MDBS DESIGN MODIFICATION REFERENCE MANUAL

The MDBS DMU MANUAL

Version 3.08

Micro Data Base Systems, Inc.

P. O. Box 248

Lafayette, Indiana 47902

USA

Telex: 209147 ISE UR

(312) 303-6300 (in Illinois)

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NEW RELEASES, VERSIONS, AND A WARNING

Any programming endeavor of the magnitude of the MDBS software will necessarily continue to evolve over time. Realizing this, Micro Data Base Systems, Inc., vows to provide its users with updates to this version for a nominal handling fee.

New versions of MDBS software will be considered as separate products. However, bona fide owners of previous versions are generally entitled to a preferential rate structure.

Finally, each copy of our software is personalized to identify the licensee. There are several levels of this personalization, some of which involve encryption methods guaranteed to be combinatorially difficult to decypher. Our products have been produced with a very substantial investment of capital and labor, to say nothing of the years of prior involvement in the data base management area by our principals. Accordingly, we are seriously concerned about any unauthorized copying of our products and will take any and all available legal action against illegal copying or distribution of our products.

I. INTRODUCTION

An important facility for a data base management system is the ability to make simple changes to the physical structure and to security access restrictions of a data base, without regenerating the data dictionary or re-entering data. In addition, it is often convenient to know how completely the data base fills disk space. When it is seen that the data base is becoming full, it should be possible to physically expand the size of the data base. The optional MDBS DMU module provides these capabilities with a minimum of effort by the user.

End users will find DMU of value in adding, deleting, or modifying user passwords and access codes. It is also valuable when changing the physical placement of areas. Furthermore, DMU can be used in monitoring free disk space and calculating efficiencies. In a multiuser environment, DMU should not be executed while the MDBS.DMS program is operating.

An OEM can mass ship DMU along with application software* and not be concerned with the physical environment of the end user. For example, suppose that XYZ, Inc. is an OEM that has developed an accounting system with MDBS III. Suppose also that XYZ defined storage for the general ledger of its package totalling as many as 4096 pages of 2048 bytes each. How does XYZ deliver this package to its customers? And if a client with a one megabyte capacity purchases the accounting system, how can this be reconciled with the DDL specification of over eight megabytes of ledger data?

DMU addresses these questions. With the MDBS DDL, XYZ can specify a shortened initialization sequence (with the o or s option). This option initializes only the minimum number of pages of system information necessary to define the ledger. Thus XYZ can send out very small versions of each data base, presumably on floppy diskettes or magnetic tape. When the end user receives his copy of the accounting system, he can execute DMU and expand the ledger area to any size up to the 4096 pages specified in the DDL declaration. Thus end users can control the size of an application data base to suit their needs and hardware capacities.

Upon receiving the accounting system, the customer can use DMU to change user passwords, add new users, and delete existing users. It is strongly recommended that a customer's access to DMU be highly centralized, so that the customer can carefully control user names, user passwords and user access codes. All such changes should be made through a central authority who bears the responsibility for controlling data base access. It is also advisable that this central authority exercises control over the DMU ability to change the physical placement of areas (i.e., drive qualifiers for names of files to which areas are assigned). Finally, the central authority should also be in charge of using DMU to periodically monitor a data base's free space and to expand the size of the data base as necessary.

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* Only with authorized MDBS run-time tokens.

The MDBS-DMU system functions by prompting the user for necessary information and then executing the indicated changes to modify the data base and/or data dictionary. For simplicity, this system prompts fully. Should the user enter an incorrect response, the system issues a warning, protects the data base from any changes, and prompts again.

As with all programs that modify a data base, we advise that the user make a backup of the data base before using MDBS-DMU.

