



**FairCom**®

c-tree **Plus**®  
**V9**

**c-tree Crystal  
Reports Driver**  
End User Guide



# **c-tree Crystal Reports Driver**

End User Guide



**FairCom®**

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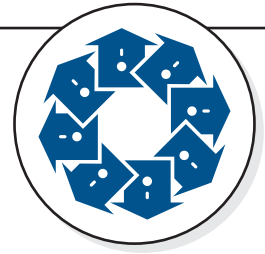
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# FAIRCOM TYPOGRAPHICAL CONVENTIONS

Before you begin using this guide, be sure to review the relevant terms and typographical conventions used in the documentation.

The following formatted items identify special information.

Formatting convention	Type of Information
<b>Bold</b>	Used to emphasize a point or for variable expressions such as parameters.
CAPITALS	Names of keys on the keyboard. For example, SHIFT, CTRL, or ALT+F4.
<i>FairCom Terminology</i>	FairCom technology term.
<b>FunctionName()</b>	c-tree Function name.
<i>Parameter</i>	c-tree Function Parameter.
Code Examples	Code example or Command line usage.
<b>utility</b>	c-tree executable or utility.
<i>filename</i>	c-tree file or path name.
CONFIGURATION KEYWORDS	c-treeACE Configuration Keyword.
<b>BIG_ERR</b>	c-tree Error Code.



## Quick Start

Welcome to the c-tree® Crystal Reports™ Driver. This powerful tool opens many possibilities for accessing the data created by your c-tree Plus® application. This guide is intended for the final user of the c-tree Crystal Reports Driver and assumes an intermediate knowledge of the Microsoft Windows operating system and Crystal Reports.

This chapter provides a quick start with the c-tree Crystal Reports Driver. It includes:

- A high-level overview of the Driver,
- Installation instructions,
- An introductory tutorial, and
- Requirements and licensing information for the Driver.

### 1.1 c-tree Crystal Reports Driver

The c-tree Crystal Reports Driver is a single-tier driver interfacing directly to the c-tree Plus API. The term single-tier indicates the driver contains all of the program logic to handle requests from a front-end application. Note: Throughout this document, references to c-tree Plus include the c-tree Server.

The c-tree Crystal Reports Driver handles the application conversion processes necessary for Crystal Reports to access c-tree Plus files. These conversion processes are:

- Connecting Crystal Reports to a c-tree Plus database (data and index file(s)).
- Defining data - includes retrieving data file-specific information (such as file mode).
- Retrieving data from database files.
- Disconnecting from a c-tree Plus database.
- Performing general utility functions - includes retrieving extended error messages, comparing data for equality, etc.
- Process optimization - includes processing joins and filters.

### 1.2 Licensing

The c-tree Crystal Reports Driver is licensed for use on a single computer. It is licensed in two versions: a demo version supporting only c-tree Server access and the standard version supporting both c-tree Server and multi-user non-server access which is licensed on a per seat basis. For pricing information, please contact your software provider or nearest FairCom office.

## 1.3 Requirements

The c-tree Crystal Reports Driver operates on Windows 95 or higher with at least 4 MB of RAM. 2 MB of available hard drive space is required. Your application vendor must also provided meta-data for the data files in the form of resources stored in the files or an external parameter file.

The c-tree Crystal Reports Driver will only connect to a c-tree Server V6.08.30 or higher (V6.09.xx or higher on Mac). This in not an issue in Multi-User (non-server) connections.

## 1.4 Installation

Place the c-tree Crystal Reports Driver disk into the appropriate drive. If Setup does not run automatically, execute **SETUP.EXE** from the disk and follow the instructions on the installation screens. If you choose to "Launch the Driver Administrator" following installation, please see ["Tutorial Setup"](#), or ["Crystal Reports Driver Configuration"](#), for additional information.

## 1.5 Tutorial Setup

Working through a quick tutorial demonstrates creation of the FairCom Data Dictionary and increases familiarity with the operation of the Driver.

A database can be thought of as a collection of related files. Large applications may have many different databases. Typically, files in the same database are related through c-tree Plus indices. The tutorial consists of a database of four data files and their associated indices. These files are described at the end of this chapter.

The c-tree Crystal Reports Driver installs ready to use with the tutorial files. To use the Driver as installed (Multi-user non-Server mode) proceed to ["Tutorial"](#). However, to run the tutorial with files controlled by the c-tree Server requires the preparation described below.

### c-tree Server Tutorial Preparation

Preparing the c-tree Crystal Reports Driver for use with the c-tree Server involves the following simple steps:

1. Copying the sample data.
2. Creating the FairCom Data Dictionary.
3. Adjusting the c-tree Crystal Reports Driver configuration.

#### Step 1: Copy Sample Data

Copy the data and index files from the *FAIRCOM\CRYSTAL\32BIT\SAMPLE* directory (or the directory name supplied during installation) to the desired location on the c-tree Server machine. For the initial install, we recommend putting the files in the c-tree Server directory.

**Note:** If the c-tree Server is installed on a High/Low platform (i.e., Unix or Apple) use the sample data found in the *FAIRCOM\CRYSTAL\32BIT\SAMPLE\HGHLOW* directory.

#### Step 2: Create FairCom Data Dictionary

The FairCom Data Dictionary, a catalog of the files in various databases, is created automatically upon the first access to the c-tree Crystal Reports Driver as follows:

A simple text script must be located in the Data Dictionary Path specified in the c-tree Crystal Reports Configuration with the following format. *alias\_name* is the symbolic file name referenced from Crystal Reports and *file\_name* is the actual file name as it resides on the c-tree Server machine hard drive:

```
alias_name file_name
```

To simplify getting started, FairCom provides a sample script, *FAIRC.COM.DB*, located in the c-tree Crystal Reports Driver directory, ...*\FAIRC.COM\CRYSTAL\32BIT* if you used the default directory name during installation.

Using a text editor, either prefix the sample file names with the fully qualified path from the c-tree Server perspective, or specify no path at all. Files with no path are assumed to be in the c-tree Server directory or the directory set by the `LOCAL_DIRECTORY` keyword. For example, if the files for the tutorial are in the directory *C:\fairserv*, *FAIRC.COM.DB* should contain:

```
CUSTOMERS      C:\fairserv\custmast.dat
ORDERS         C:\fairserv\custordr.dat
ORDER_DETAIL  C:\fairserv\ordritem.dat
ITEMS         C:\fairserv\itemmast.dat
```

The case sensitivity for the file and path names will be based on the requirements of the c-tree Server host operating system.

If your c-tree Server is on a Unix based operating system use a forward slash '/' as a path separator instead of a back slash '\.

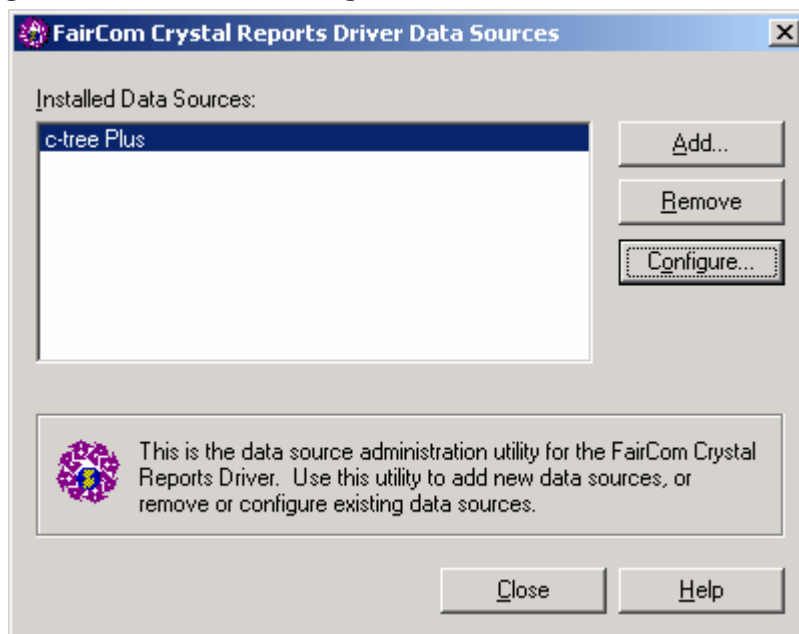
With a text script in place, such as *FAIRC.COM.DB*, when Crystal Reports accesses the c-tree Crystal Reports Driver the data dictionary is created from the information in the text script.

