ATARI-TEL

A NEW BUSINESS OPPORTUNITY IN
ADVANCED PERSONAL TELECOMMUNICATIONS
PRODUCTS AND SERVICES FOR THE 1980'S

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Atari, Inc.
October 1981

INDUSTRY BACKGROUND

The telephone system in the United States is almost as ubiquitous as commercial TV. In 1980, there were over 166 million telephones in the U.S. compared to approximately 270 million in all other countries of the world combined. In 1980, Americans used the telephone to place an average or 475 million local and over 40 million long-distance calls every day.

Telecommunications devices have introduced enormous changes in everyday life in the United States during the twentieth century. But, even greater changes are in store for the 1980's and 1990's thanks to a new pro-competitive business environment and emerging developments in communications technologies.

During this decade, emerging technologies will offer people numerous opportunities to better manage their lives within their homes and offices. Additionally, the ways in which people interact with public and private interests outside the home and office will be dramatically altered and improved.

As this decade begins, the Bell System, the independent telephone companies (those phone companies not affiliated with American Telephone and Telegraph), and a new peripheral "interconnect" industry are waging campaigns to sell, lease or rent sophisticated microprocessor-based equipment to business and residential consumers. The entire telecommunications marketplace is taking advantage of new price and performance benefits made possible through proliferation of recent developments in very high technology.

While the Bell System and the independent telephone companies retain the lion's share of the telecommunications equipment market in 1981, the young "interconnect" industry is making significant inroads into the traditional telephone companies' equipment, system supply, and services domains. The interconnect industry, officially born in 1968 when the Federal Communications Commission handed down the now famous Carterfone decision, effectively allowed American Telephone and Telegraph's (AT&T's) subscribers to connect privately owned equipment to Bell's lines for the first time. This ruling was the first of many rulings which followed during the 1970's encouraging competition in almost all aspects of the domestic telephone industry.

The major effect of Carterfone, and the pro-competitive legislative and judicial decisions of the 1970's has been

PURPOSE OF MEMORANDUM

During the August 1981 Atari Corporate Planning Meetings in Sonoma, California, the Consumer Electronics Division proposed further investigation of a new business in advanced consumer telecommunications products and services for the 1980's.

The purpose of this memorandum is to provide additional background on the proposal advanced in Sonoma, and to expand on the product and service concepts introduced.

The specific opportunity which will be outlined allows Warner Communications a unique means of entry into an industry which cannot help but impact the company's broad business purpose during the next decade. This memorandum investigates the first three stages of a new communications business in which the company could play a leadership role during the period of rapid change and evolution in home communications technology in the 1980's.

This document is intended to assist in the guidance of internal engineering and design programs, and can service as a preliminary business plan/outline for the new undertaking.

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to give the telecommunications industry all of the characteristics of a less mature industry.

The Bell System and the Independent Telephone Companies

Before Carterfone, the markets for residential and business systems were served entirely by the Bell System and the independent telephone companies. The Bell System enjoyed a virtual monopoly in telephone equipment and services, as anything not supplied by the utility was restricted from being attached to the networks. Bell operated as a vertically integrated equipment and services supplier, relying almost entirely on its own manufacturing arm, Western Electric, and its R&D arm, Bell Labs, to supply products to its 23 operating companies. Today Bell serves 80% of the 166 million telephones in the United States, of which 27% are business, and the remaining 73% are residential.

The other 20% of U.S. telephones are served by independent telephone companies. In 1970, there were over 1800 independent companies offering telephone service to approximately 20 million subscribers. Through mergers and acquisitions, the number of independents were reduced to about 1500 by the end of the 1970's.

The independents' service area ("telephone territory") constitutes about one-half of the Continental U.S. land mass, and includes portions of every state except Delaware and Rhode Island. (Bell serves one-third of the U.S. land area, while the remaining one-sixth remains unserved.) Although the independent industry is much smaller than the Bell System, independent companies have over 11,000 central offices compared to Bell's approximately 6,700. Thus the average independent office is significantly smaller than the average Bell office.

Growth in the numbers of telephones served has been much faster for the independents than for Bell, and the ratio of Bell to independent phones has changed from about 10 to 1 thirty years ago to about 5 to 1 today. Though clearly smaller than Bell, some independents operate as many telephones as are found in the entirety to some countries, and in aggregate they are larger than any national telephone administration except that of Japan. The telephone operations of the nation's largest independent, General Telephone and Electronics (GTE), are roughly equivalent to those of the entire country of France. United Telecommunications, Inc., the second largest U.S. independent, operates more telephones than Belgium or Brazil. The third largest independent, Continental Telephone and Utilities, has more telephones than the entire country of India.

While independent telephone companies are quite thinly scattered in some parts of this country, states where they are

common or even a majority include California, Florida, Ohio, Nebraska, North Carolina, Iowa, Indiana and Nevada. All of Hawaii is served by Hawaiian Telephone, a subsidiary of GTE. Alaska is also served exclusively by independent companies. In total they serve approximately 31 million telephones in 1981.

Relationships of the Independents with AT&T

The Bell System is primairly responsible for the nationwide direct-distance-dialing (DDD) telephone network. Virtually all independent telephones connect to this network, and through it, have access to 96% of the telephones worldwide. In exercising its responsibility for operating and maintaining the U.S. long-distance network, Bell necessarily sets the technical standards for the entire telephone industry. The master plan for the U.S. telephone system is issued periodically by AT&T's engineering department.

In addition to the master plan, Bell sets the detailed standards for most segments of the independents' operating plans. The need for compatibility between Bell and the independents is clearly necessary as a call may originate in a Bell office, and terminate in an independent's office. Bell's broad effort to keep the independent companies up to date on its product and planning allows the entire system to maintain compatibility while eliminating time lags in adjustments by the independents to new systems introduced by Bell.

Expanded Definitions of Telecommunications

Multiple recent advances in telecommunications technology have resulted in expanded definitions of the telecommunications product and service universe. Transmission equipment once meant copper cables. Today it includes complex central office switching, long-lines services, satellite communications and microprocessor-based telephone management systems. Terminal equipment once meant telephones and telex equipment. Today terminal equipment includes both products, and products with augmented services attached. In 1981, telecommunications manufacturers are vying for shares of the traditional and the newer markets for Telephone Subsets, Answering Machines, Pocket Pagers, Mobile Telephones, Autodialers, Modems, Toll Restrictors, Speakerphones, Key (Button) Telephone Systems (KTS's), Private Automatic Branch Exchanges (PABX's), as well as developing new generations of terminal products which will not appear in the marketplace until the middle of this decade.

The FCC, and Current Telecommunications Regulations

From 1910 until 1934, communications common carriers in the United States were regulated by the Interstate Commerce Commission (ICC). When regulation of communications by a transportation agency proved unsatisfactory in the United States, the Communications Act of 1934 created the independent Federal Communications Commission (FCC). The FCC was given a mandate to "regulate interstate and foreign commerce in communications by wire and radio so as to make available to all of the people of the United States a rapid, efficient, nationwide and worldwide wire and radio communications service with adequate facilities at reasonable charges".

Among the functions affecting the interconnect industry, the Commission:

- Approves carrier tariff schedules which specify charges and conditions of service for all public communications offerings,
- Approves mergers and/or the exchange of property among telephone and telegraph operating companies,
- Requires the larger carriers to file monthly, quarterly and annual financial and operating reports,
- Establishes ceilings for the rates of return of the larger common carriers, and
- Monitors the quality of services rendered by carriers.

Current FCC policies foster more diversity and competition in the provision of communications equipment and services than could ever have been forecast when the Carterfone decision was handed down in 1968. New policies were manifested in two fundamentally important regulatory cases; the Carterfone decision (which has already been briefly discussed), and the Special Services Common Carriers decision handed down by the FCC in 1971, and confirmed by the Ninth Circuit Court of Appeals in January of 1975.

The first of these decisions gave birth to the new interconnect industry and allowed non-telco-affiliated companies to produce equipment which subscribers could attach directly to existing networks without lengthy and complicated approvals from the Bell System or the independent operating companies. The second of these decisions permitted competition in transmission of calls by specialized common carriers (SSC's) for the first time. Both MCI and Sprint are growing interstate microwave common carriers which compete with the Bell System and the independent companies for business and residential long-distance transmission.

More recently the Computer Inquiry II decision established a framework to allow carriers to operate in areas from which they were previously excluded. this decision also called for deregulation of carrier-supplied station and terminal equipment. The result of this deregulation is that carriers like Bell will have to make subsets and other terminal equipment, and inside wiring, available for purchase by subscribers at prices which are separate and distinct from the tariffs for associated services. Thus, when CI II goes into effect, both installed equipment and wiring may be purchased.

It was just announced that the decision, originally scheduled to take effect in March of 1982, has been delayed until January 1, 1983. Oh that date, all subscribers will have the option to purchase equipment which is already installed, and they will have to purchase all equipment for new installations.

Since 1976, the FCC has administered a registration program affecting customer provided and interconnected terminal and data communications equipment. The granting of requests for registration is now fairly routine. Manufacturers merely submit test results to the FCC demonstrating equipment or protective circuitry complies with FCC limits. Registered equipment may then be connected to the switched telephone network through standard plugs and jacks without any need for other connecting arrangements. In the past these were required by telephone companies, and the telephone companies charged for both installation and service.

The Interconnect Industry and the New Competitive Environment

In 1969, there were only four major domestic manufacturers of telephone terminal equipment; Western Electric which served the Bell System; Automatic Electric which supplied GTE and equipment manufactured by GTE; and Stromberg Carlson and ITT which manufactured equipment for the independent telephone companies other than those owned by GTE. By 1980, there were easily twelve times as many active manufacturers on the list, including a number of well known foreign-based companies, almost all of which now have manufacturing facilities in the U.S. Such giants as Nippon Electric and Oki of Japan, L.M. Ericsson of Sweden, Seimens of Germany and Canada's Northern Telecom, LTD., are all participating in the U.S. market in 1981.

Thus the telecommunications industry in the United States, once limited to a few established equipment manufacturers, now also includes a number of both large and small newcomers. During the next few years, a lot of the smaller interconnect industry participants with traditional voice and PABX offerings can be expected to merge, or be acquired. At the same time, a number of new entrants with new voice/data products and services

can be expected to join the fray.

Convergence of Telecommunications and Electronic Data Processing

In 1934, when the Communications Act was passed, few people, if any, would have predicted that computers would perform switching, that telecom companies would do data processing, or that business and home communications and entertainment products would contain elements of both EDP and telecom functions.

The single most important issue facing the telecommunications industry today is the convergence of the telecom industry and the EDP industry. Both have common interests in, and futures in, the supply of new voice and data products and services for homes and offices. The 1970's saw a wave of mergers, acquisitions, start-ups, joint ventures and other activities clearly linking the industries, and there will continue to be many more in the months and years ahead. These combinations are not occuring because of the price/earnings multiple discounts, or because of large liquid asset balance sheet items. These actions reflect the perceptions of companies in the EDP, telecom, office products, and entertainment industries about the likely opportunities in the residential and office markets several years hense.

From consumers' or end-users' points of view, the distinctions between voice and data communications are blurring. This has been especially true in business environments, and as more new transaction oriented voice-replacement products and communications services enter the home, it will become increasingly true in home environments.

Likely Outcomes

The obvious convergence of data processing and telecommunications has opened new markets for a wide range of competitors, from mainframe computer and traditional telephone systems companies to manufacturers of office equipment and home entertainment products. The specialty and value-added network companies also should not be forgotten. There is potential integration of office and home communications through value added services and networks such as Tymnet's On-Tyme II, ITT's Faxpax, and GTE's Telenet which potentially offer end-users a good range of advanced services including electronic mail, facsimile networks, message storage and indexing, and electronic directories.

In the midst of all of this, several different EDP and telecom industry factions believe they have the unique capability of eventually controlling the communications environment of the

future. Looking at the claims of various groups, four senarios are currently being espoused. Each has merit, and each is equally believable, depending on one's particular persuasion. Although the brief senarios which follow are intended to reflect the Office-of-the-Future, they clearly portend the Home-of-the-Future, as well. Integration of communications hardware and systems protocols is the important issue. Although the scale of office and home systems will obviously differ, there is a good likelihood that hardware and protocols will be similiar.

Mainframe computer manufacturers such as Harris, IBM, Honeywell, Control Data Corporation, Nixdorf and Burroughs Corporation would have the communications market believe they will emerge as leaders. After all, they have existing facilities in place and a very large business customer base. Furthermore, as they have had experience with many kinds of computers and data processing, they claim to be better prepared to deal with most terminal equipment and other office products. Their claims could be correct, yet they lack telecommunications experience, particularly with regards to the American marketplace. These companies could easily be, and probably are, developing telecom expertise. It just has yet to surface.

Non-traditional telecommunications manufacturers like Exxon, Lexar Corporation, Intecom and even Datapoint might argue they have a chance to end up in control. These companies have recently been more innovative and have been the first companies to introduce "second generation" digital telephone systems. These newer systems appear to be better suited for intergration of voice and data than their predecessors, and they encourage the integration of a variety of different products. In the cases of Exxon Enterprises and Datapoint, experience with terminals, dispersed data processing, facsimile, electronic message systems, etc. would seem to prepare them to deal with the integration of a variety of functions, which combined, would constitute an automated communications environment. It must be admitted that Exxon and Datapoint, and others like them, already have a number of important in-house technologies virtually integrated or functionally compatible. Yet, companies in this category are relative newcomers to the telephone systems marketplace, and questions remain as to their ability to cope with existing and potentially formidable competition.

A third highly conceivable senario stands an equally good chance of success. Other office and home communications products manufacturers such as Apple, Atari, Radio Shack, Commodore, Wang Laboratories, etc. could emerge victorious. Experience with software, word processing, text editing, facsimile, special video reproduction and graphics gives all of these companies an edge toward the possible integration of the communications environment. Their common experience might permit integration and automation. Yet despite their unique characteristics, they

all lack any visible expertise or experience in telecommunications.

Finally, the fourth senario. Both the traditional and new telephone systems manufacturers believe they will emerge from the fray in control. Combined, they have vast market penetration and a very large business and residential customer base. Their systems are computer/microprocessor controlled. They have experimented with and have successfully developed highly complex and innovative software programs which allow Station Message Detail Recording, Least-Cost Routing and Automatic Call Distribution. They have delivered Electronic Message Systems, Electronic Directories, Sophisticated Conferencing Facilities, Energy Management Controllers, Packet Switching, and they've accomplished both voice and data transmission. These manufacturers clearly seem to have good experience in computers and data processing. The traditional telephone is just beginning to be replaced by highly intelligent phone terminals, and easily a half-dozen PABX systems manufacturers are using first and second generation systems as the transmission medium and circuit switching devices for a wide range of office products like facsimile, electronic mail, electronic directories, information store and forward, etc. These companies seem to have the right idea. They are attempting to functionally integrate a wide variety of equipment they do not manufacture. Despite their many successes in the office environment, these companies don't seem to have noticed the multiple opportunities which remain unexplored in the residential marketplace.

Apparently, the product strategies of most of these telecom manufacturers were formulated prior to 1980, or even earlier. Almost without exception, they continue to enhance the data transmission capabilities of their first and second generation PABX systems as a solution to the future integration of a mix of office products.

Regardless of which of these four senarios one wishes to support, the fact remains that telecom integration products have already migrated into the heart of the automated office. The automated home cannot be far behind. Any company planning a future in communications must keep one eye on integration. Without telecom experience that's impossible. If there is a single lesson to be learned, it's that telecom experience seems to be the single most important resource for any company either in, or planning to enter the communications business in the 1980's.

Non-Telco Consolidation

New product development and innovative product enhancements, though extremely important, are only part of a total planning function. Clever marketing, product delivery and marketplace

positioning are equally essential to the success of any single communications product or family of products. Many telecom and EDP based companies have made efforts to consolidate resources through acquisition or restructuring, allowing multiple products and those companies to migrate more quickly into the automated communications environment. Though not yet final, the Computer Inquiry II decision, which is expected to take effect in 1983, will bring about additional changes in the structure of the market. This decision will greatly expand the business and personal ownership of telecom equipment. Then, strategic positioning in clearly identified market niches will become even a more necessary prerequisite to success.

The conduct of new contenders like Harris, Lexar (UTI), and InteCom (Exxon), and traditional companies like Rolm, Northern Telecom, LTD. and others in the automated office markets could become very important examples to follow, or to avoid. The most successful of these companies have applied programming knowledge to a thorough understanding of the integration possibilities of independent multimedia products. They have made it possible to interconnect a wide range of office products, making more of the whole than the sum of all of the independent parts.

The Bell System - 1981

Finally, we must recognize that the Bell System will have a major hand in the implimentation of the automated communications environment in both offices and homes during the 1980's. For the past several years, however, AT&T's attention has been attracted to the restructuring of internal company relationships to meet the growing competition in the office communications market.

AT&T started internal reorganization in the mid-1970's in anticipation of passage of full deregulation of all terminal equipment. Today, they seem to be well prepared with separate subsidiary organizations already established to market new competitive products and services. By January of 1983, when CI II is to take effect, AT&T will have transferred close to $15 billion of its assets to 'Baby Bell'. Baby Bell can then freely sell PABX's, smart telephones and many kinds of other equipment and services, including information.

However, Bell has had little experience in competitive marketing and sales. For years, the company has been in the leasing business, not in the products business. Selling "enhanced products" in the data processing environment will remain one of AT&T's major problems well into the 1980's. If Bell is to succeed in an expanded communications products business, they will require a full line of products, including those related to voice/data processing and transmission. Bell can be expected to be hampered in their initial thrusts as they will be competing

against companies which have substantial product knowledge, product availability, and marketing strength in non-telephone aspects of the restructured marketplace.

Eventually, Bell will make a satisfactory transition with a full compliment of new products and services. The Bell System, however, will never again control the communications environment. Just like everyone else in an unregulated market, they will have to openly compete for user preferences.

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CONSUMER TELCOMMUNICATIONS PRODUCTS MARKET - 1981

The focus of this section is on consumer end-user purchases of telephone products, and the retail market and distribution system available in 1981 to reach consumers. The primary products included in the definition of Consumer Telecom Products are Telephone Subsets and Answering Units. Other products covered to a lesser extent are small Key Systems and PABX's, small business and residential Intercoms, Mobile Telephones, Pocket Pagers and Telecom Accessories.

Information used for forecasting in this section comes from the Market Analysis and Planning Group of one of the major U.S. telcos, and is the most current information available at the time of this writing. It should be noted that the forecasts should be used for reference only, as they do not fold in the possible effects of new products, markets, distribution channels or competitors during the forecast periods.

This section begins with a definition of the market and the major market segments as they exist in 1981. Distribution channels and product categories are then defined. Since a comprehensive analysis of the evolving retail market requires an understanding of the traditional telco market channels, this analysis proceeds from supplier level to end-user demand, touching briefly on key trends and actions which will influence individual categories.

Market Definition

The Consumer Telecom Products market is defined as the residential and small business end-user market for telecommunications products which can be independently connected by consumers to existing networks. These products are presently sold, or can potentially be sold, through channels other than the telephone company channels in which equipment and services have traditionally been bundled.

Market Segments

The three primary market segments for consumer telecom products in 1981 are:

- Traditional Telco Markets,
- The Telco Phone Store Market, and
- The Retail Market.

The Traditional Telco Market

In this market, products are purchased by operating telcos to be used as part of their service offerings. This market is defined as the market in which end-users do not purchase the product (e.g. Telephone Subsets, Answering Units, etc.) but effectively lease the product.

Examples: Western Electric sells to the Bell Operating Companies for use in their service offerings; ITT Corinth sells through North Supply to United Telephone Companies for tariffed applications.

The Telco Phone Store Market

In this market, consumers may purchase telephones and associated products, or pick up/order products to be installed for use in tariffed applications at telco-affiliated Phone Store retail outlets. Phones purchased in these outlets are largely of the 'Decorator' type, and customers can also order custom calling features at these outlets which helps to build store traffic. The telcos are effectively trying to train consumers to think of Phone Stores when they wish to purchase new telephone products.

Examples: AT&T now has some 1800 Phone Stores located in shopping malls and in converted Bell Business Offices. GTE is currently operating about 200 stores of this type, and all other independent telephone companies of any signicicant size now have, or are planning to open stores in the near future.

The Retail Market

A wide range of retail channels purchase telecom products directly from the manufacturer/supplier or through a middleman, and sell these products to residential and small business end-users.

Retailers include:

- Mass Merchandisers,
- Discount Stores,
- Department Stores,
- Catalog Showrooms,
- Electronic Appliance Distributors,
- Hardware/Home Improvement Stores,
- Specialty Phone Stores (non-telco-affiliated),
- Drug Chains,
- Military/PX Stores,
- Premium Houses, and
- Direct Mail Retailers.

Although Telco Phone Stores make retail sales, they are not included in the "Retail" market defined above.

Distribution Channels

There are three broad categories of distribution channels for consumer telecom products in 1981. They are:

- Telecom Distributors,
- Sales Agents, and
- Consumer Electronics and Other Distributors.

Telecom Distributors

There are two types of Telecom Distributors:

- Telco-Affiliated Distributors, and
- Independent Telecom Distributors.

Telco-Affiliated Distributors are non-installing distributors who purchase, warehouse and resell a broad range of telecom products such as subscriber apparatus, transmission wire and cable, and auxiliary central office equipment. It's customary, and in some cases obligatory, for operating companies to buy through these telco-related supply arms. However, a significant percentage of Telco-Affiliated Distributor sales are also made to non-affiliated telcos, government, private industry and public utilities.

Independent Telecom Distributors purchase, warehouse and resell the same telecom product lines as the telco-affiliated supply houses. These non-installing distributors (e.g. Graybar, etc.) sell to non-Bell-affiliated independent telephone companies, government, private industry and public utilities. A percentage of these distributor sales are also made with telephone companies which have their own associated supply operations.

It should be noted that both types of telecom distributors are beginning to serve retail channels. As legislative actions noted earlier in this memorandum increasingly shift the consumer products market to retail channels, telecom distributors are expected to increase their activity in the retail market.

Sales Agents

Sales Agents in the telecom industry are independent representatives used by manufacturers instead of direct sales forces. Agents generally specialize in a particular product area, represent only one non-competitive line in each product category, and do not stock products. They place orders with manufacturers/suppliers (usually a minimum of $250), and generally do no credit-checking, billing, accounting or shipping. Agents are assigned specific territories, and are usually protected by contract in these territories with exclusive sales arrangements covering specific trade classes (e.g. mass-merchandisers).

Consumer Electronics and Other Distributors

Three types fall into this distribution category; Consumer Electronics Distributors, Electronics/Electrical Wholesalers, and Business Supply Houses.

Consumer Electronics Distributors purchase and warehouse products of the same types as Sales Agents, but these distributors are responsible for credit-checking, billing, accounting and shipping. Generally, they call on smaller retailers with limited resources.

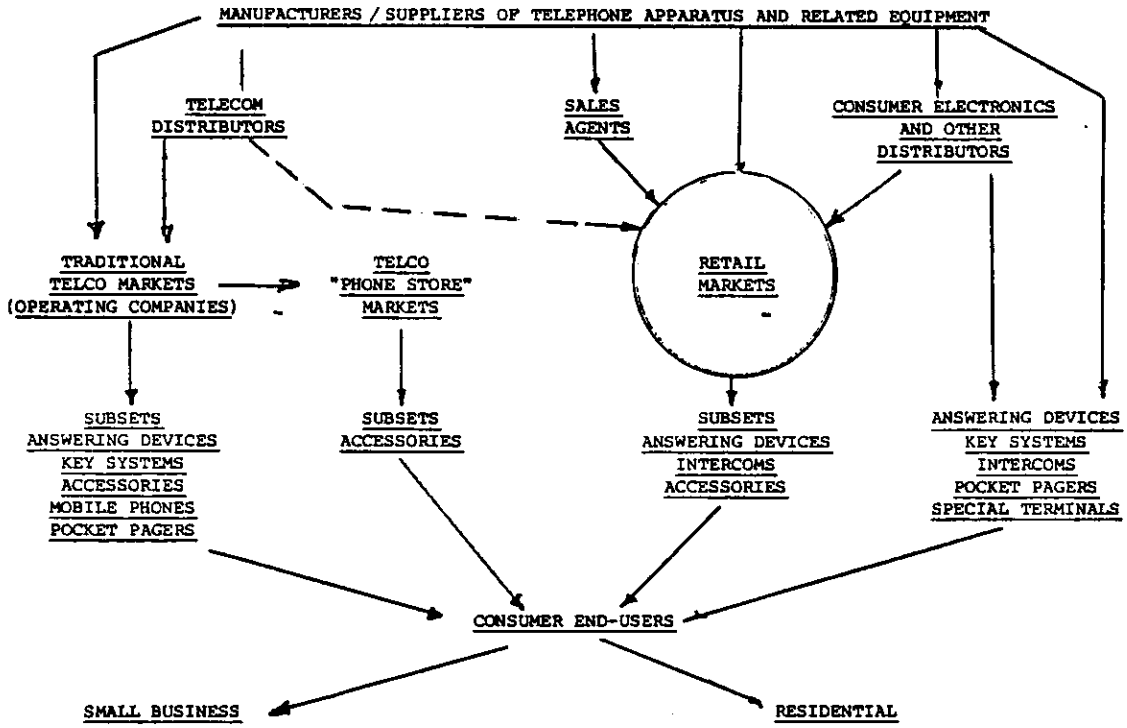
Electronics/Electrical Wholesalers carry a broad line of electronics/electrical equipment. Their customer base is local sound or communications contract dealers. These wholesalers will generally also sell directly to end-users at retail prices.

Business Supply Houses carry some telephone Answering Units, but other telecom products are generally not part of their business.

There is one sector of the telecom distribution which does not fit the channels just described. Radio Shack et. al. are unique retail outlets which operate on both a national and an international level. Parent companies provide their own retail networks with private brand product, which for the most part is purchased from overseas suppliers or manufactured overseas on specification.

