Thoroughbred® Basic™
ODBC Client Capability Customization Supplement

Version 8.9.0

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Preface

After you install or upgrade Thoroughbred Environment 8.9.0, you must customize system files to ensure that Thoroughbred Basic can interact smoothly with databases created under other products, for example, Microsoft Access databases. The Thoroughbred Basic ODBC Client Capability Customization Supplement provides information that helps you establish and maintain connections between Thoroughbred products and ODBC-compliant databases.

This manual supplements the Basic Developer Guide, Volume II of the Basic Customization and Tuning Guide, the Thoroughbred Environment for Windows Installation Guide, and the Basic for UNIX and Linux Installation Guide.

The Thoroughbred Basic ODBC Client Capability Supplement assumes familiarity with the contents of the manuals listed above, experience with Thoroughbred products, and knowledge of Windows, UNIX, or Linux. Knowledge of ODBC-compliant databases is helpful, but not assumed.

Notational Symbols

BOLD FACE/UPPERCASE	Commands or keywords you must code exactly as shown. For example, **CONNECT** VIEWNAME.
Italic Face	Information you must supply. For example, **CONNECT** *viewname*. In most cases, *lowercase italics* denotes values that accept lowercase or uppercase characters.
UPPERCASE ITALICS	Denotes values you must capitalize. For example, **CONNECT** *VIEWNAME*.
Underscores	Displays a default in a command description or a default in a screen image.
Brackets **[ ]**	You can select one of the options enclosed by the brackets; none of the enclosed values is required. For example, **CONNECT** [VIEWNAME|*viewname*].
Vertical Bar |	Piping separates options. One vertical bar separates two options, two vertical bars separate three options. You can select only one of the options
Braces { }	You must select one of the options enclosed by the braces. For example, **CONNECT** {VIEWNAME|*viewname*}.
Ellipsis **. . .**	You can repeat the word or clause that immediately precedes the ellipsis. For example, **CONNECT** {*viewname1*}[[**,** *viewname2*] **. . .**].
lowercase	displays information you must supply, for example, SEND filename.txt.
Brackets **[ ]**	are part of the syntax and must be included. For example, SEND **[**filename.txt**]** means that you must type the brackets to execute the command.
punctuation	such as **,** (comma), **;** (semicolon), **:** (colon), and **( )** (parentheses), are part of the syntax and must be included.

Windows Client Supplement

The Thoroughbred Environment for Windows enables access to ODBC-compliant databases. After the connection to such a database is established, Thoroughbred products, such as Script-IV or Thoroughbred Basic, can make use of information contained in databases created under other products, such as Microsoft Access.

Server Operating System Support: UNIX, Linux, and Windows
For specific information, please contact your Thoroughbred Sales Representative.

If you have installed Thoroughbred products running under Microsoft Windows, you can use the information in the following section to establish and maintain connections between Thoroughbred products and ODBC-compliant databases.

For more information on Thoroughbred Basic, please refer to the Basic Developer Guide. For more information on the Thoroughbred Environment, please refer to the Thoroughbred Environment for Windows Supplemental Guide. For more information on system files, such as SERVER.MAP or IPLINPUT.TXT, please refer to the Thoroughbred Basic Customization and Tuning Guide. For more information on Thoroughbred products, please refer to the relevant Thoroughbred documentation.

How to Establish Connections

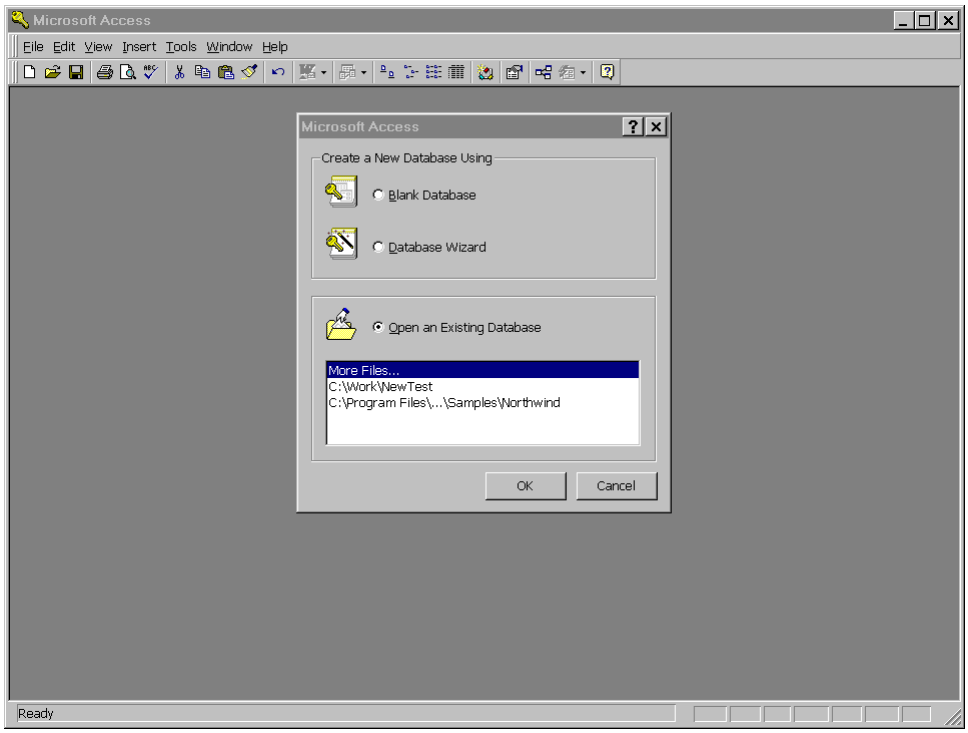
The following procedural example outlines one way to establish a connection between Thoroughbred products and an ODBC-compliant database. The methods you can use to establish such connections can vary from server to server. In this example, Thoroughbred products are used to create a Microsoft Access table. However, you can act on an existing Microsoft Access table.

NOTE: Although the following example is specific, the information presented below is comprehensive.

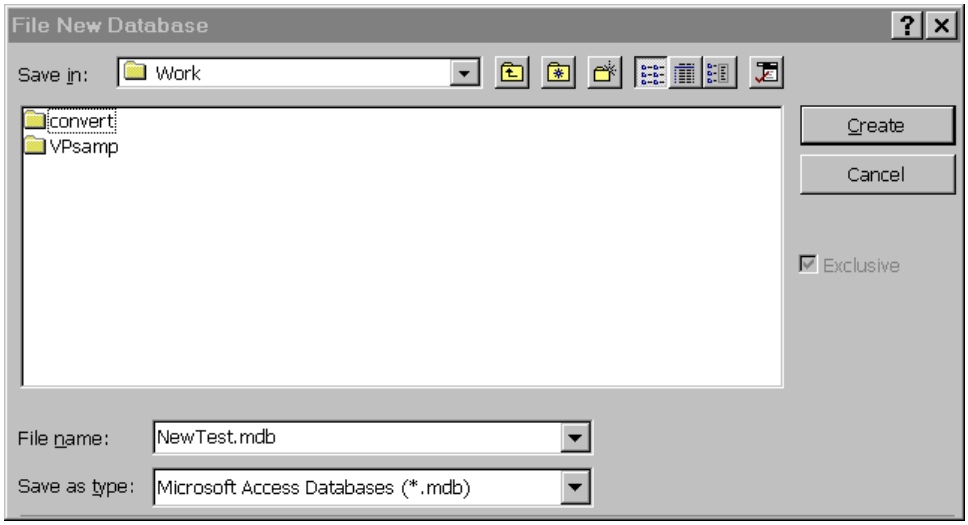
To connect Thoroughbred products to a Microsoft Access table, you can use the following procedure:

Create a Microsoft Access Database.

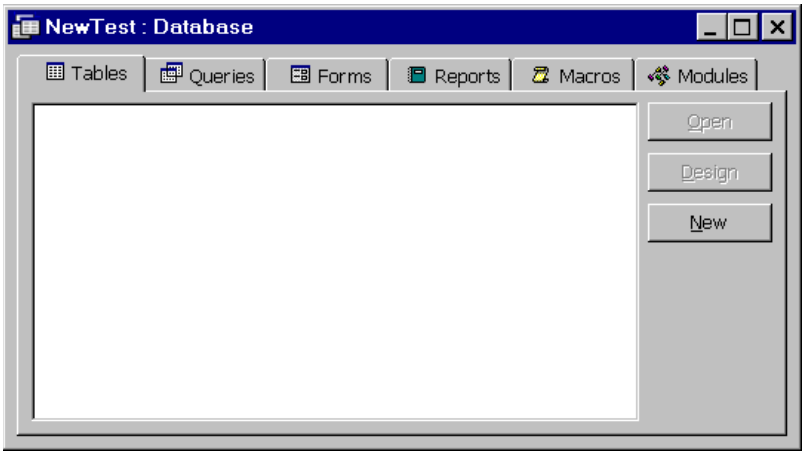
First, start Microsoft Access. The following window will be displayed:



Select **Blank Database** and press the **OK** button. The **File New Database** dialog box will be displayed.

