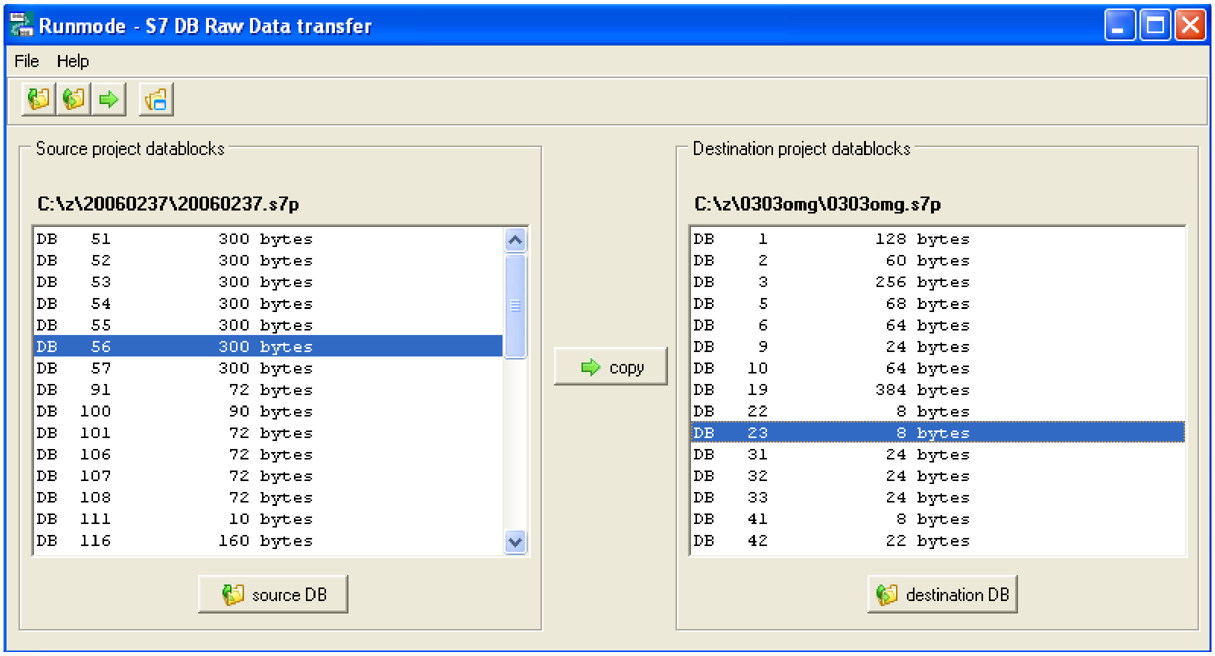
RUNMODE S7 DB RAW DATA v2.0

for Siemens S7-300 / S7-400 PLCs

Last revised: March 28, 2007



Source project datablocks

C:\z\20060237\20060237.s7p

```
DB    51     300 bytes
DB    52     300 bytes
DB    53     300 bytes
DB    54     300 bytes
DB    55     300 bytes
DB    56     300 bytes
DB    57     300 bytes
DB    91      72 bytes
DB   100      90 bytes
DB   101      72 bytes
DB   106      72 bytes
DB   107      72 bytes
DB   108      72 bytes
DB   111      10 bytes
DB   116     160 bytes
```

Destination project datablocks

C:\z\0303omg\0303omg.s7p

```
DB     1     128 bytes
DB     2      60 bytes
DB     3     256 bytes
DB     5      68 bytes
DB     6      64 bytes
DB     9      24 bytes
DB    10      64 bytes
DB    19     384 bytes
DB    22       8 bytes
DB    23       8 bytes
DB    31      24 bytes
DB    32      24 bytes
DB    33      24 bytes
DB    41       8 bytes
DB    42      22 bytes
```

Requirements

- Runmode S7DBRAWDATA is a 32 bit application for Microsoft Windows 95/98/ME/NT/2000/XP.
- The application supports Siemens Simatic S7-300 and S7-400 projects only, S7-200 and Logo! projects are not supported.

