INVESTMENT MEMORANDUM FOR RELATIONAL TECHNOLOGY, INC.

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FOR
RELATIONAL TECHNOLOGY, INC.

Copy No.: _____ Issued to: _____

Contact:

Gary J. Morgenthaler
President
Relational Technology, Inc.
1080 Marina Village Parkway
Alameda, California 94501
(415) 769-1400

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STRATEGY STATEMENT

1.0 MISSION AND FOCUS OF RELATIONAL TECHNOLOGY INC.

1.1 MISSION

Relational Technology, Inc. (RTI) is in the business of marketing relational database systems (DBMS) and associated user interface and applications development software in the IBM, VAX, UNIX, and small systems marketplaces. Our mission is to become the dominant vendor of DBMS systems in the VAX, UNIX, and small systems markets and the leading independent vendor of relational database systems in the IBM market.

1.2 FOCUS

RTI's strategic focus is to maximize our long-term competitive position. To this end, we seek to dominate the VAX, UNIX, small systems and build a strong share in IBM and selected other markets through leadership in technology, product and service quality, and aggressive marketing and sales. Once market share is attained, RTI seeks to erect long-term barriers to competition in chosen markets through heavy investment in technology and dominance of distribution channels.

RTI today has 195 employees located in Alameda, California and in sales and regional offices in 14 cities throughout the United States and Canada. RTI maintains foreign subsidiaries in the U.K. and Canada, with European regional sales and support operations based in London. International distributors are active in Belgium, Italy and Scandinavia.

RTI closed its fiscal year 1985 with its fourth consecutive year of growth and profitability. Revenues for FY1985 (ending June 30) were in excess of $17.8 million with $1.1 million in after tax profitability. This follows revenues of $8.1 million and profits of $660 thousand in FY1984, revenues of $3 million and profits of $244 thousand in FY1983, and revenues of $878 thousand and profits of $49 thousand in FY1982.

In FY1985, RTI surpassed its closest competitor in the DEC VAX marketplace despite their two year lead in the market. **INGRES is now the undisputed market share leader in RDBMS in the VAX market with installations in over 1200 locations in 400 prestigious customers.** A representative reference list is included in Appendix F of this document.

2.0 THE ENVIRONMENT

The markets where RTI will sell products through 1989 will be characterized by dramatic growth, the continued entry of new competitors, and the emergence of important new technologies.

The market for relational DBMS will increase dramatically through FY1989. Relational database systems are displacing other DBMS architectures due to the maturing of relational product offerings and the inherent productivity advantages of their greater ease of use. Increasingly, relational systems are also displacing file systems for application development as maturing technology continues to improve performance, functionality, and ease of use. Finally, ongoing hardware price/performance advances have opened large new desktop workstation and personal computer markets for DBMS. A goal of RTI's strategy is to develop products and marketing approaches which allow RTI to benefit maximally from these underlying trends.

For 1984, International Data Corporation (IDC) estimated DBMS revenues and fourth generation language (4GL) productivity tools at $1.2 billion, a figure that is expected to grow at a compound annual rate of 26 percent to almost $4 billion by 1989. According to a survey by Software News Magazine, growth of the DBMS user base during that period will increase 51 percent for minicomputers and 84 percent for micros -- two growth markets where RTI has a strong foothold.

By 1989, several major new competitors can be expected to affect the market for relational database systems. IBM introduced SQL/DS under VM and DB2 under MVS in 1983 and 1984, respectively. Both products are now beginning to gain in acceptance. During the fourth quarter of 1984, DEC introduced a new relational DBMS product ("Rdb") for sale on their hardware. Other significant vendors have announced or introduced relational products during the past year. This document briefly analyzes these competitors' product offerings and outlines RTI's strategy for competing against them.

Finally, several important new technologies will emerge by 1989. Foremost among these will be local networks, bit-mapped displays and color graphics. DBMS vendors will be forced to integrate these new technologies into their product offerings to remain competitive. It is our goal to prepare for these technologies in advance so as to be ideally positioned as they mature.

2.1 Overall DBMS Market Characteristics

The overall market for DBMS divides broadly into end users and application developers. End users buy DBMS products for general data management and reporting requirements and for simple applications development without involving the data processing department. Application developers further divide into data processing departments and systems builders/marketers. Both groups buy DBMS as a productivity tool for application development and as a basis for building applications which access shared data.

2.2 Structure of the VAX Market

2.2.1 General

Currently DEC offers VAX 11/8600, 11/785, 11/780(2), 11/750, 11/730 and 11/725 machines. DEC has also introduced low-end / systems called the MicroVAX I & II. DEC's current product line spans processor offerings from . 1 MIP to 4 MIPs at processor price points ranging from $15,000 to $500,000. Over the course of this plan we expect to see VAXes ranging from a VAX on a chip to large machines in the 10-30 mip range. We expect DEC to produce a range of VAX processors configured into systems ranging from $5000. to more than $1,000,000.

The VAX market consists predominantly of engineering and scientific users with a significant educational and military component. Commercial data processing users are a small but growing minority. To date, the market for DBMS on VAX has reflected the VAX market as a whole.

2.2.2 Engineering and Scientific Users

Engineering and scientific users are by far the largest segment of the VAX marketplace, accounting for perhaps 40% of the total VAX installed base. Among engineering and scientific users, energy services (particularly oilfield services), CAD/CAM, and aerospace sectors predominate. Engineering and scientific customers for VAXes are generally end users rather than the data processing departments within their organizations. As such, they are more interested in productivity tools for building applications and less interested in transaction processing than conventional DP departments. Due to their technical orientation, they are generally confident of their own technical judgment and willing to assume the risks associated with a new product and technology. Engineering and scientific users are most concerned with 1) overall function (including database services and productivity interfaces), 2) ease of use, 3) performance, and 4) interface support for scientific programming languages (principally FORTRAN and PASCAL). RTI's strategy in marketing to this key sector is to maintain product leadership in each of the key areas above.

2.2.3 Government and Military Users

Government and military users account for approximately 15% of the total VAX population. Whereas military users are willing to accept higher risk to gain the benefit of new technology, government agencies are similar to commercial accounts in their buying patterns and are largely risk averse. Both groups require a specialized sales force and marketing approach to gain significant penetration. RTI's strategy is to target both groups with a centrally organized and coordinated federal marketing effort based in its southern regional offices in Washington, D.C.

2.2.4 Educational Users

Educational institutions account for another 20% of the VAX installed base. Users at these institutions are generally unable and/or unwilling to spend substantial amounts of money for DBMS software. RTI's policy in this sector of the VAX market is to discount INGRES incrementally (20%) for administrative users and heavily (80%) for research and instructional users. The strategy behind this policy is to sacrifice margins in these accounts to build long-term demand for INGRES from the base of graduating students who leave to join industry. This same strategy has been very effective in creating long-term demand for UNIX from the base of graduating UNIX programmers.

2.2.5 Commercial Data Processing Users

Commercial data processing customers account for about 15% of the VAX market -- definitely a minority of Digital's users. INGRES's ease of use makes it attractive to end users in these large corporations. However, only recently have its performance and transaction management facilities improved to where it is generally usable by DP departments for production applications. DEC is clearly pursuing a strategy of expanding its commercial data processing base. The VAXcluster architecture connecting the recently introduced VAX 11/8600 hardware will allow modular, but extremely powerful system configurations. (INGRES is one of the few available products in the market today to support the VAXcluster. Notably, DEC itself has yet to include support for the VAXcluster in its competing software products.) Recent DEC software product releases -- including an enhanced COBOL, its CODASYL and relational DBMS products, office automation software, and better terminal support -- also underscore DEC's intention to challenge IBM for this customer base.

As such, we expect the percentage of the commercial DP accounts in DEC's installed VAX base to grow significantly during the next few years. Although commercial customers have been slow to accept relational DBMS, they seem likely to acquire a high percentage of such systems ultimately. RTI's strategy for end users in this market is to continue providing the most complete and easiest to use interfaces. For commercial DP departments, RTI will upgrade its application development facilities during 1985 while continuing to maintain its lead in raw performance. In addition, RTI will introduce an SQL interface for INGRES in 1985 which will further enhance its attractiveness to the commercial market.

