INTERSOLV® DataDirect® ODBC Driver

User Guide

for Informix Database Servers

INFORMIX-OnLine Dynamic Server, Version 7.2x
INFORMIX-OnLine Workgroup Server, Version 7.2x
INFORMIX-OnLine XPS, Version 8.1x
INFORMIX-SE, Version 7.2x
INFORMIX-Universal Server, Version 9.1x

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Introduction

Read this introduction for an overview of the information provided in this manual and for an understanding of the documentation conventions used.

About This Manual

This guide describes how to use INTERSOLV DataDirect ODBC Driver to access an Informix database and interact with an Informix database server.

Types of Users

This manual is for C programmers who are using INTERSOLV DataDirect ODBC Driver to access Informix relational databases. This manual assumes that you know C programming and are familiar with the structure of relational databases.

If you have limited experience with relational databases, SQL, or your operating system, see the *Getting Started* manual for your database server for a list of supplementary manuals.

Software Dependencies

This manual assumes that you are using INTERSOLV DataDirect ODBC Driver, Version 3.01, on either a Windows NT, Windows 95, or UNIX platform. In addition, you must use one of the following Informix database servers:

- INFORMIX-OnLine Dynamic Server, Version 7.2x
- INFORMIX-OnLine Workgroup Server, Version 7.2x
- INFORMIX-OnLine XPS, Version 8.1x
- INFORMIX-SE, Version 7.2x
- INFORMIX-Universal Server, Version 9.1x

Demonstration Database

The DB-Access utility, which is provided with your Informix database server products, includes a script to build a demonstration database called **stores7** that contains information about a fictitious wholesale sporting-goods distributor. Sample command files are also included. Some database server software allows you to build other demonstration databases as well.

Many examples in Informix manuals are based on the **stores7** demonstration database. For more information about installing **stores7**, see the *DB-Access User Manual* for your database server.

Documentation Conventions

This section describes the following conventions:

- Typographical conventions
- Icon conventions
- Screen-illustration conventions

Typographical Conventions

This manual uses the following standard set of conventions to introduce new terms, illustrate screen displays, describe command syntax, and so forth.

Convention	Meaning
KEYWORD	All keywords appear in uppercase letters in a serif font.
italics	Within text, new terms and emphasized words appear in italics. Within syntax diagrams, values that you are to specify appear in italics.
boldface	Identifiers (names of classes, objects, constants, events, functions, program variables, forms, labels, and reports), environment variables, database names, filenames, table names, column names, icons, menu items, command names, and other similar terms appear in boldface.
`monospace`	Information that the product displays and information that you enter appear in a monospace typeface.
KEYSTROKE	Keys that you are to press appear in uppercase letters in a sans serif font.
♦	This symbol indicates the end of feature-, product-, platform-, or compliance-specific information.
→	This symbol indicates a menu item. For example, "Choose **Tools→Options**" means choose the **Options** item from the **Tools** menu.

Tip: *When you are instructed to "enter" characters or to "execute" a command, immediately press* RETURN *after the entry. When you are instructed to "type" the text or to "press" other keys, no* RETURN *is required.*

Icon Conventions

Throughout the documentation, you will find text that is identified by several different types of icons. This section describes these icons.

Comment Icons

Comment icons identify warnings, important notes, or tips. This information is always displayed in italics.

Icon	Description
	The *warning* icon identifies vital instructions, cautions, or critical information.
	The *important* icon identifies significant information about the feature or operation that is being described.
	The *tip* icon identifies additional details or shortcuts for the functionality that is being described.

Feature, Product, and Platform Icons

Feature, product, and platform icons identify paragraphs that contain feature-, product-, or platform-specific information.

Icon	Description
GLS	Identifies information that is specific to the Informix Global Language Support (GLS) feature.
IUS	Identifies information that is specific to INFORMIX-Universal Server.
ODS	Identifies information that is specific to INFORMIX-OnLine Dynamic Server.
OWS	Identifies information that is specific to INFORMIX-OnLine Workgroup Server.
SE	Identifies information that is specific to INFORMIX-SE.
UNIX	Identifies information that is specific to the UNIX operating system.
WIN NT	Identifies information that is specific to the Windows NT environment.
WIN 95	Identifies information that is specific to the Windows 95 environment.
WIN NT/95	Identifies information that is specific to both Windows NT and Windows 95 environments.
XPS	Identifies information that is specific to INFORMIX-OnLine XPS.

These icons can apply to a row in a table, one or more paragraphs, or an entire section. A ♦ symbol indicates the end of the feature-, product-, or platform-specific information.

WIN NT/95

Screen-Illustration Conventions

The illustrations in this manual represent a generic rendition of various windowing environments. The details of dialog boxes, controls, and windows were deleted or redesigned to provide this generic look. Therefore, the illustrations in this manual depict the graphical interface of your product a little differently than the way it appears on your screen.♦

Additional Documentation

For additional information, you might want to refer to the following types of documentation:

- On-line manuals
- Printed manuals
- Error message files
- Documentation notes and release notes
- Related reading

On-Line Manuals

An Answers OnLine CD that contains Informix manuals in electronic format is provided with your Informix products. You can install the documentation or access it directly from the CD. For information about how to install, read, and print on-line manuals, see the installation insert that accompanies Answers OnLine.

Printed Manuals

To order printed manuals, call 1-800-331-1763 or send email to moreinfo@informix.com. When you place an order, please provide the following information:

- The documentation that you need
- The quantity that you need
- Your name, address, and telephone number

Error Message Files

Informix software products provide ASCII files that contain all of the Informix error messages and their corrective actions. The **finderr** utility displays these error messages on the screen. See the Introduction to the *Informix Error Messages* manual for a detailed description of these error messages.

UNIX

To read the error messages in the ASCII file, Informix provides scripts that let you display error messages on the screen (**finderr**) or print formatted error messages (**rofferr**). For a detailed description of these scripts, see the Introduction to the *Informix Error Messages* manual.♦

WIN NT/95

Informix Find Error is a graphical tool. This utility has been created with Microsoft help facilities. For more information, see the Introduction to the *Informix Error Messages* manual.♦

Documentation Notes and Release Notes

In addition to printed documentation, the following on-line files supplement the information in this manual. For UNIX, these files are located in the **$INFORMIXDIR/release/en_us/0333** directory. For Windows, these files are located in the **$INFORMIXDIR\release\en_us\04e4** directory.