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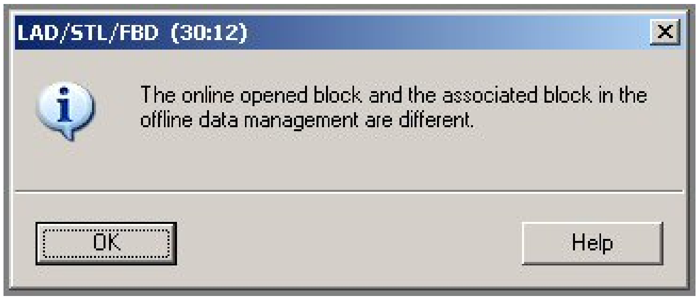
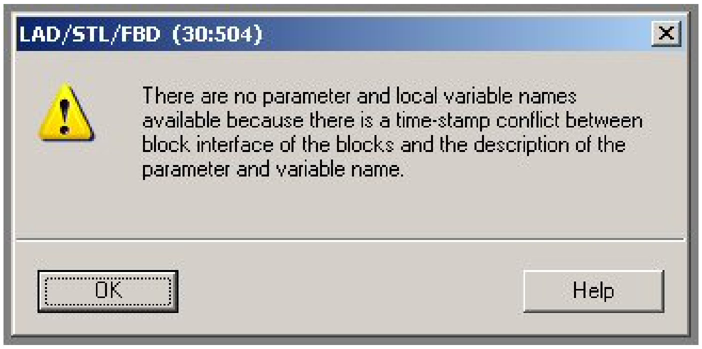
S7DbRawData concepts

S7DbRawData is a software tool that can fix some odd-behaviors of Simatic S7 editor and project management.
The following S7 message boxes should be self-explaining enough for most programmers:


LAD/STL/FBD (30:12)

The online opened block and the associated block in the offline data management are different.


LAD/STL/FBD (30:504)

There are no parameter and local variable names available because there is a time-stamp conflict between block interface of the blocks and the description of the parameter and variable name.

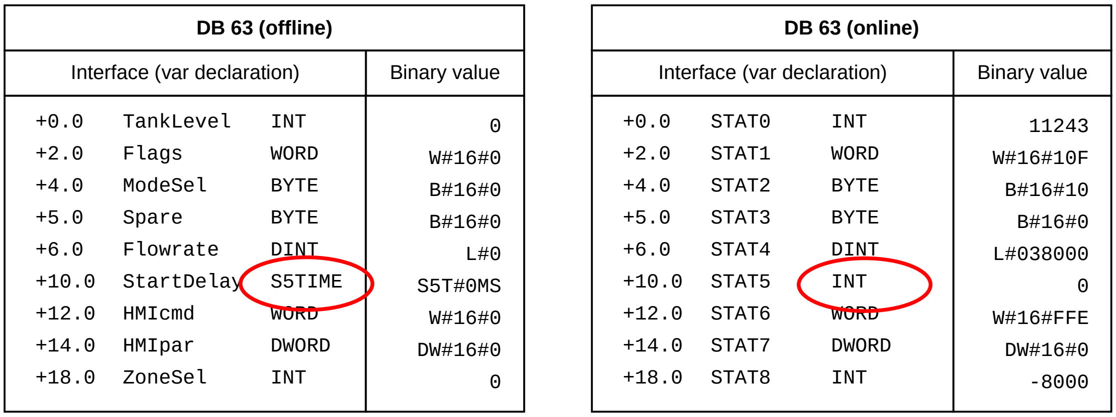
Basically, using a rough metaphor, a datablock is made of a variables descriptor container (variables name and related type: byte, integer, real, etc) and a binary container (the actual values). The datablock's header keeps track of both containers and verifies whether any substantial difference takes place, in that case the S7 editor invalidates the variables names and warns the user with a "time-stamp conflict" message.

Unfortunately what S7 thinks to be a "substantial difference" might not be such a difference for the programmer: if a spare 16 bit INT variable is recast as a 16bit S5TIME variable, the rest of the datablock remains unaffected: no addresses are shifted and DB length does not change. Despite of what we may consider a small variation, the S7 editor will not accept such a recast and will set a different time-stamp in the block's interface, thus generating a time-stamp conflict.
The above problem is likely to create difficulties in all those cases where a PLC program is first modified at office and then updated in the PLC at a later time.

The following example shows an offline and online copy of the same DB63 datablock, after a time-stamp conflict. We can notice that the offline DB63 shows a "StartDelay, S5TIME" variable while in the online DB63 the same variable address was initially assigned as INT.

