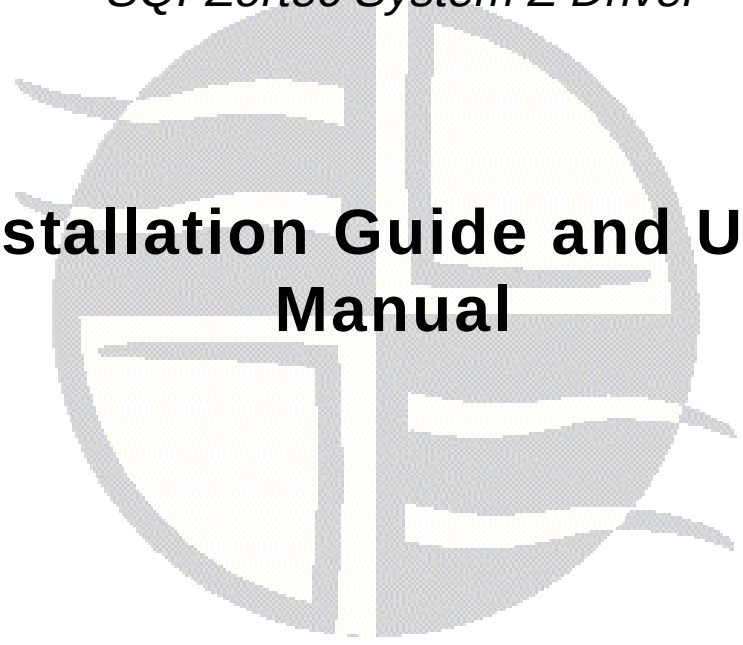
# Easysoft Data Access

*SQI-Zortec System Z Driver*



# Installation Guide and User Manual

Version 11.

This manual documents version 1.1.n of the Easysoft SQI-Zortec System Z Driver.

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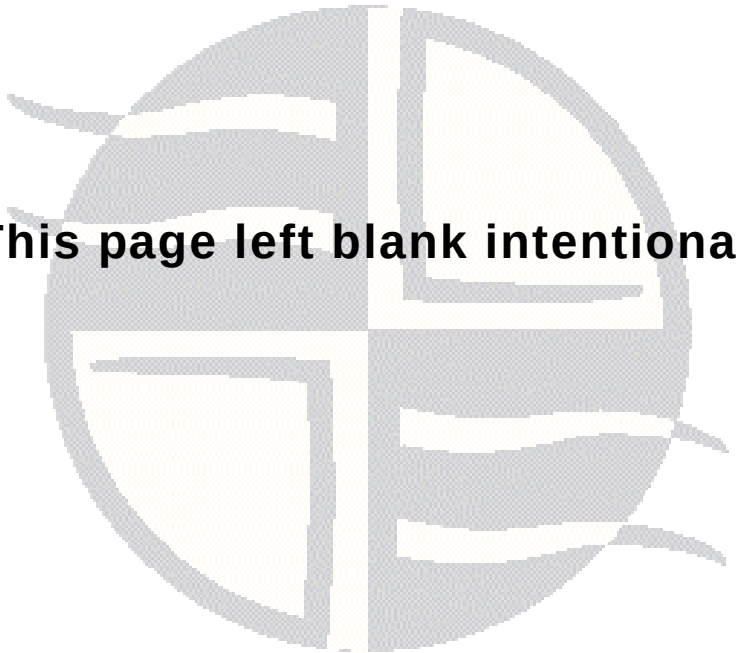

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# LIST OF FIGURES

# PREFACE

## About this manual

This manual is intended for use by anyone who wants to access Zortec System Z application data, stored on a Windows or Unix machine, from an ODBC-compliant application.

### Chapter Guide

## Intended Audience

The sections written for the Microsoft Windows platforms require some familiarity with the use of buttons, menus, icons and text boxes. If you have any experience of Apple Macintosh computers, Microsoft Windows or the X Window System, you will have no difficulty with these sections.

The Unix-based sections require that you are experienced at using a Unix shell, and can perform basic functions like editing a file. More complex activities are detailed more clearly.

## Displaying the Manual

This manual is available in the following formats:

- Portable Document Format (PDF), which can be displayed and printed using the Acrobat Reader, available free from Adobe at **http://www.adobe.com**.
- HTML (the format Easysoft recommend for viewing onscreen).

## Notational Conventions

Across the range of Easysoft manuals you will encounter passages that are emphasized with a box and a label.

A *note box* provides additional information that may further your understanding of a particular procedure or piece of information relating to a particular section of this manual:

| | |
|---|---|
| **NB** | Note boxes often highlight information that you may need to be aware of when using a particular feature. |

A *reference box* refers to resources external to the manual, such as a useful website or suggested reading:

| | |
|---|---|
| **REF** | For more manuals that use this convention, see the rest of the Easysoft documentation. |

A *platform note* provides platform-specific information for a particular procedure step:

| | |
|---|---|
| **Linux** | In Linux you must log on as the `root` user in order to make many important changes. |

A *caution box* is used to provide important information that you should check and understand, prior to starting a particular procedure or reading a particular section of this manual:

| | |
|---|---|
| **Caution!** | Be sure to pay attention to these paragraphs because Caution boxes are important! |

Information has also been grouped within some chapters into two broad classes of operating system, Windows and Unix, for which side tabs are used to help you turn to the section relevant to you.

## Typographical Conventions

To avoid ambiguity, typographic effects have been applied to certain types of reference:

- User interface components such as icon names, menu names, buttons and selections are presented in bold, for example:

  Click **Next** to continue.

  Where there is a chain of submenus, the following convention is used:

  Choose **Start > Programs > Command Prompt**.

- Commands to be typed are presented using a `monotype` font, for example:

  At the command prompt type `admin`.

- Keyboard Commands

  It is assumed that all typed commands will be committed by pressing the *<Enter>* key, and as such this will not normally be indicated in this manual. Other key presses are italicized and enclosed by angle brackets, for example:

  Press *<F1>* for help.

- File listings and system names (such as file names, directories and database fields) are presented using the `monotype` plain text style.

## Contents

## Trademarks

Throughout this manual, *Windows* refers generically to Microsoft Windows 95, 98, 2000, NT, XP, ME or 2003 Server, which are trademarks of the Microsoft Corporation. The X Window system is specifically excluded from this and is referred to as *The X Window System* or just *X*.

Note also that although the name UNIX is a registered trademark of The Open Group, the term has come to encompass a whole range of UNIX-like operating systems, including the free, public Linux and even the proprietary Solaris. Easysoft use Unix (note the case) as a general term covering the wide range of Open and proprietary operating systems commonly understood to be Unix ‘flavors’.

Easysoft and Easysoft Data Access are trademarks of Easysoft Limited.

# 1 INTRODUCTION

## Introducing the Easysoft SQI-Zortec System Z Driver

Easysoft Data Access is a series of programs that allow you to have heterogeneous access to any database on any platform.

With Easysoft software you can connect applications on more platforms to more database systems than ever before.

This section explains what the Easysoft SQI-Zortec System Z Driver is and how it works.

### Chapter Guide

## About System Z

System Z is a 4GL programming language which allows easy and rapid development of applications that run on multiple platforms, and the conversion of programs written in BASIC, COBOL and MAPPER to System Z applications.

System Z applications can be run on a variety of Windows and Unix platforms, and from Web browsers. You need only have one set of source code for both the GUI and character-based versions of your software.

System Z can read a wide variety of database formats, from ISAM-based databases to relational databases.

This platform and database independence results in a programming language which allows the development of applications that are portable to almost any environment.

## Introducing the Easysoft SQI-Zortec System Z Driver

The Easysoft SQI-Zortec System Z Driver is an ODBC 3.5 driver which enables direct access to System Z data using ODBC-compliant applications such as Microsoft Access, enabling you to view, add, modify and delete data via your favorite ODBC-compliant application, rather than via a System Z application interface.

For example, if you want to load your data into Microsoft Excel for reporting or updating purposes, the Easysoft SQI-Zortec System Z Driver makes this possible.

The Easysoft SQI-Zortec System Z Driver provides:

- direct support of the System Z data dictionary which defines the data structure of a System Z application.

  Easysoft reads the data dictionary (`DD.dat`) on-the-fly, so you do not need to specify the data structure manually.

  This also means that any user-defined tables are automatically detected, and when you upgrade your System Z installation Easysoft automatically picks up any changes in the System Z files.

- easy creation of users and their access rights to restrict access to the System Z data.
- access to all the tables within a System Z application, and full support for its data types.
- conformance to ODBC 3.5.
- support for the ODBC minimum SQL grammar with the majority of SQL92 extensions.

## Cross-platform Data Access With Easysoft Data Access For Zortec System Z

On its own, the Easysoft SQI-Zortec System Z Driver enables you to access your System Z data from an ODBC-compliant application *on the same machine*.

However, you can use the Easysoft SQI-Zortec System Z Driver in conjunction with other Easysoft Data Access products to enable cross-platform data access:

- The Easysoft ODBC-ODBC Bridge enables an ODBC-compliant application on any platform to access an ODBC data source on any other platform.

  For example, if your System Z data is stored on a Unix machine, and you want to access the data from Microsoft Access on a networked PC, then the Easysoft ODBC-ODBC Bridge makes this possible.

- The Easysoft JDBC-ODBC Bridge enables 100% pure Java Applets or Applications anywhere on a network to have Type 3 JDBC access to ODBC data sources elsewhere on the network.

  For example, the Easysoft JDBC-ODBC Bridge allows access to remote System Z data on a networked Windows NT machine from a Java Applet running on a separate machine.

## How the Easysoft SQI-Zortec System Z Driver works

Each System Z application has a data dictionary which defines the structure of that application's data. When you select a function in your ODBC-compliant application which involves accessing the System Z data, the function passes from the application into the driver manager which loads the Easysoft SQI-Zortec System Z Driver and passes the SQL query to it. The driver directly accesses the data dictionary to determine the structure of the data, then converts the SQL statement into commands that can query the data, returning the results back to the ODBC-compliant application:

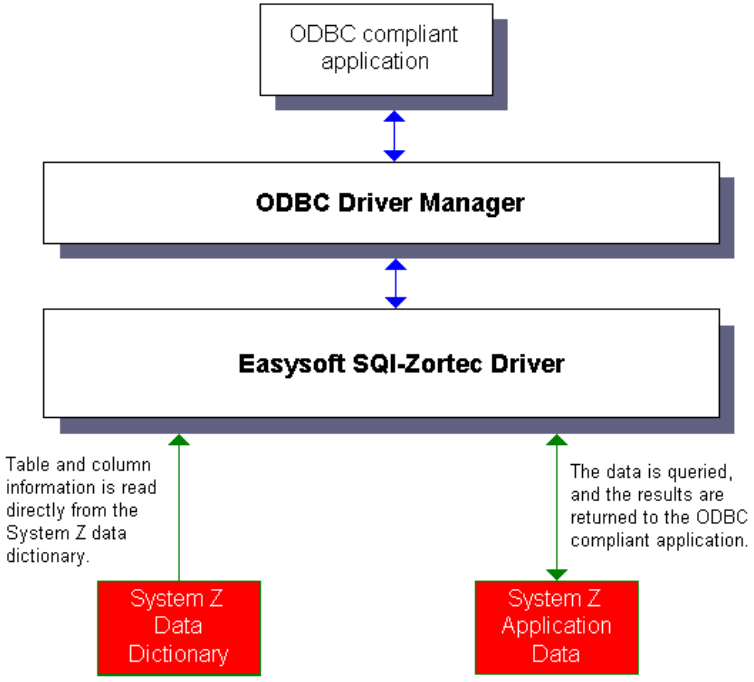


**Figure 1: How the Easysoft SQI-Zortec System Z Driver works**

With a cross-platform solution, the Easysoft ODBC-ODBC Bridge or Easysoft JDBC-ODBC Bridge transfers the SQL query from one platform to another and passes it to the Easysoft SQI-Zortec System Z Driver, which accesses the data dictionary and returns the results (via the Easysoft ODBC-ODBC Bridge or Easysoft JDBC-ODBC Bridge) to the ODBC or JDBC application:

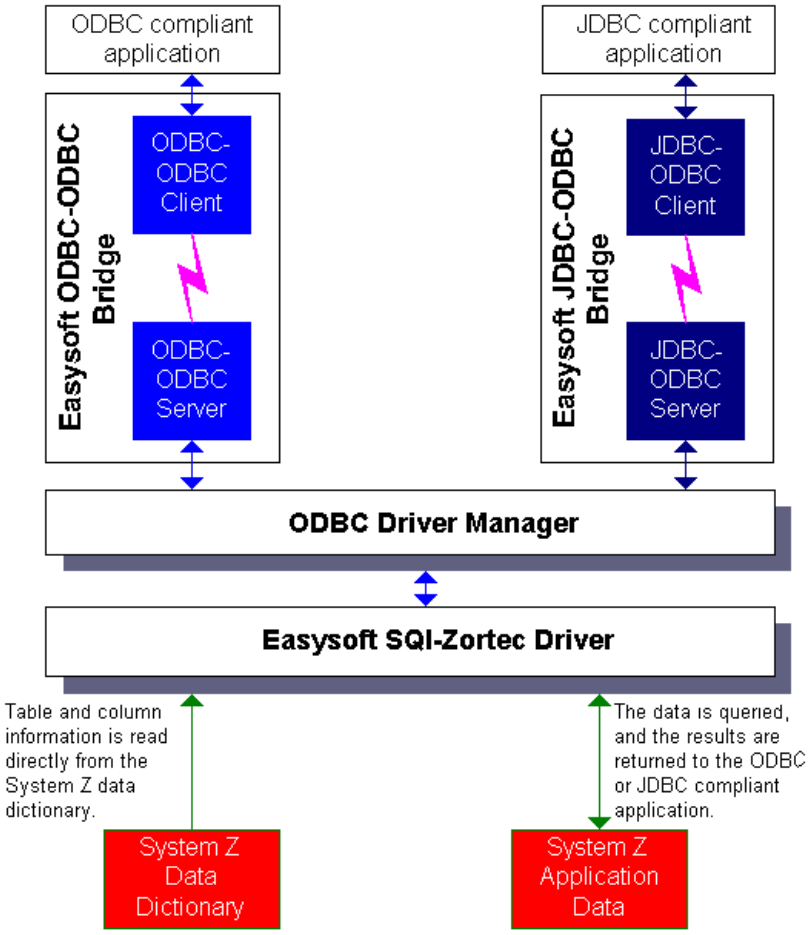


**Figure 2: The Easysoft SQI-Zortec System Z Driver cross-platform solution**

In both the local and cross-platform solutions, a driver manager sits between the ODBC or JDBC application and the Easysoft SQI-Zortec System Z Driver.

The driver manager enables you to have multiple drivers set up simultaneously and is responsible for loading the appropriate driver at runtime.

On Windows machines, the Microsoft ODBC driver manager is provided by default.

Easysoft recommend using the unixODBC driver manager on Unix machines. This is provided with the Easysoft SQI-Zortec System Z Driver distribution and can be set up and configured during the installation routine described in **“Installing on Unix” on page 45**.

For more information about the Easysoft ODBC-ODBC Bridge or the Easysoft JDBC-ODBC Bridge, please visit the Easysoft web site at **http://www.easysoft.com**.

You can find out more information about unixODBC from the unixODBC Project web site at **http://www.unixodbc.org**.

## Overview of the installation and setup procedure

To install and configure the Easysoft SQI-Zortec System Z Driver:

1. Install the Easysoft SQI-Zortec System Z Driver on the server (and optionally the Easysoft ODBC-ODBC Bridge server or Easysoft JDBC-ODBC Bridge server), which also optionally creates a data source on the server to point to your System Z data (see **“What to install” on page 25**).
2. License the Easysoft SQI-Zortec System Z Driver, which also automatically licenses the Easysoft ODBC-ODBC Bridge (see **“Licensing on Windows” on page 37** or **“Licensing on Unix” on page 49**).
3. Enable users and grant them access to your System Z data (see **“Administration” on page 75**).
4. Optionally, install the Easysoft ODBC-ODBC Bridge client on the machine of each Zortec System Z user (see **“Installing the Easysoft ODBC-ODBC Bridge client” on page 86**).
5. Optionally, create a data source on each of your client machines to connect to your System Z data via the Easysoft ODBC-ODBC Bridge (see **“Setting up a data source on your Windows client” on page 87**).

   The installation of the Easysoft ODBC-ODBC Bridge and the Easysoft JDBC-ODBC Bridge are explained briefly in this manual, but for full details please refer to the product-specific documentation.

# INSTALLATION

2

## Installing the Easysoft SQI-Zortec System Z Driver

This section explains how to install, license and remove the Easysoft SQI-Zortec System Z Driver on supported Windows and Unix platforms.

The Windows installation can be carried out by anyone with local administrator privileges for the target machine.

The Unix installation assumes you are, or have available for consultation, a system administrator.

### Chapter Guide

## Obtaining the Easysoft SQI-Zortec System Z Driver

There are three ways to obtain the Easysoft SQI-Zortec System Z Driver:

- The Easysoft web site is available 24 hours a day at **http://www.easysoft.com** for downloads of definitive releases and documentation.

  Select **Download** from the Easysoft SQI-Zortec System Z Driver section of the website and then choose the platform release that you require.

