

# **IBM i Programming Tool**

## User Guide

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## Introduction

This application is aimed on IBM i programmers. It enables work with text data, especially programs and accompanying source texts for languages RPG, CL, COBOL, C, C++, SQL, and also DDS, TBL, PNLGRP. The user can

- display and edit files
- compile programs
- create, rename, or delete directories and files
- copy files and directories

Programs implementing the application are written in Java and require version *Java SE 8* or higher installed in the PC. They cooperate with classes in *IBM Toolbox for Java* (or JTOpen). The classes require "host servers" running in IBM i and profile QUSER enabled.

The application has been created and tested in systems macOS and Windows (Parallels Desktop emulation). Remote connection to the system IBM i, version 7.5 has been used.

## Contents of the application directory

The application does not require an installation. It consists of a directory containing other directories and files of which are useful for users the following:

- The ***IBMiProgTool.jar*** file is a main, starting file. The application starts after opening or double click with the primary mouse button.
- Directory *helpfiles* contains files for help (this guide) and forms for RPG III, RPG IV, COBOL, DDS and also columns numbering.
- Directory *icons* contains icons used in the application windows.
- Directory *logfiles* contains text files *err.txt* a *out.txt*, the redirected output from System.err and System.out files.
- Directory *paramfiles* contains text file *Parameters.txt* with application parameters.
- Directory *workfiles* contains auxiliary files to retain parameters from the end to a new application run.
- File *README.md* contains an introductory description of the application and the history of versions.

Note 1: Files *err.txt* a *out.txt* can be used for revealing the cause of a program error. Messages are not written to the console but into these files.

Note 2: More files and directories are contained in the open source directory downloaded from internet. They may be deleted without any harm.

## Running the application

The application is started by double clicking on the ***IBMiProgTools.jar*** file.

Note: The ***Help*** menu for the application is placed in the menu bar of the main application window (Windows) or in the menu bar of the desktop (macOS).

## Overview

This application allows to

- display and edit text files in PC and IBM i,
- search text in multiple files,
- compile source members and IFS stream files,
- display spooled files,
- create files and directories in PC and IBM i,
- remove files and directories in PC and IBM i,
- rename files and directories in PC and IBM i,
- copy files and directories between PC and IBM i,
- copy, clear and delete libraries.

The application works with the following object types in IBM i:

- Source physical file    type \*FILE, attribute PF,
- Source member        Source physical file member,
- IFS directory         type \*DIR,
- IFS stream file        type \*STMF,
- Output queue          type \*OUTQ with spooled files inside,
- Save file             type \*FILE, attribute SAVF,
- Library                type \*LIB.

*Source physical file* is considered a *directory* in the application.

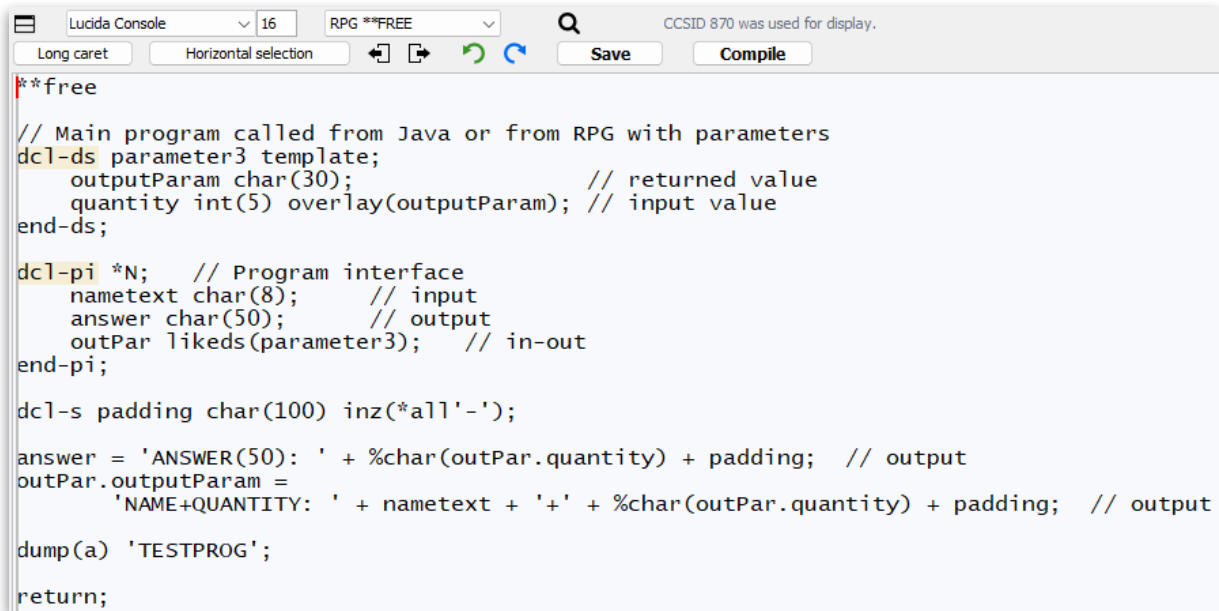
*Source member* behaves like a *file* in the application.