2.2.6 International Business

Nearly half the potential DBMS market for VAX is outside the U.S.A. Much of this is concentrated in Canada, the United Kingdom, France and Germany, and Australia. RTI maintains direct sales subsidiaries in the United Kingdom and Canada, plus distributor relationships with organizations in Scandinavia, Belgium and Italy. Through its U.K. subsidiary, RTI manages regional sales and support operations throughout Europe. During FY1986, RTI plans to establish direct sales and support subsidiaries in Germany, France and Australia.

Among RTI's highest priorities during FY1986 is the penetration of key international markets using a mix of direct sales subsidiaries, joint venture partnerships, and marketing representative relationships.

In countries where we do not market directly, we will seek relationships with strong local firms which are committed and able to market and support INGRES effectively. Given the high initial costs of training and supporting such firms, RTI will only conclude distributor agreements which we expect to last at least three years.

2.2.7 Value Added Remarketers (VARs)

To date, RTI has received little revenue from royalties based on product sales by VAX VARs. We are convinced, however, that significant long term potential exists for such revenues. To date, VAX VARs have not built systems using INGRES primarily because they perceived it as lacking in performance and support for SQL, sophisticated transaction management, and applications functionality. Given forthcoming improvements in these areas and the applications power of enhancements like abstract data types, this situation should improve during 1985-86. RTI's strategy for the VAR market is to:

1) Target "design wins" into CAD/CAM applications being built by large OEMs/VARs like Intergraph, Applicon, GE, SDRC, Calma, and Computervision, since 80% of the VAR revenues will likely come from 20% of the accounts,

2) Use references from the key accounts above to assist in selling to other VARs,

3) Use the media to promote the concept of building VAR products using DBMS generally.

In any event, VAR lead times for product development are lengthy and significant revenues cannot be expected for at least two years.

2.3 Competition in the VAX Marketplace

There are two competitors who we feel will be significant over the course of this plan, namely DEC and Oracle Corporation. We discuss each in turn. Additional competitors may appear in time such as Software Ag, Information Builders, and Computer Associates.

2.3.1 Digital Equipment Corporation

Digital Equipment Corporation introduced "Rdb", their relational DBMS product offering, in the fall of 1984. Rdb is a "bare bones" relational system, offering the same function as our basic system with competitive performance in processing "short queries" for transaction-oriented applications. To date, Rdb has been ineffective in directly competitive sales situations with INGRES, but has gained some share among the highly price conscious and "single source" segments of the VAX market for DBMS. DEC's sales and support organizations are not well trained in the product, nor have they been given strong incentives to market it.

We expect to continue leadership of the VAX market because of superior product functionality, integration and performance and because of greater marketing focus and sales force motivation.

In product terms, we expect to compete favorably against DEC's offering because:

1) our application development tools -- including our fourth generation language (4GL) -- are far superior,

2) we currently offer networking, VAXcluster support and will introduce DBMS server and distributed DBMS products in approximately 12 months,

3) we will offer superior internal function, such as abstract data types and portals,

4) we offer superior performance on complex query processing and should be able to maintain this performance advantage, and

5) with INGRES V4.0 (scheduled for release in December, 1985), we expect to establish a clear lead in "short" (i.e., transactional) query processing as well.

Over time, the relational DBMS product entry by DEC will significantly increase competition in the VAX market. The sheer size of DEC's sales force and its ability to sell their DBMS along with the hardware will make it more difficult for RTI to close business. To compete effectively, RTI will have to produce a more "mature" product: future versions of INGRES will need to be better tuned, better tested, and better documented. DEC's standards in these areas are considerably higher than our competition to date. Moreover, RTI must assume a much more aggressive marketing posture. We will need to increase both our visibility in the market and our credibility as an organization with prospective customers. Advertising and promotional programs to accomplish these objectives have been launched.

2.3.2 Oracle Corporation

The second competitor is Oracle Corporation, which offers Oracle. Relational Technology has worked hard to build a reputation for having a reliable product, good support, and timely releases of new products. Oracle's performance has been inferior to this, and has resulted in RTI's current high "win ratio" of 80-90% in North American accounts where we compete directly. We believe INGRES outsold Oracle in the worldwide VAX market during FY1985 by a ratio of more than 2 to 1. Oracle's current market strategy has been to port their product broadly across a wide variety of hardware environments, with heavy emphasis recently on the IBM mainframe and IBM PC markets.

Our strategy versus Oracle Corporation is to:

1) Continue expansion of RTI's sales coverage domestically (sales force has been increased from 20 to 29 in the last 6 months) and internationally (by opening French, German and Australian subsidiaries and additional distributor relationships) and press our product advantage so as to deprive Oracle Corporation of revenues in the critical VAX and UNIX markets,

2) Introduce INGRES versions for IBM VM/CMS in 3Q85 and for IBM PCs (XTs and ATs) by 2Q86,

3) Implement nested queries by 4Q85 and null values by 4Q86 to eliminate Oracle Corporation's only significant functional advantages, and

4) Introduce an SQL interface to INGRES in 4Q85 to provide a second query language and respond to IBM's market power causing SQL to become a de facto standard in the IBM and UNIX markets,

5) Introduce an advanced version of INGRES during 3Q86 featuring distributed database function capable of integrating databases on physically separate and/or geographically remote computer systems into a common corporate data resource for large organizations. Further enhancements to INGRES will link together heterogeneous collections of hardware and operating systems to support a common database.

2.4 The UNIX & Small Systems Marketplace

2.4.1 General

The overall market for UNIX-based systems has grown rapidly during the last four years. Market research indicates that more than 250,000 UNIX systems are now installed, and a quintupling of this market is projected during the next four years. Although it has consistently fallen short of earlier optimistic projections and is fraught with problems which have limited its growth, the UNIX market should become a major and increasingly important market during the latter half of this decade.

Growth of the UNIX market has been constrained by problems of market fragmentation, hesitant vendors, uncertain standards, lack of commercial O/S functionality, and a dearth of good application software. More than 100 hardware vendors have entered the UNIX market since its inception in the late 1970's. Dozens have already been shaken out, and more will certainly follow during the new 3-5 years. All the major hardware manufacturers -- particularly the "BUNCH" (Burroughs, Univac, NCR, CDC, Honeywell) -- have staked out positions in this market, but most of them are proceeding tentatively and "hedging their bets" while waiting for this market to develop.

This problem is compounded by the proliferation of UNIX versions from different vendors and other sources -- including Version 7, System III, Berkeley BSD 4.2, Xenix, and many others. Recently, AT&T has attempted to force the re-unification of the market around a System V standard. Ultimately this effort seems likely to succeed. However, System V lacks the more advanced features of BSD 4.2 such as virtual memory, networking and efficient file management, and will be slow to catch on commercially until they are added. Because of market fragmentation due to multiple UNIX versions, functional limitations of AT&T's System V standard, and uncertain distribution channels, most applications developers have deferred implementing their applications under UNIX.

2.4.2 RTI's Strategy in the UNIX Market

RTI has established itself as the dominant vendor of directly sold and supported relational DBMS at the high end of the UNIX market. In addition, RTI has established important OEM relationships with key UNIX suppliers -- particularly AT&T Information Systems, as well as Burroughs, NCR, and Sun Microsystems. High end systems, however, comprise only a small percentage of the total UNIX marketplace. RTI faces a substantial engineering challenge before it can establish an equally dominant position at the low end of the multi-user UNIX market.

At the high end of the UNIX market, RTI maintains joint marketing relationships with Amdahl, Hewlett Packard, Pyramid Technology, and Computer Consoles. INGRES is a good fit and runs well on UNIX systems offering 2 or more megabytes of main memory such as DEC VAX (BSD 4.2, ULTRIX, System V), Pyramid, CCI, and Amdahl (UTS). RTI dominates this end of the market and, in several individual markets, is virtually unopposed in its pursuit of business at this time.

