivery.

Reciprocal Impact Due to the inter-dependency among the CRT, Printer, and controller, the current forecast of CRTs and Printers could be negatively impacted by up to 20-25% of total volume if the controller programs were terminated.

<u>Customer Acceptance</u> Early customer acceptance of the 1371 and 1372 is important to the success of the program. Negative reactions must be handled quickly, solutions implemented, and a solid customer base built from the very beginning. This is also important for establishing a sound base for future controller products.

COMPETITIVE ACTIONS

Due to the growth of the Editing CRT and Clustered Processing markets during the 1978 to 1980 time frame, we expect aggressive competition in this market. Also, a factor is lower market availability due to IBM's change over to the newer 3270 family. Should their production increse dramatically, the market would become more price sensitive, perhaps lowering the margins of the 1371 and 1372.

Because of IBM's delay in publishing delivery schedules on their new products, we view the market more optimistically, but we expect IBM to reverse this position and be very aggressive. We will have to carefully monitor their actions and develop effective counter actions.

QUALITY/MAINTAINABILITY

The 1371 and 1372's performance is important. They must establish a reputation for quality. If problems arise associated with the units, we must seek quick resolution through Trivex. Failure of the electronics could increase the service expense, thus reducing the program profit.

OPPORTUNITY LOSS

One of the primary goals of the program is to establish a firm place for Memorex in the full line 3270 system market. Termination of the program would mean the loss of this opportunity at this time. This would mean future Memorex built controllers would have to be introduced with a very limited installed base and a negative market image, thereby greatly inhibiting their chances for success.

APPENDICES

- A. K121 FORMS
- B. FINANCIAL ASSUMPTIONS
- C. PRODUCT REQUIREMENT STATEMENT
- D. PRODUCT AND BUSINESS PLAN CALENDAR

APPENDIX A

K 121 FORMS

9/26/78 Date

PROJECT REVIEW

FINANCIAL SUMMARY

Communications Group
Organization
1371/1372 Remote/Local
Controller

mounts in Thousands of U.S. Dollar	")		rem
	WORST CASE	PROPOSED PROGRAM	BEST CASE
UNITS			
Lease .	81 Units	405 Units	405 U nit
Sale (INCL.3/P)	149 Units	779 Units	779 Unit
Total	230 Units	• 1184 Units	1184
REVENUE			
Lease	\$ 1459	\$ 7432	\$8280
Sale (INCL.3/P)	2459	7581	8186
Service	436	22 62	2262
Total	\$ 3354	\$ 17275	\$ 18728
PROFIT AFTER TAXES			
Amount	\$ (52)	\$ 2457	\$3164
Percentage	(1.6) %	14.2 %	16.9 %
	V.	·	
MAXIMUM NET CASH OUTFLO	W		· · · · · · · · · · · · · · · · · · ·
Amount	\$ 813	\$ 1669	\$ 1540
Occurs	4thQtr 19 79	4th Qtr 19 79	4thQtr 1979
POSITIVE CASH FLOW OCCURS	1stQtr 19 80	4th Qtr 19 79	4thQtr 1979
CASH BREAKEVEN OCCURS	Qtr 19	1st Qtr 1983	3rdQtr 1982
0 - 24			
Months to Breakeven: 25 - 48			
49 · Up	Does not occur	60	57
R. O. I. AFTER TAX	٠.		
	N/A%	23.0 %	28.4 %