  First time visitors must complete the new user form and click **Register**. Note that your personal Internet options may require you to login and click **Continue** if you have previously registered.

- The Easysoft FTP server is available 24 hours a day at **ftp://ftp.easysoft.com**, containing free patches, upgrades, documentation and beta releases of Easysoft products, as well as definitive releases.

  Change to the `pub/systemz_sqi` directory and then choose the platform release that you require.

- You can order Easysoft software on CD by email, telephone or post (see **Contact Details**).

## What to install

The selection of components that you require to download in order to configure the Easysoft SQI-Zortec System Z Driver varies depending on the platforms on which you wish to run.

All installations must download the Easysoft SQI-Zortec System Z Driver software itself.

The name of the Easysoft SQI-Zortec System Z Driver install file varies from platform to platform, but is of the form:

- `eda-systemz-`*`x_y_z-platform`*`.exe` (Windows)

– OR –

- `eda-systemz-`*`x.y.z-platform`*`.tar` (Unix platforms)

where "*`x`*" is the major version number, "*`y`*" is the minor version number and *"z"* is the build index, which is incremented when minor changes are made.

"*`platform`*" will vary depending on the operating system distribution you require and you may come across files of the form:

- `eda-sytemz-`*`x.y.z-platform-variation`*`.tar`

within specific Unix platforms, where "*`platform-variation`*" refers to alternative versions available for a single platform.

| | |
|---|---|
| **NB** | Select the highest release available for your platform within your licensed major version number (installing software of a different major version number requires a new Easysoft license). |

Unix filenames may also be suffixed with `.gz` for a "`gzipped`" archive, `.bz2` for a "`bzip2ed`" archive, or `.Z` for a "`compressed`" archive.

| | |
|---|---|
| **NB** | If you download a Unix file using Windows, the browser may corrupt the filename. For example, if you download a `.gz` file and Windows corrupts the filename, it may not be obvious that the file is "`gzipped`". Use "`file` *filename*" to find out the file type of the downloaded file. |

### CROSS-PLATFORM DATA ACCESS

If you intend to implement cross-platform data access, you also need to install either the Easysoft ODBC-ODBC Bridge (see **http://www.easysoft.com/products/2002/main.phtml**) for remote ODBC access or the Easysoft JDBC-ODBC Bridge (see **http://www.easysoft.com/products/2003/main.phtml**) for remote JDBC access from Java applications.

The Easysoft ODBC-ODBC Bridge consists of two separate client and server components and the Easysoft JDBC-ODBC Bridge consists of a single server component.

| | |
|---|---|
| **NB** | You cannot 'mix and match' server and client components of the Easysoft ODBC-ODBC Bridge and Easysoft JDBC-ODBC Bridge. |

The following components are required for remote ODBC access to Sage Tetra CS/3 data:

- the Easysoft SQI-Zortec System Z Driver on the server platform
- the Easysoft ODBC-ODBC Bridge server component on the server platform

- the Easysoft ODBC-ODBC Bridge client component on the client platform

| | |
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| **NB** | The first two digits of the version number must match when the Easysoft ODBC-ODBC Bridge client and server components are installed (see the Easysoft ODBC-ODBC Bridge manual for more information). This does not apply to the Easysoft JDBC-ODBC Bridge, where no specific client installation is required. |

The following components are required for remote JDBC access to Zortec System Z data:

- the Easysoft SQI-Zortec System Z Driver on the server platform
- the Easysoft JDBC-ODBC Bridge on the server platform

| | |
|---|---|
| **Win 9x** | If you are using Windows 9x with either the Easysoft ODBC-ODBC Bridge or the Easysoft JDBC-ODBC Bridge you will need Winsock2, which can be downloaded from **http://www.microsoft.com/windows95/downloads/contents/wuadmintools/s_wunetworkingtools/w95sockets2/**. |

Cross-platform data access software can be obtained as follows:

1. From the Easysoft Web site at **http://www.easysoft.com**:

   For the Easysoft ODBC-ODBC Bridge:

   - Obtain your required platform version for both client and server from the **Multiple Platforms** option on the Easysoft SQI-Zortec System Z Driver **Download** page.

- Install the **Client Download** onto your client machine (on both Unix and Windows, you need to accept the **Install ODBC-ODBC Bridge Client** option and reject the **Install ODBC-ODBC Bridge Server** option).

  This provides the Easysoft ODBC-ODBC Bridge Client.

- Install the **Server Download** on your server machine:

  On Unix you need to accept both the **remote ODBC access** and **Install ODBC-ODBC Bridge Server** options.

  On Windows you also need to download the Easysoft ODBC-ODBC Bridge via the **Multiple Platforms** option, selecting your required server platform version, and install the **Server Download** on your server machine.

  This provides the Easysoft ODBC-ODBC Bridge Server, the Easysoft ODBC-SQI SQL Engine and the Easysoft SQI-Zortec System Z Driver.

For the Easysoft JDBC-ODBC Bridge:

- Obtain your required platform version from the **Single Platform** option on the Easysoft SQI-Zortec System Z Driver **Download** page and install it on your server machine (on Unix you need to reject the **Install OOB Server** option).

  This provides the Easysoft ODBC-SQI SQL Engine and the Easysoft SQI-Zortec System Z Driver.

- Obtain your required platform version from the Easysoft JDBC-ODBC Bridge **Download** page and install it on your server machine.

  This provides the Easysoft JDBC-ODBC Bridge.

2. From the Easysoft FTP site:

   On Windows:

   - for the Easysoft ODBC-ODBC Bridge both client and server components are contained in the same Easysoft ODBC-ODBC Bridge executable file held in the **ftp://ftp.easysoft.com/pub/systemz_sqi/** directory.
   - the Easysoft JDBC-ODBC Bridge server component is contained in the Easysoft JDBC-ODBC Bridge executable file held in the **ftp://ftp.easysoft.com/pub/jdbc-odbc-bridge/** directory. There is no client component to install.

   On Unix:

   - the Easysoft ODBC-ODBC Bridge server component is bundled within the Easysoft SQI-Zortec System Z Driver archive file held in the **ftp://ftp.easysoft.com/pub/systemz_sqi/** directory.
   - the Easysoft ODBC-ODBC Bridge client component is contained in the Easysoft ODBC-ODBC Bridge archive file held in the **ftp://ftp.easysoft.com/pub/odbc-odbc-bridge/** directory.
   - the Easysoft JDBC-ODBC Bridge server component is contained in the Easysoft JDBC-ODBC Bridge archive file held in the **ftp://ftp.easysoft.com/pub/jdbc-odbc-bridge/** directory.

| | |
|---|---|
| **NB** | Both client and server components are held in the same executable installation file for the Easysoft ODBC-ODBC Bridge. There is no specific client installation for the Easysoft JDBC-ODBC Bridge. |

You can now download a file and begin the installation process.

**Caution!**

As long as you stop all running applications (on Windows), or any software either from Easysoft or using Easysoft drivers (on Unix), it is safe to reinstall or upgrade the Easysoft SQI-Zortec System Z Driver without uninstalling.

If you do uninstall, you should first back up any configuration data that you still need, as uninstalling some Easysoft products will result in this information being deleted (license details remain in place).

Refer to the section relevant to your platform to continue:

- **"Installing on Windows" on page 31**
- **"Uninstalling on Windows" on page 43**
- **"Installing on Unix" on page 45**
- **"Uninstalling on Unix" on page 55**

### Installing on Windows

1. Execute the file distribution that you downloaded in **"Obtaining the Easysoft SQI-Zortec System Z Driver" on page 24**.

**Caution!** Please shut down other Windows programs before installing. In particular, Microsoft Outlook can cause the installation routine to pause for several minutes when you start it.

There will be a short delay while setup prepares the wizard to guide you through the rest of the install procedure before the **Welcome** dialog box is displayed:


**Figure 3: The Welcome dialog box**

2. Click **Next** to continue.

The **Software License Agreement** dialog box displays more information about licensing and the components which are installed.

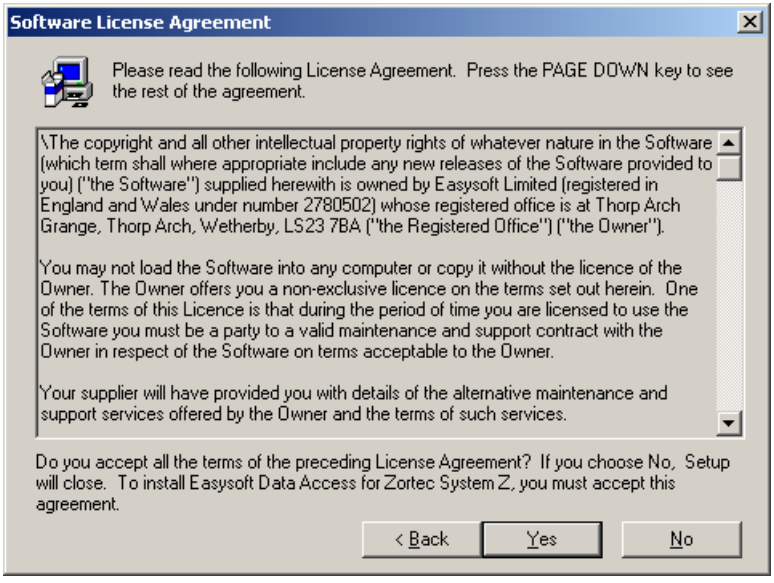



**Figure 4: The Software License Agreement dialog box**

3. If you do not agree to the License Agreement, click **No** to exit the installation.

   – OR –

   Click **Yes** to accept the License Agreement and continue with the installation.

The **Information** dialog box is displayed:

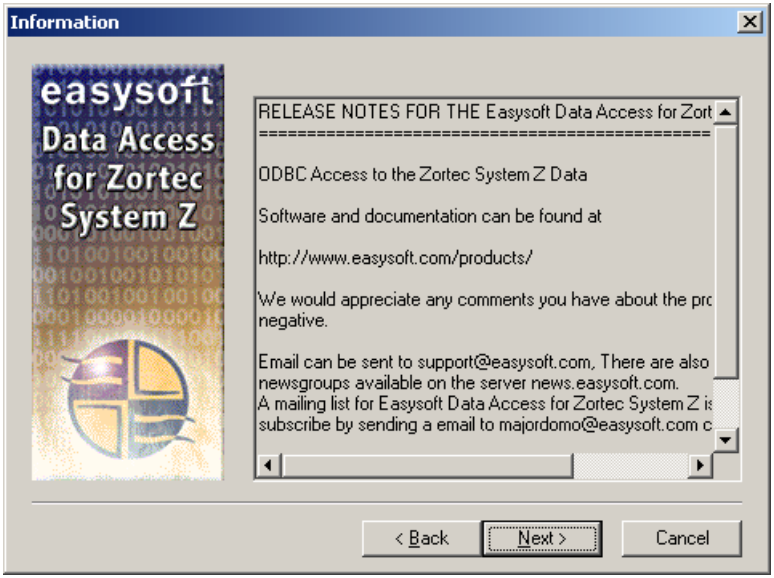



**Figure 5: The Information dialog box**

4. Click **Next** to continue.

The **User Information** dialog box is displayed:

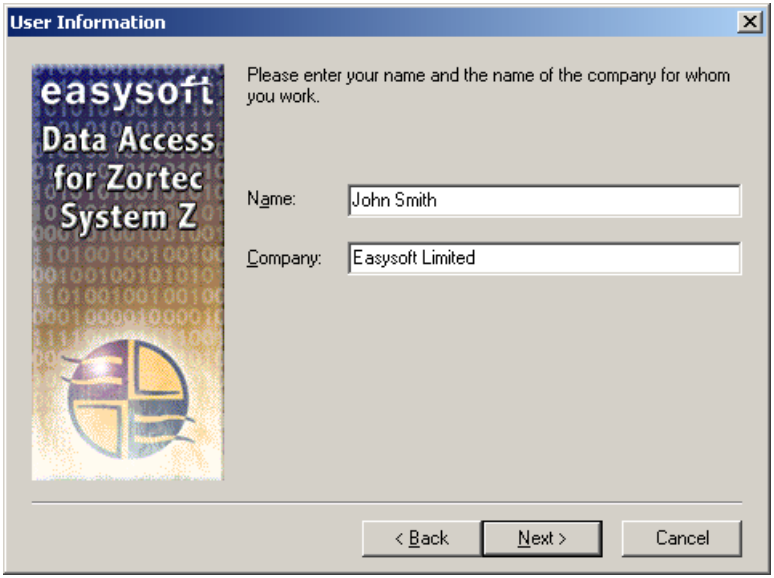



**Figure 6: The User Information dialog box**

5. Enter your name and the name of your company. Then click **Next** to continue.

| **NB** | The name and company that you enter here will become the defaults in the License Manager later on. |
|---|---|

You are then asked to choose where to install the Easysoft SQI-Zortec System Z Driver files in the **Choose Destination Location** dialog box:

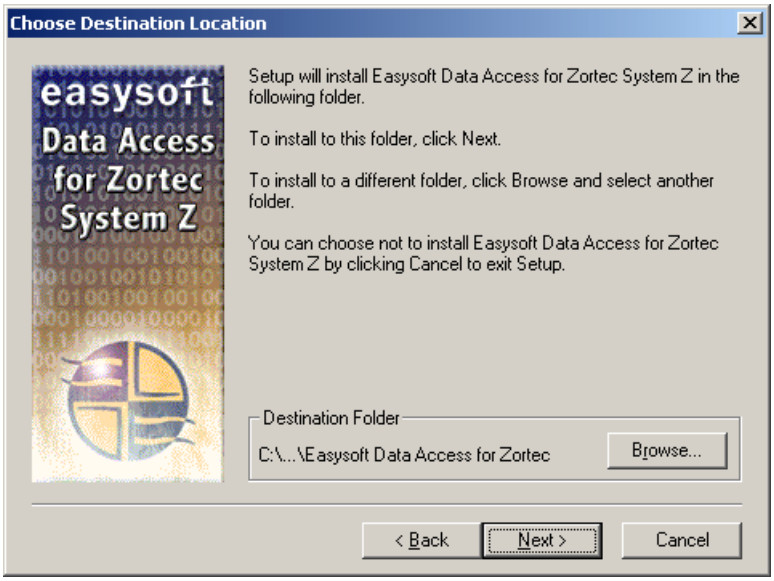



**Figure 7: The Choose Destination Location dialog box**

6. Click **Next** to install the application into the default directory location:

   `C:\Program Files\Easysoft\Easysoft Data Access for Zortec System Z`

   – OR –

   Click **Browse** and select an alternative directory location for the installation, before clicking **Next**.

   The **Easysoft Data Access for Zortec System Z** DSN dialog box is displayed, pre-configured to set up a data source connecting to sample data.

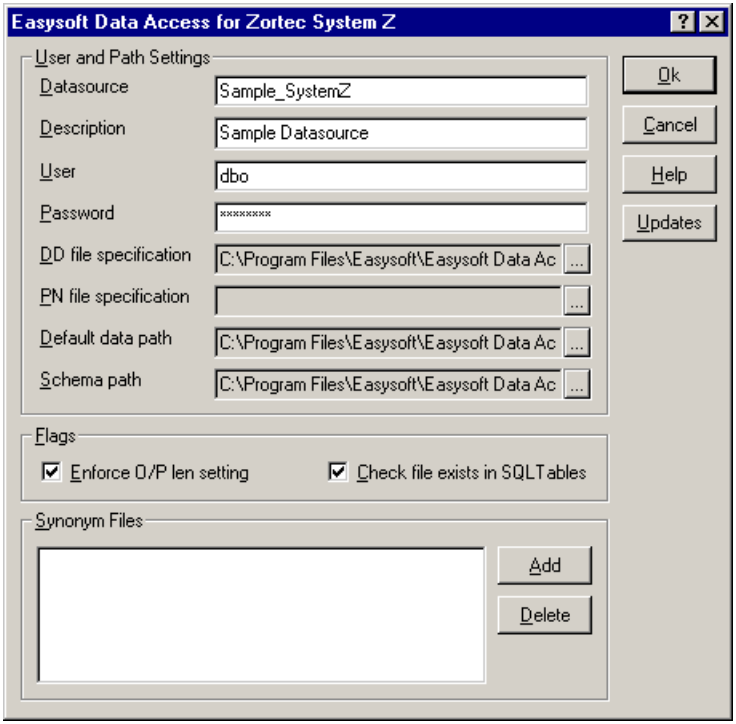



**Figure 8: The Easysoft Data Access for Zortec System Z DSN dialog box**

7. Click **OK** to create the sample data source and continue.

   Creating data sources connecting to your real System Z data is explained in **"Creating additional data sources on Windows" on page 62**.

### LICENSING ON WINDOWS

The install program now starts the Easysoft License Manager (explained fully in the **Licensing Guide**).

Licensing the Easysoft SQI-Zortec System Z Driver also obtains licenses for the Easysoft ODBC-ODBC Bridge and the Easysoft JDBC-ODBC Bridge.

The following types of license are available:

- a *trial license* which gives you free and unrestricted use of the product for a limited period (usually 28 days).
- a *purchased license* which gives you unrestricted use of the product. When you purchase the product, an authorization code is emailed to you.

8. Enter your contact details.

   You MUST enter the **Name**, **E-Mail Address** and **Company** fields.

   The **Telephone** and **Facsimile** fields are important if you require Easysoft to contact you by those methods.

