R:Synchronizer X.5

Help Manual

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by R:BASE Technologies, Inc.
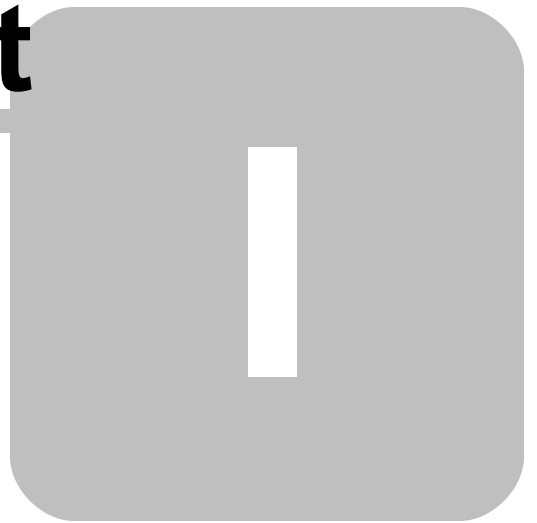
Welcome to R:Synchronizer X.5!

R:Synchronizer is a professional-strength data synchronizer program for R:BASE databases that enables you to maintain and use the same data in tables between two or more databases. R:Synchronizer provides the ability to synchronize data between home and office or desktop and notebook computers, so that the database files on both are up-to-date. With R:Synchronizer, you can easily transfer data changes with a few mouse clicks. It can even be used as powerful backup solution.

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Part I

1   Introduction

1.1   Introducing R:Synchronizer X.5

R:Synchronizer is a professional-strength data synchronizer program for R:BASE databases that enables you to maintain and use the same data in tables between two or more databases. R:Synchronizer provides the ability to synchronize data between home and office or desktop and notebook computers, so that the database files on both are up-to-date. With R:Synchronizer, you can easily transfer data changes with a few mouse clicks.

R:Synchronizer gives you complete control over the synchronization process. For example, you can specify whether records are inserted, deleted, and/or updated from the source database to the target database; and vice versa. A WHERE Clause can be specified for both the Source and Target databases to restrict which rows will be affected. The option to write synchronization results to a log file is also available.

R:Synchronizer also includes a feature to define all available parameters into a script file (.rsf) for command-line automated synchronization to totally automate the process with no human intervention!

A "Speed Sync" option is available to expedite the synchronization process by only comparing the date and time stamped columns used by R:Synchronizer.

Since you can easily transfer data with a few mouse clicks, R:Synchronizer can even be used as powerful backup solution.

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Printed: February 2024 in Murrysville, PA

First Edition

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2. To have operating system, workstations, and local network installed and functional. R:BASE Technologies will NOT be responsible for resolving issues not pertaining to the software product.

3. Our support staff deals with advanced issues, therefore the person contacting R:BASE Technologies for assistance should be the system administrator or have other R:BASE/SQL experience and be able to understand and implement the advice given.

4. To have the database, application, and command files being reviewed, safely backed-up before attempting assistance. R:BASE Technologies will NOT be held responsible for lost data or corruption as a result of advice given.
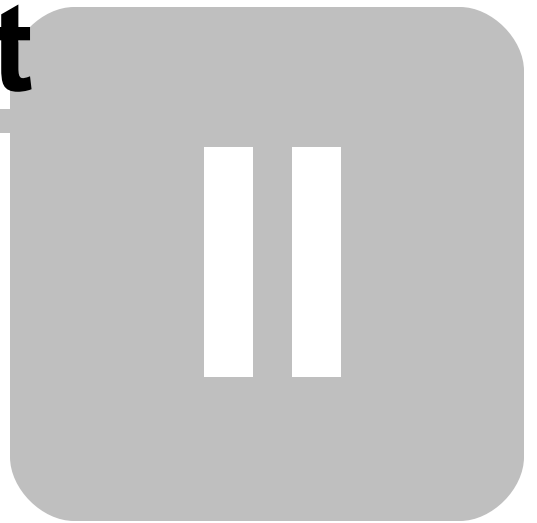
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2. To provide a reasonable solution for any solvable issue. Not all issues may be solved, and therefore we will acknowledge the existence of known issues, or bugs, which we are presently aware of, that have no reasonable work-around.

R:BASE Technologies reserves the right to limit the amount of support time allotted to a maximum of 2 HOURS during the 30-Day Complimentary Technical Support period. We also reserve the right to limit the quantity of calls from a particular licensee to 30 MINUTES in a single day. Issues are dealt with on a case-by-case basis, and are handled at the discretion of the support agent assigned to the case. Complimentary Support is limited to INSTALLATION and ELEMENTARY CONVERSION related issues ONLY. Our support hours are Monday through Friday, from 10:00 AM to 6:00 PM (EST).