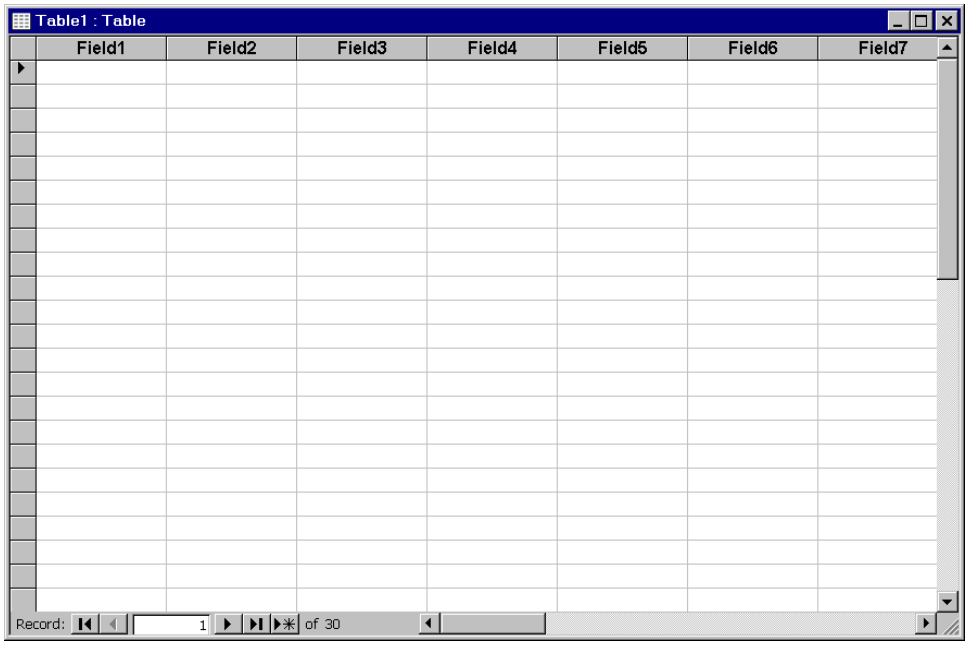


In the **File name:** text box, type **NewTest.mdb**. Press the **Create** button. The **NewTest:Database** dialog box will be displayed.



Press the **New** button. The **New Table** dialog box will be displayed.

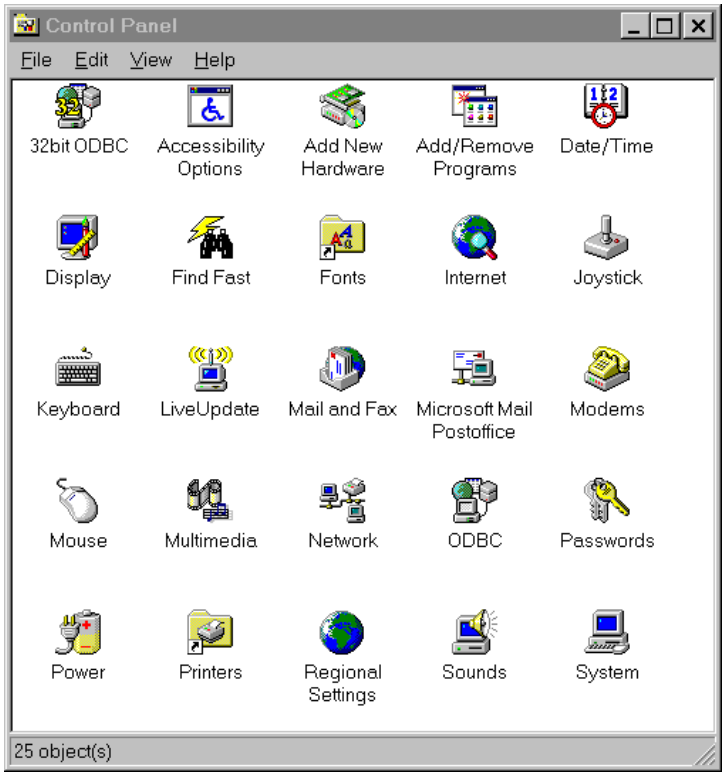
Select the **Datasheet View** option and press the **OK** button. The **Table1:Table** view will be displayed:



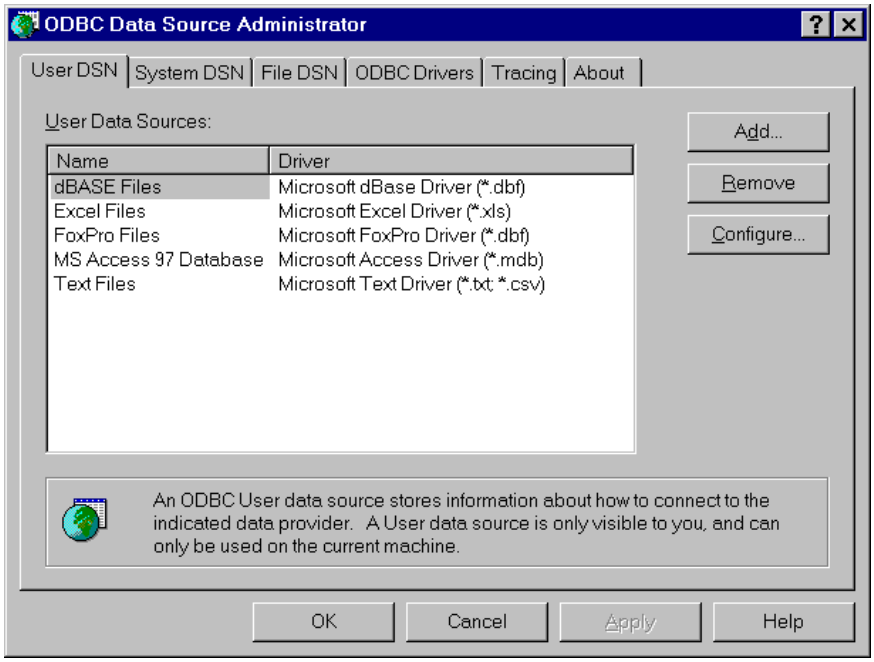
Save and close the **NewTest.mdb** database. Close Microsoft Access.

Specify a Data Source

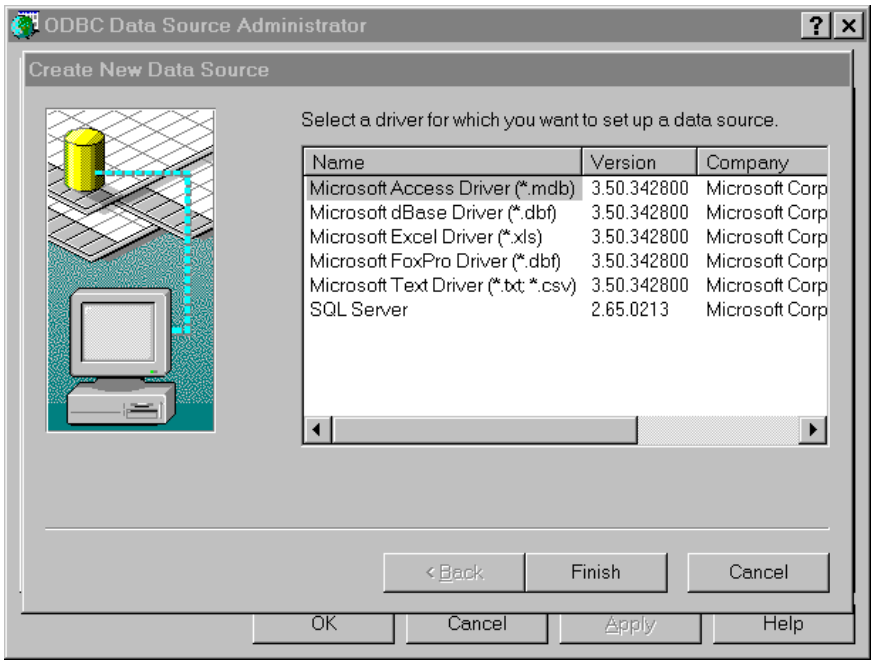
Open the Microsoft Windows **Control Panel**.



Select the 32bit ODBC icon. The **ODBC Data Source Administrator** dialog box will be displayed:

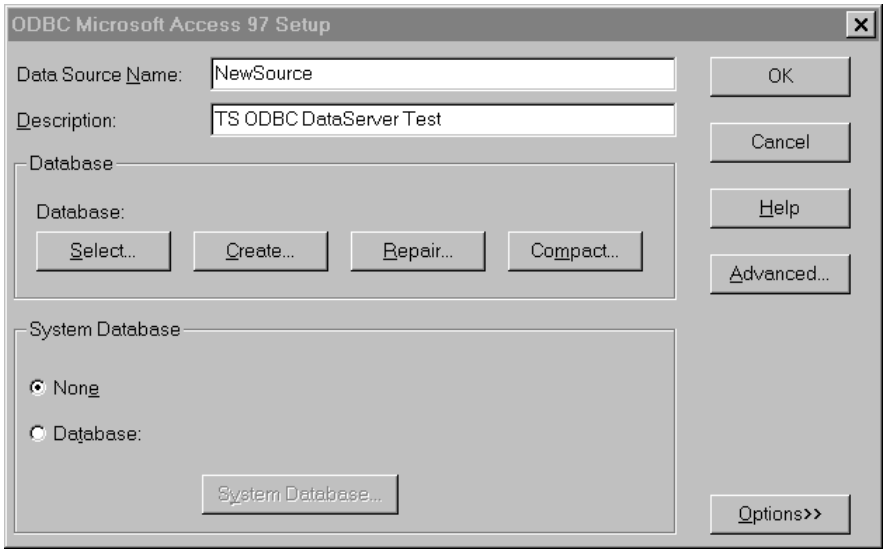


Press the **Add…** button. The **Create New Data Source** dialog box will be displayed:

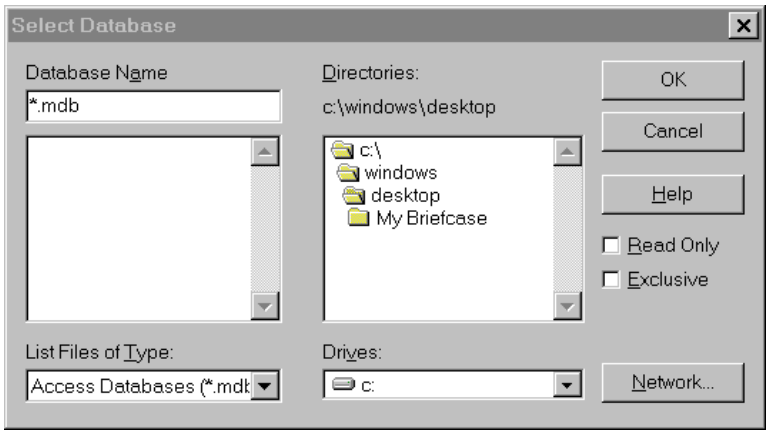


Select the **Microsoft Access Driver (*.mdb)** option. The **ODBC Microsoft Access Setup** dialog box will be displayed:

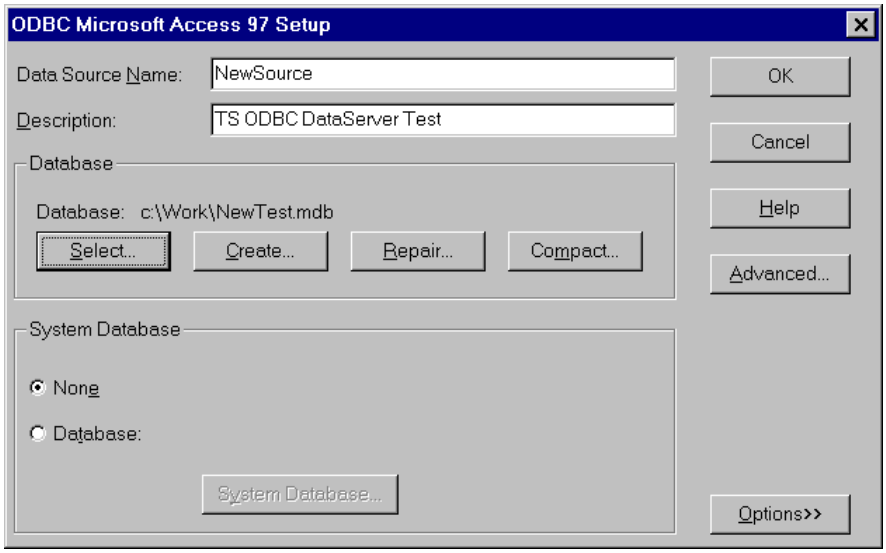
Provide a name for the data source in the **Data Source Name:** text box. Provide a description of the data source in the **Description:** text box. In the **System Database** panel, make sure that the **None** button is selected.



The **Data Source Name:** is **NewSource**. To associate the Microsoft Access **NewTest.mdb** database with this data source, go to the **Database** panel and press the **Select** button. The **Select Database** dialog box will be displayed:



Select the Microsoft Access **NewTest.mdb** database, and press the **OK** button. You will return to the **ODBC Microsoft Access Setup** dialog box.



In the **Database** panel, the **Database:** descriptor displays the full path name for the **NewTest.mdb** file. Press the **OK** button. You will return to the **ODBC Data Source Administrator** dialog box. To exit, press the **OK** button.

Close the Microsoft Windows **Control Panel**.

Edit the SERVER.MAP FILE

This system file helps establish the interface and connection between Thoroughbred products and ODBC-compliant databases. It is located in the Thoroughbred root directory. If the file does not exist, you can create it as a simple ASCII file.

Entries in the **SERVER.MAP** file are formatted in the following way:

```
server-ID:data-source
```

server-ID is a two-character ID. In the procedural example in the preceding chapter, **S1** was specified.

: separates the *server-ID* from the *data-source*.

data-source is the data source name specified to Microsoft Windows. For example, in Step 2 of the procedure described in Chapter 2, the *data-source* was **NewSource**.

Valid data source names can contain the letters **A** through **Z**, the letters **a** through **z**, and the digits **0** through **9**. Data source names are case sensitive.

In the example in the preceding chapter, the entry in the **SERVER.MAP** was specified as:

```
S1:NewSource
```

For more information on the **SERVER.MAP** file, please refer to the Thoroughbred Basic Customization and Tuning Guide.

Edit the IPLINPUT.TXT File

The DEV Statement

This section provides the **DEV** statement syntax needed to establish a connection between Thoroughbred products and ODBC-compliant databases, and a sample specification.

Syntax for an ODBC server device

DEV D*X*,*type*,*param-1*,*server-flag*,*param-3*,*param-4*,*param-5*,*server-ID*:*arguments*

DEV begins the **DEV** statement. The statement begins in the leftmost column.

D X is the device ID, which Thoroughbred Basic uses to reference the ODBC server. Valid values range from **D0** through **D9** and **DA** through **DZ**. You can specify up to 36 logical and physical devices.

ODBC server specifications do not have to follow a set order. For example, you can specify the **D0** disk after you specify the **D1** disk.

NOTE: The DX specification means that ODBC servers are regarded as disk or directory devices. You can specify up to 36 disk or directory devices.

type specifies the device type. For an ODBC server, the only valid value is **1**.

param-1 is a positional parameter. For ODBC servers do not specify a value for this parameter.

server-flag is a positional parameter. It specifies that the disk directory is located on a server, and specifies the server type. For ODBC servers, the only valid value is **3**.

param-3 is a positional parameter. For ODBC servers do not specify a value for this parameter.

param-4 is a positional parameter. For ODBC servers do not specify a value for this parameter.

param-5 is a positional parameter. For ODBC servers do not specify a value for this parameter.

server-ID[**:***arguments*] is a positional parameter. It specifies the ODBC, and any information needed to establish a connection to the ODBC-compliant database. Valid values are:

server-ID is the two-character specification assigned to the ODBC server. The *server-ID* specification in the **DEV** statement must match an entry in the **SERVER.MAP** file.

The **:***arguments* syntax element varies depending upon the *server-ID*. Some ODBC-compliant databases require only a valid *server-ID* specification.

: separates *server-ID* from the *arguments* specification.

arguments vary depending upon the *server-ID*. Some databases do not require *arguments*.

Some databases may require arguments that take the form of *login*/*password*:

login is the login used to connect to the database. The *login*/*password* specification is optional.

/ separates *ID* from *password*.

password is the password used to connect to the database. The *login*/*password* specification is optional.

For more information on *arguments*, please refer to the documentation for the relevant ODBC-compliant database management system.

Example

An example of a **DEV** statement for an ODBC server follows

DEV D8,1,,3,,,,S1

DEV	Begins the **DEV** statement.
DEV **D8**	Specifies that the device is called **D8**.
DEV D8,**1**	Specifies the device type for **D8**. Valid values are:
1	logical disk directory **4** standard dot matrix, character printer, or laser printer **5** terminal that uses Thoroughbred Basic Windows **6** terminal that uses a video card **7** terminal that does not use Thoroughbred Basic Windows **8** ghost task
D8 is defined as a logical disk directory.	
DEV D8,1,,**3**	Specifies that the disk directory is located on an ODBC server.
DEV D8,1,,3,,,,**S1**	Specifies that the *server-ID* is **S1**. No further arguments are required.

The CNF Statement

The **CNF** statement specifies configuration information. An IPL file contains only one **CNF** statement, which must occupy the first line of the file.

Syntax for the CNF Statement

The **CNF** statement has the following format:

CNF *numparts*,*numdevs*,*numtasks*,*numofiles*,*progerr*,*traceflag*,*ofilesflag*,*datefrmt*,*dfrmtsep*, *strtJulday*,*endJulday*

For the purposes of this supplement, only one parameter is important:

numdevs is the number of device definition lines that follow. You must specify a value for this parameter.

For more information on the **CNF** statement, please refer to the Thoroughbred Basic Customization and Tuning Guide.

Example

This system file contains specifications Thoroughbred products need to function under the operating system. It is located in the Thoroughbred root directory. The following is an example of a small **IPLINPUT.TXT** file:

```
CNF 1,6,1,50
PTN 1,300000
PRM NOBANNER
PRM READONLY
PRM DEBUG=OOZ00
DEV D0,1,,,,,,IDL4
DEV D1,1,,,,,,WORK
DEV D9,1,,,,1,,
DEV LP,4,,,,1,,LPT1
DEV T0,5,,,,,,CON
DEV T1,7,,,,,,TTY1
IPL 1,2,T0,ID
END
```

To establish a connection between Thoroughbred products and ODBC-compliant databases, specify a device that requires the ODBC driver, such as:

```
DEV D8,1,,3,,,,S1
```

The **3** specifies an ODBC-compliant database that will be accessed through TS ODBC DataServer. The **S1** is a server-ID that matches the entry specified in the **SERVER.MAP** file.

