UNISYS

ALLY® Software Development Environment

UNIFY Developer Notes

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Preface

This manual describes ALLY release 2.0.

The ALLY Software Development Environment can run on many computers, operating systems, and data access methods. Therefore, the ALLY manuals are generic—they describe the system-independent features of ALLY.

These developer notes provide information about version 2.0 of ALLY, which supports version 4.0 of the UNIFY Relational Database Management System. These notes are a supplement to the standard set of manuals provided with ALLY.

These notes include information about:

- using ALLY with UNIFY
- building a UNIFY Base Data Source Definition (Base DSD)
- modifications you can make and options you can select to further define a UNIFY Base DSD

The section of these developer notes titled "Building a UNIFY Base DSD" is designed as a supplement to the "Data Source Definitions" chapter of the *Dialog User's Guide* (UP-12505).

We assume that you are familiar with UNIFY as well as with ALLY and the Dialog. Before reading the developer notes, you should read the documentation conventions that are provided in the preface of the *Dialog User's Guide*.

End of Preface

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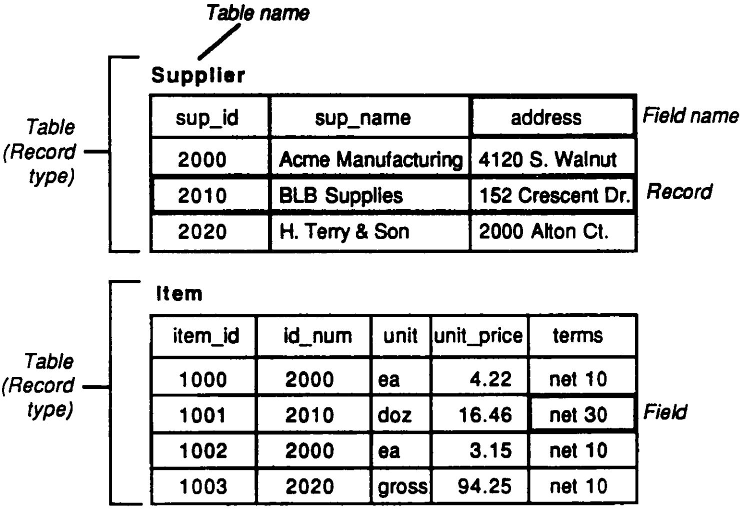
UNIFY Developer Notes

The UNIFY Relational Database Management System is a collection of programs that enable you to create databases and to enter, modify, retrieve, and sort data.

A UNIFY database consists of a group of tables. In UNIFY documentation, tables are sometimes referred to as *record types*. For consistency with the forms of the Dialog, we use the term *table* in this document.

A table is composed of records, and a record is composed of fields. Figure 1 shows a sample UNIFY database composed of two tables.



Supplier

sup_id	sup_name	address
2000	Acme Manufacturing	4120 S. Walnut
2010	BLB Supplies	152 Crescent Dr.
2020	H. Terry & Son	2000 Alton Ct.

Item

item_id	id_num	unit	unit_price	terms
1000	2000	ea	4.22	net 10
1001	2010	doz	16.46	net 30
1002	2000	ea	3.15	net 10
1003	2020	gross	94.25	net 10

F002-0900-00

Figure 1. Sample UNIFY Database

A UNIFY database is usually stored in a file called "file.db." Information about the database design is stored in a separate file called "unify.db," which is referred to as the application's *data dictionary*.

Using ALLY with UNIFY

When ALLY builds a UNIFY Base DSD, it reads information about a table from the UNIFY database. The fields of the Base DSD that ALLY builds correspond to the fields defined for the UNIFY table.

The only way to build a UNIFY Base DSD is to create it automatically from an existing UNIFY table. You cannot use the Dialog to create a UNIFY table or to create individual fields in a UNIFY Base DSD. Also, you cannot change the Base DSD type of a non-UNIFY Base DSD to UNIFY.