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Part II

2 Installation

2.1 System Requirements

The following system specifications are recommended for the optimal use of R:BASE and R:BASE-related software.

Workstation Hardware

- 2-Core 2GHz+ CPU
- 2 GB of available RAM (4 GB recommended)
- 2 GB of available hard disk space
- 1024x768 or higher resolution video adapter and display
- Standard mouse or compatible pointing device
- Standard keyboard

Server Hardware

- 2-Core 2GHz+ CPU
- 6 GB of available RAM (8 GB recommended)

Operating System

- Microsoft Windows 11 (Professional)
- Microsoft Windows 10 (Professional)
- Microsoft Windows Server 2022
- Microsoft Windows Server 2019
- Microsoft Windows Server 2016
- Microsoft Windows Server 2012, 2012 R2

Network

- Ethernet infrastructure (Gigabyte recommended)
- Internet connection recommended, but not required, for license activation, software updates, and support
- Anti-virus programs should exclude the R:BASE program, and any add-on product, executable and database files

2.2 Software Installation

The installation of R:Synchronizer is fully automated and does not require user intervention for the initial setup.

Run the installer ".exe", provided by download, while physically sitting at the workstation to begin the installation process, and read the installer screens for licensing and other information as the program installs.
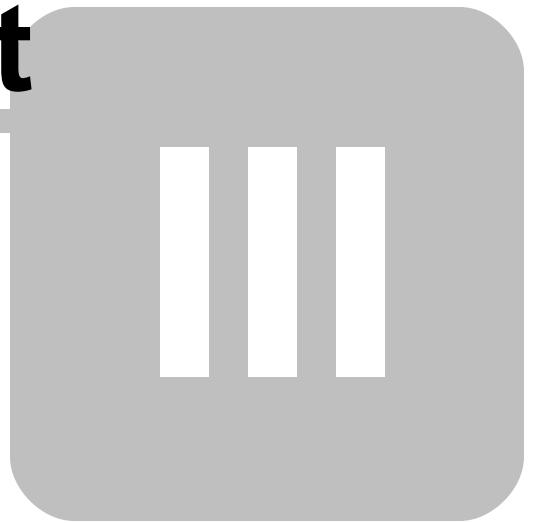
Installation Directory

C:\RBTI\RSynchronizerX5

Files Installed

RSynchronizerX5.exe
JumpList.dll
RSynchronizerX5.chm
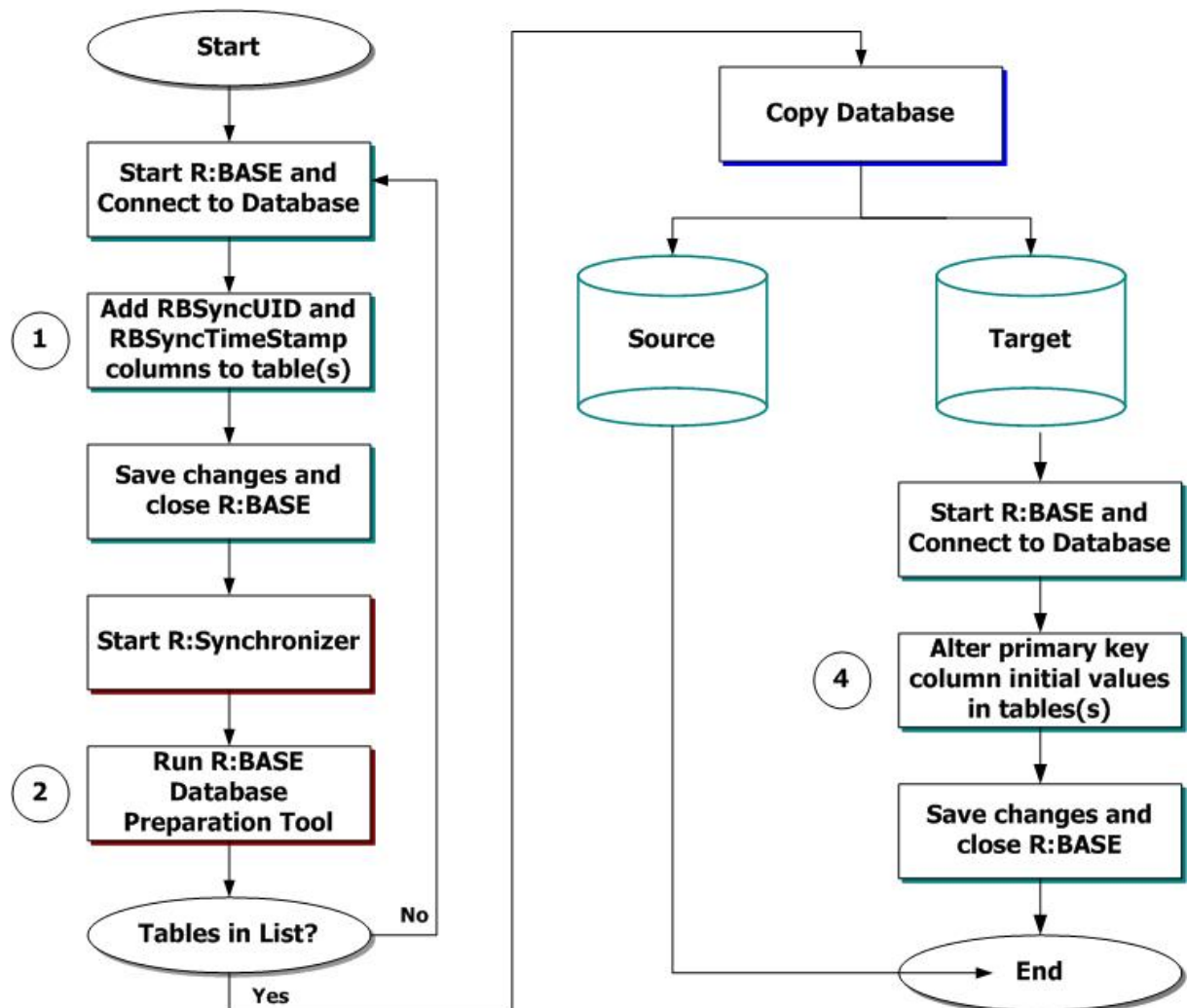RSynchronizerX5.pdf
License.rtf
ReadMe.txt

