
Guide to the Superbase

ODBC Driver

By Superbase Developers plc

SUPER **BASE**

This manual was produced using *Doc-To-Help*[®], by WexTech Systems, Inc.



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Installation

What You Received

The package you received should have contained:

- This document,
- The installation disk,
- and a registration card.

If any of the items are missing, please contact the place where you made the purchase.

Before Installing the Driver

If you have Superbase installed on your system, you should make sure that you know where it is installed. It may be useful to note the directory that it is installed into. It is also essential to know which type of Superbase installation that you have. There are three basic types:

- Single-user,
- LAN, and
- Distributed LAN

It is extremely important that the ODBC driver is installed using the same style of installation that was used originally. If you don't know for sure, don't worry too much, since the installation program will try and find out for you. It *will* require that you know where it is installed, however, to be able to do the evaluation.

Installing the Driver

Place the installation floppy disk into floppy drive a or b.

Windows 3.x, Windows NT 3.x: In Program Manager, select the Run menu option from the File menu. Type into the resulting dialog in the box provided: a:\setup or b:\setup depending on the drive you placed the disk in. Click on OK.

Windows 95, Windows NT 4.0: From the Start menu, select the Run item. Type into the box provided: a:\setup or b:\setup depending on the drive you placed the disk in. Click on OK.

Follow the instructions to install the driver and documentation.

Using the ODBC Driver

The Difference Between ODBC and Superbase

ODBC is based on the SQL standard. In a typical SQL database all of the data files, known as tables, and all of the index files, as well as the data description or metadata information, is often contained inside of one file. The users of such a database do not normally have the ability to simply move it wherever they might want, and it is often an extremely large database (millions or even billions of records — or rows, in SQL-speak). All of the relationships between the various tables will be encoded in some set of rules in the metadata portion of the database.

Most of these elements can also be found in Superbase. The tables are Superbase SBF files. The indexes are Superbase index files (.1 to .999). The metadata, in a considerably abbreviated form, is stored in the SBD file and it describes the structure and some of the rules of the database file. The container is the directory where the files are located.

Upon considering how many Superbase customers design their database systems, with files located in one directory, or often also in subdirectories below the main directory, we enhanced the Superbase ODBC driver to support files in subdirectories within a single ODBC data source. The exact capabilities and restrictions are described elsewhere.

If it was not present at the time the driver was installed, then the administrator was also installed.

In order to access the Superbase files in a given directory, an ODBC data source must be created using the ODBC Administrator tool. This tool is normally located in the Control Panel. It is not possible to simply open the files directly.

Using the Superbase ODBC Driver

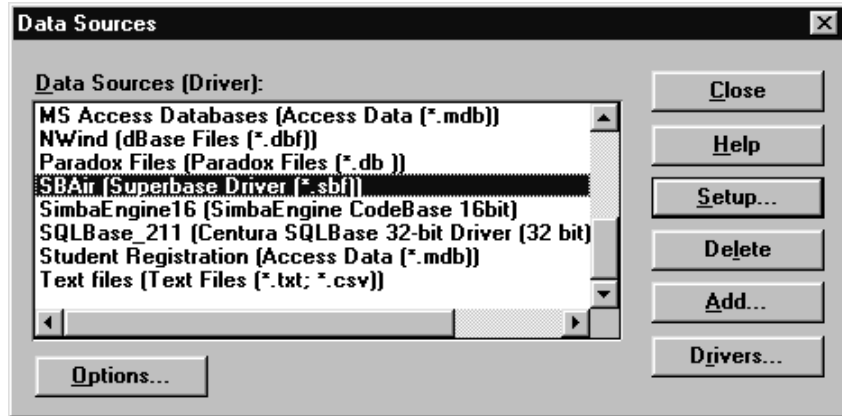
The following steps must be taken to use Superbase files via ODBC in an ODBC-client application:

1. Create an ODBC data source for the directory where the files reside
2. Connect to the data source via ODBC from the client
3. Open the table(s) (files) within the data source
4. If more than one table was opened, join the tables
5. Select the columns (fields) that are to be queried
6. Perform the query using the conditions desired (filter)

Examples are given below for each of the steps above.

