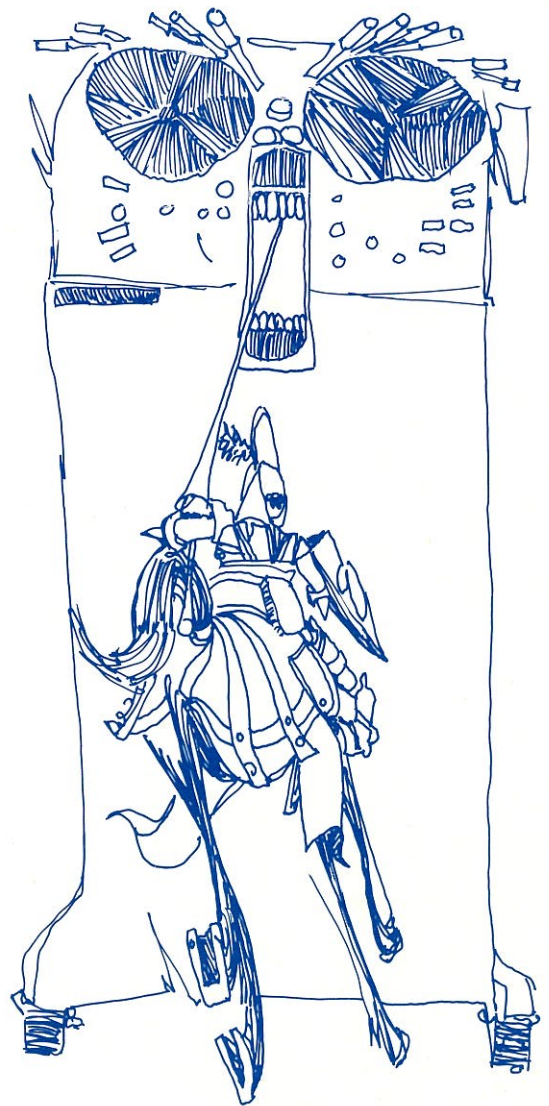# total
power

...to maximize your PDP·11

total

...fulfills your impossible dream

Don Quixote is Cincom's symbolic figure for the widely used TOTAL Data Base Management System. Why? Because PDP-11 TOTAL makes successful management information systems (MIS) a profitable and rewarding reality . . . not an *impossible dream*. Just as Quixote had his quest, our mission was to design a system that would significantly expand the power of the PDP-11 and the productivity of its users without a significant increase in resource investment. We believed there must be a better way and we found it. TOTAL is the Data Base Management tool to make *anything possible*.

the total story

TOTAL is the most widely used DBMS in the world. In fact, there are more TOTAL users than all other DBMS users combined and now it is available to you, the PDP-11 user.

Cincom is dedicated to providing the highest possible quality computer support services and proprietary programs to PDP-11 users. We know what we are talking about when we say

'We create efficiency'.

TOTAL is the best general purpose data base management system (DBMS) to be offered for the PDP-11 user. TOTAL is powerful and efficient; easy-to-use, but sophisticated in capability. Since data base is the logical starting point, why not begin by examining TOTAL?

The term Data Base is not a new one. Data bases have existed in our companies and businesses since their origins, in file cabinets and index files. With the introduction of sophisticated equipment these data bases were transferred into *files of information.*

This electronically stored data was usually created and maintained along functional or departmental boundaries and accessed on an application-by-application basis. As a result of this approach, three distinct problems arose: 1) no integration of data; 2) much redundant data; 3) poor data integrity.