On smaller hardware configurations, RTI has elected to distribute via OEM agreement with the hardware manufacturers themselves. A major marketing advantage in this regard has been the selection by AT&T Information Systems of INGRES as their "flagship" relational DBMS. The introduction of AT&T Information Systems' "3B" line of data processing systems running under UNIX has served to formalize and legitimize the UNIX commercial marketplace. RTI's INGRES is the only privately labeled RDBMS product sold and supported directly by AT&T. In addition, AT&T-IS uses INGRES as the basis of their next generation of applications now under development. This relationship with AT&T, plus a strong relationship with Bell Communications Research, gives RTI a significant competitive advantage in the UNIX marketplace as well as the right to position INGRES as the "de facto standard" relational DBMS in the UNIX market.

Other OEM agreements have been concluded with Burroughs, NCR, Gould, ELXSI, Computervision, Sun Microsystems, Sequoia Systems, and others. INGRES has enjoyed considerable success on single user workstations such as those from Sun Microsystems. On smaller hardware configurations, however, the market outlook is mixed. Larger programs such as INGRES do not fit well in small (<2MB) multi-user configurations -- particularly those which are "swap-based" rather than virtual memory in their design. As a result, although initial license sales have been substantial from AT&T, Burroughs, Computervision and others, follow-on orders for their low end hardware have been slow to develop. Although declining memory costs and wider availability of virtual memory will alleviate these problems over time, RTI is addressing the immediate problem by implementing specific performance tactics and memory conservation techniques to make INGRES more competitive in these environments.

All of the above combines to represent a substantial opportunity for RTI in the UNIX market. RTI is experiencing significant OEM interest from virtually all UNIX hardware manufacturers and has focused its marketing and engineering resources to ensure that INGRES ultimately captures a large portion of the low end as well as the high end of the UNIX market. (see 2.5.1 Systems Integrators/Hardware Manufacturers).

2.5 Structure of the UNIX and Small Systems Market

2.5.1 System Integrators / Hardware Manufacturers

These companies typically market to distributors, dealers, vertical market systems integrators, and retail outlets. Because their market is moving rapidly and lead times to develop software are long, few of these systems integrators are attempting to develop their own proprietary line of software. Rather, most of them seek to license existing software products to sell with their hardware. Their strategies range from pure hardware sales (where their software VARs are expected to locate and acquire their own software) to exclusive remarketing agreements for outside vendors' software. Typically, systems integrators will conclude remarketing agreements with one to three vendors for each category of product they wish to sell with their hardware.

RTI's strategy is to target high end system integrators for "wholesale" remarketing of INGRES licenses. Under this arrangement, system integrators acquire and inventory INGRES licensed materials (including documentation and media) according to a sliding scale of discounts based on volume.

RTI currently has signed agreements with several hardware manufacturers in these catagories. These agreements were signed in the last half of 1983 and product is now reaching the marketplace. The current list of companies is as follows:

AT&T Information Systems
Burroughs Corporation (XE550 "Megaframe")
Gould
Sun Microsystems
NCR ("Tower" product line)
Sequoia Systems
ELXSI

It is expected that this "second tier" of distribution will supplement RTI's direct sales efforts by as much as 30% over the life of this plan.

2.5.2 Independent Sales Organizations

Numerous software wholesalers, dealer organizations, and mail order houses exist in the microcomputer software market. RTI's policy with respect to these groups is to service them only via referral to system integrators which remarket INGRES.

2.5.3 Software VARs

Due to minimal costs of market entry, a cottage industry consisting of hundreds of microcomputer software manufacturers has arisen. Because most of these software firms are poorly financed yet require significant amounts of technical support, RTI will service them only via referral to system integrators which remarket INGRES.

2.6 Competition in the UNIX & Small Systems Marketplace

There are a collection of systems offering limited functionality that compete in the small systems market including Unify, Dbase II, Informix, etc. Such systems typically offer minimal function compared to INGRES but run on floppy disk based systems and require much less main memory.

There are no systems currently in that market which offer the functionality of INGRES other than ORACLE. There have been several announced commitments for them to deliver versions of ORACLE for MC68000 systems running UNIX and 8086-based systems running MS/DOS and UNIX lookalikes. To date, ORACLE's success in that market has been limited.

Two conclusions should be drawn from the this discussion. First, in the high end portion of this market, RTI offers high end function without serious competition. Second, in the lower end of this market our product either will not run at all or consumes an unacceptable level of resources. RTI would require a new offering to address this marketplace. The development of this offering is now underway (See 3.7 The IBM Marketplace).

2.7 The IBM Marketplace

2.7.1 General

At the moment the IBM marketplace is characterized by the following three points. First, it has a very heavy emphasis on "transaction processing". There appear to be a large number of commercial (e.g. banking and insurance) applications which require multi-statement transactions and bullet-proofed crash recovery. At the moment RTI, and relational systems in general offer minimally acceptable services in this area to such customers. Second, the IBM market is characterized by a heavy emphasis on performance. Most potential customers wish to drive 20 or more on-line terminals doing access and update to a shared database. The IBM sale is oriented toward competitive benchmarking. Finally, the IBM market is application programmer oriented rather than end-user oriented. This of course is changing rapidly as IBM proceeds with its "Information Center" marketing strategy. The typical IBM machine is located in a central computer center with a staff of programming specialists. By contrast, the VAX market is characterized by machines being located in an end-user's organization and directly staffed by end-users. The sale to a computer center is oriented more toward performance and less toward ease of use and functionality. Software sales are secondary to the hardware and IBM, like many hardware manufacturers, does a poor job in selling software at the high end outside of its strategic areas (operating systems, large transaction processing systems, and communication protocols, e.g. SNA).

2.7.2 Large Corporate DP Users

IBM clearly dominates the large corporation data processing organizations. Their product strategy has been to deliver a compatible family of systems which allow its users to grow through multiple levels of computing without jeopardizing their investment in education, strategic software, and of course, programming. The series of low-end, non-compatible minicomputers (S/23,S/36, and the S/38), while successful in smaller businesses, have not been successful in large corporations. The obvious product strategy emerging therefore is to extend the product compatibility downward as far as possible in the hardware hierarchy which will provide both growth and access to the corporate data resource. It is clear IBM will go this way

with the IBM PC extended base via direct compatibility (IBM 370/PC) or via extract capability -- this in particular is the basis for many recent industry product announcements, as other software vendors find a way to "co-exist" with IBM software. It also represents the "bridge" for INGRES as an information center product to co-exist as well.

In FY1985, RTI introduced INGRES/PCLink which combines personal computers and INGRES databases and applications providing a powerful way to connect IBM Personal Computers running PC software such as Lotus 1-2-3 with INGRES. Future versions of INGRES will run on the IBM PC/XT, PC/AT and other low end design points. This product will be a subset of the current INGRES product and will provide common user interfaces and programs written will be upward compatible. In addition, RTI's INGRES/NET capability will allow users to access mainframe INGRES via INGRES running on the PC. The low end subset INGRES product began development in 2Q85.

It is RTI's intent to introduce and market the above INGRES products in the 4Q85 and 2Q86, respectively. The primary target market will be Fortune 1000 organizations which embrace IBM's Information Center marketing strategy. RTI will deliver INGRES under IBM's VM (and subsequently MVS) operating system environments, and will complement that product with the PC/XT version and INGRES/NET between the two. In addition, RTI will deliver a data extract capability for production data files (VSAM,IMS,IDMS,etc.) which will provide a bridge for the corporate data to the information center INGRES products.

2.7.3 Other End Users

IBM's 43XX product line has been successful in smaller corporations where less sophisticated uses and users exist. INGRES will, through its VM operating system version, be an excellent product for these smaller, less sophisticated users. RTI has no plans at the present time to deliver INGRES on the IBM S/23, S/34-36, or S/38 product lines, since these markets depend heavily on end user application packages, and not on the ad hoc use of data.

2.7.4 VAR/OEMs

IBM has been reluctant to enter the VAR/OEM market until recently. It is expected that INGRES will become an important product in this market as it develops.