Market Structure U.S. Consumer Telecom Products

The diagram below illustrates the market structure of the U.S. Consumer Telecom Products Marketplace in 1981.



CONSUMER TELECOM PRODUCTS

The pages which follow review the major consumer telecom products which are available to end-users through retail channels in 1981.

The products discussed in this section are:

- TELEPHONE SUBSETS,
- ANSWERING UNITS,
- INTERCOMS,
- MOBILE TELEPHONES,
- POCKET PAGERS, and
- ACCESSORIES.

This section also includes information on SMALL KEY SYSTEMS and PABX SYSTEMS. Although neither Key nor PABX systems are available in 1981 for residential applications, it is important to understand the operation of these systems. Elements of both Key and PABX systems will play a role in several of the new products to be introduced later in this memorandum.

TELEPHONE SUBSETS

There are five categories of telephone subsets which are available to consumer through retail channels in 1981. They are:

- Basic,
- Decorator,
- Feature,
- One-Piece Compact, and
- Cordless.

Basic phones include the popular and familiar single-line Standard, Trimline and Princess series of telephones, both Rotary and Touch-Tone dialing versions. In the past these telephones represented over 70% of retail sales. The popular appeal of these telephones clearly resulted from consumer familiarity with the Basic products, and the low prices charged for them. Consumer preference is moving away from Basic products to other new and improved offerings.

Decorator phones are, for the most part, "French Cradle"-type phones which are generally manufactured overseas. Recently, AT&T (through Western Electric) has introduced a number of new phones in this category which it currently sells through Bell-affiliated Phone Stores. This category also includes the familiar Mickey Mouse and Snoopy character phones. All of the products in this category are purchased because of unique packaging and novelty.

Feature phones embody multiple features and functions not previously offered in telephone products. Included among many features and functions, one might find Repertory Dialing, Last Number Redial, LED/LCD Displays, Calculator Functions, Clocks or Timers, etc.

Example: TAC (Technology Applications Corporation) Strategy 1, Series 500 - 1977 - Features:

- Automatic Dialer which stores up to 60 sets of 16 digit numbers,
- Capable of 32 digits of continuous dialing,
- Touch-tone and Rotary Compatible,
- Optional 16 Digit and Timer LCD Display,
- Automatic Access to SSC Networks,
- Off-Hook detection and cancel, and
- Optional Speakerphone for hands-free operation

One-Piece Compact phones are the newest subset category. The basic characteristics of these phones are that they are smaller, "compact", and are usually of one-piece construction. These phones also make greater use of micro-electronics to support incorporated features like Push-Button-Outpulse-Dialing. Several of the more recent product entries in this category incorporate new features first introduced in Feature Phones.

Cordless phones are, as well, one of the newer subset categories. These phones operate remotely from base stations within a home or office over the 49 mhz band, and have an operational limit of between 300 and 600 feet from the base station with which they communicate. These phones have been increasing in popularity during the last several years.

Telephone Subset Market Size and Forecast

The retail market for telephone subsets has grown from a zero base in the middle of 1976 to a $142 million business in 1980. Last year, 3.4 million telephones were sold through retail. Some 2.0 million reached customers through Bell and independent telephone company Phone Stores, and these sales are believed to have been largely in the 'Decorator' category. The 2.0 million units may also have included some single option Trendline phone purchases as well as pick-ups for installation which consumers might have confused with actual purchase. Based on AT&T's estimate that 50% of subset installations in 1980 were units picked-up at Phone Stores, it is likely that 40%-50% of the traditional telco market was serviced through these stores.

Sales through non-telco retail stores (outlets familiar to Atari) totaled 1.4 million units in 1980. Even though 'Basic' phones dominated non-telco retail sales last year, sales of 'Basic' phones are on the decline. One-Piece-Compacts are expected to dominate the market by a wide margin by 1985. From 1978 through 1980, non-telco retail sales increased 20% per year on a unit basis, and in 1981, sales are expected to increase an additional 36% over last year. New market entries coupled with growing consumer acceptance of One-Piece Compact phones seems to be the key to this significant increase.

The non-telco retail market forecast which appears on the next page assumes the Computer Inquiry II deregulation will become effective in March of next year, and that the market will grow at close to 30% per year thereafter. We have just become aware of the delay until the following January (1983). We don't expect the added delay will significantly affect the figures.

The Non-Telco Retail Market - 1978-1990

	1978	1979	1980	1981	1985	1990
Phone - Units (000)						
Basic	860	710	650	600	550	550
Decorator/Fashion	100	150	225	350	550	1,000
Feature	15	25	40	50	350	1,250
One Piece Compact	---	300	500	850	4,000	7,200
Total:	975	1,200	1,400	1,900	5,500	10,000
$ Million:	26	36	42	60	200	500
*Cordless	---	---	150	175	350	1,000

* Not included in totals because of an uncertainty as to how this market might actually develop.

On a product basis, One-Piece Compact phones and Feature phones will exhibit the greatest growth rates over the forecast periods. Also, over time, it will become increasingly difficult to differentiate these two products. One-Piece Compacts will begin to incorporate more features, and Feature phones will become more compact in their design.

Market Trends

With the introduction of GTE 'Flip Phone' in 1979, the stage was set for new consumer accepted telephone subset products. The 'Flip Phone' was the first entry in its category and the newest telephone design to hit the market in over 12 years. Acceptance of the 'Flip Phone' and other manufacturers' offerings in the One-Piece Compact category, including ITT's 'Ultra 80', accounted for over 30% of all phones sold at retail between 1979 and 1980. Market indications are that these telephones will grow in popularity and use. New styling, dialing features, and retail pricing make these telephones most attractive consumer electronics products. As the telephone market takes on more of a consumer products orientation, new offerings will clearly stress One-Piece Compact features.

Product life cycles for telephones are expected to be greatly shortened during the decade, and the current subset life of 15-20 years will no longer be the rule. Standard telephones will lose their popularity and will be relegated to minor

market positions. Arthur D. Little forecasts indicate that by 1985, Standard Dial Telephones will account for only 8% of units shipped in the U.S., and that by 1990, there will be no market for these products.

Government actions designed to open the telephone market to competition have clearly stimulated consumer awareness and accelerated market growth. Further, individual State's actions, such as the New York State ruling which permitted consumers to install their own inside wiring, are currently being considered at the federal level. If, and when, these actions become national policy, we are likely to see new and additional increases in homeowner-installed equipment.

Consumer Purchase Patterns

Rather limited information profiling nationwide consumer preference and buying patterns is available for telephones. What little information we've been able to dig up indicates the following:

- Females are more likely to shop in Telco Phone Stores, and males clearly favor non-telco retail outlets.

- Females are the primary users of telephones purchased in 1980.

- Households most interested in the purchase of phones have a head-of-household between the ages of 25 and 50.

- Most purchases are made in the North East and Central states. Fewer in the South or West.

- The majority of telephones purchased in 1980 were used as extension telephones, rather than purchased for primary installation.

- The number of telephones purchased (by those making purchases) was a little over 1 per household.

ANSWERING UNITS

The Answering Unit product category has actually been available to consumers through retail channels longer than telephones. The market for these products is currently segmented by feature and price. Answering Units are either 'Remote-Activated' ($200-$450) at retail, or 'Non-Remote' ($100-$200) at retail . All Answering Units are designed to answer a user's telephone with a pre-recorded message, either requesting the caller to leave a message, or only announcing the user's message. The vast majority of these devices are manufactured in the Far East.

Answering Unit Market Size and Forecast

The FCC rulings in November 1977 which liberalized telephone equipment interconnect also had a positive effect on the Answering Unit market. Prior to this ruling, the market had been growing at a rate of 3%-5% a year. From 1978 to 1980, the market grew at 15%-20% annually, and this more recent growth rate can be expected to continue for the next several years. The market in 1981 has been estimated to be at over 560,000 units, and by 1985 is forecast to double to over one million units. Dollar volumes for this category will increase from $80 million in 1981, to in excess of $150 million at retail in 1985. This forecast does not reflect the potential impact of telephone company Central Office answering services, or store and forward features which could be built-into small business and residential PABX products. At present, it is believed that telco services, if they are introduced at all, will be priced high enough to have relatively little impact on the traditional Answering Unit market.

Currently the market is divided between small business use (65%), and consumer households (35%). Household use is growing as more advertising dollars are spent by manufacturers to educate consumers on the benefits of owning Answering Unit devices.

Market Trends

Growth in telephone Answering Unit sales is expected to take place as a positive by-product of increased consumer involvement with telephones, spurred by technology advances and new market entries of major consumer electronic companies like Panasonic. Established suppliers, like Ford Industries, are also expected to increase advertising and promotion activities.

Changes in American life-styles, with more multi-wage earners per household, will increase the need for these units, as the likelihood will increase that no member of a household will be at home for a large portion of the day.

SMALL KEY TELEPHONE SYSTEMS - (1-5 lines)

In 1980, very few, if any, Small Key Telephone Systems were sold to residential users. Key Systems are the kinds of telephone systems found in most small businesses. It's important to have at least a rudimentary understanding of the operation of these systems, as elements of Key System operation will appear in one of the new products to be introduced later in this memorandum.

Small Key Telephone Systems are today's major proprietary customer-location communications system. These systems always use direct-line termination for inward and outward outside call completion. The 'direct lines' (or PABX lines when the Key System is behind a PABX) can appear at all, or some, of the key telephones in the system and are accessed by circuit buttons on each telephone. When a user pushes one of the telephone key circuit buttons, he receives either a central office or a PABX pool dial-tone, and may place his call. For incoming calls, a user pushes the button associated with the call, which places him in contact with the calling party. Incoming calls can be directed to internal systems users by a variety of methods, the most common of which is the use of an internal intercom.

Small Key System Market Size and Forecast

A new generation of Electronic Key Systems, pioneered by NEC, is attracting attention from all of the major telecom suppliers, including AT&T. This new generation of systems is microprocessor-based and offers expanded features with reduced cabling costs.

The market for Key Systems is expected to grow at an annual rate of 7%-8% per year throughout the forecast period. This is at a slightly slower rate than was experienced between 1976 and 1980. By 1990, the market for Small Key Systems is expected to approach 275,000 units, valued at $260 million

Market Trends

With the injection of new life given to the market by interconnection, the demand for Key Systems will remain solid for the foreseeable future. Telcos and interconnect industry participants are becoming more responsive to subscriber needs, offering wider portfolios of equipment and adding and dropping suppliers more readily.

End-users of small Key Systems will continue to be small businesses ranging over the entire spectrum of industry classifications.

PABX SYSTEMS

INTERCOMS

Intercoms are loosely defined as business or residential internal communications systems consisting of a central-location control unit and master stations and/or sub-stations. Generally, these systems do not connect to the switched public telephone network. They are included in this review because they are perceived by users to be a part of the consumer telecom products market in 1981.

Although Intercom Systems can operate in a variety of ways for a variety of applications, the two most common types are:

- Dedicated Button Intercoms, and
- Key Pad, or Dial Intercoms.

Dedicated Button Intercoms are generally used in a master-to-remote sub-station arrangement. Sub-stations can be signaled from the master station, but they cannot call other sub-stations. Dedicated Button Systems are usually limited in size by the number of buttons required on a master station. A 24-station system would be considered large.

Key Pad, or Dial Intercoms are generally used where a lot of user interaction is required. A key pad or dial is used to dial user codes to signal a called party. A central switching device makes connections, and station instruments are simply intercom units equipped with a key pad or dial, a handset and/or a loud-speaker.

Key Pad or Dial Intercoms permit a wide range of features, including privacy, conferencing and multi-paths for simultaneous conversations. A centralized approach offers almost limitless expansion capabilities and optional access paging, hands-free responses, and in some cases, interconnection into telephone circuits.

Intercom systems can range in price from around $100 to several thousand dollars. Installation of small systems can involve no charges whatsoever (units plug into and use common electrical outlets as the communications pathway). Installation of large systems can be a considerable part of a final system's cost.

Intercom Systems Market Size and Forecast

Residential and small businss purchases of Intercom Systems represented a high percentage (nearly 90%) of total unit sales in 1980, but a relatively small (8%) share of end-user expenditures in this category. For large commercial systems and hi-rise/safety systems (both of which require substantial installation and maintenance), the reverse is true - low percentage of

unit sales and high dollar volume. Large systems are not included as a part of the forecasts in this memorandum.

Sales of small residential and business systems totaled 325,000 units in 1980, valued at about $26 million. Both the unit and dollar volume of inexpensive intercoms are expected to increase at annual rates of 3%-5% during the forecast periods. In 1985, 375,000 units valued at $36 million are forecast to be sold, and by 1990, 425,000 units valued at $36 million are forecast to be sold.

Market Trends

Purchase of intercoms for residential applications will continue to be tied to consumers' discretionary incomes. Intercoms are household luxury items, not necessities. New intercom capabilities, however, can be expected to be built-into a variety of new home-communications products during the during the next several years.

MOBILE PHONES

Mobile Phones are telephone units which communicate with two-way radio base stations operated by wireless and radio common carriers. These products are usually installed in cars, boats, and more recently, in briefcases. Not included in this review are two-way radios of the type used by taxi companies, etc.

Mobile Phone Market Size, Forecast and Trends

The market in 1981 for Mobile Phones is flat, due to over-loaded facilities. Equipment sales are limited to replacement units, and the replacement unit market has been relatively solid during the last several years. Many users want to upgrade their equipment to take advantage of newer automatic and semi-automatic features recently incorporated into Mobile Phone products.

The most important technology advancement in radio telephone service is the recent development of Cellular Systems which operate in the 800 mhz band. When these new systems become fully operational, they will dramatically increase the numbers of Mobile Phones in operation as they permit substantially greater volumes of traffic. In addition to increased capacity, Cellular Systems will offer larger coverage areas with fewer limits on the reuse of single channels. Service will be greatly improved, and can be offered to more consumers at greatly reduced prices.

U.S. sales of Mobile Phones were estimated at 10 thousand units, valued at $20 million in 1980. The market is expected to grow very slowly through 1984, then as a result of large increases in channel capacity, is expected to grow very rapidly. By 1990, a mass-market for Mobile Phones is conceivable. Although still years away, we have forecasted sales of 150,000 units, valued at $268 million in 1990.

The high levels of unsatisfied demand among affluent users, and cost reductions resulting from new Cellular System design are the impetus for the wider market. Consumer price thresholds which might allow a mass-market to develop are expected to be crossed by the end of the decade.

POCKET PAGERS

Pocket Pagers are paging receivers which communicate with base stations operated by wireless and radio common carriers as well as private system operators. Typically, pagers communicate with simple tones which indicate someone is attempting to call or contact the carrier. Increasingly, pagers are also incorporating digital read-outs, message storage and delayed message delivery features.

Pocket Pager Market Size, Forecast and Trends

Sales of end-user paging equipment were estimated at $60 million in 1980 at manufacturers' level. No effort has been made to establish end-user expenditures in this category.

Radio paging in the U.S. is forecast to grow from a current population of approximately 1 million units in use, distributed among telephone companies, radio common carriers and private system operators, to approximately 6 million units in 1990. Radio common carriers have captured about 70% of this market, and they can be expected to prevail in the leadership position throughout the decade. Much of the growth in this field will be stimulated by continued price reductions in 'tone-only' and 'tone-plus-digital-readout' pagers, and by aggressive marketing on the part of RCC's. About 10% of the pagers in use in 1990 will be used in regional or nationwide 'roaming' applications. Increased capacity of automated paging terminals will absorb some of the projected growth, however. The FCC is currently giving consideration to authorization of additional channels in the 800 mhz area for both private and nationwide paging services.

The most successful supplier strategies call for providing the best performance, simplest notification product at the lowest possible cost.

TELEPHONE ACCESSORIES

The Telephone Accessories Products category is the smallest segment of the retail telecom market. It's composed of products such as plugs, jacks, couplings and wiring designed to give consumers greater flexibility when adapting telecom products to their specific needs. The Far East is the major source of these products.

There is an additional sub-segment within this category which offers peripheral devices for current telephone products. Hold Buttons, Dialer Couplings, etc., are examples of these add-on products. Some of these peripheral devices eventually find their way into telephone subsets, and this sub-category should be watched for new telephone product opportunities in the future.

THE CONSUMER PRODUCTS MARKET AT SUPPLIER LEVEL

Market Size and Forecast

The total market, at supplier level, for consumer telecom products has been estimated at $720 million in 1980. Forecasts indicate this market will increase at an overall rate of 11.2% per annum to $1,235 million in 1985. Beyond 1985, growth is forecast to average 9% per annum, with the market totaling close to $1,900 million in 1990.

The single largest segment of this market is Subsets, which is expected to account for 65%-70% of the market total through 1990. In 1980, 16 million Subsets valued at $402 million were shipped by suppliers. According to present estimates, over 29 million Subsets valued at $1.3 billion will be shipped into the market in 1990.

1976 - 1990 Consumer Apparatus Market - Supplier Level

Product Category ($-millions)	1976	1977	1978	1979	1980	1985	1990
Subsets	$305	$342	$386	$431	$402	$810	$1,275
Answering Units	50	60	70	69	75	97	113
Key Systems	86	94	104	112	122	177	259
Intercoms	10	12	13	13	14	16	19
Mobile Phones	30e	35e	40e	45e	60e	75e	125e
Pocket Pagers	25e	27e	30e	35e	47e	60e	100e
Total:	$506	$570	$643	$705	$720	$1,235	$1,895

Product Category (Units-Thou.)	1976	1977	1978	1979	1980	1985	1990
Subsets	16,000	17,000	21,000	22,000	16,200	22,000	29,000
Answering Units	230	200	324	345	450	1,235	2,300
Key Systems	90	99	109	118	128	186	270
Intercoms	250	275	300	300	325	375	425
Mobile Phones	50e	60e	70e	70e	60e	80e	100e
Pocket Pagers	150e	175e	175e	200e	200e	200e	200e

e - estimate.

END-USER SALES BY MARKET SEGMENT

The impact of existing and pending legislation and regulatory actions on the consumer telecom products market can be most clearly seen in actual and anticipated shifts in the telephone subset market.

As shown in the chart below, in 1976, the telcos completely dominated this market. While they continue to do so today, it is expected that by 1985, 50% of this market will be supplied through other than traditioanl telco channels. In 1990, telco Phone Stores and other non-telco Retail Outlets are each expected to supply approximately 25% of end-user telephone subset demand.

By 1990, traditional telco channels will account for approximately one-third of all end-user subset requirements. The remaining two-thirds will be evenly split between telco Phone Stores and non-telco affiliated Retail Outlets, with each selling approximately 10 million units in that year.

Subset Market at End-User Level

Market Category	1976	1977	1978	1979	1980	1985	1990
(units-millions)							
Traditional Telco Market	16.0	17.7	19.4	19.7	12.6	11.0	9.0
Telco Phone Stores	--	--	.625	1.1	2.0	5.5	10.0
Retail Market	--	--	.975	1.2	1.4	5.5	10.0

This shift away from traditional markets is less apparent in other product categories. A solid retail market for Answering Units already exists, and indications are that very little of that market is served by telcos directly. The Intercom market, as well, has been served for the most part by non-telco channels. Key Systems and Mobile Phones are still traditional telco markets. However, retail markets for these products, as well as PABX's, could easily develop as technology improves, and costs for these products are reduced.

THE RETAIL CONSUMER TELECOM PRODUCTS MARKET

As mentioned earlier in this memorandum, the retail market for consumer telecom products is made up of outlets which are most familiar to Atari; Mass-Merchandisers, Discount Stores, Department Stores, Catalog Showrooms, etc., as well as a portion of the existing Telco Phone Store outlet sales in which consumers actually purchase, rather than lease products.

Although, on the surface, this market seems small, it is growing rapidly. As mentioned earlier, telephone subsets were essentially at a zero base in 1977 and exceeded $142 million at retail in 1980.

Retail Consumer Telecom Products Market - 1976-1990

Product Category ($-millions)	1976	1977	1978	1979	1980	1985	1990
Subsets	--	--	$64	$91	$142	$445	$850
Answering Units	na	na	na	45	66	150	310
Key Systems	--	--	--	--	--		
Intercoms	20	24	26	26	27	33	38
Mobile Phones	--	--	--	--	--	--	--
Total:	$20	$24	$90	$162	$235	$625	$1,196

Product Category (Units-Thou.)	1976	1977	1978	1979	1980	1985	1990
Subsets	--	--	1,600	2,300	3,400	11,000	20,000
Answering Units	200	240	280	300	450	1,075	2,000
Key Systems	--	--	--	--	--	--	--
Intercoms	250	275	300	300	325	375	425
Mobile Phones	--	--	--	--	--	--	--

No figures are shown for key systems or mobile phones, and PABX's are not even mentioned, as no retail markets exist for these products as defined.

INDUSTRY/MARKET SUMMARY - ATARI ENTRY

The opening sections of this memorandum devote considerable attention to the nature of the telecommunications marketplace in 1981, and the evolution it's undergoing at all levels. New technology and recent legislative and judicial decisions have given the consumer side of the industry all of the characteristics of a new business, and the opportunities which exist today could not have been forecast as few as even five years ago.

Both the computer and the telecom industries are eyeing each other's future lying in their own traditional domain. Multi-national companies and banks, which awakened both industries to the needs for round-the-clock global flows of communications and information, have set the pace for development of a myriad of new services, and the average American is just beginning to understand the new utilities which telecom technology might provide during the next decade.

New digital techniques and microelectronics have contributed greatly to the telecom industry during the past five years. Telecom devices can now have the speed, lightness, and the "intelligence" of computers, and the differences between EDP and telecom technologies are rapidly disappearing. The communications skills of computational equipment are becoming better understood, and telecom increasingly depends on computers for processed and controlled switching.

It's hard to believe the interconnect market is just 13 years old. The Carterfone decision, which effectively shattered AT&T's monopoly in communications in 1968, started a round of pro-competitive FCC decisions which shows no sign of letting up. Independent hardware and systems manufacturers are flexing competitive muscles, and 1981 finds AT&T in a new market with many companies now competing for networking services. MCI and Sprint freely advertise their abilities to provide long-distance links for both businesses and consumers at prices well below those charged by Bell. And the courts approve.

According to Arthur D. Little, Inc., over $640 billion will be spent in all markets worldwide for new telecommunications equipment during the next decade. That's a huge figure. A good share of those expenditures will be for new personal and residential communications products and systems which exist either only in part, or don't exist at all in 1981.

It's interesting to note that the majority of changes taking place in both industries (EDP and Telecom) continue to come from those industries' supply sides - the EDP, telecommunications,

semi-conductor, and even the non-traditional supplier industries. End-users, or the demand side, appear to have little influence on newer, emerging EDP and telecommunications capabilities. New hardware, software and systems protocols are coming about at such a fast clip that even the most sophisticated end-users, who have high degrees of understanding of computers and processing, have difficulties expressing the needs of the emerging voice/data environment which is expected for both the office and the home in the mid 1980's. They just don't have the "windows" to new technologies which are available to suppliers. As end-users cannot reasonably express needs, they will be defined (for better or worse) by the many manufacturers currently strategizing systems opportunities for the new marketplace. New offerings which put communications products together in meaningful applications, will ultimately lead end-users to the right buying decisions, and the timing of those buying decisions.

In the midst of all of this confusion, the fact we've found of most interest is that we've been unable to uncover any major telco, telecom supplier, or peripheral contributor programs which focus on the integration of multimedia residential communications needs through telecom skills. This is not to suggest that companies won't eventually focus on problems relating to residential communciations integration. It just doesn't seem to be happening today. We also don't mean to suggest that efforts aren't underway which focus on specific pieces of the puzzle. We are certainly aware of the many residential Videotext and Viewdata tests taking place across the country. We are merely suggesting that we are unaware of any major efforts currently being undertaken by any telecom-related, EDP or consumer electronics company to integrate, organize, manage and control multimedia household communications needs through existing and threshold telecommunications technologies.

Becoming the first company to focus on telecom organizational solutions for evolving residential communications seems to be a major opportunity. Neither Warner nor Atari is tied to any preconceived notions which could govern what might be accomplished. Additionally, we have no installed and cumbersome telecom marketing, sales, equipment or service bases which might impede such a move.

In the past we've been able to identify a market niche and to stay one step ahead of competition with effective products and skilled marketing and merchandising. We are certainly aware of the value of being first on the block. We don't expect to control the entire residential communications market in the mid-to-late 1980's. That would be wishful thinking. No single company ever will. However, with focus on what's not being properly attended to by the competition, our chances should be good to build a significant business in telecommuni-

cations. There seem to be multiple opportunities to influence the evolving residential communications/information market with new products, services and system protocols which are alltogether unavailable to consumers in 1981.

Warner/Atari's strengths differ from the strengths of the traditional telcos and telecom suppliers, and in many ways are better suited to the emerging retail marketplace. We have a unique ability to react quickly in retail markets with products and services more aligned to both retailers and consumers. Taking advantage of timing, and adding some common sense, we should be able to focus a new retail business more quickly than the telcos, telco suppliers, or multiple EDP-based companies which have had little, if any, retail experience.

Warner/Atari has a special view of consumers and has had a remarkable record of success in consumers' homes. This view is an essential resource, yet it's not easily acquired. It's also something virtually all of our potential competitors lack.

The Bell System has already tied its own future consumer relationships to those which can be built through Bell-affiliated Phone Stores. Bell will always lack the necessary flexibility to attract consumers to new products and services through more familiar and competitive consumer electronics channels - the channels which are most familiar to us. At least the Bell name is well known to consumers. Names of international companies which could conceivably enter the market like Northern Telecom, LTD., Seimens, Mitel, NEC, L.M. Ericcson, and others are not. Nor are many of the major domestic-based EDP or telecom companies, including ITT and GTE. Further, Warner/Atari's developing international consumer franchise could become very important if PTT (Postal/Telephone/Telegraph) barriers continue to fall as they are expected to during the 1980's.