Change the CNF specification to reflect the addition of a new DEV statement.

```
CNF 1,7,1,50
```

The **6** has been changed to **7** because there are now seven **DEV** statements. In this example, no other changes are required.

After these edits, the sample **IPLINPUT.TXT** file contains the following specifications:

```
CNF 1,7,1,50
PTN 1,300000
PRM NOBANNER
PRM READONLY
PRM DEBUG=OOZ00
DEV D0,1,,,,,,IDL4
DEV D1,1,,,,,,WORK
DEV D8,1,,3,,,,S1
DEV D9,1,,,,1,,
DEV LP,4,,,,1,,LPT1
DEV T0,5,,,,,,CON
DEV T1,7,,,,,,TTY1
IPL 1,2,T0,ID
END
```

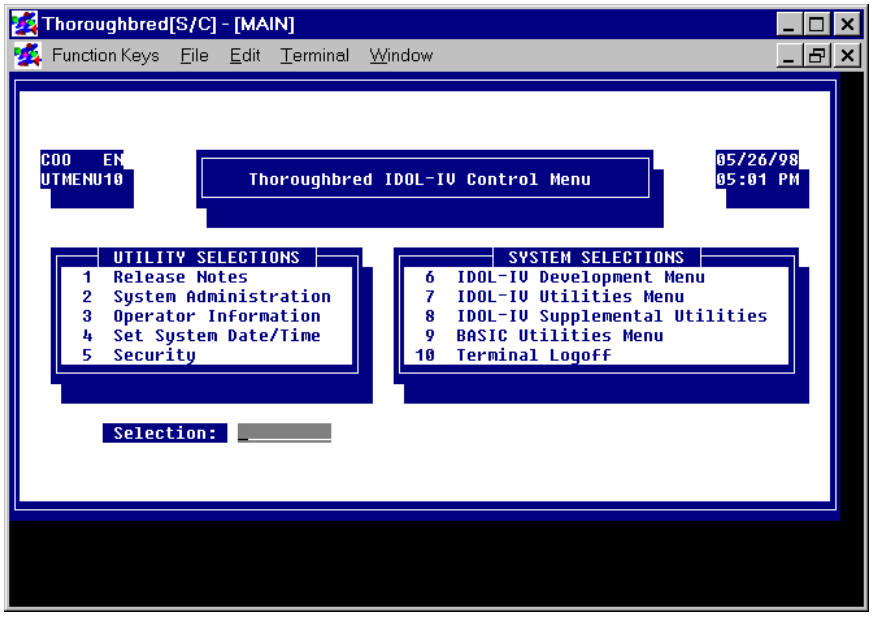
For more information on the **DEV** statement, please refer to the relevant chapter in this supplement and to the Basic Customization and Tuning Guide. For more information on the **IPLINPUT.TXT** file and the **CNF** statement, please refer to the Thoroughbred Basic Customization and Tuning Guide.

This operating system file defines attributes that enable Thoroughbred products to function within an operating system environment. The IPLINPUT file is an initial program load (IPL) file. By default, it is loaded into memory whenever a user starts a Thoroughbred product.

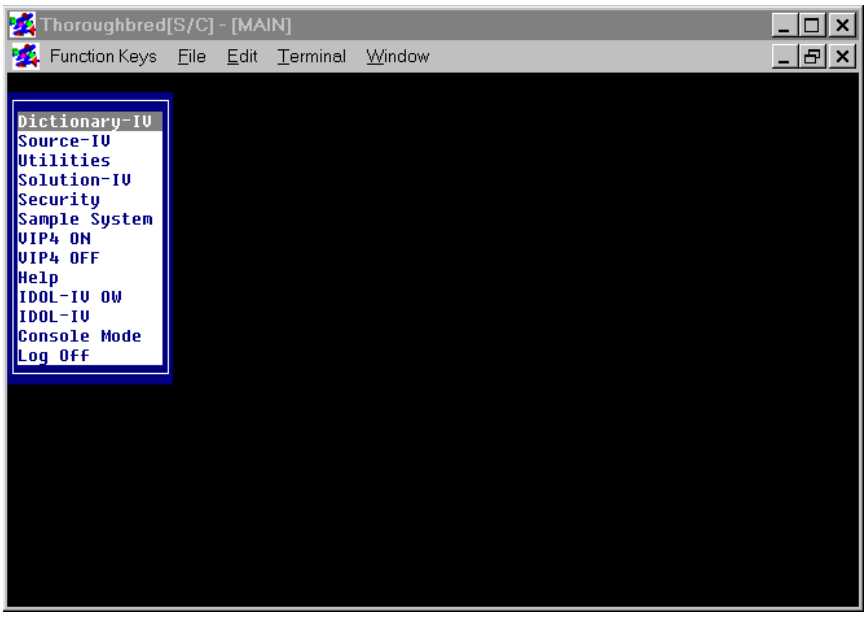
This supplement only describes the **DEV** statement and **CNF** statement needed to establish a connection between Thoroughbred products and ODBC-compliant databases. For more information on the **IPLINPUT.TXT** file, the **DEV** statement and the **CNF** statement, please refer to the Thoroughbred Basic Customization and Tuning Guide.

Setup Thoroughbred Data for Use by the Microsoft Access Database

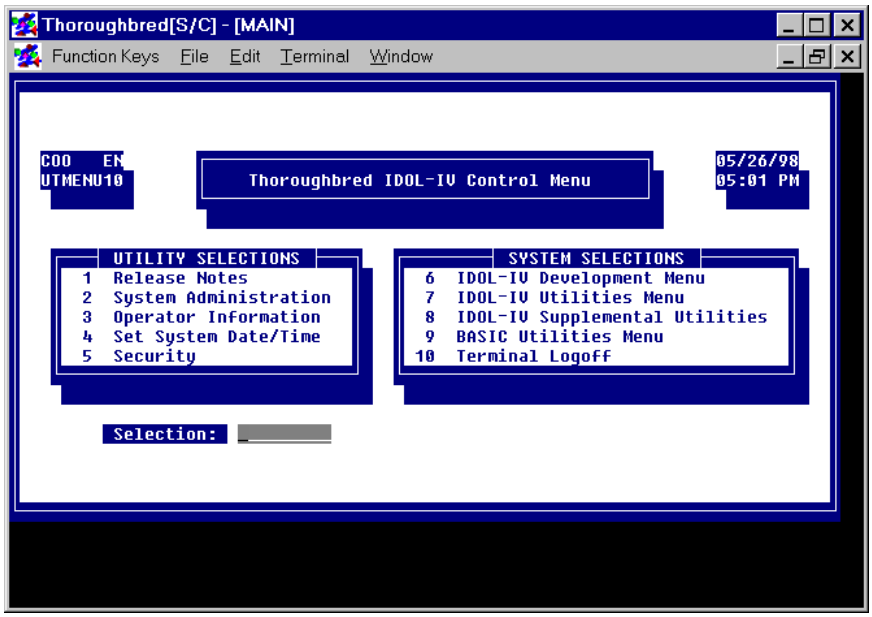
Open the Thoroughbred Environment. Go to the Thoroughbred Dictionary-IV Control Menu:



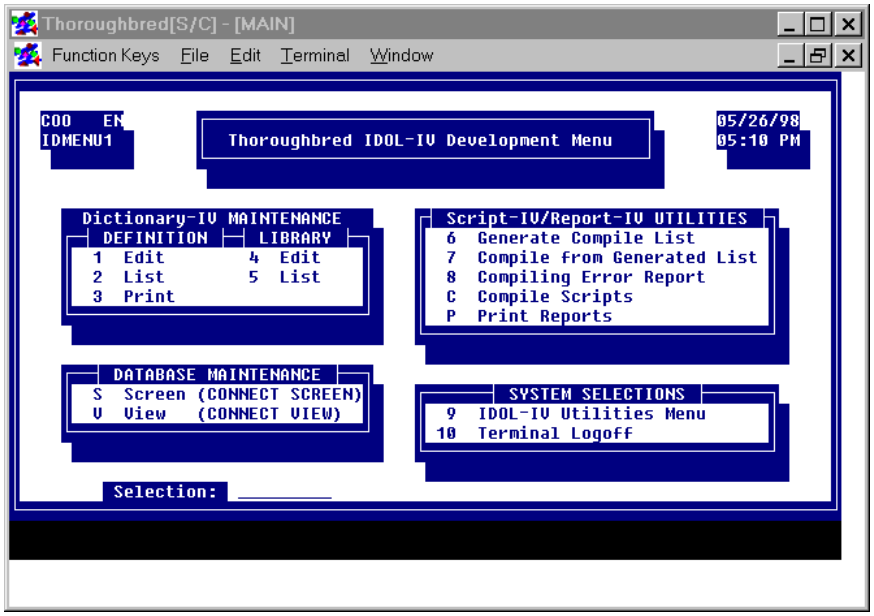
The Thoroughbred OPENworkshop provides a more efficient environment for work. To specify OPENworkshop, type **OO** and press the **Enter** key. The following menu will be displayed:



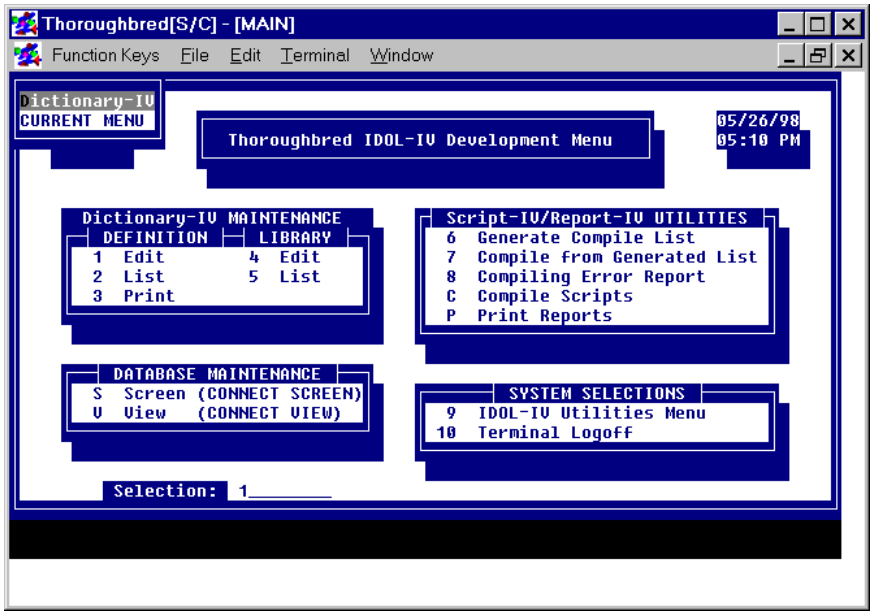
Select **OW**. You will return to the Thoroughbred Dictionary-IV Control Menu:



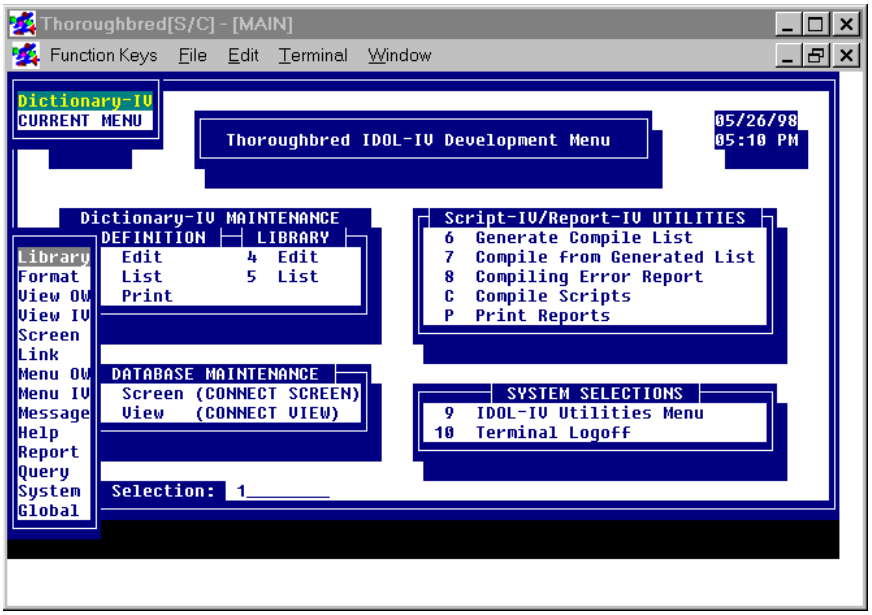
Type **6** and press the **Enter** key. The Thoroughbred Dictionary-IV Development Menu will be displayed:



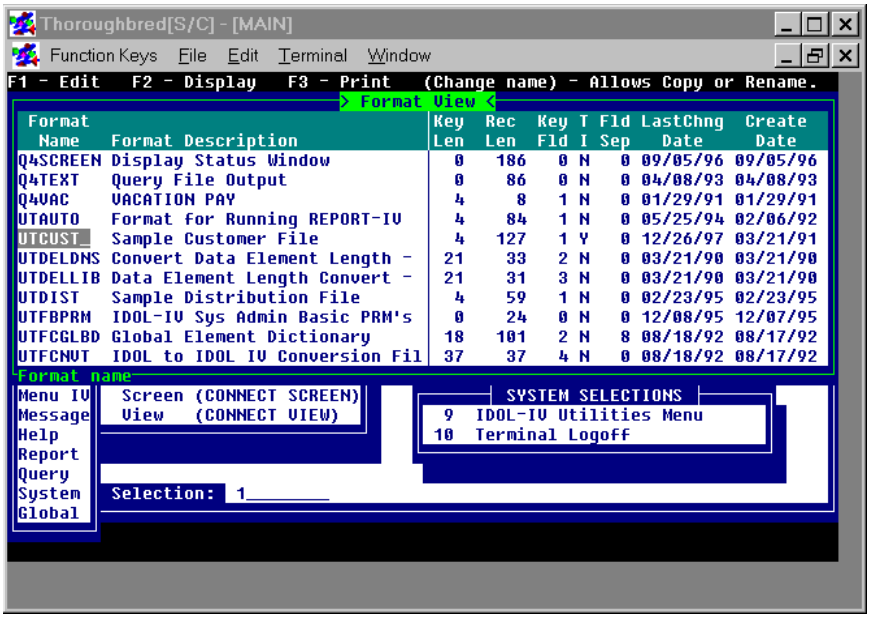
Type **1** and press the **Enter** key. The following pop-up menu will be displayed:



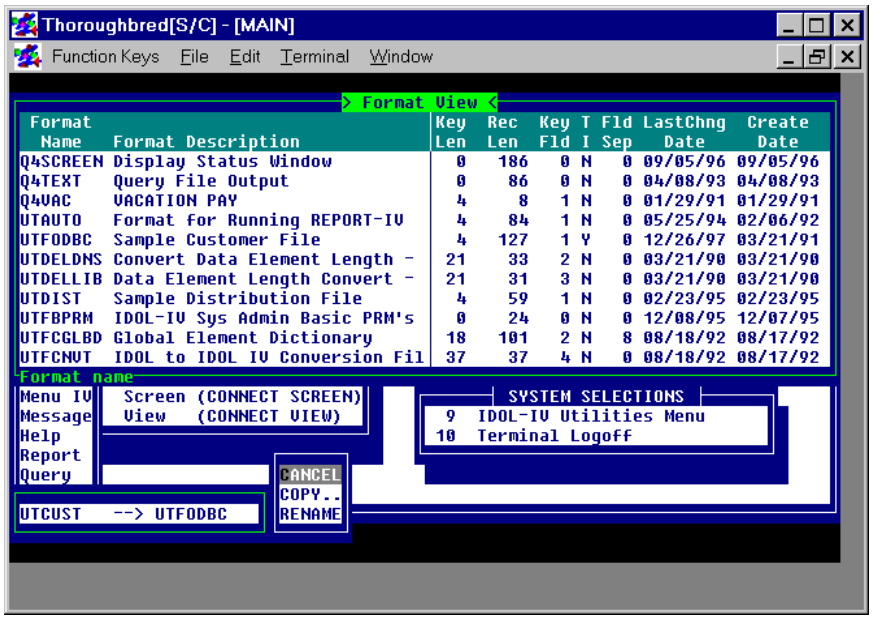
Select **Dictionary-IV**. The following pop-up menu will be displayed:



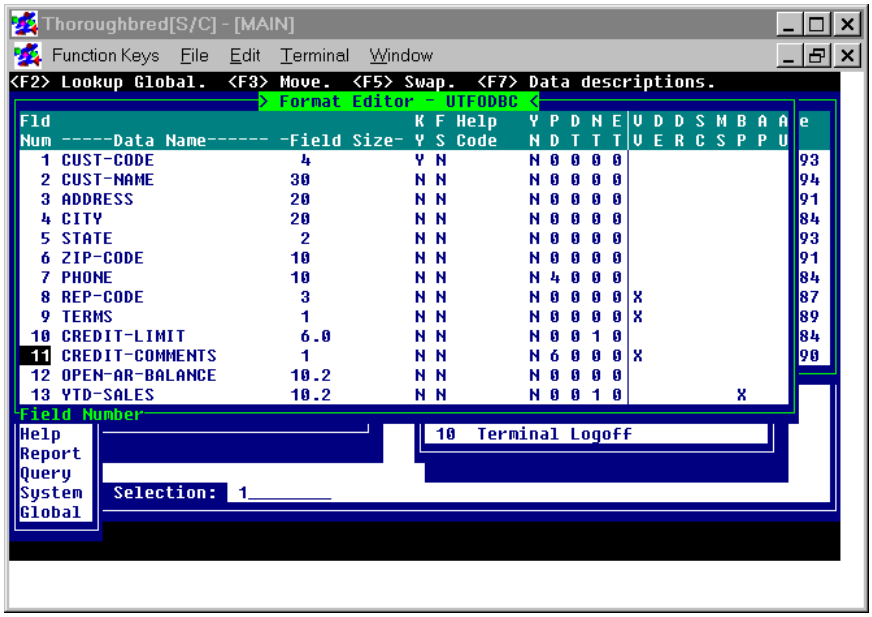
Select **Format**. A format view will be displayed:



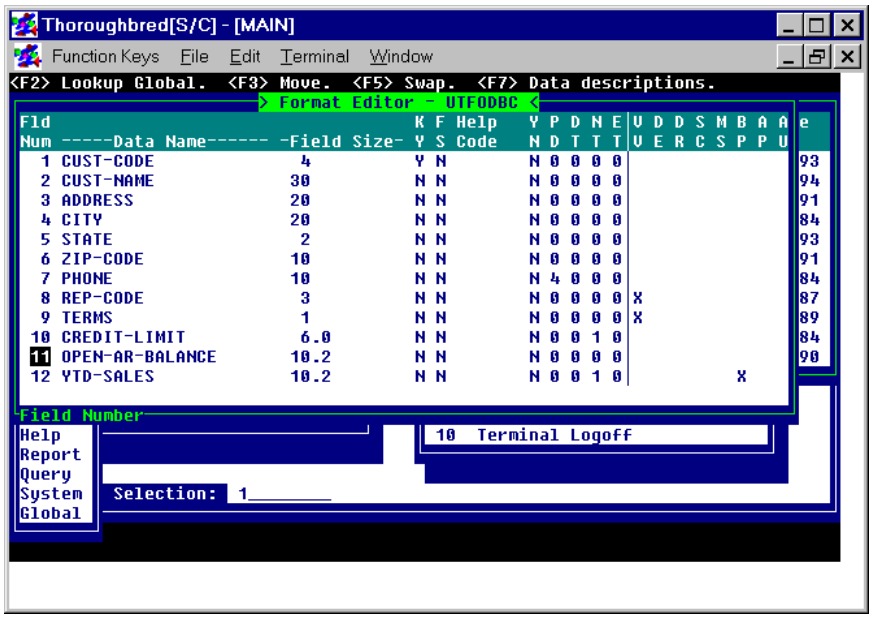
Go to the **UTCUST** format name. Overtype **UTCUST** with **UTFODBC**. Press the **Enter** key. The following pop-up menu will be displayed:



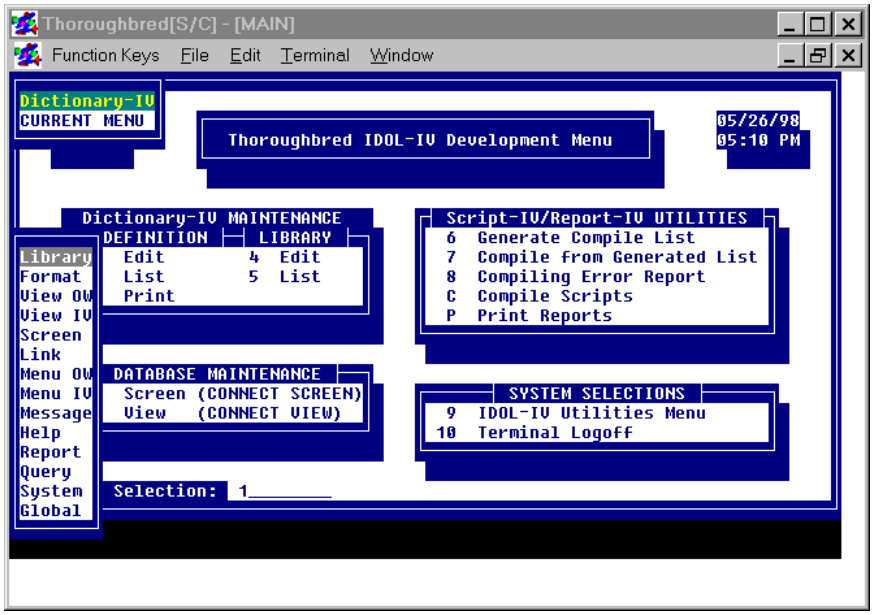
Select **COPY**. To edit the **UTFODBC** format, select **UTFODBC** and press the **F1** key:



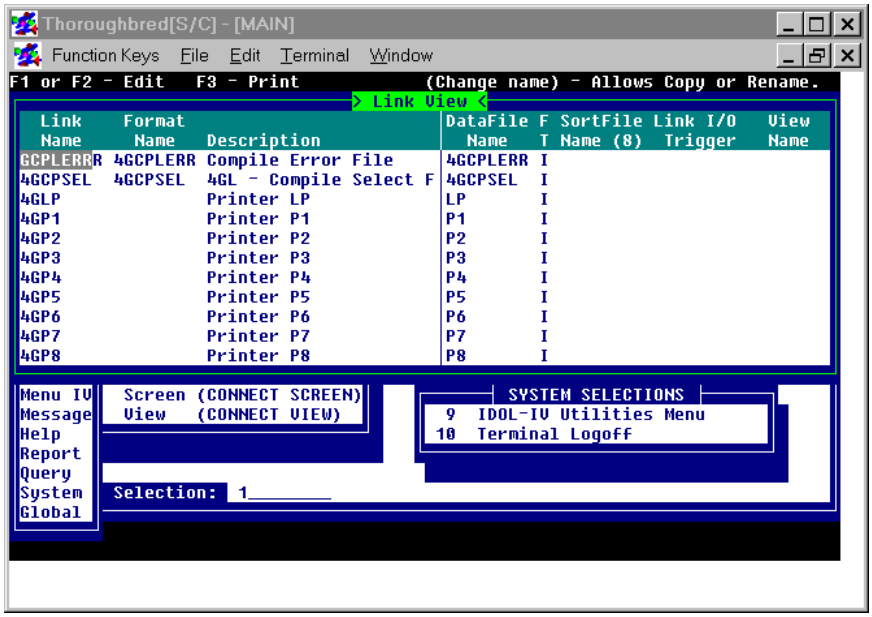
ODBC does not recognize text fields. Select **CREDIT-COMMENTS**. Press the **Line Delete** key to remove this data element:



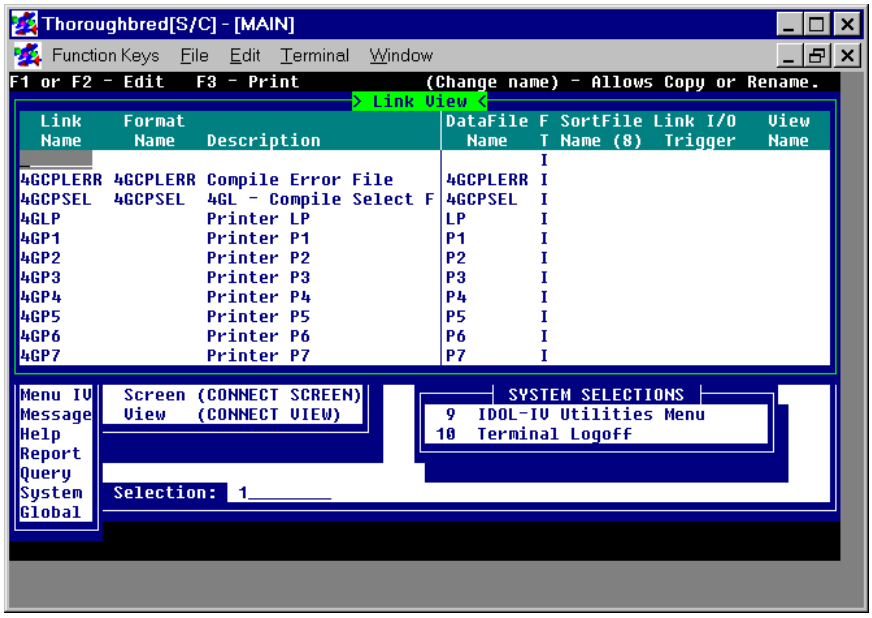
Press the **F4** key to save the format. Press the **F4** key to return to the Thoroughbred Dictionary-IV Development Menu:



Select **Link**. The following view will be displayed:



To add a new link, press the **Line Insert** key:



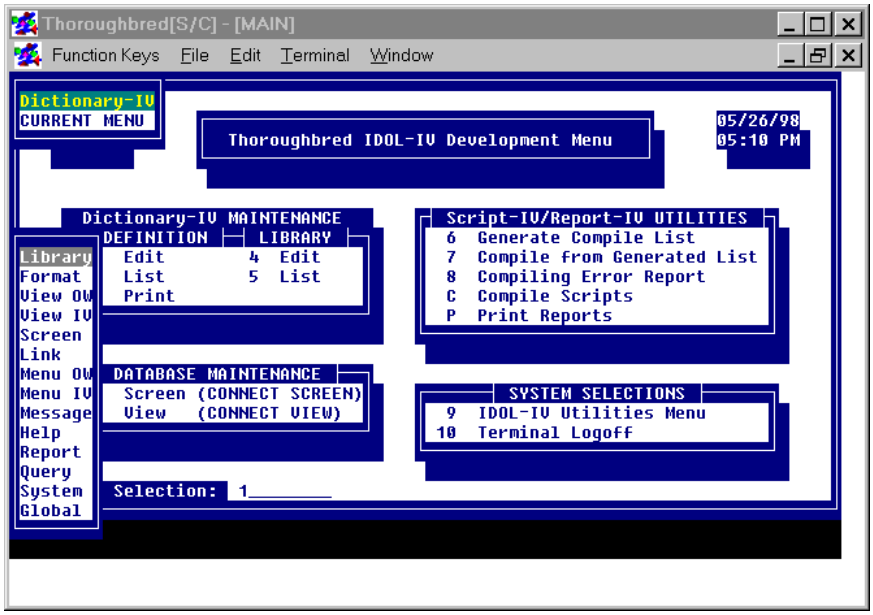
To specify the link, enter values in the following fields:

- In the **Link Name** field, type **UTLODBC** and press the **Enter** key.
- In the **Format Name** field, type **UTFODBC** and press the **Enter** key.
- In the **Description** field, type a description and press the **Enter** key.
- In the **F T** (File Type) field, type **M** and press the **Enter** key.