On-Line File	Purpose
ODBCDOC_3.0	The documentation-notes file describes features that are not covered in this manual or that have been modified since publication. For Windows, click the **Documentation Notes** icon.
CLIENTS_2.0	The **CLIENTS_2.0** file lists the release-notes files for the 2.0 Client SDK. These release-notes files describe feature differences from earlier versions of Informix products and how these differences might affect current products. These files also contain information about any known problems and their workarounds. For Windows, click the **Release Notes** icon.

Please examine these files because they contain vital information about application and performance issues.

Compliance with Industry Standards

INTERSOLV DataDirect ODBC Driver is based on Version 3.0 of the Microsoft Open Database Connectivity specification, which in turn is based on the X/Open Group SQL Access Call-Level Interface (CLI) specification. The ODBC and CLI specifications provide a common and open interface through which ANSI-compliant SQL is passed.

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Chapter

1

Getting Started

This chapter contains the following sections:

- About INTERSOLV DataDirect ODBC Driver 3.01
- Environment-specific information
- Error messages

About INTERSOLV DataDirect ODBC Driver 3.01

INTERSOLV DataDirect ODBC Driver is compliant with Version 3.0 of the Open Database Connectivity (ODBC) specification. ODBC is a specification for an application programming interface (API) that enables applications to access multiple database management systems with Structured Query Language (SQL).

ODBC permits maximum interoperability where a single application can access many different database management systems. This compliance enables an ODBC developer to develop, compile, and ship an application without targeting a specific type of data source. Users can then add INTERSOLV DataDirect ODBC Driver, which links the application to an Informix database server.

Support for Multiple Environments

INTERSOLV provides the ODBC-compliant INTERSOLV DataDirect ODBC Driver on the Windows 95, Windows NT, and UNIX platforms.

For current driver information, see the **CLIENTS_2.0** file that is shipped with this release.

"Environment-Specific Information" explains the environment-specific differences that you should be aware of when you use INTERSOLV DataDirect ODBC Driver in your operating environment.

Installing the INTERSOLV DataDirect ODBC Driver

The Setup program installs INTERSOLV DataDirect ODBC Driver. For instructions on how to run the Setup program, see the *Informix Client Products Installation Guide* for your operating system.

Environment-Specific Information

The following sections contain information specific to your operating environment, such as filenames and system requirements. Information is provided for Windows 95, Windows NT, and UNIX systems.

WIN NT/95

For Windows 95 and Windows NT Users

On Windows 95 and Windows NT systems, INTERSOLV DataDirect ODBC Driver is a 32-bit driver. All required network software that your database system vendors supply must be 32-bit compliant. For a list of specific requirements, see "System Requirements for Windows 95 and Windows NT" on page 2-3.

Starting the ODBC Administrator

"Configuring Data Sources" on page 2-5 instructs you to start the ODBC Administrator. To start the ODBC Administrator under Windows 95 or Windows NT, double-click the ODBC icon in the Windows 95 or Windows NT Control Panel.

Driver Name

The INTERSOLV DataDirect ODBC Driver filenames on Windows 95 and Windows NT is **IVINF12.DLL**.

Disk Space and Memory Requirements

Disk space requirements are 15 megabytes of free disk space on the disk drive where Windows 95 or Windows NT is installed.

Memory requirements are at least 16 megabytes of memory on Windows 95 and at least 24 megabytes of memory on Windows NT.♦

UNIX

For UNIX Users

For specific requirements, see "System Requirements for Windows 95 and Windows NT" on page 2-3.

.odbc.ini

In the UNIX environment, no ODBC Administrator exists. To configure a data source, you must edit the **.odbc.ini** file, a plain text file that is normally located in the user's **$HOME** directory. Use any text editor to define data-source entries in this file, as described in "Using a Connection String to Connect to a Data Source" on page 2-11. A sample file (**odbc.ini**) is located in the driver installation directory.

Driver Name

INTERSOLV DataDirect ODBC Driver is an ODBC API-compliant dynamic link library, referred to in UNIX as a *shared object*. On UNIX, the INTERSOLV DataDirect ODBC Driver filename is **ivinf12.so**.

Setting the Library Path Environment Variable

You must include the full path to the dynamic link libraries in the environment variable **LD_LIBRARY_PATH** (on Solaris), **LIBPATH** (on AIX), and **SHLIB_PATH** (on **HP-UX**). For example, if you install INTERSOLV DataDirect ODBC Driver in the system directory **/opt/odbc**, the fully qualified path for the ODBC Pack is **/opt/odbc/lib**. During installation, a shell startup script is created and stored in the ODBC directory. This shell script sets up the ODBC environment for you.

For C shell users, the shell startup script is called **.odbc.csh**. This script can be sourced from a user's own **.login** script. For example:

```
source /opt/odbc/odbc.csh
```

For Bourne or Korn shell users, the shell startup script is called **.odbc.sh**. This script can also be sourced from a user's own **.profile** script. For example:

```
. /opt/odbc/odbc.sh
```

If you do not include the path **/opt/odbc** in the environment variable **LD_LIBRARY_PATH** (on Solaris), **LIBPATH** (on AIX), and **SHLIB_PATH** (on HP-UX), your applications are unable to load INTERSOLV DataDirect ODBC Driver dynamically at runtime.

Disk Space and Memory Requirements

Disk space requirements are 25 megabytes of free disk space on the disk where the UNIX system is installed.

Memory requirements are at least 16 megabytes of memory.♦

Error Messages

Error messages can come from:

- an ODBC driver.
- the Informix database server.
- the ODBC driver manager.

An error reported on an ODBC driver has the following format:

```
[vendor] [ODBC_component] message
```

The *ODBC_component* is the component in which the error occurred. For example, an error message from the INTERSOLV SQL server driver would look like this:

```
[INTERSOLV] [ODBC SQL Server driver] Invalid precision
specified.
```

If you get this type of error, check the last ODBC call that your application made for possible problems or contact your ODBC application vendor.

An error that occurs in the data source includes the data-source name, in the following format:

```
[vendor] [ODBC_component] [data_source] message
```

With this type of message, the *ODBC_component* is the component that received the error from the data source indicated. For example, you might get the following message from an Informix data source:

```
[INTERSOLV] [ODBC Informix driver] [Informix] -0919:
specified length too long for CHAR column
```

If you get this type of error, you did something incorrectly with the database server. For more information about this type of error, refer to the *Informix Error Messages* manual or consult your database administrator.