Systems designed as such were also not readily adaptable to change; trivial or major. In most cases, the cost of the change prohibited any change at all.
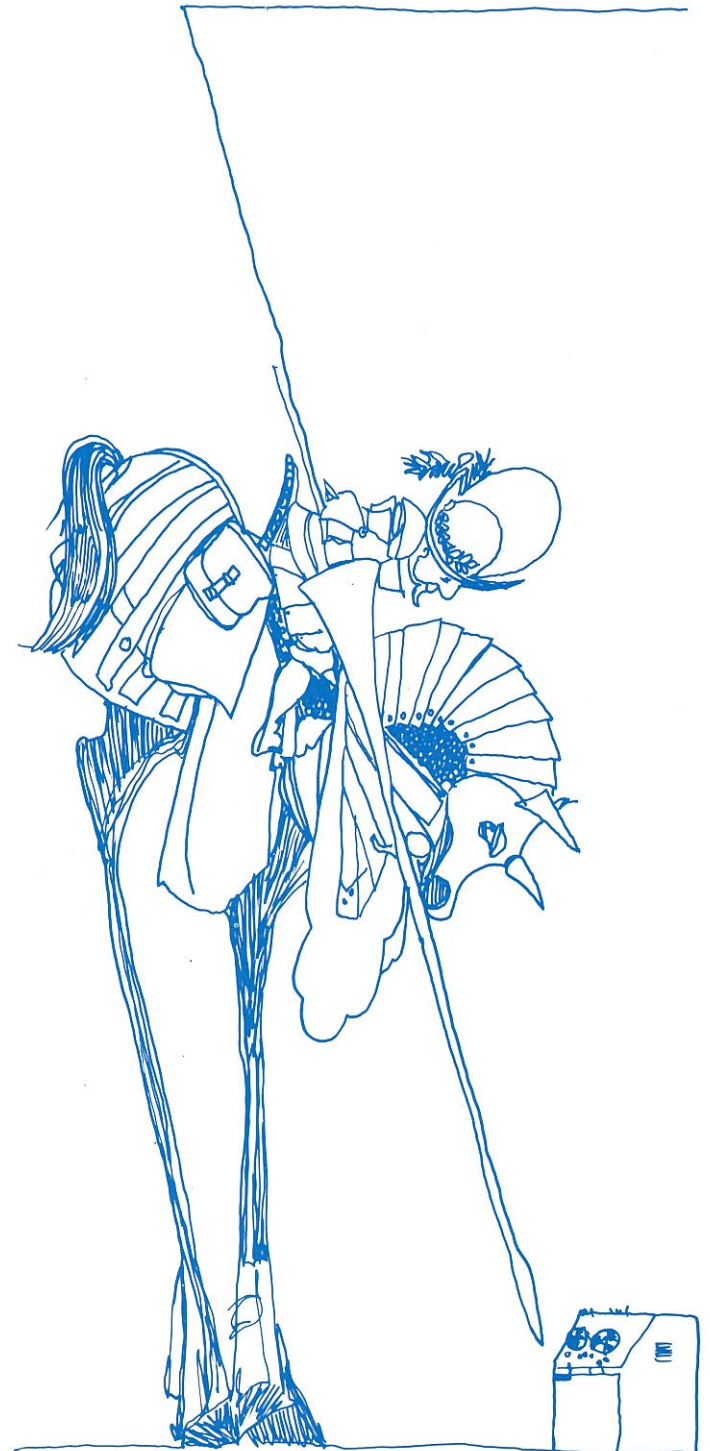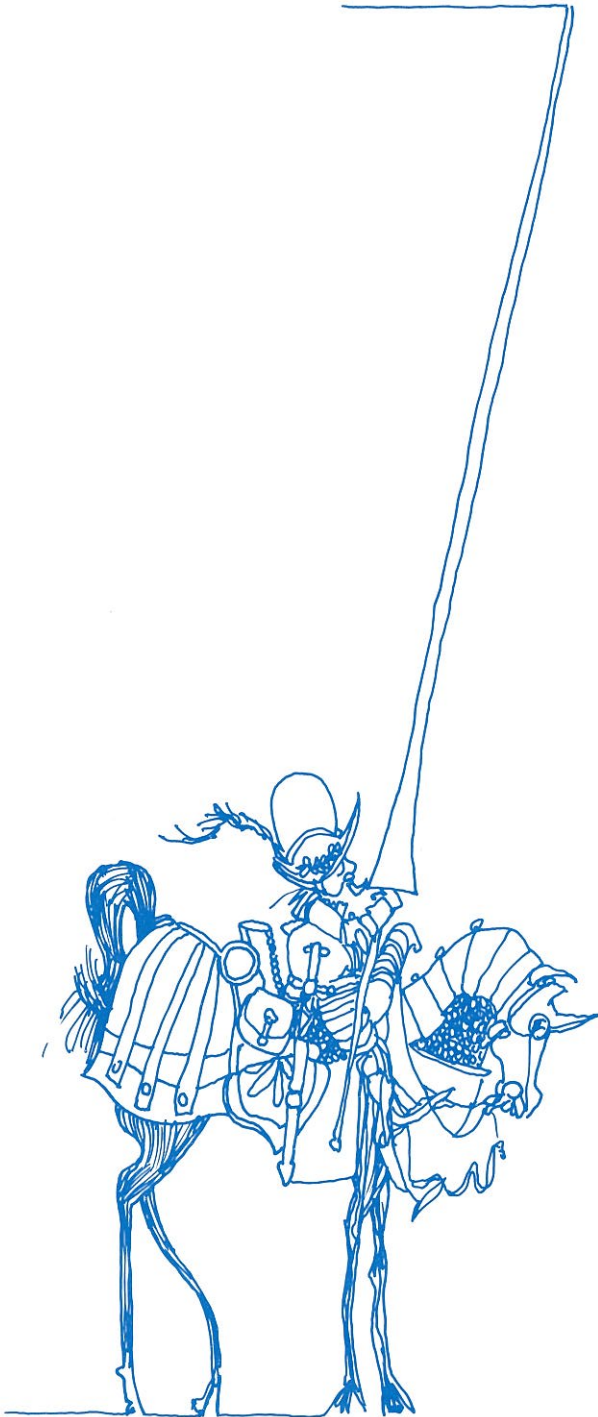
All this is now historical.