To perform data queries and modifications, ALLY communicates directly with the UNIFY database. You can enhance the performance of your application by using UNIFY to build B-tree indexes for:

- fields assigned to the local key of an ALLY foreign key link
- fields that are used frequently in queries
- fields assigned to an ALLY primary key

When developing an application, you should use the advanced features of ALLY and not the advanced features of UNIFY. ALLY provides its own capabilities for defining advanced characteristics like default and initial values of fields.

ALLY allows you to assign passwords to form/report fields or to assign special characteristics to fields so that they cannot be modified. Use ALLY's security features instead of UNIFY's.

Names

The name you assign to a UNIFY Base DSD need not be the same as the name of the UNIFY table from which you build the Base DSD. The Base DSD name can contain up to eighty alphanumeric characters and underscore characters. It must begin with a letter.

When ALLY creates a Base DSD from a UNIFY table, it creates a Base DSD field to correspond to each UNIFY field. The UNIFY short name for each field becomes the name of the corresponding Base DSD field. The UNIFY short name and long name are also saved as characteristics of the Base DSD field. These characteristics are part of the field's definition and are independent from the Base DSD field's name.

You can change the Base DSD field's name at any time. It does not have to match the UNIFY short name. However, the short name that is part of the field's definition must match the UNIFY short name.

Data Types

ALLY's data types support seven of UNIFY's nine data types:

ALLY Data Type	Supports UNIFY Data Type
NUMBER	NUMERIC FLOAT AMOUNT
CHAR	STRING
DATE	DATE LONGDATE TIME

ALLY does not support UNIFY's BINARY and TEXT data types. You can create a Base DSD based on a table that includes these data types. If you do, ALLY will create Base DSD fields that correspond to all of the fields except those with BINARY and TEXT data types.

Date Fields

When you build a Base DSD from a UNIFY table that includes a field with the DATE, LONGDATE, or TIME data type, ALLY creates a date field in the Base DSD. This field has ALLY's default format for dates (MM/DD/YY).

If the UNIFY data type of the field is LONGDATE or TIME, you should change the Base DSD field's output format. To do this, create a date format and then assign it to the Base DSD field. (Alternatively, you could assign the date format to a form/report field.)

For LONGDATE fields, create a date format with the date picture "MM/DD/YYYY." For TIME fields, create a date format with the date picture "HH24:MI."

Use the *Create a Date Format* form (menu path 3 5 3 1 from the Dialog's main menu) to create the date format. Exit from this form to display the form called *Date Format—Characteristics*, and specify the date format's date picture. To assign the date format to the Base DSD field, use the *Date Field—Initial and Null Values, Data Formats* form (menu path 3 1 2 < > 2 2 < > 2 from the Dialog's main menu).

Combination Fields

ALLY also supports combination fields.

When you build a Base DSD from a UNIFY table, ALLY creates Base DSD fields for all of the fields that comprise a combination field. However, ALLY does not create a Base DSD field that corresponds to the combination field itself.

ALLY keys are analogous to UNIFY combination fields. If your UNIFY database contains combination fields, we recommend that you create an ALLY key for each combination field. Assign to the key the Base DSD fields that correspond to the fields of the UNIFY combination field.

Environment Variables

When you use ALLY with UNIFY, there are two ways to ensure that ALLY will find the UNIFY files you want to use:

1) Execute all ALLY applications (including the Dialog) from the directory that contains the UNIFY database.

2) Use an operating system environment variable.

There are two UNIFY environment variables that affect ALLY's ability to locate your UNIFY files:

- DBPATH
- DBNAME

Both of these environment variables can be set from your operating system shell.