The driver manager is a DLL that establishes connections with INTERSOLV DataDirect ODBC Driver, submits requests to INTERSOLV DataDirect ODBC Driver, and returns results to applications. An error that occurs in the driver manager has the following format:

```
[Informix] [ODBC XXX] message
```

For example, an error from the INTERSOLV DataDirect ODBC Driver manager might look like this:

```
[Informix] [ODBC Driver Manager] Driver does not support this
function
```

For more information about this type of error, refer to the *Informix Error Messages* manual or use the **finderr** utility for information about a specific error.

UNIX

UNIX error handling is performed according to the X/Open XPG3 messaging catalog system. Localized error messages are stored in the subdirectory **locale/*localized_territory_directory*/LC_MESSAGES**, where ***localized_territory_directory*** depends on your language.

For instance, German localization files are stored in **locale/de/LC_MESSAGES,** where **de** is the locale for German.

If localized error messages are not available for your locale, then the error messages will contain message numbers instead of text. For example:

```
[INTERSOLV] [ODBC 20101 driver] 30040
```

♦

Chapter

2

INTERSOLV DataDirect ODBC Driver Configuration and Reference

This chapter contains the following sections:

- System requirements
- Configuring data sources
- Using a Logon dialog box to connect to a data source
- Using a connection string to connect to a data source
- Data types
- Isolation and lock levels supported
- ODBC conformance level
- ODBC API and scalar functions

INTERSOLV DataDirect ODBC Driver supports multiple connections to Informix database servers Versions 5.x, 6.x, 7.x or 9.x in the Windows 95, Windows NT, and UNIX environments.

WIN NT/95

System Requirements for Windows 95 and Windows NT

To access remote Informix databases, you need to install INFORMIX-Connect for Windows 95 and Windows NT.

Tip: *INTERSOLV DataDirect ODBC Driver for Windows 95 and Windows NT does not work with versions of INFORMIX-Connect earlier than Version 7.2.*

Use the **SETNET32.EXE** utility supplied with INFORMIX-Connect to define database servers and the location of the INFORMIX directory. Use **ILOGIN.EXE** to test your connection to the Informix database server.

The INFORMIX-Connect package includes **ISQLT0*n#*.DLL** where *n#* is the specific release number and version. The path to this DLL must be in your PATH environment variable. If it is not and you attempt to configure a data source, a message similar to the following one appears:

```
The setup routines for the INTERSOLV 3.00 32-BIT ODBC driver
could not be loaded due to system error code 126.
```

When you click **OK**, the following message appears:

```
Could not load the setup or translator library.
```

UNIX

System Requirements for UNIX

You must set the environment variable **INFORMIXDIR** to the directory where you have installed the Informix client.

For example, the following syntax is valid for C-shell users:

```
setenv INFORMIXDIR /databases/informix
```

For Bourne- or Korn-shell users, the following syntax is valid:

```
INFORMIXDIR=/databases/informix;export INFORMIXDIR
```

In addition, you must set the **INFORMIXSERVER** variable to the name of the Informix database server (as defined in your **$INFORMIXDIR/ext/sqlhosts** file). For further details, refer to the *Administrator's Guide* or the *Installation Guide* for your database server. ♦

Configuring Data Sources

UNIX

The UNIX environment does not have an ODBC Administrator. To configure a data source in the UNIX environment, you must edit the **.odbc.ini** file with the attributes in Figure 2-6 on page 2-12. ♦

WIN NT/95

To configure an Informix data source

1. Start the ODBC Administrator to display a list of data sources.
2. If you are configuring an existing data source, select the data-source name and click **Configure** to display the ODBC INFORMIX Driver Setup dialog box.

   If you are configuring a new data source, click **Add** to display a list of installed drivers. Select INTERSOLV DataDirect ODBC Driver and click **Finish** to display the ODBC INFORMIX Driver Setup dialog box. Figure 2-1 shows the **General** page of the ODBC INFORMIX Driver Setup dialog box.

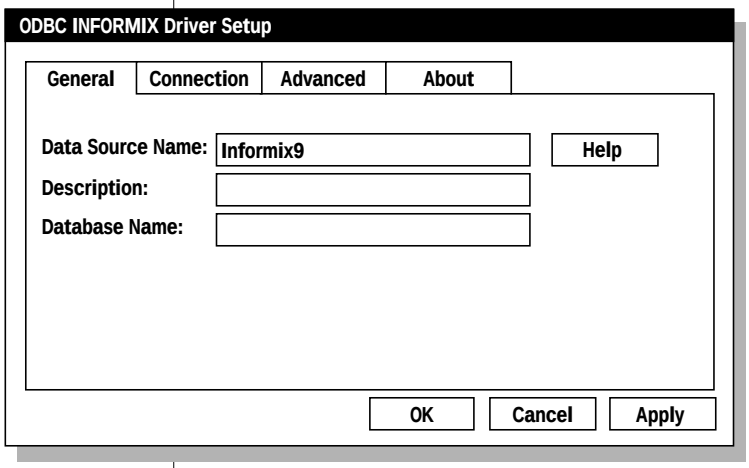

Figure 2-1
General Page of the ODBC INFORMIX Driver Setup Dialog Box

3. Specify values as follows, then click **Apply**:
   - **Data Source Name.** A string that identifies this data-source configuration in the system information. Examples include **Accounting** or **Serv1**.
   - **Description.** An optional long description of a data-source name. For example, **My Accounting Database** or **Files on Server number 1**.
   - **Database Name.** The name of the database to which you want to connect by default.
4. Click the **Connection** tab to configure additional, optional settings for the data source. Figure 2-2 shows the **Connection** page of the ODBC INFORMIX Driver Setup dialog box.