2.7.5 Competition in the IBM Marketplace

There are a large collection of entrenched competitors in the IBM market, including IBM (IMS and SQL/DS), Cullinet (IDMS), CCA (Model 204), ADR (Datacom DB/DC), Software Ag (Adabas), NCSS (Nomad), Information Builders (Focus), Intel (System 2000), Infodata (Inquire), and Mathematica (Ramis). At the moment INGRES offers superior ease of use and functionality compared to all non-relational offerings that we know about but offers somewhat inferior performance for high volume multi-terminal applications. Most all of these competitors have announced, or will announce both relational-like capability and also IBM PC versions. Their ability to deliver networking with their existing products is in doubt, and to date they have been generally dependent upon data extract capability rather than native implementations of DBMS on the IBM PC.

2.7.6 Competitive Position of Relational Technology, Inc.

Compared to SQL/DS, RTI will offer better performance and much better user interface software. RTI's entry into the IBM marketplace will require better transaction management, and an improved report writer. An SQL interface will be added to the base INGRES product in 4Q85. Additional performance improvements are also expected. Networking is available today in the base product and will have immense value due to its ability to tie together similar as well as dissimilar types of hardware systems running INGRES. This will allow not only the inclusion of IBM PC/XT devices in the network with mainframes, but also any other machine running INGRES, including intermediate range products which IBM is anticipated to offer in the office automation arena. It is RTI's strategy to extend INGRES/NET capabilities to include systems from different hardware vendors and to provide fully distributed database management (See 3.0 Product Development Strategies).

3.0 PRODUCT DEVELOPMENT STRATEGIES

3.1 General

A critical reading of Section 3 will yield the following conclusions:

1) RTI will continue to spend a large fraction of it's resources on innovative software development. We will continue to improve our transaction processing facilities and concentrate on improving performance. Moreover, we will continue to stress user level software and innovative internal functions.

2) RTI will develop a fully distributed database system and support for bit-mapped displays to protect our VAX customer base. This will also reinforce our position of technological leadership. A distributed database system will also protect INGRES against database machines like the Britton-Lee and Teradata systems.

3) RTI is developing a small system oriented offering to compete effectively in the lower end of the UNIX small systems market as well as in the IBM PC market among corporate users in the Fortune 1000.

4) Entry into the IBM market will be based on networking, both a low and high end product, and VM, MVS, and UNIX versions.

3.2 Overall Product Goals

To win sales from competition in the above markets, RTI will offer a higher quality product with greater function at equal or better performance. We will release reliable code, provide excellent technical support, and consistently improve the quality of our documentation. We expect to gain considerable advantage relative to our competitors in two key areas:

1) Distributed databases, and

2) "User friendly" front end software.

RTI will, of course, continue to tune INGRES and provide back-end database support for functionality which the user sees. The main areas that we expect to pursue concerning 2) above include application generators, browsing tools, database design aids, spread sheet programs, support for documents, support for mail and an interface to a statistics package. There seems no shortage of desirable functions or bright people to work out the design details. We expect to succeed in markets which we choose to enter by the scope and quality of our product. RTI will be a leader in the implementation of distributed databases, as we are a leader in networked databases.

4.0 SALES STRATEGY

4.1 United States and Canada

RTI sells INGRES to end-users through three tiers of distribution: The first is through a direct sales force located currently in 14 cities throughout the United States and Canada. Sales locations report to three regional sales and support offices which in turn report to the Vice President of Sales. Sales territories are geographic with the exception of selling to academic institutions which is done on a national basis with specialized salesmen. Cities currently served by RTI sales offices are: Boston, New York (2), Washington, D.C., Atlanta, Columbus, Chicago, Houston, Dallas, Toronto, Montreal, Los Angeles, Denver, Seattle, and San Francisco. The primary leverage item in selling INGRES in the direct market is the sales seminar. Ninety (90) seminars are planned for FY86. Sales leads generated via seminars (Direct mail invitations average 10+% response!) plus leads generated by other traditional methods (other direct mail, advertising, trade shows, and press coverage) are followed and tracked with a sophisticated, on-line INGRES-based prospect system.

The second tier of distribution of INGRES is through software VARs in the VAX marketplace and hardware distributors in UNIX based hardware systems markets. Software VARs (See discussion in 3.5.3) are sold INGRES for use in their end-user products via the geographically based sales force described above. Hardware OEMs (See discussion in 3.5.1) are sold and serviced via dedicated OEM marketing and support staff located in Alameda, CA and Clifton, New Jersey.

The overall sales force has been increased from 24 to 29 in the last 6 months. Plans are in place to continue to increase that staff to 37 during FY1986.

4.2 International Sales

In 2Q85, RTI established European regional sales and support offices, and a U.K. subsidiary, based in London. During FY1986, RTI expects to establish French, German, and Australian subsidiaries.

RTI has signed agreements with three European distributors to sell and support INGRES in Belgium (SOBEMAP), in Scandinavia (INENCO), and Italy (Mesarteam). The use of distributors is desirable in these countries due to the limited size of their markets, and the level of investment and amount of time required to establish a direct marketing organization. RTI expects to expand distribution arrangements during FY1986 to include Switzerland, the Netherlands, Denmark, Spain, Greece and Israel.

5.0 FINANCIAL PROJECTIONS

5.1 Income Statements

5.1.1 Summary Income Statement by Quarter FY1985

RELATIONAL TECHNOLOGY, INC.
INCOME STATEMENT (UNAUDITED)
FY 1985

	QTR ENDG. 9/30/84	QTR ENDG. 12/31/84	QTR ENDG. 3/31/85	QTR ENDG. 6/30/85	YTD TOTALS
Licenses	1,847,864	3,096,417	3,004,122	4,658,615	12,575,019
Other Revenue	1,850,124	985,288	1,352,541	1,012,551	5,232,503
Total Revenue	3,697,988	4,081,705	4,356,663	5,671,166	17,807,522
Cost of Revenue	299,599	615,122	645,233	1,033,400	2,593,354
Gross Margin	3,398,389	3,466,583	3,711,430	4,637,766	15,214,168
Expenses:					
R&D	1,199,899	1,391,212	1,590,866	1,701,818	5,883,795
Sales & Mktg	1,215,815	1,614,413	1,536,576	1,833,137	6,199,942
G&A	361,500	416,463	448,990	641,678	1,868,631
Total Exp.	2,777,214	3,422,088	3,576,432	4,176,633	13,952,368
Operating Income	621,175	44,495	134,998	461,133	1,261,800
Interest Inc/(Exp)	(6,928)	35,871	37,365	77,264	143,573
Misc (Inc) Exp.	(15,145)	(32,917)	42,147	(44,232)	(50,147)
Profit B/f Taxes	643,248	41,541	55,486	428,101	1,168,374
Prov. for Taxes	13,253	39,350	12,649	34,382	99,634
Net Income	**629,995**	**2,191**	**42,837**	**393,719**	**1,068,740**

5.1.2 Summary Income Statement Pro Forma FY1985-FY1989

RELATIONAL TECHNOLOGY, INC.
PRO FORMA INCOME STATEMENT 1985-1989

	1985	1986	1987	1988	1989
Total Revenue	17,807	31,749	64,193	107,688	152,319
Cost of Revenue	2,593	3,492	7,703	14,000	22,819
Gross Margin	15,214	28,257	56,490	93,688	129,500
Expenses:					
R&D	5,884	9,714	16,900	21,500	29,593
Sales & Marketing	6,200	10,217	20,297	33,632	46,198
G&A	1,868	3,133	6,993	15,076	20,709
Total Expenses	13,952	23,064	44,190	70,208	96,440
Operating Income	1,262	5,193	12,300	23,480	33,060
Interest (Exp)/Inc	(144)	(600)	(800)	(1,000)	(1,200)
Misc (Exp)/Income	50	80	100	120	140
Profit Before Taxes	1,168	4,673	11,600	22,600	32,000
Provision for Taxes	99	1,402	4,060	8,588	12,800
Net Income	**1,069**	**3,271**	**7,540**	**14,012**	**19,200**