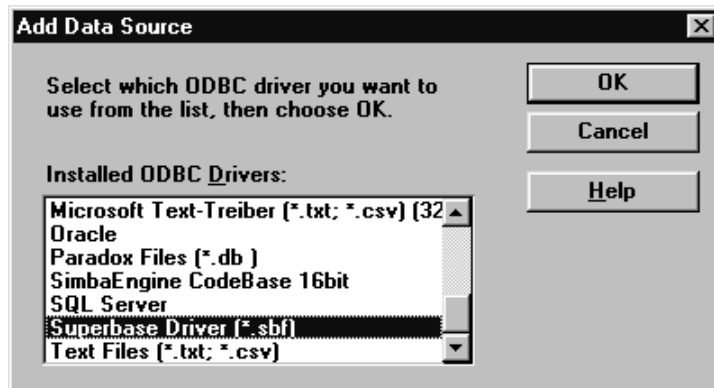
Creating a Data Source

Open the Control Panel. Open the ODBC administrator tool. Once it is open a window similar to the one below will appear, although the contents may differ:



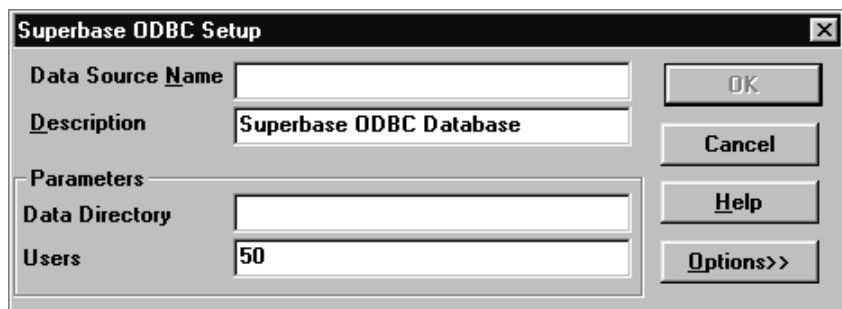
The ODBC Administrator Window

In the Data Sources window, click on Add... to add a new data source. That will display the ODBC Add Data Source window shown below:



The ODBC Add Data Source Window

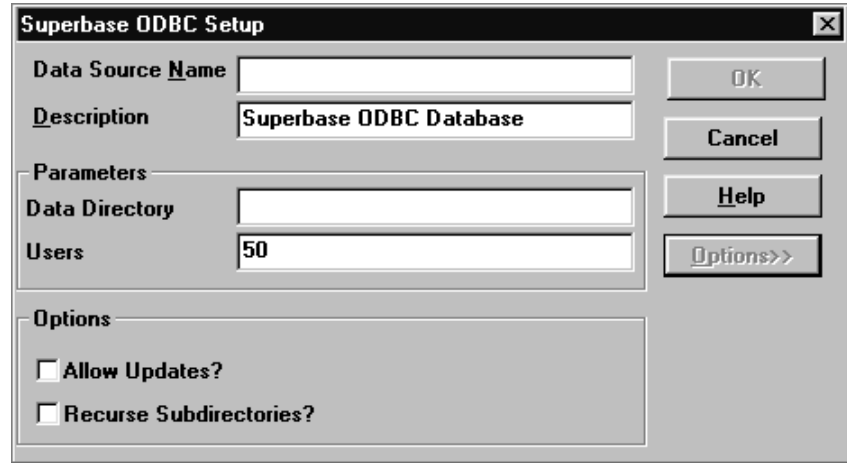
Select the entry Superbase Driver (*.sbf) from the list and click on OK. At this point, the Superbase ODBC Setup window is presented:



Superbase ODBC Setup Window

All that is required to create an ODBC data source is to supply it with a name in the Data Source Name box, which must be different from any existing data

source name, and then enter the into the **Data Directory** box where the data source is located. This will create a read-only data source for the Superbase files that are located in that directory. If the data source should include the files located in subdirectories or if it should be an updatable data source, then it is necessary to click on the **Options>>** button to display the rest of the dialog, as shown below:

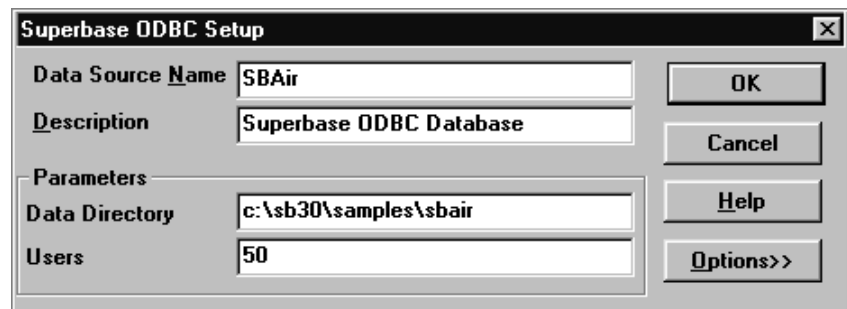


Complete Superbase ODBC Setup Window

Selecting the **Allow Updates?** box will enable writing to the Superbase files and selecting the **Recurse Subdirectories?** box will cause the data source to include the files located in subdirectories. For information on limitations on the number of files per data source see "Total Number of Files in One Data Source — 16-Bit ODBC Driver" on page 7.

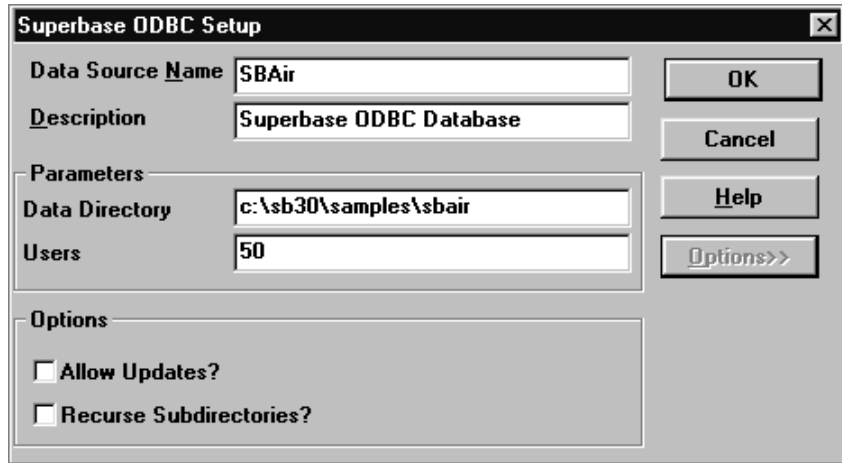
Modifying a Data Source

The process of modifying a data source is quite similar to that of creating one. The only difference is that some of the items in the windows are already filled out. Below is the initial dialog:



Superbase ODBC Setup Window

Modify the fields as required. If necessary, click on the **Options>>** button to open the remaining portion of the dialog as shown below:



Complete Superbase ODBC Setup Window

Check the **Allow Updates?** box to enable read/write access to the data source. By checking the **Recurse Subdirectories?** box it is possible to access all of the files in all of the directories below the location of the data source in one data source rather than needing to create multiple data sources. For information on limitations on the number of files per data source see "Total Number of Files in One Data Source — 16-Bit ODBC Driver" on page 7.

ODBC Limitations

Why Limitations?

The Superbase database product is extremely flexible and powerful. With that flexibility, however, comes a price.