### Step 3: c-tree Crystal Reports Driver Configuration

To continue the tutorial, modify the c-tree Crystal Reports Driver Configuration options to match the c-tree Server to be used:

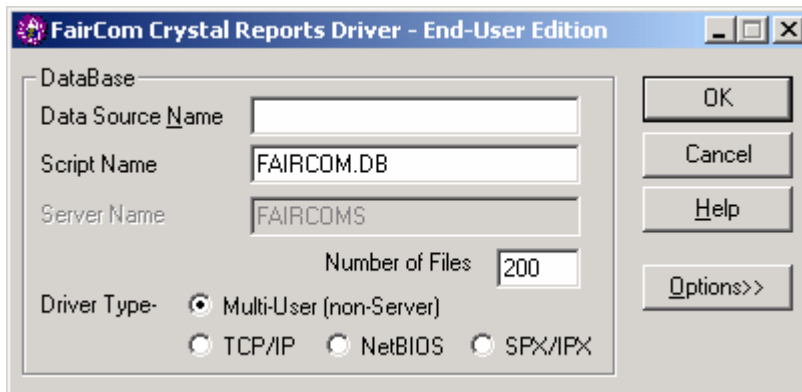
1. From the Windows Start Menu, select Programs, FairCom, Crystal Reports Driver, Crystal Reports Driver Administrator.
2. From the c-tree Crystal Reports Driver Data Sources dialog (shown in the following figure) choose **Add...** to add a new data source.

Figure 1: Data Sources Dialog



3. The c-tree Crystal Reports Driver configuration dialog box appears as shown in the following figure:

**Figure 2: Configuration Dialog Box**



The c-tree Crystal Reports Driver Configuration dialog contains the following prompts:

### Data Source Name

The default data source has no name. For your new data source, type a new name, such as “Server Tutorial”, in this field.

### Script Name

The script name should be FAIRCOM.DB for the tutorial.

### Server Name

Default: FAIRCOMS

The c-tree Server name default may be overridden with the `SERVER_NAME` keyword in `ctsrvr.cfg`. If you are not sure of the name of your c-tree Server, contact your network administrator or consult `ctsrvr.cfg` in your c-tree Server directory.

When using TCP/IP, the c-tree Server name must include the host machine name. Both the Server name and host name are case sensitive. The format is as follows, where `Server_Name` is the name of the c-tree Server, and `Server_Hostname` is the name of the machine where the c-tree Server resides. If you are unsure about the host name, consult your network administrator:

`Server_Name@Server_Hostname`

For example, to connect to a machine with a hostname of Sun and using the default Server name FAIRCOMS, specify the following in the Server Name prompt:

`FAIRCOMS@Sun`

Once the Server Name and other prompts are properly defined, click OK for the configuration dialog box and click Close for the c-tree Crystal Reports Driver Data Sources.

### Driver Type

(Default: Multi-User)

The c-tree Crystal Reports Driver makes it possible to select different operational modes for the Driver. The types are as follows:

- Multi-User: FairCom’s multi-user non-server mode of operation. (Available with the standard c-tree Crystal Reports Driver)
- TCP/IP: Communicate through the TCP/IP communication protocol to a c-tree Server.
- NetBIOS: Communicate through the NetBIOS communication protocol to a c-tree Server.

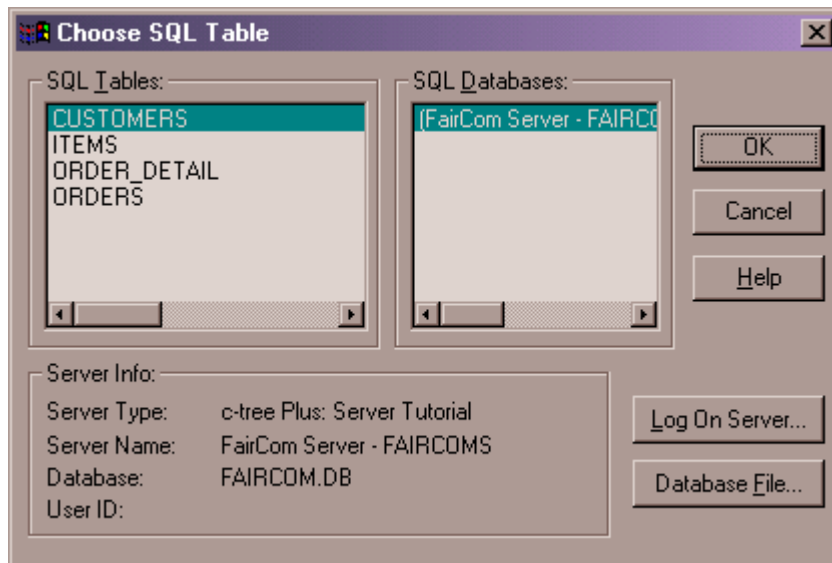
- SPX/IPX: Communicate through the SPX/IPX communication protocol to a c-tree Server.

Select the proper communication protocol. If you are unsure which protocol to select, start with TCP/IP, which is the default for the c-tree Server or contact your network administrator.

## 1.6 Tutorial

1. Start Crystal Report Designer.
2. Create a new report, either by clicking “New Report” in the Welcome dialog, or by selecting **New...** from the Crystal Reports File menu.
3. In the Report Gallery dialog, click **Custom>>>**, then **SQL/ODBC**.
4. In the Log On Server dialog, select “c-tree Plus” or “c-tree Plus:<datasource>” (where <datasource> is the Data Source name you entered) and click **OK**.
5. In the Choose SQL Table dialog (shown in the following figure) listing the four sample files, select **CUSTOMERS** and click **OK**.

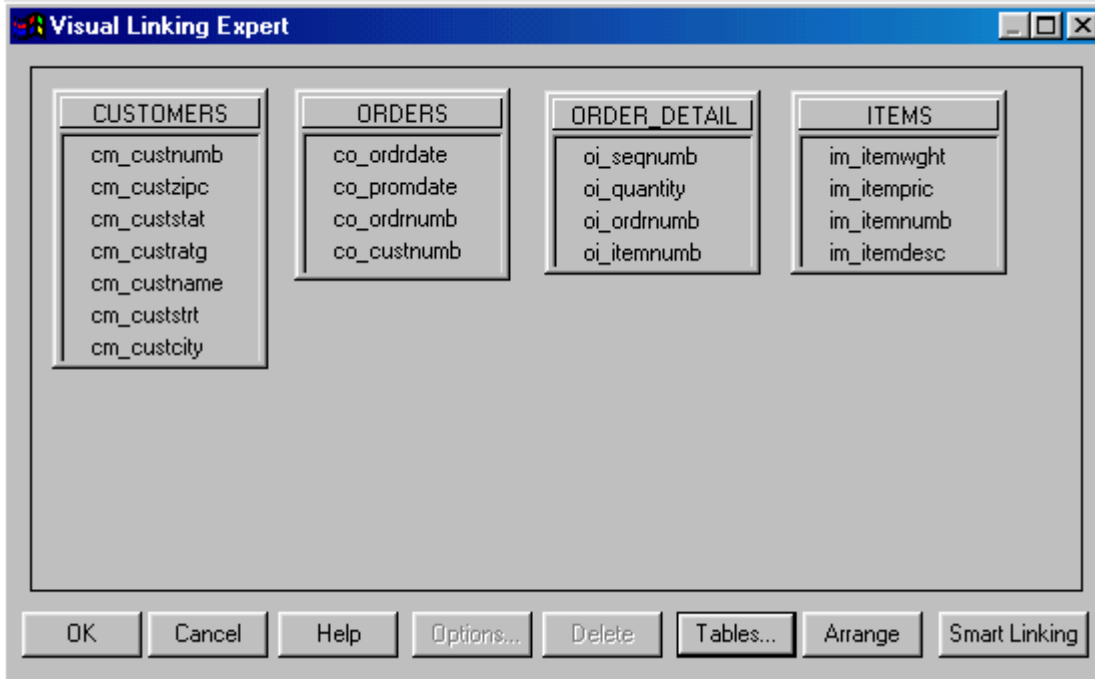
**Figure 3: Choose SQL Table Dialog Box**



6. In the Insert Fields dialog, click **Close**.
7. Continue by adding the other three files in the order listed. Select the Database menu, the click **Add Database to Report**. Choose the next table and click **OK**. This will bring up the Visual Linking Expert. Click **Tables...**, then click **Add SQL/ODBC** to add the remaining two tables.