IONS GROUP			PROGRAM	1642	5939	2262	727		1452	0 6 0 E	80	1279	3141	2635	132	42		3530	2944	3196 5196	7660	293	611	250	256	340 60	2346	449	4388	1831	2457
CONSIGNICATIONS GROUP			1987	0	ပ ၀	252	Ō	10 10 10 10 10 10 10 10 10 10 10 10 10 1	01	- 0	0	68 15	06	c	ပ	0 0	0	0	224	314	37.7	12	0	٠;	10	00	34	18	319	140	178
			1986	0	0 427	252	. 0		•		0	65 15	100	o	0	0 0	00	0	529	330	374	1	0	٥ ;	, o	00	36	18	313	138	175
			1985	30	203 803 804	252	ı Ի-		80	20		112 20	180	ĸ	65	0 0	00	20	32.7	577	464	19		0 6		22 %	68	28	390	171	218
			1984	101	1055	252	22	H H H H H H H	98	n ©		153 28	281	20	112	0 0	0	132	32.7	741	1487	37	0	0 9	9	23	138	58 21	1270	559	111
	ROP SHIP	_	1983	-	950	252	8	# C) D)	160	9 0	•	158 30	363	0	S.	0 %	0	41	327	731	1350	34		0 4		37	144	34	1117	492	626
	NO DROP	STATEMENT	1982	0	416 943	252		() () 1) 1) 10 10 10	213	7 0	0	152 32	419	0		0 0	0	60	327	80.6	8:35	28		6 €		å o	154	24 5	555	544	311
	PROGRAM REVIEW	INCOME :	1861	0	1100	25	S	# # # #	266	40	0	143	458	0	0	0 9	0	60	282	800	. 554	24	0	50 73	, 0	 	156	35	233	125	159
CONTROLLER	PROGRA		1980	0	1174	2		# # # # # # # # # # # # # # # # # # #	319	v 0	_	153	526	0	c	40 60	0	4.8	289	863	563	56	0	30	•	27.0	192	37	235	104	132
			1979	97	2200	212	32	90 14 01 01 11 10 10 10	306	0	50	216 32	574	1914	0	9 6	0	2003	443	3020	1305	72	433	09 7 (151	ю С	921	112	145	99	81
1372 REMOTE/LOCAL			1978	53	102	m i	178		9 4	, e	18		150	908	0 (76	0	1115	167	1432	350	29	178	121	105	. 50	512	46 31	(533)	(105)	(134)
1371/1372		٠	٠	E/U SALES	ASE CFVENUE	C REVENUE	TOTAL PEVENUE		CCL -0= P2 CCI -2FFIIRB	23-1	-veG VAR	COL-TAXES	דפדאר כפנ	5-570	S-PECON	CCS-4FG VAR	H21-3	TOTAL CGS	COST SVC		GUESS PARSIN	S EXPENSE	FS EXPENSE	UVZUCKU YI	ER (1) SE	ATTACK EXPENSE	TOTAL EXPENSE	CCPP ADMIU IVTEREST	KPST	INCOME TAXES	NPAT