II. DMU FEATURES

MDBS.DMU can be invoked with a -b argument on the command line to explicitly allocate the page buffer region. If this argument is not specified, approximately half of the available memory is automatically allocated. The remainder of available memory is reserved as a non-data base working space (e.g., file control blocks, stack, sort work areas). If the argument is used, it has the form -bnnnnn where nnnnn is the (decimal) number of bytes to be allocated for the page buffer region. This number should be at least as large as the "minimum DMS buffer region size" reported by the DDL Analyzer, otherwise DMS command status error 31 results. If too large a page buffer region is requested, an error message indicating "excessive memory request" is displayed. The remaining memory reserved for non-data base working space is normally sufficient. However, in rare cases this working space may be insufficient, resulting in various kinds of error conditions and situations where the data base may be left open. In such a case, -b can be used to allocate a smaller page buffer region to allow a larger non-data base working space.

When a user invokes the DMU module, a DMU banner message appears on the console screen. This banner can be suppressed by including a -m argument in the command line used to invoke DMU. In any event, the system prompts for the user name, password, and the name of the file holding the main data base area. See Figure II-1. The password is not echoed to the console when it is entered. These prompt can be suppressed by including -d, -u and -p arguments on the command line used to invoke DMU. If used, the -d should be followed immediately by the file name. Similarly, -u and -p should be followed by the user name and password respectively. An optional -i argument followed by a file name can also appear on the DMU command line. The contents of this file will be used as automatic responses to subsequent DMU prompts.

If valid user and password information is provided for the data base, DMU will open the data base.* At this point there are two possibilities.

If the data base has been initialized with the DDL o or s options and has not yet been expanded, then the following message is displayed:

```
This Data Base was initialized with the Short option in DDL.
It must be expanded before it is used.
```

DMU then issues a prompt for each area, showing the smallest and largest permissible sizes for that area. The user responds by selecting a size for the area and DMU expands the area to this user-specified size. This is repeated for each data base area.

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* If DMS error 15 or 16 was encountered the last time the data base was used, then DMU does not automatically open the data base. Instead, a message is issued, warning of possible data inconsistency. A prompt is then displayed which asks whether the data base should be reset so that it can be opened. If the user requests a reset, then the data base can then be opened by DMU (or any other DML program). If the data base has been reset, a message to that effect is issued when DMU opens it. However, after DMS error 15 or 16 occurs complete consistency of all data cannot be presumed.

The second possibility is that the data base has already been expanded, either by using the DDL y option or by using DMU. In this case, the main DMU menu (see Figure II-2) is displayed and the user can choose any of its five options by entering a displayed mnemonic. When a main menu option is selected, the user is prompted with an appropriate menu of suboptions. Once a main menu DMU option has been completed, either through its exit suboption or due to an error in using one of its suboptions, the system will again display the main menu.

```
MDBS DMU ver 3.08
(C) COPYRIGHT 1981,1985  Micro Data Base Systems, Inc.
Lafayette, IN 47902
Serial Number:  xxxxxxxx

Data base:  JOBS.DB
User name:  D LEHR
Password:
```

Figure II-1. Entry to DMU

```
OPTIONS:

Summarize free space statistics:        S
exPand data base areas:                 P
Add, change, or delete users:           A
Change default file names:              C
Exit DMU:                               E
```

Figure II-2. Main DMU Menu Options

Main Options

A. Get free space statistics:

When the S option is selected, DMU displays a "statistics" menu. As shown in Figure II-3, this menu provides three suboptions. If the "All areas:" suboption is chosen, the system displays each area followed by its statistics. If the user chooses the "Individual area:" suboption, he is prompted for the name of the area for which he wants statistics. Any area name can be given, including the main area name (i.e., the data base name). DMU will display an area's statistics only if the user has read access to that area.

The statistics displayed for an area include information on holes and overflows. A hole is a contiguous group of bytes that is free for storing data. This option allows a user to find the frequency of holes and the total space occupied by these holes in the data base areas. DMU collects the hole information into several size classifications and displays the results in a table of decimal values. The percentage of free bytes in the area is computed and displayed. Finally, this option also displays the number of calc record overflows that have occurred within an area.

```
Enter Option: S

     Statistics Menu:

All areas:                A
Individual area:          I
Exit to main DMU menu:    E

Enter Option: A
```

Data Base Statistics

Area JOBS

Range:	0-50	50-128	129-256	257-384	385-512	totals	%free
Bytes:	0	0	0	352	22680	23032	89.96
Freq.:	0	0	0	1	45	46	