Superbase Capabilities

Field-level Formulae

Unlike many database products on the market, Superbase allows the database developer to attach calculations, constants, and validations to the field description in the file. This means that Superbase will then carry out those calculations, constants and validations at the appropriate time.

Validation, constant, and calculation formulae can also reference other files. If necessary, Superbase automatically opens the other files as required. This is very high-level functionality and is not *built-in* as part of the ODBC driver. It is not automatically guaranteed that every file will be opened that is required by another file.

User-defined Functions

Few limitations are placed on the database developer with respect to what can be placed in those formulae. They can even include user-defined functions. The only limitation then being that the function must be present in a Superbase program buffer when it is required (such as when displaying a record which contains a virtual, calculated field which in turn references a user-defined function).

Total Number of Files in One Data Source — 16-Bit ODBC Driver

The total number of tables supported by a data source in the 16-bit ODBC driver is 357. Any files beyond the first 357 will be ignored. Users may circumvent this limitation by building multiple data sources which do not recurse directories and by making sure that no more than 357 Superbase files are present in the same directory.

What Is Not Supported?

Field-Level Calculations, Constants, and Validations

User-defined functions at the field level are the ultimate in flexibility and power for a database, but this degree of flexibility is not possible in the ODBC driver. To provide this level of functionality, the file format would have to be changed to tell the ODBC driver where to find the necessary code fragment being used for the calculation and the entire Superbase language parser would have to be added to the driver. Also, the user-defined function may depend on other functions being present, or on global variables having been defined and initialised by the user's program. At some point it would cease to be an engine and merely be most of Superbase. As such, some limitations *had* to be placed on what the Superbase ODBC driver could reasonably support at the field level.

Validations are also supported, but only those which are of the simplest variety. Something like:

```
MyField.MYFILE > 255
```

will also work in the driver, but crossfile lookup validations which include the REQUEST keyword are not supported and if present will result in the file being opened read-only. If you need to write to the file, do not put validations which use the REQUEST keyword in the field description, put them into your code. Then put the same (modified as necessary for language, etc.) validations into the non-Superbase program which will also be writing to the file. If a file has validation, calculation, or constant formulae which use user-defined functions or unsupported SBL key words, or references files in those validations, calculations, or constants which are not already open, then the file will be opened in read-only mode, regardless of the mode requested.

ODBC Driver Limitations

ODBC is based on SQL and as such, even if an operation is supported by Superbase, that does not mean that it is supported by SQL. One major difference between Superbase and the ODBC driver is that Superbase allows updating of files which do not possess a unique key. ODBC does *not* support this and as such will return an error 901 if an attempt is made to update a record in a file that does not have at least one unique index.

Forward-Referencing Calculations

In Superbase it is possible to define calculations at the field-level which reference fields which follow them. By setting the CalculationCount property of the Superbase object, it is possible to force Superbase to go through the calculation of field values the number of times referenced by this value so as to guarantee that all of the calculations are based on the proper values. Depending on how many forward referencing calculations there are, this could be as many as 5 or 6 passes through the calculations. This is a high-level function in Superbase and is *not* supported in the Superbase ODBC drivers. Before using your files with the ODBC driver, make sure to convert your files to not have forward-referencing calculations in them.

SQL Key Word Conflicts

It is possible that your Superbase database files contain SQL key words as field names. If that is the case, then you will get errors when attempting to access these files via ODBC. This is a limitation of the ODBC access and cannot be resolved by Superbase. For a list of SQL key words, see Appendix B.

What Is Supported?

Supported SBL Keywords

The Superbase ODBC driver was designed to be able to support a subset of the key words and operators from the Superbase Basic Language (SBL) when used in field-level constants, calculations, and validations.