Part III

3 Synchronization Preparation

Before a database can be synchronized, it must be optimized with table level and system level alterations. The table level changes must be performed within R:BASE. The only tables that need changed are the tables which will be included in the synchronization process. If all of the tables will be synchronized, then all of the tables must be altered.

1. Database Tables

2. Preparation Tool

3. Copy Database

4. Primary Key Update

3.1 Database Tables

The table changes must be made within R:BASE. The R:BASE tables that will be included in the synchronization process are the only tables that will require to be changed. If all of the tables will need to be synchronized, then all of the tables need altered. For each table to be synchronized, two new columns, **RBSyncUID** and **RBSyncTimeStamp**, must be added to the table(s).

You may be thinking, "Common column names in multiple tables? This is going to interfere with my multi-table forms and reports!" You are correct. When accidentally using common column names, which are not primary and foreign keys, in multi-table forms and reports, the relational integrity of R:BASE will prevent data from displaying. This was taken into consideration during the development of R:Synchronizer. In effect, the RBSyncUID and RBSyncTimeStamp columns are NOT recognized as common columns when R:Synchronizer tables are used in multi-table forms and reports.

The new columns <u>MUST</u> meet the following requirements:

Column Name	Column Data Type	Column Value
RBSyncUID	TEXT (38)	NULL (No Calculation)
RBSyncTimeStamp	DATETIME	NULL (No Calculation)

The RBSyncUID and RBSyncTimeStamp columns can be added at any place within the table. It is not required to be located in the beginning or end of the table. The column names are not case sensitive. The RBSyncUID column must have the TEXT data type with no calculation properties added to it. The RBSyncTimeStamp column must have the DATETIME data type with no calculation properties added to it. **To increase the speed of the synchronization process, be sure to index the RBSyncUID column.**

Once complete, the R:Synchronizer program will recognize these tables as a R:Synchronizer tables. In the next section, values will be inserted into the R:Synchronizer columns.

Before continuing, be sure to review the following **<u>important</u>** considerations from adding the R:Synchronizer columns to your database:

1. When adding column objects to forms, using the Form Wizard or the Form Designer, you should not add the RBSyncUID and RBSyncTimeStamp columns. These columns are to be used by R:Synchronizer only. Displaying the RBSyncUID and RBSyncTimeStamp columns on reports and labels should also be avoided.

2. When unloading data from R:BASE, be advised that the RBSyncUID and RBSyncTimeStamp columns will be included in the output. More importantly, when loading data into R:BASE, be advised that the RBSyncUID and RBSyncTimeStamp columns must be held accountable for the number of column values being inputted.

3. When using SELECT commands with the "SELECT *****" or "SELECT ALL" parameter, the RBSyncUID and RBSyncTimeStamp columns will be included in the displayed data. This includes all new or existing Views that use "SELECT *****".

4. When using the INSERT and/or APPEND commands to load new data into R:Synchronizer tables, the values for the RBSyncUID and RBSyncTimeStamp columns MUST be NULL. This tells R:Synchronizer that the record is new.