Although we don't have an in-house telecom engineering and development resource which is critical to success in the emerging telecom market, there are numerous role models available of the kinds of resources we would commit to a new telecom undertaking. It's only important to mention here that resources are available and a specialized and independent telecom management and engineering group (with possible acquisitions) could be assembled rather quickly to attend to the needs of the new business.

At this moment, industry and market conditions seem right for a Warner/Atari entry into the U.S. telecom market. With carefully developed and planned strategies yielding the right family of communications products, we should be able to build a solid base for growth within the industry for the remainder of this decade and beyond. The niche which has attracted our attention is still in its infancy.

ATARI-TEL

Introduction

If we were asked for a single line of advertising copy which would indicate to consumers the broad intentions of the new business in telecommunications, we would write:

"WE MAKE TALKING EASIER."

The focus of the new business will be on a NEW FAMILY OF COMMUNICATIONS PRODUCTS designed to improve the quality and reach of naive-user residential communications.

The business we will propose clearly evolves from the telecommunications domain. It will be based on familiar communications transactions and familiar language and dialogue skills.

In 1990, people will be interested in many of the same kinds of communications transactions in which they have interests today. They will be using devices of some sort to talk with friends over some kind of communications pathway. They will be making travel plans, paying their bills, checking their bank balances, leaving memos and messages, paging their kids, calling for theater reservations, shopping remotely from their homes for new goods and services. The list goes on and on. People will be using quite the same language they use today, just as we talk using much the same language and conversational standards we used 50 years ago.

The focus of new communications products and services has always been on the "means" of communicating, not on the "ends". Basic communications transactions and the language used to facilitate transactions change very little over time, if at all. What changes (and never more wonderfully than during the last decade) are the "means" by which people communicate or transact their needs.

It would therefore seem that the success of a new business in telecommunications can best be measured by our ability to convert current naive-user "means" of conversing or transacting to Warner/Atari manufactured products or provided services. Our new business will focus on building the numbers, kinds and parts of transactions which can be supported by new products and protocols. The more transactions or parts of transactions - from the very simple to the very complex - that we can enhance by making them either more pleasant, less costly, faster or more efficient to conduct, the larger our new business franchise should become.

Although this 'transactions' concept might seem obvious on the surface, it's fundamental to the development of the new communications business. We will not be selling Telesets (advanced telephones), Telecenters, Teledata Terminals, or Teledata Systems Protocols. We will be selling enhanced means of conducting naive-user-oriented conversations and transactions.

Building the business depends on a plan which will allow our transactions base to spread over time. As the business focuses on discrete and quantifiable transactions which occur in today's environment (and can be comfortably be expected to occur in equal or greater numbers in 1985 and 1990), the more transactions we can handle, the better.

At each stage in the growth plan a larger number of increasingly complex communications transactions can be supported by a family of new communications products, services and system protocols.

We've planned it that way.

Broad Business Objectives

We have established four broad objectives for the new business.

Because of the particular urgency within the company to grow a major new business in a new market which can take advantage of our existing consumer franchise, we first have a short-term objective to establish a 'presence' for the company within the retail telecom marketplace as quickly as possible. Fortunately, there is a window for entry now which might not be so readily available in the future.

Our second objective is longer-term. It's our intention to accommodate as many kinds of multimedia transactions as possible within an integrated family of products and system protocols. We expect our market base will spread to accommodate new product offerings as consumers increasingly understand the utility of the proposed product line.

Next, we want to make it possible for consumers to move gracefully from one new product to another without impact to their existing equipment (whether ours or another manufacturer's). Product planning and development will focus on discrete building blocks which can operate independently of each other. This will allow consumers to up-grade their communications systems as they wish (and can afford to) with the least possible system inadequacy. As consumers' systems grow, we expect to play an increasingly large role in fulfilling their total residential communications and transactions needs.

Last, but certainly of equal importance, it's our intention

to tailor our entire product planning program to existing naive-user communications and transactions needs which can be understood as needed and useful by our audience. Nothing esoteric. Every new product should reek of instant-utility. Consumers should be able to SEE IT, WANT IT, BUY IT, BRING IT HOME, PLUG IT IN, AND HAVE IT PERFORM.

New products, services and system protocols which score high marks in:

- Relative Advantage - the degree to which they can be viewed as superior to existing alternatives,
- Communicability - the ease with which the 'utility' can be accessed by naive-users,
- Visibility - the ease with which new products can be demonstrated to end-users where purchased (if necessary), and
- Compatibility - the extent to which new products match familiar consumer values and behavior (for communications products this means products and services keyed to familiar transactions and language/dialogue standards),

have the greatest opportunity to be adopted by naive-users in the shortest period of time. These qualities must be incorporated in every new product and service.

Crawl, Stand, Walk, Run - Product Planning

One simple observation must be made about the telecommunications products industry which separates it from virtually every other industry with the possible exceptions of Health Care and Transportation.

Bells and whistles are great, but the single most important telecom product characteristic is reliability. Consumers' lives depend on communications products and services in 1981 as they never have before, and this dependence can easily be expected to increase as the numbers and kinds of transactions which can be supported by new communications offerings increases during the decade. If we enter the retail telecom market we must be able to demonstrate our ability to manufacture reliable telecom products which perform for end-users virtually 100% of the time.

The product introduction cycle we will propose allows us to demonstrate our ability to manufacture fairly simple and basic telecom products first. It's convenient that the largest and fastest growing retail telecom product category is comprised of

relatively easy to engineer and manufacture products. It's also convenient that manufacturing and marketing of basic products will establish the most rapid 'presence' for the new enterprise as a bona-fide telecommunications competitor.

A learning Curve

Getting up to speed will take some time, both for Warner/Atari and for potential end-users. We have to learn how to successfully design, engineer and manufacture new telecom products, and end-users have to become comfortable with the notion that we have entered the business for the long haul.

Therefore, we propose a migration:

- From products easiest to engineer and manufacture to products more difficult to engineer and manufacture,

- From entry in a competitive but potentially rewarding product category (where there is plenty of business despite the presence of competition), to more rewarding and proprietary product categories (where there is an opportunity to have a proprietary market position, with less potential for direct competition),

- From familiar product concepts (products which consumers are already using to converse or facilitate transactions), to complex end-user product concepts (products which handle transactions in new and improved, but unfamiliar ways), and

- From products designed for naive-users, to products designed for naive-users. (This isn't migration, it's restraint!).

Transactions - The Focus of the New Business

As we are interested in having the new telecom business support multiple varieties of transactions, we have divided the communications transactions in which we have an interest into three discrete transactions groups.

These groups are:

- o VOICE COMMUNICATIONS TRANSACTIONS,

- o MULTIMEDIA HOUSEHOLD COMMUNICATIONS MANAGEMENT TRANSACTIONS, AND

- o DATA COMMUNICATIONS TRANSACTIONS.

VOICE COMMUNICATIONS TRANSACTIONS are interactive voice conversations within the home, to the home, and from the home to the outside, in which a user uses a device to either place or recieve a call, and to either talk or listen. Naturally, these transactions take place on TELEPHONES.

MULTIMEDIA HOUSEHOLD COMMUNICATIONS MANAGEMENT TRANSACTIONS are essentially "gatekeeping" transactions which control and manage multimedia communications for residents in the home and for the home itself through a centralized communications management device. These transactions will be assisted by system protocols controlled by a TELECENTER. The transactions which are managed fall into three categories:

- Those which take place within the home,
- Those which enter the home from the outside, and
- Those which are made to the outside from within the home.

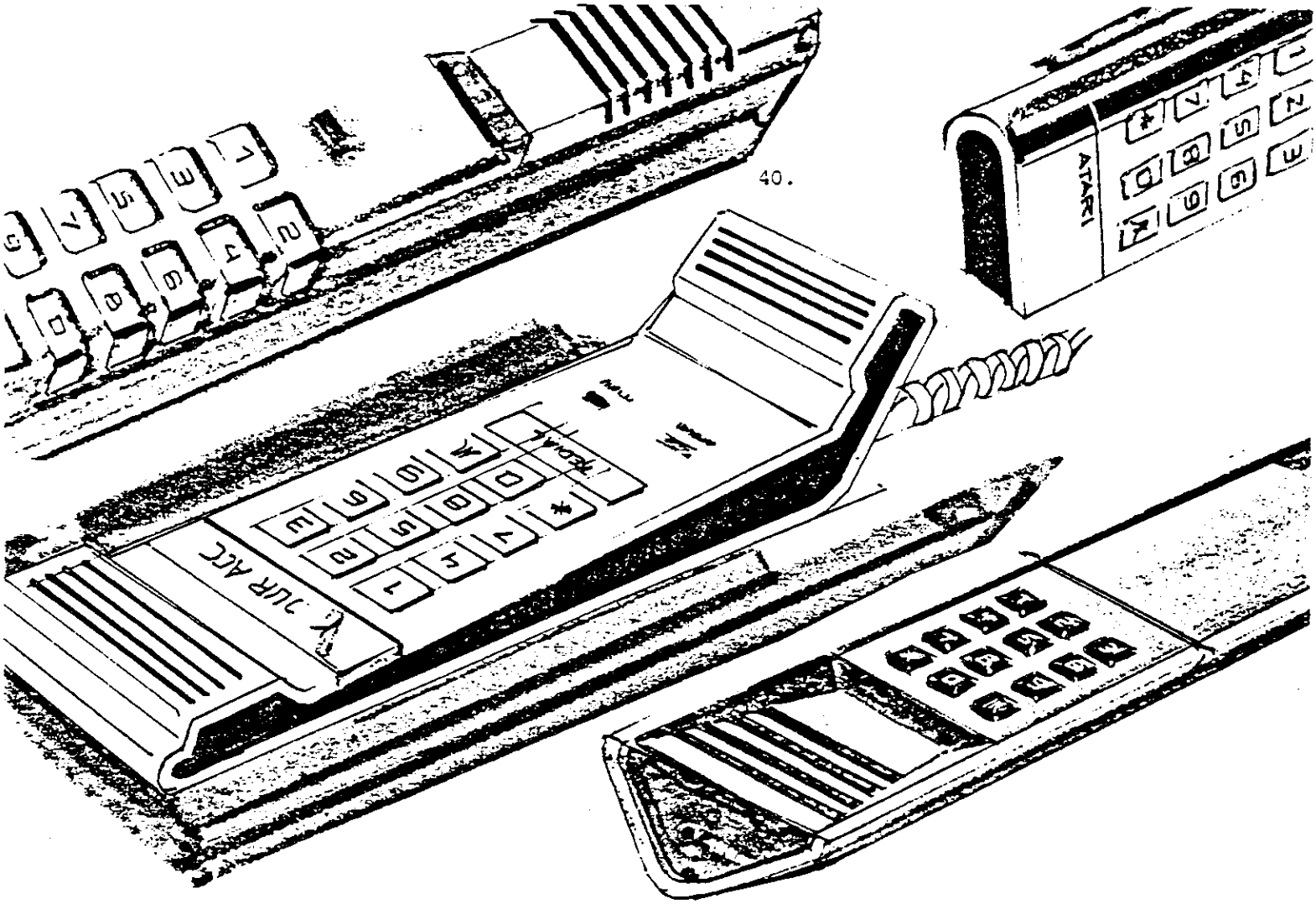
DATA COMMUNICATIONS TRANSACTIONS are either one-way or interactive "Teleprocessed" data transactions with outside electronic publishers or other services. The major factor motivating end-users is their need to access or manipulate discrete data or information, not a need to access raw processing power. These transactions take place on a TELEDATA TERMINAL, and through TELEDATA SYSTEM PROTOCOLS.

The three sections of this memorandum which follow independently describe, in greater depth, the three sets of transactions and the new products which will make them possible. Each section focuses on a single product concept. Although each of the product groups can be considered independently, each is a new building block in the new family of telecommunications offerings.

The three sections which follow are:

- o ATARI TELEPHONES - ADVANCED TELEPHONE SUBSETS,
- o TELECENTERS, AND TELECENTER PERIPHERALS, and
- o TELEDATA TERMINALS AND TELEDATA SYSTEM PROTOCOLS.

These products are the new business.



STAGE 1

ATARI TELEPHONES - ADVANCED TELEPHONE SUBSETS

Introduction

This section of the memorandum introduces the first stage of the new communications business. The focus is on:

VOICE COMMUNICATIONS,

or more simply put, on TELEPHONES.

Entry into the telecommunications market through advanced telephone subsets will give us broad exposure in the single telecom category which is most often seen, is most clearly understood, and in which purchases are currently being made by the largest number of American consumers.

From another perspective, entry into the business through telephones will begin our taking share of total household/ residential voice transactions. As outlined in the introduction to the new business, one of the broad objectives we've charted is to steadily increase the numbers of transactions which actually occur on, or can be supported by individual new devices in the new family of communications products. The number of transactions which actually occur on a device are obviously

related to that device's end usership. Although the first Atari telephone purchased by a consumer might enter his household as the second or third most important telephone in terms of usage, we would like that telephone to ultimately become his primary telephone. The second and third stages of the new business additionally give us the opportunity to design and market the first comprehensive household communications system.

Background

In 1980, telephones represented 55% of total sales, roughly $400 million of the $720 million of consumer telecom product sales at manufacturers' level. During the next 10 years, the telephone category is forecast to increase to approximately 68% of total telecom product sales at manufacturers' level. In 1980, 16 million telephone subsets were shipped into the U.S. market, and by 1990, the industry expects shipments to exceed 30 million units.

Operating telcos (Bell and the independent companies) account for about 80% of the total end-user market. Based on the Bell System and GTE dominance of the traditional market, it's highly likely that 55%-60% of this sector is supplied by Western Electric and GTE.

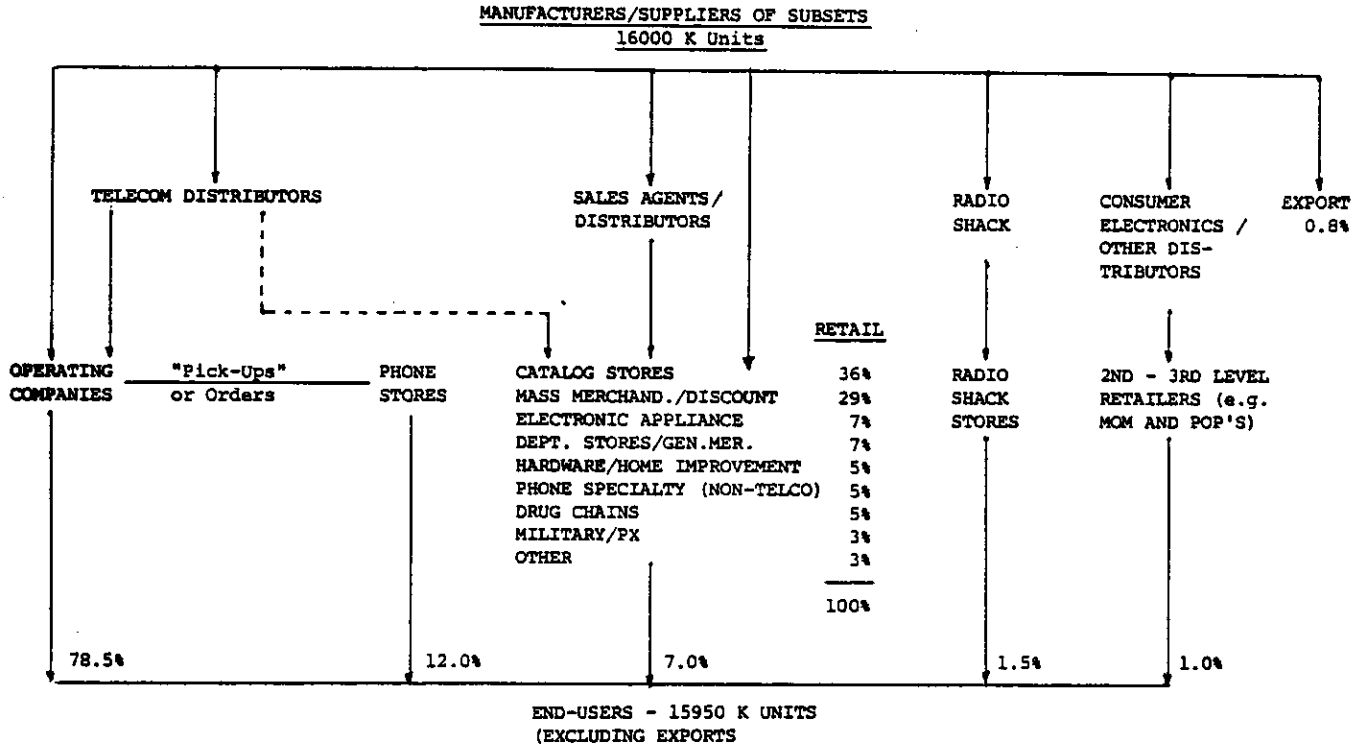
Bell-affiliated distributors fulfill the subset needs of the Bell Operating Companies, and Independent Telecom Distributors fulfill the needs of the independent operating companies. In the traditional channels, telephones are either delivered to end-users by telco installers or are picked-up by end-users at Telco-affiliated Phone Stores. The 1980 AT&T Annual Report indicates that the Bell System ratio of installed to picked-up is approaching 50%/50%.

The remaining 20% of telephones supplied to end-users are purchased either at Telco-affiliated Phone Stores, or in retail outlets. Telco-affiliated Phone Store purchases accounted for 12% of the total end-user telephone market in 1980, or 60% of retail purchases in 1980.

Retail outlets other than Telco-affiliated Phone Stores accounted for the remaining 40% of end-user purchases, or 8% of the total end-user market in 1980. These purchases took place in the retail outlets with which we have the greatest familiarity (Mass-merchandisers, Discount Stores, Department Stores, Catalog Showrooms, etc.). These retail outlets are serviced by Sales Agents (independent reps), Consumer Electronics and other Distributors, and by Radio Shack types of operations. Many manufacturers of telephones also serve house and key accounts directly.

The diagram which appears on the next page illustrates how approx-

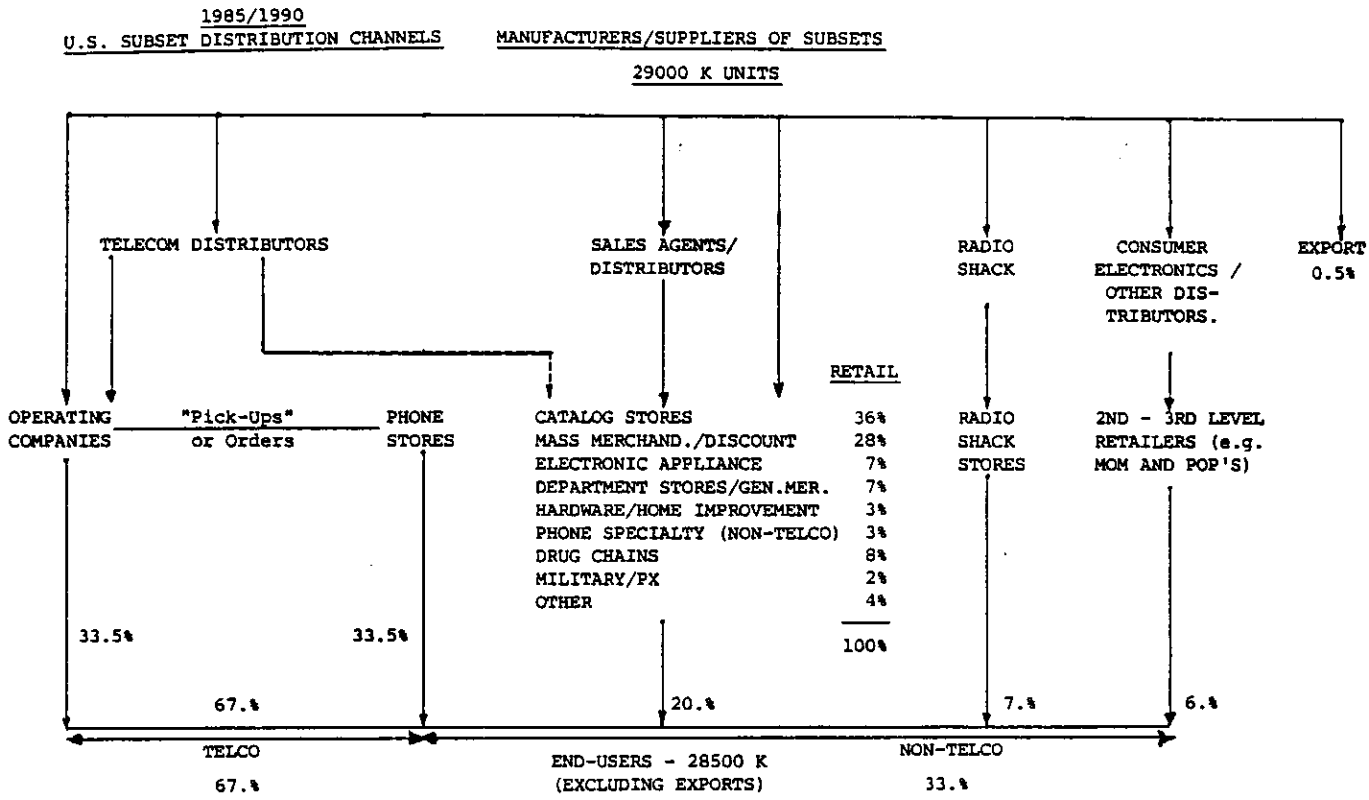
imately 16 million telephones moved from manufacturers to end-users in 1980. This diagram indicates that Catalog Stores and Mass-Merchandisers were the major non-telco retail outlets for telephones last year.



As the market for telephones is currently configured, the telcos (Bell and the independents) are expected to lose share of the total end-user market during the next decade. The increasing importance of Telco-affiliated Phone Stores is the single factor preventing even further Telco share decline.

At the same time, non-Telco-affiliated retail outlets are expected to increase to over 30% share of the total market in the 1985/1990 timeframe in comparison to the small 8% share these retail outlets enjoy today. Recalling that the retail market was effectively at zero in the middle of 1976, the 8% share already achieved by non-Telco-affiliated retail outlets is certainly a significant achievement. The non-telco retail market is still in its infancy.

The diagram which appears on the following page illustrates how approximately 30 million phones might move through channels from manufacturers to end-users in the 1985/1990 timeframe. Regardless of new subset unit volume which might be brought into the market by new non-telco manufacturers (increasing the non-telco share and decreasing the telco share), we feel that mass-merchandisers and catalog houses will continue to be the major non-telco retail outlets for telephones.

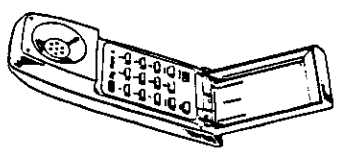


New Subset Categories - New Participants

In an earlier part of this memorandum we noted that the subset category is currently divided into five sub-categories:

- BASIC,
- DECORATOR,
- FEATURE,
- ONE-PIECE COMPACT, and
- CORDLESS.

Three of these sub-categories (Decorator, Feature and One-Piece Compact) are new entries since 1977. As also noted earlier, the stage was set for consumer acceptance of new telephone designs with the 1979 GTE national introduction of 'Flip Phone', which essentially opened up the One-Piece Compact sub-category.



Flip Phone

Although other telephone designs, mostly altered products from Europe, frequently appeared in small pockets of the domestic retail market during the mid-to-late 1970's, the GTE 'Flip Phone' provided the first meaningful evidence of consumers' reactions to new marketing and merchandising 'push' from manufacturers in non-telco retail settings. According to a source at GTE, the 'Flip Phone' achieved sales in excess of 650,000 units in its first 14 months at retail, and the figure could have been even higher. In any case, the unit sales achieved by this single product are significant.

Consumer acceptance of new designs which differ from traditional telco offerings seems to be the key to the growth of the market. ITT raced to enter the non-telco retail market late in 1980 with a competitive One-Piece Compact phone called 'Ultra-80'. Considering the poor design and engineering of this product, ITT achieved remarkable success with consumers. We've heard that sales of 'Ultra 80's' have now exceeded 250,000 units.

GTE is adding three new products to its retail line this year; an improved 'Flip Phone II', a One-Piece 'Solitaire', and an answer-only extension telephone. It's remarkable that in the past several years no other large companies (telco or non-telco) have made significant efforts to sell products on a national basis in non-telco retail outlets.

There are numerous (well over 100) remaining companies which are trying to introduce subset products through the new retail channels. Many smaller domestic consumer electronics companies (like Webcor), and many even smaller Far East based companies are attempting to ride GTE's coattails with look-alike subset products. None of the smaller companies advertise on a national basis, nor have any made concerted efforts to design new products which would be worthy of a national push.

Older companies in the telecom business (Stromberg Carlson, for example) continue to supply select mass-merchandisers and department stores with outmoded lines of Basic products. They don't appear to be planning to introduce anything new. Additionally, the newer competitors in the telecom products market (the ones mentioned in the four senarios earlier in this memorandum) are paying little attention to the emerging retail market for residential phones. Instead, they are focusing on the needs of the evolving office-of-the-future, producing Basic telephones to back-up office offerings in Key or PABX .

Appendix to this memorandum contains a sampling of subset products spanning all five sub-categories. It's worth spending several minutes reviewing the contents of this Appendix section to note the levels of engineering and product design represented. We feel it's a bumper crop of medium-to-poor products (including both GTE's and ITT's entries). You should also note the lack of lack of familiar brand names and manufacturers represented in

this section.

Subset Differentiation - Design and User Functions

Superior product design sells in 1981. So do interesting and useful product features. American consumers are being attracted to new phones for many of the same reasons the are drawn to other new consumer electronics offerings. They actively look for new products, and they've come to expect manufacturers to deliver new models of products which match increasingly sophisticated tastes. American consumers have a greater understanding, than ever before, of the benefits new materials, processes and technology can offer.

During the last 10 years, virtually every familiar consumer electronics device, from typewriters to high-end audio gear, has been improved. In today's market, improvement to consumers means enhanced product design (appearance and human engineering), and new and useful features and functions. Sometimes it's design only. Sometimes it's functions. Sometimes it's both.