The following key words are supported (and cannot be used as field names):

AND	ASC	CHR\$
DATE\$	DAY	DAYS\$
DAYS	FCASE\$	FN
FN alpha	FN ansi	FN ext
FN ibm	FN name	FN oem
FN path	FN root	HRS
IF	LCASE\$	LEFT\$
LEN	LIKE	LOOKUP
LTRIM\$	MID\$	MINS
MOD	MONTH	MONTH\$
NOT	NOW	OR
PAD\$	PI	REM
REPLICATE	RIGHT\$	SECS
SER	SPACE\$	STR\$
THOUSECS	TIME\$	TIMEVAL
TODAY	TRIM\$	UCASE\$
USERNAME	VAL	YEAR

Also the following binary operators are supported:

+, -, *, /, ^, MOD, =, <>, >, <, >=, <=, LIKE.

Appendix A — Error Codes

16-Bit ODBC Driver Error Codes

The following is a list of error codes that could be returned by the 16-bit ODBC driver:

SQL Errors

- 901 Attempt to update a table with no unique key
- 902 Attempt to bookmark a table with no unique key
- 903 Attempt to read a row in a table with no index
- 904 Superbase error inserting a column
- 905 Superbase error updating a column
- 906 Superbase network administration file (superbas.net) not found

Superbase Errors

- 6 Access to file not allowed
- 8 Exact match not found. Next in sequence selected
- 16 Can't find this field
- 33 String too long
- 40 Attempt to open a table with unresolvable formulae
- 50 This field must have some data
- 52 Can't open this file
- 57 Attempt to create a duplicate index entry
- 174 Can't lock database file

32-Bit ODBC Driver Error Codes

This section will be filled out when the 32-bit ODBC driver ships.

Superbase Errors — Full Explanation

Error 6 — Access to file not allowed

- You tried a task for which you need read/write access but you have read-only access. Check that:
- You used the correct password
- You have been granted access to this file by your network administrator
- The file you're using isn't protected with a password
- The task you're trying to complete is allowed on the type of file you're using. For example, you can't make an index on a dBASE file or export data to a .SBF file
- A file exists before you try to open it using SBL

Error 8 — Exact match not found. Next in sequence selected

Superbase can't find a match for the key value you specified. The closest matching record is selected. This error should only occur when writing or deleting records.

Error 16 — Can't find this field

Superbase displays this message if you mistype a field name. Superbase treats a text item that's not a string variable or a reserved word as a field name. Superbase displays this message if the field referred to doesn't exist.

Error 33 — String too long

The maximum length of a text string stored in a field or a variable is 4000 characters. Some strings are limited to 255 characters. The size of the string being assigned to a field may exceed the maximum length allowed by the field definition.

Reduce the number of characters in the string to less than 4000 or, if you're assigning a string to a field in a Superbase database file, modify the Superbase definition to increase the length of the field.

In some SQL implementations, you may be limited to 255 characters per string.

Error 40 — Attempt to open a file with unresolvable formulae

As stated earlier in the documentation, not every Superbase file that can be defined in Superbase is able to be opened outside of Superbase. The file that you are attempting to open may reference other Superbase files which are not yet open, or may reference unsupported Superbase Basic Language commands, or user-defined functions. Make sure that you are opening any referenced files *before* opening a file which needs them. In most cases, this error will result in the file being opened in Read-Only mode, regardless of the mode requested.

Error 50 — This field must have some data

This field is a required field. If a file contains required fields, you must enter data in these fields when you create, or edit a new record.

Error 52 — Can't open this file

A system error occurred when Superbase tried to open a .SBF or index file.

Check that:

- The file exists
- It's in the directory you specified
- You typed the filename correctly

Error 57 — Attempt to create a duplicate index entry

You tried to store a record with an index value that is identical to an index value in an existing record. This error can also occur when you're importing data where more than one record has a blank value in the same field which is indexed as unique.

Error 174 — Can't lock database file

The Superbase File Engine can't lock a database file. Either there are not enough file handles or not enough locks (as set with the SHARE command). Retry, and if this doesn't succeed, check with your network administrator.