TOTAL is the true Data Base Management System. It can manage an unlimited variety of data on an *integrated, non-redundant* basis that provides for entry to and association with all other data in the data base. This increases the value of your raw data which subsequently provides you with more valuable information.

for totaL efficiency

Optimum performance and efficiency is one of TOTAL's strongest advantages to you as a PDP-11 user. Traditionally, these two vital factors for a successful system tended to oppose each other. This is not true with TOTAL.

Other desirable benefits of PDP-11 TOTAL which incorporate the system's criteria and philosophies are outlined for your consideration.

MODULAR & EVOLUTIONARY IN DESIGN & USE — Significantly reduces the cost involved with change; major or trivial. Relieves the paralysis- by-analysis syndrome too evident in systems design.

DATA INDEPENDENCE — Application programs are sensitive only to data elements (fields), not records. This eliminates recompilation of old programs due to physical data changes (records, files, relationships, etc).

DATA NON-REDUNDANCY — Eliminates the so-called *multiple versions of the truth.* Therefore less disk space is required to maintain the data base. Significantly reduces maintenance cost and lessens the chance for inaccuracies.

DATA RELATABILITY — Allows the data base to be structured the way your company does business. Provides for relevant information on a realistic basis.

DATA INTEGRITY AND SECURITY — Vital to the data base. The data base becomes one of your company's *most valuable assets.* Prohibits destroyed files and records by application programs and unauthorized entry to and from the data base.

EQUIPMENT, LANGUAGE & ENVIRONMENT INDEPENDENT — Supplies to you a high level of independence in such important areas as operating systems and computers, DASD devices, application programming languages used, and your processing approach; batch or on-line. *Conversion as a way of life* is eliminated from your future data processing endeavours.

total
data
sets

To effectively handle your many varieties and categories of data, TOTAL Provides two kinds of files or *data sets:* Single-Entry and Variable Entry.

SINGLE-ENTRY DATA SETS — are organized and managed according to the user-selected primary control field. These control fields can be from 1 to 256 bytes in length with any content.

Within each record in the data set the number of *data elements* and their field sizes are limited only by the size of the logical record itself. If needed, each record within the data set can be directly related to as many as 2,500 other data sets.

In normal use TOTAL Single-Entry Data Sets are self-optimizing and NEVER require reorganization. As a record is deleted the space is immediately available for reuse.

If the user wishes to reformat the basic record or if the physical space extents are exceeded, only the affected data requires unloading/reloading from and back to the data base. All other data sets do not require modification, reorganization or additional processing.

VARIABLE-ENTRY DATA SETS — may be accessed by a variable number of control fields. They contain a variable (and possibly volatile) number of data records. The data sets and data records may have unique relationships based on the user-specified attributes.

TOTAL Variable-Entry Data Sets reflect the business functions as they occur and are always interrelated with Single-Entry Data Sets.

There may be up to 2,500 different record types within one Variable-Entry Data Set. Again, there are no restrictions as to size, number, content or relationships of data elements other than those imposed by the PDP-11 and operating system considerations.