8. Once all four tables are added, in the Visual Linking Expert, arrange the window to appear similar to the following figure:

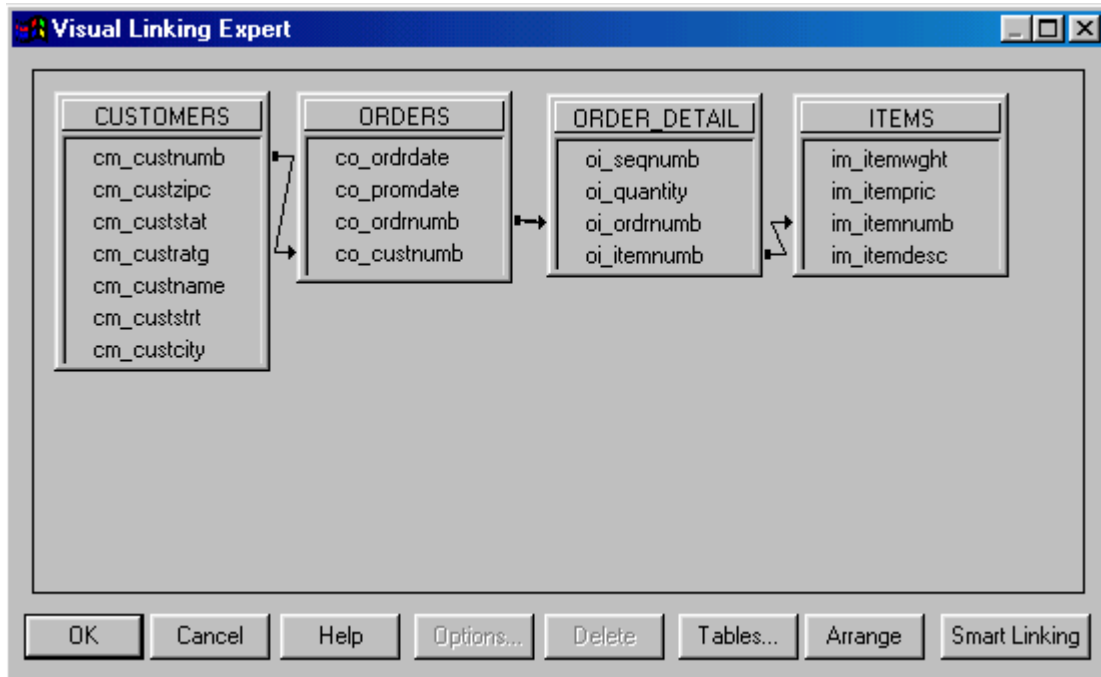
**Figure 4: Visual Linking Expert Window**



9. Add file relationships by selecting the *cm\_custnumb* field in the CUSTOMERS file by clicking and holding the left mouse button. Drag the cursor over to the *co\_custnumb* field in the ORDERS file and release the left mouse button. This should draw a line between the two fields, as shown in the following figure. Using the data as shown in the dialog window and the following table, relate the ORDERS file to ORDER\_DETAIL and ORDER\_DETAIL to the ITEMS file.

Data File 1	Common Field	Data File 2	Common Field
CUSTOMERS	cm_custnumb	ORDERS	co_custnumb
ORDERS	co_ordnumb	ORDER_DETAIL	oi_ordnumb
ORDER_DETAIL	oi_itemnumb	ITEMS	im_itemnumb

Figure 5: Visual Linking Expert Window with Line



10. Once the files are related, click **OK**. You may now use the files to create reports.

## 1.7 Tutorial File Layout

The Tutorial uses the following four data files and six indices:

Data File	Symbolic Index Name	Key Segment(s)
<i>custmast.dat</i>	<i>cm_custnumb_idx</i>	cm_custnumb
<i>itemmast.dat</i>	<i>im_itemnumb_idx</i>	im_itemnumb
<i>custodr.dat</i>	<i>co_ordrnumb_idx</i>	co_ordrnumb
<i>custodr.dat</i>	<i>co_custnumb_idx</i>	co_custnumb
<i>ordritem.dat</i>	<i>oi_ordrnumb_idx</i>	oi_ordrnumb oi_seqnumb
<i>ordritem.dat</i>	<i>oi_itemnumb_idx</i>	oi_itemnumb

**Note:** The unique column indicates if the index accepts duplicate data values.

*custmast.dat*, the Customer Master File, contains the table CUSTOMERS made up of the fields shown below:

Symbolic name	Field description	Field type	Field Length
<i>cm_custnumb</i>	Customer number	CT_STRING	5
<i>cm_custzipc</i>	Customer zip code	CT_STRING	10
<i>cm_custstat</i>	Customer state	CT_STRING	3

Symbolic name	Field description	Field type	Field Length
<i>cm_custratg</i>	Customer rating	<i>CT_STRING</i>	2
<i>cm_custname</i>	Customer name	<i>CT_STRING</i>	48
<i>cm_custstrt</i>	Customer address	<i>CT_STRING</i>	48
<i>cm_custcity</i>	Customer city	<i>CT_STRING</i>	48

*itemmast.dat*, the Item Master File, contains the table ITEMS made up of the fields shown below:

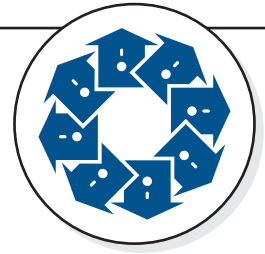
Symbolic name	Field description	Field type	Field Length
<i>im_itemwght</i>	Item weight	<i>CT_INT4</i>	4
<i>im_itempric</i>	Item price	<i>CT_MONEY</i>	4
<i>im_itemnumb</i>	Item number	<i>CT_STRING</i>	6
<i>im_itemdesc</i>	Item description	<i>CT_STRING</i>	48

*custordr.dat*, the Customer Order File, contains the table ORDERS made up of the fields shown below:

Symbolic name	Field description	Field type	Field Length
<i>_o_delflag</i>	Order delete flag	<i>CT_INT4</i>	4
<i>co_ordrdate</i>	Order date	<i>CT_DATE</i>	4
<i>co_promdate</i>	Order promise date	<i>CT_DATE</i>	4
<i>co_ordrnumb</i>	Order number	<i>CT_STRING</i>	7
<i>co_custnumb</i>	Customer number	<i>CT_STRING</i>	5

*ordritem.dat*, the Order Item File, contains the table ORDER\_DETAIL made up of the fields shown below:

Symbolic name	Field description	Field type	Field Length
<i>_i_delflag</i>	Order item delete flag	<i>CT_INT2</i>	2
<i>oi_seqnumb</i>	Order item stock number	<i>CT_INT2</i>	2
<i>oi_quantity</i>	Order item quantity	<i>CT_INT2</i>	2
<i>oi_ordrnumb</i>	Order item number	<i>CT_STRING</i>	7
<i>oi_itemnumb</i>	Item number	<i>CT_STRING</i>	6



## Getting Started with Your Data

The FairCom Data Dictionary, the Driver's catalog of available data files, created in the previous chapter was specific to the sample tutorial. This chapter helps you get Crystal Reports operational with your c-tree Plus data. To take full advantage of the c-tree Crystal Reports Driver features consult ["Crystal Reports Driver Configuration"](#), for additional application Configuration information and performance tips.