Telephone Product Design

As larger numbers of products appear in any consumer electronic category, functional differentiation becomes more difficult to achieve, and design becomes increasingly important. In the fragmented and highly competitive CE industry, virtually every participant has seen the profit potential in a well-conceived product design program. The reasoning behind this potential is circular. Products are recognized because they are successful, and are successful because they are recognized.

Yet, it has taken a long time for product design to become recognized as important in telephones. There are good reasons why. As few as four years ago, consumer choice in telephones was limited to alternatives available from Bell and the independent telephone companies. Choice meant:

- Standard, Princess, Trimline or Trendline models,
- Rotary or Touch-Tone Dialing, and
- One of six available colors.

That was it. ITT and GTE mimicked Western Electric's designs and all three produced subsets which could survive 17-20 years in residential environments. Once installed, forgotten. Americans might not have liked their phones, but they worked and could be lived with. Telcos had no incentive to offer alternatives because replacement cost the telcos money. Even though subtle improvements were made in engineering from time to time, Americans could have cared less. The improvements were

transparent. Then the market changed.

Beginning in 1968, Bell and the independents no longer controlled the devices consumers could interconnect to the networks. Consumers could own telecom equipment for the first time. Following the Carterfone decision in 1968, products designed as discrete communications-aids began to appear in greater numbers in the market (Autodialers, Answering Units, etc.), and the retail market, though tiny, was officially open.

Telephones, forever a ubiquitous necessity, inevitably had to assume new personality. Late in the 1970's, as a result of new legislation making interconnection even easier, consumers began to learn that telephones could be attractive, fun to use, and fun to own.

If 'Flip Phone's' and 'Ultra-80's' successes are any indication of consumer interest in, and the potential of, enhanced design in telephone products, then the potential for new approaches in telephone design have barely been scratched.

Telephone Features and Functions

New and useful telephone features and functions are the other side of the telephone differentiation equation. They have begun to appear in greater quantities, and have found high levels of consumer acceptance.

In examining this issue, we have two important concerns. First, the laundry list of functions which can be built-into today's telephones is endless. There must be a declining scale of utility for those incorporated in new products. Secondairly, as our business addresses a family of communications products, the specific location or user functions becomes very important. The Second-Stage product section which follows this one focuses on a unique centrally-located communications control device. If we were intending to manufacture only telephones, we might have been predisposed to incorporate as many functions as possible into new subset product. As we have the luxury of looking ahead, we will be very selective. We will choose functions based on where they belong, as opposed to where they might fit.

Functions relating to freestanding telephones generally relate to 13 broad categories:

- Ease of Dialing,
- Mobility,
- Emergency,
- Reduction of Dialing Errors,
- Prevention of Redialing and forgetting to Redial,

- Plural Party Functions,
- Convenience of Called Party,
- Enhanced Sound Reproduction,
- Optimization of Incoming Tones,
- Measures During Call,
- Diversification of Network Access and Payment,
- Charge Information, and "Other".

A breakdown of each of these optional feature sub-categories appears in Appendix . Suffice it to say that well try to achieve the highest utility and the proper location for all features we might incorporate - at the lowest possible cost.

ATARI TELEPHONES - "TELESETS"

Preliminary Product Description

Our new advanced telephones will be called "TELESETS". They will be compact, lightweight, fun to own, reasonably priced, easy to operate, and should stand apart from all other subset offerings in the retail telecom market in the Fall of 1982. Telesets will be more than ordinary telephones.

Our new phones will derive their character from concepts embodied in the One-Piece-Compact and Feature Phone sub-categories described earlier in this memorandum. To describe our product line, we need to again briefly focus on Appearance and Function. Although we can offer only limited information at the moment, our broad product intentions should be clear.

Teleset Appearance

We are aiming for a final Teleset appearance which derives more from the very best design the consumer electronics industry has to offer (the quality embodied in the best of high-end audio products, for example), as opposed to typical telecom offerings. Our advanced Telesets will have an "upscale" image. We intend to spend considerable time refining a number of industrial design concepts, and have already begun a review of new materials which could be candidates for new Teleset housings.

Illustrations of several Teleset candidates appear on pages

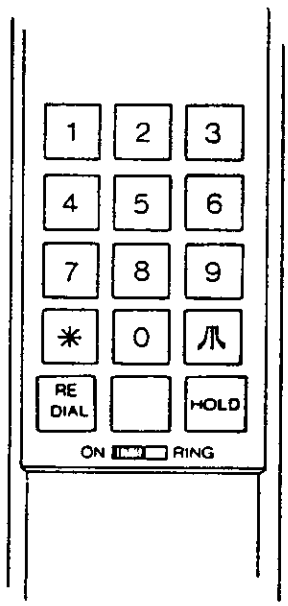
. These renderings are not final. They are just the beginning of our design effort and only reflect possible styling approaches. These drawings have been rushed for inclusion in this memorandum, and many more concepts and designs will follow in the coming weeks.

Teleset Functions

Telesets will incorporate all of the existing functions of standard telephones. However, because of the unique systems approach behind our new family of communications products, several Second-Stage Telesets will incorporate new functions which will not be incorporated in the First-Stage.

First-Stage Teleset Functions

The illustration below indicates the appearance of a Teleset Control Panel in the First-Stage introductory products.



The keyset illustrated above will be a universal push-button-outpulse keyset. This special keyset will allow pushbutton operation of Telesets on either Rotary or Touch-Tone private lines.

The relationship of the keys will be the industry-standard, Bell established, 12 button keyset. It will not be altered in initial Teleset offerings, however, we will test the possible use of new keyset formats as illustrated on page .

Telesets will additionally incorporate several functions which

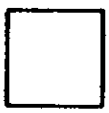
are manditory for new phones in today's market. The functions which follow are not only useful, they are already incorporated into GTE's and ITT's more recent offerings.

REDIAL

The last number REDIAL key allows the last number called to be redialed with the press of a single button. This function becomes valuable when a user finds a number busy, especially a long-distance number.

MUTE or HOLD

The MUTE or HOLD key allows a user to place a call on "HOLD" such that the individual with whom he is talking cannot hear, even though the line remains connected.



RESET

The RESET key overrides the normal disconnect and allows a user to make multiple calls without having to "hang-up" the telephone.

RINGER CONTROL

The RINGER CONTROL switch or key allows the ringer tone or bell to be turned ON and OFF, or its volume to be set.

AUTOMATIC DISCONNECT (No key, built-in)

If a Teleset has been left "off the hook" by mistake for a period in excess of two minutes, the Automatic Disconnect function will restore the line to "on-hook" status. A press of the RESET key will restore the Teleset's operation.

This is just he beginning of new functions which might be incorporated in the First Stage. We will not commit to more

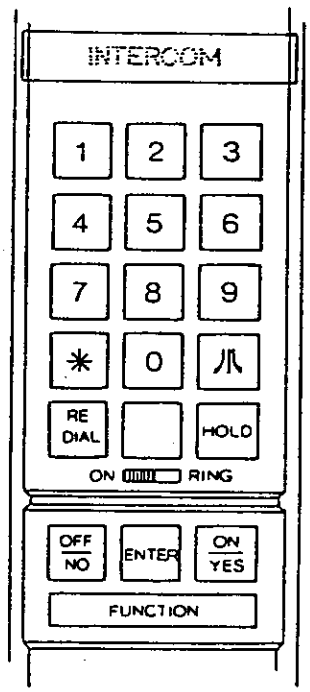
until we've had a chance to review all possible function candidates for their utility, proper location and cost.

Second-Stage Teleset Functions

Many of the user functions which we might have considered for inclusion in our initial First-Stage Telesets belong most reasonably incorporated in the Second-Stage TELECENTER.

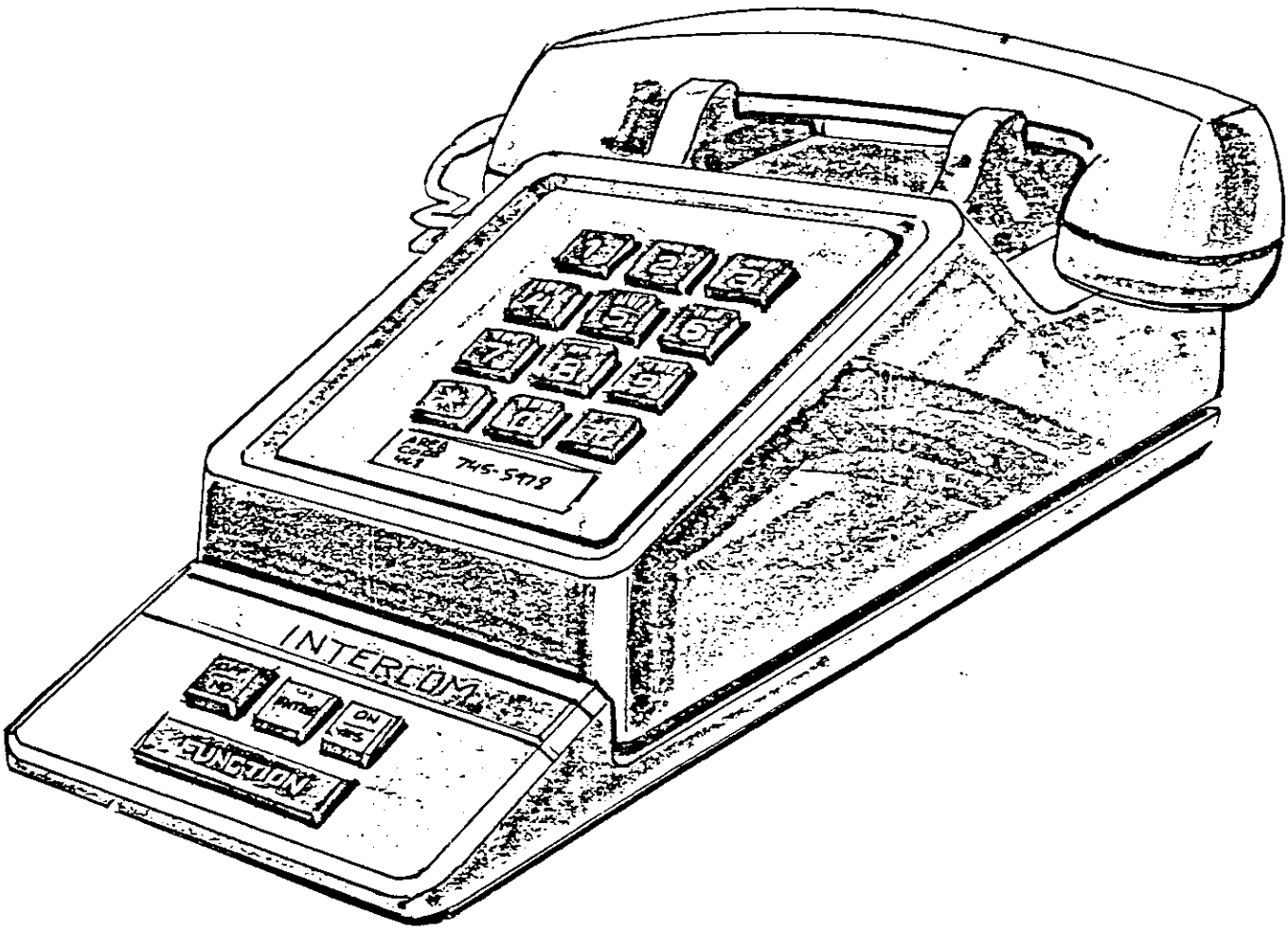
Although we will not discuss the functions of the Second-Stage TELECENTER here, we will reveal a unique four-key remote TELECENTER CONTROL which will be incorporated into Telesets at the time of the TELECENTER introduction.

The illustration below indicates the appearance of a Teleset control panel in the Second-Stage of the new business. With the exception of the four new keys and the small LCD display window, all of the functions of the control panel below should already be clear.



The extra four keys above and the small LCD window will permit new remote control Telesets to control all of the new TELECENTER communications functions. Additionally, these new

naive-user keys will be incorporated into a new peripheral device which can turn any existing telephone into a remote TELECENTER controller. An illustration of this special remote peripheral appears below. Its operation will be covered in the TELECENTER section of this memorandum.



The Telecenter Remote Control Peripheral

The Introductory Teleset Line

To launch the first stage of the new telecommunications business, we feel it will be necessary to introduce 3 - 5 new Teleset units at the same time. Any fewer entry products would not constitute a line and would not have sufficient impact to achieve the high unit volumes we would like to generate in the first stage of the new business. Additionally, three to five Teleset units would put Atari-Tel on a par with, or slightly ahead of GTE and ITT in the telephone subset sub-categories in which we plan to compete at market entry.

If retail demand exists to the extent we believe it does for new national brands of telephones, the introduction of a comprehensive, well thought out line could very quickly put the new business in a brand leadership position across the country. The recent delay in the Computer Inquiry II decision (from March of 1982 to January of 1983) works in our favor. We should be able to capitalize on the timing of that decision's implimentation. Following January 1983, end-users will be required to purchase all telephone subsets for new installations.

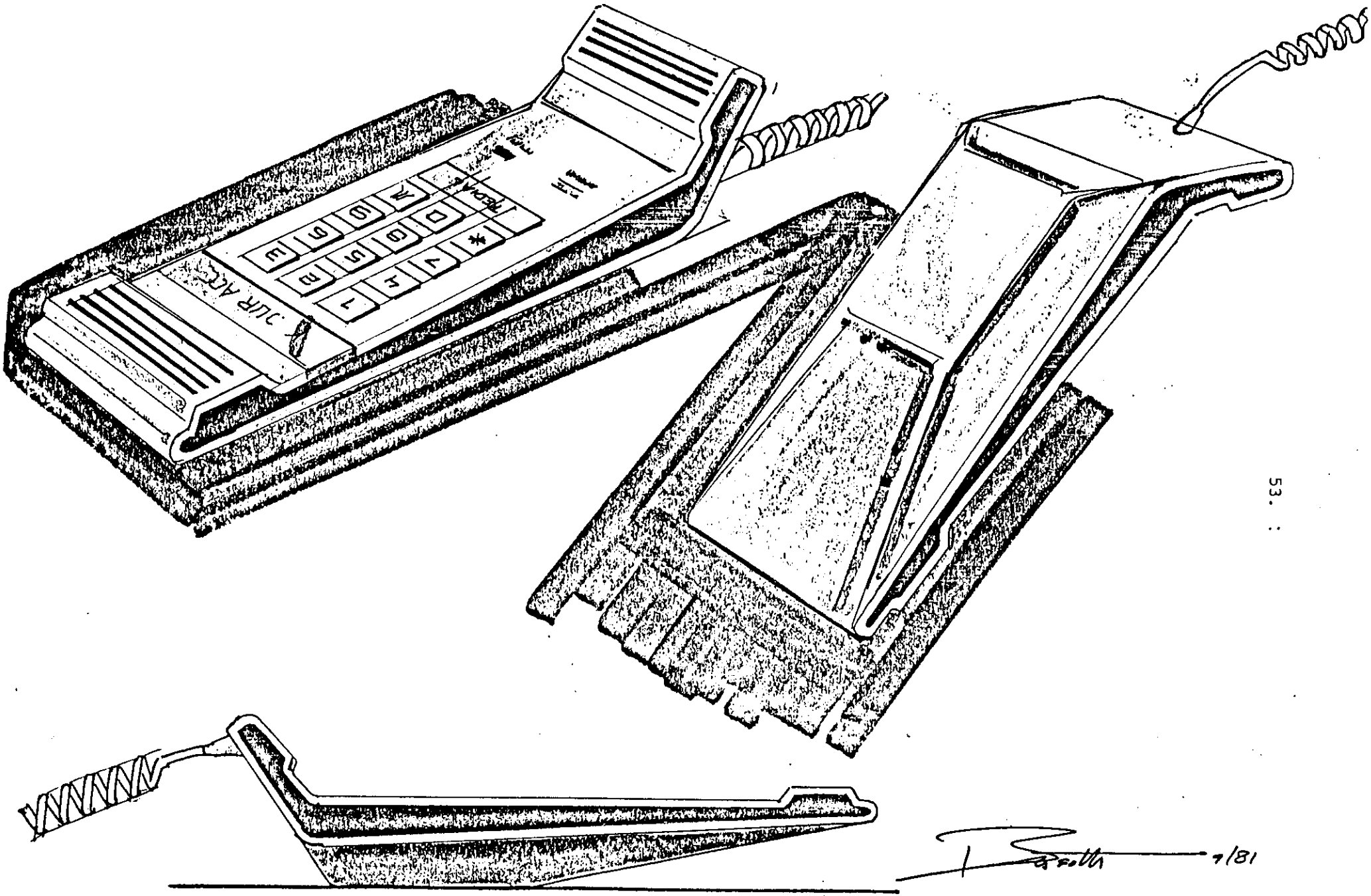
Although three to five Teleset units might seem a large number of phone products to design and engineer in a relatively short period, remember that all of the electronics will be shared and common to all. The chip-sets for these products are currently available. The real challenge, beyond state-of-the-art electronics, is going to be the engineering and design of unique Teleset housings. We will require a number of fresh housing concepts from which to pick.

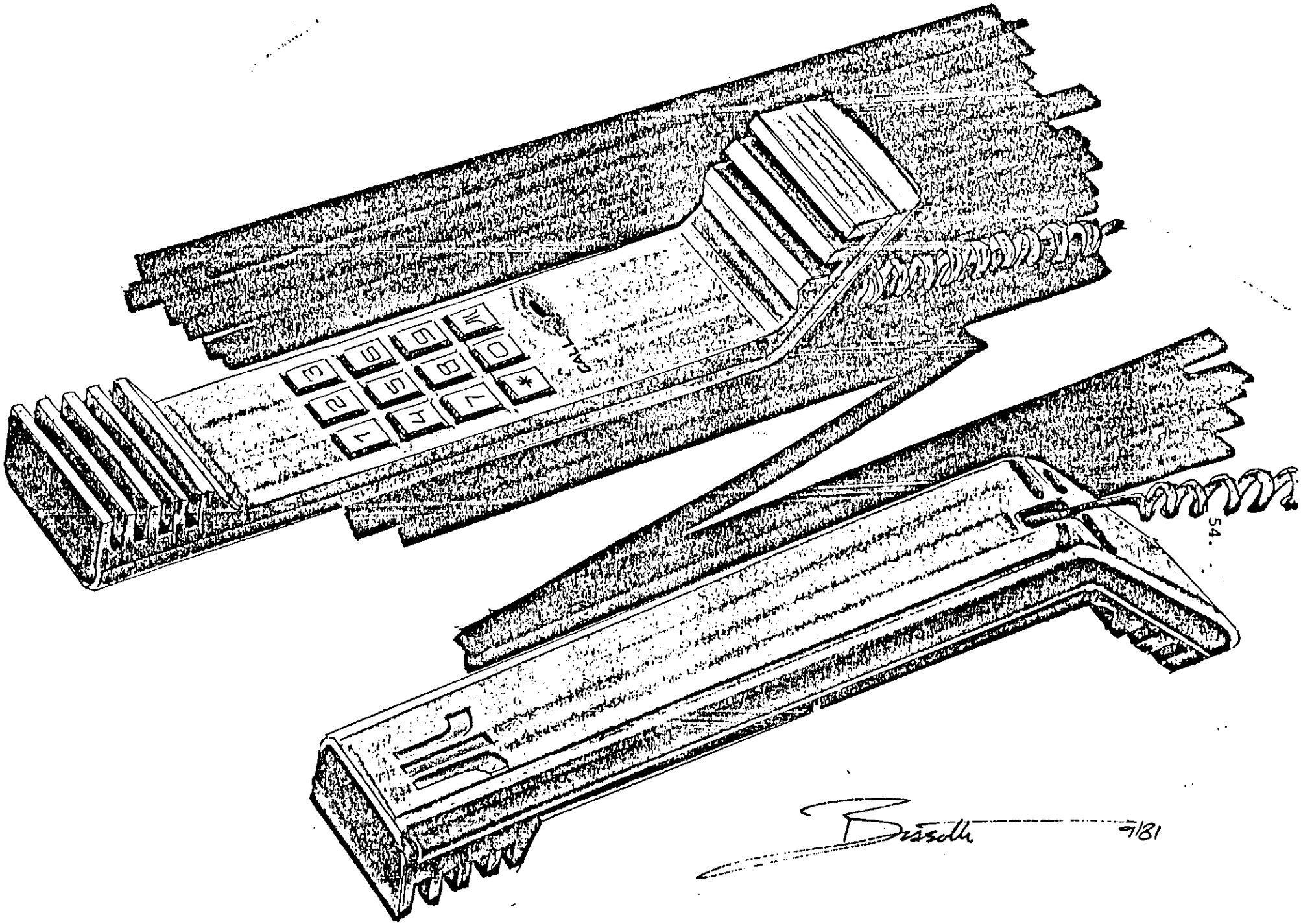
At launch of the new business in 1982, we plan to introduce:

- 2 - 4 different Teleset models which incorporate all of the features described in the first-stage product description, and

- 1 - 2 "Answer-Only" extension Telesets. One of these Answer Only Telesets will also be used as the handset for the Telecenter to be introduced in the second stage of the new business.

The pages which follow indicate possible appearance of new Teleset products. As noted earlier, these renditions are just the beginning, and many more concepts will be generated within the coming weeks.

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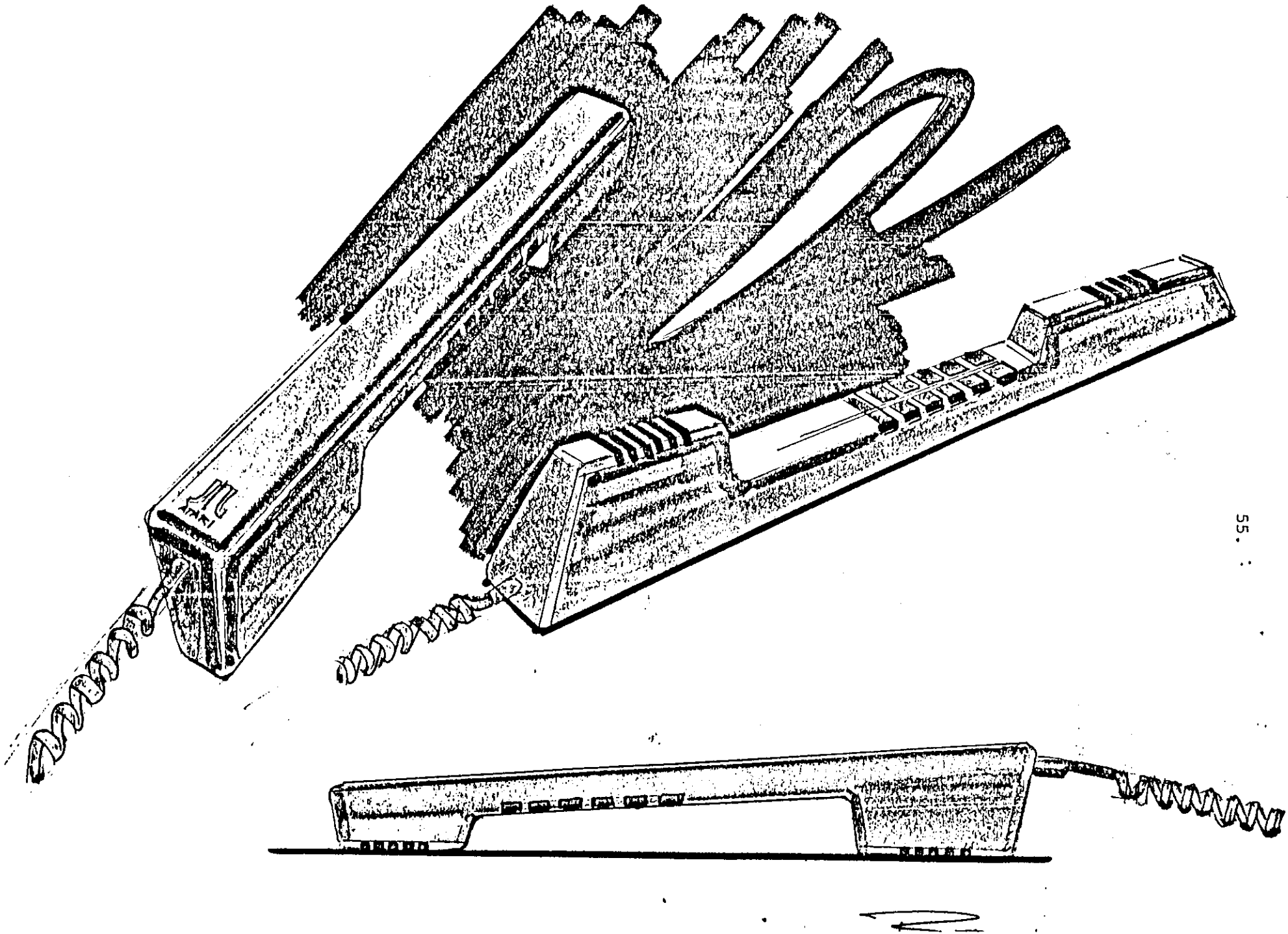