5.2 Balance Sheets

5.2.1 Summary Balance Sheet by Quarter FY1985

RELATIONAL TECHNOLOGY, INC.
BALANCE SHEET (UNAUDITED) -- FY1985

	QTR ENDG. 9/30/84	QTR ENDG. 12/31/84	QTR ENDG. 3/31/85	QTR. ENDG. 6/30/85
Cash & Equivalents	(667,499)	455,467	344,248	663,137
Accounts Receivable	4,165,480	4,410,767	5,562,279	4,884,457
Installment Receivable-current	276,666	371,999	299,049	308,251
Prepaid Expenses	236,294	252,168	341,343	329,759
Current Assets	4,010,941	5,490,401	6,546,919	6,185,604
Furniture & Equipment	3,234,064	3,717,395	4,549,902	5,776,871
Accumulated Depreciation	(582,417)	(750,308)	(893,723)	(1,155,926)
Leasehold Improvements	165,517	175,656	372,582	441,110
Amortization	(94,745)	(139,116)	(3,195)	(13,190)
Net Fixed Assets	2,722,419	3,003,627	4,025,566	5,048,865
Installment Rec-Long Term		186,431	192,316	203,888
Other Assets	53,145	62,227	154,974	83,876
Total Assets	7,007,363	8,742,686	10,919,775	11,522,233
Accounts Payable	345,461	420,952	1,410,184	669,190
Notes Payable to Bank	78,524	702,000	1,002,000	902,000
Current Portion-LT Bank Debt	13,373	78,524	157,048	420,252
Current Portion-LT Debt		28,206	37,270	37,089
Income Taxes Payable	67,968	104,268	84,887	118,150
Deferred Income Taxes	8,528	8,528	8,528	8,528
Accrued Expenses	254,720	875,197	648,366	1,136,126
Deferred Revenue - Current	7,099	17,500	28,178	5,519
Current Liabilities	775,673	2,235,175	3,376,461	3,296,854
Long Term Bank Debt	706,717	931,717	1,891,861	2,188,227
Long Term Debt	46,102	96,542	100,868	89,441
Capitalization Losses	2,861	2,132	1,365	282
Deferred Income Taxes	14,520	14,520	14,520	14,520
Deferred Revenue-Long Term			28,800	24,800
Series A Deferred Stock	305,000	305,000	305,000	305,000
Series B Preferred Stock	936,400	936,400	936,400	936,400
SbSeries C Preferred Stock	2,500,000	2,500,000	2,500,000	2,500,000
Common Stock	304,419	303,337	303,801	300,469
Retained Earnings	1,415,671	1,417,863	1,460,699	1,866,240
Shareholders' Equity	5,461,490	5,462,600	5,505,900	5,908,109
Total Liabilities & Equities	7,007,363	8,742,686	10,919,775	11,522,233

6.0 CAPITALIZATION

A.	Series A Preferred Each share convertible into 5 common shares	305,000 shares
B.	Series B Preferred Each share convertible into 5 common Shares	192,000 shares
C.	Series C Preferred Each share convertible into 1 common Share	625,000 shares
D.	Common Shares outstanding (As of 6/30/85)	3,127,173 shares
	Total common equivalent shares	6,237,173 shares

Options: Authorized 600,000
Issued 431,050

(Incentive Stock Option Plan)

7.0 BACKGROUNDS OF KEY PERSONNEL

MANAGEMENT

Gary Morgenthaler, President and Chief Executive Officer, has 15 years of experience in high-technology product marketing, finance, development and design. Prior to co-founding RTI in 1980, Morgenthaler was a consultant with McKinsey & Company Inc., advising major U.S. and European companies on marketing, operations, finance, strategy and research and development. Before that, he worked for five years at Tymshare, as manager of systems development, where he was the principal architect of the company's distributed applications network architecture. He was also an instructional systems programmer at the Stanford University Institute for Mathematical Studies in the Social Sciences. Morgenthaler holds a B.A. from Harvard University.

Lawrence Rowe, consulting Vice President, co-developed the INGRES prototype at UC Berkeley and helped develop a commercialized version as a co-founder of RTI. An Associate Professor of Electrical Engineering and Computer Science at UC Berkeley since 1976, Dr. Rowe has served as a consultant for Apple Computer and Tandem Computers and has written extensively on programming languages, database management systems and computer networks. He holds a Ph.D. in Information and Computer Science from the University of California, Irvine.

Michael R. Stonebraker, consulting Vice President and director, was the principal architect of INGRES in its developmental stages at UC Berkeley. A UCB Professor of Electrical Engineering and Computer Sciences since 1971, Dr. Stonebraker has written and published extensively on DBMS systems, operating systems and modeling and simulation of large scale systems. He holds a Ph.D. in Computer Information and Control Engineering from the University of Michigan.

Eugene Wong, consulting Vice President and Secretary, was also a key member of the design team that created the INGRES prototype at UC Berkeley. A UCB Professor of Electrical Engineering and Computer Sciences since 1962 and Chairman of the Electrical Engineering and Computer Sciences Department, Dr. Wong has worked on the research staff at IBM, served as a consultant to Ampex Corp. and Honeywell Corp., and published numerous articles on database management systems. He was a National Science Foundation Postdoctoral Fellow at the University of Cambridge in 1959, a Guggenheim Fellow in 1968, a Senior Fellow of the British Research Council in 1972, a Vinton Hayes Senior Fellow at Harvard in 1976, and a visiting professor at the Massachusetts Institute of Technology in 1979. Dr. Wong holds a Ph.D. in Electrical Engineering and Computer Sciences from Princeton University.

Peter Tierney, Vice President of Marketing, has more than 18 years of experience marketing and selling high-end information and data processing systems for IBM. Prior to joining RTI in October 1983, Tierney was Director of Marketing for the Northwest Region of IBM's National Marketing Division, Information Systems Group. Before that, he worked as Director of Marketing for the Great Lakes Region of the IBM Data Processing Division in Detroit, and as manager of IBM's San Francisco Data Processing Division branch office. Prior to that, he served in several sales and marketing management positions in the Data Processing Division.

Tierney began his career with IBM in Boston, selling large general purpose business computer systems. He holds a B.S. in Business Administration from Northeastern University in Boston.

Al Sisto, Vice President of Sales, has more than 15 years of experience marketing high-technology products. Before coming to RTI, Sisto was marketing manager of database operations at Intel. He was previously sales manager for the computer division of National CSS (a subsidiary of Dun & Bradstreet), and before that, national marketing manager for Bell Systems at Honeywell. He began his career at the New York City office of General Electric. Sisto holds a B.E. in Engineering from Stevens Institute of Technology, Hoboken, N.J.

Martin J. Sprinzen, Vice President of Engineering, has 15 years of experience in product development and software design. Before joining RTI, Sprinzen was Vice President of Technical Services at Candle Corporation and was responsible for the company's product development, customer support, and marketing activities. Prior to Candle, Sprinzen managed the Operating Systems Group at Southern California Edison for 5 years, and designed scientific application programs for Consolidated Edison of New York following his graduate work. Originally from New York City, Sprinzen holds a B.S.E.E. from the Cooper Union, completed a graduate program in Power Systems Engineering at New York University, and has written over 30 technical papers and articles for SHARE, GUIDE, IEEE, and The Candle Computer Report and Software Magazine.

Raymond J. Sims, Vice President of Finance and Administration, joined RTI from Raychem Corporation where he was Director, Corporate Operations Review Group, responsible for operational and compliance reviews for Raychem's operations in 72 countries around the world. Prior to Raychem, Sims was Assistant Treasurer for McKesson Corporation, where his responsibilities included corporate investments, acquisitions and divestitures, and major real estate transactions. Before McKesson, Sims held the position of Engagement Manager at Bain & Company, a leading management consulting firm, where he was responsible for international corporate planning and business strategy for clients in the United States, Western Europe, and Japan. Sims also worked three years for the accounting firm of Arthur Young and Company as a senior member of their audit staff. He is a Certified Public Accountant. Sims received an MBA from Harvard Business School in 1976, graduating as a Baker Scholar. His undergraduate degree is from Lehigh University where he was elected to Phi Beta Kappa.

Nicholas Birtles, Managing Director of European Operations, has more than 17 years in the field of computer software and services. Before joining RTI, Birtles spent 13 years with Comshare, most recently as its European Sales Director, where he was responsible for 12 sales offices in the U.K., with subsidiaries in Belgium, the Netherlands, France and Germany. As European Sales Director, his responsibilities also included overseeing a distributor in Norway, a joint venture in Sweden, and joint ventures in Italy, South America and Hong Kong. Prior to Comshare, Birtles worked in sales support for Burroughs in Canada and, before Burroughs, for English Electric/Marconi as a systems engineer. Birtles manages RTI's European headquarters, overseeing direct sales and support outlets in the U.K., Germany and France, and supporting RTI's distributors in Norway, Italy and Belgium.