Any attempt to open the online DB63 copy will then result in variables name loss. Recovery is not possible by using standard procedures, for any further operation has a drawback:

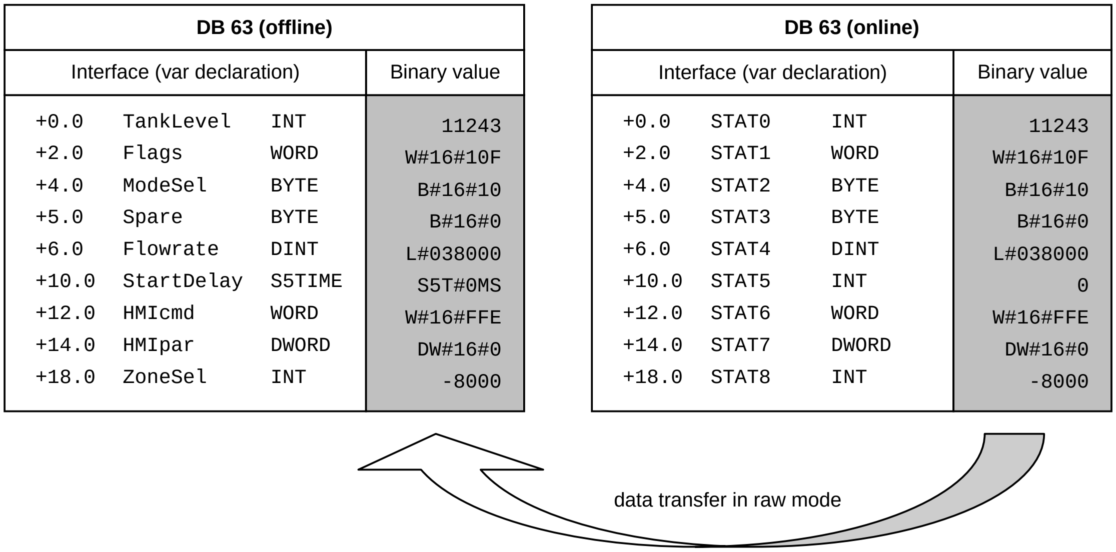
- If we copy the offline DB to the online DB, we will loose all the current values in online DB.
- If we copy the online DB to the offline DB, we will loose the variables name in the offline DB.



DB 63 (offline)			
Interface (var declaration)			Binary value
+0.0	TankLevel	INT	0
+2.0	Flags	WORD	W#16#0
+4.0	ModeSel	BYTE	B#16#0
+5.0	Spare	BYTE	B#16#0
+6.0	Flowrate	DINT	L#0
+10.0	StartDelay	S5TIME	S5T#0MS
+12.0	HMIcmd	WORD	W#16#0
+14.0	HMIpar	DWORD	DW#16#0
+18.0	ZoneSel	INT	0

DB 63 (online)			
Interface (var declaration)			Binary value
+0.0	STAT0	INT	11243
+2.0	STAT1	WORD	W#16#10F
+4.0	STAT2	BYTE	B#16#10
+5.0	STAT3	BYTE	B#16#0
+6.0	STAT4	DINT	L#038000
+10.0	STAT5	INT	0
+12.0	STAT6	WORD	W#16#FFE
+14.0	STAT7	DWORD	DW#16#0
+18.0	STAT8	INT	-8000

S7DbRawData solves this kind of problems by transferring the binary data portion only, without affecting the variables declaration:



DB 63 (offline)			
Interface (var declaration)			Binary value
+0.0	TankLevel	INT	11243
+2.0	Flags	WORD	W#16#10F
+4.0	ModeSel	BYTE	B#16#10
+5.0	Spare	BYTE	B#16#0
+6.0	Flowrate	DINT	L#038000
+10.0	StartDelay	S5TIME	S5T#0MS
+12.0	HMIcmd	WORD	W#16#FFE
+14.0	HMIpar	DWORD	DW#16#0
+18.0	ZoneSel	INT	-8000

DB 63 (online)			
Interface (var declaration)			Binary value
+0.0	STAT0	INT	11243
+2.0	STAT1	WORD	W#16#10F
+4.0	STAT2	BYTE	B#16#10
+5.0	STAT3	BYTE	B#16#0
+6.0	STAT4	DINT	L#038000
+10.0	STAT5	INT	0
+12.0	STAT6	WORD	W#16#FFE
+14.0	STAT7	DWORD	DW#16#0
+18.0	STAT8	INT	-8000

The S7DbRawData can do any trick we can imagine by transferring data in raw mode: convert an array into a series of single variables or vice-versa, copy a stream of data into an UDT-typed variable, etc. You can even transfer data from datablocks of different size, helping in recovery of messed-up projects.