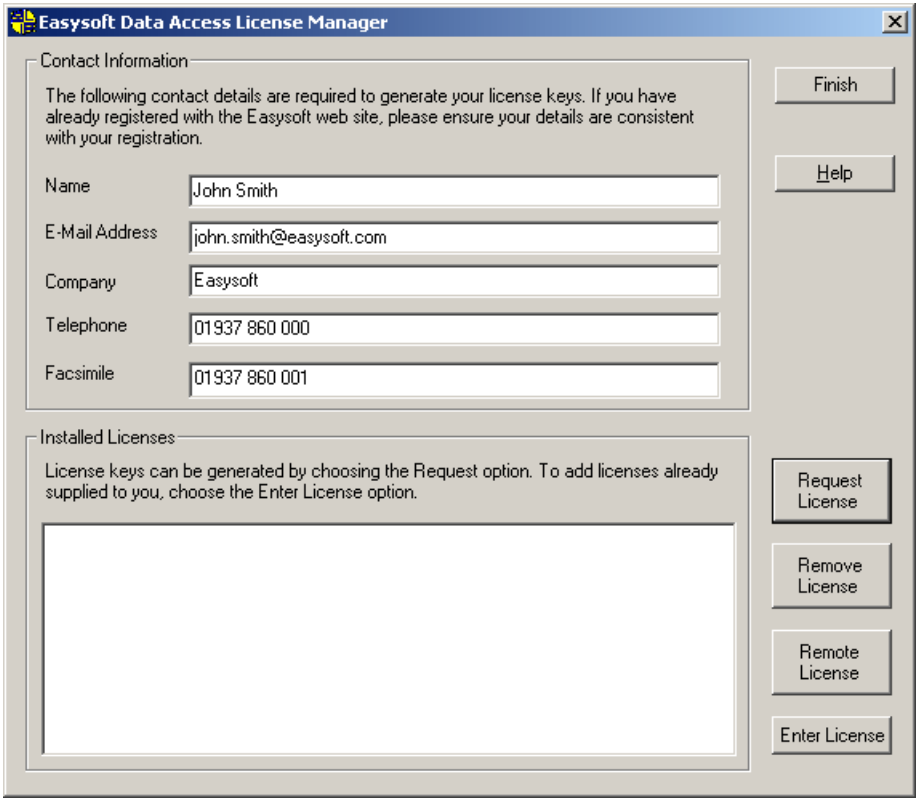



**Figure 9: The Windows License Manager screen**

9. Click **Request License**.

You are asked for a license type:


**Figure 10: The License Type dialog box**

10. To obtain a trial license click **Time Limited Trial** and then click **Next**.

    The License Manager asks what software you are licensing:

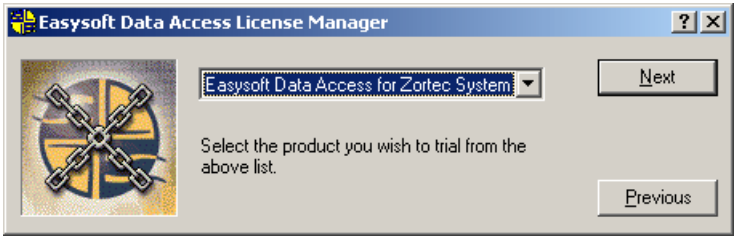



**Figure 11: Select the product you are licensing**

Select **Easysoft SQI-Zortec System Z Driver** from the drop-down list and then click **Next**.

– OR –

If you have obtained an authorization code for a purchased license, select **Non-expiring License** and then click **Next**.

The License Manager requests your authorization code.

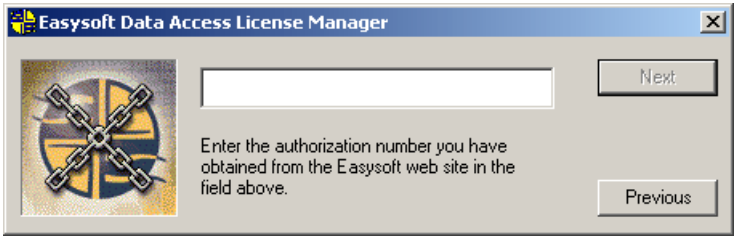



**Figure 12: The Authorization Number dialog box**

Enter the authorization code and then click **Next**.

11. The License Manager displays a summary of your details and allows you to choose the method of applying for your license:


**Figure 13: The License Application dialog box**

Choose **On-line Request** if your machine has a connection to the internet.

The License Manager then transmits a network packet to the license server at Easysoft. The whole process is automatic and you can proceed to **step 12 on page 42**.

| | |
|---|---|
| **NB** | Only your license request identifier and contact details as they are displayed in the main License Manager screen are sent to Easysoft. |

The remaining three options (**Email Request**, **Print Request** and **View Request**) are all ways to obtain a license if your machine is offline (i.e. does not have a connection to the internet).

Each of these methods involves providing Easysoft with information including your machine number (a number unique to your machine) and then waiting to receive your license key.

Instead of emailing, faxing or telephoning your details to Easysoft, you can enter them directly onto Easysoft's web site and your license key will be emailed to you automatically.

To use this method, click **View Request** to display your machine number, then run a web browser and go to **http://www.easysoft.com/sales/autolicense.phtml**.

Choose the type of license you require, enter your machine number and then click **Continue**. Your license key will now be emailed to you.

When you receive the license key, you can activate it either by double-clicking the email attachment or by clicking **Enter License** on the License Manager main screen and pasting the license key into the dialog box.

A message is displayed, telling you how many licenses have been added.

| | |
|---|---|
| **NB** | If you use the **Email Request** option, the license key is emailed to the email address as displayed on the License Manager main screen, not the `from:` address of your email. |

12. Click **Finish** in the License Manager to return to the install program.

    The **Setup Complete** dialog box is displayed:


**Figure 14: The Setup Complete dialog box**

13. Click **Finish**.

The installation is complete.

See **"Querying data sources" on page 59** for details of how to check if the installation has been successful.

## Uninstalling on Windows

This section explains how to remove the Easysoft SQI-Zortec System Z Driver from your system.

You should uninstall this software before installing a more recent version.

1. Select **Start > Settings > Control Panel** and then double-click the **Add/Remove Programs** icon.

   A list is displayed of applications that can be automatically removed.

2. Select **Easysoft Data Access for System Z** and click **Add/Remove**.

3. Click **Yes** to confirm that you wish to remove Easysoft Data Access for System Z and all its components.

   The system begins to remove all the components. If shared components seem not to be required, you will be prompted to decide whether or not to delete them.

| | |
|---|---|
| **NB** | The Windows install/uninstall procedure incorporates a mechanism in the registry to determine whether or not shared files are still required by other programs. Sometimes this database can become out-of-date, for instance if the user deleted an application directly, without using **Add/Remove Programs**, or the registry was ‘repaired’ after a system crash. |

4. If you feel confident with the registry (i.e. your system has had relatively few programs installed and removed) you should click **Yes** or **Yes to All** to continue.

   – OR –

   If you have any doubts (e.g. uninstall procedures have failed in the past) you should click **No** or **No to All**.

   The uninstall process removes the Easysoft Data Access for Zortec System Z components from your system.

   | | |
   |---|---|
   | **NB** | If files have been created in any of the installation directories then these directories will not be removed. In this case, the uninstall program will issue a warning and you can click **Details** to find out what directories remain. |

5. On completion, click **OK** to return to the **Control Panel Install/Uninstall** window.

6. The uninstall process is complete.

   Any licenses you obtained for the Easysoft SQI-Zortec System Z Driver and other Easysoft products are held in the Windows registry.

   When you uninstall, your licenses are not removed so you do not need to relicense the product if you reinstall or upgrade.

## Installing on Unix

Although this section covers a range of platforms and the precise output may vary from system to system, the installation process is essentially the same.

### INSTALLATION REQUIREMENTS

The Unix installation routine has the following requirements:

- The Bourne shell (or BASH) must either be named (or linked to) `/bin/sh` or the first line of the `install` file updated to the correct location.
- Various common Unix commands such as `grep`, `awk`, `cut`, `ps`, `sed`, `cat`, `wc`, `uname`, `tr` and `find`.

  If any of these commands are missing they can be obtained from the Free Software Foundation (**http://www.fsf.org**).
- Depending on the platform, you will need up to 10Mb of free disk space for the installed programs and up to 10Mb temporary space for the installation files themselves.
- You must know the location of your System Z data dictionary (e.g. `/z/DD.dat`).

### PREPARATION

1. Log on to your Unix machine as the `root` user.
2. Download the Easysoft SQI-Zortec System Z Driver (see **"Obtaining the Easysoft SQI-Zortec System Z Driver" on page 24**).
3. Place the distribution file in a temporary directory on your Unix machine.

### EXTRACTING THE INSTALLATION FILES

4. Change to the directory in which the distribution file resides.
5. Extract the installation files from the distribution file:

   If the distribution file has been `gzipped` (i.e. the filename ends in `.gz`), then use:

   `gunzip eda-systemz-`*`x.y.z-platform`*`.tar.gz`

   – OR –

   If the distribution file has been `bzip2ed` (i.e. the filename ends in `.bz2`), then use:

   `bunzip2 eda-systemz-`*`x.y.z-platform`*`.tar.bz2`

   – OR –

   If the distribution file has been `compressed` (i.e. the filename ends in `.Z`), then use:

6. `uncompress eda-systemz-`*`x.y.z-platform`*`.tar.Z`
7. If the distribution file has not been compacted at all (i.e. the filename ends in `.tar`), then it is ready for extraction:

   `tar -xvf eda-systemz-`*`x.y.z-platform`*`.tar`

   The `tar` program creates a directory of the same name as the `tar` file (without the final `.tar`) containing further archives, checksum files, a script called `install` and a text file called `INSTALL`.

It also contains a versioned directory to ensure that any shared components already installed by other Easysoft products are only overwritten if those included in this distribution are newer.

| | |
|---|---|
| **NB** | If you do not wish to keep the original downloaded distribution file you can now delete it safely. |

8. Change into the newly-created `eda-systemz-x.y.z-platform` directory.

**Caution!**

Check through the `INSTALL` file before continuing. It gives full installation instructions for the Unix-literate, and if you are confident in the use and administration of your system, you can follow the instructions in the `INSTALL` file instead of working through the remainder of this section.

### BEGINNING THE INSTALLATION

9. Type:

```
./install
```

| | |
|---|---|
| **NB** | During the installation, you are asked to answer some questions. The default reponse is displayed in square brackets [], which you can press *<Enter>* to accept or you can choose any of the alternative responses shown in round brackets () by typing the required response and then pressing *<Enter>*.<br><br>Occasionally, the install program pauses to give you time to read the information displayed on screen. Press *<Enter>* to continue when you have read the current screen of information. |

10. If you have read and agree to the **Easysoft License Agreement**, type `yes` and then press *<Enter>* to continue.

    > **NB** You must type `yes`, not `y`, to continue.

11. Specify the directory into which you want to install the Easysoft SQI-Zortec System Z Driver.

    If you accept the default base directory, the files are installed into a subdirectory called `easysoft` within the specified path.

    For example, if you accept the default path of `/usr/local`, the files are installed into `/usr/local/easysoft`.

    If you specify an alternative directory, the files are installed into that directory but a symbolic link is created from `/usr/local/easysoft` pointing to the install directory. This link is necessary for licensing to work.

12. Depending on the server platform, there may be more than one configuration of the Easysoft SQI-Zortec System Z Driver in the distribution file. If this is the case, you will be asked to choose the configuration that best suits your system.

13. The Easysoft SQI-Zortec System Z Driver requires unixODBC to be installed. If you do not already have unixODBC installed, it is installed now.

    The Easysoft product database now needs resetting. You should close down any Easysoft products that are currently running otherwise they may terminate unexpectedly and any applications using them will need to be restarted.

### LICENSING ON UNIX

You are now asked if you want to obtain a license. Accept the default [y] to start the licensing procedure.

A menu of options is displayed.

14. Choose the option to license the Easysoft SQI-Zortec System Z Driver.

| NB | By licensing the Easysoft SQI-Zortec System Z Driver, you also license the Easysoft ODBC-ODBC Bridge. |
|---|---|

You will then be asked to provide some contact information.

15. Enter your **Name**.
16. Enter your **Company Name**.
17. Enter at least one of **Email**, **Phone** and **Fax** (preferably all three).
18. At the **Ref** prompt, do either of the following:
    - If you want a trial license, leave it blank and press *<Enter>*.
    - If you want a purchased license, enter your authorization code then press *<Enter>*.
19. The License Manager displays a menu of options for acquiring your license.

    If you have an internet connection you should select `1, Automatic`. This is the quickest and easiest method unless your firewall or other network obstacles prevent the message from getting through.

    – OR –

If you do not have an internet connection, or the `Automatic` option fails, select option 2 to write the required information to a text file in the current working directory called `license_request.txt`, which you will then need to view to obtain a license.

20. The License Manager displays the menu again. Select 0 to exit.

| | |
|---|---|
| **NB** | The View Existing Licenses option will not display any license you obtained during this License Manager session. You must quit the License Manager and allow the install script to finish applying the license. |

If you chose the automatic licensing method and licenses are retrieved, the licensing script outputs them to a file called `licenses.out`.

If the install script detects possible new licenses in the file `licenses.out` it asks whether you want to add them to the license database.

21. If you obtained licenses and you want to add them now, enter `y`.

    – OR –

    If you did not obtain licenses, enter `n`.

    – OR –

    If you do not see this message, then read on. You will need to complete the offline licensing procedure as explained in **"Completing the offline licensing procedure" on page 53**.

22. After the licensing is complete, the install program asks for the location of certain System Z files, so that a data source can be set up to your data (by default this data source is named `SYSTEMZ`).

    If you do not know the location of these files, press *<Enter>* to skip each prompt in turn.

You can specify these paths later by editing the data source directly.

- Enter the path of the data dictionary, e.g. `/z/DD.dat`. The DD.dat file defines the structure of your System Z application's data.
- Enter the path of the PN file, e.g. `/z/PN`. The PN file provides an alternative to using synonyms for file pointers; it lists the directory paths of filenames that begin with an asterisk (*).
- Enter the path of your `SYNONYM.VAL` file. This file lists the synonyms in your data.
- Enter the path of the data, e.g. `/z/DATA`. If your data cannot be located using the other references, the Easysoft SQI-Zortec System Z Driver checks this directory.

This information is written to *<InstallDir>*`/easysoft/sqi/systemz/dsn_template`, which is the temporary holding place for new data sources.

23. Choose whether to configure unixODBC for use with this [SYSTEMZ] data source.

    `odbcinst` will then add the data source stored in `dsn_template` to `odbc.ini` which is placed in `/etc` by default.

24. Choose whether to create a data source to access sample data.

You are advised to accept this option, because the sample data source [SAMPLE_SYSTEMZ] is used as an example elsewhere in this manual.

| | |
|---|---|
| **NB** | The sample data is installed into *<InstallDir>*/easysoft/sqi/systemz/demo. Do not add any important information to the sample data, because it will be overwritten if you reinstall the Easysoft SQI-Zortec System Z Driver. |

At the end of the install, information is displayed telling you which data sources have been set up and explaining how to test the installation by running the demosql SQL script provided with the Easysoft SQI-Zortec System Z Driver to query the sample data source (see **"Querying a data source on Unix" on page 60**).

If you choose to query the data source now, press *<Enter>* after you have finished to return to the system prompt.

| | |
|---|---|
| **NB** | You will not be able to query the sample data source if you have still to complete the offline licensing procedure.<br><br>Complete the licensing, as explained in **"Completing the offline licensing procedure" on page 53** and then try running demosql. |

If, at **step 22 on page 50**, you were unable to enter the locations of your System Z files, see **"Unix odbc.ini settings" on page 69** for details of which settings you need to specify for the data source before you can access the data.

If you have more than one set of System Z data, you can create more data sources by manually editing *<InstallDir>*/easysoft/sqi/systemz/dsn_template and then running odbcinst to add them to odbc.ini.

See **"Creating additional data sources on Unix" on page 68** for details of how to do this.

Once you have installed the Easysoft SQI-Zortec System Z Driver you can run the Web Administrator to create users and set up their access rights to restrict access to the System Z data. See **"Using the Easysoft Web Administrator" on page 75** for details.

### COMPLETING THE OFFLINE LICENSING PROCEDURE

If at **step 19 on page 49** you chose to write the licensing information to a file, you still need to complete the licensing procedure before the Easysoft SQI-Zortec System Z Driver can be used.

The licensing information is written to the `license_request.txt` file.

This file contains information including a machine number (a number unique to your machine) which Easysoft require before you can be issued with a license key.

1. Do any one of the following:

   - Display the `license_request.txt` file (e.g. using `cat license_request.txt`) and note the machine number. Now run a web browser and go to **http://www.easysoft.com/sales/autolicense.phtml**. Log in to the Easysoft web site. On the License Generator screen, choose the type of license you want, then enter your machine number and click **Continue**. You can now close the web browser. You will shortly receive your license key(s) via email.
   - Email the file `license_request.txt` to **autolicense@easysoft.com**. Your license key(s) will be emailed to you automatically.

- Email the file `license_request.txt` to **license@easysoft.com**. A member of the Licensing Department will email the license keys(s) to you.