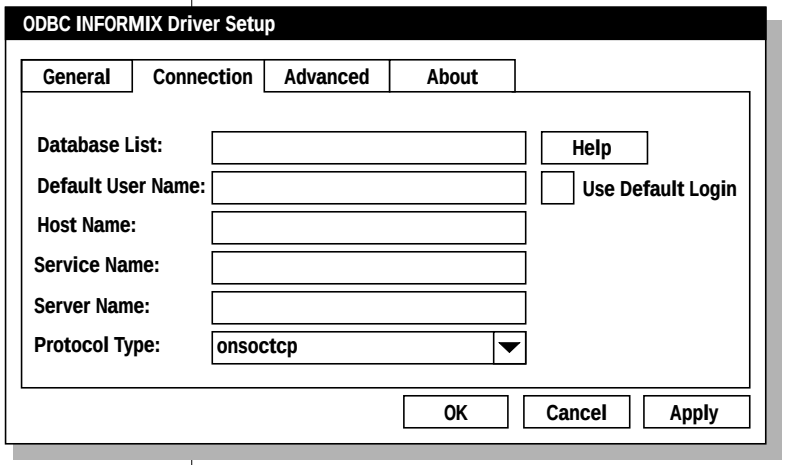

Figure 2-2
Connection Page of the ODBC INFORMIX Driver Setup Dialog Box

5. Specify values as follows, then click **Apply**:

   - **Database List.** The list of databases that is displayed in the logon dialog box if **Get DB List From Informix** is set to `0`. If **Get DB List From Informix** is set to `1`, the list of databases that is displayed in the logon dialog box is created from the database list returned from the Informix database server.
   - **Default User Name.** The name of the user as specified on the Informix database server.
   - **Use Default Login.** Select this check box to read the Logon ID and Password entries directly from the registry. The check box is cleared by default; that is, logon information is read from the system information, the connection string, or the Logon to INFORMIX dialog box.
   - **Host Name.** The name of the computer on which the database server resides.
   - **Service Name.** The name of the service as it appears on the host computer. The system administrator assigns this service. The name that you specify is displayed in the INFORMIX Server Options dialog box.
   - **Server Name.** The name of the database server as it appears in the **sqlhosts** file.
   - **Protocol Type.** The protocol used to communicate with the database server. Specify one or more values; separate the names with commas. Values can be `olsocspx`, `olsoctcp`, `onsocspx`, `onsoctcp`, `seipcpip`, `sesocspx`, and/or `sesoctcp`.

6. Click the **Advanced** tab to configure additional, optional settings for the data source. Figure 2-3 shows the **Advanced** page of the ODBC INFORMIX Driver Setup dialog box.

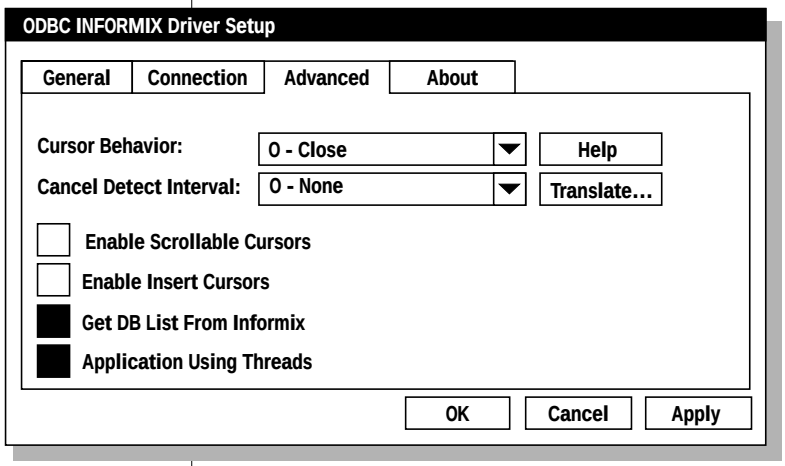

Figure 2-3
Advanced Page of the ODBC INFORMIX Driver Setup Dialog Box

7. Specify values as follows, then click **Apply**:
   - **Cursor Behavior.** Holds cursor at the current position when the transaction ends if you select **Preserve**. Otherwise, leave this set to database operations.
   - **Cancel Detect Interval.** Lets you cancel long-running queries in threaded applications. Select a value to determine how often INTERSOLV DataDirect ODBC Driver checks whether a request has been canceled by **SQLCancel.** For example, if **CDI**=5, then for every pending request, INTERSOLV DataDirect ODBC Driver checks every five seconds to see whether the user has canceled execution of the query with **SQLCancel**. The default is **0 - None**, which means that requests will not be canceled until the request has completed execution.
   - **Enable Scrollable Cursors.** Determines whether INTERSOLV DataDirect ODBC Driver provides scrollable cursors. The check box is cleared by default (no use of scrollable cursors). INTERSOLV DataDirect ODBC Driver can use scrollable cursors only if no long columns are (**SQL_LONGVARCHAR** or **SQL_LONGVARBINARY**) in a **Select** list. If you select this check box, you must not include long columns in the **Select** list.

- **Enable Insert Cursors.** Determines whether INTERSOLV DataDirect ODBC Driver can use **Insert** cursors during parameterized inserts. **Insert** cursors improve performance during multiple insert operations with the same statement. This option enables insert data to be buffered in memory before it is written to disk. When this check box is cleared (the default), INTERSOLV DataDirect ODBC Driver does not use **Insert** cursors.
- **Get DB List From Informix.** Determines whether INTERSOLV DataDirect ODBC Driver requests the database list to be returned from the Informix database server or from the database list that the user entered at driver setup.
- When the check box is selected, which is the default setting, INTERSOLV DataDirect ODBC Driver requests the database list from the Informix database server. When the check box is cleared, INTERSOLV DataDirect ODBC Driver uses the list that the user entered at driver setup.
- **Application Using Threads.** A setting that ensures that INTERSOLV DataDirect ODBC Driver works with multithreaded applications. You can clear this check box when you use INTERSOLV DataDirect ODBC Driver with single-threaded applications. Clearing this check box avoids the additional processing required for ODBC thread-safety standards.

8. Click **Translate** to display the Select Translator dialog box, which lists the translators specified in the ODBC Translators section of the system information.

   INTERSOLV provides a translator named INTERSOLV OEM ANSI that translates your data from the IBM PC character set to the ANSI character set.

9. Select a translator, then click **OK** to close this dialog box and perform the translation. Click **Apply** in the ODBC INFORMIX Driver Setup dialog box to save the translation setting.

10. Click **OK** or **Cancel**.

    If you click **OK**, the values that you specified become the defaults when you connect to the data source. You can change these defaults with this procedure to reconfigure your data source. To override these defaults, you can connect to the data source with a connection string that has alternative values. ♦

Using a Logon Dialog Box to Connect to a Data Source

Some ODBC applications display a Logon dialog box when you connect to a data source. In these cases, the data-source name is already specified. Figure 2-4 shows the Logon to INFORMIX dialog box.