In case the source and datablocks' size differs, the data transfer will obey the following rules:

- If the **source DB is larger that destination DB**, only the amount of data to match the destination DB size will be transferred. The destination DB will not change in size and the exceeding source data will be discarded.
- If the **source DB is smaller that destination DB**, all source DB data will be transferred. The exceeding data in the destination DB will remain unchanged.

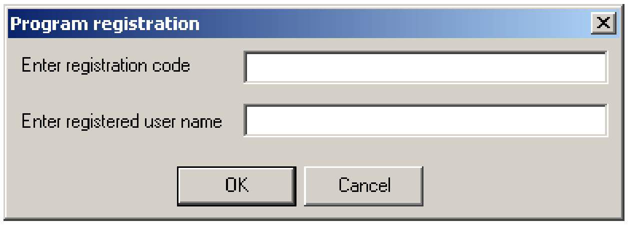
In any case, the source DB will not be modified.

Installing S7DbRawData

1. Unzip the zip file to a temporary folder, then run S7DBRAWDATA.MSI
2. The setup procedure will start installing the S7dbrawdata program.
3. During the setup, Borland Database Engine (BDE) will be installed on your PC
4. Once setup terminates, a proper shortcut will be available in the taskbar

Registering S7DbRawData

Select “register” form the “Help” menu and insert the registration data when asked to. Please note that registration data is case-sensitive, make sure to enter the text exactly as received by email, avoiding possible leading or trailing blanks.



Running S7DbRawData

Datablocks belonging to different projects

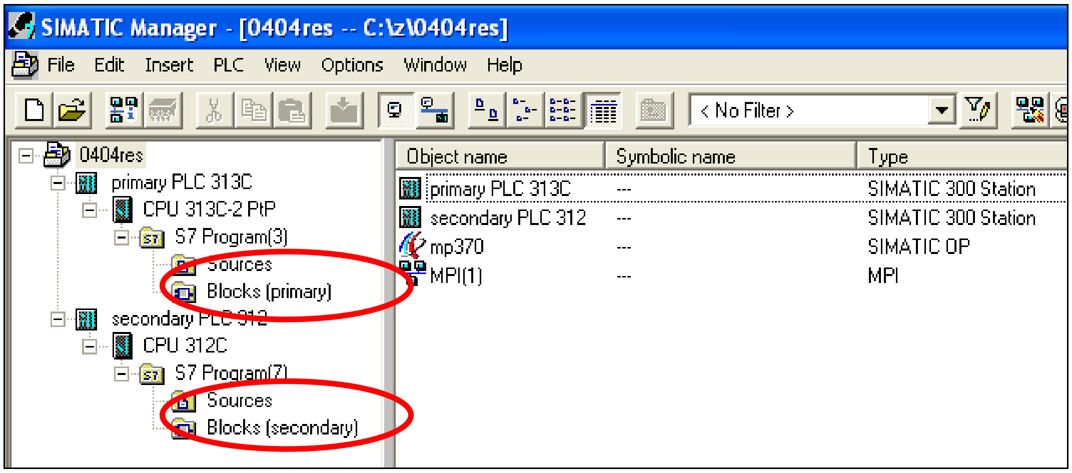
The S7DbRawData can work on datablocks stored in the same S7 project or belonging to different S7 projects.

Online datablocks

The S7DbRawData works on file projects only, the utility does not provide direct access to PLC memory in online mode. In case you need to synchronize online and offline datablocks, you should create a new project and then retrieve the PLC contents by using the “upload station to PG” function from the Simatic Manager menu: in this way you will save on disk a perfect copy of all the blocks currently stored in the PLC memory..

Opening an S7 project

- As a rule, always backup your S7 projects before attempting to process them with the S7DbRawData utility.
- Source and Destination DB can belong to different S7 projects or can be contained into the same S7 project. In case you have multiple PLCs contained in a single project, you may modify the “blocks” folders name so that you can then easily select the right folder.