2. When you receive your license key(s), append them to the file `/usr/local/easysoft/license/licenses`, removing any `LIC:` prefixes.

| | |
|---|---|
| **NB** | The Easysoft license responder puts an attachment in its outgoing emails that allows Windows users to activate their licenses with a double-click. If you read your email in Windows, this attachment will be visible but it will not work for licensing Unix versions of the software. |

The Easysoft SQI-Zortec System Z Driver is now licensed and you can begin using it.

If you need further information about licensing, please refer to the **Licensing Guide**.

## Uninstalling on Unix

To uninstall the Easysoft SQI-Zortec System Z Driver, you need to:

- stop the Web Administrator if it is running (the Web Administrator is explained fully in **"Administration" on page 75**).
- remove the *<InstallDir>*`/easysoft/sqi/systemz` directory.

To stop the Web Administrator:

1. Log onto your Unix machine as `root`.
2. Change into the *<InstallDir>*`/easysoft/sqi/systemz` directory.
3. You can check if the Web Administrator is running by typing

   ```
   cat /etc/services
   ```

   A list of the ports currently in use is displayed. By default the Web Administrator listens at port `8454`.
4. Type

   ```
   ./stop_http.sh
   ```
5. When asked if you want to stop all http administration servers, type

   y

   If you do not stop the Web Administrator, then later perform another installation of the Easysoft SQI-Zortec System Z Driver, the installation may not be successful.

To remove the *<InstallDir>*`/easysoft/sqi/systemz` directory:

1. Change into the *<InstallDir>*`/easysoft/sqi/systemz` directory.
2. Type

   ```
   rm -rf *
   ```

   to delete all the files and directories beneath the current directory.

3. Type

   ```
   cd ..
   ```

   to move back up one level in the directory structure.

4. Type

   ```
   rmdir systemz
   ```

   to remove the `systemz` subdirectory.

   If you have installed the Easysoft ODBC-ODBC Bridge or the Easysoft JDBC-ODBC Bridge and you wish to uninstall, please refer to the manual supplied with that product for details of its uninstall procedure.

   Any licenses you obtain for the Easysoft SQI-Zortec System Z Driver and other Easysoft products are stored in the *<InstallDir>*`/easysoft/license/licenses` file.

   After uninstalling the Easysoft SQI-Zortec System Z Driver, unless you have deleted this file, you will not need to relicense the product when you reinstall or upgrade.

   However, for security purposes you may want to make a copy of *<InstallDir>*`/easysoft/license/licenses` before uninstalling.

# CONFIGURATION

3

## Configuring the Easysoft SQI-Zortec System Z Driver

This section explains how to check that the Easysoft SQI-Zortec System Z Driver is connecting to a sample System Z database and how to set up additional local data sources on both Windows and Unix.

### Chapter Guide

## Creating data sources

When the Easysoft SQI-Zortec System Z Driver is installed, a System Data Source called `SAMPLE_SYSTEMZ` is automatically created to point at an Easysoft sample System Z database in the `<InstallDir>\Easysoft\Easysoft Data Access for Zortec System Z\Demo` directory on the server machine when the Easysoft SQI-Zortec System Z Driver is installed.

This is used as an example in **"Querying a data source on Windows" on page 60** and **"Querying a data source on Unix" on page 60** to illustrate how to validate that a connection has been made after the installation process has been completed.

Another data source called `SYSTEMZ` is also created, which contains empty data and schema directories which are ready to accept data definitions entered via the Easysoft Administrator.

The `SYSTEMZ` data source can be used to point directly at your own ISAM data or new data sources may be created, as shown in **"Creating additional data sources on Windows" on page 62** and **"Creating additional data sources on Unix" on page 68**, to:

- allow access to multiple System Z files with the same name and layout, but located in different directories
- provide different sets of permissions and privileges for the same database
- allow groups of files from the same database to be configured differently
- allow multiple copies of the same database to be separately configured

- permit an application into which the data source name has been hard-coded to access a database

A correctly configured data source can then be connected to from any ODBC-compliant application.

An example is provided in **"Demonstration" on page 95**.

| | |
|---|---|
| **NB** | If you are implementing cross-platform access to your System Z data using the Easysoft ODBC-ODBC Bridge or the Easysoft JDBC-ODBC Bridge, see **"Client Setup" on page 85**. |

## Querying data sources

After installing the Easysoft SQI-Zortec System Z Driver it is a good idea to check that it is successfully accessing your System Z data.

| | |
|---|---|
| **NB** | The following SQL utilities will not work correctly with the Easysoft SQI-Zortec System Z Driver if synonyms have not been detected in your System Z application data.<br><br>Synonyms are detected from a file called `SYNONYM.VAL`, which can be specified by the database owner for each individual user.<br><br>You can do this either by using the Web Administrator (see **"Adding Users" on page 79**) or by specifiying an attribute for the data source (see **"Creating additional data sources on Windows" on page 62** or **"Creating additional data sources on Unix" on page 68**). |

## Querying a data source on Windows

On Windows, the Easysoft SQI-Zortec System Z Driver installs a program called `sql.exe` into *<InstallDir>*`\Easysoft\Easysoft Data Access for Zortec System Z`, which can be run with a data source as a parameter.

For example:

```
sql.exe "dsn=sample_systemz"
```

which points at the `SAMPLE_SYSTEMZ` Easysoft demo database.

When the Easysoft SQI-Zortec System Z Driver is installed, a System Data Source called `SAMPLE_SYSTEMZ` is automatically created and the demo database is loaded into the *<InstallDir>*`\Easysoft\Easysoft Data Access for Zortec System Z\Demo` directory.

## Querying a data source on Unix

On Unix, you can type SQL queries at the system prompt once you have installed the Easysoft SQI-Zortec System Z Driver, which allows you to test whether or not the Easysoft SQI-Zortec System Z Driver is successfully accessing your System Z data.

An Easysoft script called `isql` is provided to enable you to run the SQL command without needing to set `LD_LIBRARY_PATH`.

This script determines the `LD_LIBRARY_PATH` values from a separate configuration file (`es.ld.so.conf`) and then runs the '`sql`' command, specifying the data source to query and the user name and password to use to access the data source.

By default, the `isql` script specifies:

- the data source name as `sample_systemz` (`dsn=sample_systemz`).
- the user name as `dbo` (`uid=dbo`).
- the password as `easysoft` (`pwd=easysoft`).

User names and passwords can be set up by the database owner (see **"Adding Users" on page 79**).

If you have different logon details (e.g. if you want to query a different data source), edit the script to change those details.

| | |
|---|---|
| **NB** | Before editing the `isql` script, you will need to allow write permissions to the file so that it can be edited, but remember to remove these after you have finished. |

If you have more than one data source, you can create a copy of the `isql` script for each data source and specify the appropriate data source name in each copy of the script, giving you a script ready to run for querying each data source.

To query a data source using the `isql` script:

1. Change into the *<InstallDir>*`/easysoft/sqi/systemz` directory.
2. Type:

   ```
   ./isql
   ```

   If an '`invalid user`' or '`invalid password`' error is displayed, check that the script specifies the correct user name and password.

   If a line beginning `"conn ="` is displayed, then the connection has been made and you can type an SQL statement to query the data source.

For example:

```
select * from info_schema.tables;
```

3. To finish your SQL session, press *<Enter>* to return to the system prompt.

Another utility, also called `isql`, is included in unixODBC, the Open Source ODBC Driver Manager for non-Windows platforms, which is installed with the Easysoft SQI-Zortec System Z Driver on Unix.

To run this program:

1. Change into the *<InstallDir>*/easysoft/unixODBC/bin directory.
2. Type:

```
./isql DSN [UID [PWD]] [options]
```

where

- `DSN` is the data source name
- `UID` is the user name
- `PWD` is the password

Type `./isql` only to get details of the possible options that you can enter.

---

### Creating additional data sources on Windows

To create a data source connecting to your local System Z data:

1. Select **Start > Settings > Control Panel**, double-click **Administrative Tools** and then **Data Sources (ODBC)**.

| | |
|---|---|
| **9x** | Select **Start > Settings > Control Panel** and double-click **ODBC Data Sources (32bit)**. |

| NT | Select **Start > Settings > Control Panel** and double-click **Data Sources (ODBC)**. |
|---|---|

The **ODBC Data Source Administrator** dialog box is displayed:

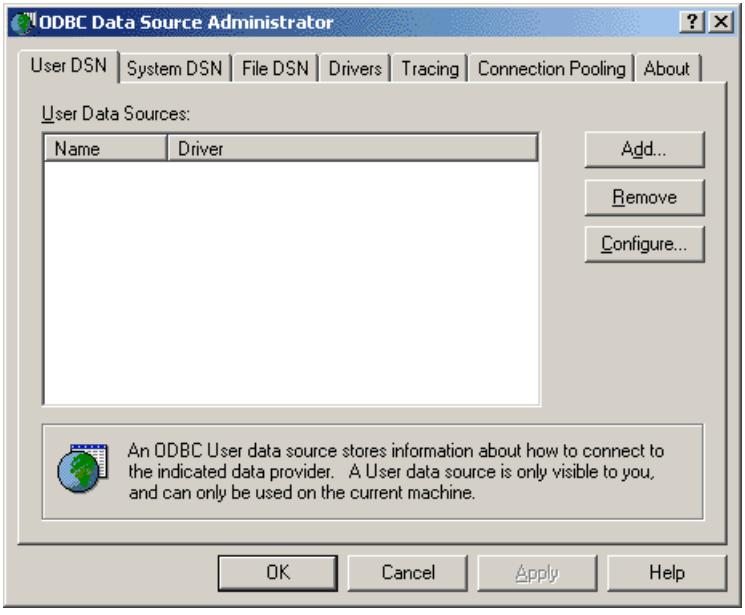



**Figure 15: The ODBC Data Source Administrator**

2. Select the **User DSN** tab to set up a data source that only you can access.

   – OR –

   Select the **System DSN** tab to create a data source which is available to anyone who logs on to this Windows machine.

3. Click **Add** to add a new DSN.

The **Create New Data Source** dialog box displays a list of the drivers which are available:

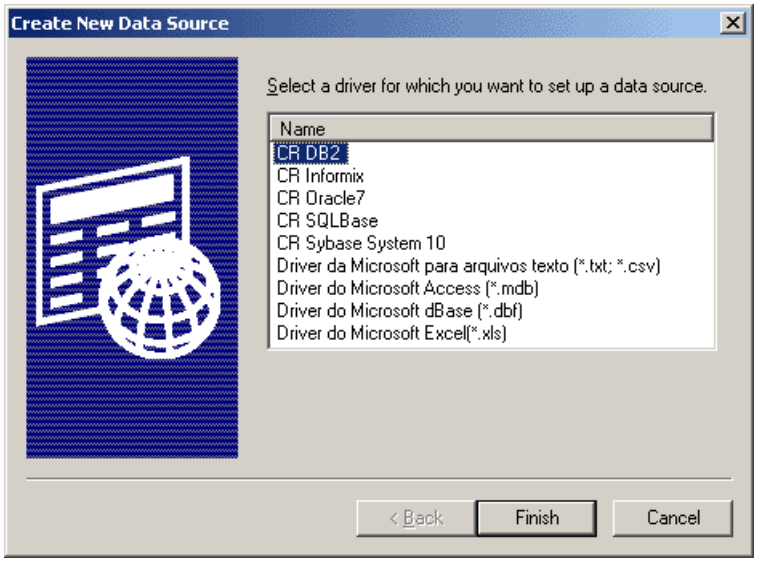



**Figure 16: The Create New Data Source dialog box**

4. Select `Easysoft Zortec System Z` and then click **Finish**.

A dialog box displays the fields required to configure an Easysoft SQI-Zortec System Z Driver data source:

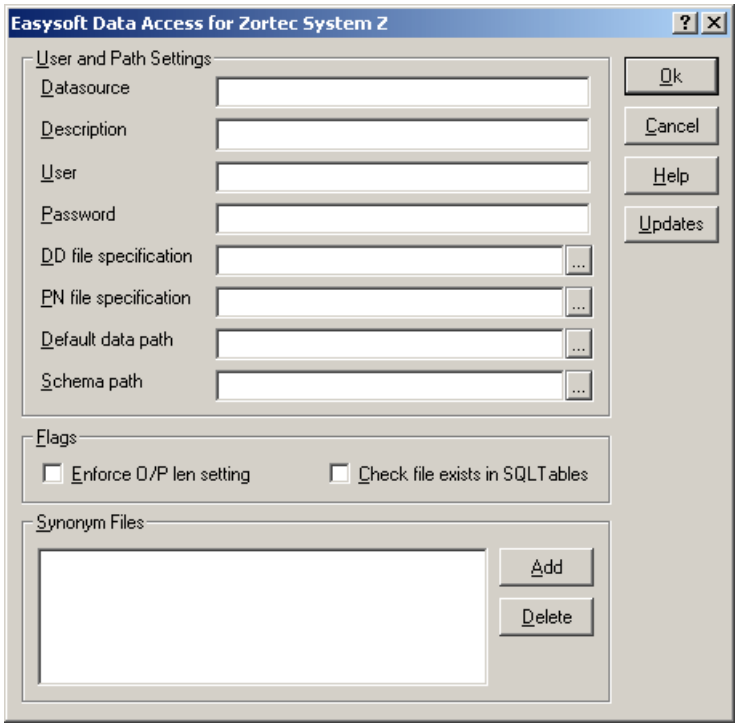



**Figure 17: The Easysoft SQI-Zortec System Z Driver DSN setup dialog box**

- **Datasource**

  The name of the User or System data source to be created, as used by the application when calling the `SQLConnect` or `SQLDriverConnect` functions.

  This name cannot be changed once the data source has been created.

- **Description**

  Descriptive text which may be retrieved by certain applications to describe the data source.

- **User**

  The user name (if any) with which you will connect to the data source.

- **Password**

  The password (if any) for the user name you have entered in the **User** field.

- **DD file specification**

  The path of the data dictionary file (`DD.dat`) for the data that you want to access with this data source.

- **PN file specification**

  The path of the `PN` file for the data that you want to access with this data source.

- **Default data path**

  The default path of the data that you want to access with this data source.

- **Schema path**

  The directory where the schema files (views, users, passwords and privileges) for the data source are stored.

  Each data source should have a different schema path to allow unique users and privileges to be specified.

If schema files (e.g. `user.dat`, `user.idx`) do not exist in the specified directory then a database owner ('`dbo`' user) with the password '`easysoft`' is created, which can be used to set up more users and specify their access rights in the Web Administrator.

- **Enforce O/P len setting**

  Select this attribute to enforce the System Z output length settings.

  This might result in fields being truncated and data being lost.

- **Check file exists in SQL tables**

  Select this attribute to check that a table exists before it is loaded.

  An error will be displayed if a table is not found.

- **Synonym Files**

  Click Add to add a SYNONYM.VAL file to the list specified for this data source or click Delete to remove a SYNONYM.VAL file from the list specified for this data source.

  Any `SYNONYM.VAL` files listed here are checked only if no `SYNONYM.VAL` file is specified for this user via the Web Administrator (see **"Adding Users" on page 79** for details of specifying `SYNONYM.VAL` per user via the Web Administrator).

5. Click **OK** to create the data source, or click **Cancel** to abandon it.

When your data source is correctly set up, you can connect to it from within ODBC-compliant applications such as Microsoft Access or Microsoft Excel (see **"Demonstration" on page 95**).

The **Updates** button on the **Easysoft Data Access for Zortec System Z** DSN dialog box attempts to connect your machine to the Internet and get the latest version number for this software from the Easysoft version server.

A message will be displayed if a more recent version of the software is available.

If you have changed your data source configuration, you are advised to click **OK** on the dialog box to save the changes before accepting the new software.

### Creating additional data sources on Unix

To create a data source connecting to your local System Z data requires you to edit the `SYSTEMZ` data source created during the installation, which contains empty data and schema directories that are ready to accept data definitions entered via the Easysoft Administrator:

1. Change into the `<InstallDir>/easysoft/sqi/systemz` directory.
2. Open the file `dsn_template` in an editor.
3. Edit the following settings:
   - replace the data source name, [SYSTEMZ] by default, with the name of your data source.
   - change the `data_path` to point to the directory containing your System Z application data.

- change the `dd_file` to point to the data dictionary for this data.
- change the `pn_file` to point to the PN file for this data.
- change the `synonym_1` path to point to the SYNONYM.VAL file for this data.

4. Save the file under a new name.
5. Change into the *<InstallDir>*`/easysoft/unixODBC/bin` directory.
6. Type:

   `odbc_system_dsn=1 ./odbcinst -i -s -f` *`filename`*

   where *`filename`* is the name you chose at step 4.

   This creates a system-wide data source in the `odbc.ini` file, so that it can be accessed by the unixODBC driver manager.

   See **"Unix odbc.ini settings" on page 69** for details of other settings that you can specify in `odbc.ini`.

| **NB** | Data sources can also be created by adding their attributes directly into the `odbc.ini` file. |
|---|---|

#### UNIX ODBC.INI SETTINGS

If you are running the Easysoft SQI-Zortec System Z Driver on a Unix machine, you will probably set up data sources by editing `dsn_template.sample` (see **"Creating additional data sources on Unix" on page 68**).