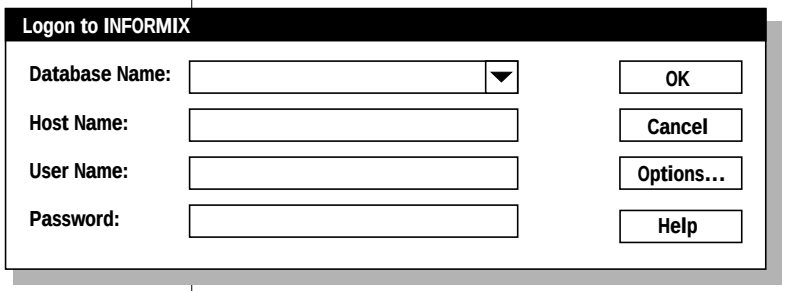

Figure 2-4
Logon to INFORMIX Dialog Box

To connect to a data source

1. Type the name of the database that you want to access or select the name from the **Database Name** list box.

   This list box displays the names that you specified in the Setup dialog box if, during setup, you specified a value of 0 for the connection option **Get DB List From Informix**. Otherwise, the names displayed in this list box are returned from the Informix database server.

2. Type the name of the computer (host name) on which the Informix database server is installed.
3. If required, type your user name as specified on the Informix database server.
4. If required, type your password.

WIN NT/95

5. You can click **Options** to display the INFORMIX Server Options dialog box, where you can change the Service Name, Server Name, and Protocol Type that you specified in the ODBC INFORMIX Driver Setup dialog box. Click **OK** to save your changes. Figure 2-5 shows the INFORMIX Server Options dialog box. ♦

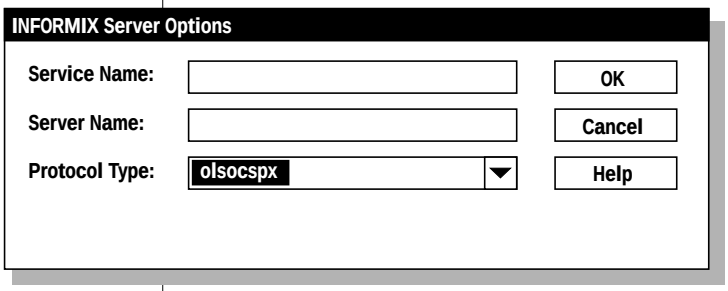

Figure 2-5
INFORMIX Server Options Dialog Box

6. Click **OK** to complete the logon and to update these values in the system information.

Using a Connection String to Connect to a Data Source

If your application requires a connection string to connect to a data source, you must specify the data-source name that tells INTERSOLV DataDirect ODBC Driver which section in the system information to use for the default connection information. Optionally, you can specify *attribute=value* pairs in the connection string to override the default values stored in the system information. These values are not written to the system information.

You can specify either long or short names in the connection string. The connection string has the following form:

```
DSN=data_source_name[;attribute=value
[;attribute=value]...]
```

An example of a connection string is:

```
DSN=INFORMIX TABLES;DB=PAYROLL
```

Figure 2-6 gives the long and short names for each attribute, as well as a description.

UNIX

To configure a data source in the UNIX environment, you must edit the **.odbc.ini** file. This file accepts only long names for attributes. ♦

The defaults listed in the table are initial defaults that apply when no value is specified in either the connection string or in the data-source definition in the system information. If you specified a value for the attribute when you configured the data source, that value is your default.

Figure 2-6
Informix Connection String Attributes

Attribute	Description
DataSourceName (DSN)	A string that identifies an Informix data-source configuration in the system information. Examples include **Accounting** or **Serv1**.
Database (DB)	The name of the database to which you want to connect.
HostName (HOST)	The name of the computer on which the database server resides.
UseDefaultLogin (UDL)	UseDefaultLogin={0 | 1}. Specify 1 to read the Logon ID and Password directly from the registry. The default is 0; that is, logon information is read from the system information, the connection string, or the Logon to INFORMIX dialog box.
LogonID (UID)	Your user name as specified on the Informix database server.
Password (PWD)	A password.
Service (SERV)	The name of the service as it appears on the host computer. The system administrator assigns this service.
ServerName (SRVR)	The name of the computer running the Informix database server.
Protocol (PRO)	Protocol={olsocspx | olsoctcp | onsocspx | onsoctcp | seipcpip | sesocspx | sesoctcp}. The protocol used to communicate with the database server. You can specify one or more values; separate the names with commas. ♦

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Attribute	Description
CursorBehavior (CB)	CursorBehavior={0 | 1}. This attribute determines whether cursors will be preserved or closed at the end of each transaction. The initial default is 0 (close). Set this attribute to 1 if you want cursors to be held at the current position when the transaction ends. The value CursorBehavior=1 might impact the performance of your database operations.
EnableScrollable Cursors (ESC)	EnableScrollableCursors={0 | 1}. This attribute determines whether INTERSOLV DataDirect ODBC Driver provides scrollable cursors. The initial default value is 0 (no use of scrollable cursors). INTERSOLV DataDirect ODBC Driver can use scrollable cursors only if no long columns (SQL_LONGVARCHAR or SQL_LONGVARBINARY) are in a Select list. If you set this option to use scrollable cursors (EnableScrollableCursors=1), you must not include long columns in the Select list.
EnableInsert Cursors (EIC)	EnableInsertCursors={0 | 1}. Determines whether INTERSOLV DataDirect ODBC Driver can use Insert cursors during parametrized inserts. The initial default value is 1 (INTERSOLV DataDirect ODBC Driver uses Insert cursors). Using Insert cursors improves performance during multiple Insert operations that use the same statement. This option enables insert data to be buffered in memory before being written to disk. When EnableInsertCursors=0, INTERSOLV DataDirect ODBC Driver does not use Insert cursors.
GetDBListFrom Informix (GDBLFI)	GetDBListFromInformix={0 | 1}. This attribute determines whether INTERSOLV DataDirect ODBC Driver requests the database list to be returned from the Informix database server or from the database list that the user entered at the INTERSOLV DataDirect ODBC Driver setup. When set to 1, the initial default, INTERSOLV DataDirect ODBC Driver requests the database list from the Informix database server. When set to 0, it uses the list that the user entered at driver setup.

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Attribute	Description
ApplicationUsing	ApplicationUsingThreads={0 | 1}. Ensures that INTERSOLV DataDirect ODBC Driver works with multi-threaded applications. The default is 1, which makes INTERSOLV DataDirect ODBC Driver thread-safe. When you use INTERSOLV DataDirect ODBC Driver with single-threaded applications, you can set this option to 0 to avoid additional processing required for thread-safety standards.
CancelDetect Interval (CDI)	Lets you cancel long-running queries in threaded applications. Select a value to determine how often INTERSOLV DataDirect ODBC Driver checks whether a request has been canceled with **SQLCancel**. For example, if CDI=5, then for every pending request, INTERSOLV DataDirect ODBC Driver checks every five seconds to see whether the user has canceled execution of the query with **SQLCancel**. The default is 0, which means that requests will not be canceled until a request has completed execution.