5. When using the UPDATE command to edit existing data within a R:Synchronizer table, the value for the RBSyncTimeStamp column must be updated to the current date and time when the update occurs. This tell R:Synchronizer that the record has been changed and must be compared against the opposite R:Synchronizer table.

<u>Recommendation:</u> Add a column description for the RBSyncUID and RBSyncTimeStamp columns in order to prevent another user from accidentally deleting them.

Examples:

- This is an example of adding the RBSyncUID and RBSyncTimeStamp columns to the tables using the R:BASE R> Prompt:

```
ALTER TABLE tablename ADD COLUMN RBSyncUID TEXT (38)
COMMENT ON RBSyncUID IN tablename IS 'R:Synchronizer Column - DO NOT DELETE!'

ALTER TABLE tablename ADD COLUMN RBSyncTimeStamp DATETIME
COMMENT ON RBSyncTimeStamp IN tablename IS 'R:Synchronizer Column - DO NOT DELETE!'
```
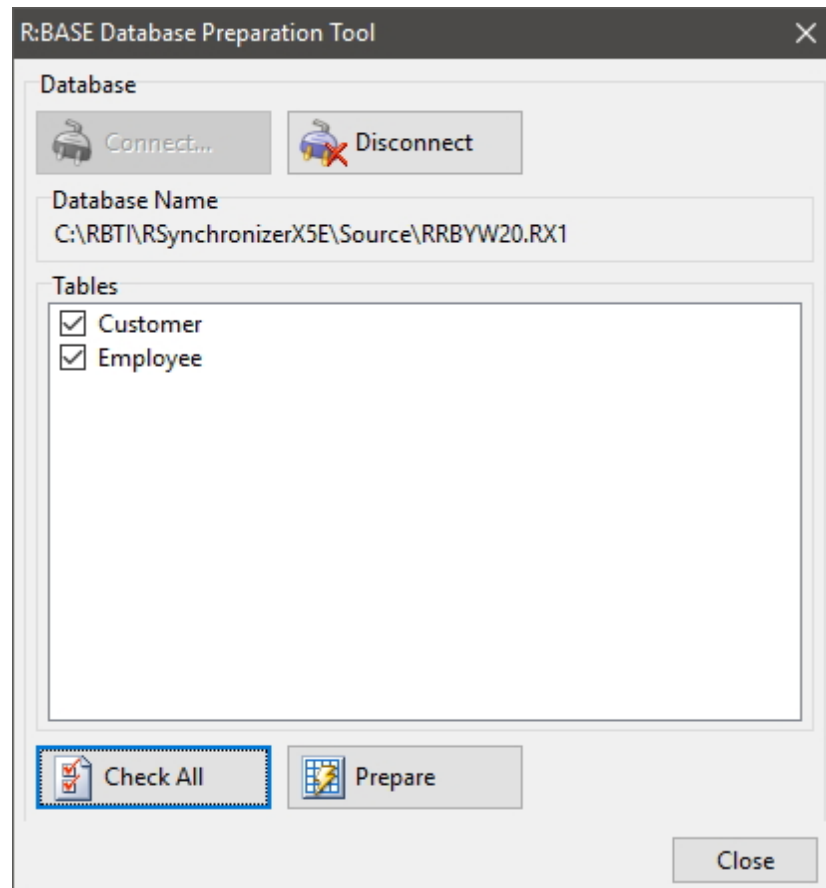
3.2   Preparation Tool

Before a database is synchronized, the database must be optimized using the R:BASE Database Preparation Tool. This tool is accessed from the "Prepare" button on the toolbar. Choose the "Connect..." button to connect to your database.

After connecting to the database, the path and the database RB1 file will appear in the "Database Name" panel. In the "Tables" panel, a list of tables, with the RBSyncUID and RBSyncTimeStamp columns, will appear.

Next, place a check next to each table name to be prepared, or select "Check All" to select all the tables. Individual tables may only need to be selected if a table is being added to a synchronization process already in place.

Select the "Prepare" button to optimize the table for synchronization. A status dialog will be displayed. Once all of the tables have been prepared, select the "Close" button.

3.3 Copy the Database

After the database tables have been optimized for synchronization, it is time to make a copy of the database. The copy of the database will be used on the other computer/medium and will be specifically used in all synchronization processes. The database will likely have the same name and reside in a different directory, but the database names are not forced to be identical.

3.4 Primary Key Update

This step is required for tables which include primary keys that have been added to the synchronization process. Specifically, if there will be data added into both Source and Target databases over time. If your synchronization process will be a single direction, from Source to Target or Target to Source only, then this step is not necessary.