9/	25/7	8

PROJECT REVIEW

PROGRAM RATIOS

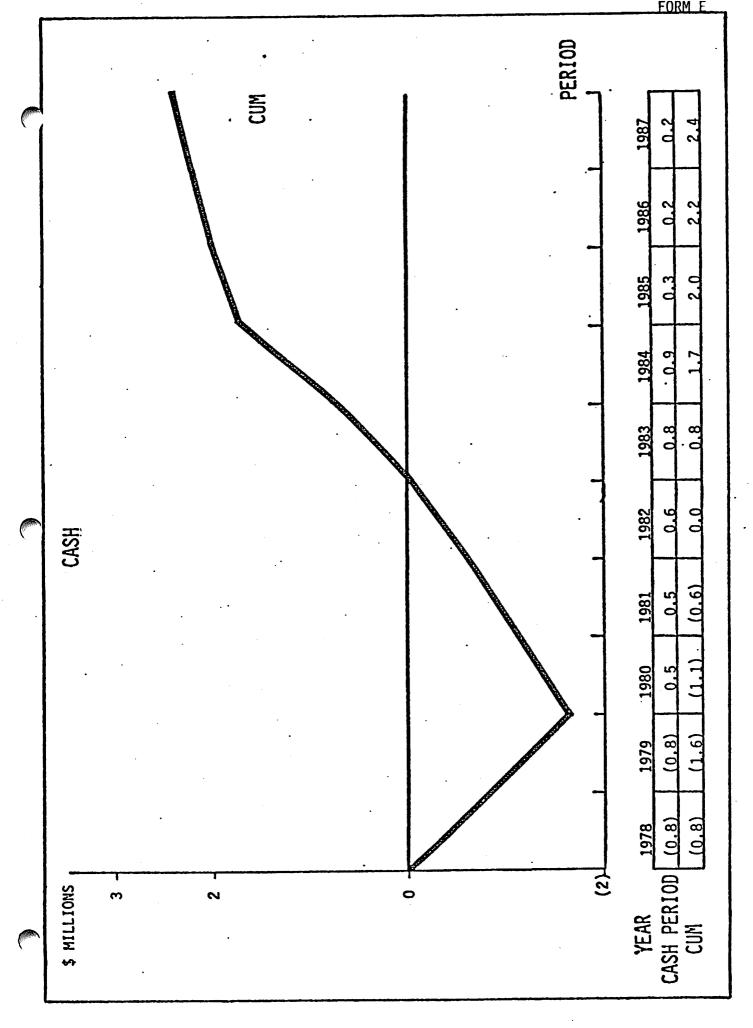
Communications Group
Organization

1371/1372 Remote/Local Controller

Program

pressed as perc il Program Rev	ent of enue)			
		WORST CASE	PROPOSED PROGRAM	BEST CASE
REVENUE	Lease .	43.5 %	43.0 %	44.2 %
	Sale (INCL.3/P)	43.5	43.9	43.7
	Service	13:0	13.1	12:1
٠.	Total	100 %	100 %	100 %
	DOMESTIC .	60.5 %	60.4 %	59.7 %
•	A & A	39.5	39.6	40.3
	EUMEA	0	0	0
	Total	100 %	100 %	100 %
OSTS	Manufacturing	31.0 %	21.1 %	19.4 %
	Service	24.3	24.4	22.5
	Other	10.4	10.2	9.6
	•			
MARGIN		34.3 %	44.3 %	48.5 %
EXPENSES	Marketing	1.7 %	1.7 %	1.7 %
•	Sales	3.5	3.5	3.4
	Engineering	7.5	1.4	1.3
•	Administration	3.1	3.1	3.1
	Other I & E	13.7 %	3.8 %	3.6
NTEREST	•	5.0 %	2.8 %	2.6 %
ORPORATE	ADMINISTRATION	2.6 %	2.6	2.6 %
ROFIT BEFORE	E TAX	(2.8) %	25.4 %	30.2 %
Rofit After	TAX	(1.6) %	14.2 %	16.9 %

			PROCEAN	REVIEW		DED CHIS					
					8					•	
	1976	1979	1980	1861	1982	1963	2984	1985	1986	1981	PROGRAM
LEASE	79	898	1176	1116	156	198	836	809	454	164	739
3/E SALES	420	060	.	-	0 4	9	400	6	0 (0 (1642
SERVICE	20	161	252	252	252	252	252	. 252	252	252	22
TOTAL INFLOW	1191	4346	1429	1369	1619	2083	2238	9011	708	693	17201
ENGR PPE	c	c	•	•	c	c	•	c	c	•	
SVC PPE		•	0	•	•	•	•	•	•	.,	
MFG PPE	01	0	0	0	0		• •	0	0	0	•
OTHER PPE	0 0	00	00	00	00	o o	00	00	00	<u>.</u> .0	
TOTAL CAPITAL	09	0	0	0	0	0	0	0	•	0	9
Product cast	1204	3184	•	•		•	•		•		
REFURB COSTS MFG VARIANCE	161	0 6	~ 9	20	2 S	6	212	≠ °	200	~ €	266
TOTAL MFG	10	3293		22			115	12	=		
		•		: :				: . :		• :	•
ALSE OUILEOUS	•	75	•	<u> </u>	26	0	92	02	£	<u>.</u>	52
MARKET ING	52	~	56	24.	50	34	37	61	2	12	Ň·
SFPVICE	964	733		424		- ¥	9 6	94	906	900	o vi
ENGINEFRING	121	•		2	•			0	9		~
ADMIN OTHER 111CE	28 20 20		‡ 0	4 0	80	n 0	5 0	m O	2°	21.0	536 256
TOTAL EXPENSE	982	1583	543	21.5	576	584	586	492	328	326	6510
COPP. ADMIN	9 6	112	37	35	45	\$6	86	28	18	2	644
INCOME TAXES	1501)	N •0	200	129	244	492	959	111	138	9 2	1661
TOTAL MUTFLOW	2383	9212	694	620	1030	1249	1366	795	521	\$13	14822
NET CASH	(277)	(866)	533	910	589	. 834	118	311	107	180	. 2380
CUM CASH	1772)	(1630)	(1103)	(593)	3	830	1702	2013	2200	2380	
M/A EMPLOYED	636	1585	1162	169	255	3;	491 .	5	79	#	•
CIEM MPAT	(134)	1521	70	238	840	1174	1886	. 2104	2279	1576	