However, if you intend to edit `odbc.ini` directly, you should be familiar with all the data source parameters that can be specified (by default, `odbc.ini` is located in the `/etc` directory):

| Setting | Description/Example |
|---|---|
| [data source name] | e.g. [SYSTEMZ] |
| driver = `ZORTEC_SYSTEMZ` | |
| sort_path = `/tmp` | Temporary directory |
| sort_mem_size = 256 | Amount of memory allocated for sorts before the results are saved to disk |
| rs_mem_size = 256 | Number of rows that will cache into memory before being stored on disk |
| rs_path = `/tmp` | Temporary directory |
| blob_path = `/tmp` | Temporary directory |
| sqicount = 1 | Number of SQI's this data source uses |
| target_string1 = Zortec System Z SQI | Connection string for SQI |
| target_driver1 = `/usr/local/easysoft/sqi/systemz/libessystemz_sqi.so` | Required SQI driver |
| dtcount = 1 | Number of datatype libraries required for Zortec System Z |
| dtlibrary1 = `/usr/local/easysoft/sqi/systemz/libessystemz_dt.so` | Data type library for data type conversions |
| data_path = path of the System Z application data | e.g. `/u/Z` |
| dd_file = path of DD.dat file | e.g. `/u/Z/DD.dat` |

| Setting | Description/Example |
|---|---|
| pn_file = path of PN file | e.g. `/u/Z/PN` |
| synonyms = | Number of SYNONYM.VAL files to check for this data source |
| synonum_*n* = | Path of SYNONYM.VAL file to check for this data source. If you are using multiple SYNONYM.VAL files then you must list them in the order that you want them to be checked. |
| schema_path = `/usr/local/easysoft/sqi/systemz/schema/` | Directory where the data source's schema files (views, users, passwords and privileges) are stored. Specify a different schema path per data source so that you can set up different users and privileges for each data source. |
| cache_expiry = 2 | How long files are cached open for (default is 2) |
| cache_maxopen = 30 | Maximum number of concurrently cached files (default is 30) |
| logging = 3 | See **"Logging options" on page 72**. |
| logfile = `/tmp/systemz` | See **"Logging options" on page 72**. |
| default_uid = | Specify a default user name for the data source. This overrides any user name specified on remote client machines. |
| default_pwd = | Specify a default password for the data source. This overrides any password specified on remote client machines. |

**Figure 18: Unix odbc.ini settings**

### LOGGING OPTIONS

By including particular settings in your `odbc.ini` file, you can specify various levels of logging.

**Caution!** Enabling logging will seriously impair performance so remember to disable it once you have finished.

To enable logging, include the `logfile=` and the `logging=` lines in your `odbc.ini` file:

- `logfile=` specifies the directory path and the filename prefix to which the log file is generated.

  The log filename takes this prefix and the process ID.

  For example, if you set `logfile=/tmp/systemz` then the log filename will be something like `systemz_026503.log`.

- `logging=` specifies the level of logging that you want.

  The values you can set it to are:

| Log Number | Log Description |
|---|---|
| 1 | logs entry to all functions and attributes to all calls in the SQI layer |
| 2 | logs exit from all functions |
| 4 | logs information regarding the file cache |
| 8 | logs information on opening of files and how many reads are performed |
| 16 | logs any expression checking that the SQI layer performs |
| 32 | logs any errors reported at the SQI layer |
| 64 | logs the selection of indexes used when starting a query |
| 128 | logs summary information about the SQI function calls |

**Figure 19: Unix logging settings**

You can enable multiple logging options simply by adding the values together. For example, for entry, exit and expression logging, 1+2+16=19.

## Checking for unsupported data types

System Z contains in excess of 200 data types and a platform-specific utility is provided with the Easysoft SQI-Zortec System Z Driver to detect any obscure data types which are not supported in the current release:

**Win**

1. Run a DOS prompt and change into the `Program Files\Easysoft\Easysoft Data Access for Zortec System Z` directory.

2. Type:

```
ddcheck -d data dictionary file
```

where *`data dictionary file`* is the path and filename of your data dictionary. For example:

```
ddcheck -d \z\DD.dat
```

**Unix**

1. Change into the *`<InstallDir>`*`/easysoft/sqi/systemz` directory.

2. Type:

```
./ddcheck -d data dictionary file
```

where *`data dictionary file`* is the path and filename of your data dictionary. For example:

```
./ddcheck -d /z/DD.dat
```

If your data contains any unsupported data types, they are listed on screen along with the file names that you should send to Easysoft if you want these data types to be resolved.

# ADMINISTRATION

4

## Using the Easysoft Web Administrator

This section describes how to create and grant user access permissions to your data using the Easysoft Web Administrator provided with the Easysoft SQI-Zortec System Z Driver.

### Chapter Guide

## Introduction

The Web Administrator utility allows you to limit the access that people have to your data by creating users for a data source and specifying their access rights to the data within that data source.

This allows individual users to be prevented from editing, deleting or viewing certain files.

## Starting the Web Administrator

To run the Web Administrator it is necessary to start the Web Administrator server and then connect to it from a web browser.

Follow the instructions in the appropriate platform box to start the server:

| | |
|---|---|
| **Win** | 1. Select **Start > Programs > Easysoft > Easysoft Data Access for Zortec System Z > Web Administration Server**.<br>The Web Administrator starts up in a minimized DOS session. The port at which the server is listening is displayed in this DOS window. The default port is `8454`. |

| | |
|---|---|
| **Unix** | 1. Log onto your machine as `root`.<br>2. Change into the *`<InstallDir>`*`/easysoft/sqi/systemz` directory.<br>3. Type:<br>`./start_http.sh`<br>Accept the default port (`8454`) or specify another unused port. |

Run a Web browser on the machine from where you want to manage your users, and go to `http://`*`server`*`:8454` (where *`server`* is the name or IP address of the machine on which the Easysoft SQI-Zortec System Z Driver is installed and `8454` is the port at which the Web Administrator is listening).

For example, if the Web Adminstrator is running on the local machine, type:

```
http://localhost:8454
```

The main screen of the Web Administrator displays a list of the data sources which have been configured for use with the Easysoft SQI-Zortec System Z Driver:

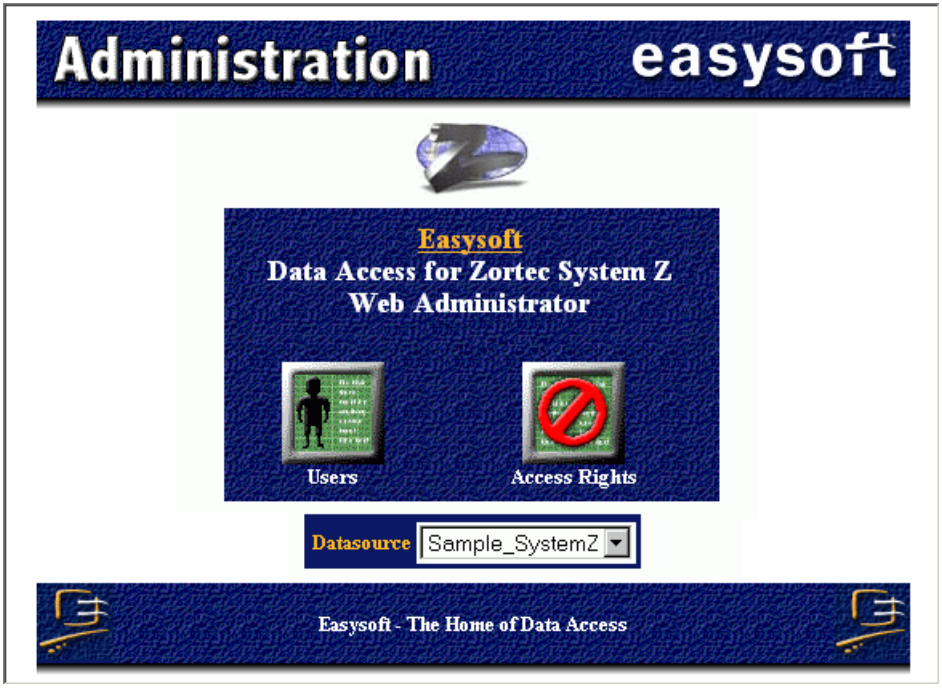



**Figure 20: The main Web Administrator screen**

| Unix | During installation, if you did not specify the file locations needed to link to your System Z data, and you have not specified them since, any attempt to work with a SYSTEMZ data source will produce an error. See **"Unix odbc.ini settings" on page 69** for details of the attributes you need to set to configure the data source. |
|---|---|

If you ever need to stop the Web Administrator:

- Windows users should close the DOS window in which the server is running.
- Unix users should log on as `root`, change into the *<InstallDir>*`/easysoft/sqi/systemz/bin` directory and run `./stop_http.sh`.

The Web Administrator should only ever need to be restarted if the server fails or if it is to be run from another port.

| NB | Sufficient permissions are required in order to stop the Web Administrator (i.e. users other than `root` can only stop processes they started). Also, in Unix (especially) file permissions dictate who can change the schema files where the users and privileges are stored. |
|---|---|

## Logging on to the Web Administrator

To create users and specify their rights, you must log on to the Web Administrator as the top level user (known as the database owner) and enter the password for that user.

You are required to log on when you click **Users** or **Access Rights** for the first time in a Web Administrator session, and again if you select a different data source or change the password of the database owner.

When asked to log on for the first time, enter a user name of `dbo` and password of `easysoft`, but once logged on, the password of the database owner must be changed immediately:

1. Click **Users** to display a list of users.

   Only the `dbo` user is set up by default.

2. Enter a new `dbo` password in the **Password** box and the old `dbo` password in the **Old Password** box.

   The old password must be entered for the new password to take effect.

3. Click **Submit** to save the new `dbo` password.

   **"Adding Users" on page 79** explains how to add other users so that their access to the ISAM data can be restricted.

| | |
|---|---|
| **NB** | The database owner sees all tables that contain System Z data within the Web Administrator, irrespective of their own synonym settings. |

### Adding Users

To add users:

1. Log on to the Web Administrator as described in **"Logging on to the Web Administrator" on page 78**.

   You must log on as the `dbo` user if you have not already done so.

2. Click **Users**

3. Select the data source for which you want to create users.

   Any users already set up for this data source are listed on the page. The last row in the list of users is blank, which is where the details are entered to add a new user.

| NB | Click **Refresh** whenever you select a different data source to ensure that you are viewing the correct list of users for that data source. |
|---|---|

4. To add a user, type a name in the empty **User** box.
5. Enter a `SYNONYM.VAL` file and/or password for the user if required:
   - a `SYNONYM.VAL` file contains a user-specific list of synonyms in the System Z data, and can either be specified here or as an attribute of the data source (any synonyms specified here override any specified as an attribute of the data source).
   - a password provides additional security against unauthorized access to the selected data source.
6. Click **Submit** to create the user:

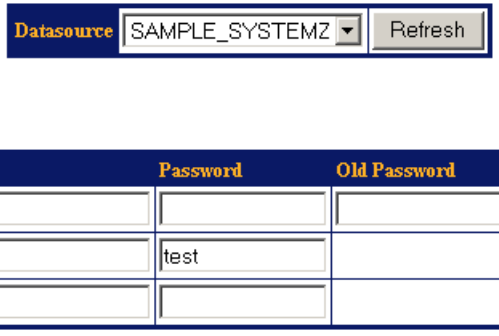



**Figure 21: Adding users in the Web Administrator**

By default, new users do not have access to any tables in the selected data source.

To find out how to enable privileges for a user see **"Specifying user access rights" on page 82**.

When you have enabled a user, you must inform the user of their user name and password (if any) because they will need to enter these details when setting up a data source to connect to the System Z data.

Where the user enters these details depends on how they are connecting to the data, as the user name and password may be entered either as part of the data source configuration during set up or via an application dialog box at run time.

To configure the data source:

- when connecting to local data on a Windows NT machine, the user needs to enter these details on the **Easysoft Data Access for Zortec System Z** DSN dialog box
- when connecting to local data on a Unix machine, the user needs to enter these details in the appropriate DSN section in `odbc.ini`
- when using an Easysoft ODBC-ODBC Bridge client on Windows NT to connect to data on a Unix server, the user must enter these details on the **Easysoft ODBC-ODBC Bridge** DSN dialog box that they complete to connect to the data source.

| | |
|---|---|
| **NB** | The user name and password are case-sensitive, so ensure that you give your users these details in the correct case. |

## Modifying and removing users

You can change a user's `SYNONYM.VAL` file and/or password and delete users to permanently remove their access to the database.

To modify or remove a user:

1. Log in to the Web Administrator as described earlier.
2. Click **Users**.
3. Select the data source whose users you want to modify or delete, then click **Refresh** to ensure that you are viewing the users for that data source.
4. Edit the details in the **Synonym File** or **Password** box for the appropriate user then click **Submit** to confirm your changes.
5. To delete a user, click the **Delete** box for that user (the box contains an X when it is selected), then click **Submit**. The user is removed from the list on this page.

### Specifying user access rights

Once you have created a user for a System Z data source, you can choose which data source tables that user has access to and whether they have select, insert, update or delete access to each table.

To grant a user access to specific data source tables:

1. Log in to the Web Administrator as described earlier.
2. Click **Access Rights**.
3. Choose the data source for which you are granting access. Click **Refresh** to ensure that the correct list of users is displayed.
4. Choose the user for whom you want to grant access (choose the Public user to specify the same rights for all users).
5. Click **Refresh** to ensure that the correct permissions are displayed for this user.

All the tables in the selected data source are listed, and the current user's rights to those tables are shown.

6. To grant the user all rights to all tables, click **Grant All**.
7. To remove all the user's rights to all tables, click **Revoke All**.
8. To grant specific rights to specific tables, select or deselect the appropriate boxes and click **Submit Selection** to apply the changes.

   For example, to give a user read-only access to all the tables in the data source, click **Revoke All** to remove all their rights, then click the **Select** box for each table (these boxes contain an X when they are selected) and apply the changes by clicking **Submit Selection**.

   In **"The Web Administrator user access rights screen" on page 83**, user `test` has SELECT access for all four tables in the data source, INSERT access to the Supplier table, and UPDATE and DELETE access to the Product table:

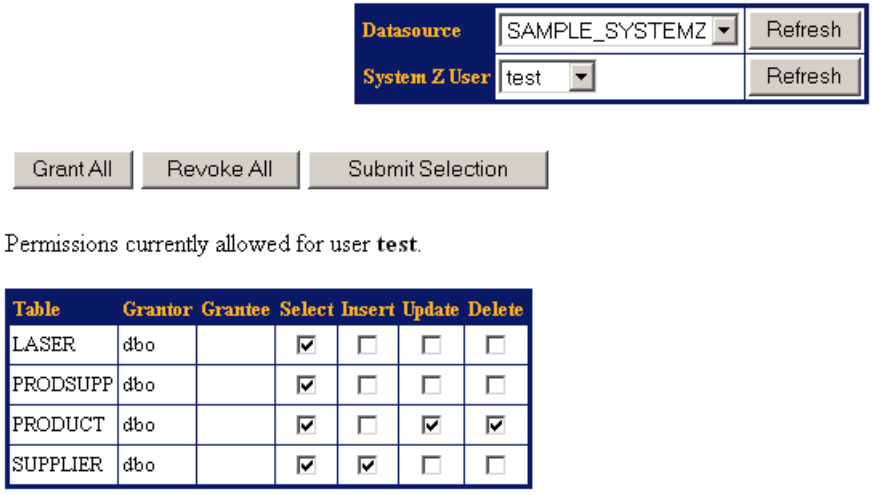
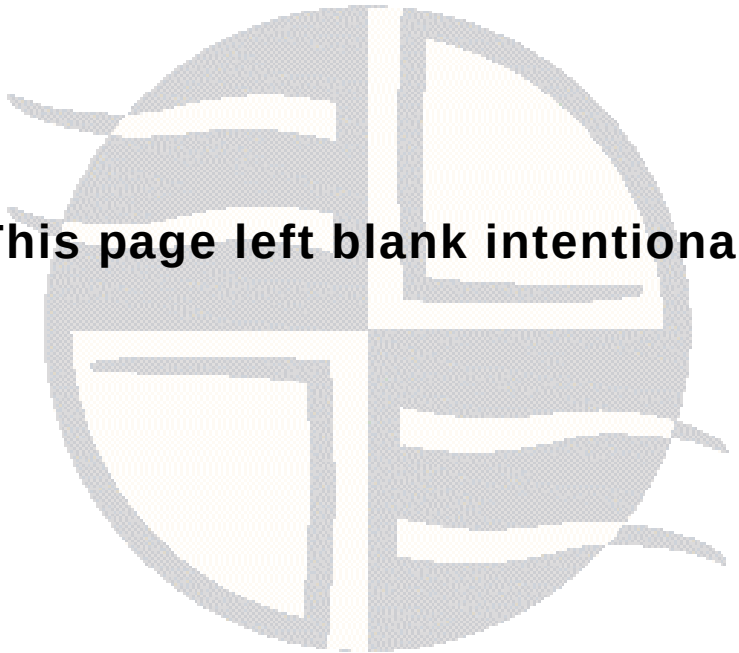



**Figure 22: The Web Administrator user access rights screen**



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# CLIENT SETUP

5

## Setting up clients to connect to Zortec System Z data

This section explains how to set up Windows client machines to connect to System Z data on the server.

The procedure involves installing the Easysoft ODBC-ODBC Bridge client and setting up a data source.