There are a few ways to provide the information needed to build the data dictionary: with a vendor-supplied script, by browsing for the files, or with a locally created script.

- If your vendor provided a script this is the simplest solution. Proceed to ["Installing a Vendor Supplied Script"](#).
- To simply browse your disks for the necessary files, proceed to ["Browse Method"](#), the next simplest method.
- If you know the names and locations of the files and would like to create a script, proceed to ["Script Method"](#).

You may use any or all of these methods, creating a new data source for each combination of files you need to access. See ["Adding a Data Source"](#).

### 2.1 Installing a Vendor Supplied Script

All c-tree Drivers need some form of data dictionary to provide file definitions to the application accessing the driver. In an effort to make the c-tree Crystal Reports Driver easier to install, FairCom has made it possible for your software vendor to create the FairCom Data Dictionary script for you.

If you purchased the c-tree Crystal Reports Driver from your c-tree Plus application vendor, check the enclosed disk(s) for an existing script file named *VENDOR.DB*. If *VENDOR.DB* is not present or you did not purchase the c-tree Crystal Reports Driver from your c-tree Plus application vendor, skip to ["Browse Method"](#), or ["Script Method"](#), to use the Browse or Script methods to locate files.

If *VENDOR.DB* is present, check the pocket inside the cover of this guide for a document titled, "Notes from your Software Provider". This document, if present, contains additional instructions from your software vendor. To create the data dictionary, copy *VENDOR.DB* to the Data Dictionary Path, *FAIRCOMCRYSTAL32BIT* by default, and rename it to the Script Name, *FAIRCOM.DB* by default, as follows:

```
COPY A:\VENDOR.DB C:\FAIRCOM\CRYSTAL\32BIT\FAIRCOM.DB
```

**Note:** You may receive a warning message stating that *FAIRCOM.DB* already exists. Most likely, an existing *FAIRCOM.DB* is left over from the Tutorial, in which case you can answer the prompt with a Yes to replace the file.

The FairCom Data Dictionary (*CTSYSCAT.FCS*) will now automatically be created upon the first access to the c-tree Crystal Reports Driver by Crystal Reports. Once the dictionary is created, you may delete *FAIRCOM.DB*.

## 2.2 Browse Method

This method allows you to browse in search of the c-tree Plus files to include in the data dictionary. Enable this feature by specifying a wild card identifier in the Script Name setting of the c-tree Crystal Reports Driver Configuration window, as follows:

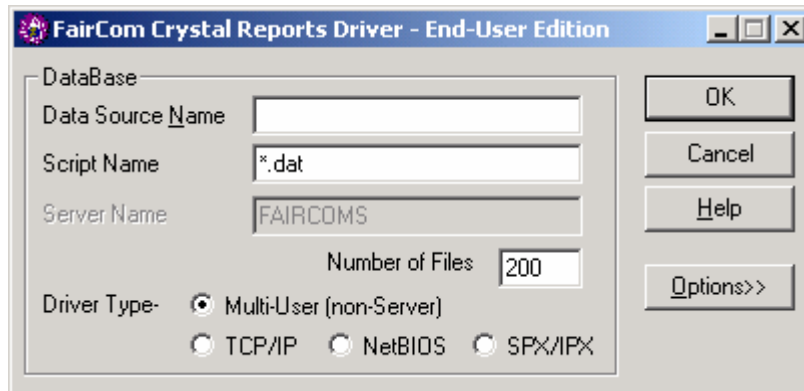
1. Access the c-tree Crystal Reports Driver Configuration window by clicking Start, Programs, c-tree Crystal Reports Driver, Crystal Driver Configuration, or by executing **p2sctcfg.exe** in the installation directory.
2. In the c-tree Crystal Reports Driver Configuration window, enter a desired database file name filter by inserting a file name and wildcard combination (as discussed below) into the Script Name prompt. The two standard wild cards supported are as follows:
  - \* match all characters
  - ? match a single character

For example, with the following c-tree Plus files: *ABBC.DAT*, *ABCD.DAT*, and *ABDD.DAT*.

- Entering *AB\** matches all three files.
- Entering *AB?D.DAT* matches *ABCD.DAT* and *ABDD.DAT* only.

The following dialog shows a wildcard search for \*.dat, indicating find all files that have .dat as a file extension.

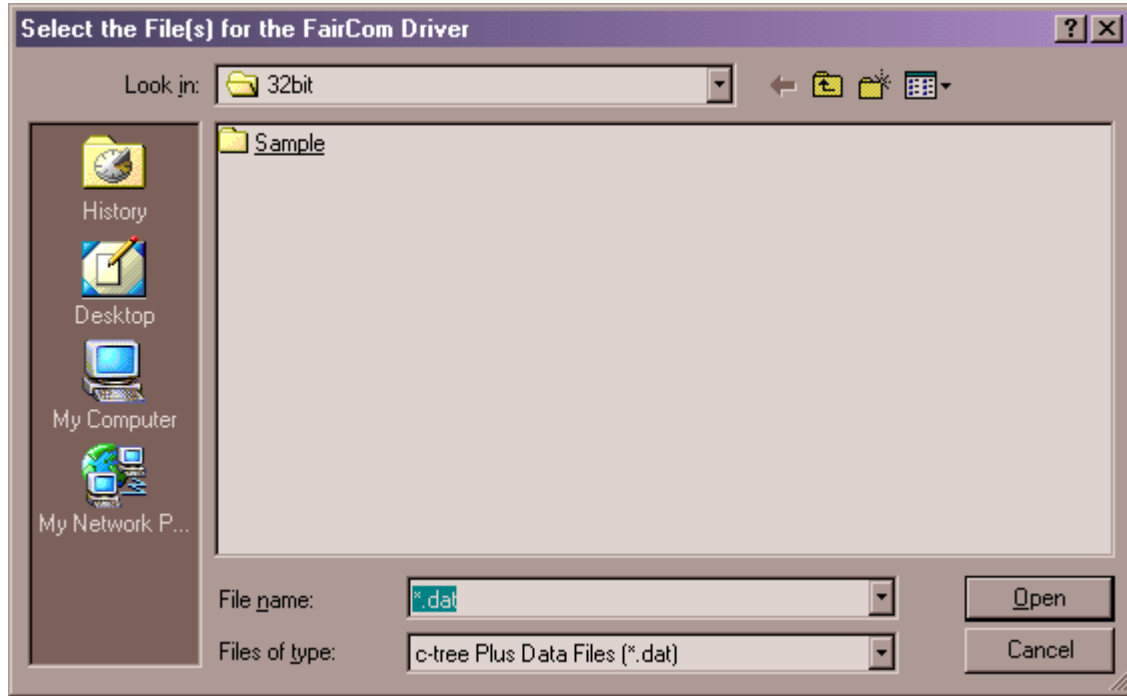
**Figure 6: Wildcard Search**



3. Once the Script Name setting contains a wildcard, click **OK**.

The first time you select the c-tree Crystal Reports Driver from Crystal Reports, a Database File Selection window appears asking if you “want to browse for the files to be used by this Crystal Reports Driver”. Answer **Yes**. You are presented with the following dialog:

**Figure 7: Selecting Files**



4. From the File Browse window, highlight the files you would like available to the c-tree Crystal Reports Driver. Please note the following two points:
  - To select multiple files, hold down the shift key or control key while selecting files.
  - Files can be selected only from one directory at a time. If you have files in multiple directories, select all of the files from the first directory then select **OK**. After inserting these files, the c-tree Crystal Reports Driver will ask if you wish to select additional files. If so, this will be your opportunity to include files from other directories and append them into one common FairCom Data Dictionary.
5. Once you have selected all of the files, answer **No** to indicate that there are no more files to select. The c-tree Crystal Reports Driver will automatically create the FairCom Data Dictionary, *CTSYSCAT.FCS*.