Just as in Single-Entry Data Sets, space management is optimized to minimize storage requirements and maximize performance.
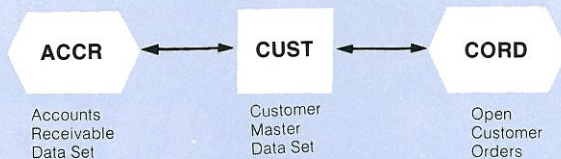
total
in
action

Utilizing the facilities of the DBDL and the DML, TOTAL provides a completely integrated data base which is available to the application programmer.

data base definition (DBDL)

TOTAL DBDL is the English-like language used to describe and declare the data base system. After definition, the data base is compiled and catalogued. A PDP-11 user can be fully trained in a matter of hours and he will then be capable of defining and developing data bases of considerable complexity. Modifications and expansions either to the operational subsystem data base or the entire data base takes but a matter of minutes of computer time.
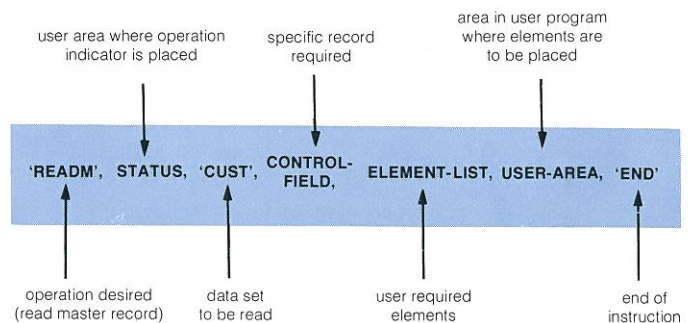
data manipulation language (DML)

TOTAL DML is the language the PDP-11 programmer uses to communicate between his program and the data base. TOTAL DML is not a complete language by itself but functions within the framework of a host language to provide data manipulation capabilities to and from the data base. It functions in conjunction with such host languages as MACRO-11, FORTRAN IV and COBOL at the CALL level.

This extremely powerful and comprehensive repertoire of data base manipulation commands enables the programmer to retrieve data, to modify data or data relationships and to add/delete data or data relationships with extreme ease.

order entry and accounts receivable

ACCR ⟷ CUST ⟷ CORD

Accounts Receivable Data Set

Customer Master Data Set

Open Customer Orders

Sample Data Base Definition Using the TOTAL DBDL

The Customer Master File (CUST) and each data set to be included in this data base would be described in TOTAL DBDL in this manner:

DATA ELEMENT	PROCESSING NAME	DIGITS	DBDL CODED ENTRIES
Customer Number	CUSTCTRL	6	BEGIN-DATA-BASE-GENERATION
Customer Name	CUSTNAME	30	DATA-BASE-NAME = xxxxxx
			BEGIN-MASTER-DATA-SET
Customer Address	CUSTADDR	30	DATA-SET-NAME = CUST
Customer City & State	CUSTCTYS	20	MASTER-DATA:
Customer Zip Code	CUSTZIPC	5	CUSTROOT = 8
Special Credit Terms	CUSTCRED	6	CUSTCTRL = 6 CUSTOMER NO.
—	—	—	CUSTLK01 = 8 = CORD LINK
			TO OPEN ORDERS
—	—	—	CUSTLK02 = 8 = ACCR LINK
			TO ACCTS. REC.
Any Other Elements Required	—	—	CUSTNAME = 30 FULL NAME
—	—	—	CUSTADDR = 30
—	—	—	CUSTCTYS = 20
—	—	—	CUSTZIPC = 5
—	—	—	CUSTCRED = 6
Customer Credit Limit	CUSTCLIM	4	CUSTCLIM = 4
Accts. Rec. Balance	CUSTARBL	4	CUSTARBL = 4
Outstanding 60 Days	CUSTAR60	4	CUSTAR60 = 4
Outstanding 90 Days	CUSTAR90	4	CUSTAR90 = 4
			END-DATA:

Data elements, processing names and digits are under complete control of the user. There is no limit to the length of elements, the number of elements or the alpha numeric or special character mix.

total DML statement

The following parameter lists must be given to a 'Call' statement according to the rules of the calling language. The parameters enclosed in quotes (') must be presented to the Call statement as literal values, other parameters must be defined as storage areas to be used by the user program and TOTAL.

CALL 'DATBAS' USING

user area where operation indicator is placed

specific record required

area in user program where elements are to be placed

'READM', STATUS, 'CUST', CONTROL-FIELD, ELEMENT-LIST, USER-AREA, 'END'

operation desired (read master record)

data set to be read

user required elements

end of instruction

At the completion of this statement, the specific record elements requested for Customer No. 123* are placed in the user defined areas precisely as desired by the application programmer. It is not necessary for him to perform any extractive and move functions.

