# THE Data Base SPECIALIST

**HDBS - HIERARCHICAL DATA BASE MANAGEMENT SYSTEM**

**MDBS - OUR FULL NETWORK DATA BASE MANAGEMENT SYSTEM**

## HDBS FEATURES
- Hierarchical Data Structures
- Fixed Length Records
- Read/Write Protection at File Level
- One-to-Many SET Relationships Allowed

## ADDITIONAL FEATURES IN MDBS
- Hierarchical and Full Network Data Structures (CODASYL Oriented)
- Fixed and Variable Length Records
- Multiple Levels of Read/Write Protection at Item, Record, Set and File Levels
- Explicit Representation of One-to-One, One-to-Many, Many-to-One and Many-to-Many Sets
- Occurrences of a Record Type May Own Other Occurrences of the Same Record Type
- A Single Set May Have Multiple Owner and Member Record Types

## FEATURES COMMON TO HDBS and MDBS
- Straight Forward Use of ISAM-like Structures
- Sorted, FIF0, LIF0, Next and Prior Set Ordering Provided
- Commands to Add, Delete, Update, Search and Traverse the Data Base
- Names of Data Items, Records, Sets and Files Are Wholly User Definable
- Records Can Be Maintained in a Number of Sorted Orders
- Routines Are Callable from Basic, Pascal, Fortran, COBOL or Machine Language
- Written in Machine Language for Maximal Execution Efficiency and Minimal Memory Usage
- Supports Data Base Spread Over Several Disk Drives (Max. 8 disks) may be mini or full sized floppies or hard disks

### REQUIREMENTS
- Z-80 Approximately 16K Memory – $325
- 8080 Approximately 20K Memory – $550
- In addition to the operating system, host language, user’s program and some buffer area

## HDBS and MDBS PACKAGES INCLUDE
- DDL Data Definition Language Analyzer/Editor: The user specifies data structures to be used in a Concise Data Definition Language (DDL). The Data Definition Language Analyzer/Editor allows the user to interactively create and edit DDL Specifications and to initialize the data base for use based on these specifications.

**200 PAGE USERS MANUAL** with extensive documentation of the Data Base Management System.

- DMS Data Management Routines: These are the routines callable from the host language (Basic, COBOL, etc.) which perform the data base operations of finding, adding, and deleting records; fetching and storing data items; and traversing the (possibly complex) data structure.
- Sample Application Program and DDL Files
- Relocator to Re-ORG All Routines
- System Specific Manual to show how to bring up your software on your computer

## NEW DYNAMIC RESTRUCTURING SYSTEM

**MDBS-DRS FEATURES**
- Allows item, record and/or set types to be added to or deleted from an existing MDBS data base. This allows the user to re-design a data base after it is already on-line.

### RUNS UNDER
- CP/M with Microsoft Basic, COBOL and Fortran
- Machine Language Callable Forms
- Other Forms in Development

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CP/M is a registered trademark of Digital Research Corp.
The THEORETICAL LIMITS on the size of a MDBS or HDBS data base are:

- A Data Record May Be Up To 65521 Bytes Long.
- A Data Item (Field) In A Record May Be Up To 9999 Bytes Long. An Item May Be Treated As A Vector Which Repeats Up To 9999 Times (But Note That The Maximum Length Is 65521).
- Up To 255 Data Items May Be Defined In A Given Data Record.
- Up To 254 Different Record Types May Be Defined In The Data Base.
- A 32 Bit Address Space Is Used For Disk Resident Data, Implying A Maximum Data Base Size Of Over 4.2 Billion Bytes.

SUGGESTED PRACTICAL LIMITS (due to non-MDBS restrictions — such as memory) are:

- A DATA RECORD IS TYPICALLY LESS THAN 4000 BYTES LONG.
- A DATA ITEM IS TYPICALLY LESS THAN 4000 BYTES LONG, ALSO.
- UP TO 255 DATA ITEMS PER RECORD AND 254 RECORD TYPES PER DATA BASE.
- UP TO 8 ON-LINE DISK DRIVES, EACH OF WHICH ARE TYPICALLY LIMITED TO 32 MEGABYTES.
- THE LIMIT ON THE NUMBER OF OCCURRENCES OF A DATA RECORD IS LIMITED ONLY BY THE AMOUNT OF AVAILABLE DISK SPACE.

SYSTEM OVERHEAD

The Amount Of Disk Space Required For Pointers And System Information Varies Depending On the Application. A Rough Approximation Of The Amount Of Disk Space Required, In Bytes, Can Be Roughly Estimated For Each Type Of Data Record In The Data Base By The Following Formula:

\[ NRO \times (5 + DL + 8 \times NS) \]

Where

- \( NRO \) = expected number of occurrences of the record type.
- \( DL \) = number of bytes required to hold the data for this record.
- \( NS \) = the number of set relationships in which this record is a participant (owner or member)