## 2.3 Script Method

By creating a simple text script, the FairCom Data Dictionary can be created automatically upon the first access to the c-tree Crystal Reports Driver. A sample text script, *FAIRCOM.DB*, is included with the c-tree Crystal Reports Driver and is placed in the Data Dictionary Path (*C:\FAIRCOM\CRYSTAL\32BIT* by default). The format of the text script is as follows. *alias\_name* is the symbolic file name referenced from Crystal Reports. *file\_name* is the actual file name as it resides on disk.

```
alias_name file_name
```

The text file should list the file alias names and the actual file names on a separate line for each file (see [“Adding Files to the Dictionary”](#) for an example).

The steps to create the FairCom Data Dictionary using the script method are:

1. Create the script with the format defined above.

2. Specify the name of the script with the Script Name setting in c-tree Crystal Reports Driver Configuration.
3. Set the Data Dictionary Path setting in the Options section of c-tree Crystal Reports Driver Configuration to the directory containing the script.
4. With the script in place, when Crystal Reports accesses the c-tree Crystal Reports Driver, the Data Dictionary, *CTSYSCAT.FCS*, will be created from the information located in the script file. The Data Dictionary will be created in the Data Dictionary Path in multi-user non-server mode or in the c-tree Server directory when using the c-tree Server.

After successfully creating the dictionary, the text script is no longer needed.

**Note:** A third method for creating the FairCom Data Dictionary is available for advanced users. This method is to use the **import.exe** utility shipped with the c-tree Crystal Reports Driver. The import utility creates the FairCom Data Dictionary from the same type of simple text script described above. See [“Data Dictionary Creation - Import Method”](#) for more details.

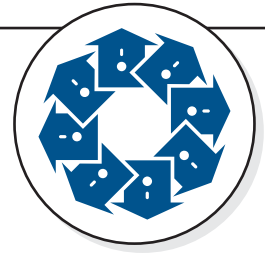
## 2.4 Additional tips for the c-tree Server Script

The following suggestions are intended for c-tree Crystal Reports Driver dictionary scripts when used with the c-tree Server.

It is best to either prefix the file name with the path to the data files, from the c-tree Server perspective, or include no path at all. For example, to create the data dictionary for a c-tree Server residing in the directory */usr/fairserv*, *FAIRCOM.DB* should appear as in the following:

```
CUSTOMERS      /usr/fairserv/custmast.dat
ORDERS         /usr/fairserv/custordr.dat
ORDER_DETAIL   /usr/fairserv/ordritem.dat
ITEMS          /usr/fairserv/itemmast.dat
```

The case sensitivity for file and path names is based on the requirements of the operating system (i.e., most Unix file naming conventions are case sensitive). If your c-tree Server is on a Unix based operating system (AIX, SCO, AT&T, etc.) be sure to use a forward slash '/' to separate the paths as shown in the example above.



## Crystal Reports Driver Configuration

This chapter details the c-tree Crystal Reports Driver Configuration dialog and provides valuable insight into optimal application configuration. This information is important for understanding the features and options required to effectively use the c-tree Crystal Reports Driver.

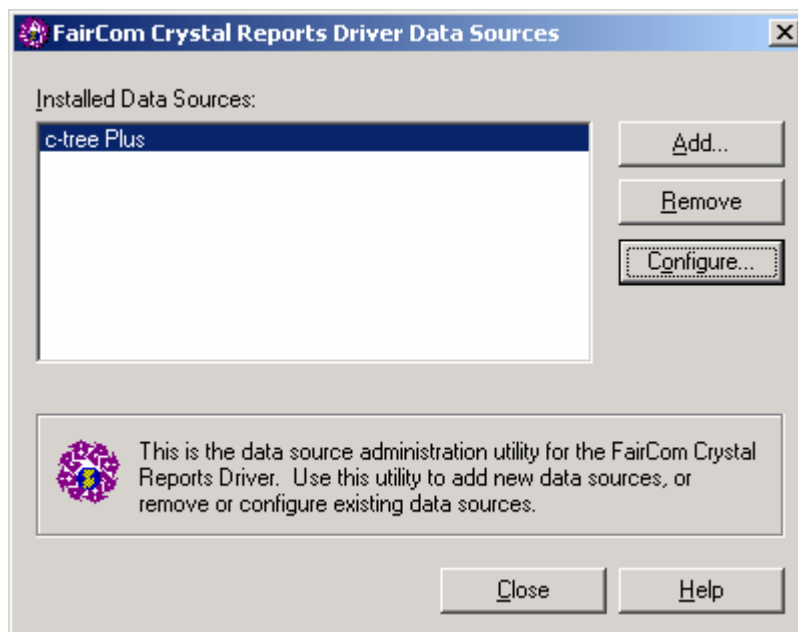
### 3.1 Adding a Data Source

The c-tree Crystal Reports Driver allows you to specify different configurations, or data sources, and to manage the configuration options of each data source separately.

This allows you to select different data sources (e.g., a local database, a c-tree Server, or different versions of a database) from within Crystal Reports instead of having to reconfigure the Driver and restart Crystal Reports to change data sources.

The c-tree Crystal Reports Driver Data Sources dialog box is accessed by selecting the Windows Start menu, Programs, c-tree, Crystal Reports Driver, Crystal Reports Driver Administration.

**Figure 8: Data Sources Dialog Box**



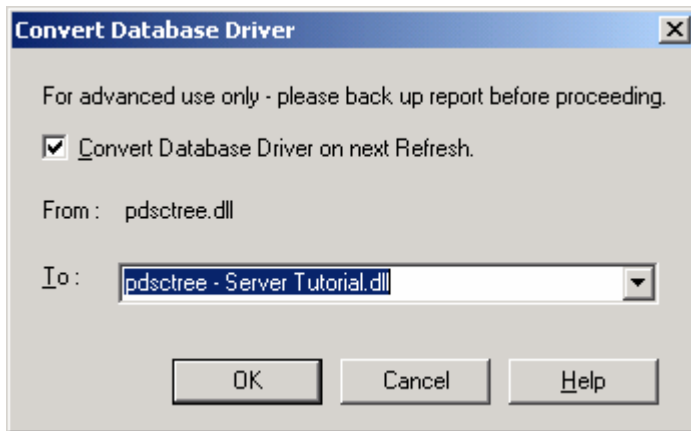
Click **Add...** to add a new data source. Click **Remove** to remove the selected data source. Click **Configure...** to configure the selected data source. See [“Crystal Reports Driver Configuration Options”](#) for more information on adding or configuring a data source.

**Note:** Crystal Reports saves the data source name within each report. If you change the name of a data source or delete a data source, reports using that data source must be converted to use a new data source in order to work properly.

To convert to a new data source:

1. In the Crystal Reports “Database” menu, select **Convert Database Driver...**
2. In the “Convert Database Driver” dialog, ensure the **Convert Database Driver on next Refresh** checkbox is checked. In the **To:** dropbox, select the desired data source (e.g., “pdsctree - Server Tutorial.dll”). Click **OK**.