If you are using the C shell, use the following syntax when setting these environment variables:

```
setenv variable_name value
```

If you are using the Bourne shell, use the following syntax:

```
variable_name=value
```

If you are using the Bourne shell, you must then export the environment variable by typing:

```
export variable_name
```

There are two ways to unset an environment variable. If your operating system supports the 'unsetenv' command, type:

```
unsetenv variable_name
```

For example,

```
unsetenv DBNAME
```

If your operating system does not support 'unsetenv', reset the variable, using a different value. For example,

```
setenv DBNAME file.db
```

Using DBPATH

If your UNIFY files are not located in the directory from which you will start ALLY, use the environment variable DBPATH to indicate the directory in which your UNIFY files can be found. For example,

```
setenv DBPATH /a/usr/alex/emp
```

If you use DBPATH, all of your UNIFY data files (file.db, file.dbr, and unify.db) and all .idx files must be in the directory you specify.

When you build a UNIFY Base DSD, ALLY does not store the value of DBPATH. At runtime, ALLY does not verify that the current setting of DBPATH is the same as the setting in effect when the Base DSDs were created. Therefore, when you develop or run an ALLY application, be sure that DBPATH (if set) is set to access the UNIFY database you want to use.

Using DBNAME

Use the environment variable DBNAME to indicate that your UNIFY database file has a name other than the default name (which is file.db). For example, if your database file is called empfile.db, you would type:

```
setenv DBNAME empfile.db
```

If you set DBNAME before creating a UNIFY database, UNIFY assigns the name you specify to the database file you create.

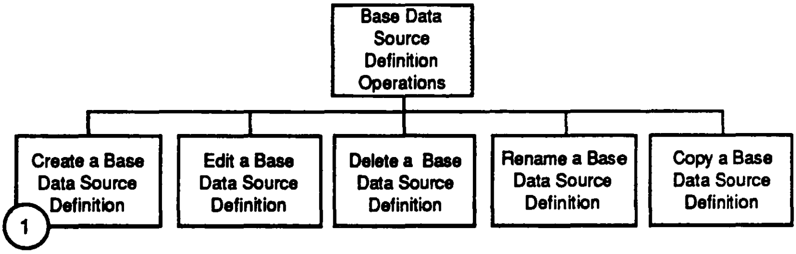
We recommend that you do not set this environment variable when executing an ALLY application that uses a UNIFY database. When you build a Base DSD to describe a UNIFY table, ALLY maintains the database file's name as part of the Base DSD. At runtime, ALLY looks for a file with the file name stored in the Base DSD. If the DBNAME environment variable is set to any name other than the name stored in the Base DSD, ALLY will be unable to locate the file. If this happens, ALLY issues an error message indicating that it cannot open the database.

Building a UNIFY Base DSD

When you build an ALLY application that uses data from a UNIFY database, you must build a UNIFY Base DSD to describe each table in the database.

The following instructions describe the process of building a UNIFY Base DSD. When you work on an application's DSDs, you are in the "Data Definitions" branch of the Dialog—choice 3 from the Dialog's main menu.

Figure 2 shows the location of the Dialog form you will use.


Base Data Source Definition Operations
Create a Base Data Source Definition
1
Edit a Base Data Source Definition
Delete a Base Data Source Definition
Rename a Base Data Source Definition
Copy a Base Data Source Definition

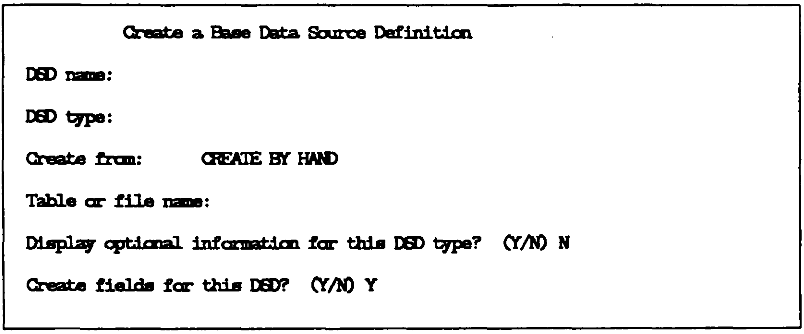
F002-0648-01

Figure 2. UNIFY Base Data Source Definition Path

① Name the UNIFY Base Data Source Definition and the table that the Base DSD will describe.