The STATUS area will contain **** which indicates a successfully completed operation. The control is returned to the program and the user is free to perform whatever operations he wishes.

*Assumes that Customer No. 123 was set up as the desired key in CONTROL-FIELD
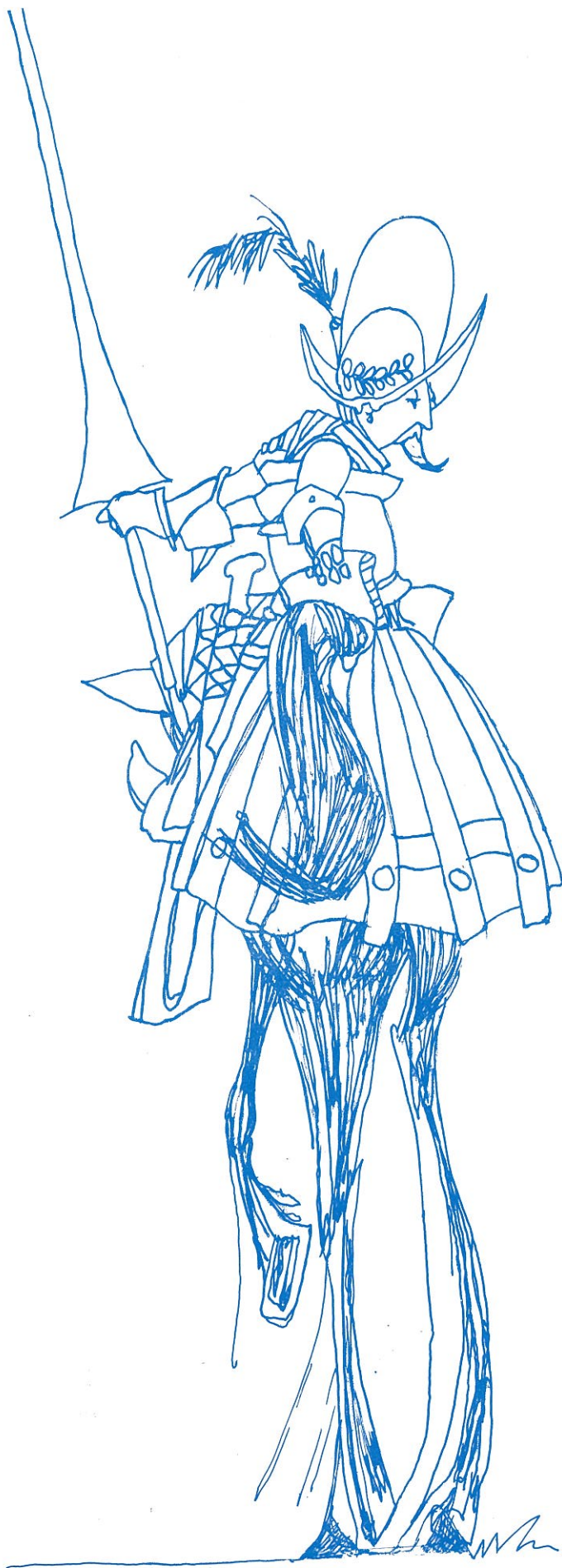
for
total
structuring

The vital importance of this TOTAL DBMS feature cannot be over-emphasized. As discussed earlier, it is the ability to remove ALL and ANY physical dependency by an application program on data. By communicating at the data element level (the field within the logical record) TOTAL achieves the greatest degree of data independence possible. An independence that provides for you, the PDP-11 user, a level of modularity and evolutionary approach toward growth and change.