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Data Types

Figure 2-7 shows how the Informix data types map to the standard ODBC data types.

Figure 2-7
Informix Data Types

Informix Data Type	ODBC Data Type
Byte*	SQL_LONGVARBINARY
Char	SQL_CHAR
Date	SQL_TYPE_DATE
Datetime year to fraction(5)	SQL_TYPE_TIMESTAMP
Datetime year to fraction(f)	SQL_TYPE_TIMESTAMP

* Not supported for INFORMIX-SE.

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Informix Data Type	ODBC Data Type
Datetime year to second	SQL_TYPE_TIMESTAMP
Datetime year to day	SQL_TYPE_DATE
Datetime hour to second	SQL_TYPE_TIME
Datetime hour to fraction(f)	SQL_TYPE_TIME
Decimal	SQL_DECIMAL
Float	SQL_DOUBLE
Integer	SQL_INTEGER
Interval year(p) to year	SQL_INTERVAL_YEAR
Interval year(p) to month	SQL_INTERVAL_YEAR_TO_MONTH
Interval month(p) to month	SQL_INTERVAL_MONTH
Interval day(p) to day	SQL_INTERVAL_DAY
Interval day(p) to hour	SQL_INTERVAL_DAY_TO_HOUR
Interval day(p) to minute	SQL_INTERVAL_DAY_TO_MINUTE
Interval day(p) to second	SQL_INTERVAL_DAY_TO_SECOND
Interval day(p) to fraction(f)	SQL_INTERVAL_DAY_TO_SECOND
Interval hour(p) to hour	SQL_INTERVAL_HOUR
Interval hour(p) to minute	SQL_INTERVAL_HOUR_TO_MINUTE
Interval hour(p) to second	SQL_INTERVAL_HOUR_TO_SECOND
Interval hour(p) to fraction(f)	SQL_INTERVAL_HOUR_TO_SECOND
Interval minute(p) to minute	SQL_INTERVAL_MINUTE
Interval minute(p) to second	SQL_INTERVAL_MINUTE_TO_SECOND
Interval minute(p) to fraction(f)	SQL_INTERVAL_MINUTE_TO_SECOND
Interval second(p) to second	SQL_INTERVAL_SECOND

* Not supported for INFORMIX-SE.

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Informix Data Type	ODBC Data Type
Interval second(p) to fraction(f)	SQL_INTERVAL_SECOND
Interval fraction to fraction(f)	SQL_VARCHAR
Money	SQL_DECIMAL
Serial	SQL_INTEGER
Smallfloat	SQL_REAL
Smallint	SQL_SMALLINT
Text*	SQL_LONGVARCHAR
Varchar*	SQL_VARCHAR

* Not supported for INFORMIX-SE.

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Isolation and Lock Levels Supported

If connected to a database server, INTERSOLV DataDirect ODBC Driver supports isolation levels 0 (read uncommitted), 1 (read committed), and 3 (serializable). The default is 1.

SE

INFORMIX-SE supports isolation level 0 (read uncommitted) only. ♦

INTERSOLV DataDirect ODBC Driver also supports an alternative isolation level 1, called cursor stability. Your ODBC application can use this isolation level by calling **SQLSetConnectAttr** (1040,1).

Additionally, if transaction logging has not been enabled for your database, the driver does not support transactions. (The driver is always in auto-commit mode.)

Informix supports page-level and row-level locking.

ODBC Conformance Level

INTERSOLV DataDirect ODBC Driver supports the functions listed in the next section "ODBC API and Scalar Functions." In addition, INTERSOLV DataDirect ODBC Driver supports the following X/Open functions:

- **SQLProcedures**
- **SQLColumnPrivileges**
- **SQLTablePrivileges**
- **SQLPrimaryKeys**
- **SQLForeignKeys**
- **SQLProcedureColumns**

INTERSOLV DataDirect ODBC Driver also supports scrollable cursors with **SQLExtendedFetch** or **SQLFetchScroll** if the connection attribute **Enable-ScrollableCursors** is set to 1. INTERSOLV DataDirect ODBC Driver supports the core SQL grammar.

ODBC API and Scalar Functions

This section lists the ODBC API functions that INTERSOLV DataDirect ODBC Driver supports and the scalar functions that you use in SQL statements.

API Functions

INTERSOLV DataDirect ODBC Driver is ODBC Level 1-compliant. It supports all ODBC Core and Level 1 functions. It also supports a limited set of Level 2 functions. INTERSOLV DataDirect ODBC Driver supports the functions listed in Figure 2-8 on page 2-18 and Figure 2-9 on page 2-19. Any additions to these supported functions or differences in the support of specific functions are listed in the previous section "ODBC Conformance Level."

Figure 2-8
Supported 2.x ODBC API Functions

Core Functions	Level 1 Functions	Level 2 Functions
SQLAllocConnect	**SQLColumns**	**SQLBrowseConnect (all drivers except PROGRESS)**
SQLAllocEnv	**SQLDriverConnect**	**SQLDataSources**
SQLAllocStmt	**SQLGetConnectOption**	**SQLExtendedFetch (forward scrolling only)**
SQLBindCol	SQL**GetData**	**SQLMoreResults**
SQLBindParameter	**SQLGetFunctions**	**SQLNativeSql**
SQLCancel	**SQLGetInfo**	**SQLNumParams**
SQLColAttributes	**SQLGetStmtOption**	**SQLParamOptions**
SQLConnect	**SQLGetTypeInfo**	**SQLSetScrollOptions**
SQLDescribeCol	**SQLParamData**	
SQLDisconnect	**SQLPutData**	
SQLDrivers	**SQLSetConnectOption**	
SQLError	**SQLSetStmtOption**	
SQLExecDirect	**SQLSpecialColumns**	
SQLExecute	**SQLStatistics**	
SQLFetch	**SQLTables**	
SQLFreeConnect		
SQLFreeEnv		
SQLFreeStmt		
SQLGetCursorName		
SQLNumResultCols		
SQLPrepare		
SQLRowCount		
SQLSetCursorName		
SQLTransact		