Appendix A
VAX/VMS Revenue Projections

	Comment	FY1985	FY1986	FY1987	FY1988	FY1989
# VAXes	<Estimate>	40,000	55,000	75,000	110,000	160,000
VAX CPU Avg Price		$160,000	$130,000	$110,000	$90,000	$75,000
INGRES Avg Price		$26,000	$22,000	$18,000	$13,500	$10,000
Penetration (%)	<Estimate>	2.6 %	3.1 %	3.4 %	4.0 %	4.6 %
Total Installed		1,024	1,705	2,550	4,400	7,360
Lic Revenue(000)	<w/o Renewals>	$12,324	$14,982	$15,210	$24,975	$29,600
Renewal Fee	<8% Cum. Reven	$768	$1,754	$2,952	$4,169	$6,167
INGRES/Net	< % Cum. Sales	4.6 %	8.0 %	12.0 %	18.0 %	26.0 %
#INGRES/Net Lic.	<Cum Installed	47	136	306	792	1,914
Revenue (000)	<@1/3 Lic Fee>	$408	$655	$1,018	$2,187	$3,739
Distrib. INGRES	<% Cum. Sales>	0.0 %	0.0 %	4.0 %	10.0 %	15.0 %
#Distrib. INGRES		0	0	102	440	1,104
Revenue (000)	<@2/3 Lic Fee>	$0	$0	$1,224	$3,959	$7,359
INGRES/Graphics		30.0 %	30.0 %	33.0 %	37.5 %	40.0 %
# INGRES/Graphics		307	512	842	1,650	2,944
Revenue (000)		$799	$1,874	$5,047	$7,423	$9,812
INGRES/Cluster		4.0 %	5.0 %	7.0 %	8.5 %	10.0 %
# INGRES/Cluster		41	85	179	374	736
Revenue (000)		$106	$375	$642	$1,010	$1,472
INGRES/PClink		0.0 %	22.0 %	30.0 %	30.0 %	30.0 %
# INGRES/PClink		0	375	765	1,320	2,208
Revenue (000)		$0	$1,649	$4,588	$5,939	$7,359
TOTAL REVENUE		**$14,405**	**$21,290**	**$30,681**	**$49,662**	**$65,508**

Appendix B
IBM Revenue Projections

	Comment	FY1985	FY1986	FY1987	FY1988	FY1989
# IBMs		20,000	27,000	35,000	44,000	55,000
IBM Avg Price	<Estimate>	$350,000	$300,000	$250,000	$200,000	$175,000
INGRES Avg Price		$0	$63,000	$55,000	$47,000	$41,000
Penetration (%)	<Estimate>	0.0 %	0.2 %	0.9 %	1.7 %	2.5 %
Total Installed		0	54	315	748	1,375
Sales (000)	<w/o renewals>	$0	$3,402	$14,355	$20,351	$25,707
Renewal Fee	<8% Cum. Reven	$0	$0	$272	$1,421	$3,049
INGRES/Net	< % Cum. Sales	0.0 %	0.0 %	6.0 %	9.0 %	13.0 %
#INGRES/Net Lic.	<Cum Installed	0	0	19	67	179
Revenue (000)	<@1/3 Lic Fee>	$0	$0	$347	$759	$1,523
Distrib. INGRES	<% Cum. Sales>	0.0 %	0.0 %	2.0 %	5.0 %	7.5 %
#Distrib. INGRES		0	0	6	37	103
Revenue (000)	<@2/3 Lic Fee>	$0	$0	$230	$1,170	$2,817
INGRES/Graphics		0.0 %	15.0 %	18.0 %	22.5 %	25.0 %
# INGRES/Graphics		0	8	57	168	344
Revenue (000)		$0	$167	$1,036	$2,633	$4,695
INGRES/PClink		0.0 %	50.0 %	50.0 %	50.0 %	50.0 %
# INGRES/PClink		0	27	158	374	688
Revenue (000)		$0	$334	$2,878	$5,851	$9,389
TOTAL REVENUE		**$0**	**$3,903**	**$19,118**	**$32,185**	**$47,179**

Appendix C
UNIX Revenue Projections

	Comment	FY1985	FY1986	FY1987	FY1988	FY1989
# UNIX Systems		250,000	500,000	750,000	1000000	1250000
UNIX Sys Avg Price		$25,000	$25,000	$25,000	$25,000	$25,000
INGRES Avg Price		$2,400	$2,000	$1,600	$1,200	$800
Penetration (%)	<Estimate>	0.9 %	1.0 %	1.3 %	1.8 %	2.7 %
Total Installed		2,125	4,850	9,750	18,000	33,750
Sales (000)	<w/o renewals>	$3,300	$5,450	$7,840	$9,900	$12,600
Renewal Fee	<8% Cum. Reven	$90	$264	$700	$1,327	$2,119
INGRES/Net	< % Cum. Sales	0.0 %	3.0 %	6.0 %	9.0 %	13.0 %
#INGRES/Net Lic.	<Cum Installed	0	145	585	1,620	4,387
Revenue (000)	<@1/3 Lic Fee>	$0	$97	$234	$414	$738
Distrib. INGRES	<% Cum. Sales>	0.0 %	0.0 %	2.0 %	5.0 %	7.5 %
#Distrib. INGRES		0	0	195	900	2,531
Revenue (000)	<@2/3 Lic Fee>	$0	$0	$208	$720	$1,350
INGRES/Graphics		0.0 %	0.0 %	37.5 %	45.0 %	50.0 %
# INGRES/Graphics		0	0	3,656	8,100	16,875
Revenue (000)		$0	$0	$1,950	$3,240	$4,500
INGRES/PClink		0.0 %	15.0 %	25.0 %	30.0 %	35.0 %
# INGRES/PClink		0	728	2,437	5,400	11,812
Revenue (000)		$0	$291	$1,300	$2,160	$3,150
TOTAL REVENUE		**$3,390**	**$6,102**	**$12,232**	**$17,761**	**$24,457**

Appendix D
IBM PC Revenue Projections

	Comment	FY1985	FY1986	FY1987	FY1988	FY1989
# IBM PCs		6000000	7200000	8600000	10000000	12000000
UNIX Sys Avg Price		$4,500	$4,000	$3,500	$3,000	$2,500
INGRES Avg Price			$600	$500	$400	$350
Penetration (%)	<Estimate>	0	0.0 %	0.1 %	0.2 %	0.4 %
Total Installed		0	720	5,160	20,000	48,000
Sales (000)	<w/o renewals>	$0	$432	$2,220	$5,936	$9,800
Renewal Fee	<8% Cum. Reven	$0	$0	$35	$212	$687
INGRES/Net	< % Cum. Sales	0.0 %	3.0 %	6.0 %	9.0 %	13.0 %
#INGRES/Net Lic.	<Cum Installed	0	22	310	1,800	6,240
Revenue (000)	<@1/3 Lic Fee>	$0	$4	$48	$199	$518
INGRES/Graphics		0.0 %	0.0 %	30.0 %	35.0 %	40.0 %
# INGRES/Graphics		0	0	1,548	7,000	19,200
Revenue (000)		$0	$0	$258	$933	$2,240
INGRES/PClink		0.0 %	20.0 %	25.0 %	30.0 %	35.0 %
# INGRES/PClink		0	144	1,290	6,000	16,800
Revenue (000)		$0	$17	$215	$800	$1,960
TOTAL REVENUE		**$0**	**$454**	**$2,775**	**$8,080**	**$15,205**

Appendix E
TOTAL REVENUE PROJECTIONS -- FY1985-FY1989

($000)

	FY1985	FY1986	FY1987	FY1988	FY1989
VAX/VMS	$14,409	$21,290	$30,068	$49,662	$65,508
IBM Systems	$0	$3,903	$19,118	$32,185	$47,149
UNIX Systems	$3,390	$6,102	$12,232	$17,761	$24,457
IBM PCs	$0	$454	$2,775	$8,080	$15,205
TOTAL REVENUE	**$17,799**	**$31,749**	**$64,193**	**$107,688**	**$152,319**