Behavior of the application is directed by *parameters* saved in directories "paramfiles" and "workfiles".

## Editing files

Text files in IBM i and in the PC can be displayed and edited by choosing the *Edit* command from a [context menu](#) or *double click* on the file name in the displayed [tree](#).

Contents of the file are displayed in a separate window with the information about *character set* of the text in the file.



The screenshot shows a window titled 'Lucida Console' with a font size of 16. The programming language is set to 'RPG \*\*FREE'. The text area contains the following code:

```
**free
// Main program called from Java or from RPG with parameters
dcl-ds parameter3 template;
  outputParam char(30);          // returned value
  quantity int(5) overlay(outputParam); // input value
end-ds;

dcl-pi *N; // Program interface
  nametext char(8); // input
  answer char(50); // output
  outPar likeds(parameter3); // in-out
end-pi;







dcl-s padding char(100) inz(*all'-');

answer = 'ANSWER(50): ' + %char(outPar.quantity) + padding; // output
outPar.outputParam =
  'NAME+QUANTITY: ' + nametext + '+' + %char(outPar.quantity) + padding; // output

dump(a) 'TESTPROG';

return;
```


Control components are placed on top of the window:

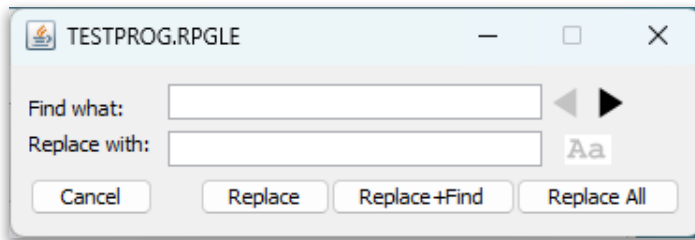
-  *Split/unsplit* - toggle split/unsplit editor text vertically by a movable horizontal line into upper and lower area. A copy of the editor text is in the lower area. All text changes made in one area are automatically projected in the other area.
- *Lucida Console etc.* – choose a font and its size from the combo box.
- *RPG \*\*FREE etc.* – choose the programming language suitable to the editor text from the combo box to highlight blocks (compound statements).
-  *Find text* – invokes a window to find text. Shortcut Ctrl F may also be used.
- *Long caret/Short caret* – defines the pointer in text as a long vertical line or a short vertical line (standard).
- *Horizontal/Vertical selection* – defines method of selecting text. *Horizontal* selection is a common method in PC editors. *Vertical* selection selects a rectangular area in the text.
- *Shift selection* – button  shifts selected text one position to the left, button  shifts selected text to the right. Keyboard shortcuts Ctrl ← and Ctrl → may also be used.
-  *Undo* – remove changes. Keyboard shortcut Ctrl Z may also be used.
-  *Redo* – restore changes. Keyboard shortcut Ctrl Y may also be used.
- *Save* – save changes. Keyboard shortcut Ctrl S may also be used.
- *Compile* – shows a window for compilation (see [below](#)) if the edited file is a source member or an IFS file. This button is not visible for the PC file.



*ESC* key escapes editing (without saving) and removes the window.

Note: *Cmd* key is used instead of Ctrl in macOS.

## Finding text

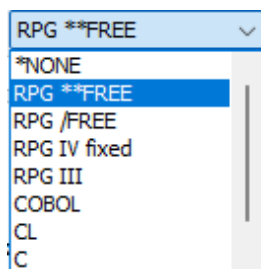
Clicking on the magnifying glass  or pressing keyboard shortcut Ctrl F (Cmd F in macOS) invokes the following window.



- *Find what* – enter a text pattern to be found in the editor area. Numbers in the field show sequence number and number of matches.
-   *Arrow buttons* – find preceding or following matches in the file. An arrow gets dark on clicking on it and indicates direction of searching and replacing. The opposite arrow gets gray. The same function is provided by keyboard shortcuts Ctrl ↑(previous) and Ctrl ↓ (next).
- *Replace with* – enter a text replacement.
- **Aa/Aa** *toggle button* – when light gray, the search is case insensitive, when black, the found text must exactly match the the pattern.
- *Replace* – replace the text just found by the replacement
- *Replace+Find* – replace the matching text just found by the replacement and find the *next* matching text.
- *Replace All* – replace *all* matching texts by the replacement text.