This evolutionary concept of TOTAL makes it easy to add new data to records, new data sets and data relationships without being detrimental to the present systems. The illustrated data base could grow over time to include hundreds of data sets and hundreds of new relationships, with little if any impact on operational programs.
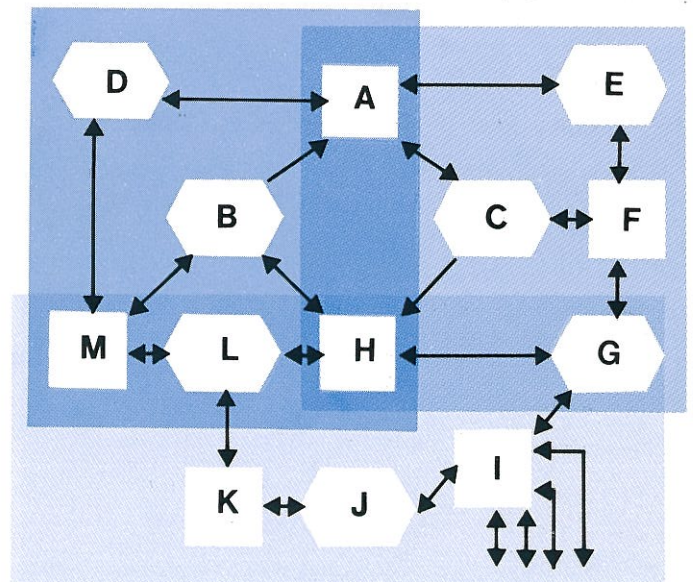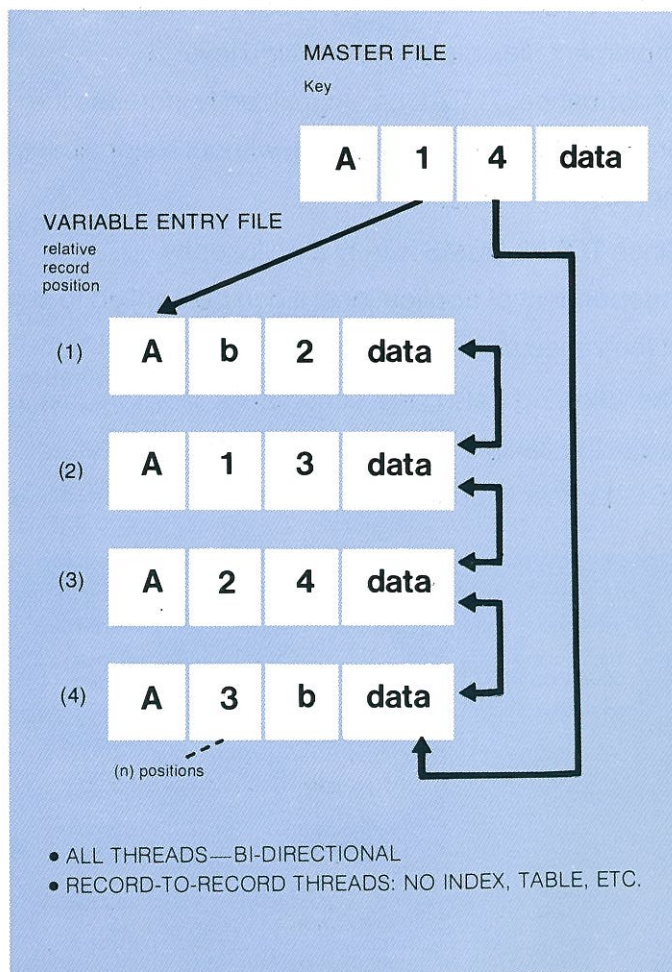

"N" Relationships

Note that several data sets appear in more than one data base and that data set 'H' appears in all data bases. Any data updated in data set 'H' resulting from any program will automatically be available for all subsequent processing by other programs that utilize this common data. TOTAL always deals with a *single-version of the truth*.
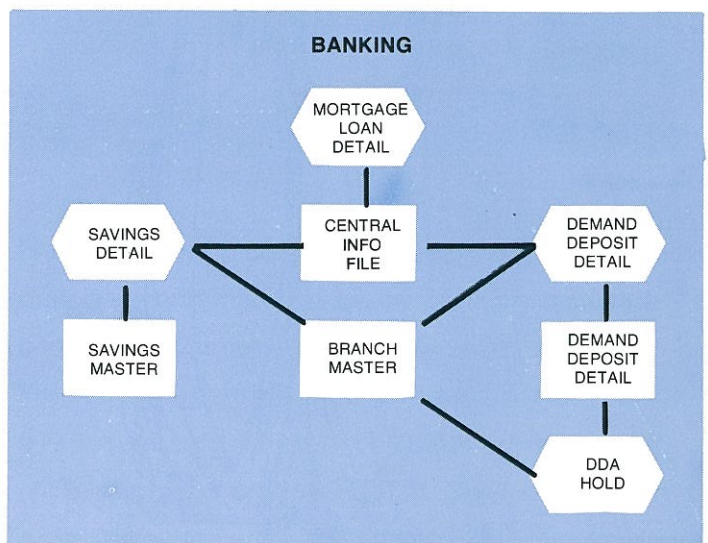
network structure