APPENDIX F
Customer Reference List

NORTH AMERICAN REFERENCES

Mr. Justice H. Schlichting
COMMERCE CLEARING HOUSE
One Thorndale Drive, CS-4900
San Rafael, CA 94903
(415) 472-3100

Ms. Jackie Boydston
FLIGHT SYSTEMS
Hangar #71
Mojave Airport
Mojave, CA 93501
(805) 824 4601

Mr. James D. Lyons
Engineering Computer Systems Manager
RAYCHEM CORPORATION
2555 Bay Road
Redwood City, CA 94061
(415) 361-4658

Mr. Stuart Koop
Director of Computer Center
MILLIKIN UNIVERSITY
1184 W. Main Street
Decatur, IL 62522
(217) 424-6333

Mr. Aaron Cook
CHAMPLIN PETROLEUM
4100 Equitable Drive, Room 309
Forth Worth, TX 76151
(817) 737-1000

Mr. Emran Qureshi
C.A.D. Engineer
MITEL
350 Legget Drive
Kanta, ON K2K 1X3
CANADA
(613) 592-3050 X 2611

Mr. John Landgren
LINN COUNTY, OREGON
4th and Broadalbin
Albany, OR 97323
(503) 967-3803

Mr. Al Roesler
SCHLUMBERGER WELL SERVICES
12125 Technology Boulevard
Austin, TX 78727
(512) 250-3500

Mr. Peter Wong
Senior Project Manager
TRW
One Space Park
Redondo Beach, CA 90278
(213) 536-2331

Mr. Don Shafer
Administrative Data Processing
LOS ALAMOS NATIONAL LABORATORIES
Group ADP2, MS P224
Los Alamos, NM 87545
(505) 667-8505

Mr. Darwin Mecham
Senior Engineer
EG&G IDAHO
P.O. Box 1625
Idaho Falls, ID 83415
(208) 526-2199

Mr. Ron Boeving
AMERICAN CRITICAL CARE
1600 Waukegan Road
McGee Park, IL 60085
(312) 473-3000 x 389

Mr. Peter Eakle
Systems analyst
CHEVRON RSEARCH
576 Standard Avenue
Richmond, CA 94809
(415) 620-2867

INTERNATIONAL REFERENCES

Institut Francais de Petrole
B.P. 311
92506 Rueil Malmaisen Cedex
FRANCE

Mr. Jean Dutertre
1-749-0214

Norwegian Pulp and Paper Research Institute
Papirindustriens Forskningsinstitutt
Boks 250, Vinderen Forskningsvn. 3
Oslo 3 NORWAY

Dr. Tor Steensland
2-14-0090

Schlumberger Etudes Et Production
Informatique et
Logistique Industrielle
26, Rue de la Cavee
Clamart
FRANCE 92142

Mr. Claude Barbe
1-630-2185

Universitat Erlangen-Nurnberg
Marten Strasse 3
D-8520 Erlangen
WEST GERMANY

Professor Dr. Harwut Wedekind or
Dr. A. L. Luft
9131-85-7892

Dow Chemical - Australia
Box 85
Altona
Melbourne, Victoria
AUSTRALIA 3018

Mr. Les Chambers
Senior Systems Engineer
3-368-4211

MITEL
350 Legget Drive
Kanata, ON K2K 1x3
CANADA

Mr. Emran Qureshi
613-592-3050 x2611

Make sure to use the correct international access code and country code (if applicable) when you are dialing these numbers.

LIST OF REFERENCES BY INDUSTRY

OIL

Champlin Petroleum Company
Inter First Tower
801 Cherry Street
Fort Worth, Texas 76102
(817) 877-6324
Mr.Aaron Cook

Schlumberger Well Services
12125 Technology Boulevard
Austin, Texas 78727
(512) 250-3500
Mr. Al Roesler

Husky Oil Operations Ltd
124 West Carmen Lane
Santa Maria, California 93455
(805) 928-3811
Mr. Roy Boswell

CHEMICAL

Borden Chemical
180 E. Broad Street
23rd Floor
Columbus, Ohio 43215
(614) 225-7456
Mr. Irwin Schehr

Celanese Chemical
1901 Clarkwood Road
Corpus Christi, Texas 78469
(512) 241-2343
Mr. Al Rumme

Dow Chemical - Australia
Box 85
Altona
Melbourne, Victoria
Australia 3018
3-368-4211
Mr. Les Chambers

Monsanto Company
V2B
800 N. Lindbergh
St. Louis, Missouri 63167
(314) 694-4462
Ms. Nancy Meyer

PHARMACY

Ortho Pharmaceutical Corporation
Route 202
Raritan, New Jersey 08869
(201) 524-8871
Ms. Joan Peskin

MANUFACTURING

Interstate Electronic
707 East Vermont Avenue
Anaheim, California 92803
(714) 635-7210
Mr. Jeff Hart

MACOM DCC
11717 Exploration Avenue
Germantown, Maryland 20874
(301) 428-5638
Mr. Nigel Simmons

ENGINEERING

Boeing Aerospace Company
MS 85-20
P.O. Box 3999
Seattle, Washington 98124
(206) 773-0192
Mr. Bob Kubby

Flight Systems, Inc.
Hangar #71, Mojave Airport
Mojave, California 93501
(805) 824-4601
Ms. Jackie Boydston

Hellmuth, Obata & Kassabaum, Inc.
100 North Broadway
St. Louis, Missouri 63102
(314) 421-2000
Mr. Chuck Atwood

Impell Corporation
220 Montgomery Street
San Francisco, California 94104
(415) 544-8080
Mr. Brian Phipps

HOSPITAL

Johns Hopkins Hospital
Johns Hopkins Road
Laurel, Maryland 20707
(301) 953-7100
Dr. Steve Tolchin

CAD/CAM

CADTEC
2355 Oakland Road
(408) 942-1535
Mr. Brent Hoffman

MITEL
350 Legget Drive
Kanata, ON K2K 1x3
CANADA
(613) Mr. Emran Qureshi

APPENDIX G
INGRES PRODUCT DESCRIPTION

RTI's principal product, INGRES(TM), combines an English-like query language with forms-based Visual Programming(TM) tools, allowing end users and data processing professionals to create, control and view large, complex databases simply as tables without programmer assistance. In addition, with RTI's networking tool, INGRES/NET(TM), users gain corporate-wide access to remote databases located on computers connected in a network. With INGRES/NET, all details of network access are hidden from the user.

As the leading independently produced full function high-performance RDBMS for DEC VAXes, INGRES has also been ported to IBM VM/CMS (now completing beta test) and a number of UNIX-based super microcomputers, as well as several other minicomputers and mainframes running UNIX operating systems. Other systems are planned so that INGRES will be available on computers whose powers range from smaller microcomputers to the largest of mainframes.

INGRES: THE INTEGRATED SOLUTION

Relational systems are distinguished from other database systems because they are substantially easier to use. With INGRES, end users and data processing professionals can access, manipulate and display complex databases as simple tables. By employing English-like data manipulation languages called SQL and QUEL, users can specify the information they want without having to navigate the database via more complex systems of known pointers and data relationships.

Visual Programming Application Tools

Built upon the INGRES relational DBMS is a comprehensive set of application development tools. Each tool provides the user a simple forms-based Visual Programming interface. By interactively entering, modifying or reviewing data in forms, users can define and manipulate the high-level objects (e.g., forms, graphs, reports) of an application instead of grappling with abstract programming languages. The result is that data entry, query/update, reports and graphs can be integrated into entire production applications by end users and professionals in a fraction of the traditional time.

Distributed Access to Remote Data

To address the problem of distributed processing, RTI offers INGRES/NET that allows users to gain easy and efficient access to data stored on remote computers. This capability truly makes data a corporate wide resource.

Maximal Portability

INGRES is easily ported. Written entirely in the C language, only two percent of the INGRES code is dependent on any individual operating system. This code has been carefully isolated into a central library. Thus, RTI can easily adapt INGRES to a wide range of computers, from micros to minis to mainframes.