		PRO	PROGRAM REVIEW	1	NO DROP S	SHIP				
-			8 0	BALANCE SH (\$000)	SHEET					
	1978	1979	1980	1861	1982	1983	1984	1985	1986	1981
A/R LEASE A/R Sales	40	119	116	101	66	89	72	8	43	41
A/R SERVICE		32	32	32	32	32	32	32	. 350	32
TOTAL A/R	171	151	148	133	125	122	112	80	75	73
d-1-M	0	0	0	O	c	c	c	c	•	•
F1%. G000S	0	0	0	0	0	0	0	၁	0	> C
E-1-T Spars	0	0 6	0 %	0 (0 ;	C	0	0	0	00
	107	740	246	345	342	342	342	342	342	345
TOTAL GROSS	267	342	345	342	345	342	342	342	345	345
RESERVES	20	83	156	217	. 266	303	326	338	340	340
TOTAL NET	247	259	186	125	76	. 39	15	7 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	2	2. 11
GROSS LBASE DEPRECIATION	645 46	1480	1480	1480 936	1480	1476	1167	979	979	
NET LBASE	1000 mm	1128	809	543	330	1 1	52	-	2	2
		} 		4 1 7	1	11 12 13 14 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	M M M M	11 11 11 11 11	20 CT 00 CT	11 13 13 14 14 16
G4OSS PPEF DFPRECIATION	09	£1 09	60 21	30	38	60	60 55	60 60	60 60	9 9
NET PPGE	26 mm	25 dans	39	30	22	13			0 2 2 2 2 2	
GRJSS ASSETS NET ASSETS	1142 1073 ************************************	2032 1585 ######	2030 1162 EBECE EB	2014 831	2006 552 ##GHHHH	2000 344 ##DEUE	1681 184 *********************************	1460 91	1456 79 ammanan	1454
TRADE PPLS	435	0	0	0	c	c	c	c		(
OTHER POLS ASSETS FMPLOYED	0 84	0 9 5	0	0	0	0	0	0	0),O

PROJECT REVIEW 9/26/78 Communications Group Date Organization ASSET MANAGEMENT PRODUCTIVITY Base Case 1371/1372_Remote/Local Controller Case Program (Amounts in Thousands of U.S. Dollars) PERIOD ENDING: 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 INVENTORY TURNS Total* N/A -_ N/A Manufacturing * 425 479 227 759 442 485 480 439 Spares 294 292 ASSET RATIOS: .57 **Acid Test Ratio** .96 **Current Ratio** (12.5)5.1 11.2 19.1 56.3 182.0 386.0 240.0 222.0 231.1 Return on Assets Revenue to Accounts 9.4 28.8 9.6 10.3 13.0 17.1 20.0 13.8 9.4 9.5 Receivable (Times) Davs Sales in 38.7 12.7 37.8 35.5 28.2 21.4 18.3 26.4 38.7 38.4 Receivables

INVENTORY YIELDS:

Total Revenue Yield per \$1 of Gross Inventory

Lease & Service Revenue Yield per \$1 of Spares Inventory

N/A	-	-	-	-	· -	-		-	-
0.5	3.4	4.2	4.0	3.5	3.3	3.1	2.4	2.1	2.0

^{*}Units are shipped in month received, resulting in no Inventory Balance.