In order to maintain the relational integrity of the R:BASE database, using primary keys and foreign keys in two or more locations, you must insure that there will never be an occurrence when two identical primary keys will exist on the Source and Target databases during the synchronization process. To do so, an update of the primary key column properties is required.

In nearly all cases, the primary key attributes include the INTEGER data type set to "AutoNum" for automatically incrementing the primary key column values. In R:BASE, you need to connect to the "Target" database(s), open the Data Designer for ALL the primary key tables, and increase the "Initial Value" and "Incrementing Value" fields by a value you would feel comfortable using.

Or, if you would prefer that your primary key column values be closer together, another possibility to prevent the Target database(s) from containing the same primary key as the Source database is to alter each primary key initial value to end with the number 1, then 2, and so on, and have the value increment by 10. This way each primary key column value ends with a unique number. A Target database starting at 111 would increment by 121, 131, 141, etc. In environments where there are a great number of Target databases, you would simply have all of the primary key values incrementing by the total number of Target databases.

In the event where the data type would be anything but INTEGER, you will be forced to create a unique logic for each user's values inserted into the primary key column.

Part IV

4 Using R:Synchronizer

When you synchronize tables, changes made to the table(s) in one database are applied the other. There are two databases involved in the synchronization process; the Source database and the Target database. There may be more than one Target database.

Before synchronizing any database tables, you must first follow the <u>Synchronization Preparation</u> instructions.

4.1 Toolbar

Button	Description
	Connects and disconnects to the Source database
	Connects and disconnects to the Target database
	Loads synchronization parameters from a script file
	Saves the synchronization parameters to a script file
	Runs the synchronization process for the current project
	Opens the Column Mapping dialog to link table columns
	Opens the R:BASE Database Preparation Tool
	Toggles the writing of processes to a log file
	Defines the name and path of the log file
	Displays the log file
	Displays the R:Synchronizer in-line help documentation
	Displays current R:Synchronizer information such as version, build
	Exits R:Synchronizer

4.2 Source Database

To connect to the Source database, choose the "Connect" button from the "Source Database" panel.

Use the browse dialog to locate the Source database. Once connected, the list of tables that have been optimized for synchronization will be listed. Select the table name you wish to synchronize. If the table list is blank, then no tables have been properly optimized for synchronization and you must return to the <u>Synchronization Preparation</u> instructions.

4.3 Target Database

To connect to the Target database, choose the "Connect" button from the "Target Database" panel.

Use the browse dialog to locate the Target database. Once connected, the list of tables that have been optimized for synchronization will be listed. Select the table name you wish to synchronize. If the table list is blank, then no tables have been properly optimized for synchronization and you must return to the Synchronization Preparation instructions.

4.4 Synchronization Settings

Once the Target and Source databases are connected, the Synchronization Settings options will become enabled. Use the Synchronization Settings for the specific table synchronization conditions.

4.4.1 Direction

Using the "Direction" panel, a direction priority is specified for the database synchronization at the table level (example, source table records exist and target table records do not exist).

If there is **any** indication that data can or will be changed on both the Source and the Target database, you must use the R:Synchronizer Direction setting "Source <=> Target", which will compare the data values in both databases.

In instances where you are certain no data will change in either the Source or the Target, then the other two available Direction settings are available.

Source => Target
Synchronizes records from the Source database to the Target.

Source <= Target
Synchronizes records from the Target database to the Source.

Source <=> Target
Synchronizes records on both the Target and the Source databases.

4.4.2   Actions

4.4.2.1   Source => Target

Synchronizes records from the Source database to the Target database.

Actions

☑ Delete from Target Table
☑ Insert from Source Table
☑ Update Target Table

Actions
Delete from Target Table
Deletes records from the Target table, which have been deleted from the Source table, in the synchronization process.

Insert from Source Table
Inserts new records from the Source table into the Target table in the synchronization process.

Update Target Table
Updates existing records in the Target table from the Source table in the synchronization process.

To proceed, the columns must now be mapped between the Source and Target tables. Choose the Column Mapping button. If the "Column Mapping" button is disabled, make sure you have selected your tables.

4.4.2.2   Source <= Target

Synchronizes records from the Target database to the Source database.

Actions

☑ Delete from Source Table
☑ Insert from Target Table
☑ Update Source Table

Actions
Delete from Source Table
Deletes records from the Source table, which have been deleted from the Target table, in the synchronization process.

Insert from Target Table
Inserts new records from the Target table into the Source table in the synchronization process.

Update Source Table
Updates existing records in the Source table from the Target table in the synchronization process.

To proceed, the columns must now be mapped between the Source and Target tables. Choose the Column Mapping button. If the "Column Mapping" button is disabled, make sure you have selected your tables.