### Chapter Guide

## Installing the Easysoft ODBC-ODBC Bridge client

You can install the Easysoft ODBC-ODBC Bridge client on either Windows or Unix platforms, but, while installing the Easysoft ODBC-ODBC Bridge client on Unix makes it possible to access your Zortec System Z data from Perl, CGI and Apache/PHP, most users of the Easysoft SQI-Zortec System Z Driver will probably be running Windows machines to access their Zortec System Z server data.

To install the Easysoft ODBC-ODBC Bridge client on Windows:

1. Run the Easysoft ODBC-ODBC Bridge installation file.

   This file is supplied as a `.exe` on Windows (see **"Obtaining the Easysoft SQI-Zortec System Z Driver" on page 24**).

2. Follow the instructions on screen to install the Easysoft ODBC-ODBC Bridge client component, which must be installed on each machine that will be used to access the server database.

   You do not need to license the Easysoft ODBC-ODBC Bridge client, because the client license is covered by the Easysoft ODBC-ODBC Bridge server license that you obtained when licensing the Easysoft SQI-Zortec System Z Driver.

   Once you have installed the Easysoft ODBC-ODBC Bridge client, you can set up a data source to connect to the Zortec System Z data on the server (see **"Setting up a data source on your Windows client" on page 87**).

   Please refer to the Easysoft ODBC-ODBC Bridge manual for full details of the client installation on both Windows and Unix.

   For details of connecting from a remote JDBC client, please refer to the Easysoft JDBC-ODBC Bridge manual.

## Setting up a data source on your Windows client

To enable cross-platform ODBC access to your data using the Easysoft ODBC-ODBC Bridge you need to create a remote data source on your client to connect to your data on the server.

1. Select **Start > Settings > Control Panel**, double-click **Administrative Tools** and then **Data Sources (ODBC)**.

| | |
|---|---|
| **9x** | Select **Start > Settings > Control Panel** and double-click **ODBC Data Sources (32bit)**. |
| **NT** | Select **Start > Settings > Control Panel** and double-click **Data Sources (ODBC)**. |

The **ODBC Data Source Administrator** dialog box is displayed:

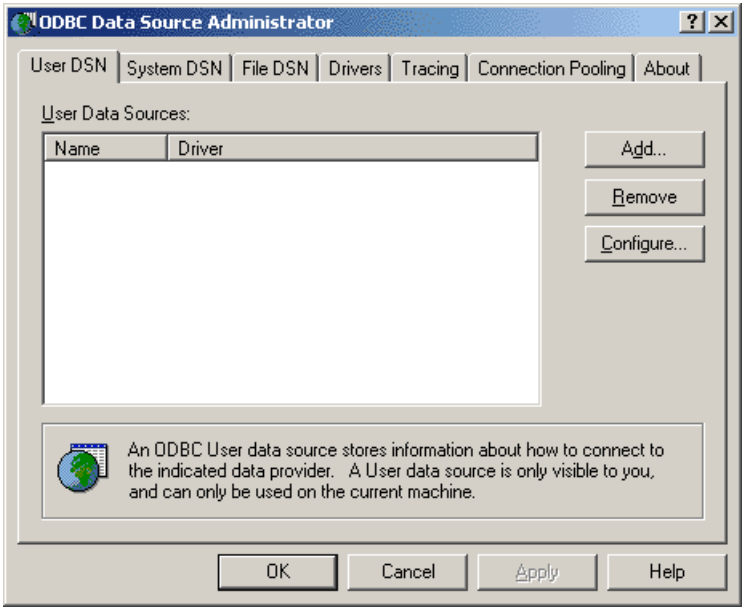



**Figure 23: The ODBC Data Source Administrator**

2. Select the **User DSN** tab to set up a data source that only you can access.

   – OR –

   Select the **System DSN** tab to create a data source which is available to anyone who logs on to this Windows machine.

3. Click **Add** to add a new DSN.

   The **Create New Data Source** dialog box displays a list of the drivers which are available:

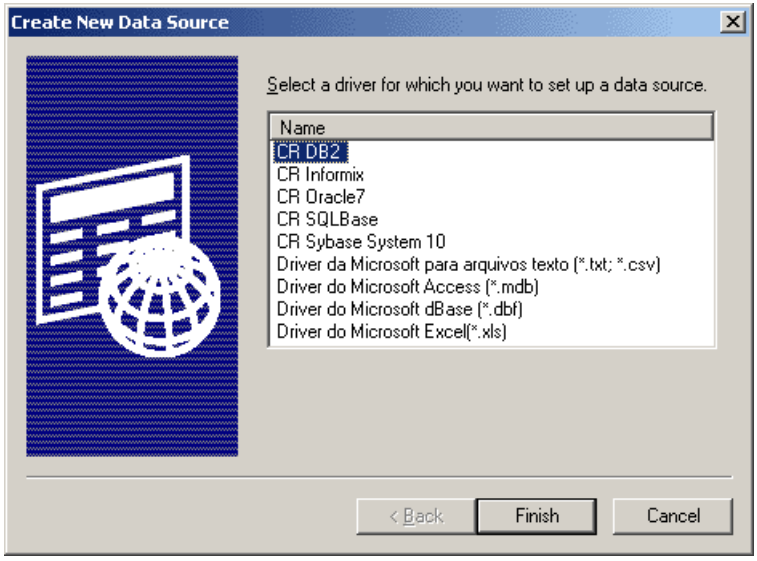



**Figure 24: The Create New Data Source dialog box**

4. Select `Easysoft ODBC-ODBC Bridge` and click **Finish**.

The Easysoft ODBC-ODBC Bridge dialog box is displayed:

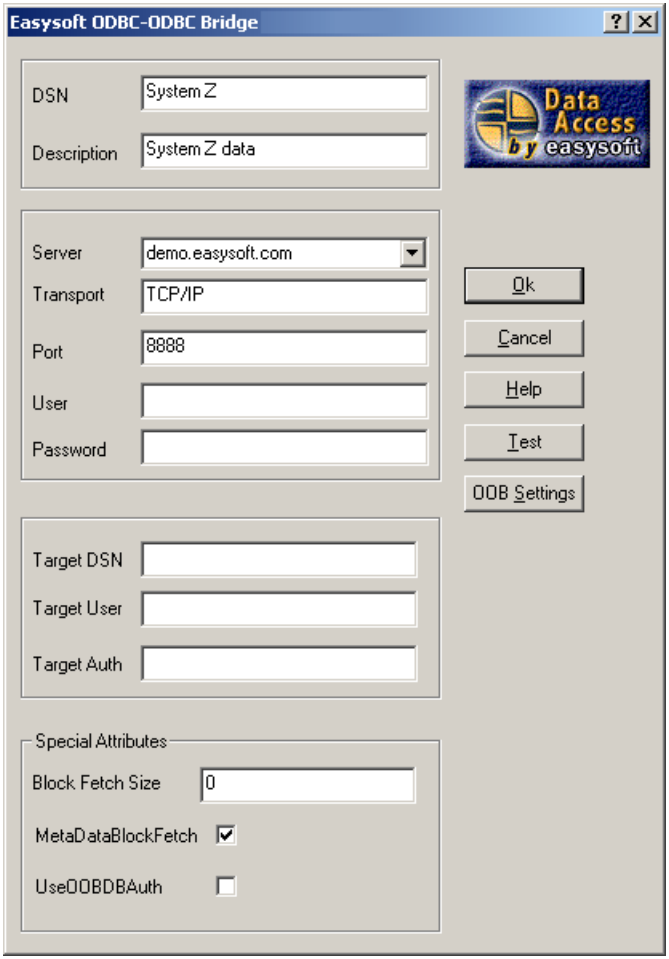



**Figure 25: The Easysoft ODBC-ODBC Bridge DSN setup dialog box**

5. In the **DSN** field, type a name for the data source, e.g. "`System Z`". Choose carefully because you cannot change this later.

6. In the **Description** field, type a description for the data in the data source, e.g. "`System Z data`".
7. In the **Server** box, type the hostname or IP address of the System Z server.
8. The **Transport** field shows the network transport protocol that will be used to connect to the data.

   By default this is set to `TCP/IP` because this is the only protocol currently supported.
9. The **Port** field shows the port number on the server at which the Easysoft ODBC-ODBC Bridge server is listening for connections.

   Accept the default (8888) unless you know that the server is listening at a different port.
10. In the **User** and **Password** fields, type the user name and password that you use to log on to the server machine on which the System Z data is stored.
11. In the **TargetDSN** field, type the name of the System Z data source on the server machine.

    Your system administrator will be able to tell you what this name is.
12. In the **Target User** and **Target Auth** fields, type the user name and password that you use to log on to your System Z server database.

    Your system administrator will be able to tell you what your logon details are.
13. Set **Block Fetch Size** to 10.

    This means that rows of data will be returned in blocks of 10 instead of one row at a time, resulting in faster performance.

    However, you should set this value to 1 if your ODBC application uses cursors or positioned updates/deletes.

14. Click **Test** to see if this data source can connect to the data on the server.

    The results are displayed in a separate window.

15. If the test is successful, click **OK** in the **Easysoft ODBC-ODBC Bridge** dialog box.

    The new data source is listed on the **User DSN** or **System DSN** tab of the **ODBC Data Source Administrator**.

16. Click **OK** to close the **ODBC Data Source Administrator**.

    Possible reasons for an unsuccessful test are:

    - if you see an "*Authentication Failure*" error, double-check the **User** and **Password** settings.
    - if you see a "*Failed to connect to remote driver*" error and additional text in which a login failure is noted, double-check the **Target User** and **Target Auth** settings.
    - if you see an error referring to data sources or DSNs, double-check the **Target DSN** name.
    - if you see a message referring to RPC, the client cannot connect to the Easysoft ODBC-ODBC Bridge server, so double-check the **Server**, **Transport** and **Port** settings.

## Worked example for Windows clients

This section provides a worked example of using Microsoft Excel 97 to connect to your System Z data source.

This worked example assumes that:

- you have a data source connecting to your System Z data on the server. Consult your system administrator if you need to create a data source and are unsure where the data is stored on the server.
- your system administrator has given you access (via the Easysoft SQI-Zortec System Z Driver) to at least the SALES_CUSTOMER table in the data source.
- you have Microsoft Query installed (so that the **Data > Get External Data** command is available).
- you are familiar with the basics of using Microsoft Excel.

To obtain a list of customers and display the results in Microsoft Excel:

1. Run Microsoft Excel.
2. Select **Data > Get External Data > Create New Query**.
3. On the **Choose Data Source** dialog box, select the data source that connects to your System Z data.
4. Make sure the **User Query Wizard** to create/edit queries option is selected (the box is ticked when the option is selected).
5. Click **OK** on the dialog box.
6. On the **Query Wizard - Choose Columns** dialog box, scroll down the list of tables to find the SALES_CUSTOMER table.

7. Click the + adjacent to this table to view the columns within it.
8. Select each of the following columns in turn, and click **>** so that they are listed in the **Columns in your query** box:

   `CUSTOMER`

   `ALPHA`

   `NAME`

   `ADDRESS1`

   `ADDRESS2`

   `ADDRESS3`

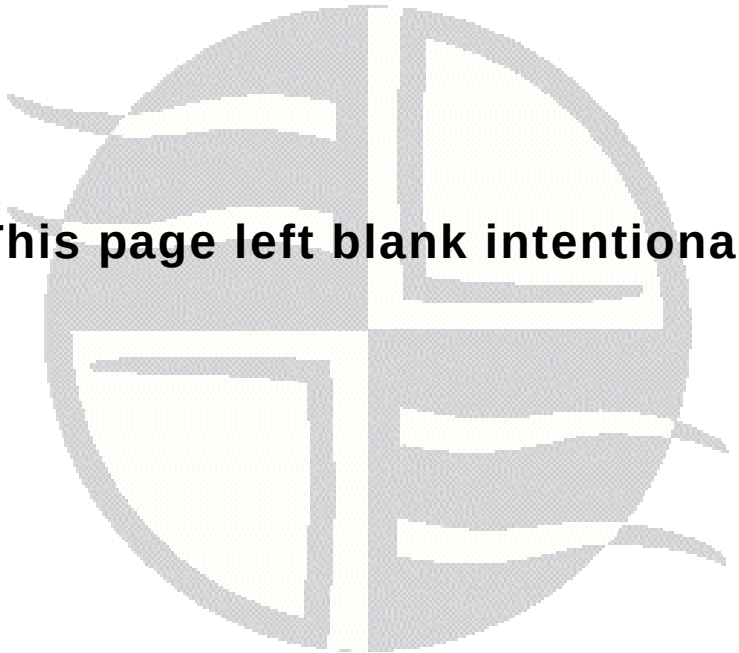
   `ADDRESS4`

   `ADDRESS5`
9. Click **Next** on this and the following dialog boxes until the **Query Wizard - Finish** dialog box is displayed.
10. Ensure that **Return Data to Microsoft Excel** is selected, then click **Finish**.
11. On the **Returning External Data to Microsoft Excel** dialog box, select **Existing worksheet** then click **OK**.

    A list of customers and their addresses is displayed in the worksheet.

    You could try creating another query using columns from both the SOP_ORDER_HEADER table and SOP_ORDER_DETAIL table to display a list of what these customers have purchased.

    When you have finished querying your data, close Microsoft Excel unless you want to continue using it for another task.



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# 6

# DEMONSTRATION

## Worked example of connecting to System Z data

This section demonstrates connecting to local System Z data from an ODBC-compliant application on your Windows or Unix machine.

If you are implementing cross-platform access to your System Z data using the Easysoft ODBC-ODBC Bridge or the Easysoft JDBC-ODBC Bridge, please refer to the documentation provided with those products for an example of connecting to remote data.

### Chapter Guide

## Demonstration on Windows

This section provides a worked example of using Microsoft Access to connect to the sample System Z data provided with the Easysoft SQI-Zortec System Z Driver and assumes that:

- you have a data source connecting to the sample data. A sample data source is created automatically during the installation. If you do not have this data source set up, refer to **"Creating additional data sources on Windows" on page 62** for details.
- you are familiar with the basics of using Microsoft Access.

To obtain a list of customers and display the results in Microsoft Access:

1. Run Microsoft Access.
2. Create a new blank database.
3. Display the **Tables** tab on the database window.
4. Right-click in the empty window, then select **Link Tables** to display the **Link** dialog box.
5. Select **ODBC Databases ()** from the **Files of Type** drop-down list box to display the **Select Data Source** dialog box.
6. Click the **Machine Data Source** tab.
7. Select the data source that connects to the sample data (the default name for this data source is `Sample_SystemZ`, but you may have given it an alternative name).
8. Click **OK** to display the **Link Tables** dialog box.
9. Click **Select All** to link all the tables into the database, then click **OK**.

After a few moments, the tables are listed in the **Tables** tab of the database window in Microsoft Access.

10. Click the **Queries** tab in the database window, then click **New** to create a new query.
11. On the **New Query** wizard, click **Design View** and then click **OK**.
12. On the **Show Table** dialog box, select the `Z_SUPPLIER` table then click **Add** to add the table to the **Select Query** window.
13. Select the Z_PRODSUPP table then click **Add**.
14. Select the Z_PRODUCT table then click **Add**.
15. Click **Close** to close the **Select Table** dialog box.
16. Delete the two join lines between the tables by selecting each in turn and pressing *<Delete>*.