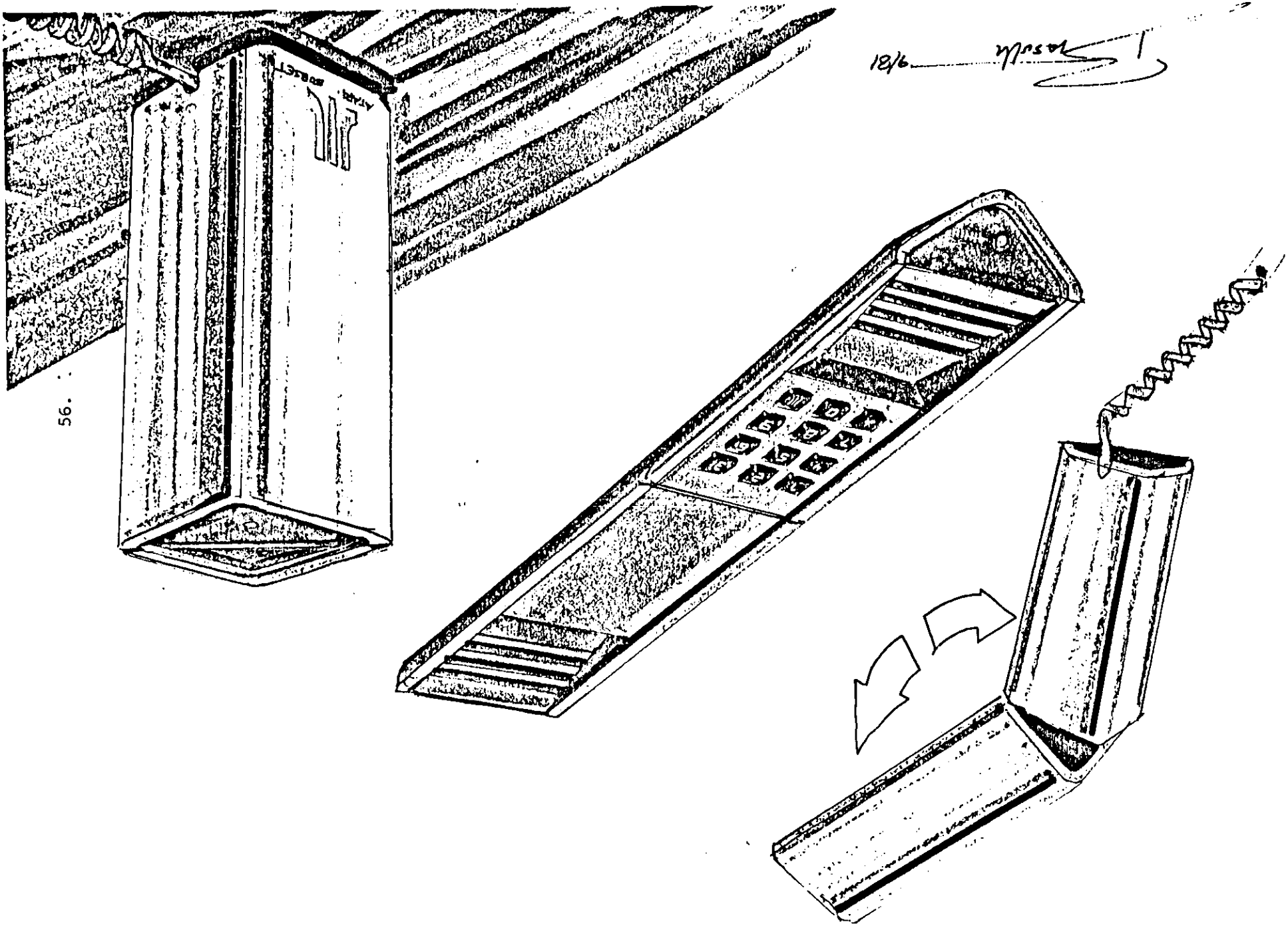

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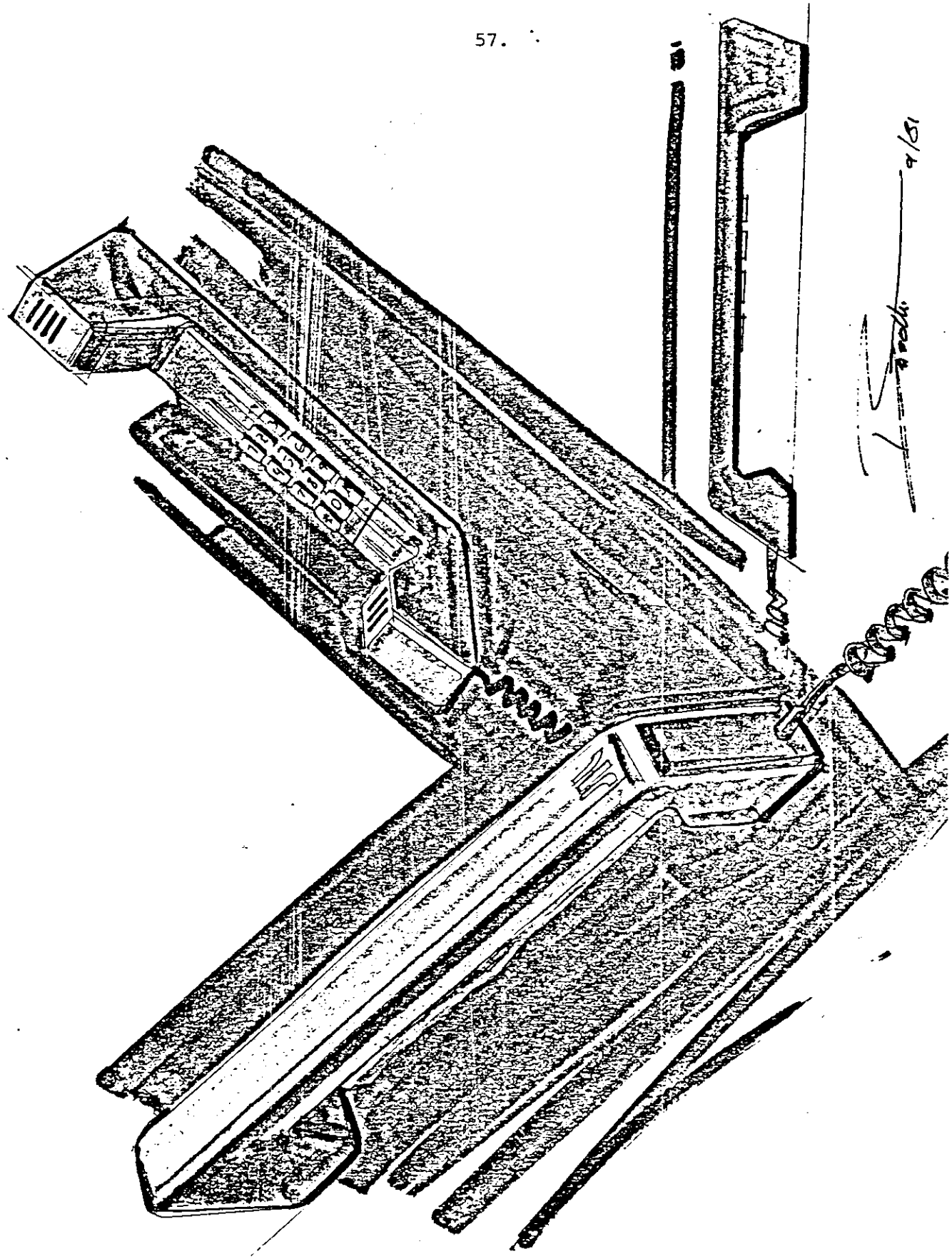
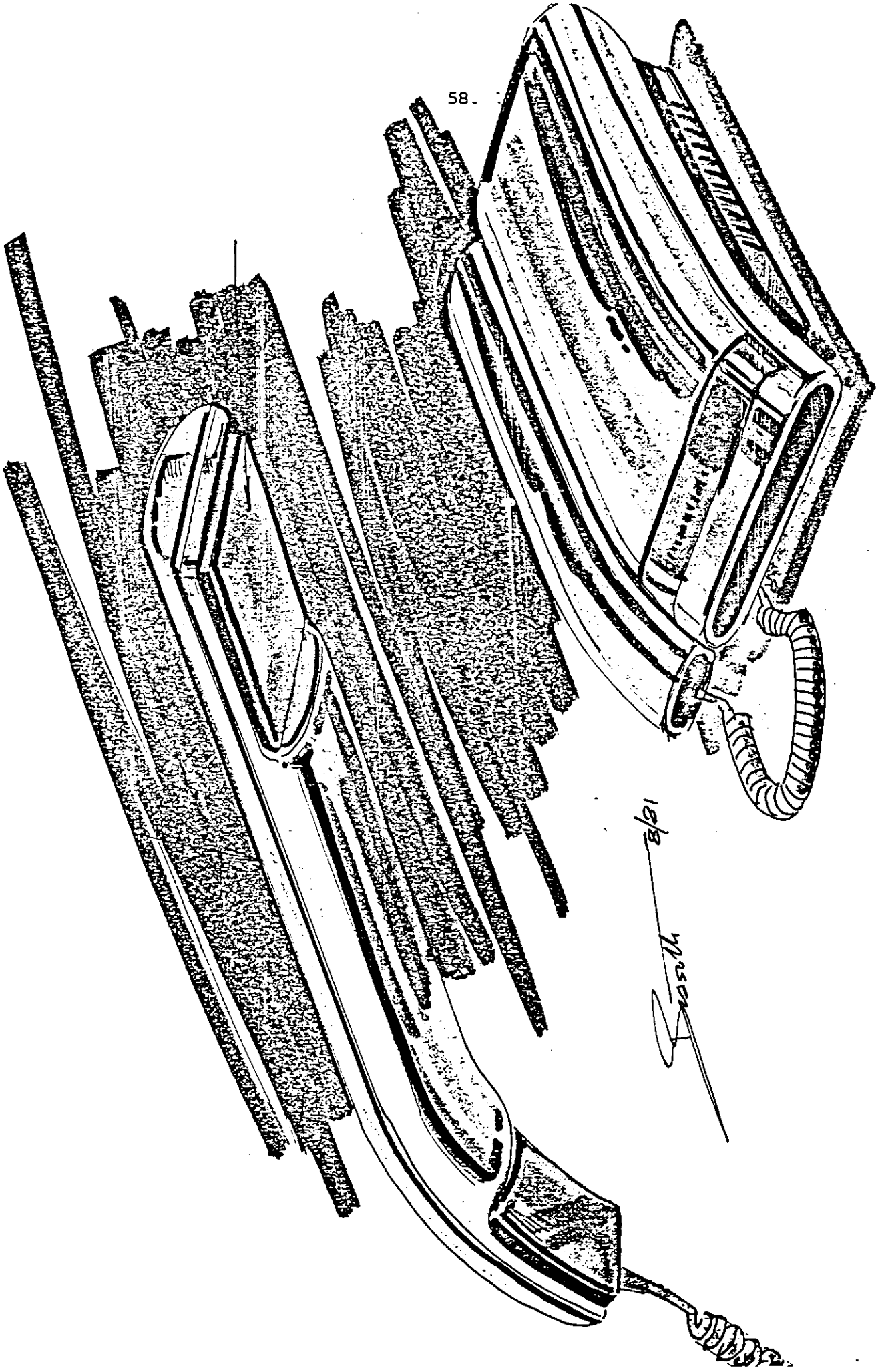
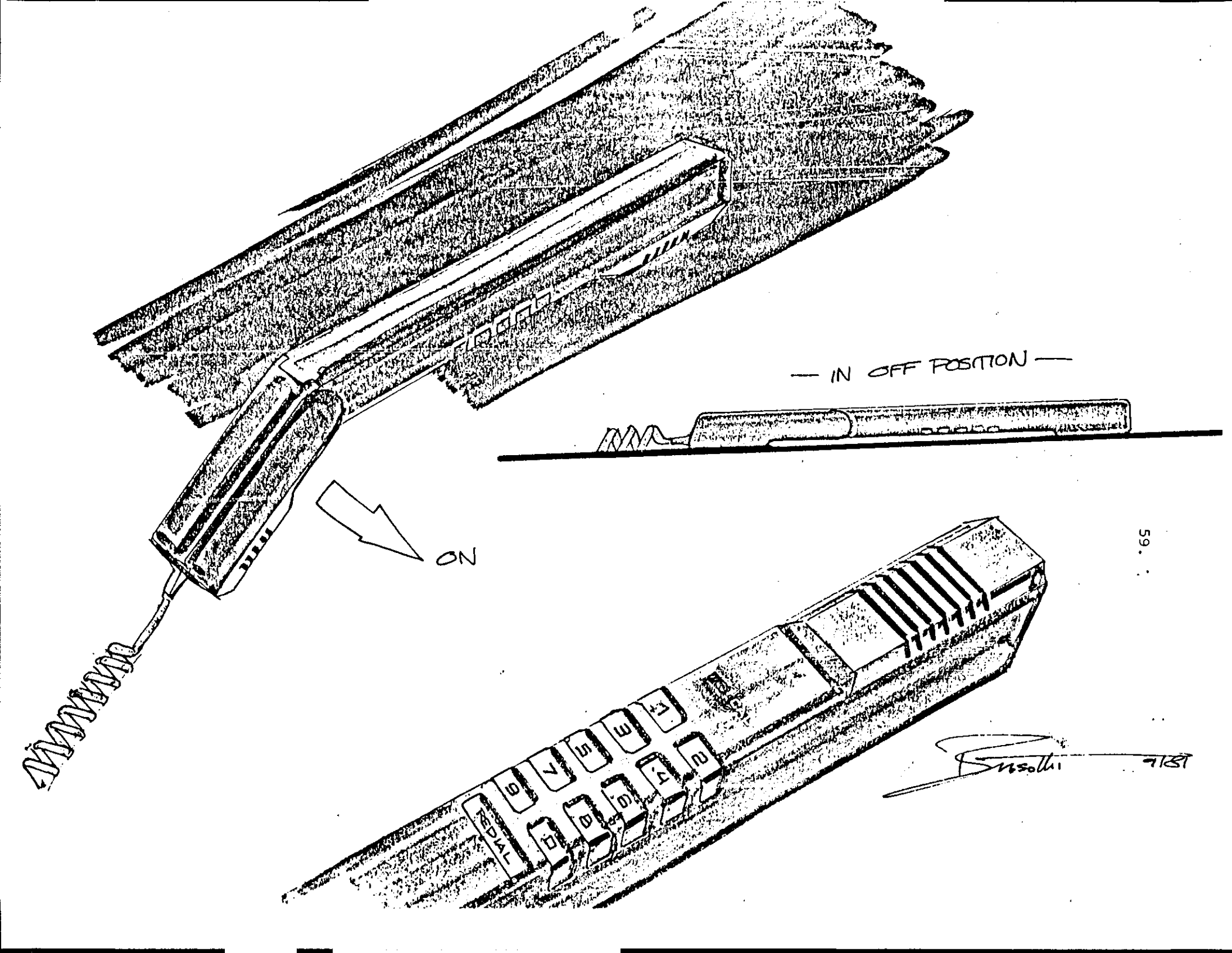
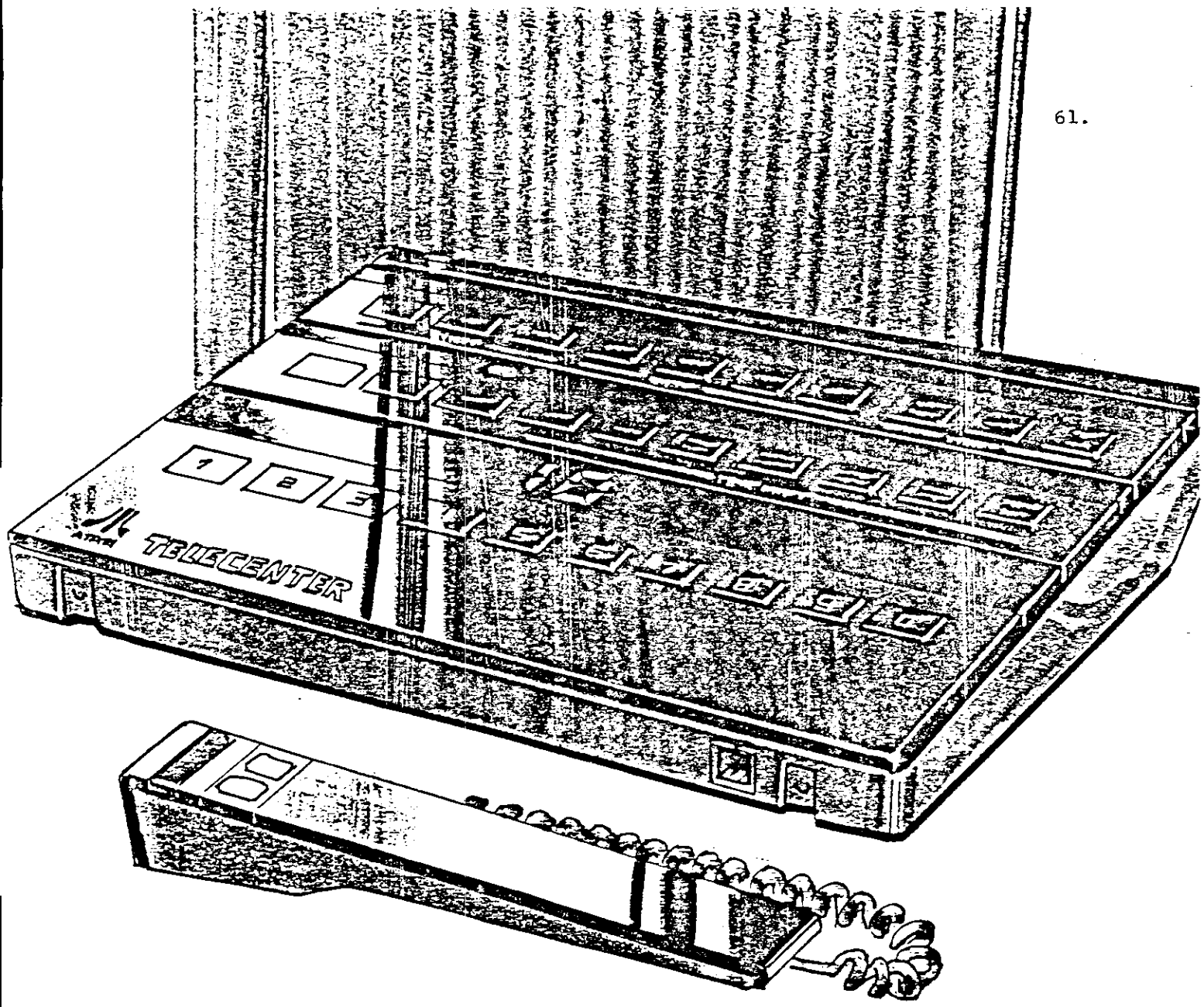





— IN OFF POSITION —
ON
PEDAL



STAGE 2

TELECENTER and TELECENTER PERIPHERALS

The second stage of the new business introduces the first totally new telecom device/system in the new family of communications products. The focus of the new device/system us on:

MANAGEMENT OF HOUSEHOLD COMMUNICATIONS.

At the heart of the new system is a TELECENTER which has the ability to independently manage and control a wide variety of communications transactions. The unique Telecenter device integrates many telecom functions which have traditionally been the basis of discrete telecom products.

A new series of TELECENTER PERIPHERALS can also be added to

the Telecenter System by consumers. These new peripherals greatly extend the power and reach of the Telecenter's transaction management and control functions. When the Telecenter "converses" with the Telecenter Peripherals, the new system is able to conduct more individual household communications transactions than any other device or system on the market today. This new home communications integration system stands a good chance of becoming the first major household communications management system to be introduced to American consumers in the 1980's.

As of this writing, the Telecenter System we propose to engineer and market incorporates:

- Answering unit functions in a MESSAGE CENTER section,
- Autodial, Call Forwarding and SSC Network Access functions in a DIAL ACCESS section,
- Household Security functions in a HOUSE SECURITY section,
- House Appliance and Energy Management functions in a HOUSEHOLD CONTROL section, and
- In-House Communications functions in an IN-HOUSE CALL and LISTEN section.

Background

A number of discrete communications-aid consumer products and services surfaced either within the telecom industry, or within markets separated from it during the 1970's. If one looks at the products and services introduced during that period with a special point-of-view, they all appear to "converse" with something else, and allow "conversations" to take place. The conversations just aren't all "voice".

- Answering units were designed to "converse" - to deliver and record messages for homeowners,
- Household Security devices and systems were designed to "report" - to alert homeowners and let local authorities know of fire or intrusion,
- Intercoms allowed homeowners to "converse" over in-house communications pathways,

- Appliance control devices and systems were designed to "converse" with household appliances - to switch them ON or OFF, and to adjust their settings,

- Energy Management devices and systems were designed to monitor and "report" levels of household energy consumption - to turn thermostats ON and OFF and to adjust their settings from remote locations,

- Autodialers "memorized" often-called telephone numbers,

- Etc., etc., etc.

Although these products and systems independently manage and control separate "sets" of household transactions, all of these products and systems share certain functional elements. Further, they were all "communicators".

During the mid-to-late 1970's, each of these products independently achieved very large unit sales (all in the hundreds of millions). Homeowners have clearly indicated a liking for these devices and systems. However, they all are still sold independently. In some cases, they are also sold into vastly different market channels, even though they all end up in homes.

There seems to be a real opportunity to integrate the most common household devices and systems into a single household communications center. The power and reach of combined functions should enhance each separate function if they are all able to borrow new abilities from integrated partners.

That's the Telecenter System Concept

Telecenter and Telecenter Peripherals Product Description

The Telecenter will be the first "household operator" of the 1980's. This new device and/or system will be a gatekeeper, manager, and controller for a very large number of discrete household "communications" transactions. The Telecenter System is comprised of:

- o The TELECENTER BASE UNIT, and

- o A series of unique TELECENTER PERIPHERALS which can be added to the system by consumers as needed. This allows the new system to be tailored to specific residential requirements.

As part of the Telecenter System, the Telecenter Base Unit can stand alone as an independent product without any need for peripherals. When the base-unit is compared to any existing telecom product alternative, it should be powerful enough, in its own right, to be very enticing to consumers interested in telecom products.

When the special series of Telecenter Peripherals (which can "converse" over a special communications pathway) are added to the system by consumers, the new system will be unmatched in either price or performance by any other household telecom product or service available today.

The Telecenter Communications Pathway

In addition to being connected to the Public Telephone Network (1-2 lines-in), the Telecenter will use the existing household electrical wiring system (bounded by the electric meter) as a special communications pathway between the Telecenter and the new peripheral devices. A consumer will be able to plug any of the new Telecenter Peripherals into any household outlet, and that peripheral device will be able to "converse" with the base-unit from that remote-outlet-location

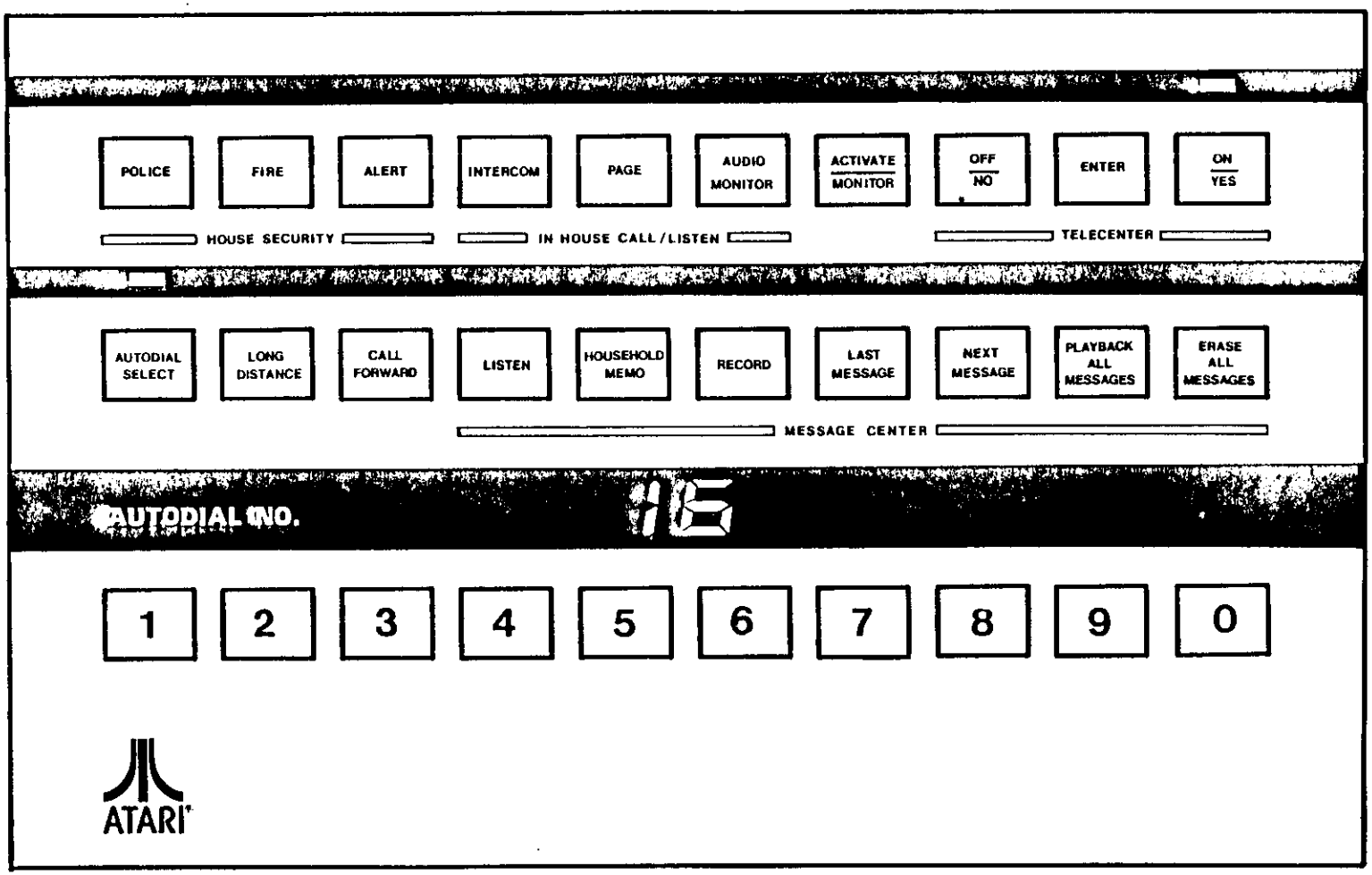
For the moment, this is all we will say about the new communications pathway. A full discription of the proposed household electrical system communications pathway is described in-Appendix to this memorandum.