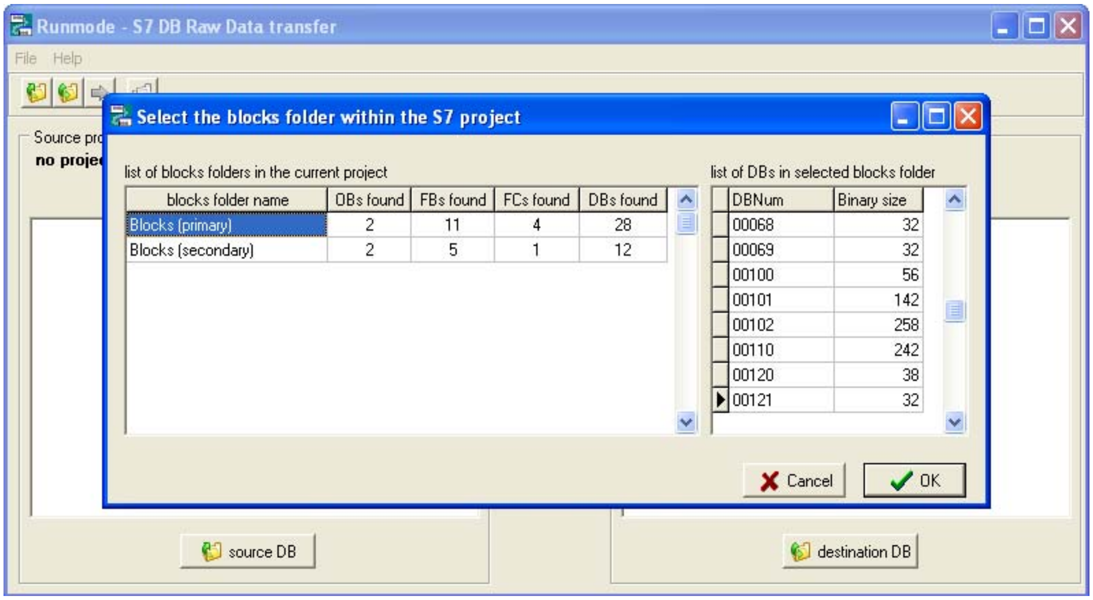
Object name	Symbolic name	Type
primary PLC 313C	---	SIMATIC 300 Station
secondary PLC 312	---	SIMATIC 300 Station
mp370	---	SIMATIC OP
MPI(1)	---	MPI

Data transfer procedure

Ensure that the projects are not opened in any S7 window (S7Manager, LAD/STL/FBD editor, etc).

1. Click on the “Source DB” button to open the file dialog box and select the S7 project that contains the datablock you want to fetch the data from.

2. From the list of blocks folder, select the “blocks” folder you want to work on. Once the folder has been selected, a list of the available datablocks will be displayed in the DBs grid along with their binary size. Confirm with OK button.


Runmode - S7 DB Raw Data transfer
File Help
Source pro
no projec
Select the blocks folder within the S7 project
Cancel
OK
source DB
destination DB

list of blocks folders in the current project

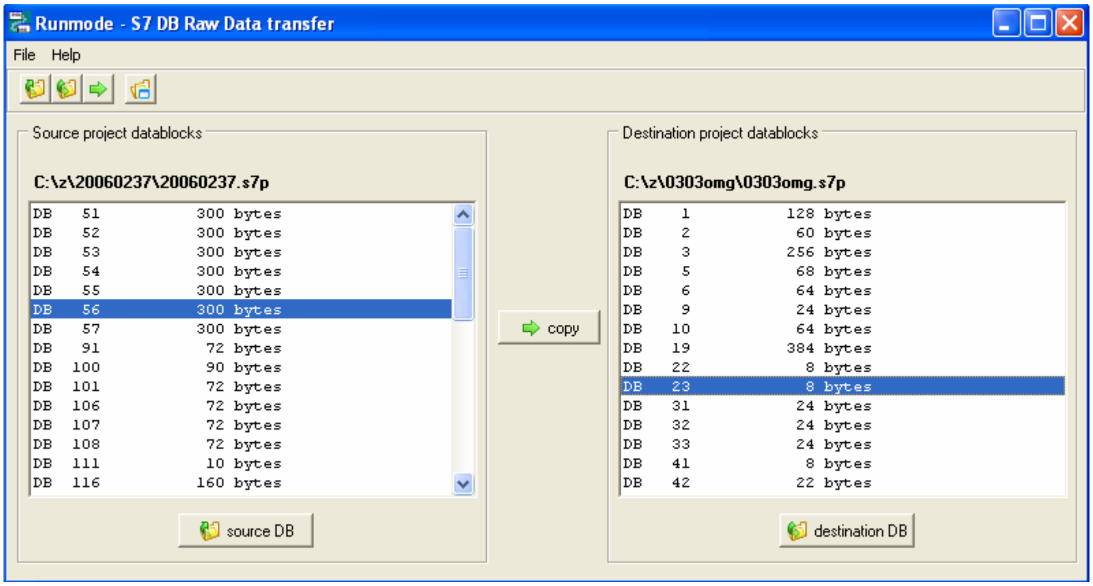
blocks folder name	OBs found	FBs found	FCs found	DBs found
Blocks (primary)	2	11	4	28
Blocks (secondary)	2	5	1	12