4.4.2.3   Source <=> Target

Synchronizes records on both the Target database and the Source database.

Actions	
If Source Table Record Does not Exist:	<-Copy to Source
If Target Table Record Does not Exist:	->Copy to Target
If Source and Target Table Records Exist:	<-> Ask User

Actions

If Source Table Record Does not Exist:
A drop down menu offers three synchronization options for when the Source table record does not exist.

- None
- <-Copy to Source
- Delete from Target

If Target Table Record Does not Exist:
A drop down menu offers three synchronization options for when the Target table record does not exist.

- None
- ->Copy to Target
- Delete from Source

If Source and Target Table Records Exist:
A drop down menu offers four synchronization options for when Source and Target tables contain the same record.

- None
- <- Update Source
- -> Update Target
- <-> Ask User

The "<-> Ask User" menu option will display a dialog when the a record matches between the source and target tables. An example of this would be if the same record, which already existed in both tables, was updated in both tables since the last synchronization. R:Synchronizer will prompt the user which table to update, as well as options to "Skip" or "Cancel". The differences in the common record are displayed in red highlight.

To proceed, the columns must now be mapped between the Source and Target tables. Choose the Column Mapping button. If the "Column Mapping" button is disabled, make sure you have selected your tables.

4.4.3   WHERE Clause

The WHERE Clause setting is used if you require a conditional synchronization process. A WHERE Clause can be specified for both the Source and Target databases to restrict which rows will be affected.

Source Table WHERE Clause:	
Target Table WHERE Clause:	

The Source and Target Table WHERE Clause fields support all conditions based upon the current R:BASE supported syntax with the exception of using an expression. Expressions are stored within R:BASE, so R:Synchronizer will not recognize these values. Please refer to the R:BASE Help Command Index for the WHERE Clause to refer to the supported conditions that do not include expressions.

4.4.4   Speed Sync Option

During synchronization processing, R:Synchronizer compares every [mapped](#) column on every row in the two tables. If the WHERE Clause field(s) are used, then only the rows meeting that criteria are compared. With large tables, the time taken to complete this process will increase.
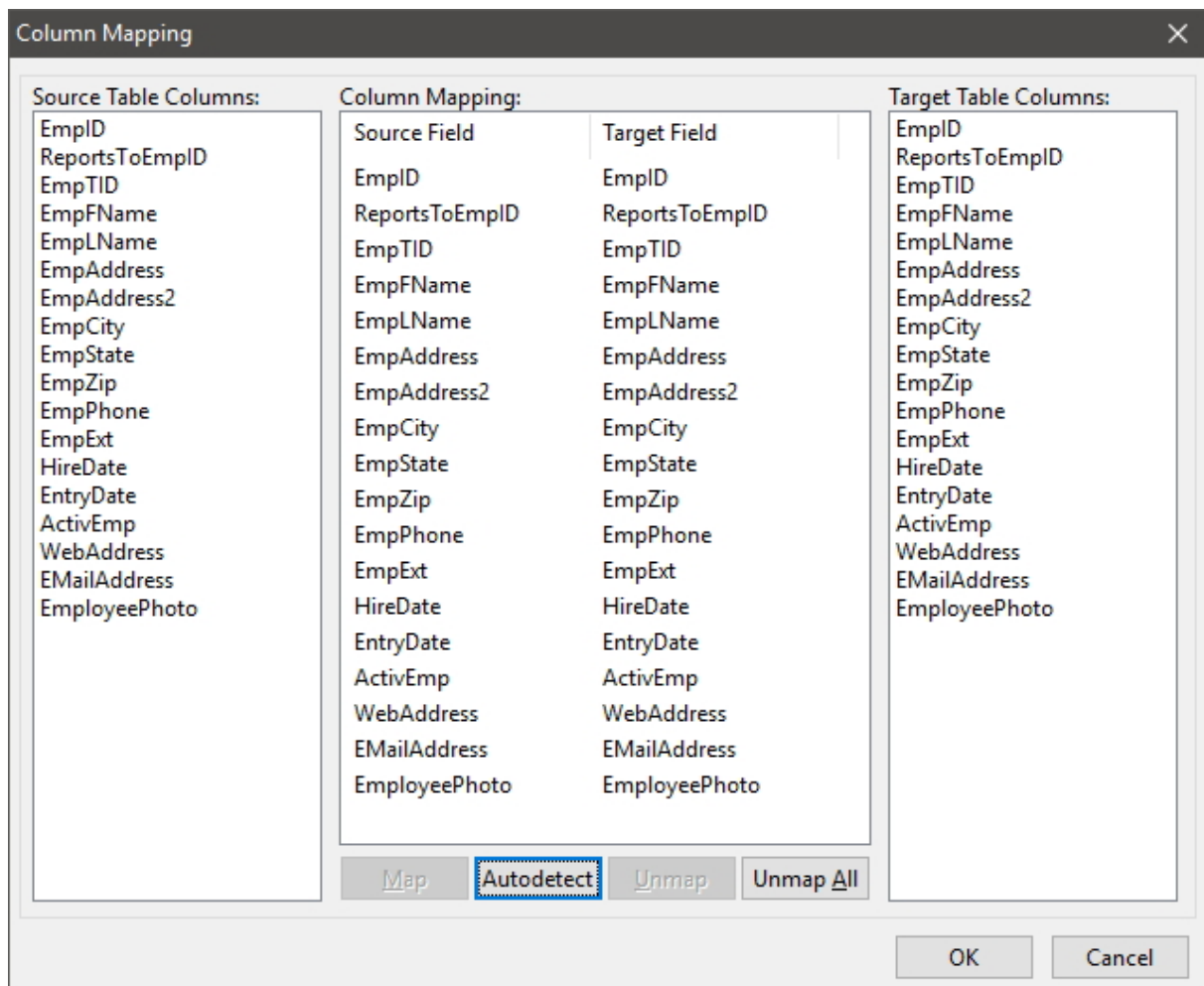
The Speed Sync option only compares the RBSyncTimeStamp columns on rows with matching RBSyncUID values and performs the synchronization on that row, if the two timestamps differ. By not comparing every column to be synchronized, processing time is optimized.