**Figure 9: Convert Database Driver Dialog Box**



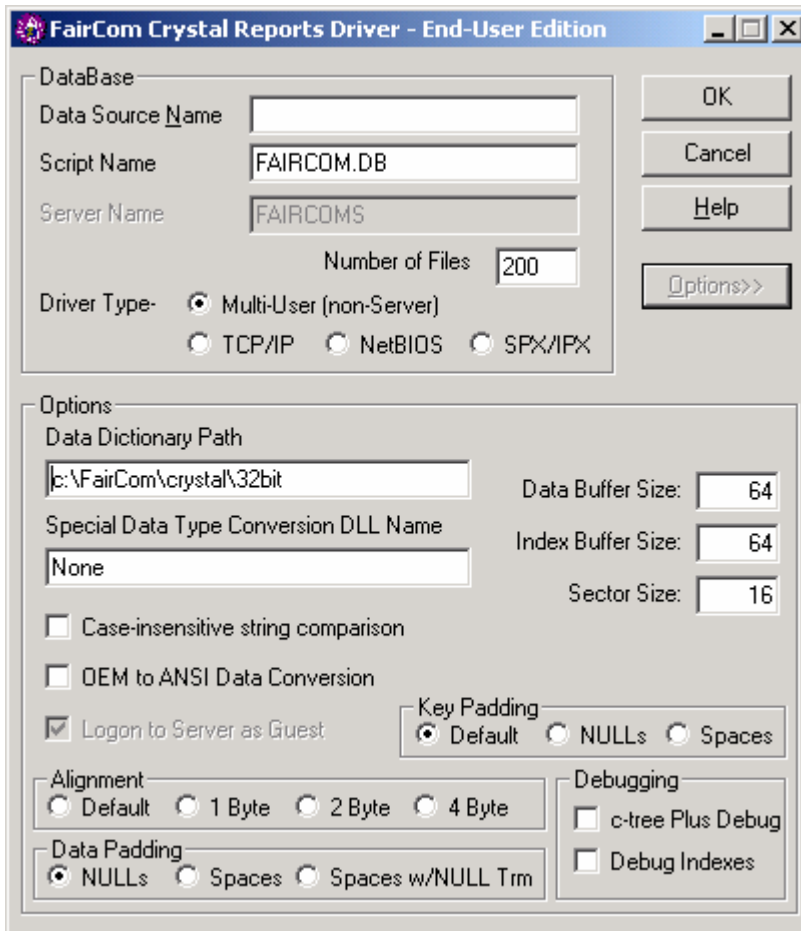
3. On your next Refresh, the report will pull data from the new data source.

## 3.2 Crystal Reports Driver Configuration Options

The c-tree Crystal Reports Driver is optimized to simplify configuration. The c-tree Crystal Reports Configuration dialog box is accessed by clicking **Add...** or **Configure...** in the c-tree Crystal Reports Driver Data Sources dialog box, and provides the following basic settings and options. Refer to the following configuration options screenshot.

**Note:** Not all options are supported or required for the Demo version of the Driver.

**Figure 10: Configuration Dialog Box**



### Data Source Name

The default data source has no name. For a new data source, type a unique name in this field to distinguish this configuration.

### Script Name

Default: *FAIRCOM.DB*

Database script file name. This prompt is not case sensitive.

### Server Name

Default: *FAIRCOMS*

The c-tree Server name. The default may be overridden with the *SERVER\_NAME* keyword in *ctsrvr.cfg*. If you are not sure of the name of your c-tree Server, contact your network administrator or consult *ctsrvr.cfg* in your c-tree Server directory.

When using TCP/IP, the Server name must also include the c-tree Server host machine name. The Server Name is case sensitive. The format is:

*Server\_Name@Server\_Hostname*

- *Server\_Name* - The name of the c-tree Server.

- **Server\_Hostname** - The name of the machine where the c-tree Server resides. If you are unsure about the host name, consult your network administrator.

For example, to connect to a machine with a hostname of Sun and using the default Server name FAIRCOMS, specify the following in the Crystal Reports Configuration Server Name:

FAIRCOMS@Sun

### **Number of Files**

Default: 200

Maximum number of concurrently open c-tree Plus files (data plus index).

### **Driver Type**

Select the I/O operational mode for the c-tree Crystal Reports Driver. The choices are:

- **Multi-User:** FairCom's multi-user non-server mode.
- **TCP/IP:** Communicate through the TCP/IP communication protocol to a c-tree Server.
- **NetBIOS:** Communicate through the NetBIOS communication protocol to a c-tree Server.
- **SPX/IPX:** Communicate through the SPX/IPX communication protocol to a c-tree Server.

## **3.3 Options>>**

The **Options>>** button is intended for developers or advanced users only. By selecting the **Options>>** button, it is possible to specify several initialization parameters. For the c-tree tutorial and your initial use of Crystal Reports, FairCom recommends using the default values. The following options are available:

### **Data Dictionary Path**

Default: installed path

FairCom Data Dictionary location. This directory should point to the location of the *CTSYSCAT.FCS* file in multi-user mode. When using the c-tree Server, the dictionary is created in the c-tree Server directory and should remain there. The c-tree Crystal Reports Driver searches this path for the data dictionary script specified in Script Name. If found, the contents of the script are used to recreate *CTSYSCAT.FCS*.

### **Special Data Type Conversion DLL Name**

This entry has been added to allow developers to add support for their own data types with the c-tree Driver SDK.

### **Buffer Sizes - Data/Index**

Default: 64

These values set the amount of memory for data and index caching in multi-user non-server mode only. Typically, the larger the value the better the performance. The memory is calculated as follows: Bytes in RAM = (Sector Size X Buffer Size X 128).

### **Sector Size**

Default: 16

Index node size. Set the same value as the target c-tree Plus files, or larger if they are not superfiles. The default value of 16 yields a 2K node size (16 x 128), the default for the c-tree Server. Each time this

value is changed, *CTSYSCAT.FCS* must be recreated to match the new value. Normally, the default value will be best, but your application vendor will know the optimum value for your c-tree Plus files.

### **Case-insensitive string comparison**

Default: OFF

When enabled causes target string values to be compared to column data without regard to case. For example, "THE" and "the" are identical with the box checked.

### **OEM to ANSI Data Conversion**

Default: OFF

Allows customers to choose to perform the OEM to ANSI conversion for string data. Consult your vendor before changing this setting.

### **Logon to Server as Guest**

Default: ON

Username and password support for client-server mode. When enabled in client-server mode, the c-tree Crystal Reports Driver connects to the c-tree Server as user GUEST. If this option is not enabled, the user is prompted for the username and password when connecting to the c-tree Server.

### **Key Padding**

Default: Default

This option allows the padding byte for target key values to be altered. Note: This option should only be used by advanced users and is discussed in more detail in ["Advanced - Registry Options"](#).

### **Alignment**

Default: Default

This option allows the default c-tree Plus data file alignment to be altered. Note: This option should only be used by advanced users and is discussed in more detail in ["Advanced - Registry Options"](#).

### **Data Padding**

Default: NULLs

This option allows the padding byte for string data to be altered. Note: This option should only be used by advanced users and is discussed in more detail in ["Advanced - Registry Options"](#).

### **c-tree Plus Debug**

Default: OFF

Enabling this feature sends debugging information to a log file. See ["Advanced - Registry Options"](#) for additional information.

### **Debug Indexes**

Default: OFF

Enabling this feature sends debugging information to a log file. See ["Advanced - Registry Options"](#) for additional information.

## 3.4 Data Dictionary - In Depth

This section contains additional information about the FairCom Data Dictionary: defining multiple databases and adding files to the dictionary.

### Defining Multiple Databases

One important concept is that each database defined by the Script Name setting can be thought of as a view into a larger database. The FairCom Data Dictionary (*CTSYSCAT.FCS*) can hold many database names (views), each containing many file (table) names. The fewer files in each database the faster data access will be. It is advisable to split your application files across many databases each containing different groups of files.

For example, the tutorial in [“Getting Started with Your Data”](#) has four files: CUSTOMER, ORDERS, ORDER\_DETAIL, and ITEMS. If a user only requires access to information from the CUSTOMER file, create a database with only the CUSTOMER file. This is done with the automatic dictionary method by creating a dictionary script, *CUSTOMER.DB*, as follows:

```
CUSTOMER    c:\faircom\crystal\32bit\sample\custmast.dat
```

Use the c-tree Crystal Reports Driver Configuration to set Script Name to *CUSTOMER.DB*.