MASTER FILE

Key

| A | 1 | 4 | data |

VARIABLE ENTRY FILE

relative
record
position

(1)	A	b	2	data
(2)	A	1	3	data
(3)	A	2	4	data
(4)	A	3	b	data

(n) positions

- ALL THREADS—BI-DIRECTIONAL
- RECORD-TO-RECORD THREADS: NO INDEX, TABLE, ETC.
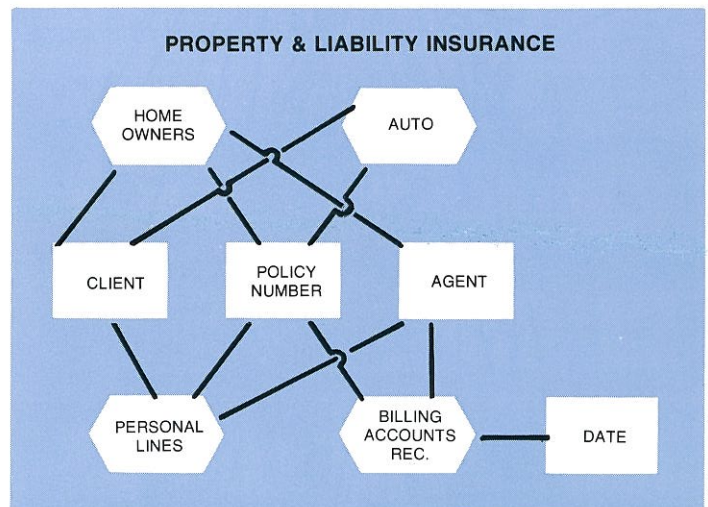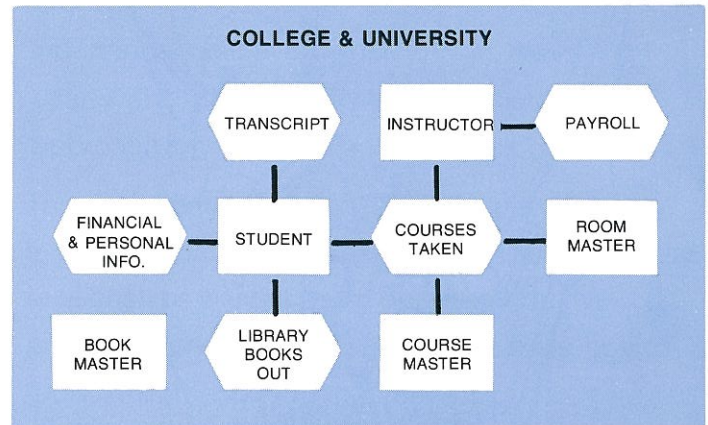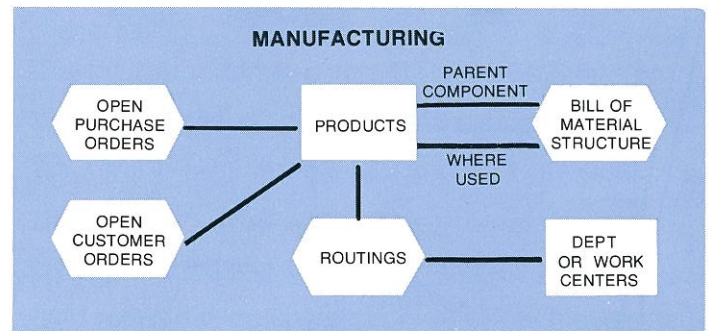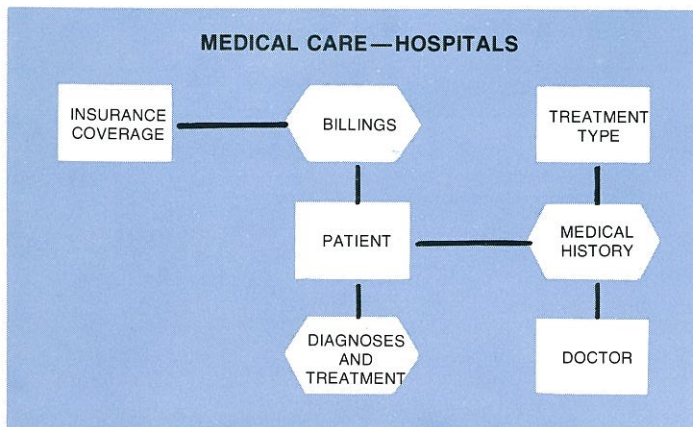
for total flexibility

TOTAL users are leaders in manufacturing, education, insurance and banking, just to name a few. If there is a *typical* Cincom client, perhaps the common denominator is the fact that they are successful. They represent a broad range of diverse endeavours. Geographically, they span the globe. Frankly, they are at the forefront in Management Information System technology. For them, the (MIS) is not an impossible dream. It is a rewarding reality.