Menu path: **3 1 1** from the Dialog's main menu
Form name: *Create a Base Data Source Definition*

Figure 3 shows this form.



```
          Create a Base Data Source Definition

DSD name:

DSD type:

Create from:        CREATE BY HAND

Table or file name:

Display optional information for this DSD type?  (Y/N) N

Create fields for this DSD?  (Y/N) Y
```

Figure 3. Create a Base Data Source Definition

Name the UNIFY Base DSD and choose "UN" as the type of Base DSD you are creating. The Dialog changes the value of the "Create from" field to CREATE FROM TABLE and moves the cursor to the "Table or file name" field.

Type the name of the UNIFY table from which ALLY will build this Base DSD, and exit from the form.

Optional Steps for Base DSD Fields

The *Base DSD Field Characteristics* menu (menu path 3 1 2 < > 2 2 < > from the Dialog's main menu) provides access to six Dialog forms that allow you to display or edit a Base DSD field's:

- status and names
- initial and null values and data formats
- minimum and maximum values
- options inheritable by a form/report field
- ALLY (internal) data type
- storage (UNIFY) data type

Define Field Status and Names

Menu path: **3 1 2** < > **2 2** < > **1** from the Dialog's main menu
Form name: *UNIFY Field—Major Characteristics*

This form allows you to indicate whether a Base DSD field is also a physical field in the UNIFY database. By default, a field is a physical field. If you remove a field from the UNIFY database, remove the "X" from the field of this form labeled "Physical field."

You can also use this form to change a field's short name and long name so that the field names in the Base DSD correspond to the field names in your UNIFY table. However, changing a name in the Base DSD does not alter the name of the field in the corresponding UNIFY table. Do not change the short name and long name in the Base DSD field definition unless you have changed, or you plan to change, the names in the UNIFY table.

The "Not on target list" field on this form does not apply to UNIFY.

Display Field Initial and Null Values and Data Formats

Menu path: **3 1 2** < > **2 2** < > **2** from the Dialog's main menu
Form name: *Field—Initial and Null Values, Data Formats*

This form allows you to specify the initial and null values of a Base DSD field and the data format of the field.

Chapter 4 of the *Dialog User's Guide* discusses ALLY formats. By default, ALLY provides the following initial and null values and input and output formats for character, number, and date fields.

Table 1. Default DSD Field Values and Formats

Data Type	**Initial Value**	**Null Value**	**Input Format**	**Output Format**
Character	none	none	none	none
Number	none	none	free format*	free format*
Date	none	none	MM/DD/YY*	MM/DD/YY*

* These formats are the Dialog's global defaults and are used when no format is specified for a DSD field.

For numeric, time, and float fields, UNIFY initializes all null values to zero. Therefore, when the initial value of a Base DSD field corresponding to a numeric, time, or float field is null, the value that will appear in a form/report referencing the Base DSD will be zero.

Define Field Minimum and Maximum Values

Menu path: **3 1 2** < > **2 2** < > **3** from the Dialog's main menu
Form name: *Field—Field Validation*

This form allows you to specify a minimum and maximum value for the field you are defining. By default, ALLY does not assign a minimum or maximum value to DSD fields.

Define Inheritable Form/Report Options

Menu path: **3 1 2 < > 2 2 < > 4** from the Dialog's main menu
Form name: *Options Inheritable by a Form/Report Field*

This form allows you to specify the options that will be inherited by all form/report fields that reference the Base DSD field. These options allow the field to require a valid value, be addable only, be enterable only, or accept no blank characters.

Display a Field's Internal Data Type

Menu path: **3 1 2 < > 2 2 < > 5** from the Dialog's main menu
Form name: *Base DSD Field—Internal Data Information*

This form allows you to display a Base DSD field's ALLY (internal) data type.

This form is provided for reference only. You cannot change any of the information.