Speed Sync is primarily used for existing rows being updated. Speed Sync would have no impact on new or deleted rows. As recommended during the [Database Preparation](#) on consideration #5, when using the UPDATE command to edit existing data within a R:Synchronizer table, the value for the RBSyncTimeStamp column must be updated to the current date and time when the update occurs. This tell R:Synchronizer that the record has been changed and must be compared against the opposite R:Synchronizer table.

4.5   Column Mapping

The table columns must be mapped between the Source and Target databases. The "Column Mapping" button will only become enabled when both databases are connected and the tables are selected.

Column Mapping is a link between the tables which compares the column values for the synchronization process. If the tables columns are identical, the "Autodetect" button will automatically link the tables by common column names. Select "OK' when you are complete.

If the column names do not match, then select the column names which are to be mapped for synchronization and use the "Map" button to establish the link. Select "OK' when you are complete.

4.6 Script Files

R:Synchronizer includes support to save all available synchronization parameters into a script file.

Save Script File
To save your current settings into a script file, choose the "Save Script File..." button. A dialog window will appear prompting you to save the file with the .rsf file extension.

Load Script File
The script file can be used to load your previous settings when R:Synchronizer is used again. To load your settings, choose the "Load Script File..." button. A dialog window will appear prompting you to locate the file with the .rsf file extension.

Running Script Files
R:Synchronizer script files can also be used to automate your synchronization process. This will start the synchronization process as defined in the script file. At a command prompt , you can use the following command to run that script file.

```
RSynchronizerX5.exe scriptfilename.rsf -t -ss
```

During the synchronization process, any -ERRORs-, if found, will be recorded in the log file, if defined.

-t

The "-t" parameter allows the ability to substitute the target database name at the command line. Following the "-t", the path and database name must be specified. This entire optional parameter must be enclosed in double quotes. This parameter is beneficial to users with multiple synchronization processes to configure.

Example:

    RSynchronizerX5.exe sync_alpha.rsf "-t \\RRBYW20\TeamAlpha\rrbyw20.rb1"

Where:

   the -t parameter is a target database override that only substitutes the target database name for the one in the script file

-ss

The "-ss" parameter toggles the [Speed Sync](#) option for faster synchronization. Toggle Speed Sync using "YES" or "NO". This entire optional parameter must be enclosed in double quotes.

Example:

    RSynchronizerX5.exe sync_alpha.rsf "-ss YES"

Where:

   the -ss parameter activates Speed Sync mode

Your script files can also be used when assigning operating system scheduled tasks!

4.7   Run R:Synchronizer

After the databases are connected, the settings are confirmed, all the settings are confirmed, and the columns are mapped, the "Run" button will become enabled. Select it to begin the synchronization process.

When using primary key and foreign key relationships in your database, you must synchronize all of the linked tables when you run R:Synchronizer. Otherwise, your data will not match.

During the synchronization process, a progress window is displayed. When synchronizing multiple tables, each table's progress is displayed.

4.8   Synchronization Log

The synchronization process can be kept with a log file. An is available to enabled or disable logging, as well as an option to store the log file location.