Other Superbase Errors

For the specific error information regarding any other Superbase errors check the Superbase online help or in your Superbase handbook.

Appendix B — SQL Key Words

List of SQL Key Words

The following list of SQL key words should be checked to make sure that none of the fields in your files have the same name as a SQL key word. If so, then the field name must be changed before you can successfully access that file via the ODBC drivers.

ABSOLUTE	ACTION	ADA
ADD	ALL	ALLOCATE
ALTER	AND	ANY
ARE	AS	ASC
ASSERTION	AT	AUTHORIZATION
AVG	BEGIN	BETWEEN
BIT	BIT_LENGTH	BOTH
BY	CASCADE	CASCADED
CASE	CAST	CATALOG
CHAR	CHAR_LENGTH	CHARACTER
CHARACTER_LENGTH	CHECK	CLOSE
COALESCE	COBOL	COLLATE
COLLATION	COLUMN	COMMIT
CONNECT	CONNECTION	CONSTRAINT
CONSTRAINTS	CONTINUE	CONVERT
CORRESPONDING	COUNT	CREATE
CROSS	CURRENT	CURRENT_DATE
CURRENT_TIME	CURRENT_TIMESTAMP	CURRENT_USER
CURSOR	DATE	DAY
DEALLOCATE	DEC	DECIMAL
DECLARE	DEFAULT	DEFERRABLE
DEFERRED	DELETE	DESC
DESCRIBE	DESCRIPTOR	DIAGNOSTICS
DISCONNECT	DISTINCT	DOMAIN
DOUBLE	DROP	ELSE
END	END-EXEC	ESCAPE
EXCEPT	EXCEPTION	EXEC
EXECUTE	EXISTS	EXTERNAL

EXTRACT	FALSE	FETCH
FIRST	FLOAT	FOR
FOREIGN	FORTRAN	FOUND
FROM	FULL	GET
GLOBAL	GO	GOTO
GRANT	GROUP	HAVING
HOUR	IDENTITY	IMMEDIATE
IN	INCLUDE	INDEX
INDICATOR	INITIALLY	INNER
INPUT	INSENSITIVE	INSERT
INTEGER	INTERSECT	INTERVAL
INTO	IS	ISOLATION
JOIN	KEY	LANGUAGE
LAST	LEADING	LEFT
LEVEL	LIKE	LOCAL
LOWER	MATCH	MAX
MIN	MINUTE	MODULE
MONTH	MUMPS	NAMES
NATIONAL	NATURAL	NCHAR
NEXT	NO	NONE
NOT	NULL	NULLIF
NUMERIC	OCTET_LENGTH	OF
ON	ONLY	OPEN
OPTION	OR	ORDER
OUTER	OUTPUT	OVERLAPS
PAD	PARTIAL	PASCAL
PLI	POSITION	PRECISION
PREPARE	PRESERVE	PRIMARY
PRIOR	PRIVILEGES	PROCEDURE
PUBLIC	REFERENCES	RELATIVE
RESTRICT	REVOKE	RIGHT
ROLLBACK	ROWS	SCHEMA
SCROLL	SECOND	SECTION
SELECT	SEQUENCE	SESSION
SESSION_USER	SET	SIZE
SMALLINT	SOME	SPACE
SQL	SQLCA	SQLCODE
SQLERROR	SQLSTATE	SQLWARNING
SUBSTRING	SUM	SYSTEM_USER
TABLE	TEMPORARY	THEN
TIME	TIMESTAMP	TIMEZONE_HOUR
TIMEZONE_MINUTE	TO	TRAILING
TRANSACTION	TRANSLATE	TRANSLATION
TRIM	TRUE	UNION
UNIQUE	UNKNOWN	UPDATE
UPPER	USAGE	USER
USING	VALUE	VALUES

VARCHAR
WHEN
WITH

VARYING
WHENEVER
WORK

VIEW
WHERE
YEAR