Note: *Cmd* key is used instead of *Ctrl* in macOS.

## Highlighting blocks



The combo box contains list of programming languages whose compound statements (blocks) should be highlighted. The list contains the following entries:

**\*NONE** – no highlighting,

**RPG \*\*FREE** – RPG version with completely free statement entries,

**RPG /FREE** – RPG version allowing both fixed and free statements,

**RPG IV fixed** – RPG version allowing extended fixed form statements,

**RPG III** – RPG version (RPG/400) allowing traditional fixed form statements,

**COBOL** – COBOL language,

**CL** – Control language,

**C** – C language,

**SQL** – SQL language script.

The method of highlighting of compound statements used in this application may have some unwanted effects, because short sequences of letters – namely IF, DO, FOR, may appear also in other places in the text. This might be acceptable for relevant programming languages, however.

A block of an RPG program with *RPG /FREE* or *RPG \*\*FREE* option:

```
dcl-PROC VRATIT_CENU;
  dcl-ds cenik_ds extname('*LIBL/CENIKP') qualified end-ds;

  dcl-pi *n packed(10: 2);
    material like(cenik_ds.MATER) CONST; // nebo VALUE
  end-pi;

  exec SQL select CENA into :cenik_ds.CENA from CENIKP
    where MATER = :material;
  if sqlstate >= '02000';
    cenik_ds.CENA = -1;
  endif;

  return cenik_ds.CENA;
end-PROC;
```



A block of a CL program with *CL* option:

```
DoUntil ('0') /* Execute at least once */
  Rcvf opnid(FILES) /* Read from the list of file objects */
  Monmsg msgid(CPF0864) exec(Leave) /* EOF - quit this loop */

  If (&FILES_ODOBAT = 'PF') Do /* If a Physical file then ok */
    /* Generate a file with a list of members of this file */
    Dspfd file(&Library/&FILES_ODOBNM) Type(*MBRLIST) +
      output(*OUTFILE) outfile(QTEMP/MEMBERS) +
      outmbr(*FIRST *ADD)
  EndDo /* If */
EndDo /* Do Until */
```



COBOL program:

```
.....*A+++B+++++Pgm-id++
IDENTIFICATION DIVISION.
PROGRAM-ID. Conditions.
AUTHOR. Michael Coughlan.
* An example program demonstrating the use of
* condition names (level 88's).
* The EVALUATE and PERFORM verbs are also used.

DATA DIVISION.
WORKING-STORAGE SECTION.
01 Char PIC X.
88 Vowel VALUE "a", "e", "i", "o", "u".
88 Consonant VALUE "b", "c", "d", "f", "g", "h"
            "j" THRU "n", "p" THRU "t", "v" THRU "z".
88 Digit VALUE "0" THRU "9".
88 ValidCharacter VALUE "a" THRU "z", "0" THRU "9".

PROCEDURE DIVISION.
Begin.
  DISPLAY "Enter lower case character or digit. No data ends.".
  ACCEPT Char.
  PERFORM UNTIL NOT ValidCharacter
    EVALUATE TRUE
      WHEN Vowel DISPLAY "The letter " Char " is a vowel."
      WHEN Consonant DISPLAY "The letter " Char " is a consonant."
      WHEN Digit DISPLAY Char " is a digit."
      WHEN OTHER DISPLAY "problems found"
    END-EVALUATE
  ACCEPT Char
END-PERFORM
STOP RUN.
```

## Shifting selected text

Left  and Right  buttons shift the selected text left or right by one position. The keyboard shortcuts **Ctrl** ← and **Ctrl** → do the same functions. In macOS the **Cmd** key is used instead of Ctrl. Results of shifts may be undone or redone.