Display a Field's External Data Type

Menu path: **3 1 2 < > 2 2 < > 6** from the Dialog's main menu
Form name: *UNIFY Field—External Data Storage*

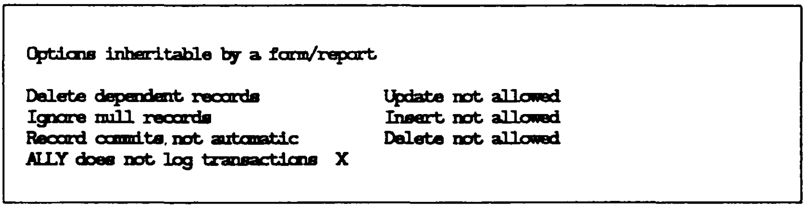
This form allows you to display a Base DSD field's external (UNIFY) data type.

This form is provided for reference only. You cannot change any of the information.

Options Inheritable by Forms/Reports

Menu path: **3 1 2 < > 1** from the Dialog's main menu
Form name: *UNIFY Base DSD—Characteristics*

ALLY provides several options that are inheritable by any form/report that references a UNIFY Base DSD. Figure 4 shows the subform that allows you to select these options.



```
Options inheritable by a form/report

Delete dependent records            Update not allowed
Ignore null records                 Insert not allowed
Record commits, not automatic       Delete not allowed
ALLY does not log transactions  X
```

Figure 4. Options Inheritable by a Form/Report Subform

Delete dependent records (default off)
This option refers to subordinate records in a form/report. It determines whether ALLY will delete dependent records from this Base DSD when a user deletes the records' parent record.

Ignore null records (default off)
This option determines whether ALLY will ignore a record when all of the fields of the record contain null values.

Record commits not automatic (default off)
This option determines whether record changes will be made automatically or only when the user invokes the 'commit' command. If this option is off, a commit is done automatically when the cursor moves from a changed record. If this option is on, ALLY allows no changes to be made until a user invokes the 'commit' command. When this option is off, the "ALLY does not log transactions" option should be on. This is the default condition.

ALLY does not log transactions (default on)
This option determines whether ALLY will maintain a file to log transactions for a form/report that references a UNIFY Base DSD. This transaction file, which is re-created at the end of each commit or rollback, communicates only commit transactions from the transaction log file to the data source file. ALLY uses this log to return rolled-back records to their previous internal values in a form/report. ALLY maintains this transaction file when this option is off; it does not maintain the file when the option is on.

Update not allowed (default off)
This option determines whether ALLY will prevent records from being updated in a UNIFY database.

Insert not allowed (default off)
This option determines whether ALLY will prevent records from being inserted into a UNIFY database.

Delete not allowed (default off)
This option determines whether ALLY will prevent records from being deleted from a UNIFY database.

Base DSD Keys

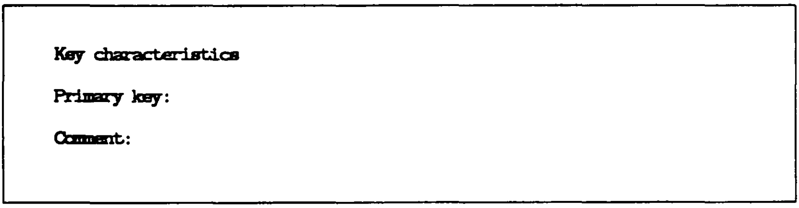
Menu path: **3 1 2** < > **3 2** < > from the Dialog's main menu
Form name: *Base Definition Key*

ALLY allows you to assign one or more Base DSD fields to a Base DSD key.

In a Base DSD, keys can:

- uniquely identify a record (such keys are called primary keys)
- be used with foreign key links to establish hierarchical relationships between Base DSDs
- indicate how records should be sorted

When you define a key in a UNIFY Base DSD, ALLY allows you to specify that the key is a primary key. Figure 5 shows the subform that allows you to assign this characteristic to a key.