0 CALC Record Overflows

Area JOB1

Range:	0-50	50-128	129-256	257-384	385-512	totals	%free
Bytes:	0	0	144	672	2560	3376	13.18
Freq.:	0	0	1	2	5	8	

0 CALC Record Overflows

Area JOB2

Range:	0-50	50-128	129-256	257-384	385-512	totals	%free
Bytes:	0	0	140	305	4864	5169	20.19
Freq.:	0	0	1	1	11	12	

3 CALC Record Overflows

Figure II-3. Statistics Menu Example

B. Add, modify, or delete user information:

This option allows one to change user information. Upon entering the A option, the password menu of Figure II-4 appears showing the four available suboptions. These include:

1) Modify
A DMU user can modify a data base user's name and/or password in the data dictionary, only if the user being changed has read access codes that are a subset of the DMU user's read access codes and has write access codes that are a subset of the DMU user's write access codes. This suboption prompts for the user name that is to be deleted and that user's password. Passwords are not echoed to the console. The original access codes are unchanged. If the user name and old password do not correspond to present data dictionary contents, the password is not modified.

2) Add
A DMU user can add a data base user to the data dictionary, only if the user being added has read access codes that are a subset of the DMU user's read access codes and has write access codes that are a subset of the DMU user's write access codes. This suboption prompts for the new user name, the new read and write access codes, and the new password. The password is not echoed to the console. Access codes can be entered in any of four ways:

a) For the read access code, entering return with no input line results in a default access code of 'a'.
b) For the write access code, entering return with no input line results in the write access code being the same as the read access code.
c) For both read and write access codes, entering a single letter enclosed in parentheses results in the access code corresponding to that letter.
d) For both read and write access codes, entering a string of the form

(code1, code2,..., coden)

where code# is either a single character or two characters separated by a '-'. The only permissible characters are in the range a through p. The codes specified in the string must be separated by commas. The access code will consist of all of the listed single characters and the characters that lie lexicographically between characters separated by "-". Note that increasing lexicographic order is required for characters separated by "-". Thus (a-b), (b-g), and (d-p) are all legal examples whereas (b-b) and (d-c) would result in error messages.

3) Delete

A DMU user can delete a data base user from the data dictionary, only if the user being deleted has read access codes that are a subset of the DMU user's read access codes and has write access codes that are a subset of the DMU user's write access codes. This suboption prompts for the user name that is to be deleted and that user's password. The password is not echoed to the console. If this password and user name do not correspond to present data dictionary contents, the password is not deleted.

Since the DMU user can delete his own user name and password, he should **be very careful not to delete all remaining data base users.** If all are deleted, the data base is no longer accessible. If a user deletes himself, there is no guarantee that DMU processing will continue.

```
Enter option:  A

       User Menu:
Modify:                      M
Add:                         A
Delete:                      D
Exit to new DMU option:      E

Enter option : M
Old user name: D_LEHR
Old password :
New user name: D_LEHR
New password :
```

Figure II-4. User Change Menu, with Password Modification Example

C. Perform data base area expansion:

After data has been loaded into a data base, the DMU S option can be used to see how full the data base areas are becoming. When an area is nearly full, it can be expanded to make room for more data. This is accomplished with the P option in DMU. This option results in a series of prompts for new area sizes as shown in the example in Figure II-5. Notice that for each area a range of permissible sizes is provided to the user. DMU will generally allow an area to be expanded to a size somewhat larger than the maximum specified in the DDL, and thereby overcome mis-estimations of area size at design time. Areas which may contain CALC records are not permitted to be expanded.

```
Enter option :  P

Area JOBS

Enter number of pages (6<=number<=252),
(0 to skip expansion of this area):  50

Operation in progress


Area JOB1

Enter number of pages (3<=number<=252),
(0 to skip expansion of this area):  20

Operation in progress


Area JOB2

Enter number of pages (3<=number<=252),
(0 to skip expansion of this area):  25

Operation in progress
```

Figure II-5. Area Expansion Examples
(user responses are underlined)