9/26/78 Date	A	_	PROJECT NAGEMEI		UCTIVIT	Y	<i>:</i>	Communi	cations lon	Group
Base Case	e Case (Amounts in Thousands of U. S. Dollars)					1371/1372	1371/1372 Remote/Local Controller Program			
Page 2 of 2										
PERIOD ENDING:	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
LEASE BASE PRODUCTIVITY: Lease & Service Revenue Yield as				•						•
% Gross Lease Base	20.6	78.0	96.4	91.4	80.7	76.5	91.8	85.3	71.8	70.6
% Net Lease Base	22.2	102.4	176.3	249.0	362.1	664.1	2059.6	10437.5	35150.0	21950.0
EQUIPMENT IN TRANSIT IN DAY	/S:	J	- 		· · · · · · · · · · · · · · · · · · ·					······
Plant Ship to Customer Site	10	10	10	10	10	10	10	10	10	10
Field Avail. to Customer Site	15	15	15	15	15	15	15	15	15	15
Installation	10	10	10	10	10	10	10	10	10	10
I r@tall to On/Rent	10	10	10	10	10	10	10	10	10	10
Discontinuance to Field Transfer Ship	15	15	15	15	15	15	15	15	15	15
Discontinuance to Arrive at Plant	30	30	30	30	30	30	30	30	30	30
Recon (Plant Time Only)	30	30	30	30	30	30	30	30	30	30 ·
LEASE BASE GROWTH:			- 		·\					
NCGLB	645	835	0	0	0	(4)	(313)	(188)	0	0
%		229	0	0	0	0.3	21.2	16.1	0	0 .
OFF-RENT AS % OF TOTAL LEASE BASE:										· · · · · · · · · · · · · · · · · · ·
Units	0	0	2.2	12.3	9.9	3.7	0.3	13.8	9.1	6.3
Points	0	0	1.0	8.8	9.7	0.8	2.0	16.6	11.2	6.4

APPENDIX B

· FINANCIAL ASSUMPTIONS

1371/72 REMOTE/LOCAL CONTROLLER FINANCIAL ASSUMPTIONS

GENERAL

0	MODEL MIX	MIX	
	1371 1372	60% 40%	
0	ENTITY ALLOCATION		
		<u>1371</u>	1372
	Domestic A&A	75% 25%	70% 30%

REVENUE

o PRICING

	2 Yr. Lease	3 Yr. Lease	4 Yr. Lease	Purch.	мммс
1371	\$199	\$17 <i>5</i>	\$172	\$5445	\$20.00
1372	\$2 53	\$248	\$248	\$6840	\$35.00

PRICE EROSION

1371

LEASE - 10% PER YEAR STARTING 1980 SALES - 10% PER YEAR, 1980-82; 20% PER YEAR THEREAFTER

1372

LEASE - 5% PER YEAR STARTING 1980 SALES - 5% PER YEAR, 1980-82; 10% PER YEAR THEREAFTER

• INTERNATIONAL PRICING A & A = DOMESTIC + 20%

0	LEASE/SALE MIX	DOMESTIC	INTERNATIONAL
	Lease	18%	70%
	Third Party	72%	0%
	Sale	10%	30%

- o THIRD PARTY MULTIPLE 30
- LEASE MIX (DOMESTIC)

	<u>1978-1980</u>	<u>1981-82</u>	<u>AFTER 1982</u>
24 Month	18%	8%	50%
36 Month	72%	72%	80%
48 Month	10%	20%	20%

405-120AC

o REVENUE LIFE

1371 - 66 MONTHS; 1372 - 72 MONTHS

SHIP-TO-ON-RENT TIME

Domestic - 30 Days; International - 60 Days

o OFF-RENT TO ON-RENT TIME

90 Days

COSTS

- COSTS AND EXPENSES PROVIDED BY RESPONSIBLE FUNCTIONS
- PRODUCT COST

1371 - \$3297;

1372 - \$4235

DEPRECIATION

Lease Base - 7 Yrs. (20, 20, 20, 15, 15, 5, 5) Capital Equipment - 7 Yrs. Straight Line

- o PROPERTY TAX
 3.4% Lease Revenue
- SERVICE LABOR AND PARTS PER MACHINE MONTH

	1978	1979	1980	<u>1981</u>	1982
1371	163	55	36	36	39
1372	126	<i>5</i> 7	26	24	31

• START-UP COSTS BASED ON MANUFACTURING AND QUALITY ASSURANCE ESTIMATES.