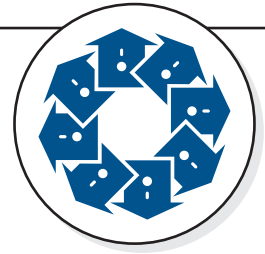
### Adding Files to the Dictionary

To add additional files to the FairCom Data Dictionary, create a new dictionary script listing all files to include in that database. The new files will be appended to the database name that corresponds to the script name. This also allows you to remove files from a database. The re-creation of the dictionary takes place the next time the c-tree Crystal Reports Driver is accessed.

For example, to add a new file ORDERS to *CUSTOMER.DB*, a script would be created as follows:

```
CUSTOMER    c:\faircom\crystal\32bit\sample\custmast.dat  
ORDERS      c:\faircom\crystal\32bit\sample\order.dat
```

For this example, ensure the Script Name is set to *CUSTOMER.DB* and the location specified by the Data Dictionary Path is the location of *CUSTOMER.DB*. The next time Crystal Reports accesses the c-tree Crystal Reports Driver, the ORDERS file will be appended to the dictionary. After the file is appended to the dictionary, the script (*CUSTOMER.DB*) is no longer needed.



## Advanced Topics

This chapter describes advanced topics, such as performance optimization, importing dictionaries, and file locations.

### 4.1 Performance Optimization

- The fewer file names in a database, the faster the data access. Since the c-tree Crystal Reports Driver supports multiple database names, it is advantageous to create multiple views into the database. See [“Data Dictionary Creation - Import Method”](#) for further information.
- The fewer records per data file yield faster data access.
- Joins operate most efficiently when performed on indexed fields.

### 4.2 Data Dictionary Creation - Import Method

The FairCom Data Dictionary can be created with the import utility, **import.exe**. This utility loads the database and file member names into the FairCom Data Dictionary. **import.exe** uses a text-based script with the following layout:

```
DATABASE d_name
```

```
TABLE alias_name1(\path\file_name1)  
TABLE alias_name2(\path\file_name2)
```

- *d\_name* is an arbitrary database name or view over the data files (i.e., *FAIRCOM.DB* is the database name used in the tutorial in [“Getting Started with Your Data”](#)).
- *alias\_name1* and *alias\_name2* are arbitrary names for the data files residing on disk (i.e., CUSTOMERS and ORDERS are sample alias names from the tutorial import script, *SAMPLE.TXT*).
- path1 and path2 are either fully qualified paths or relative paths to the current logical drive (i.e., *c:\faircom\crystal\32bit\sample\* from the tutorial import script, *SAMPLE.TXT*).
- file\_name1 and file\_name2 are the actual file names residing on disk (i.e., *CUSTMAST.DAT* and *CUSTORDR.DAT* from *SAMPLE.TXT*).

The example below contains one database view (*FAIRCOM.DB*) and four file members (CUSTOMERS, ORDERS, ORDER\_DETAIL, and ITEMS).

```
DATABASE FAIRCOM.DB
```

```
TABLE CUSTOMERS(C:\faircom\crystal\32bit\sample\CUSTMAST.DAT)  
TABLE ORDERS(C:\faircom\crystal\32bit\sample\CUSTORDR.DAT)  
TABLE ORDER_DETAIL(C:\faircom\crystal\32bit\sample\ORDRITEM.DAT)  
TABLE ITEMS(C:\faircom\crystal\32bit\sample\ITEMMAST.DAT)
```

## Import Script

The import utility (**import.exe**) is a DOS-based, command line utility executed from the MS-DOS prompt. To create the dictionary for the Crystal Reports tutorial, execute the import utility by specifying the path to **import.exe** and pass the import script on the command line as follows:

```
c:\faircom\crystal\32bit\import sample.txt
```

The data dictionary file, *CTSYSCAT.FCS*, is created in the root directory of your local drive. For example, if the c-tree Crystal Reports Driver is installed on drive C:, *CTSYSCAT.FCS* is created in the C:\ directory. Move this file to a new location by copying it to the desired location and specifying the path in the c-tree Crystal Reports Driver Configuration dialog, discussed in [“Crystal Reports Driver Configuration”](#). Each time the import utility is executed, any existing *CTSYSCAT.FCS* file in the root directory of the local drive is overwritten.

When building your own script, it is recommended to fully specify the file paths (i.e., include the logical drive letter in addition to the path, for example, *c:\faircom\crystal\32bit\sample\* as opposed to *faircom\crystal\32bit\sample*).

## Wildcard

Rather than building your own script, **import.exe** can be passed a wild card to build the script. Execute the import utility by specifying the path to **import.exe** located in the *\CRYSTAL\32BIT* directory and pass *-f \*.dat* as follows:

```
c:\faircom\crystal\32bit\import -f *.dat
```

Passing *-f \*.dat* tells **import.exe** to create the Data Dictionary (*CTSYSCAT.FCS*) and add all of the files with the *.dat* extension located in the current directory. When the import utility sees the *-f* switch, it also creates a text-based import file, *IMPORT.TXT*, listing all the data files located in the current directory. This script can be used by **import.exe** to re-create the dictionary.

## Multiple Database Script

Splitting application files into distinct database groups enhances performance of the c-tree Crystal Reports Driver. This is easily done with **import.exe**.

```
DATABASE FAIRCOM.DB
```

```
TABLE CUSTOMERS(C:\faircom\crystal\32bit\sample\CUSTMAST.DAT)  
TABLE ORDERS(C:\faircom\crystal\32bit\sample\CUSTORDR.DAT)  
TABLE ORDER_DETAIL(C:\faircom\crystal\32bit\sample\ORDRITEM.DAT)  
TABLE ITEMS(C:\faircom\crystal\32bit\sample\ITEMMAST.DAT)
```

```
DATABASE CUSTOMER.DB
```

```
TABLE CUSTOMERS(C:\faircom\crystal\32bit\sample\CUSTMAST.DAT)
```

The above example illustrates adding a new database view (*CUSTOMER.DB*) over the Customer file (*CUSTMAST.DAT*). When this script is passed to **import.exe**, the Data Dictionary created contains two databases: *FAIRCOM.DB* with four data files; and *CUSTOMER.DB* with one data file. To switch between the databases, change the name specified in the Script Name setting in the Crystal Reports Configuration dialog.

## 4.3 File Locations

The c-tree Crystal Reports Driver installation process places several files on your system. The FairCom supplied files are installed in the *windows\crystal\* or *windows\system\* directories. The c-tree Sample data files are installed in the directory specified during installation, *FAIRCOM\CRYSTAL\32BIT\* by default.

## FairCom Supplied Files

- *P2SCTREE.DLL*: c-tree Crystal Reports Driver DLL
- *P2SCTCFG.EXE*: c-tree Crystal Reports Driver Configuration Utility
- *CTCR\_FPG.DLL*: c-tree 32-bit c-tree Plus multi-user non-server DLL
- *CTCR\_TCP.DLL*: c-tree 32-bit c-tree Plus TCP/IP client side DLL
- *CTCR\_NET.DLL*: c-tree 32-bit c-tree Plus NetBIOS client side DLL
- *CTCR\_SPX.DLL*: c-tree 32-bit c-tree Plus SPX/IPX client side DLL
- *P2SCTREE.HLP*; *P2SCTREE.CNT*; *ROBOEX32.DLL*: c-tree Crystal Reports Driver Help files

## FairCom Supplied Sample Files

The following c-tree sample files are for the c-tree Crystal Reports Driver. See [“Getting Started with Your Data”](#) in this Guide for more information.