PDP-11 TOTAL is low on core, easy-to-use and implement, flexible and has a high level of performance. TOTAL can significantly increase the productivity of your installation, without a significant increase in overhead cost.

Since TOTAL DBMS is truly a philosophy, independent of applications, it can be applied to any of the varied requirements of today's environment.

The following data base 'schematics' illustrate just a few of the flexible applications of TOTAL for the PDP-11 user in business.

MEDICAL CARE—HOSPITALS

INSURANCE COVERAGE — BILLINGS — TREATMENT TYPE — PATIENT — MEDICAL HISTORY — DIAGNOSES AND TREATMENT — DOCTOR

MANUFACTURING

OPEN PURCHASE ORDERS — PRODUCTS — PARENT COMPONENT — BILL OF MATERIAL STRUCTURE — WHERE USED — OPEN CUSTOMER ORDERS — ROUTINGS — DEPT OR WORK CENTERS

COLLEGE & UNIVERSITY

TRANSCRIPT — INSTRUCTOR — PAYROLL — FINANCIAL & PERSONAL INFO. — STUDENT — COURSES TAKEN — ROOM MASTER — BOOK MASTER — LIBRARY BOOKS OUT — COURSE MASTER

PROPERTY & LIABILITY INSURANCE

HOME OWNERS — AUTO — CLIENT — POLICY NUMBER — AGENT — PERSONAL LINES — BILLING ACCOUNTS REC. — DATE

BANKING

MORTGAGE LOAN DETAIL — SAVINGS DETAIL — CENTRAL INFO FILE — DEMAND DEPOSIT DETAIL — SAVINGS MASTER — BRANCH MASTER — DEMAND DEPOSIT DETAIL — DDA HOLD

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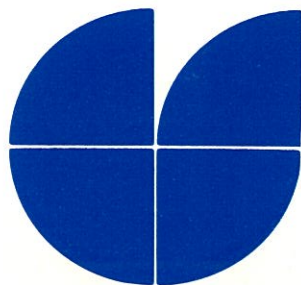
We would welcome the opportunity of discussing
PDP-11 TOTAL with you and reviewing its potential
for your firm. Please write or call:
Cincom Systems, Inc.:
 2300 Montana Avenue, Cincinnati, Ohio 45211
(513) 662-2300 TWX 810-461-2732

ten reasons for total success

1. A common data base can be created and maintained, available to all applications but adversely affected by changes to various individual applications.

2. All communication with the data base functions in a standardized manner which provides the highest levels of performance, integrity and flexibility.

3. All data management programming effort and testing is eliminated as a function of application programming. This effort can account for up to 80% of all programming effort in integrated data base environments.

4. Evolutionary data base and systems design capabilities are achieved.

5. Significant hardware benefits are gained by TOTAL features. Two examples are: a) reduces core requirements and increases effective disk storage capacity and performance; b) eliminates external directories and indexes, speeds retrievals and maintenance and provides more useable disk space for prime data.

6. Duplication of data files and redundancy of data are eliminated.

7. Unique flexibility and independence is gained in such areas as host language, types of secondary storage devices used, and operating system types and release levels.

8. User retains control over structuring of data files, data relationships, physical placement of data files, etc. but is freed of the major programming effort.

9. The approach of data base security and integrity makes it impossible for programmers to compromise files, break chains, lose records or make other errors which can adversely affect systems.

10. In total, TOTAL DBMS is easy-to-use and implement, understandable, flexible and has a high level of performance and integrity.
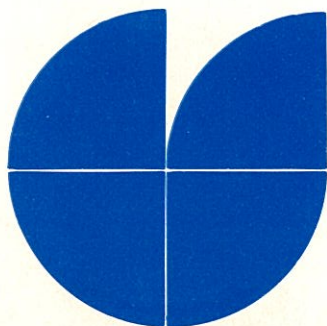
Cincom Systems Inc: We create efficiency

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