list of DBs in selected blocks folder

DBNum	Binary size
00068	32
00069	32
00100	56
00101	142
00102	258
00110	242
00120	38
00121	32

3. Repeat the operation with the “Destination DB” button

4. Select the source and destination datablocks in the related list, then click on “Copy” button to actually copy the data.



Source project datablocks

C:\z\20060237\20060237.s7p

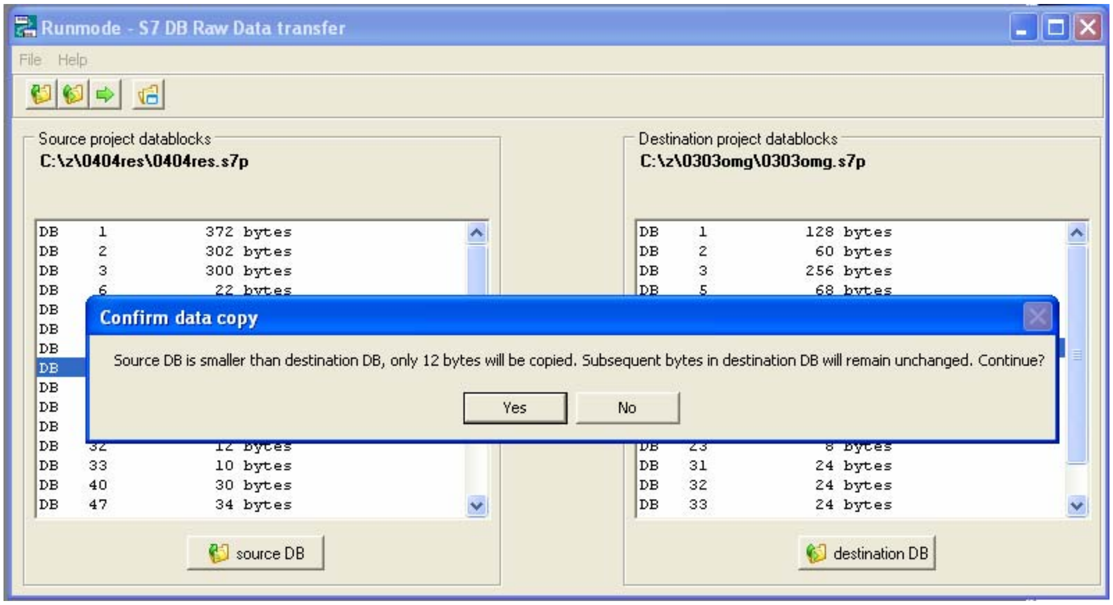
```
DB   51        300 bytes
DB   52        300 bytes
DB   53        300 bytes
DB   54        300 bytes
DB   55        300 bytes
DB   56        300 bytes
DB   57        300 bytes
DB   91         72 bytes
DB  100         90 bytes
DB  101         72 bytes
DB  106         72 bytes
DB  107         72 bytes
DB  108         72 bytes
DB  111         10 bytes
DB  116        160 bytes
```

Destination project datablocks

C:\z\0303omg\0303omg.s7p

```
DB    1        128 bytes
DB    2         60 bytes
DB    3        256 bytes
DB    5         68 bytes
DB    6         64 bytes
DB    9         24 bytes
DB   10         64 bytes
DB   19        384 bytes
DB   22          8 bytes
DB   23          8 bytes
DB   31         24 bytes
DB   32         24 bytes
DB   33         24 bytes
DB   41          8 bytes
DB   42         22 bytes
```

5. If the DBs' number or size differs, a series of messages box will warn you and ask for confirmation before the data is actually transferred.