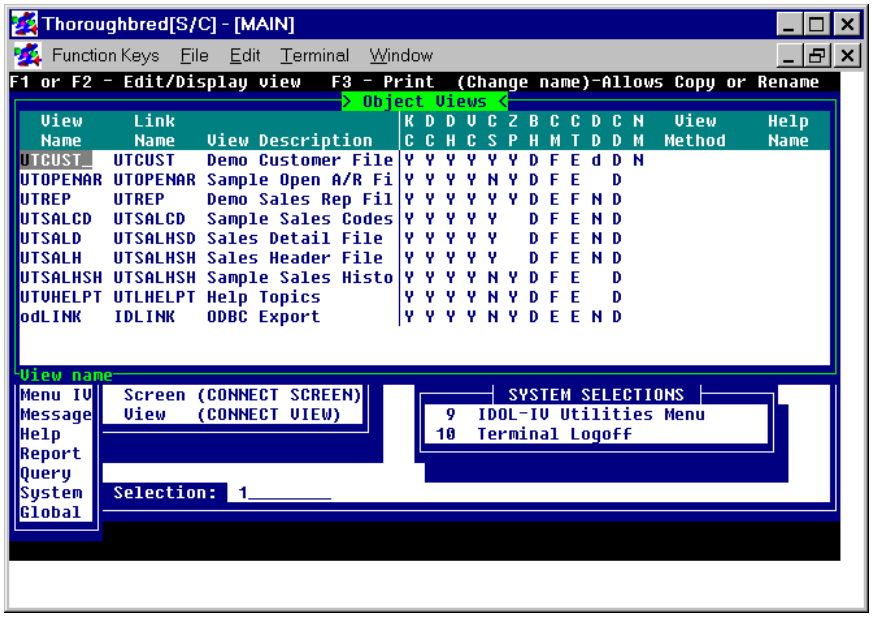
- Use the **Tab** key to move to the **Link Server Table Name** column. Because this view may be missing a field, press the **Insert** key. From the displayed pop-up menu, select **LINK-SERVER ID** to bring this field into the view. In this field, type **S1** and press the **Enter** key.

- In the **Link Server Table Name** field, type **Customers** and press the **Enter** key. This entry must match the name of the table specified to the ODBC-compliant database. In this case, a table will be created in Microsoft Access with the name **Customers**.

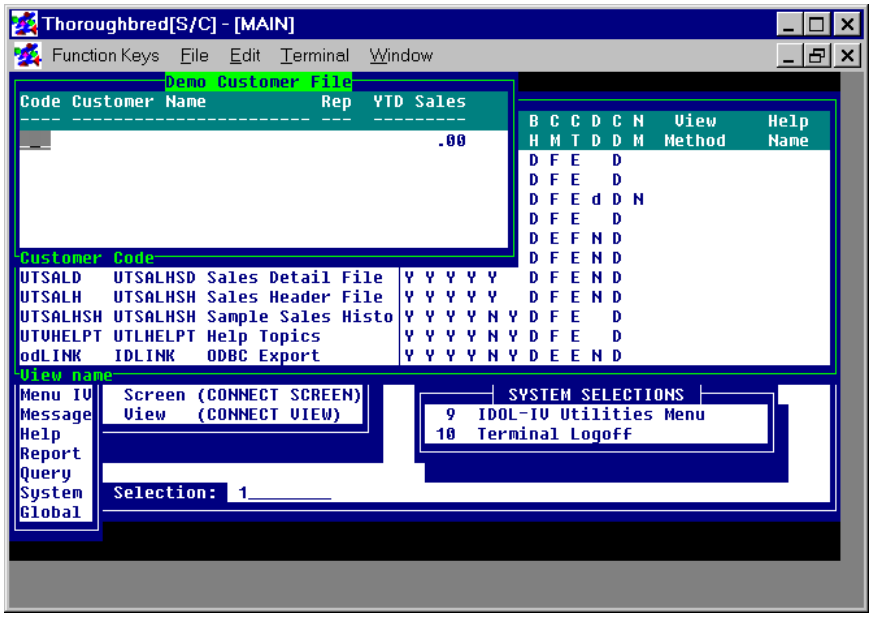
After entering these specifications, press the **F4** key to save the **UTLODBC** link. You will return to the Thoroughbred Dictionary-IV Development Menu:



Select **VIEW OW**. The current set of object views will be displayed:



Highlight the **UTCUST** view. To enter the view, press the **F1** key:



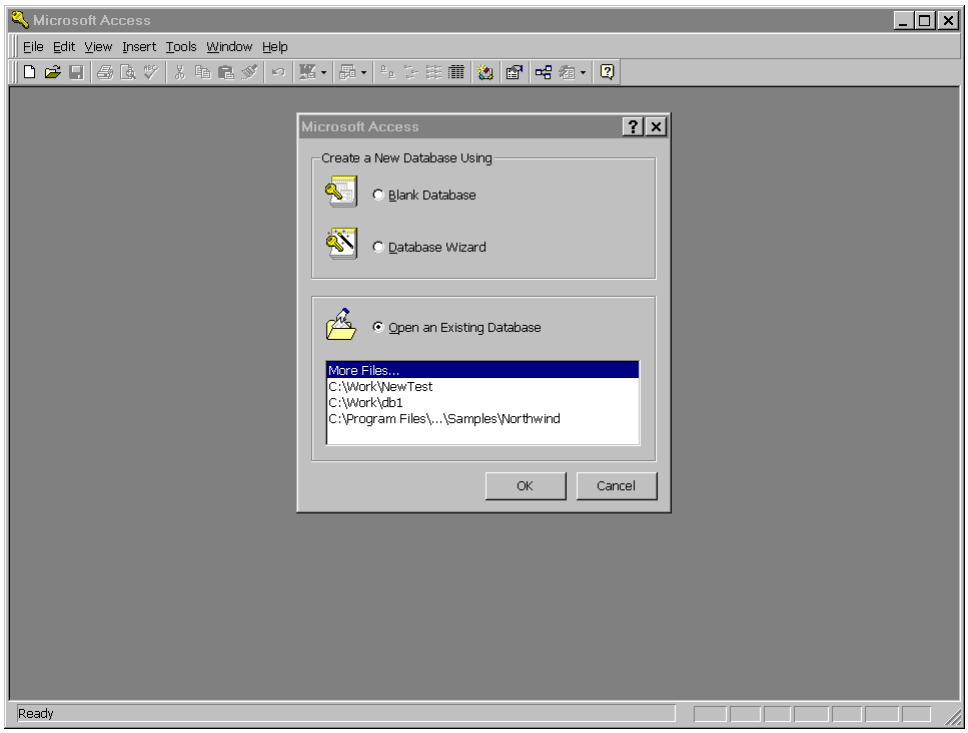
Press the **F8** key. From the displayed pop-up menu, select **COPY**, and copy everything to **UTLODBC**. When asked if you want to create the data source and accept the defaults, choose **Y**.

At this point, you can exit from Dictionary-IV.

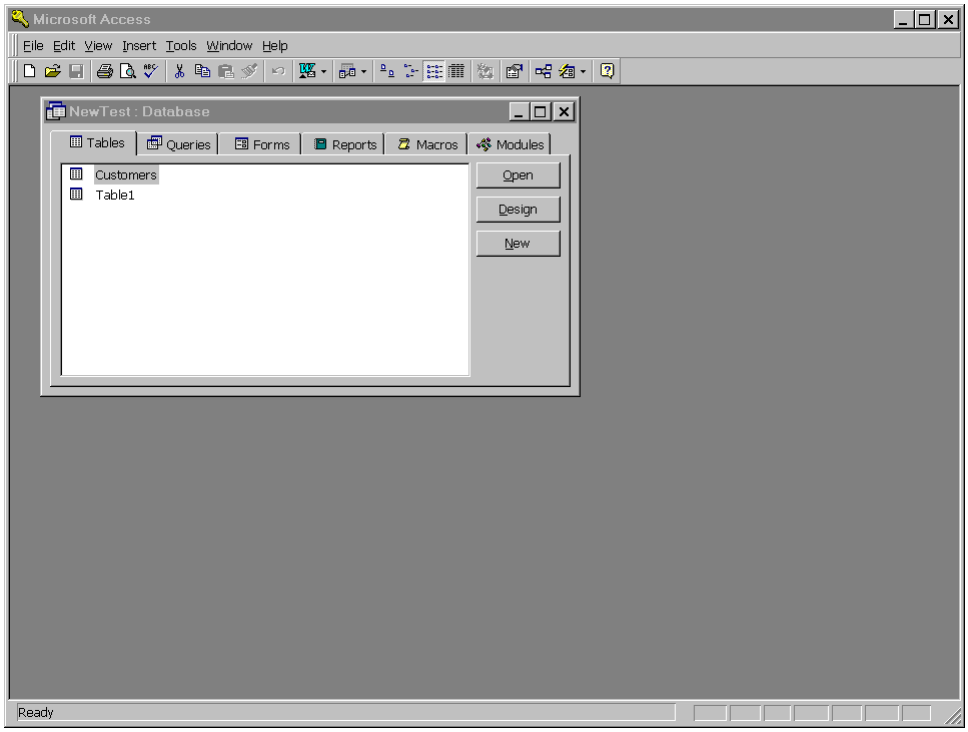
For more information on formats and links, please refer to Thoroughbred Dictionary-IV documentation. For more information on views, please refer to Thoroughbred OPENworkshop documentation.