Telecenter Incorporated Functions

Telecenter control is currently divided into five functional sections, each of which manages an independent "set" of household communications transactions. A preliminary drawing of the Telecenter Control Panel appears on the next page. In the next few pages we will outline the function of each of the Telecenter control sections, and will briefly discuss the "set" of transactions handled by each. The Telecenter sections are:

- MESSAGE CENTER
- DIAL ACCESS
- HOUSE SECURITY
- HOUSEHOLD CONTROL, and
- IN HOUSE CALL and LISTEN

The Telecenter Control Panel



MESSAGE CENTER SECTION

This section of the Telecenter is designed to function as the household message center. It will operate much like any remotely accessible answering unit in today's telecom marketplace. The Message Center will record messages and give them to incoming callers, and, it will take messages from incoming callers. Uniquely, it will also allow messages to be taken from one family member to be stored for retrieval by another family member. All messages taken by the Message Center will be able to be remotely accessed from locations outside of the home with a Message Center Remote Access device.

LISTEN-IN

The LISTEN-IN key will allow users to listen in on incoming callers' messages, and to select incoming calls they choose to take.

HOUSEHOLD MEMO

The HOUSEHOLD MEMO key will allow users to leave a recorded message to be retrieved by another member of the family. An LED indicator light will indicate a message has been left in the Household Memo.

RECORD

The RECORD key allows a message to be recorded for delivery to incoming callers.

LAST MESSAGE

The LAST MESSAGE key reverses the Message Center tape to the last message taken.

NEXT MESSAGE

The NEXT MESSAGE key advances the Message Center tape (fast forward) to the next message taken on the tape.

PLAYBACK ALL MESSAGES

The PLAYBACK ALL MESSAGES key reverses the tape to the first message taken and starts Message Center playback of all messages.

ERASE ALL MESSAGES

The ERASE ALL MESSAGES key erases all messages on the tape. Pressing ERASE ALL MESSAGES and RECORD simultaneously will erase the message stored for incoming callers so that a new message can be recorded in its place.

DIAL ACCESS SECTION

The DIAL ACCESS section of the Telecenter controls several special autodial functions. This section of the Telecenter also supports several of the HOUSE SECURITY section functions.

AUTODIAL SELECT

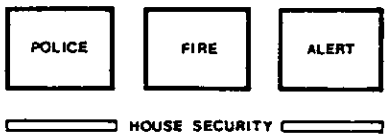
The AUTODIAL SELECT key allows a user to select one of 16-24 telephone numbers stored in the Telecenter autodial memory. A user would press AUTODIAL SELECT and then would press either one of several numbers (depending on the person to be automatically called) on the keypad (1-0) in the bottom row on the unit.

LONG DISTANCE

The LONG DISTANCE key accesses a single telephone number and "log-on" sequence stored within the autodial memory. If a household has subscribed to a MCI or SPRINT (SSC) services, a user can store the access number and code, and become able to call and "log-on" with the service with the press of a single key. This key saves repeated dialing of up to 19 digits.

CALL FORWARD

The CALL FORWARD key allows the Telecenter to forward all incoming calls to the household to another location. This key accesses a number temporarily stored in the autodial memory and forwards all calls to that number's location.



HOUSE SECURITY SECTION

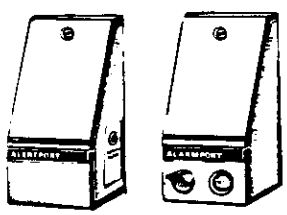
This section of the Telecenter is designed to operate the Household Security function of the Telecenter. It controls three separate functions; POLICE, FIRE and ALERT. This section can operate with, or without, special peripheral devices. The functions of each key in this section will be described as they will operate, both with and without peripherals.

POLICE

The POLICE key, without peripheral devices, automatically dials the number for the local police and provides a pre-recorded message to the police when they answer. This function (without peripherals) makes use of both the autodial and the message center functions of the Telecenter. Users will have to enter the telephone number of local policy and record the message they would like to have automatically sent.

The POLICE key, with one of several possible peripherals "conversing" from remote locations in the house, will not have to be pushed by the user. This function can be automatically tripped if one of the peripherals plugged into remote outlets senses intrusion. In this case, the peripheral device is integrated with the autodial and the message center functions, providing household security, whether or not anyone is home.

At the moment, we have two peripherals in mind. One might sense sound, and the other might sense that a set of contacts has been broken. In either case, both peripherals would send an identical signal through the household wiring to let the Telecenter know that an intrusion is underway.



FIRE

The FIRE key, without peripheral devices, operates in much the same fashion as the POLICY key just described. Users have to enter the number of the local Fire Department and record the special message they would like to have automatically sent.

The FIRE key, with a peripheral FIREPORT in a remote household location, would not have to be pressed by the user. The remote smoke detection FIREPORT peripheral would automatically signal the Telecenter, which would dial the Fire Department and report the possibility of a fire with the pre-recorded message. All smoke detection peripherals in the house would send the indentical signal through the household wiring back to the Telecenter.

ALERT

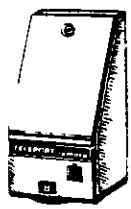
The ALERT key does not have it's own peripheral. However, it operates differently if there are peripherals on line. Without wither Fire of Police Peripherals, the ALERT key, when pressed, automatically dials a chosen location other than the Policy or Fire Departments, to let someone at that location know of trouble within the residence. With the peripherals in place, the Fire or Police Department is first notified automatically, then the location to be alerted is automatically called and provided the same message.

IN-HOUSE CALL and LISTEN SECTION

This section of the Telecenter is designed to function as the in-house communications monitoring section of the Telecenter. This section allows users to have in-house Intercom, Paging and Monitoring functions.

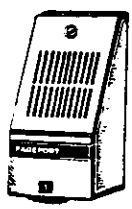
INTERCOM

Pressing the INTERCOM key will allow a user to access another location within the household, provided that location's telephone is connected to the household communications pathway with a special TELEPORT. The user merely presses the INTERCOM key, then presses the location code desired on the 0-9 keypad in the bottom row of the Telecenter.



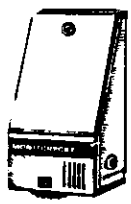
PAGE

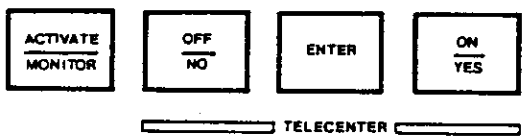
Pressing the PAGE key will allow a user to page all locations within the house in which a special peripheral PAGEPORT has been installed in an outlet. This PAGEPORT is little more than a remote speaker.



AUDIO MONITOR (LISTEN-IN)

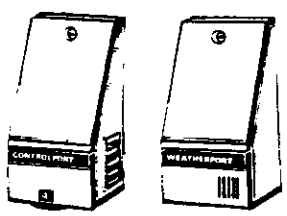
Pressing the AUDIO MONITOR key, a user can monitor a location in which MONITORPORT peripheral has been installed in an outlet. The monitor feature might be installed in a baby's room, in the garage, or some other location in which the user has interest in monitoring.





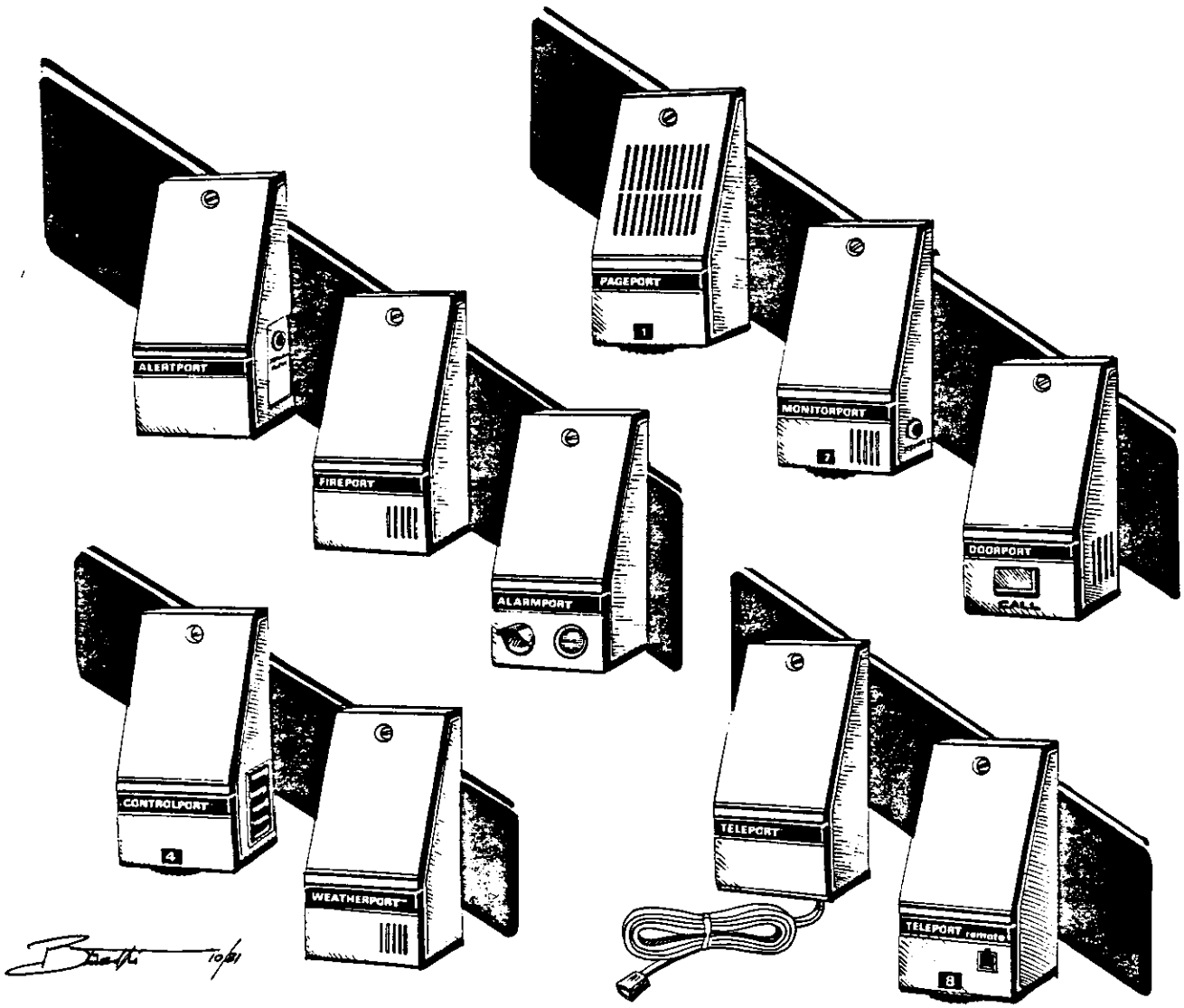
HOUSEHOLD CONTROL SECTION

This section of the Telecenter is designed to act as the Household Control function. Like the IN-HOUSE CALL and LISTEN section, this section requires special peripheral devices. By using the ACTIVATE/MONITOR key, users can turn appliances, air conditioners, thermostats, etc. ON and OFF and adjust them, by location, to different settings. The peripheral devices we have in mind for this section are a CONTROL PORT and a TEMPERATURE PORT. One has the ability to turn devices ON and OFF and to adjust their settings. The other merely reports a state of condition in a particular location (i.e. temperature).



The renditions below show the series of Telecenter Peripherals we have in mind for the new system at the time of this writing. All peripherals would be purchased independently by consumers, in much the same way in which VCS cartridges are currently purchased.

Although the Telecenter will be designed to be able to operate using both the existing household Telephone wiring and the new household electrical wiring pathway, Telecenter peripherals will depend on the use of the household electrical systems as the communications pathway over which they will "converse".

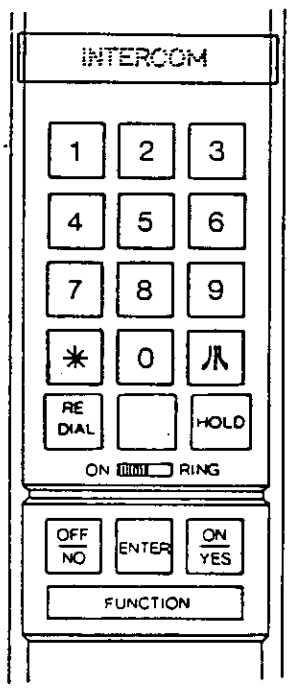


Admittedly, the Telecenter and the Telecenter Peripheral system seems complicated. However, it's less so than you might imagine. (A quick look at the control panel on page 65 will remind the reader that the number of actual control keys is fairly small, given the power of the device and system)

The Telecenter merely integrates basic functions of an auto-dialer, an answering unit, and adds memory and switching to provide its basic capabilities. The addition of the unique communications pathway, and some relatively uncomplicated peripheral signaling, listening, controlling and monitoring capabilities complete the system.

Second Stage Telesets

Now that we have introduced the functions of the Telecenter, the special control keys of the second stage Telesets should be clear. The second stage Telesets which incorporate the extra four keys and the small LCD display, will be able to remotely control all of the Telecenter's major functions.



The second stage Teleset Control Panel.

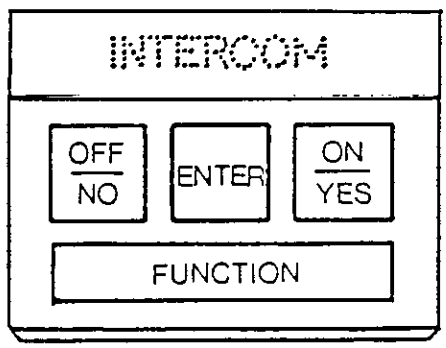
By pressing the FUNCTION key, a user will be able to select from a "menu" of functions which will appear on the LCD screen. The OFF/NO key, ENTER key, and the YES/ON key will control the

specific function selected. Therefore, from a location which is remote from the Telecenter, a user using a Remote Teleset will be able to control:

- INTERCOM,
- PAGE,
- AUDIO MONITOR (LISTEN-IN),
- AUTODIAL,
- LONG DISTANCE,
- FIRE
- POLICE,
- ALERT, and all of the
- HOUSE CONTROL Telecenter functions.

Telecenter Remote Telephone Peripheral

The special four-key and LCD controlled peripheral, which turns any telephone into a Remote Teleset (illustrated on page 51.) will also be introduced at the same time as the second-stage Telecenter and Telecenter Peripherals.



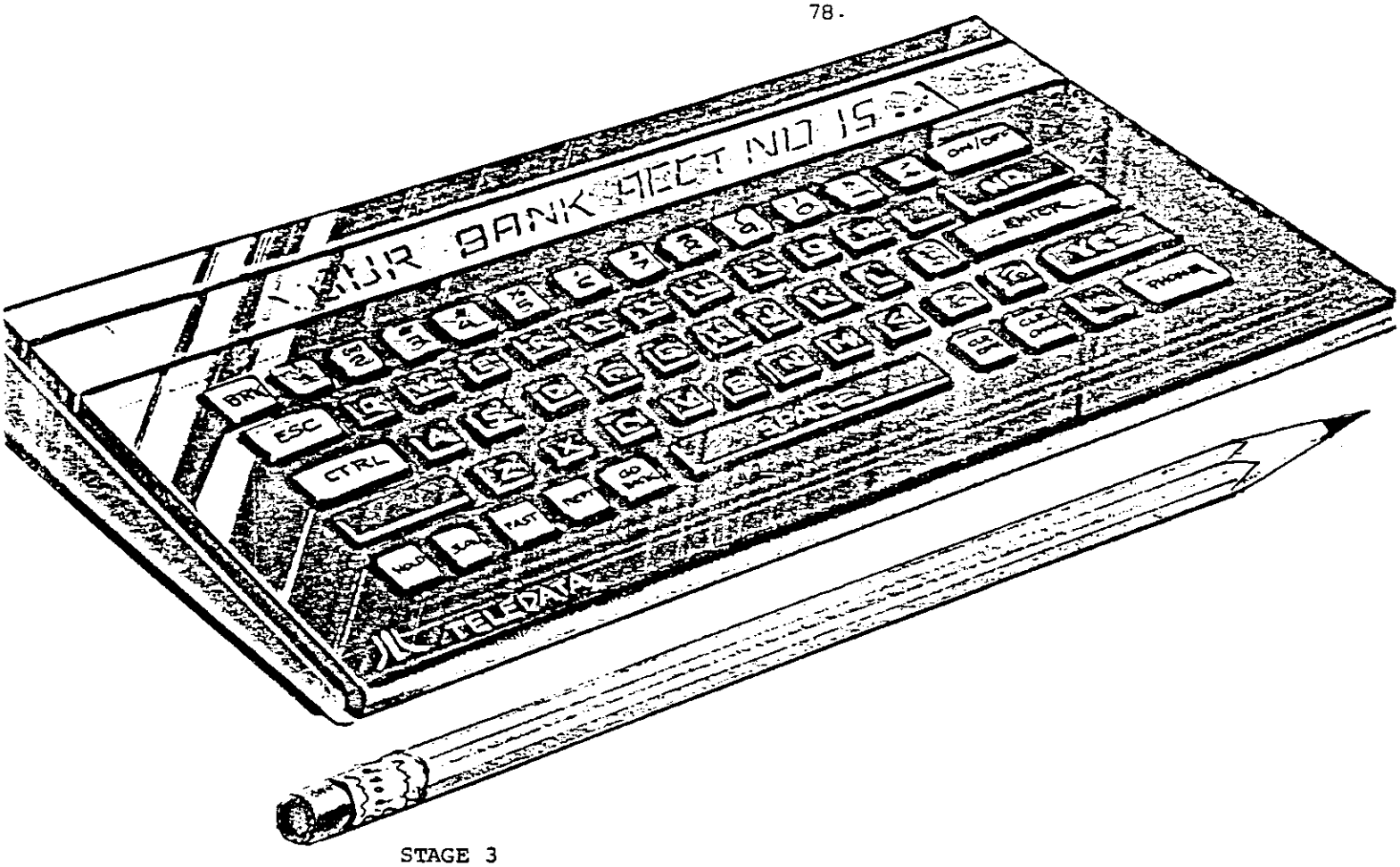
The Introductory Telecenter Line

To launch the second-stage of the new communications business, we feel it will be necessary to introduce the TELECENTER BASE UNIT and 10 TELECENTER PERIPHERALS at the same time.

Thus the introductory Telecenter line would include:

- THE TELECENTER BASE UNIT which would come equipped with an "Answer-Only" first-stage Teleset, and
- TELECENTER PERIPHERALS (the 10 identified below:
  - ALERTPORT (SECURITY) Alarm Ringer
  - ALARMPORT (SECURITY) Broken Contacts
  - ALARMPORT (SECURITY) Sound Detection
  - FIREPORT (SECURITY) Smoke Detection
  - PAGEPORT (IN-HOUSE COMM) Speaker
  - MONITORPORT (IN-HOUSE COMM) Mike
  - CONTROLPORT (HOUSE CONTROL) ON and OFF
  - CONTROLPORT (HOUSE CONTROL) ON, OFF, and ADJUST
  - TEMPERATUREPORT (HOUSE CONTROL) Measure/Report
  - TELEPORT (IN-HOUSE COMM) In-House Communications special pathway - Voice.

At the same time as the introduction of the Telecenter Line, we would introduce a single Remote Teleset, and the Remote Telecenter Control Peripheral.



STAGE 3

TELEDATA TERMINALS and TELEDATA SYSTEM PROTOCOLS

This section of the memorandum introduces the third stage of the new communications business. The focus is on:

NAIVE-USER DATA COMMUNICATIONS,

or more simply put, on naive-user access to remotely stored and processed information, and remotely offered services.

This stage, like the previous two, further expands the numbers and kinds of communications transactions which can be supported by the new business. This stage, however, offers another major difference. It's not just another hardware business. The third stage offers potential revenues from Teledata Terminal hardware, and from individual transactions facilitated by new Teledata System Protocols.

Background

During the last two and a half decades, the EDP industry has focused most of its attention on finding more efficient means of storing and processing information. Computers have attained

new processing speeds and storage capacities which could not have been anticipated a decade ago. Despite the advances made in computer speed and capacity, relatively little attention has been paid to terminals and end-user protocols (the input medium for information storage and retrieval). In 1981, terminals and protocols continue to have only an adjunctive relationship to information/data processing and storage.

The result of this lack of attention is that casual, untrained and naive users - like terminals - remain adjunct to computer technology. In 1981, adult Americans clearly benefit from computer technology exercised on their behalf. However, the overwhelming majority of American adults haven't the slightest idea either how to operate a computer (personal, home or otherwise), or to access the growing storehouse of available computer processed information. They cannot write a single word of computer language, and chances are good they will remain computer illiterate. Technology must be able to provide a "window".

Microprocessors, RAM, ROM and other support circuitry have fallen in price during the last several years to the extent where they can be used in general purpose equipment, and still have that equipment remain price competitive. Designers can add "intelligence" to general purpose instruments and systems protocols with ease today, enabling them to perform tasks faster and with more accuracy than could ever previously have been accomplished. In 1981, one dollar purchases easily 100 times the software instructional load it would have purchased ten years ago.

Today's computer designers, engineers and operators (and personal/home computer owners) can be compared to the telephone industry's operators of the 1920's. Telephones had just begun to affect everyone's lives, increasing casual telephone users' abilities to communicate quickly with others at great distances. Yet in the 1920's, access for casual and naive users to the telephone system required the assistance of trained operators who recorded telephone ID's and performed the rudimentary switching operations which connected the users in one location to users in another location. By the late 1920's it was evident that unless a "friendly" automatic interface was quickly developed, by 1940 easily one-half of the American population would have to serve as telephone operators for the other half.

This was a dialogue problem. The U.S. telephone system needed a mechanical device and a system protocol which could permit naive-users to "converse" with the phone system without the assistance of trained operators. The solution was the Rotary-Dial telephone and automatic mechanical switching. Dial phones allowed the telephone industry to flourish, and forestalled the growth of an already huge operator population.

In 1981, the growth of new transactional capabilities and appli-

cations for computer processing and storage are impeded for many of the very same reasons. Users wishing to access remotely stored information have to be trained to use special access equipment, or they need intermediaries. Admittedly, the current information access problem is one of significantly greater complexity.

Unlike telephones, computers were designed to compute, not to communicate. However, the need for computers to be able to communicate has never been greater. The average adult American can't reach the storehouse, and the storehouse is not properly configured to reach the average adult American. The days of end-users tolerating hard to use devices is rapidly disappearing.

An information window can be constructed which takes into consideration the entire interface continuum from information or service to naive end-users and back again.

This "window" is the focus of the Teledata Terminal and the Teledata System Protocol.

The third stage business, TELEDATA TERMINALS and TELEDATA SYSTEM PROTOCOLS could be the first non-CRT-based system (hardware and services) which could provide casual, untrained and naive-users with innexpensive and remarkably simple access over existing networks to the vast benefits of remotely stored and processed information, and other services.

For the first time since the introduction of computer technology over a quarter-century ago, anyone with basic reading, counting and spelling abilities, WITH NO ADDITIONAL TRAINING, can have portable and instantenous interactive dialogues with information/data base services worldwide.

The Teledata System - "Personal Teleprocessing"

A special process, or protocol, stands behind the Teledata System we're about to introduce. We call it "personal teleprocessing", and it's defined as:

Personal - being accomphished by, and for, the benefit of an individual, in either his personal or professional life,

Tele - a link which allows any individual, whereever he may be, to access any computing service (information data base or other service) whereever it may be, and

Processing - the performance of the work of a transaction, either instantenously, or delayed.

Personal teleprocessing is, therefore, the personal access and manipulation of information or data by an enhanced means (hardware and system protocols). Teleprocessing reduces the personal work required and greatly simplifies the efforts required of individuals (naive, or otherwise) to interact with remote services.