EXPENSES

- MARKETING -- 1.5% OF REVENUE
- SALES -- 10% of Revenue 1978 & 1979 0
- GROUP ADMINISTRATION -- Domestic 2.5% of Revenue 0 International - 5% of Revenue
- CORPORATE ADMINISTRATION -- 2.6% of Revenue 0
- INTEREST 0
 - Corporate Average of 8% of Net Assets Employed
- NO ASSUMPTIONS REGARDING FUTURE INFLATION 0
- ENGINEERING EXPENSES PER YEAR

1978 -- \$121,000

1979 — \$ 60,000 1980 — \$ 30,000

1981 -- \$ 20,000 1982 -- \$ 20,000

ASSET MANAGEMENT

_	ם	FC	FI	VΑ	RI	LES
0	1	-		4 4 B		

Lease --Sale -

•	
37.5 Days	60 Days
37.5 Days	60 Days
60 Days	60 Days

INVENTORY - there is no inventory balance except for spares 0

DOMESTIC

PAYABLES

45 Days To OEM Vendor Current Labor and Expenses

RESIDUAL VALUE 0

Maintenance ---

20% OF LIST IN FIRST YEAR AFTER REVENUE LIFE; 10% OF LIST THEREAFTER

INTERNATIONAL

BEST/WORST SENSITIVITY

- Best Case 5% Original Price Increase, Price Erosion Cut 0
 - By One Half
- Worst Case 80% Volume Decrease

PURCHASE SCHEDULE

137 2 1	1978	1979	TOTAL
	270	397	667
	212	305	517
Total	482	702	1184

APPENDIX C

PRODUCT REQUIREMENT STATEMENT

MEMOREX

COMMUNICATIONS GROUP

I ssuo .	A
	8-9-78

Product Requirement Statement

Product Type	TERMINALS	PRODUCTS	·	•
Product Name _	1371/1372		CONTROLLER	S
	•		•	-
Sub-models inclu	Jaea			
				=

MEMOREX PRIVATE Technical — Scientific

REGISTERED COPY for Memorex internal use only

PERSONAL COPY OF

1371/72 BUSINESS TEAM

Date Distributed 8-9-78

REPRODUCTION PROHIBITED

Approved by:	•
Marketing Manager	Marketing/Product Manager 28/78
"Undershood/Accepted:	Charles
Dovolopnie bi & rymogring 8-17-78	C. D. Den 8/20/78
Field Engineering: Date 5-37-5	Product Salars Management (CCCC) S/10 PS
Grand Describer Stor /20	Jack Crick Contact 8-18-18

MEMOREX PRIVATE Technical — Scientific

Product Medaitement Statement

Issue A
Page 1 of

PRODUCT REQUIREMENT STATEMENT For 1371/1372 Terminal Controllers

1. INTRODUCTION

The 1371/1372 Display System Control Units will provide a physical and logical interface between an IBM 360/370 (or equivalent) or IBM System/3 (via a BSC line) and the family of IBM clustered 3270 display stations and printers, and their Memorex counterparts which require the IBM 3270 type "B" device adapter and a buffer size of 1920 characters or less. The 1371 will be the remote version, predominately utilizing transmission lines and modems, while the 1372 will be the local version, utilizing direct cable connection to the mainframe selector or block multiplexor channel.

The 1371 and 1372 Control Units are required to be a cost-effective functional equivalent to their IBM counterparts, the 3271 Model 2 and 3272 Model 2, respectively, as specified in the attached "IBM 3270 Information Display System Component Description," order number GA27-2749-7.

Exceptions to functional equivalence are specified below.

- 1. The basic 1371 and 1372 will support eight (8) devices. A maximum of three (3) device adapters, each of which will support eight (8) devices, will be addable.
- The standard line interface of the 1371 will support both 1200 BPS internally clocked and 1200 to 19.2K BPS externally clocked communications. No options will be required.
- 3. The Extended Character Set feature for APL and Text programs will not be supported by the 1371 or 1372.
- 4. The 1372 will support the copy feature as specified for the IBM 3271.
- 5. The 1371 and 1372, in conjunction with the Memorex 1377 Display Station, will support a Local Display Print feature which will allow the display station operator to print the contents of the display buffer without host intervention. The operator may request the output to appear on the first available printer with higher port number (Priority Print) or assign it to a particular printer attached to the same controller (Assign Print).
- 6. The 1371 and 1372 will provide self-contained diagnostic capability for off-line self test and fault isolation. Also the units will provide status information concerning themselves and the other clustered devices while in on-line mode.
- 7. The 1371 will not support ASCII transmission code.

In all other respects, the 1371 and 1372 are to be functionally equivalent to the IBM 3271 Model 2 and the 3272 Model 2 as specified in the "IBM 3270 Information Display System Component Description.