Figure 2-9
Supported 3.x ODBC API Functions

SQLAllocHandle	**SQLGetData**
SQLBindCol	**SQLGetDescField**
SQLBindParameter	**SQLGetDescRec**
SQLBrowseConnect (except for PROGRESS)	**SQLGetDiagField**
SQLBulkOperations	**SQLGetDiagRec**
SQLCancel	**SQLGetEnvAttr**
SQLCloseCursor	**SQLGetFunctions**
SQLColAttribute	**SQLGetInfo**
SQLColumns	**SQLGetStmtAttr**
SQLConnect	**SQLGetTypeInfo**
SQLCopyDesc	**SQLMoreResults**
SQLDataSources	**SQLNativeSql**
SQLDescribeCol	**SQLNumParens**
SQLDisconnect	**SQLNumResultCols**
SQLDriverConnect	**SQLParamData**
SQLDrivers	**SQLPrepare**
SQLEndTran	**SQLPutData**
SQLError	**SQLRowCount**
SQLExecDirect	**SQLSetConnectAttr**
SQLExecute	**SQLSetCursorName**
SQLExtendedFetch	**SQLSetDescField**
SQLFetch	**SQLSetDescRec**
SQLFetchScroll (forward scrolling only)	**SQLSetEnvAttr**
SQLFreeHandle	**SQLSetStmtAttr**
SQLFreeStmt	**SQLSpecialColumns**
SQLGetConnectAttr	**SQLStatistics**
SQLGetCursorName	**SQLTables**
	SQLTransact

Scalar Functions

Figure 2-10 on page 2-21 list the scalar functions that INTERSOLV DataDirect ODBC Driver supports. Your database server might not support all of these functions. See the documentation for your database system to find out which functions are supported.

You can use these functions in SQL statements with the following syntax:

```
{fn scalar-function}
```

where *scalar-function* is one of the functions listed in the following tables. For example:

```
SELECT {fn UCASE(NAME)} FROM EMP
```

String Functions

Figure 2-10 on page 2-21 lists the string functions that INTERSOLV DataDirect ODBC Driver supports.

The string functions listed can take the following arguments:

string_exp	can be the name of a column, a string literal, or the result of another scalar function, where the underlying data type is SQL_CHAR, SQL_VARCHAR, or SQL_LONGVARCHAR.
start, *length*, *count*	can be the result of another scalar function or a literal numeric value, where the underlying data type is SQL_TINYINT, SQL_SMALLINT, or SQL_INTEGER.

The string functions are one-based; that is, the first character in the string is character 1.

Character string literals must be surrounded in single quotation marks.

Figure 2-10
Scalar and String Function

Function	Returns
ASCII(*string_exp*)	ASCII code value of the leftmost character of *string_exp* as an integer.
BIT_LENGTH(*string_exp*) ODBC 3.0	The length in bits of the string expression.
CHAR(*code*)	The character with the ASCII code value specified by *code*. *code* should be between 0 and 255; otherwise, the return value is data-source dependent.
CHAR_LENGTH(*string_exp*) ODBC 3.0	The length in characters of the string expression, if the string expression is of a character data type; otherwise, the length in bytes of the string expression (the smallest integer not less than the number of bits divided by 8). (This function is the same as the **CHARACTER_LENGTH** function.)
CHARACTER_LENGTH (*string_exp*) ODBC 3.0	The length in characters of the string expression, if the string expression is of a character data type; otherwise, the length in bytes of the string expression (the smallest integer not less than the number of bits divided by 8). (This function is the same as the **CHAR_LENGTH** function.)
CONCAT(*string_exp1*, *string_exp2*)	The string resulting from concatenating *string_exp2* and *string_exp1*. The string is system dependent.
DIFFERENCE(*string_exp1*, *string_exp2*)	An integer value that indicates the difference between the values returned by the **SOUNDEX** function for *string_exp1* and *string_exp2*.
INSERT(*string_exp1*, *start*, *length*, *string_exp2*)	A string where *length* characters have been deleted from *string_exp1* beginning at *start* and where *string_exp2* has been inserted into *string_exp*, beginning at *start*.
LCASE(*string_exp*)	Uppercase characters in *string_exp* converted to lowercase.
LEFT(*string_exp*,*count*)	The *count* of characters of *string_exp*.

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Function	Returns
LENGTH(*string_exp*)	The number of characters in *string_exp*, excluding trailing blanks and the string termination character.
LOCATE(*string_exp1*, *string_exp2*[,*start*])	The starting position of the first occurrence of *string_exp1* within *string_exp2*. If *start* is not specified, the search begins with the first character position in *string_exp2*. If *start* is specified, the search begins with the character position that the value of *start* indicates. The first character position in *string_exp2* is indicated by the value 1. If *string_exp1* is not found, 0 is returned.
LTRIM(*string_exp*)	The characters of *string_exp*, with leading blanks removed.
OCTET_LENGTH(*string_exp*) ODBC 3.0	The length in bytes of the string expression. The result is the smallest integer not less than the number of bits divided by 8.
POSITION(*character_exp* IN *character_exp*)ODBC 3.0	The position of the first character expression in the second character expression. The result is an exact numeric with an implementation-defined precision and a scale of 0.
REPEAT(*string_exp*, *count*)	A string composed of *string_exp* repeated *count* times.
REPLACE(*string_exp1*, *string_exp2*, *string_exp3*)	Replaces all occurrences of *string_exp2* in *string_exp1* with *string_exp3*.
RIGHT(*string_exp*, *count*)	The rightmost *count* of characters in *string_exp*.
RTRIM(*string_exp*)	The characters of *string_exp* with trailing blanks removed.
SOUNDEX(*string_exp*)	A data-source-dependent string representing the sound of the words in *string_exp*.
SPACE(*count*)	A string consisting of *count* spaces.
SUBSTRING(*string_exp*, *start*, *length*)	A string derived from *string_exp* beginning at the character position *start* for *length* characters.
UCASE(*string_exp*)	Lowercase characters in *string_exp* converted to uppercase.

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Numeric Functions

Figure 2-11 lists the numeric functions that INTERSOLV DataDirect ODBC Driver supports.

The numeric functions listed can take the following arguments:.

numeric_exp can be a column name, a numeric literal, or the result of another scalar function, where the underlying data type is SQL_NUMERIC, SQL_DECIMAL, SQL_TINYINT, SQL_SMALLINT, SQL_INTEGER, SQL_BIGINT, SQL_FLOAT, SQL_REAL, or SQL_DOUBLE.

float_exp can be a column name, a numeric literal, or the result of another scalar function, where the underlying data type is SQL_FLOAT.

integer_exp can be a column name, a numeric literal, or the result of another scalar function, where the underlying data type is SQL_TINYINT, SQL_SMALLINT, SQL_INTEGER, or SQL_BIGINT.