    If you resize the tables until you can see all the column names in full, the **Select Query** window will look something like:

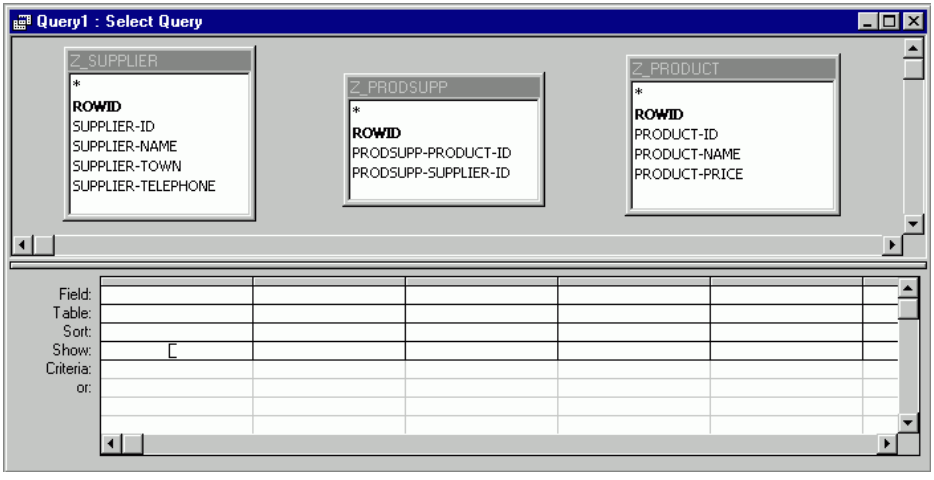



**Figure 26: The Microsoft Access Select Query window table details**

17. Create the following joins:

    - From SUPPLIER-ID in the Z_SUPPLIER table to PRODSUPP-SUPPLIER-ID in the Z_PRODSUPP table
    - From PRODUCT-ID in the Z_PRODUCT table to PRODSUPP-PRODUCT-ID in the Z_PRODSUPP table

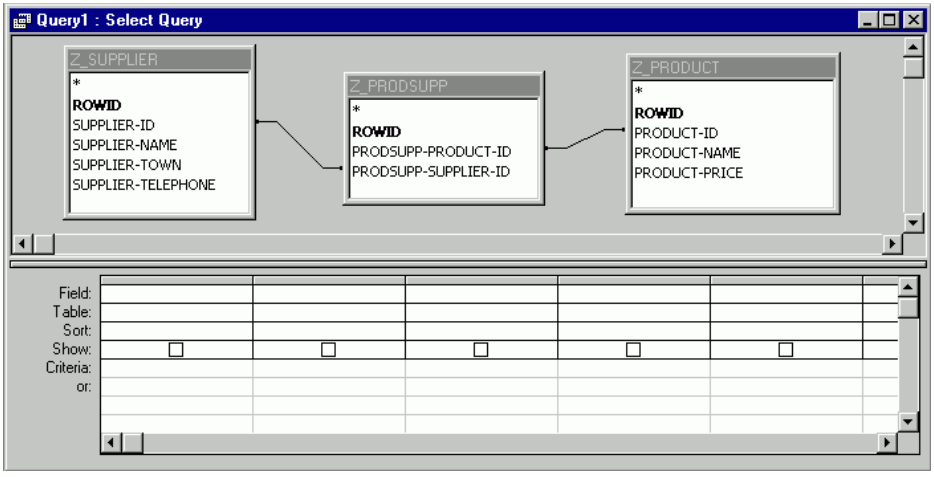



**Figure 27: The Microsoft Access Select Query window table join details**

18. In the **Select Query** window, drag each of the following columns in turn from the Z_SUPPLIER and Z_PRODUCT tables in the upper half of the window and release them in the columns in the lower half of the window:

    SUPPLIER-NAME

    SUPPLIER-TOWN

    PRODUCT-NAME

    PRODUCT-PRICE

The **Select Query** window will now look something like:

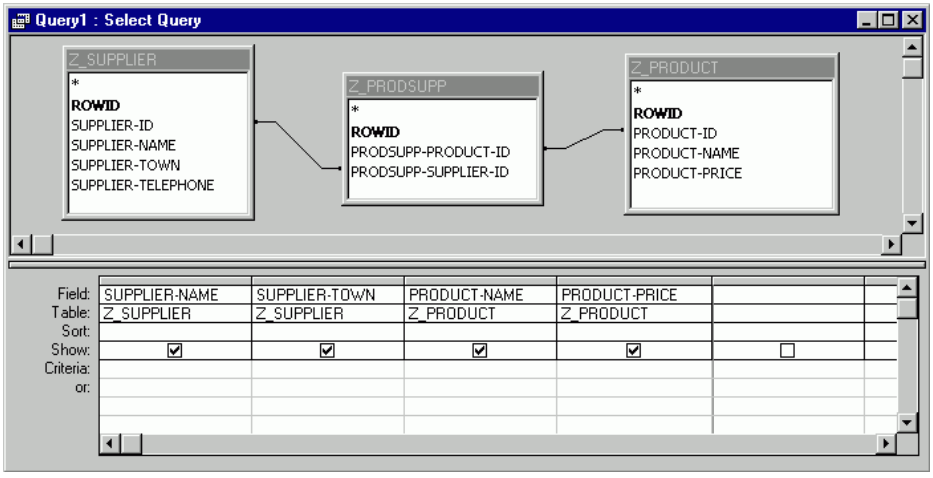



**Figure 28: The Microsoft Access Select Query window table column details**

19. Click the **Close** box to close the **Select Query** window. When asked if you want to save the query, click **Yes**. The **Save As** dialog box is displayed.
20. Enter a name for the query and then click **OK**.

    The query is now listed on the **Queries** tab of the database window.
21. Double-click the query to open it.

    A list of suppliers and the products they supply is displayed.
22. Close Microsoft Access unless you want to continue using it for another task.

## Demonstration on Unix

This section provides a worked example of using SQL queries to connect to the sample System Z data provided with the Easysoft SQI-Zortec System Z Driver.

> **NB** This demonstration uses the isql script described in **"Querying data sources" on page 59**. You may prefer to skip this demonstration if you have already worked through the instructions in that section.

This worked example assumes that:

- you have a data source connecting to the sample data. This sample data source is created automatically during the installation. If you do not have this data source set up, refer to **"Creating additional data sources on Unix" on page 68** for details of how to set up a data source.
- the `dsn=` attribute in the isql script is set to the sample data source (’`sample_systemz`’ by default), and the `uid=` and pwd= attributes are set to the name and password of an existing user who has full access to all the tables in the sample data source.

To query the sample data source using the iSQL script:

1. Change into the `usr/local/easysoft/sqi/systemz` directory.
2. Type:

   ```
   ./isql
   ```

   If an '`invalid user`' or '`invalid password`' error is displayed, check that the correct user name and password are specified in the script.

If a line beginning "`conn =`" is displayed, then the connection has been made and you can type an SQL statement to query the data source.

3. Type the following to display a list of tables in the data source:

```
select * from info_schema.tables;
```

4. Type the following, on one continuous line, to display a list of supplier names and their locations:

```
select "supplier-name", "supplier-town"
 from z.supplier;
```

5. Type the following, on one continuous line, to display a list of product names and their prices:

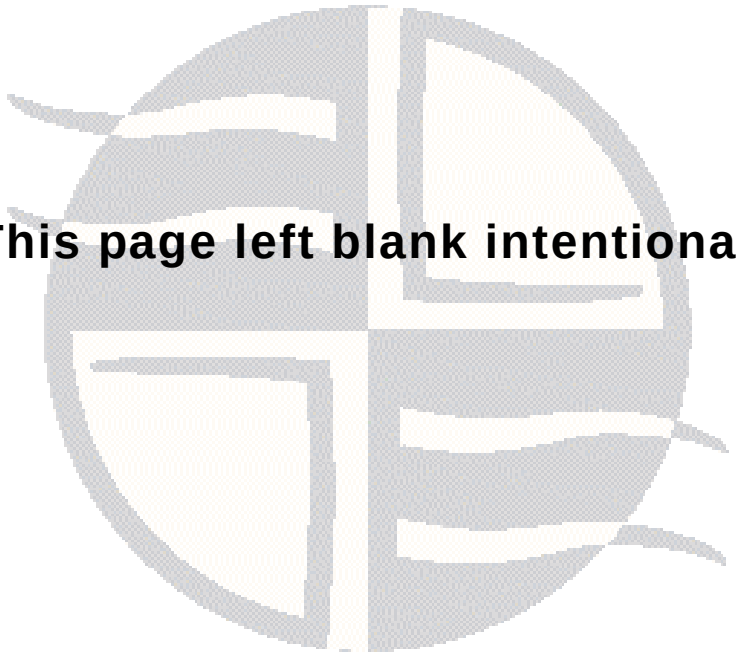
```
select "product-name", "product-price"
 from z.product;
```

6. Type the following, on one continuous line, to display a list of suppliers and the products that they stock:

```
select "supplier-name", "supplier-town",
 "product-name", "product-price"
 from z.supplier, z.prodsupp, z.product
 where "supplier-id"="prodsupp-supplier-id"
 and "product-id"="prodsupp-product-id";
```

If the returned data scrolls out of view, press *<Pause>* to pause the scrolling, then press *<Enter>* to view the remainder of the list.

7. To finish your sql session, press *<Enter>* to return to the system prompt.



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# TECHNICAL REFERENCE

A

## Technical Reference for Easysoft SQI-Zortec System Z Driver

This section documents the ODBC and SQL conformance in the Easysoft SQI-Zortec System Z Driver and supported Zortec System Z data types.

### Appendix Guide

## Conformance

This section specifies the level of SQL and ODBC conformance in the Easysoft SQI-Zortec System Z Driver.

### API Support

The Easysoft SQI-Zortec System Z Driver provides the following API Entry points:

| Function | ODBC Conformance |
|---|---|
| SQLAllocHandle | Core |
| SQLBindCol | Core |
| SQLBindParameter | Core |
| SQLBrowseConnect | Level 1 |
| SQLCancel | Core |
| SQLCloseCursor | Core |
| SQLColAttribute | Core |
| SQLColumnPrivileges | Level 2 |
| SQLColumns | Core |
| SQLConnect | Core |
| SQLDescribeCol | Core |
| SQLDescribeParam | Level 2 |
| SQLDisconnect | Core |
| SQLDriverConnect | Core |
| SQLEndTran | Core |
| SQLExecDirect | Core |
| SQLExecute | Core |

| Function | ODBC Conformance |
|---|---|
| SQLFetch | Core |
| SQLFetchScroll | Core |
| SQLForeignKeys | Level 2 |
| SQLFreeHandle | Core |
| SQLFreeStmt | Core |
| SQLGetConnectAttr | Core |
| SQLGetCursorName | Core |
| SQLGetData | Core |
| SQLGetDescField | Core |
| SQLGetDescRec | Core |
| SQLGetDiagField | Core |
| SQLGetDiagRec | Core |
| SQLGetEnvAttr | Core |
| SQLGetFunctions | Core |
| SQLGetInfo | Core |
| SQLGetStmtAttr | Core |
| SQLGetTypeInfo | Core |
| SQLMoreResults | Level 1 |
| SQLNativeSql | Core |
| SQLNumParams | Core |
| SQLNumResultCols | Core |
| SQLParamData | Core |
| SQLPrepare | Core |
| SQLPrimaryKeys | Level 1 |

| Function | ODBC Conformance |
|---|---|
| SQLProcedureColumns | Level 1 |
| SQLProcedures | Level 1 |
| SQLPutData | Core |
| SQLRowCount | Core |
| SQLSetConnectAttr | Core |
| SQLSetCursorName | Core |
| SQLSetDescField | Core |
| SQLSetDescRec | Core |
| SQLSetEnvAttr | Core |
| SQLSetPos | Level 1 |
| SQLSetStmtAttr | Core |
| SQLSpecialColumns | Core |
| SQLStatistics | Core |
| SQLTablePrivileges | Level 2 |
| SQLTables | Core |

**Figure 29: API Entry points**

The following functions are provided by the ODBC Driver Manager:

| Function | ODBC Conformance |
|---|---|
| SQLDataSources | Core |
| SQLDrivers | Core |
| SQLAllocConnect | Core |
| SQLAllocEnv | Core |
| SQLError | Core |

| Function | ODBC Conformance |
|---|---|
| SQLGetConnectOption | Core |
| SQLSetParam | Core |

**Figure 30: ODBC Driver Manager functions**

The following functions are provided by the Setup DLL:

| Function | ODBC Conformance |
|---|---|
| SQLConfigDriver | Core |
| SQLConfigDSN | Core |

**Figure 31: Setup DLL functions**

The following functions are currently not supported but are planned for future release:

| Function | ODBC Conformance |
|---|---|
| SQLBulkOperations | Level 1 |
| SQLCopyDesc | Core |

**Figure 32: Unsupported functions**

### STATEMENT TYPES

The Easysoft SQI-Zortec System Z Driver supports the following statements:

ALTER TABLE

COMMIT

CREATE VIEW

DELETE STATEMENT (positioned)

DELETE STATEMENT (searched)

DROP VIEW

GRANT

INSERT

REVOKE

ROLLBACK

SELECT

SELECT FOR UPDATE

UPDATE (positioned)

UPDATE (searched)

### UNIONS

The Easysoft SQI-Zortec System Z Driver supports UNION and UNION ALL.

### TABLE REFERENCE

The Table reference list in a select can contain all or any of:

Table Name

Sub Query

Join

### JOINS

The Easysoft SQI-Zortec System Z Driver supports the following types of joins:

INNER

LEFT OUTER

RIGHT OUTER

FULL OUTER

NATURAL

The joining condition may be specified with the ON or USING clause.

Both the left and right source can be a table name, sub query or another join.

Joins can be nested with no restriction on depth, and in both SQL92 and ODBC format:

#### *SQL*

```
SELECT * from x LEFT OUTER JOIN y ON x.a = y.a
```

#### *ODBC*

```
SELECT * from {oj x LEFT OUTER y ON x.a = y.a }
```

### PREDICATES

The Easysoft SQI-Zortec System Z Driver supports the following predicates:

Comparison ( a = b )

BETWEEN ( a BETWEEN b AND c )

LIKE ( a LIKE '%green%' )

NULL ( a IS NOT NULL )

IN value_list ( a IN ( 1, 2, 3 ))

IN sub_query ( a IN ( SELECT x FROM y )

Quantified comparison ( a = ALL ( SELECT x FROM y ))

Exists ( EXISTS( SELECT x from y ))

The sub queries in predicates can be correlated or non correlated:

***Correlated***

```
SELECT a FROM b WHERE c = ALL ( SELECT x
 FROM y WHERE z = a )
```

***Non-correlated***

```
SELECT a FROM b WHERE c = ALL ( SELECT x FROM y
 WHERE z = 12 )
```

## SCALAR FUNCTIONS

The Easysoft SQI-Zortec System Z Driver provides all the functions required by ODBC and also functions from SQL92.

Functions can be specified in SQL92 or ODBC format:

***SQL***

```
SELECT CURRENT_DATE, EXTRACT( YEAR FROM
 Employee.data_of_birth ) FROM Employee
```

***ODBC***

```
SELECT {fn CURRENT_DATE()}, {fn EXTRACT( YEAR
 FROM Employee.data_of_birth )} FROM Employee
```

The following is a complete set of supported functions:

### *Pseudo Variable Functions*

CURRENT_DATE

CURRENT_TIME

CURRENT_TIMESTAMP

CURRENT_USER

USER

### *SQL92 Functions*

BIT_LENGTH

CHAR_LENGTH

CHARACTER_LENGTH

OCTET_LENGTH

POSITION

SUBSTRING

TRIM

### *ODBC Functions*

ASCII

CHAR

CONCAT

DIFFERENCE

INSERT

LCASE

LEFT

LENGTH

LOCATE

LTRIM

REPEAT

REPLACE

RIGHT

RTRIM

SOUNDEX

SPACE

UCASE

ABS

ACOS

ASIN

ATAN

ATAN2

CEILING

COS

COT

DEGREES

EXP

FLOOR

LOG

LOG10

MOD

PI

POWER

RADIANS

RAND

ROUND

SIGN

SIN

SQRT

TAN

TRUNCATE

CURDATE

CURTIME

DAYNAME

DAYOFMONTH

DAYOFWEEK

DAYOFYEAR

EXTRACT

HOUR

MINUTE

MONTH

MONTHNAME

NOW

QUARTER

SECOND

TIMESTAMPADD

TIMESTAMPDIFF

WEEK

YEAR

DATABASE

IFNULL

### Aggregate Functions

The Easysoft SQI-Zortec System Z Driver supports the following aggregate functions:

COUNT( * | ALL | DISTINCT )

AVG( ALL | DISTINCT )

MIN( ALL | DISTINCT )

MAX( ALL | DISTINCT )

SUM( ALL | DISTINCT )

### Conversion functions

The Easysoft SQI-Zortec System Z Driver supports both the SQL92 CAST function and the ODBC CONVERT FUNCTION for conversion between compatible data types.

### Conditional Functions

The Easysoft SQI-Zortec System Z Driver supports CASE statements and the shorthand forms NULLIF and COALESCE.

## LITERALS

All SQL92 and ODBC32 literals are supported and can be specified in either form:

### *SQL92*

```
DATE '1999-01-02', INTERVAL '10-2' YEAR TO MONTH
```

### *ODBC*

```
{d '1999-01-02'}, {INTERVAL '10-2' YEAR TO MONTH}
```

## OPTIMIZATION

The Easysoft SQI-Zortec System Z Driver performs several optimizations to improve performance including the following:

### *Query optimization*

The WHERE clause of a query will be rewritten into a form that allows more efficient processing of data. For example the query:

```
SELECT * FROM x WHERE ( a = 10 or b = 20 ) and c = 30
```

Will be changed into the equivalent:

```
SELECT * FROM x WHERE a = 10 and c = 30

UNION

SELECT * FROM x WHERE b = 20 and c = 30
```

### *Table Optimization*

In cases where indexes are present on tables, the Easysoft SQI-Zortec System Z Driver will if necessary rearrange the order in which tables are processed to enable the index to be used.

This can lead to huge increases in performance.

For example, consider the following query where tables a, b and c each have 800 rows and an index on catalog_number.

```
SELECT * FROM a, b, c
 WHERE a.catalog_number = c.catalog_number
 AND b.catalog_number = a.catalog_number
 AND a."desc" = b."desc"
 AND c.retail = a.retail
 AND a.catalog_number = b.catalog_number
```

When run with the table order specified the query takes about 350 seconds on a given test configuration.

If table optimization is enabled then, on the same machine, the query takes under 2 seconds.

The effect of this optimization is most noticeable on some of the queries that comprise the TPC-D benchmark set.

Without this optimization some of the queries can be considered to never end (still running after a day), with optimization the same query will return in under 10 seconds.

### INFORMATIONAL SCHEMA

The Easysoft SQI-Zortec System Z Driver provides an informational schema view of the tables supplied by the target data sources.