The Teledata Teleprocessing System

The Teledata Teleprocessing System does not directly compete with any of the parts in a continuum from user to service, and back again. Rather than compete, it greatly enhances the power and reach of all of the links in the system. The next page illustrates the relationships of the various components in the system:

CONSUMERS,

NETWORKS,

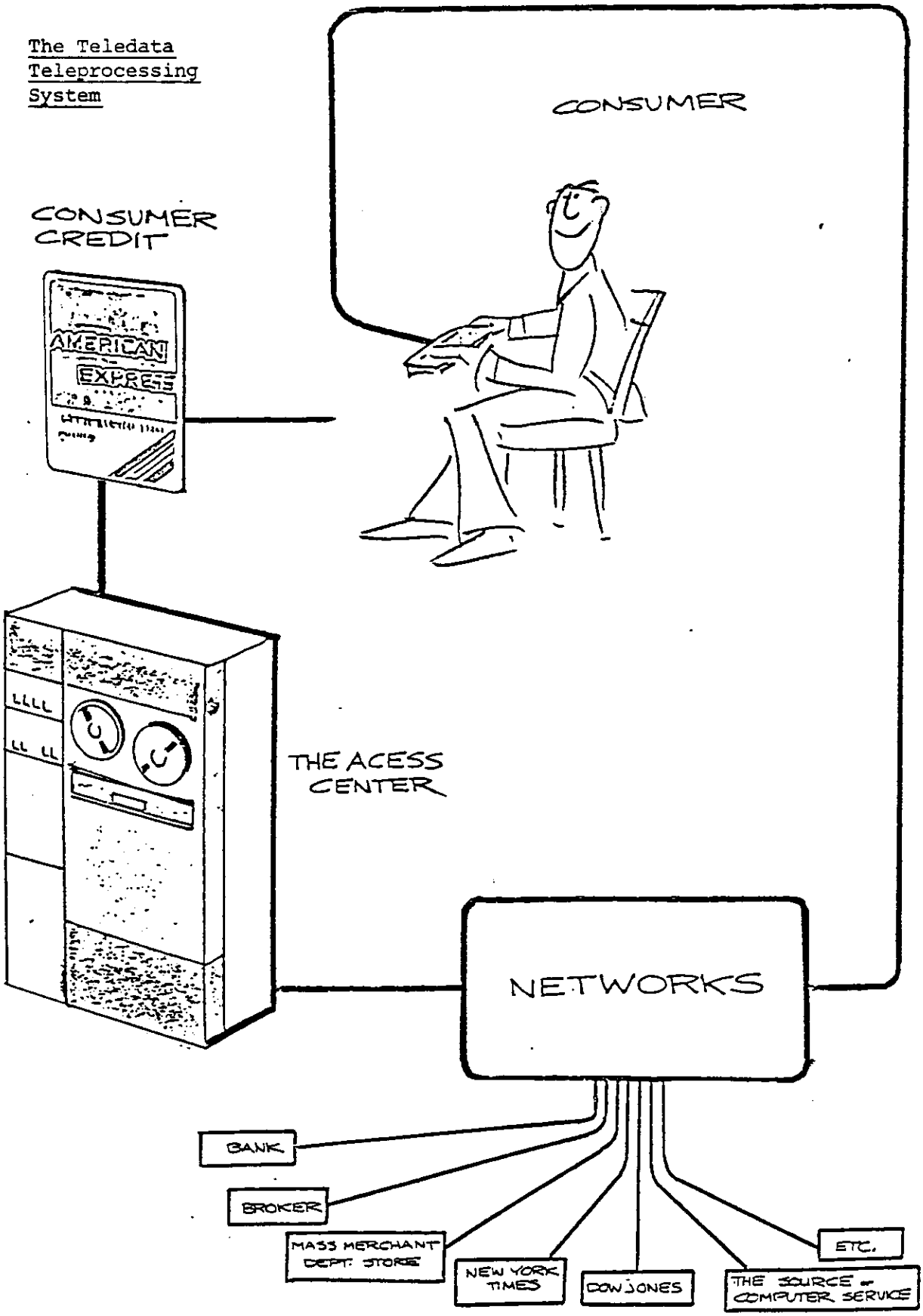
HOSTS (SERVICES),

THE TELEDATA ACCESS CENTER, and

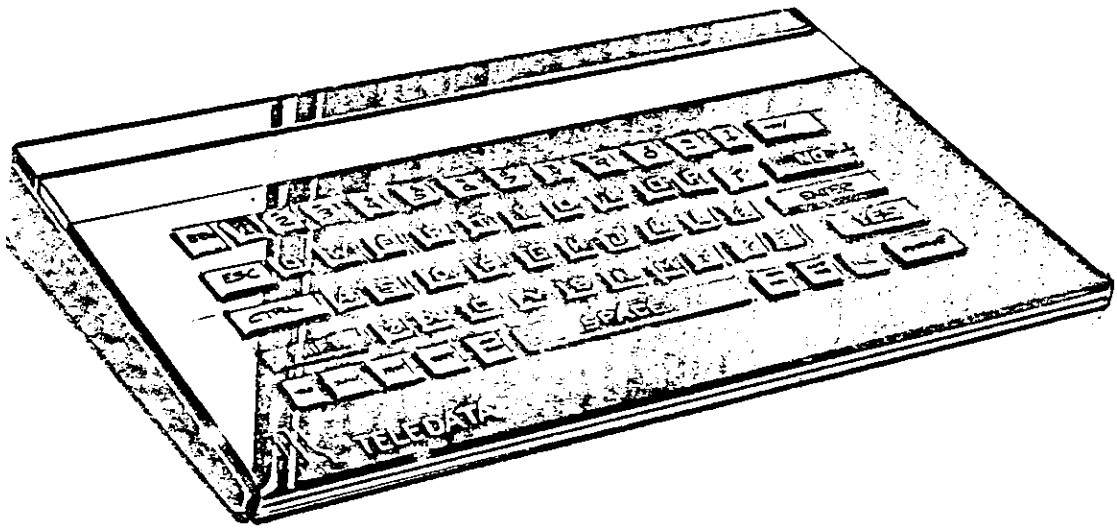
CONSUMER CREDIT VENDORS.

In the pages which follow the illustration, we will introduce individual components of the Teledata System.

The Teledata Teleprocessing System



The TELEDATA TERMINAL - Product Description



The TELEDATA TERMINAL may easily be developed into a full range of terminal products, accessories and peripherals. First efforts, however, will focus on the development of the lowest cost, easiest to use, and most portable terminal device. The tiny terminal will be able to support both the most important and the largest numbers of personal information and data transactions in which consumer interest and need has already been expressed.

As the Teledata System does not depend on the availability of a CRT display, very special attention has been paid to an enhancement of the "limited window" information environment. Transactions themselves have forced special development of new information and display management functions which are not currently available in any competitive terminal products. It's interesting to note that all of the unique 'management' functions incorporated into the tiny Teledata Terminal have equal validity in larger CRT based information systems.

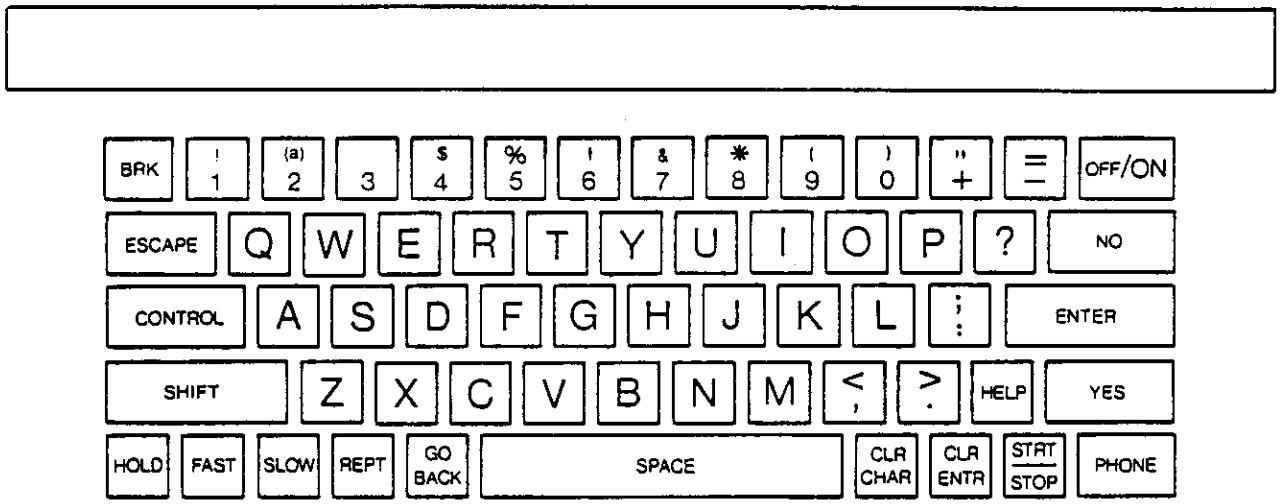
The Teledata System (Terminal and supporting Protocols) jointly address "conversational" display/information management and naive-usership. The two cannot be separated.

The Teledata Keyboard

The Teledata keyboard will have 61 keys, and will conform to standard QWERTY layout (an illustration appears on the next page). Otherwise, the terminal will be compatible with all standard terminals (e.g. Teletype, ACS Class 1, full ASCII control character set). The keyboard also has special keys unique to

Teledata, which enables user to communicate in plain English, and eliminate the needs for special computer commands and controls.

The Teledata Terminal Display and Keyboard



Display Management, Special Keys and Sound Effects

As displays constitute a major cost component, a target of a 16-24 digit display is proposed. The information/display management system has specifically been designed to support this tiny "window". The Teledata Terminal also incorporates special Sound Effects to reinforce the clarity of controller and information communications.

Teledata Features and Functions

START/STOP

A user can STOP the display if he's interrupted or wishes to record information, and START it again with a single key. When the terminal is in the STOP mode, a microprocessor will automatically store data that is to immediately follow, and will signal the information service to hold the rest until the user restarts the display. A T-I-C-K-I-N-G sound is also generated by the microprocessor to remind the user (particularly if he was interrupted) that the terminal is still on-line.

SLOW DOWN and SPEED UP - Variable Speed

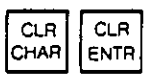
By pressing the SLOW DOWN or SPEED UP keys, a user can adjust the display to one of fourteen different speeds. The change in speed is reinforced by either an increasing or decreasing set of pitched tones. These keys and their associated sounds permit users to find a comfortable reading rate. Users may also wish to use these keys to fast-forward past information which is not of interest.

Pop, Scroll, Split-Screen and Blink

Information and messages from an information service can be scrolled or popped onto the display, or both (the latter via a special split-screen technique). The system also permits an information service to B-L-I-N-K characters or words to prompt responses from users (e.g. blinking of a question mark to elicit an answer).

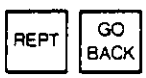
Teledata Punctuation

Teledata punctuation is a unique development which is key to making the tiny "limited window" display easier and more comfortable to read, even for long periods of time. All other terminals on the market today scroll information onto the display in a constant and a monotonous stream. Unfortunately, people don't read that way. People naturally pause or stop momentarily, guided by punctuation marks. Teledata punctuation automatically recognizes the punctuation of incoming messages and manages the display accordingly (i.e. pauses or stops at commas, periods, dashes, question marks, etc.).



CLEAR ENTRY AND CLEAR CHARACTER

With CLEAR ENTRY and CLEAR CHARACTER keys, a user can correct a mistake by erasing the entire entry or an individual character.



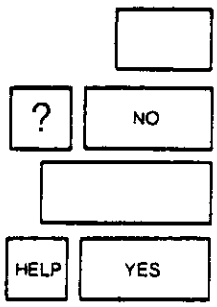
REPEAT and GO BACK

The REPEAT key enables users to repeat the information service's last message. The GO BACK key enables users to backtrack to a

previous menu selection point.

BREAK and ESCAPE

The BREAK key enables users to exit a particular service at any time, or initiate a disconnect sequence. The ESCAPE key is part of the ASCII standard control character set.



YES, NO, DON'T KNOW, and HELP

These four keys, YES, NO, DON'T KNOW and HELP, are the basic ingredients which enable users of the Teledata system to communicate with information services in plain English. With carefully sequenced questions transmitted by the service, the majority of users' inputs can be reduced to these four naive-user keys.

PHONE

This key is a single button access key. Pressing PHONE initiates automatic telephone dialing and log-on sequences. It can also be used to disconnect.

Automatic Disconnect

If a user does not depress any key for two minutes (perhaps he was called away or otherwise delayed), the terminal gives an audio and a visual prompt, asking the user if he wishes to disconnect. The display can be restored by the user by simply

pressing any key. However, if the user does not respond within 30 seconds following the warning, the terminal will automatically disconnect from the service.

The Teledata Interface

The following features and functions continue the list of Teledata incorporated capabilities. These special interface capabilities are built-into the Teledata Terminal, but they also, in and of themselves, constitute the elements of an "Independent Interface" device which can convert computer terminals on the market today (the Atari 800, for example) into Teledata Teleprocessors fully compatible with the Teledata System. The elements of the Teledata Interface Chip Set are as follows:

Modem

A modem is built-into the Teledata Terminal which can operate at either 300 baud, for "limited window" displays, or 1200 baud for CRT display interface. The built-in modem connects directly to the telephone line via a mod-plug jack (the telephone industry standard jack), eliminating the need for an accoustic coupler, except in the few cases where a mod-plug is unavailable. Even then, we feel an accoustic coupler can be developed which can retail for less than $50., which is considerably less than models available today. (See section on Enhancements, Accessories and Peripherals.)

Automatic Repetory Dialer

An automatic repetory dialer is built-into the Teledata Terminal. It will store between six and ten user-programmable phone numbers for accessing services from different locations, or through different types of phone systems (e.g. a direct line or switchboard requiring a special prefix - "9" - for example). In response to a user pressing a single key, the repetory dialer automatically dials the desired access number.

Unique Teledata ID

Implanted into each Teledata Terminal (or "Interface" - for the Atari 800, for example) is a unique identification number. This ID number identifies:

- Atari-Tel as the Manufacturer,
- The Teledata Model Number, and
- The Teledata Serial Identification.

Combining all three, the ID number facilitates an Automatic-Sign-On procedure. The Automatic-Sign-On procedure, together with a user-assigned "PASSWORD", an Encryption System, and a Seed-Key Generator, form the essential ingredients in the Teledata System's overall identification and security procedure.

These operations will be briefly introduced now, and will be discussed at greater length later in this memorandum.

Teledata Password, Automatic-Sign-On, Encryption System, and Encryption System with Seed-Key Generator

Teledata "PASSWORD"

Each terminal owner/user selects a PASSWORD which is known only to the user. This PASSWORD is recognized by the system in conjunction with the encrypted Teledata Terminal ID. The combination of the encrypted ID and the single PASSWORD allows user access to all cooperative system information services with a single PASSWORD.

Automatic-Sign-On

When a Teledata session (call) is initiated, the unique ID number is automatically sent to, and recognized by the Network. The Network, in turn, routes it to the TELEDATA ACCESS CENTER. The TELEDATA ACCESS CENTER (which will be discussed shortly) searches its files for the encrypted ID number, indentifies its authorized user by name and sends back a personal and friendly greeting, "HELLO, JACK?....", for example. All of this is accomplished automatically within a few seconds of the user initiating an automatic dialing sequence.

Encryption System

The ID number as well as the user's chosen "PASSWORD" are encrypted for transmission to the TELEDATA ACCESS CENTER by the Teledata Terminal. Assuming the TELEDATA ACCESS CENTER verifies the user's PASSWORD, and the user requests routing to an information service ("Bank", for example), the Bank if automatically notified and sends out a unique Seed-Key. The Seed-Key is then mixed with the ID number by the encryption system in the terminal, for verification and transmission back to the service.

Encryption System with Seed-Key Generator

Each Teledata information service is provided with a Seed-Key Generator as their part of the encryption system. A unique Seed-Key is generated with each session (call). Even if the

user's phone line was tapped, an unauthorized attempt to penetrate a user's personal service would be thrarted by the fact that the Seed-Key now generated will be different from that previously transmitted and recorded. The Teledata System now becomes secure enough to eliminate financial transactions services having to consider providing inefficient and costly single-use/dedicated terminals or extra peripheral devices such as magnetic card readers.

TELEDATA ACCESS CENTER - Terminal and User Identity Services

The Teledata Access Center is the core of the Teledata teleprocessing system. The widespread use of computers has aroused concerns about controlling access to private data and communications, and controlling decisions or transactions by unauthorized persons in unauthorized ways. Demands for privacy come into conflict with demands for information, and opportunities abound for severe and subtle abuses by governments, individuals and businesses.

A system must be able to automatically recognize all terminals and users operating within the system in an organized and consistant fashion. No orderly development of identity and credit systems for individual transactions is possible without cooperative standards. User transaction security and privacy depend on cooperative systems solutions.

The Teledata Access Center is essentially a "master file", or "gatekeeper" which allows naive-user automatic access to, and dialoguing with information services. As the brains and the facilitator of the proposed Teledata System, the Teledata Access Center offers a variety of services which can support all, or part, of the system participants' needs.

The Teledata Access Center's services includes:

- o Identification and Security for users of terminals and for terminals themselves,
- o Consumer Credit for Users, Networks, and Information and/or Service Providers,
- o A "Nielsen-Like" System Monitoring, and
- o A System Services Directory.

Before introducing these special services (each can generate revenue for the Teledata System), it's important to have an understanding of the kind of information which is "banked" by the Teledata Access Center.

Information "Banked" by the Teledata Access Center

As the records-keeper or gatekeeper of the Teledata System, the Access Center collects its information from two different sources"

- o From Teledata Terminals, and
- o From Teledata Users.

Information from Teledata Terminals

The Access Center is able to automatically recognize and file the unique Terminal ID contained within, and unique to each Teledata Terminal. The three parts of this ID have already been discussed.

Information from Users

Following purchase, each owner/user inputs the following information through his terminal to fill his personal Access Center File. He needs to file this information only once, unless he wishes to either update or change the information he already has on file.

- o His NAME, ADDRESS, and PHONE NUMBER.
- o His chosen CREDIT VEHICLE, whether American Express, Visa, or Master Charge. This allows the user to charge throughout the system for either Information or Services, and to be billed by a credit vehicle he is already using. As will be noted later in this memorandum, many system services are expected to be supplied

to users free of cost.

- His PERSONAL SERVICES FILE, e.g. the identification of his bank and brokerage firm. The PERSONAL SERVICES FILE allows rapid routing to the service desired with a simple keyboard entry such as "BANK", or "BROKER", etc.

- His selected and personal system "PASSWORD".

The combination of the unique Terminal ID and the information files by the user on his own status and interests forms the basis of naive-usership of the Teledata system. Once the user has filled his Access Center "File", he need never repeat the same information again when accessing cooperative services. He needs to remember only his personal single password for access to all systems services.

The Teledata System automatically draws from the Access Center file, pairing user-supplied and terminal-supplied information, and clears the user into the system. He can be recognized as an individual by the system, BY NAME, in a familiar and friendly manner, whether or not he has ever previously conversed with a particular service he has chosen.

It's most important to note that the information contained in the file cannot be used in unauthorized ways by the Access Center. The Access Center cannot enter an individual's bank or brokerage account. It cannot check the user's credit history with an established credit vendor. It can only establish that the user has credit. It's a gate, not a judge.

Teledata Access Center Services

As we have already mentioned, the Teledata Access Center can have a link to:

- Consumers/Users/Owners of Teledata Terminals,

- Networks,

- Service Providers (information, or other), and

- Credit Vendors,

if they choose. Obviously, the question is, "What will make them choose?"

We know that communications services have traditionally been slow in their ability to gain massive market acceptance. It's characteristic of the industry that new ways to communicate gain market acceptance slowly at first, then build to an accelerated rate of growth. This is easy to understand, as pioneering subscribers to new communications services usually have few people to "call", introductory costs are usually high, and perceived benefits provided by new systems at the time of their introduction are usually limited.

For example, few people wanted television service when it was first offered. There wasn't much to watch, and once the novelty wore off, consumers found out how really little there was. Nevertheless, the novelty of the system attracted enough participants to build an installed base. Of most importance is the fact that THERE WAS A SYSTEM. With an installed base built around a system, investment for programming to serve the base was easily attracted, and television bloomed. Communications, by its very nature, is a chicken and egg problem.

The Access Center is either the bird or the egg. It makes very little difference which, as long as it's one of the two. In combination with the Teledata Terminal, it offers a SYSTEM which can attract, and enhance, the services already being offered by networks, service providers (hosts), and it will additionally draw new service providers into the market. Further, it is the only SYSTEM of its kind which we know to be in the planning stage.

Services for Consumers/Users/Owners of Teledata Terminals

The Access Center offers consumers who purchase Teledata Terminals:

Teledata Consumer Applications

The following list is offered to stimulate the reader's thinking about the wide variety of potential consumer applications for the Teledata System.

Most consumer applications will also be of value to businessmen, and possible of direct business value, as well. They will not be listed again in the Business Applications section which follows.

- BANKING SERVICES
  - Bill paying services
  - Checking account balances, activity reports
  - Loan applications
  - Transfer of funds - savings to checking
  - Consumer credit checking (credit card accounts)
- HOUSEHOLD BUDGETING
  - Monthly expenses by category
  - Income tax data collection
- INCOME TAX
  - Returns preparation
- SHOPPING
  - To shop remotely - Sears, Penneys, etc.
- RESERVATIONS
  - Travel
    - Airlines
    - Bus, train, ship
    - Car rental
    - Directions, routing assistance
    - Weather conditions anywhere
  - Accommodations
    - Hotels
    - Athletic facilities
  - Entertainment
    - Concerts
    - Theater
    - Sports
    - Schedules - where and when?

- LOCATOR SERVICES - Computer Sorted Classified Ads

  - Real Estate
  - AutoMate new and used car purchases/sales
  - Employment - job locator
  - Personals - DataMate
  - Bulletin board by subject

- FINANCIAL/INVESTMENTS

  - Stock brokerage
    - Stock quotes
    - Buy/sell
  - Portfolio Analysis

- SCHEDULE REMINDER

  - Appointments
  - Events
  - Birthdays

- NEWS SERVICES

  - Personalized news
    - by subject - sports, news, politics, business, etc.
    - by region - local weather, etc.

- EDUCATION

  - Languages/translation
  - Encyclopedia
  - Almanac
  - History - chronology by date, subject
  - Dictionary

- ENTERTAINMENT

  - Games
    - Adventure/Dungeon
    - Word Games
  - Dear computer letters
  - Horoscope advice
  - Guinness world records
  - Day of birth - biorythms

- MEDICAL HELP

  - Symptom reporting - quick diagnosis
  - Computer maintained personal medical records
  - Telephone prescription orders
  - Out-patient report status

- FILING SYSTEM

  - Telephone and address directory
  - Important numbers
    - Family medical
    - Credit cards
    - Clothing sizes
    - Serial numbers
  - Household Inventory
    - Insurance requirements
    - Policy numbers
  - Menu/Diet/Shopping lists

- ELECTRONIC MAIL

  - Short notes and reminders
  - Including language translation service

- TELEPHONE DIRECTORY ASSISTANCE

  - Includes addresses and zips

- REPAIR SERVICE INFORMATION

  - Product manufacturers help debug small problems

- REMOTE ACCESS TO HOME COMPUTER/TELECENTER

  - Home security
  - Home energy control
  - Change lighting patterns in empty home
  - Start air conditioning or heat before return

- STENOGRAPHIC SERVICE

- TELETYPE CALL

  - At 5¢ per minute, coast to coast, some users (and all the deaf or hearing impared) will have a real time dialogue with one another

- VOTING SYSTEMS

  - Electronic town meetings
  - Opinion research
  - Continuous market research capabilities

Potential Teledata Terminal Business Applications

The following list is offered to stimulate the reader's thinking about the wide variety of potential business applications for the Teledata System.

Note: Business uses for Teledata which are specific to one or a few types of business are listed separately in this memorandum.

- ELECTRONIC MAIL/MESSAGE SYSTEM
  - Easy to address memo to multiple readers
  - Instant transmission, no paperwork
  - Confirmation of receipt
  - Message does not interrupt work in progress
  - Compatible interface with corporate TWX/Telex
- EXECUTIVE CALENDAR/SCHEDULER
  - Including executive locator
  - Plans meetings to minimize cost or difficulties of travel
- EXPENSE ACCOUNT MAINTENANCE
- ORDER ENTRY FOR COMPANY SALESMEN FROM CUSTOMER PREMISES OR ANYWHERE
  - Including verification, estimated shipping date, etc.
- ON-LINE CUSTOMER INFORMATION
  - Account numbers, contact names, addresses, phone numbers, credit
- ON-LINE PARTS/PRODUCTS CATALOGS
  - For own company and major suppliers
- ON-LINE SUPPLIER/VENDOR INFORMATION
  - Account numbers, contact names, addresses, phone numbers, credit, etc.
- INVENTORY STATUS INFORMATION
  - Including reorder points, delivery times, etc.
- DISTRIBUTION STATUS, SHIPPING INFORMATION
  - By waybill number, order number, customer number, etc.
  - Where is a given shipment at the moment?

- TEXT ENTRY

  - Low cost text entry station
  - Can supplement expensive word processing stations
  - Can be taken home by employees to complete tasks
  - Executives can make correction to first draft correspondence

- DATA ENTRY

  - Low cost remote job entry station
  - Can be taken home
  - Jobs can be supervised at off-hours

- INFORMATION RETRIEVAL - DOCUMENT LOCATION

  - Search data-bases, supply abstracts and document identification numbers to facilitate facsimile or hard copy retrieval
  - Personnel files, company reports, correspondence (if word processor integrated), etc.
  - Guide executive through classifying documents for later retrieval

- MEMO-TO-FILE

  - Maximum security memos to file are seen only by the executive creating them
  - Especially important for personnel issues

Information "Utilities" - General Data Base Services Accessible by Teledata

There are many remote computer services available today that can be accessed from a Teledata terminal because of it will operate as a standard "dumb" terminal. Some of these services may be used with only a little training. Others require study of complex user's manuals, even constant reference to command summaries and file entry directories. For example, the New York Times Information Bank has a thousand page (8.5x11" pages!) "thesaurus" of terms needed to access stories, and the instructions for all the Lockheed Dialog services fill a bookshelf.

Among the services properly formatted and requiring relatively little training are those designed for hobbiest home computer owners, like the Source and Compuserve, and the many Community Bulletin Board Systems. They represent the best offerings at the moment directed toward a consumer environment.

There are also several electronic mail offerings, some with only a few commands to be learned (those on the Source and Compuserve, for example), and some with powerful editing and filing capabilities like COMET (from Computer Corporation of America), OnTyme and OnTyme II from Tymnet, and Telemail from GTE Telenet.

Financial services offerings are not terribly difficult to use but they require a listing of the stock symbols for all the companies whose quotations you might want. Booklets with stock symbols listings are available.

Games are not likely to be a major use for the Teledata terminal because they tie up telephone lines. However, one of the most interesting of all the computer games is easily played on Teledata. "Adventure" - the search through a colossal cave for hidden treasures, while defending yourself from dwarves, is available on the Source.

This section provides summary comments on the Source, Compuserve and Dow Jones and mentions Lockheed Dialog, SDC and Mead Data Central.

The Source

The Source was the first of the (self described) "information utilities" aimed at the home market. They have had a moderate success in terms of subscriptions, aith about 10,000 accounts (probably 4000-5000 active) that produced a nominal registration fee (many were given group discounts), and a small average billing.

digital mainframes available for timesharing in non-prime time hours (6:00pm to 5:00am weekdays, all day Saturday, Sunday and holidays).

Not many home computerists need additional computing power (most haven't yet figured out what to do with what they already have). Consequently MicroNET has many fewer subscribers than the Source. That situation may be changed as a result of major events.

1. H&R Block recently acquired Compuserve, and thus MicroNET, for a sum reported between $10 and $20 million. MicroNET has nothing that is proprietary and defensible in a competitive environment, just some know-how and a small private data communications network with a few leased lines that link private nodes in about 50 cities. Although it was rumored that H&R Block bought Compuserve for the private network, intending to use it to support its many tax offices, it seems more likely that Block is looking far into the future, when tax returns may be done from the home environment.