Key characteristics

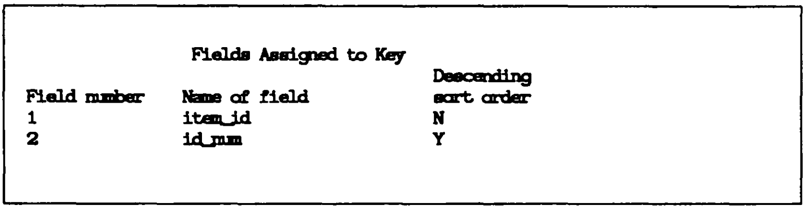
Primary key:

Comment:

Figure 5. Key Characteristics Subform

To optimize performance, ALLY primary keys should correspond to UNIFY primary keys. Any time an ALLY primary key corresponds to a UNIFY field (or set of fields) that is not a UNIFY primary key, you should build a UNIFY index on the field(s) assigned to the ALLY primary key.

When you define a key, you must assign one or more Base DSD fields to the key. Figure 6 shows the subform that allows you to assign fields to a key.



```
                    Fields Assigned to Key
                                                 Descending
Field number        Name of field                sort order
1                   item_id                      N
2                   id_num                       Y
```

Figure 6. Fields Assigned to a Key Subform

The "Descending sort order" field of this form allows you to specify the order in which records should be sorted.

Reading Records in Sorted Order

ALLY can read a UNIFY table in sorted order if you:

- create an ALLY key that references the fields used for sorting
- indicate whether records should be sorted in ascending or descending order
- create a View Definition and specify the Base DSD key to be used as its sort key
- create a UNIFY index to support the Base DSD key

The UNIFY index that supports your ALLY Base DSD key must reference the same fields as the Base DSD key, and the fields must be in the same order. Each field of the index must have the same ascending or descending order characteristic as the corresponding field of the Base DSD key.

The UNIFY index can include more fields than are referenced by the Base DSD key. However, the additional fields of the index cannot occur before or between the fields referenced by the Base DSD key. For example, a Base DSD key that references fields A, B, and C (in that order) can use a UNIFY index that contains the fields A, B, C, and D—as long as the ascending/descending order characteristics are the same. However, ALLY would be unable to use a UNIFY index containing the fields A, D, B, and C because the order of the fields is not the same as the order of the Base DSD key's fields. ALLY would also be unable to use an index containing the fields D, A, B, and C because the fields referenced by the Base DSD key are not at the beginning of the index.

ALLY does not look for an appropriate UNIFY index at define time. Therefore, you can create the Base DSD key before you create the corresponding index in the UNIFY environment. At runtime, if ALLY cannot find an index to support its sort key, it displays the following error message:

```
Unable to perform sorting.
There is no UNIFY index that corresponds to the ALLY sort key.
```

Modifying a UNIFY Base DSD

You can use ALLY to modify the values of the fields of a UNIFY database, but you cannot modify the structure or design of the database.

If you change the name of a field in your UNIFY database, you must change the short name that has been saved as part of the definition of the corresponding Base DSD field. We recommend that you change the long name in the Base DSD also.

If you need to add or delete fields from a UNIFY database, you must first make the modifications in the UNIFY table. Then you must build a Base DSD with a different name, and copy the new Base DSD over the old one. If the old Base DSD had any keys or foreign key links, you will have to rebuild them. You will also have to add the new fields to any existing forms/reports.

ALLY Development Language (ADL) and UNIFY

You can use ADL generic Data Manipulation Language (DML) functions to manipulate the data in a UNIFY database file through ADL procedures. These functions are described in the *ALLY Development Language (ADL) User's Guide* (UP-12507).

Concurrency

ALLY does not lock UNIFY records to prevent concurrent access to data. Because UNIFY uses field-level I/O rather than record-level I/O, record locking is not necessary.