Test the Connection between Thoroughbred and Microsoft Access

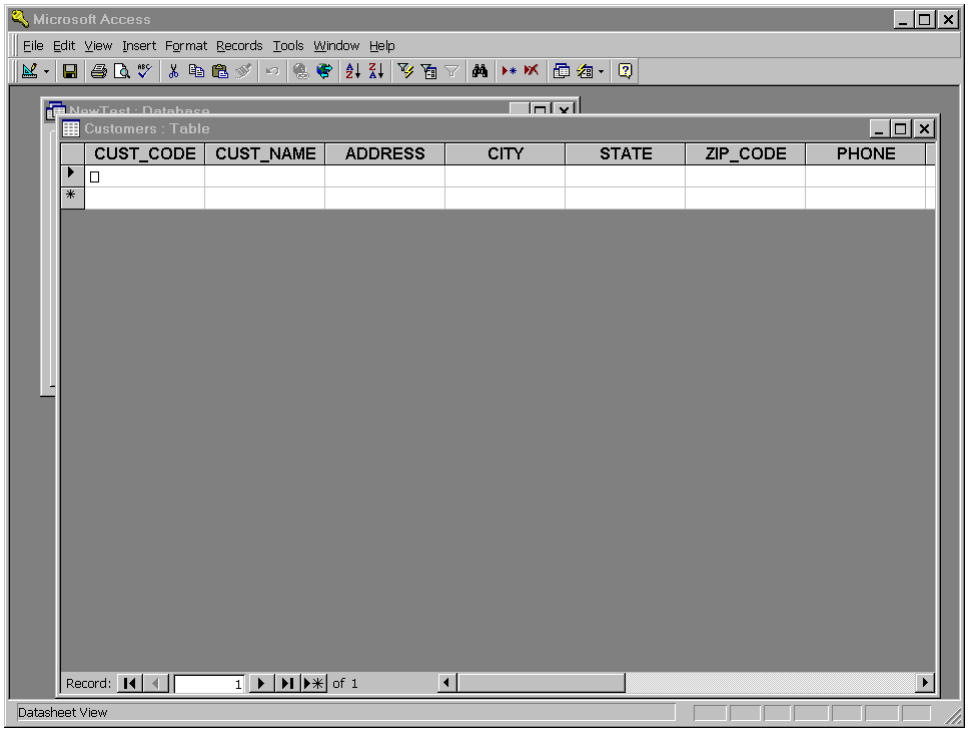
Start Microsoft Access. The following window will be displayed:



Select the **NewTest** database, which you created earlier. The following window will be displayed:



Select the **Customers** table. The following window will be displayed:



The **Customers** Microsoft Access table contains the same fields and specifications as the **UTFODBC** format. Any data in this database can be maintained by Microsoft Access or by Thoroughbred products.

For more information on programming issues that may arise when Thoroughbred Basic connects to ODBC-compliant databases, please refer to the relevant section in this supplement.

Programming Issues

After establishing a connection between Thoroughbred products and ODBC-compliant databases, some of the following programming issues may arise:

- To use Thoroughbred Basic directives to manage databases, please refer to the information in *Thoroughbred Basic Directives*.
- Under Microsoft Windows, the Thoroughbred Basic **File** menu contains an **ODBC** menu option. For more information on the options, please refer *ODBC Menu Options*.
- For more information on data sources, please refer to *Data Sources*.
- For more information on how some ODBC-compliant databases manage record locking, please refer to the information in *Record Locking*.

Thoroughbred Basic Directives

To access ODBC-compliant database tables, you must define links and formats under Dictionary-IV. Step 5 of the procedural example illustrates one way to accomplish these tasks.

If you plan to use Thoroughbred Basic to manage these database tables, some directives will require an argument to enable Dictionary-IV access. The **OPEN**, **ERASE**, **RENAME**, and **INITFILE** directives all provide the **OPT="LINK"** argument.

For example, you can create an ODBC database table with the following Thoroughbred Basic directive:

```
OPEN (channel, OPT="LINK|CREATE") "link-name"
```

For more information on the directives listed above, please refer to the Thoroughbred Basic Language Reference.

ODBC Menu Options

If an ODBC data source is specified in the **IPLINPUT.TXT** file, the Microsoft Windows Thoroughbred Basic menu bar **File** menu will contain an entry for **ODBC**. The **ODBC** menu options are:

Show ODBC Errors enables or disables an error dialog box, which displays errors returned from the ODBC driver manager.

Log ODBC Errors enables or disables error logging. When error logging is active, the **ODBCERR.LOG** file will include the name of the Thoroughbred Basic program, the line number, the ODBC error returned from the ODBC driver, and a description of the error.

Debug SQL enables or disables a dialog box that displays the SQL statement sent to the ODBC driver.

Data Sources

Thoroughbred products do not create data sources. Data sources must exist before Thoroughbred Basic attempts connection.

Data sources are not database tables. Your application can create new database tables within existing data sources.

Valid data source names can contain the letters **A** through **Z**, the letters **a** through **z**, and the digits **0** through **9**. Data source names are case-sensitive.

Record Locking

Not all ODBC-compliant databases support row-level locking. For these databases, advisory locking is used. When a **WRITE** directive updates a row, advisory locking compares the original record to the record on disk. If they are still the same, the **WRITE** directive works. If they are not the same, the **WRITE** directive returns a locking error. For databases that do not support row-level locking, you may need to test Busy (Error 0) on the **WRITE** directive rather than on the **EXTRACT** directive.

Linux Client Supplement

The TS ODBC DataServer provides access to Thoroughbred data from ODBC-enabled applications. This document will detail the components and installation steps for the TS ODBC DataServer client for Linux.

Client Platforms Supported

Linux kernel 2.4.20 and later -- verify with uname -a

unixODBC 2.2.8 and later -- verify with odbcinst -j

Server Platforms Supported

The server component software of TS ODBC DataServer is available on various UNIX platforms and Windows. Please call your Thoroughbred Sales Representative for a list of available servers.

Driver Files

The following files are included in the product:

libtfodbcst.so - Single-Tier Driver Library

libtfodbcsS.so - Single-Tier Setup Library

libtfodbccl.so - Multi-Tier Driver Library

libtfodbccS.so - Multi-Tier Setup Library

Installing/Upgrading the Linux Client Software

Load the Drivers

The driver files may be installed in any directory. The following examples assume they are installed in /usr/local/lib.

Move the downloaded product file into the /usr/local/lib directory.

cpio -ivBud < TSLNX

Build Entries in odbcinst.ini

Add a section to **odbcinst.ini** for each driver you want use. Locate the odbcinst.ini on your system by executing the odbcinst command (which is supplied as part of the unixODBC package) as follows:

odbcinst -j

The system will return information similar to the following:

unixODBC 2.2.10
DRIVERS.....: /etc/odbcinst.ini
SYSTEM DATA SOURCES: /etc/odbc.ini
USER DATA SOURCES..: /root/.odbc.ini

The **odbcinst.ini** file will be stored in the directory referenced by the 'DRIVERS' line.

The logical name for a driver is enclosed in brackets at the beginning of a section. This name will be used when defining Data Sources. Insert the following information into the odbcinst.ini file to add the Thoroughbred ODBC drivers to the system:

[TSODBCST]

Description= TS ODBC DataServer for unixODBC (Single-Tier)

Driver = /usr/local/lib/libtfodbcst.so

Setup = /usr/local/lib/libtfodbcsS.so

FileUsage = 1

[TSODBCCL]

Description= TS ODBC DataServer for unixODBC (Multi-Tier)

Driver = /usr/local/lib/libtfodbccl.so

Setup = /usr/local/lib/libtfodbccS.so

FileUsage = 1

Define Data Sources

You can define Data Sources manually by editing **odbc.ini**. Refer to the 'SYSTEM DATA SOURCES' line of the odbcinst command output for the **odbc.ini** file location on your system. The following is a sample Multi-Tier definition:

[SERVER]

Description= ODBC Test DataSource

Driver = TSODBCCL

HOST = your.server.com

UID = abc

In this example, SERVER is the name of the definition. It **must match** a name you created using the ODBC Expose Utility. This name is **case sensitive**.

The **Description** is a required keyword and should describe the Data Source.

The **Driver** keyword is also **required** and must match a driver that you have defined in odbcinst.ini.

The **HOST** keyword is **required** for **Multi-Tier** connections.

The following are **optional** keywords recognized by the TS ODBC drivers.

UID	A Dictionary-IV operator code may be stored for login.
PWD	The password associated with the listed UID.
HOST	A URL used to connect to a remote TS ODBC DataServer.
PORT	The port number to use for remote connections

Security

The drivers are not capable of presenting dialogs for such things as logins and passwords. If a Dictionary-IV operator code and password is required it must be provided in the **odbc.ini** file or by the ODBC client you are using. LINK passwords and Record Access passwords are not allowed in this version.

Additional Resources

Refer to the TS ODBC Reference Manual for details about the ODBC Expose Utility.

The ODBCConfig program, if available, is an X-Windows client useful for maintaining Data Source configurations. The setup library must have been installed for the program to work. The program's sole purpose is to display and edit the **odbc.ini** and **odbcinst.ini** files. It cannot handle the password and translation features of the TS ODBC drivers.

You can find more information about unixODBC at www.unixODBC.org