D. Change file names:

This option allows the DMU user to change the default physical file name corresponding to an area. The DMU user must have write access to an area before its file name can be changed. A "Change file name options:" menu is displayed (see Figure II-6). If a user chooses the "All areas:" suboption, DMU will display each area name. DMU will then prompt for the new physical file name. If the user chooses the "Individual area:" suboption, he will be prompted for the current name of an area and its new default physical file name. The new file name must be fully qualified within the host operating system (see the pertinent system specific manual).

```
Enter option:  C

     Change file name suboptions:
All  areas:              :  A
Individual area          :  I
Exit to new DMU option:  E

     Suboption:  I
Enter area name:  JOB1
Enter new physical file name:  ALTJOB1.DB
```

Figure II-6. Change File Name Menu and Example

E. Exit DMU:

This option closes the data base and returns the user to the operating system.

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III. EXPLANATION OF MESSAGES AND ERRORS

This section lists the possible errors and messages that could be encountered when using MDBS-DMU. For each error condition, there is an explanation of its meaning as well as its possible cause.

DMS COMMAND STATUS: nnn

Explanation:
This message may accompany any other ERROR type of message and provides a decimal DMS Command Status Descriptor (nnn) under which the user may find more information. Refer to your DMS Manual for details.
Possible Causes:
1. Any DMU error condition

ERROR: Area xxxxx could not be opened on file xxxx

Explanation:
DMU could not open the specified area from the specified file.
Possible Causes:
1. Incorrect disk, does not contain data base area
2. Incorrect data base area name
3. Inconsistent or invalid area file

ERROR: Cannot change area file name

Explanation:
DMU unable to access physical file to execute the logical name change.
Possible Causes:
1. Incorrect disk, does not contain data base area
2. Disk not in place
3. Invalid physical file name

ERROR: Cannot close data base or data base area

Explanation:
Upon exit, DMU attempted to close the data base, and failed.
Possible Causes:
1. Incorrect disk, does not contain main data base area
2. Disk not in place
Notes:
This error may indicate that the data base has been damaged.

ERROR: Cannot expand data base or data base area

Explanation:
Operating system error during data base expansion.
Possible Causes:
1. Insufficient room for expansion
2. Bad or damaged sector on disk
3. Operating system I/O error
Notes:
This error will most likely leave the data base in a damaged state.

ERROR: Cannot open data base using given parameters

Explanation:
DMU could not open the data base.
Possible Causes:
1. Incorrect disk, does not contain main data base area
2. Incorrect data base file name
3. Invalid user name or password

ERROR: Illegal user addition

Explanation:
DMU could not add the specified user.
Possible Causes:
1. Specified user already exists
2. DMU user does not have sufficient access permission

ERROR: Illegal user modification

Explanation:
DMU could not modify user's name or password.
Possible Causes:
1. Old user name and password did not correspond
2. New user name and password combination already exist

ERROR: Illegal user deletion

Explanation:
DMU could not delete the specified user.
Possible Causes:
1. Specified user name and password did not correspond
2. Specified user does not exist

ERROR: Insufficient write access

Explanation:
DMU was unable to carry out the requested operation.
Possible Causes:
1. DMU user does not have permission for requested operation

ERROR: Invalid access code entry

Explanation:
DMU unable to analyze the entered access code.
Possible Causes:
1. Entered access code not in correct format
2. Entered access code not in range used by data base
3. Range of entered access code not in ascending order

ERROR: Invalid area name

Explanation:
No area of the specified name is defined for this data base
Possible Causes:
1. Misspelled area name

ERROR: Invalid option selection

Explanation:
DMU unable to recognize the user's selected option.
Possible Causes:
1. User attempted to select an unimplemented option

ERROR: Page count of nnnn is not within allowable range

Explanation:
DMU detected that requested expansion size was out of range of the limits for the data base.
Possible Causes:
1. User entry was out of range

ERROR: User is not authorized to see AAAAAAA.

Explanation:
DMU detected an attempt to access statistical data on an area the user is not allowed to access.
Possible Causes:
1. User has insufficient read access

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