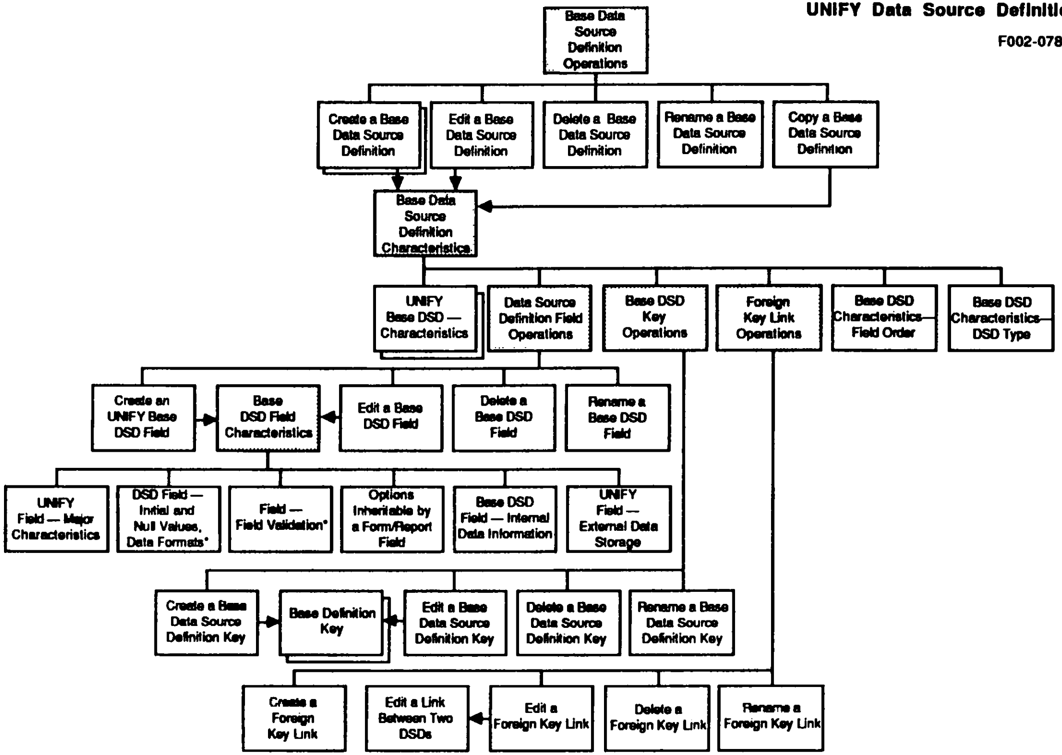
Just before a change is made to a field, UNIFY locks the database to prevent write access by another user. The lock is released as soon as the change to the field has been made.

During a Dialog session, do not go to the operating system to modify your UNIFY database design. If you do, the changes you make will not appear when you return to the Dialog. If you need to modify the database design, exit from the Dialog first.

End of UNIFY Developer Notes

Appendix A
Dialog Structure for UNIFY DSDs

Application Developer's Dialog
UNIFY Data Source Definitions
F002-0787-01


Base Data Source Definition Operations
Create a Base Data Source Definition
Edit a Base Data Source Definition
Delete a Base Data Source Definition
Rename a Base Data Source Definition
Copy a Base Data Source Definition
Base Data Source Definition Characteristics
UNIFY Base DSD — Characteristics
Data Source Definition Field Operations
Base DSD Key Operations
Foreign Key Link Operations
Base DSD Characteristics—Field Order
Base DSD Characteristics—DSD Type
Create an UNIFY Base DSD Field
Base DSD Field Characteristics
Edit a Base DSD Field
Delete a Base DSD Field
Rename a Base DSD Field
UNIFY Field — Major Characteristics
DSD Field — Initial and Null Values, Data Formats*
Field — Field Validation*
Options Inheritable by a Form/Report Field
Base DSD Field — Internal Data Information
UNIFY Field — External Data Storage
Create a Base Data Source Definition Key
Base Definition Key
Edit a Base Data Source Definition Key
Delete a Base Data Source Definition Key
Rename a Base Data Source Definition Key
Create a Foreign Key Link
Edit a Link Between Two DSDs
Edit a Foreign Key Link
Delete a Foreign Key Link
Rename a Foreign Key Link

* The exact title of this form depends on the field's type (character, number, or date).

End of Appendix A

Index

End of Index