Figure 2-11
Scalar Numeric Functions

Function	Returns
ABS(*numeric_exp*)	Absolute value of *numeric_exp*.
ACOS(*float_exp*)	Arccosine of *float_exp* as an angle in radians.
ASIN(*float_exp*)	Arcsine of *float_exp* as an angle in radians.
ATAN(*float_exp*)	Arctangent of *float_exp* as an angle in radians.
ATAN2(*float_exp1*, *float_exp2*)	Arctangent of the x and y coordinates, specified by *float_exp1* and *float_exp2* as an angle in radians.
CEILING(*numeric_exp*)	Smallest integer greater than or equal to *numeric_exp*.
COS(*float_exp*)	Cosine of *float_exp* as an angle in radians.
COT(*float_exp*)	Cotangent of *float_exp* as an angle in radians.

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Function	Returns
DEGREES(*numeric_exp*)	Number if degrees converted from *numeric_exp* radians.
EXP(*float_exp*)	Exponential value of *float_exp*.
FLOOR(*numeric_exp*)	Largest integer less than or equal to *numeric_exp*.
LOG(*float_exp*)	Natural log of *float_exp*.
LOG10(*float_exp*)	Base 10 log of *float_exp*.
MOD(*integer_exp1*, *integer_exp2*)	Remainder of *integer_exp1* divided by *integer_exp2*.
PI()	Constant value of pi as a floating-point number.
POWER(*numeric_exp*, *integer_exp*)	Value of *numeric_exp* to the power of *integer_exp*.
RADIANS(*numeric_exp*)	Number of radians converted from *numeric_exp* degrees.
RAND([*integer_exp*])	Random floating-point value using *integer_exp* as the optional seed value.
ROUND(*numeric_exp*, *integer_exp*)	*numeric_exp* rounded to *integer_exp* places right of the decimal (left of the decimal if *integer_exp* is negative).
SIGN(*numeric_exp*)	Indicator of the sign of *numeric_exp*. If *numeric_exp* < 0, -1 is returned. If *numeric_exp* = 0, 0 is returned. If *numeric_exp* > 0, 1 is returned.
SIN(*float_exp*)	Sine of *float_exp*, where *float_exp* is an angle in radians.
SQRT(*float_exp*)	Square root of *float_exp*.
TAN(*float_exp*)	Tangent of *float_exp*, where *float_exp* is an angle in radians.
TRUNCATE(*numeric_exp*, *integer_exp*)	*numeric_exp* truncated to *integer_exp* places right of the decimal. (If *integer_exp* is negative, truncation is to the left of the decimal.)

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Date and Time Functions

Figure 2-12 lists the date and time functions that INTERSOLV DataDirect ODBC Driver supports.

The date and time functions listed can take the following arguments:

date_exp can be a column name, a date or timestamp literal, or the result of another scalar function, where the underlying data type can be represented as SQL_CHAR, SQL_VARCHAR, SQL_DATE, or SQL_TIMESTAMP.

time_exp can be a column name, a timestamp or timestamp literal, or the result of another scalar function, where the underlying data type can be represented as SQL_CHAR, SQL_VARCHAR, SQL_TIME, or SQL_TIMESTAMP.

timestamp_exp can be a column name, a time, date, or timestamp literal, or the result of another scalar function, where the underlying data type can be represented as SQL_CHAR, SQL_VARCHAR, SQL_TIME, SQL_DATE, or SQL_TIMESTAMP.

Figure 2-12
Scalar Time and Date Functions

Function	Returns
CURRENT_DATE() ODBC 3.0	Current date.
CURRENT_TIME [(*time-precision*)] ODBC 3.0	Current local time. The *time-precision* argument determines the seconds precision of the returned value.
CURRENT_TIMESTAMP [(*timestamp-precision*)] ODBC 3.0	Current local date and local time as a timestamp value. The *timestamp-precision* argument determines the seconds precision of the returned timestamp.
CURDATE()	Current date as a date value.
CURTIME()	Current local time as a time value.

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Function	Returns
DAYNAME(*date_exp*)	Character string containing a data-source-specific name of the day for the day portion of *date_exp*.
DAYOFMONTH(*date_exp*)	Day of the month in *date_exp* as an integer value (1-31).
DAYOFWEEK(*date_exp*)	Day of the week in *date_exp* as an integer value (1-7).
DAYOFYEAR(*date_exp*)	Day of the year in *date_exp* as an integer value (1-366).
HOUR(*time_exp*)	Hour in *time_exp* as an integer value (0-23).
MINUTE(*time_exp*)	Minute in *time_exp* as an integer value (0-59).
MONTH(*date_exp*)	Month in *date_exp* as an integer value (1-12).
MONTHNAME(*date_exp*)	Character string containing the data source-specific name of the month.
NOW()	Current date and time as a timestamp value.
QUARTER(*date_exp*)	Quarter in *date_exp* as an integer value (1-4).
SECOND(*time_exp*)	Second in *date_exp* as an integer value (0-59).
TIMESTAMPADD(*interval*, *integer_exp*, *time_exp*)	Timestamp calculated by adding *integer_exp* intervals of type interval to *time_exp*. *interval* can be SQL_TSI_FRAC_SECOND SQL_TSI_SECOND SQL_TSI_MINUTE SQL_TSI_HOUR SQL_TSI_DAY SQL_TSI_WEEK SQL_TSI_MONTH SQL_TSI_QUARTER SQL_TSI_YEAR Fractional seconds are expressed in billionths of a second.

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Function	Returns
TIMESTAMPDIFF(*interval*, *time_exp1*, *time_exp2*)	Integer number of intervals of type *interval* by which *time_exp2* is greater than *time_exp1*. *interval* has the same values as TIMESTAMPADD. Fractional seconds are expressed in billionths of a second.
WEEK(*date_exp*)	Week of the year in *date_exp* as an integer value (1-53).
YEAR(*date_exp*)	Year in *date_exp*. The range is data-source dependent.

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System Functions

Figure 2-13 lists the system functions that INTERSOLV DataDirect ODBC Driver supports.

Figure 2-13
Scalar System Functions

Function	Returns
DATABASE()	Name of the database, corresponding to the connection handle (*hdbc*).
IFNULL(*exp*,*value*)	*value*, if *exp* is null.
USER()	Authorization name of the user.

Number of Connections and Statements Supported

The INTERSOLV DataDirect ODBC Driver supports multiple connections and multiple statements per connection.

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