The INGRES Advantage

For end users, international corporations and computer vendors, all of these innovations have far-reaching implications. First, by giving end users access to the data and application tools they need, the classic application backlog is reduced, and the productivity of professionals who need up-to-the-moment information skyrockets. Second, with INGRES/NET, any information that is available locally can be accessed and disseminated worldwide at a fraction of the traditional time and cost.

Moreover, all details of network access are hidden from the user. With INGRES/NET, remote access to information no matter how widely dispersed can be achieved effortlessly by non-programmers. Third, INGRES' high degree of portability gives users of a wide range of computers from different vendors a simple means of utilizing the most sophisticated, reliable, high performance relational DBMS available.

MARKET OVERVIEW

RTI is currently aiming INGRES at three markets: IBM mainframes running VM/CMS and UTS/V, DEC VAXes running VMS and UNIX, and super microcomputers, also UNIX based. RTI sees the VAX market in the next few years growing at a 30 percent compound annual rate from a current user base of approximately 25,000 machines.

Currently, only a fraction of those users have a DBMS or file system. RTI expects that 75 percent of the installed VAXes will require a DBMS. Furthermore, most DBMS developers are specifying relational systems. Of the VAX installations that do have DBMSs, half purchased their software from vendors other than DEC. That gives RTI an excellent opportunity to capitalize on its record of superior product, price/performance and service in the VAX marketplace.

Also, because companies no longer feel compelled to choose between an older file system and an DBMS, it's becoming commonplace for companies to own more than one database system. Many in fact, own both types of systems, and use each for specific applications. This is another trend on which RTI is capitalizing.

The UNIX-based supermicrocomputer market also holds explosive potential for RTI. Because of the superior price/performance of many of the supermicrocomputers in the marketplace today, products that span the entire range of offerings from the under $10,000 price point to the $200,000 and $500,000 price points are becoming major components in business, engineering, and scientific organization information processing strategies.

INGRES: The Relational Database Management System

RTI's leading product, INGRES, is a fully relational database management system that includes the following features:

Tables - Only relations or tables are available to users for viewing or storing data. Using simple commands, users can combine tables and arbitrarily select rows and columns, creating new or updated relations dynamically. The advantage is that such databases are easy to construct, access, understand, maintain and control.

Integrated Data Dictionary - All information about databases, applications, storage, integrity controls and catalogues of forms, graphs and reports are stored in an Integrated Data Dictionary, which is a relational database itself. The dictionary is kept up-to-date automatically whenever changes to any portion of the database are made. INGRES uses this dictionary to select the most efficient retrieval path in response to user requests for information.

SQL or QUEL - Using the structured English-like query languages, SQL or QUEL, INGRES users specify what they want done rather than how to do it. With a single command, for example, data from several tables can be joined together and multiple rows can be selected for update or retrieval. Also, commonly used command patterns can be stored and executed automatically so that the details of processing SQL or QUEL are transparent to the user. In addition to data manipulation, SQL and QUEL offer complete services for data definition and protection through their simple, English-like syntax.

ESQL or EQUEL - are preprocessors that allow SQL and QUEL and forms control to be embedded in programs written in several host programming languages such as BASIC, C, COBOL, FORTRAN and PASCAL.

Data Integrity - INGRES lets users define comprehensive data validation checks that automatically insure the accuracy of a database by validating updates.

Data Security - Safeguards are further fortified through an elaborate set of security controls based on the content of the database, thereby protecting the database against unauthorized access to private material.

Concurrency/Transaction Processing - With INGRES, a database can be shared concurrently by multiple users without endangering the consistency of on-line data. Transaction logging, back-out and roll-forward are provided in case of hardware or applications failures.

Failure Recovery - A journal of update transactions is written into a disk file so that the database can be reconstructed in the event of hardware failure. Also, journaling allows users to back out erroneous changes made to the database. Another benefit is the ability to create an audit trail that can be loaded into an INGRES relational DBMS so that a transaction stream can be analyzed.

Superior Performance - INGRES speeds access to data by employing sophisticated data indexing strategies and proprietary automatic query optimization techniques. As a result, data access is system-optimized rather than programmer-optimized. In competitive trials, INGRES consistently wins benchmarks.

Multiple Data Types - Data storage in most DBMS systems is restricted to numbers and characters. In contrast, INGRES allows data to be categorized and stored as text, money, time or calendar dates.

Visual Programming Applications Development Tool - Visual Programming is based on the concept of a forms-based application. With INGRES it is used in video form as the sole interface to every application. Each form represents a set of related data fields for display or entry and contains a command menu for selecting a task. By entering data into the form and selecting one of the commands from the menu, the user controls the underlying actions of the application.

With INGRES commands, users can also sequence between forms or invoke any of INGRES' productivity tools. They include the following:

INGRES/Forms - lets the user interactively define, create and edit forms to be used by applications, with specification for validation checks, ranges and relative field values of data during entry.

INGRES/Report-By-Forms - lets the user visually lay out the format of a report on the screen as it would be seen on the printed page, and thereby generate the report from this simple specification.

INGRES/Graph-By-Forms - a tool that allows data to be displayed visually with many graph types including bar charts, pie charts, multi-line plots, scatter plots, etc.

INGRES/Query-By-Forms - offers a Visual Programming interface to QUEL's query-update services. It lets users express queries and perform transactions by simply filling in fields on a form. Entered values act as a search criteria for retrieving or updating the database.

INGRES Applications-By-Forms - lets end users define new applications by integrating the INGRES generic tools with custom-designed forms and programs. All the functions of an application can be included: data entry, manipulation, graphics and report generation. A simple, fourth generation command language is used to control the sequence and flow of forms.

In contrast to traditional applications generators that require a rigid, predefined structure, INGRES allows users to develop applications step-at-a-time. The result is that new applications can be created quickly through prototyping, making developers more productive.

INGRES/NET Toward Distributed Databases

INGRES/NET - gives users of the INGRES DBMS, distributed access to all databases connected in a computer network. With INGRES/NET, all INGRES tools and applications run interactively on the user's local computer, while INGRES, acting as a database manager, controls the processing of data at a remote location. The tools and DBMS communicate via messages across the network, with the details of network access totally hidden from the user.

INGRES/NET offers users many advantages. By dedicating each machine environment to a specified task, the speed of interactive applications and overall system throughput are greatly improved. Also, the number and size of messages are reduced, thereby lowering the cost of sending information over long distance lines. Only concise QUEL/QUERY update statements are sent to the remote computer, and only the minimum amount of qualified data is returned to the local system.

By allowing a database to be accessed simultaneously by many users for different functions, INGRES/NET achieves the effect of parallel processing that is, many computers running INGRES can be interconnected to run larger applications.

This ability to link many machines obviates the need for buying a new piece of hardware each time a database outgrows the capacity of a host computer. Each piece of hardware can be connected modularly.

INGRES/PCLink - A Unique PC Connection to INGRES

INGRES/PCLink - With INGRES/PCLink, INGRES users combine personal computers an INGRES data and applications to form a single, cohesive system. INGRES/PCLink provides a simple, yet powerful way to popular PC software packages such as Lotus 1-2-3, dBASE II, and Wordstar with INGRES databases on host computers. Users get the personal power of the most popular PC productivity tools, and the power of INGRES all in one complete solution. PCLink also includes ASCII terminal emulation, file transfer and file management capabilities.

COMMITMENT TO CUSTOMER SUPPORT

RTI is committed to superior product and customer support. To this critical area, RTI has dedicated 30 percent of its technical staff. Its services include comprehensive, up-to-date and easy-to-read documentation, and training that is tailored to customers' needs. In addition, unlimited telephone consulting is available as well as a 24-hour, 7 day-a-week hotline.

VAR/OEM marketing support programs include availability of sales presentations, sales kit materials and key account direct sales assistance.

In addition, through the INGRES User Association, RTI provides a successful forum for customers' involvement in INGRES' future.

RELATIONAL TECHNOLOGY

Relational Technology Inc.
2855 Telegraph Avenue
Berkeley, CA 94705
415·845·1700