The following tables are available:

INFO_SCHEMA.CHARACTER_SETS

INFO_SCHEMA.COLLATIONS

INFO_SCHEMA.COLUMN_PRIVILEGES

INFO_SCHEMA.COLUMNS

INFO_SCHEMA.INDEXES

INFO_SCHEMA.SCHEMATA

INFO_SCHEMA.SERVER_INFO

INFO_SCHEMA.SQL_LANGUAGES

INFO_SCHEMA.TABLE_PRIVILEGES

INFO_SCHEMA.TABLES

INFO_SCHEMA.USAGE_PRIVILEGES

INFO_SCHEMA.VIEWS

### DATA TYPES

The following data types are supported:

SQL_CHAR

SQL_VARCHAR

SQL_LONGVARCHAR

SQL_NUMERIC

SQL_DECIMAL

SQL_SMALLINT

SQL_INTEGER

SQL_REAL

SQL_FLOAT

SQL_DOUBLE

SQL_BIT

SQL_TINYINT

SQL_BIGINT

SQL_BINARY

SQL_VARBINARY

SQL_LONGVARBINARY

SQL_TYPE_DATE

SQL_TYPE_TIME

SQL_TYPE_TIMESTAMP

SQL_INTERVALS (all types)

## ODBC Features

### *Cursors*

The Easysoft SQI-Zortec System Z Driver provides FORWARD ONLY, STATIC and KEYSET CURSORS and also provides the following additional ODBC features (reported via the SQLGetInfo API call):

SQL_ASYNC_MODE

Asynchronous operation is supported both at the statement and connection level (SQL_AM_STATEMENT)

SQL_COLUMN_ALIAS

The data source supports column alias using the optional AS clause

SQL_CORRELATION_NAME

Correlation names are supported and can be any valid user-defined-name

SQL_DATETIME_LITERALS

All SQL92 Datetime literals are supported

SQL_GETDATA_EXTENSIONS

SQLGetData can be called for any column, bound or unbound

SQL_GROUPBY

The columns in the GROUP BY clause and the select list are not related (SQL_GB_NO_RELATION)

SQL_INDEX_KEYWORDS

All keywords are supported

## Zortec System Z data types

The following tables list the Zortec System Z data types and edit masks which are supported by the Easysoft SQI-Zortec System Z Driver, and the SQL data types to which data is converted.

You will probably be familiar with the Zortec System Z types and edit masks because they can be displayed within Zortec System Z.

For example, the following Zortec System Z screen shows the columns in a table (the **Type** and **Edit** columns display type and edit mask information respectively):

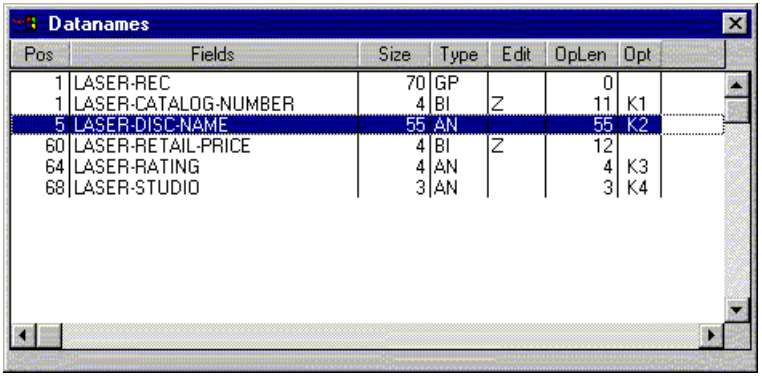



**Figure 33: The Zortec System Z Datanames screen**

Double-click on a column to display the attributes of the column:

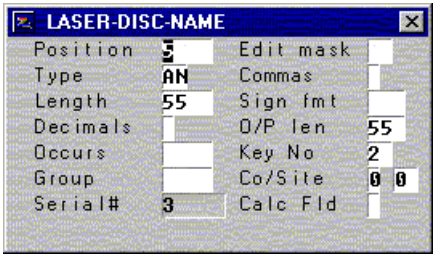



**Figure 34: The Zortec System Z column attributes screen**

This screen shows that the LASER-DISC-NAME column contains alpha numeric data (Type = AN), has no edit mask, and can contain up to 55 characters (Length = 55).

The Comments column in the following tables refers to the fields in Zortec System Z which are used when converting the data to the appropriate SQL data type.

For example, alpha numeric data (AN) is converted to the SQL_VARCHAR data type and its length is determined by the Length value in Zortec System Z.

A utility that checks whether your data contains any unsupported data types is provided with the Easysoft SQI-Zortec System Z Driver.

See **"Checking for unsupported data types" on page 74** for details of using this utility.

If you do find any unsupported data types, please contact Easysoft at **support@easysoft.com**, who will endeavour to support them in future releases of the software.

## AN - ALPHANUMERIC

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_VARCHAR | Length |
| B | SQL_VARCHAR | Length |
| BZ | SQL_VARCHAR | Length |
| CN | SQL_VARCHAR | Length |
| UC | SQL_VARCHAR | Length |
| SS | SQL_VARCHAR | Length |
| YN | SQL_VARCHAR | Length |

**Figure 35: Zortec System Z alphanumeric data types**

## BI - UNSIGNED BINARY

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_NUMERIC | Length * 2, Decimals |
| B | SQL_NUMERIC | Length * 2, Decimals |
| Z | SQL_NUMERIC | Length * 2, Decimals |
| BZ | SQL_NUMERIC | Length * 2, Decimals |
| $ | SQL_NUMERIC | Length * 2, Decimals |
| B$ | SQL_NUMERIC | Length * 2, Decimals |
| * | SQL_NUMERIC | Length * 2, Decimals |
| B* | SQL_NUMERIC | Length * 2, Decimals |
| $9 | SQL_NUMERIC | Length * 2, Decimals |
| $B | SQL_NUMERIC | Length * 2, Decimals |
| $Z | SQL_NUMERIC | Length * 2, Decimals |
| $* | SQL_NUMERIC | Length * 2, Decimals |
| JD | SQL_DATE | |
| AP | SQL_VARCHAR(13) | format "(999)999-9999" |
| P | SQL_VARCHAR(8) | format "999-9999" |
| SS | SQL_VARCHAR(11) | format "999-99-9999" |
| D3 | SQL_DATE | |
| D4 | SQL_DATE | |
| DR | SQL_DATE | |
| DC | SQL_DATE | |

**Figure 36: Zortec System Z unsigned binary data types**

## SB - SIGNED BINARY

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_NUMERIC | Length * 2, Decimals |
| B | SQL_NUMERIC | Length * 2, Decimals |
| Z | SQL_NUMERIC | Length * 2, Decimals |
| BZ | SQL_NUMERIC | Length * 2, Decimals |
| $ | SQL_NUMERIC | Length * 2, Decimals |
| B$ | SQL_NUMERIC | Length * 2, Decimals |
| * | SQL_NUMERIC | Length * 2, Decimals |
| B* | SQL_NUMERIC | Length * 2, Decimals |
| $9 | SQL_NUMERIC | Length * 2, Decimals |
| $B | SQL_NUMERIC | Length * 2, Decimals |
| $Z | SQL_NUMERIC | Length * 2, Decimals |
| $* | SQL_NUMERIC | Length * 2, Decimals |
| JD | SQL_DATE | |
| AP | SQL_VARCHAR(13) | format "(999)999-9999" |
| P | SQL_VARCHAR(8) | format "999-9999" |
| SS | SQL_VARCHAR(11) | format "999-99-9999" |
| D3 | SQL_DATE | |
| D4 | SQL_DATE | |
| DR | SQL_DATE | |
| DC | SQL_DATE | |

**Figure 37: Zortec System Z signed binary data types**

## UP - UNSIGNED PACKED DECIMAL

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_NUMERIC | Length * 2, Decimals |
| B | SQL_NUMERIC | Length * 2, Decimals |
| Z | SQL_NUMERIC | Length * 2, Decimals |
| BZ | SQL_NUMERIC | Length * 2, Decimals |
| $ | SQL_NUMERIC | Length * 2, Decimals |
| B$ | SQL_NUMERIC | Length * 2, Decimals |
| * | SQL_NUMERIC | Length * 2, Decimals |
| B* | SQL_NUMERIC | Length * 2, Decimals |
| $9 | SQL_NUMERIC | Length * 2, Decimals |
| $B | SQL_NUMERIC | Length * 2, Decimals |
| $Z | SQL_NUMERIC | Length * 2, Decimals |
| $* | SQL_NUMERIC | Length * 2, Decimals |
| SS | SQL_VARCHAR(11) | format "999-99-9999" |

**Figure 38: Zortec System Z unsigned packed data types**

## SP - SIGNED PACKED DECIMAL

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_NUMERIC | Length * 2, Decimals |
| B | SQL_NUMERIC | Length * 2, Decimals |
| Z | SQL_NUMERIC | Length * 2, Decimals |
| BZ | SQL_NUMERIC | Length * 2, Decimals |
| $ | SQL_NUMERIC | Length * 2, Decimals |
| B$ | SQL_NUMERIC | Length * 2, Decimals |
| * | SQL_NUMERIC | Length * 2, Decimals |
| B* | SQL_NUMERIC | Length * 2, Decimals |
| $9 | SQL_NUMERIC | Length * 2, Decimals |
| $B | SQL_NUMERIC | Length * 2, Decimals |
| $Z | SQL_NUMERIC | Length * 2, Decimals |
| $* | SQL_NUMERIC | Length * 2, Decimals |
| SS | SQL_VARCHAR(11) | format "999-99-9999" |

**Figure 39: Zortec System Z signed packed decimal data types**

## UN - UNSIGNED ASCII NUMERIC

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_NUMERIC | Length, Decimals |
| B | SQL_NUMERIC | Length, Decimals |
| Z | SQL_NUMERIC | Length, Decimals |
| BZ | SQL_NUMERIC | Length, Decimals |
| $ | SQL_NUMERIC | Length, Decimals |
| B$ | SQL_NUMERIC | Length, Decimals |
| * | SQL_NUMERIC | Length, Decimals |
| B* | SQL_NUMERIC | Length, Decimals |
| $9 | SQL_NUMERIC | Length, Decimals |
| $B | SQL_NUMERIC | Length, Decimals |
| $Z | SQL_NUMERIC | Length, Decimals |
| $* | SQL_NUMERIC | Length, Decimals |
| DR | SQL_DATE | |
| D | SQL_DATE | |
| DC | SQL_DATE | |
| SS | SQL_VARCHAR(11) | format "999-99-9999" |
| AP | SQL_VARCHAR(13) | format "(999)999-9999" |

**Figure 40: Zortec System Z unsigned ASCII numeric data types**

## SN - SIGNED ASCII NUMERIC

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_NUMERIC | Length, Decimals |
| B | SQL_NUMERIC | Length, Decimals |
| Z | SQL_NUMERIC | Length, Decimals |
| BZ | SQL_NUMERIC | Length, Decimals |
| $ | SQL_NUMERIC | Length, Decimals |
| B$ | SQL_NUMERIC | Length, Decimals |
| * | SQL_NUMERIC | Length, Decimals |
| B* | SQL_NUMERIC | Length, Decimals |
| $9 | SQL_NUMERIC | Length, Decimals |
| $B | SQL_NUMERIC | Length, Decimals |
| $Z | SQL_NUMERIC | Length, Decimals |
| $* | SQL_NUMERIC | Length, Decimals |

**Figure 41: Zortec System Z signed ASCII numeric data types**

## FP - FLOATING POINT

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_DOUBLE | |
| B | SQL_DOUBLE | |
| Z | SQL_DOUBLE | |
| BZ | SQL_DOUBLE | |
| $ | SQL_DOUBLE | |
| B$ | SQL_DOUBLE | |
| * | SQL_DOUBLE | |
| B* | SQL_DOUBLE | |
| $9 | SQL_DOUBLE | |
| $B | SQL_DOUBLE | |
| $Z | SQL_DOUBLE | |
| $* | SQL_DOUBLE | |

**Figure 42: Zortec System Z floating point data types**

## DP - Double Precision Float

| System Z Edit mask | SQL Data Type | Comment |
|---|---|---|
| (No mask) | SQL_DOUBLE | |
| B | SQL_DOUBLE | |
| Z | SQL_DOUBLE | |
| BZ | SQL_DOUBLE | |
| $ | SQL_DOUBLE | |
| B$ | SQL_DOUBLE | |
| * | SQL_DOUBLE | |
| B* | SQL_DOUBLE | |
| $9 | SQL_DOUBLE | |
| $B | SQL_DOUBLE | |
| $Z | SQL_DOUBLE | |
| $* | SQL_DOUBLE | |

**Figure 43: Zortec System Z double precision float data types**

# GLOSSARY

B

## Terms and definitions

**API (Application Programmer Interface)**

A published set of function calls and constants allowing different programmers to utilize a ready-written library of subroutines.

**Application**

A program that applies the computer to solving some real-world problem. In ODBC terms, it is the program connecting to the data source.

**Authorization code**

You must have an authorization code for the Easysoft product you wish to license in order to obtain a purchased license. When you purchase a product your authorization code is emailed to you. You do not need an authorization code to obtain a trial license.

**Client**

A process performing tasks local to the current user, for example, formatting and displaying a report from data retrieved from the server.

**Client server**

The architecture whereby one process (the server) keeps track of global data, and another task (the client) is responsible for formatting and presenting the data. The client connects to the server and requests queries or actions be performed on its behalf. Often these processes run on different hosts across a local-area network.

**Column**

The vertical dimension of a table. Columns are named and have a domain (or type).

**Database**

A collection of data files.

**Data source**

In ODBC terms, a data source is a database or other data repository coupled with an ODBC Driver, which has been given a Data Source Name (see **“DSN” on page 133**) to identify it to the ODBC Driver Manager.

**Data type**

The specification of permitted values. A data type limits the values which are allowed to be used.

**DBMS**

Database Management System. Software that handles access to a database.

**Download**

To retrieve data from a remote machine (or the Internet) to your local machine. Mechanisms for achieving this include FTP and the World Wide Web.

**Driver**

See **“ODBC driver” on page 134**.

**Driver Manager**

Software whose main function is to load ODBC drivers. ODBC applications connect to the Driver Manager and request a data source name (DSN). The Driver Manager loads the driver specified in the DSN's configuration file. In Windows, the ODBC Data Source Administrator is used to set up the Driver Manager.

**DSN**

Data Source Name. A name associated with an ODBC data source. Driver Managers, such as unixODBC or the Microsoft Windows Driver Manager, use the Data Source Name to cross-reference configuration information and load the required driver.

**Field**

A placeholder for a single datum in a record, for example you can have a Surname field in a Contact Details record. Fields are sometimes referred to as cells.

**FTP**

File Transfer Protocol. A standard method of transferring files between different machines.

**Host**

A computer visible on the network.

**HTTP**

HyperText Transfer Protocol. The means of transferring web pages.

**Middleware**

Software that is placed between the client and the server to improve or expand functionality.

**License key**

A string which is provided by Easysoft for use in the licensing process.

**ODBC**

Open Data Base Connectivity. A programming interface that enables applications to access data in database management systems that use Structured Query Language (SQL) as a data access standard.

**ODBC driver**

Software that accesses a proprietary data source, providing a standardized view of the data to ODBC.

**Row**

The horizontal dimension of a table. At its most basic, a row equates to a record within a file.

**Schema**

A specification of the structure of a database, including the tables, their column headings and keys.

**Server**

A computer, or host, on the network, designed for power and robustness rather than user-friendliness and convenience. Servers typically run around-the-clock and carry central corporate data.

OR

A process performing the centralized component of some task, for example, extracting information from a corporate database.

**SQL**

Structured Query Language. An international standard text language for querying and manipulating databases.

**System data source**

In the context of ODBC under Microsoft Windows, a data source which can be accessed by any user on a given system. See also **“User data source” on page 135**.

**Table**

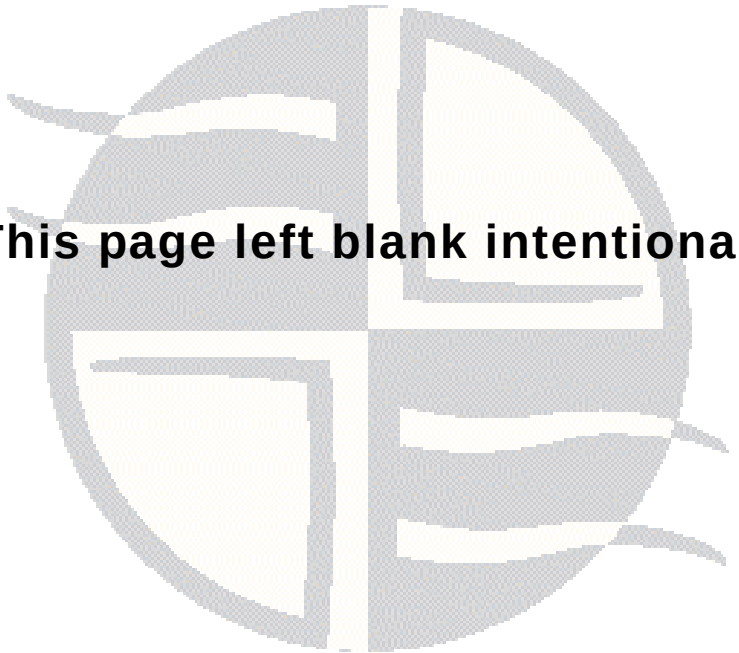
A data set in a relational database, composed of rows and columns.

**TCP/IP**

Transmission Control Protocol/Internet Protocol. A standard method of accessing data on different machines.

**User data source**

In the context of ODBC under Microsoft Windows, a data source which can only be accessed by a specific user on a given system. See also **“System data source” on page 135**.



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