2. In June, Tandy Corporation announced that Compuserve would support Radio Shack's new "Videotex" - a terminal version of the TRS-80 keyboard/CPU unit with a built-in 300 baud modem, and a 32 character by 16 line video generator with Viewdata line color graphics capabilities.

At the June 1980 Consumer Electronic Show we showed a version of our home computer with a special modem package and were promoting a Compuserve/MicroNET association.

Panasonic and Quasar also had access to the demonstration of Compuserve Information Service which became available to MicroNET subscribers starting in July 1980.

Dow Jones News Services

Although it might be thought of as a single data base service (stock market quotations), Dow Jones actually offers a wide range of financial services which makes Dow, independently, a significant contender in the "home information utility" field.

Current (15 minute delayed) quotations will excite businessmen being shown Teledata for the first time. Beyond quotations, the Dow Jones News Retrieval Service also offers specially edited versions of the news stories of the Wall Street Journal, Barron's and the Dow Jones News Service - the "Broadtape".

Source Telecomuting Coporation had a capital investment (including two 300 Megabyte Prime Computers) of probably $2 million in 1980, and have invested on the order of $5 million, including several hundred thousand dollars in marketing, to produce 1980's annualized gross income stream of just under $1 million.

Data-Bases Available on The Source

This "utility" data-base provides hobbiest home computer owners with a sampling of information in 1980. The following list represents typical services selected from their catalog.

Announcements (Updated Frequently)
Advanced Applications and Programs
Astrology Library
Business and Finance
Classified Ads and Bulletin Board
Consumer Information
Dining Out
Discount Shopping Service (Money Savers)
Education
Energy Saving News and Tips
Financial News
Games
Home Entertaining
Mailcall
New York Times - News Summary
New York Times - Consumer Data Base
Oracle - Ask Any Question on Any Subject
Personal Calendar and Notebook
Personal Finance
Real Estate Advisory (The Real Source, Inc.)
Science and Engineering
Sports
Suggestion Box
System News
Travel Club
United Press International (UPI)
User Directory
Weather
Wisdom of the Ages

Compuserve/Micronet (Radio Shack Videotex)

Compuserve Incorporated became the second company (after the Source) to market remote computing services directly to the home computerist, when in 1979 they formed the Personal Computing Division to offer Micronet. Micronet made the powerful computing capability of Compuserve's

Recently Dow also added online access to 10K reports of listed corporations maintained in a computer data base by Disclosure, Inc. of Washington, D.C.

Other Information "Utilities" - General Data Bases

Lockheed DIALOG, Systems Development Corporation, and Mead Data Central are other information utilities which are currently accessible by a Teledata system. If catalog of all of these services mentioned (including the Source, etc.) are received in time, Xerox copies will be found in the appendix of this memorandum.

		Portability			
Manufacturer/Model	Cost	Size(Inches)	Weight(lbs.)	Power	Keyboard
Warner/Atari Teledata	$300	7x4x1	1	Phone line & battery	I/O Standard English Keyboard (61 keys)
MSI 77	$600-$1000	8x4x2	2	Battery	Numeric only (27 keys)
88	$1000-$3325	8x4x2	2	Battery	Numeric only (27 keys)
Telxon 716-718	$400-$800	8x4x2	1	Battery	Numeric only (24 keys)
787	$1500	8x4x3	2	Battery	Numeric only (24 keys)
Norand Sprint 100	$400	7x3x1	1	Battery	Numeric only (20 keys)
101XL	$850-$1500	9x3x2	2	Battery	Numeric only (20 keys)
Azurdata					
Scorepak I/II	$900-$1320	8x4x2	1	Battery	Numeric only (20 keys)
Scorepad II	$2000	13x9x1	3	Battery	Numeric only (20 keys)
Texas Instrument Silent 700's	$1700-$2900	15x4x16 to 16x6x16	13-17	AC	Qwerty (63 keys)
Novation Infone	$900	11x7x2	3	Battery or adapter	Qwerty (53 keys)
Matsushita HHC/Information Processor	$475 for Modem	9x4x1	1	Battery	Qwerty (65 keys)

Competitve Portable Terminals

Display Lines x Char's	Built-in Modem	Ease of Use			Security System
		Auto Dial	Auto Log-on	English Dialogues	
1x16	Yes (send & receive) (300 baud)	Yes	Yes	Yes	Yes
1x12	No	No	No	No	No
1x16	No	No	No	No	No
1x16	No	No	No	No	No
1x32	No	No	No	No	No
1x12	No	No	No	No	No
1x12	No	No	No	No	No
1x14	No	No	No	No	No
1x14	No	No	No	No	No
80 column printer	Yes (send & receive) (300-1200 baud)	No	No	No	No
1x40	Yes (send & receive) (voice & data) (300-1200 baud)	Yes	No	No	No
1x24	No	No	No	No	No

Peripherals			
Modem	Printer	Video Int.	Other
Built-in	20 column	32x16 text	Acoustic Int., RS232C Int.
Send only (110-1350 baud)	No	No	Optical Wand
Send only (110-1350 baud)	No	No	Optical Wand
Send only (300 baud)	No	No	Optical Wand
Send only (1200 baud)	20 column	No	Optical Wand
Send only (300 baud)	None	No	Optical Wand
Send only (1200 baud)	20 column	No	Optical Wand
Send only (110-1200 baud)	None	No	Optical Wand
Send only (110-9600 baud)	40 & 80 column	No	Optical Wand
Built-in	Built-in	No	No
Built-in	40 column	No	No
Send & receive (300 baud)	16 column	32x16 text	Cassette Int.

Peripheral	Purpose	Features	Input
Kylex Display			
Acoustic Interface	To allow use of the telecomputers when no mod jack connection is available	. Acoustic interface battery powers itself and the telecomputer	Molded rubber telephone handset cradle
20 Column Printer	To provide low cost, portable, hard copy capability for the telecomputers	. 20 column, thermal, dot matrix printhead . Speed of 40 characters per second . Intelligence to prevent word breaks at end of line	3.5mm jack from telecomputer
Video Interface	To provide text only video display for the telecomputers	. 32 x 16 characters, text only . Intelligence to prevent word breaks at end of line . Works with video monitors and television receivers	3.5mm jack from telecomputer
RS232C Interface	To enable the telecomputers to be utilized with a major portion of the installed base of other manufacturer's 80 column plus printers	N.A.	3.5mm jack from telecomputer

Output	Controls	Indicators	Power	In-Packed Accessories
RJ11 modular phone jack to telecomputer	. On/off slide switch	LED indicating power on	4 "AA" alkalines, estimated 23 hour continuous use life	None
3.5mm jack to another peripheral	. Push button on for power on/off . Push button for advance paper	LED indicating power on	AC adapater	. Two foot cable for additional peripheral . 1-2 rolls of two inch thermal paper
. Composite video output to monitors/ TV's with video input . RF output to TV's with antennas	. Push button for power on/off . Channel 3/4 slide switch	LED indicating power on	AC adapter	. Antenna switch box with 12 foot cable to telecomputer . 6 foot coax cable to TV antenna
. 3.5mm jack to another peripheral . Standard DB-25 connector to other printers	. On/off slide switch	LED indicating power on	4 "AA" alkalines, estimated 1 year life	. 2 foot cable for additional peripheral

EXHIBIT A

MAJOR MILESTONES

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
Initial Shipments					
Telesets A-C (3 models)					
Telesets D-E (2 models)					
Teleset F (1 model)					
Telecenter					
Telecenter Peripherals					
Telecenter Remote					
Teledata Terminal					
Teledata Peripherals					
Acoustic Coupler					
Printer					
Video Interface					
Kylex LCD					
Teledata Access Center					
In Operation					
Services Directory					

However, the principals in Microcosmos have been correct in the past about the new directions for consumer electronics. One is Jeffrey A. Rochlis, former president of Mattel Electronics. The others are Robert and Holly Doyle, the Cambridge astrophysicists who invented Parker Brothers electronic games, including the top selling Merlin.

Article taken from the Wall Street Journal
Dated June 12, 1981
Written by Richard A. Shaffer
Staff Reporter of the Wall Street Journal

THE WALL STREET
TECHNOLOGY

Some Bet Portable Terminals Will Be Next Consumer Rage

Now that the personal computer has become so popular, success may not be far away for the personal terminal. Many in the electronics and computer industries believe there is a large consumer market for small, portable machines with just enough electronic brainpower to talk over the telephone with large computers, enabling individuals to get information, do shopping and banking, pay bills and even play games.

"It's unlikely that thousands will be sold immediately," says Bill Meserve, a senior consultant at the Arthur D. Little consulting company. "But demand will continue to build," he says, and will lead to "a substantial business" over the next five to ten years.

Much of the technology for such machines is available already. The question is how to package it for the broadest, most profitable market. A potentially important answer came last week at the summer Consumer Electronics Show in Chicago; another is expect at the winter show in January.

In Chicago, a small Tarzana, California, company called Novation introduced the Infone, a battery-powered ternimal that can fit into a briefcase and can telephone large computers almost by itself, sending and receiving messages even when its owner isn't around or late at night when telephone rates are lower.

Touch typing is possible on the Infone, which can store about three pages of text internally and much more if it is attached to a tape recorder. A telephone handset about the size of a fountain pen is part of the machine, which also contains circuits that produce electronic speech. It can send and receive voice as well as text and can make recorded announcements.

The machine also can serve as a telephone dialer and can turn household or office appliances on or off at preselected times. The first models of the Infone will be able to display only one line of text at a time on a panel of liquid crystals, but a printer can be attached, and later the company plans to add a connector that will allow the use of television screens.

Infone shipments are to begin in August at prices ranging from about $700 to $1200, depending on the model. A version selling for less than $300 is expected by the end of the year.

In January, a similar product, about the size of a pocket calculator, is expected to be announced by a start-up company in Cambridge, Mass., Microcosmos. Company insiders won't talk

to the press about their product, known an Microterminal. But they have distributed several prototypes to friends, consultants, venture capitalists and suppliers, some of whom give it enthusiastic reviews.

Says Thomas S. Burns, manager of personal computer programs for the SRI International consulting company, "Microterminal is a neat little toy now, but in the future, I expect them to sell like calculators and be a lot more handy. As a consumer product, it's a winner."

Prototypes of Microterminal plug directly into the modular jack used for telephones and automatically dial into a demonstration program on a large computer. The computer then determines what the caller wants to do by asking a series of brief questions. Those who have seen the demonstration say that Microterminal seems to eliminate much of the awkwardness and frustration that novices feel when they try to get information from the growing number of so-called computer data bases.

The Microcosmos demonstration data base, called Macronet, "is the key to Microterminal's success and a breakthrough in a mass-market information systems," says Lee Greenhouse, a market researcher for Link Resources of New York.

Microterminal is expected to come on the market about a year from now for $300 or less, and some believe its price could drop to as little as $100 within another two years. Other companies have similar terminals in development. Somewhat larger personal terminals are expected soon from such Japanese companies as Epsom, Fujitsu and Oki Data. Tandy Corporation, whose Radio Shack division sells a Japanese-made pocket computer, is "working in the area of an easy-to-use pocket terminal," an official says.

Tiny terminals have disadvantages, of course. The smaller they become, the less information they can retain or display and the more difficult their keyboards are to use.

"Microterminal is nifty. It's got terrific engineering. But its display of only 16 characters is a problem," says Marshal Graham, president of Source Telecomputing, a McLean, Virginia, computer information network. In addition, such companies as MSI Data of Costa Mesa, California, with years of experience in making small terminals for industrial and commercial markets, don't believe a mass-market for such terminals exists. And at least one previous attempt to sell pocket-size terminals failed. Nixdorf Computer, Burlington, Mass., subsidiary of a West German concern, tried to turn its hand-held electronic language translator into a hand-held terminal, but recently stopped selling the product after marketing it only a few months.

EXHIBIT I

INCOME ANALYSIS - TELESET REVENUE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Unit Sales (000's)						
Telesets A-C						
Telesets D-E						
Teleset F						
Total Unit Sales						
(2) Wholesale Price						
Telesets A-C						
Telesets D-E						
Teleset F						
(3) Dollar Sales (000's)						
Telesets A-C						
Telesets D-E						
Teleset F						
Total Dollar Sales						

Notes: (1) Estimated. Telesets A-C are first-stage Telesets. Telesets D-E are first-stage "Answer-Only" Telesets. Teleset F is a second-stage Remote Teleset.
(2) Estimated to reflect cost and attendant price reductions
(3) (1) above multiplied by (2) above

EXHIBIT II

INCOME ANALYSIS - TELECENTER REVENUE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Unit Sales (000's)						
(2) Wholesale Price						
(3) Dollar Sales (000's)						

Notes: (1) Estimated
(2) Estimated to reflect cost and attendant price reductions
(3) (1) above multiplied by (2) above

EXHIBIT III

INCOME ANALYSIS - TELECENTERS IN USE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Telecenter Unit Sales (000's)						
(2) Cum Telecenter Unit Sales (000's)						
(3) Total Telecenters In Use (000's)						
(4) Units In Use Sold In 1983						
(5) Units In Use Sold In 1984						
(6) Units In Use Sold in 1985						
(7) Units In Use Sold In 1986						

Notes: (1) From Exhibit II, Line (1)
(2) Cum of (1) above
(3) Sum of (4), (5), (6) and (7) below
(4), (5), (6), and (7) - Assumes:

- only 85% of units sold are actually in use in the year of sale
- 70% of units sold are still in use in the year following sale
- 60% of units sold are still in use two years following sale
- 50% of units sold are still in use three years following sale

EXHIBIT IV

INCOME ANALYSIS - TELECENTER PERIPHERALS REVENUE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Total Peripheral Unit Sales (000's)						
(2) Against TC's In Use Sold In 1983						
(3) Against TC's In Use Sold In 1984						
(4) Against TC's In Use Sold In 1985						
(5) Against TC's In Use Sold in 1986						
(6) Average Wholesale Price						
(7) Peripheral Dollar Sales						

Notes: (1) - Sum of (2),(3),(4),(5) below

(2),(3),(4),(5) Assume - Peripherals sold against Telecenters in use only
- Four peripherals sold against Telecenters in their first year in use
- Two peripherals sold against each of 40% of Telecenters in their second year of use
- One peripheral sold against 20% of Telecenters in their third year of use

Therefore, (2),(3),(4), and (5) above are the result of the above peripheral sale assumptions multiplied by Exhibit III, Lines (4), (5),(6), and (7), respectively.

(6) - Estimated average for various peripherals with anticipated cost/price reduction reflected

(7) - (1) multiplied by (6) above

EXHIBIT V

INCOME ANALYSIS - TELEDATA TERMINAL REVENUE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Unit Sales (000's)						
(2) Wholesale Price						
(3) Dollar Sales (000's)						

Notes: (1) Estimated
(2) Estimated to reflect cost and attendant price reductions
(3) (1) above multiplied by (2) above

EXHIBIT VI

INCOME ANALYSIS - TELEDATA TERMINALS IN USE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Teledata Terminal Unit Sales (000's)						
(2) Cum Teledata Terminal Unit Sales (000's)						
(3) Total Teledata Terminals In Use (000's)						
(4) Units In Use Sold In 1982						
(5) Units In Use Sold In 1983						
(6) Units In Use Sold In 1984						
(7) Units In Use Sold In 1985						
(8) Units In Use Sold In 1986						

Notes: (1) From Exhibit V, Line (1)
(2) Cum of (1) above
(3) Sum of (4),(5),(6),(7),and (8) below
(4),(5),(6),(7),and (8) Assumes:

- only 85% of units sold are actually in use in the year of sale
- 70% of units sold are still in use the year following sale
- 60% of units sold are still in use two years following sale
- 50% of units sold are still in use three years following sale
- 50% of units sold remain in use thereafter

EXHIBIT VII

INCOME ANALYSIS - TELEDATA PERIPHERALS REVENUE

	CY 1981	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Total Peripheral Unit Sales (000's)						
(2) Against TD's In Use Sold in 1982						
(3) Against TD's In Use Sold in 1983						
(4) Against TD's In Use Sold in 1984						
(5) Against TD's In Use Sold In 1985						
(6) Against TD's In Use Sold In 1986						
(7) Average Wholesale Price						
(8) Peripheral Dollar Sales						

Notes: (1) - Sum of (2),(3),(4),(5),and (6) below

(2),(3),(4),(5),(6) Assume - Peripherals sold against Teledata Terminals in use only
- One peripheral sold against each Teledata Terminal in first year of use
- One peripheral sold against each of 50% of Teledata Terminals in their second year of use.
- One peripheral sold against each of 20% of Teledata Terminals in their third year of use

(7) - Estimated average for various peripherals with anticipated cost/price reduction reflected

(8) - (1) multiplied by (7) above

EXHIBIT VIII

INCOME ANALYSIS - TELEDATA ACCESS CENTER FACILITATED TRANSACTIONS

		CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1)	Total Transactions Facilitated (000's)					
(2)	From Units In Use In 1982					
(3)	From Units In Use In 1983					
(4)	From Units In Use In I984					
(5)	From Units In Use In 1985					
(6)	From Units In Use In 1986					

Notes: (1) - Sum of (2),(3),(4),(5), and (6) below

(2),(3),(4),(5), and (6) - Assumes - 1.5 transactions per week for 15 weeks for 50% of units in their first year of sale
- 2.0 transactions per week for 50 weeks for each unit in its second year of use
- 2.5 transactions per week for 50 weeks for each unit in its third year of use
- 3.0 transactions per week for 50 weeks for each unit in its fourth year of use
- 3.5 transactions per week for 50 weeks for each unit in its fifth year of use

- Therefore, (2),(3),(4),(5), and (6) are the result of the above facilitated transaction rate assumptions multiplied by Exhibit VI, Lines (4),(5),(6),(7), and (8) respectively

EXHIBIT IX

INCOME ANALYSIS - TELEDATA ACCESS CENTER FACILITATED TRANSACTIONS - MINUTES ON LINE

		CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1)	Total Facilitated Transactions - Minutes On Line					
(2)	From Units Sold In 1982					
(3)	From Units Sold In 1983					
(4)	From Units Sold In 1984					
(5)	From Units Sold In 1985					
(6)	From Units Sold In 1986					

Notes: (1) Sum of (2),(3),(4),(5), and (6) below
(2),(3),(4),(5), and (6) - Assume average transaction time 5 minutes
- Therefore, (2),(3),(4),(5), and (6) are the result of 5 times Exhibit VIII, Lines (2),(3),(4),(5), and (6) respectively

EXHIBIT X

INCOME ANALYSIS - TELEDATA ACCESS CENTER FACILITATED TRANSACTIONS REVENUE

		CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1)	Total Transactions Facilitated (000's)					
(2)	Total Minutes On Line (000's)					
(3)	Host/Service Per Minute Charge	$.25	$.25	$.25	$.25	$.25
(4)	Access Center Facilitation Charge To Host/Service/User	5%	5%	5%	5%	5%
(5)	Total Access Center Transaction Income (000's)					

Notes:
(1) From Exhibit VIII, Line (1)
(2) From Exhibit IX, Line (1)
(3) Estimated average of $.19 Per Minute Host Charge (current range is from $.10 for the Source to $3.00 per minute for Dow Jones), and $.06 Per Minute Network Charge
(4) Estimated Access Center Transaction Service Charge
(5) (2) above multiplied by (3) above multiplied by (4) above

EXHIBIT XI

INCOME ANALYSIS - ACCESS CENTER MISCELLANEOUS REVENUE (000's)

		CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1)	Total Teledata Terminals In Use First Year Of Use (000's)					
(2)	Teledata Access Center Personal File Charge	$5.00	$5.00	$5.00	$5.00	$5.00
(3)	Teledata Access Center Personal File Charge Revenue					
(4)	Access Center Services Directory Subscription Revenue					
(5)	Total Access Center Miscellaneous Revenue (000's)					

Notes:
(1) From Exhibit VI, Lines (4),(5),(6),(7) and (8)
(2) Estimated one-time charge
(3) (2) above multiplied by (1) above
(4) Assumes - Services directory published quarterly beginning 4th quarter 1982 and costs subscriber $1.50 per issue
- 25% of owners of Teledata Terminals in use subscribe to four issues per year in years following terminal purchase
(5) Sum of (3) and (4) above

EXHIBIT XII

INCOME ANALYSIS - REVENUE SOURCE SUMMARY

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Teleset Revenue					
(2) Telecenter Revenue					
(3) Telecenter Peripherals Revenue					
(4) Teledata Terminal Revenue					
(5) Teledata Peripherals Revenue					
(6) Teledata Access Center Revenue					
(7) Access Center Miscellaneous Revenue					
(8) Total Revenue					
(9) Cum Total Revenue					

Notes:
(1) Exhibit I, Line (3)
(2) Exhibit II, Line (3)
(3) Exhibit IV, Line (7)
(4) Exhibit V, Line (3)
(5) Exhibit VII, Line (8)
(6) Exhibit X, Line (5)
(7) Exhibit XI, Line (5)
(8) Sum of (1),(2),(3),(4), (5),(6), and (7)
(9) Cum of (8) above

EXHIBIT XIII

EXPENSE ANALYSIS - MARKETING

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Materials					
(2) Presentations					
(3) Public Relations					
(4) Media					
(5) Outside Consultation					
(6) Demo Access Center					
(7) Samples					
(8) Total Marketing Expense					
(9) Cum Total Marketing Expense					

Notes: (1) Printed materials to support sales effort - slides, video tapes, brochures, ads, etc.
(2) Displays, trade shows, etc.
(3) P.R. agency fees and out of pocket expenses
(4) Space costs for advertising
(5) Outside study contracts, consultation, etc.
(6) Rental charges for telecom and other networks for Access Center (e.g. WATS, etc.) and link charges for Access Center with hosts (e.g. DOW JONES, etc.)
(7) Costs for Teledata Sample Terminals
(8) Sum of (1) thru (7) above
(9) Cum of (8) above

EXHIBIT XIV

EXPENSE ANALYSIS - ENGINEERING AND DEVELOPMENT - TELESETS, TELECENTERS, TELEDATA TERMINALS - EQUIPMENT

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Capital Equipment					
(2) Software Development					
(3) Operations/Maintenance					
(4) Total Engineering and Development Equipment Expense (000's)					
(5) Cum Total Engineering and Development Equipment Expense (000's)					

Notes: (1) Basic advanced telecommunications lab equipment
(2) Software programming development systems
(3) Operations and special maintanance for (1) and (2) above
(4) Sum of (1), (2), and (3)
(5) Cum of (4) above

EXHIBIT XV

EXPENSE ANALYSIS - **TELEDATA ACCESS CENTER EXPENSE**

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Capital Equipment					
(2) Software Development					
(3) Operations/Maintenance					
(4) User Access					
(5) Services Directory					
(6) Total Teledata Access Center Expense					
(7) Cum Total Teledata Access Center Expense					

Notes:
(1) - Purchase of 2 computers for Access Center at $150M each
(2) - Software development of control programs
(3) - Outside operation and maintence of Access Center computers - optional
(4) - Assumes - only access and testing in CY
(5) - Assumes - services directory is published quarterly commencing with the 4th quarter of , and costs $15M per issue to set up, $.50 per copy to publish, and $.25 per copy to mail. Company overprints each issue in quantity equal to 5% of subscriber base.
(6) - Sum of (1) thru (5)
(7) - Cum of (1) thru (5) above

EXHIBIT XVI

EXPENSE ANALYSIS - COST OF GOODS SOLD - TELESETS (000's)

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Total Teleset Sales					
(1A) Telesets A-C					
(1B) Telesets D-E					
(1C) Teleset F					
(2) Teleset/Unit Cost					
(2A) Telesets A-C					
(2B) Telesets D-E					
(2C) Teleset F					
(3) Total Telesets - Cost of Goods Sold					
(3A) Telesets A-C					
(3B) Telesets D-E					
(3C) Teleset F					

Notes: (1)
(1A)
(1B)
(1C)
(2)
(2A)
(2B)
(2C)
(3)
(3A)
(3B)
(3C)

EXHIBIT XVII

EXPENSE ANALYSIS - COST OF GOODS SOLD - TELECENTERS AND TELECENTER PERIPHERALS (000's)

		CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1)	Total Telecenter Sales					
(2)	Telecenter/Unit Cost					
(3)	Total Telecenter Cost Of Goods					
(4)	Total Telecenter Peripherals Sales					
(5)	Average Peripheral Unit Cost					
(6)	Total Telecenter Peripherals Cost of Goods Sold					

Notes: (1)
(2)
(3)
(4)
(5)
(6)

EXHIBIT XVIII

EXPENSE ANALYSIS - COST OF GOODS - TELEDATA TERMINALS AND TELEDATA PERIPHERALS

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Total Teledata Terminal Sales					
(2) Teledata Terminal/Unit Cost					
(3) Teledata Terminal Cost Of Goods					
(4) Total Teledata Peripherals Sales					
(5) Average Peripheral Unit Cost					
(6) Total Teledata Peripherals Cost Of Goods					

Notes: (1)
(2)
(3)
(4)
(5)
(6)

EXHIBIT XX

PROFORMA P & L

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Total Sales Revenue					
(2) Cost of Goods Sold					
(3) Telecenter Expense					
(4) Net Income from Operations					
(5) Marketing Expense					
(6) Engineering and R&D Expense					
(7) G&A Expense					
(8) Net Income Before Taxes					
(9) Net Income After Taxes					
(10) Return on Sales					

EXHIBIT ____

EXPENSE ANALYSIS - G & A (000's)

	CY 1982	CY 1983	CY 1984	CY 1985	CY 1986
(1) Salaries and Fringe					
(2) Offices, Furniture, Supplies, Equipment, Communications					
(3) Travel and Entertainment					
(4) Outside Legal Services					
(5) Miscellaneous					
(6) Total G & A Expenses					
(7) Cum Total G & A Expenses					

Notes: See following pages