Part V

5   FAQ

Q: Can it run on a database running in any version of R:BASE?
A: Only on any database format having the extension (.RB1-.RB4), as long as the initial preparation work is performed on the tables to be involved with synchronization. R:BASE X.5 Enterprise users (.RX1-.RX4) will use R:Synchronizer X.5 Enterprise.

Q: Can the "source" database be open in multi-user mode while the synchronization process is running? In both manual, as well as script mode?
A: Yes! R:Synchronizer was built in keeping these practical environments in mind to start with.

Q: Can multiple users synchronize simultaneously to the same "source" database?
A: Yes! After the initial setup and preparation, you can automate the entire process based on the user's Synchronization Settings.

Q: Can I synchronize two databases that are not identical?
A: Yes! Using the Column Mapping, you can link columns manually or automatically by common column names.

Q: Can I speed up the synchronization process?
A: Yes. Be sure to index the RBSynchUID column in the R:BASE table.

Part VI

6   Technical Support

Please read over the help documentation at least once before seeking support. We have worked very hard to make the help documentation clear and useful, but concise. It is suggested that you reread these instructions once you have become accustomed to using the software, as new uses will become apparent.

If you have further questions, and cannot find the answers in the documentation, you can obtain information from the below sources:

- Email our Technical Support Staff at: support@rbase.com
- Access the R:BASE Technologies Support home page online at https://www.rbase.com/support

You may be required to purchase a technical support plan. Several support plans are available to suit the needs of all users. Available Technical Support Plans

Please be prepared to provide the following:

- The product registration number, which is located on the invoice/order slip for the purchased product
- The type of operating system and hardware in use
- Details regarding your operating environment; such as available memory, disk space, your version of R:BASE, local area network, special drivers, related database structures, application files, and other files that are used or accessed by your application

All provide information will be used to better assist you.

R:BASE Technologies has a number of different services available for R:BASE products. As a registered user, you will receive information about new features for R:BASE and other R:BASE Technologies products. Please remember to register your software. https://www.rbase.com/register/

Part VII

7   Useful Resources

. R:BASE Home Page: https://www.rbase.com

. Up-to-Date R:BASE Updates: https://www.rbaseupdates.com

. Current Product Details and Documentation: https://www.rbase.com/rbgx5

. Support Home Page: https://www.rbase.com/support

. Product Registration: https://www.rbase.com/register

. Official R:BASE Facebook Page: https://www.facebook.com/rbase

. Sample Applications: https://www.razzak.com/sampleapplications

. Technical Documents (From the Edge):   https://www.razzak.com/fte

. Education and Training: https://www.rbase.com/training

. Product News: https://www.rbase.com/news

. Upcoming Events: https://www.rbase.com/events

. R:BASE Online Help Manual: https://www.rbase.com/support/rsyntax

. Form Properties Documentation: https://www.rbase.com/support/FormProperties.pdf

. R:BASE Beginners Tutorial: https://www.rbase.com/support/rtutorial

. R:BASE Solutions (Vertical Market Applications):   https://www.rbase.com/products/rbasesolutions

Part VIII

8 Feedback

Suggestions and Enhancement Requests:

From time to time, everyone comes up with an idea for something they'd like a software product to do differently.

If you come across an idea that you think might make a nice enhancement, your input is always welcome.

Please submit your suggestion and/or enhancement request to the R:BASE Developers' Corner Crew (R:DCC) and describe what you think might make an ideal enhancement. In R:BASE, the R:DCC Client is fully integrated to communicate with the R:BASE development team. From the main menu bar, choose "Help" > "R:DCC Client". If you do not have a login profile, select "New User" to create one.

If you have a sample you wish to provide, have the files prepared within a zip archive prior to initiating the request. You will be prompted to upload any attachments during the submission process.

Unless additional information is needed, you will not receive a direct response. You can periodically check the status of your submitted enhancement request.

If you are experiencing any difficulties with the R:DCC Client, please send an e-mail to rdcc@rbase.com.

Reporting Bugs:

If you experience something you think might be a bug, please report it to the R:BASE Developers' Corner Crew. In R:BASE, the R:DCC Client is fully integrated to communicate with the R:BASE development team. From the main menu bar, choose "Help" > "R:DCC Client". If you do not have a login profile, select "New User" to create one.

You will need to describe:

- What you did, what happened, and what you expected to happen
- The product version and build
- Any error message displayed
- The operating system in use
- Anything else you think might be relevant

If you have a sample you wish to provide, have the files prepared within a zip archive prior to initiating the bug report. You will be prompted to upload any attachments during the submission process.

Unless additional information is needed, you will not receive a direct response. You can periodically check the status of your submitted bug.

If you are experiencing any difficulties with the R:DCC Client, please send an e-mail to rdcc@rbase.com.

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