Source project datablocks
C:\z\0404res\0404res.s7p

```
DB    1         372 bytes
DB    2         302 bytes
DB    3         300 bytes
DB    6          22 bytes
DB
DB
DB
DB
DB
DB
DB
DB   32          12 bytes
DB   33          10 bytes
DB   40          30 bytes
DB   47          34 bytes
```

Destination project datablocks
C:\z\0303omg\0303omg.s7p

```
DB    1         128 bytes
DB    2          60 bytes
DB    3         256 bytes
DB    5          68 bytes
DB   23           8 bytes
DB   31          24 bytes
DB   32          24 bytes
DB   33          24 bytes
```

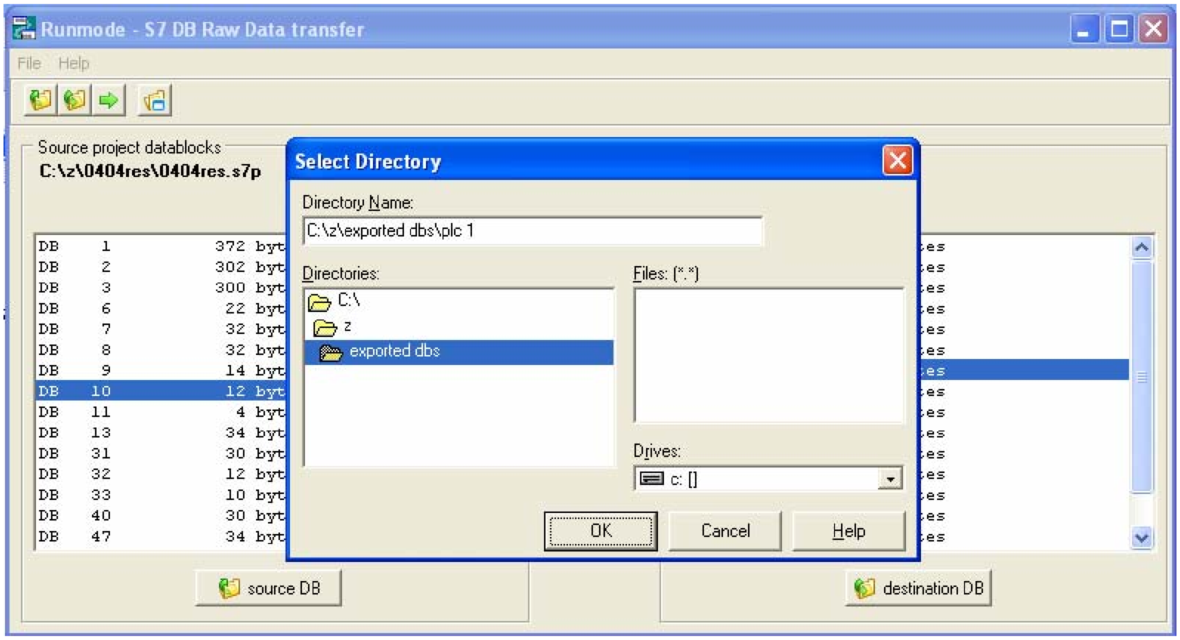
Confirm data copy

Source DB is smaller than destination DB, only 12 bytes will be copied. Subsequent bytes in destination DB will remain unchanged. Continue?

Yes No

Data export procedure

Once a source project has been opened, as already described in the “Data transfer procedure” section, you can export the projects’ DBs as binary files. Select the “export DB” option from File menu , then provide a destination folder name. All projects’ DBs will be exported at once, a single file for each datablock is created.



Source project datablocks
C:\z\0404res\0404res.s7p

```
DB     1         372 byt
DB     2         302 byt
DB     3         300 byt
DB     6          22 byt
DB     7          32 byt
DB     8          32 byt
DB     9          14 byt
DB    10          12 byt
DB    11           4 byt
DB    13          34 byt
DB    31          30 byt
DB    32          12 byt
DB    33          10 byt
DB    40          30 byt
DB    47          34 byt
```

Directory Name: C:\z\exported dbs\plc 1

Directories:
- C:\
- z
- exported dbs

Files: (*.*)

Drives: c: []

Version history

Version 1.0

- First release

Version 1.1

- The utility can now operate on large datablocks (maximum DB size in S7 systems is 65536 bytes)
- DB operations are now available either by buttons or menu commands
- Minor cosmetic changes

Version 2.0

- New user interface
- No need to reopen the source and destination projects in case of repeated operations on blocks
- Datablocks' content can be exported as binary file

Author's notes

Please report any bug or suggestion to the author:

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