- *FAIRCOM.DB*: Script for tutorial, creates dictionary for sample files
- *SAMPLE.TXT*: Script for creating the tutorial data dictionary
- *IMPORT.EXE*: Data dictionary creation utility
- *CUSTMAST.DAT*: Tutorial customer master data file.
- *CUSTMAST.IDX*: Tutorial customer master index file.
- *CUSTORDR.DAT*: Tutorial customer order data file.
- *CUSTORDR.IDX*: Tutorial customer order index file.
- *ITEMMAST.DAT*: Tutorial item master data file.
- *ITEMMAST.IDX*: Tutorial item master index file.
- *ORDRITEM.DAT*: Tutorial order item data file.
- *ORDRITEM.IDX*: Tutorial order item index file.
- *TUTORIAL.RPT*: Tutorial report file.

## 4.4 Advanced - Registry Options

The c-tree Drivers set several Registry keys. c-tree Crystal Reports Driver subkeys correspond to configuration entries shown in the table below. Each data source contains all of the subkeys below in a subkey of the key \\HKEY\_CURRENT\_USER\\Software\\FairCom\\Crystal Driver\\. Registry changes made to one data source to not affect other data sources.

Registry subkey	Configuration option
Alignment	Alignment
AllowUpdates	Allow Updates
CaseSensitive	Case-insensitive string Comparison
ColumnsOrderedBy	Column Order
DataBuffers	Data Buffer size
DataDictionary	Script Name

Registry subkey	Configuration option
DBQ	Data Dictionary Path
DebugCtree	c-tree Plus Debug
DebugIndex	Debug Indexes
Description	Description
Files	Number of Files
GuestLogin	Logon to Server as Guest
IndexBuffers	Index Buffer Size
MaxColSupport	Table's max number of columns
OEMtoANSI	OEM to ANSI Data Conversion
Protocol	Driver Type
Sectors	Sector Size
ServerName	Server Name
SpecialTypes	Special Data Type Conversion DLL Name
StringDataPadding	Data Padding
StringKeyPadding	Key Padding

## Adding a Shareable DSN

The Registry feature allows the creation and use of shareable file DSN's by the 32 bit c-tree ODBC Driver. The Driver creates unshareable file DSN's automatically when creating user or system DSN's.

To create a shareable file DSN:

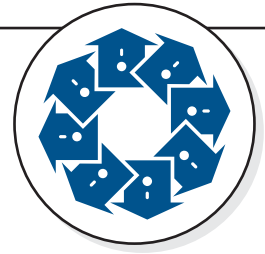
1. Start the 32 bit ODBC Administrator.
2. Select the **File DSN** tab.
3. Click the **Add...** button.
4. Select the ODBC driver for which you wish to create a file DSN (either "FairCom 32 bit ODBC Driver" or "FairCom c-tree Driver").
5. Click the **Advanced...** button and enter the desired driver-specific keywords (from the list above). Both DRIVER= (driver name) and DBQ= (data dictionary path) are required. For example:  
`DRIVER={FairCom 32bit ODBC Driver}`  
`DBQ=c:\faircom\odbc\32bit`
6. Click the **OK** button.
7. Click the **Next** button.
8. Enter the name of your new file DSN.
9. Click the **Next** button.
10. Click the **Finish** button.

If after you follow the above steps, the ODBC administrator returns the error “A connection could not be made using the file data source parameters entered. Save non-verified file DSN?”, you probably omitted some needed parameters or specified invalid parameter values (see step 5 above). Click **Cancel** and start over at step 1.

After a file DSN is successfully created in this manner, it can't be configured from the ODBC Administrator, however, it is a plain text file that can be edited to change its settings.

This type of file DSN is known as a shareable file DSN - if you arrange for it to be shared by multiple machines (each with the c-tree ODBC Driver installed), it will serve as an ODBC data source that is identically configured on all of these machines.





## Errors

### 5.1 DBOPEN

**DICTDBGETBYNAME(FAIRCOM.DB)=101** - The specified database, *FAIRCOM.DB* in this message, could not be located. This error message is typically seen if Debug is enabled in the c-tree Crystal Reports Driver Configuration dialog.

1. The Data Dictionary Path was not properly specified.
2. The c-tree Crystal Reports data dictionary has not been created.

### 5.2 No such database

1. If the FairCom Data Dictionary has been created, ensure the Data Dictionary Path in the c-tree Crystal Reports Driver Configuration dialog points to *CTSYSCAT.FCS*.
2. If the path is correct, re-create the FairCom Data Dictionary file *CTSYSCAT.FCS*.

### 5.3 No table names appear in the Select Table dialog box

Be sure the table name paths specified in the dictionary create script (i.e., *FAIRCOM.DB* for the tutorial) or the import script (i.e., *SAMPLE.TXT* for the Import example) point to where the tables (files) are located.

### 5.4 Not able to open \*.FCS file

1. *CTSYSCAT.FCS* not created. Create the Data Dictionary.
2. *CTSYSCAT.FCS* not in the proper path. This file must reside in Data Dictionary Path as specified in the c-tree Crystal Reports Driver Configuration window.

### 5.5 Specified driver could not be loaded

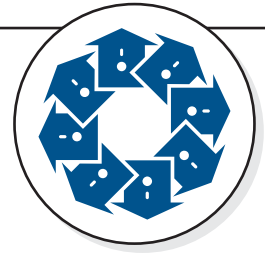
Possible solutions:

1. Driver DLL may be missing. Reinstall the Driver.
2. Driver DLL may be corrupt. Reinstall the Driver.

3. Driver DLL not in *windows\system* directory. Place Driver DLL in the *windows\system* directory.

## 5.6 System Catalog's Files Need to be Rebuilt

Click **OK** to delete and recreate *CTSYSCAT.FCS* using the data dictionary script specified in the c-tree Crystal Reports Driver Configuration dialog. Otherwise, *CTSYSCAT.FCS* will not be touched and the connection attempt will fail.



## Glossary

The following terms are used throughout this guide.

### *32-bit*

An application designed to operate only on 32-bit operating systems, such as Windows 95/98 and Windows NT. The theory of 32-bit applications is that they are typically superior since they utilize the underlying power of the newer operating systems and hardware available today.

### *c-tree®*

FairCom's legacy data engine. The parent product for c-tree Plus

### *c-tree Plus®*

FairCom's data engine. Used in many applications and embedded systems to manage data.

### *column*

Synonymous with the definition of field. In the relational model, column is used in place of the term field. Column and field are used interchangeably in this guide.

### *CTSYSCAT.FCS*

The FairCom Data Dictionary file.

### *data dictionary*

A list of the data files used in various databases.

### *data source*

A database or application view. In the c-tree Drivers, a unique set configuration.

### *directory*

A location where files are stored on disk. A directory can be thought of as a drawer in a file cabinet. Each file folder within the drawer can be thought of as a separate file, or collection of like information.

### *field*

A specific piece of information stored within a record. Many fields are commonly stored in one record. For example, a record storing a customer address might contain fields for the customer's name, address, city, state, zip, and phone number. This example therefore contains 6 fields in each record.

### *file*

A collection of like information, referred to as records. See the definitions for directory, record and table for further information.

### *index file*

A special type of file that provides a mechanism for performing fast data retrieval.

### *record*

A piece of information stored within a data file. Expanding on the file cabinet example used in the directory definition, each piece of paper found within a file folder can be thought of as a record. A record is a unique piece of information similar to other pieces of information (papers) within the file folder.

*row*

Synonymous with definition of record. In the relational model, row is used in place of the term record. Row and record are used interchangeably in this guide.

*segment*

A piece of information (field) stored within an index file. An index can be made up of many fields or even portions of fields. Each field or portion of a field stored within an index is called a segment.

*table*

A term synonymous with the definition of file. In the relational model, table is used in place of file. Table and file are used interchangeably in this guide.

*unique index*

An index that does not accept duplicate records, indicating each value stored in the index is unique. An index defined over a customer social security number field would typically be a unique index. If the index supports duplicate records, it is said to be non-unique or duplicate allowed. An index defined over one field, last name, would most likely accept duplicate records since it may be common to have more than one customer with the last name of Smith.

*VENDOR.DB*

A script file to build the data dictionary for a vendor's application data files.

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