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1	INITIALS				L				<u> </u>	<u> </u>	ļ
	2. 4. 2.41				l	•	ł	İ	Ì	İ	ł
1	DATE				1			<u> </u>		<u> </u>	<u> </u>

WELHOREX PRIVATE Froduct regularism statement

Technical — Scientific

Issue A Page 2 of

2. MARKETING CONSIDERATIONS

The Market

In 1976 the market for editing-type CRT terminals produced the installation of 291,600 new units at a value of 1.361 billion dollars. At the end of 1976 the installed base for these devices stood at 1.456 million units with a value of 7.480 billion dollars. Of this, IBM and IBM-compatible independents maintained an approximate 60% share.

International Data Corporation (IDC), the source of the above information in a study titled "U.S. DATA ENTRY/COMMUNICATIONS EQUIPMENT MARKET" (Aug., '77), maintains in the same publication that the editing CRT terminal market will maintain a steady growth of 25% per year and by 1981 will comprise the largest single segment in the terminal equipment market with an installed base of 2.882 million units valued at 13.671 billion dollars. IBM and its compatibles are expected to maintain their 60% share.

The average number of CRT terminals and printers (not included in above analysis) attached to a control unit is 8 for the remote version and 20 for the local version. It is estimated that approximately one-third of the market is not available to vendors not providing control units.

The estimated market size in number of units for Memorex as forecast for the Business Plan in February 23, 1978, is as follows:

	1978	1979	TOTAL
1371	359	298	657
1372	419	348	767
•		•	1424 TOTAL

The introduction of the 1371 and 1372 Display System Control Units is a step in developing full coverage of the IBM 3270-compatible market. It will provide the following benefits:

- o Enhance the prospects of 1377 and 2089 sales.
- Provide current 1377 and 2089 users the possibility of one vendor terminal system support.
- Aid in opening the door for Memorex peripheral equipment sales.
- Provide a bridge to the marketing of more advanced Memorex-produced controllers.
- Help establish Memorex as a full-line, full-time communications equipment vendor.

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The Competition

Competition will of course come from IBM but other independent vendors will also be active.

They are:

Raytheon PTS-100
Courier 270

 Teletype
 Model 40/4

 Telex/TCI
 277

 GTE/IS
 7800

 Trivex
 Plus 70

 Harris (Sanders)
 720

 Sycor
 250, 290

Sycor 250, 290 CO: 77

3. HARDWARE ENVIRONMENT

The 1371 and 1372 must be entirely hardware compatible with the IBM 3271 Model 2 and the 3272 Model 2. Refer to the "IBM 3270 Information Display System Component Description" manual. Additionally, the Memorex 1377 and 2089, among other IBM 3277 and 328X "B" interface units, define the hardware environment.

4. SOFTWARE ENVIRONMENT

The 1371 and 1372 must be entirely software compatible with the IBM 3271 Model 2 and 3272 Model 2. Refer to the "IBM 3270 Information Display System Component Description" Manual.

5. TECHNICAL DESCRIPTION

Refer to the "IBM Information Display System Description" manual.

6. PERFORMANCE REQUIREMENTS

Refer to the "IBM 3270 Information Display System Component Description" manual.

7. SCHEDULING REQUIREMENTS

It is planned that the units be drop-shipped from the vendor.

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8. PRODUCT LINE COMPATIBILITY

As stated in the Marketing Considerations section, the 1371 and 1372 serve to unify the 1377 and 2089 into one complementary product line. Also they will serve as a bridge to more advanced controllers planned for the future.

9. ADDITIONAL COMMENTS

Both 1371 and 1372 will be U.L. approved. Additionally, approval must be granted by CSA, VDE, BSI and other foreign regulatory bodies.

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APPENDIX D.

PRODUCT CALENDAR/SCHEDULE

1371/72 BUSINES TEAM BUSINESS PLAN CALENDAR

EV	<u>ENT</u>	DATE
0	Product Requirement Statement Approved	8/25/78
0	Financial Input Turned In (Except Service)	9/1/78
0	Outline of Narrative and Assumptions Presented By Each Function	8/30/78
0	Narrative Turned In	9/1/78
0	Plan Approved by Team	9/20/78
0	Business Plan Presentation to R. C. Allen	10/4/78