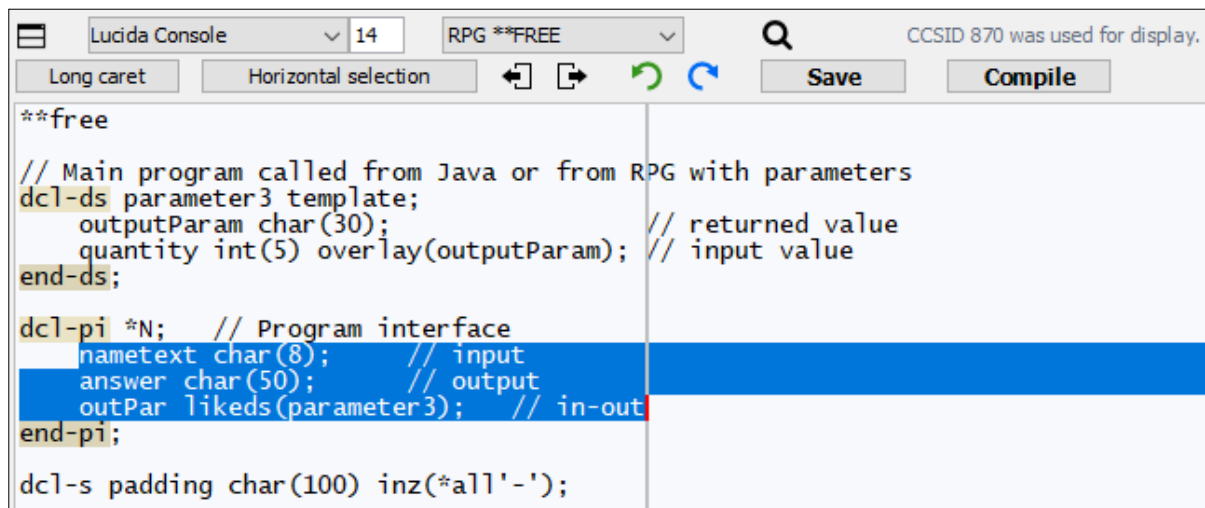
### Horizontal selection

The selected lines shift *right* along with the unselected rest of the last line.

The selected lines shift *left* if all of them contain at least one space on the left.

### Example

Horizontal selection was made over 3 lines:




The screenshot shows the Lucida Console editor with the following code:

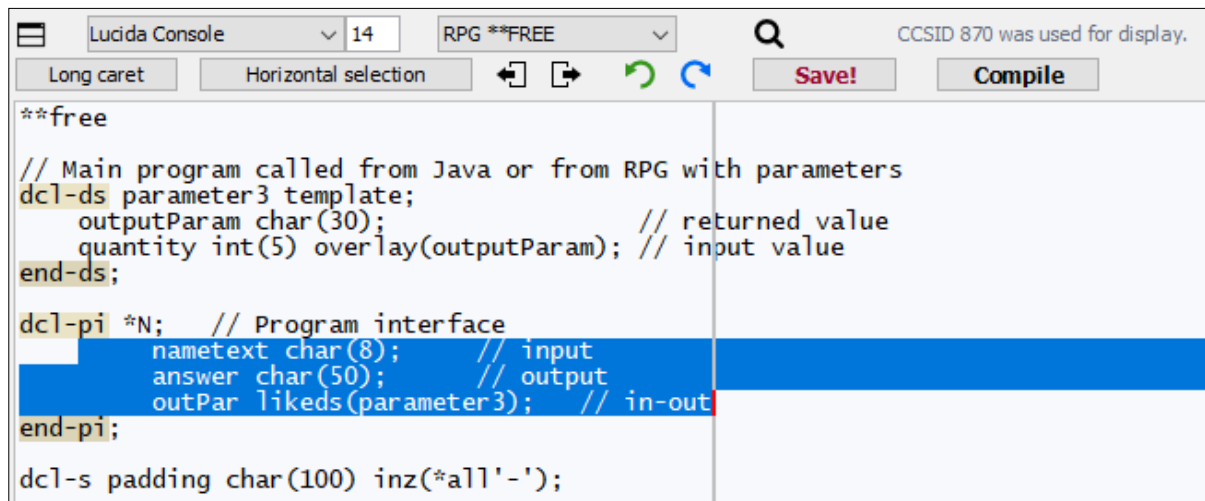
```
**free
// Main program called from Java or from RPG with parameters
dcl-ds parameter3 template;
  outputParam char(30);           // returned value
  quantity int(5) overlay(outputParam); // input value
end-ds;

dcl-pi *N; // Program interface
  nametext char(8); // input
  answer char(50); // output
  outPar likeds(parameter3); // in-out
end-pi;

dcl-s padding char(100) inz(*all'-');
```

The lines from `dcl-pi *N;` to `end-pi;` are selected. The interface includes a menu, font settings (Lucida Console, 14), a language dropdown (RPG \*\*FREE), a search icon, and a status bar indicating CCSID 870 was used for display. Buttons for 'Long caret', 'Horizontal selection', 'Save', and 'Compile' are visible.

The selection was shifted *right* 5 positions after 5 clicks on the  button:



The screenshot shows the same code as the previous image, but the selection has been shifted right by 5 positions. The selected lines now start with 5 spaces before the `dcl-pi` keyword. The interface is identical to the previous screenshot.

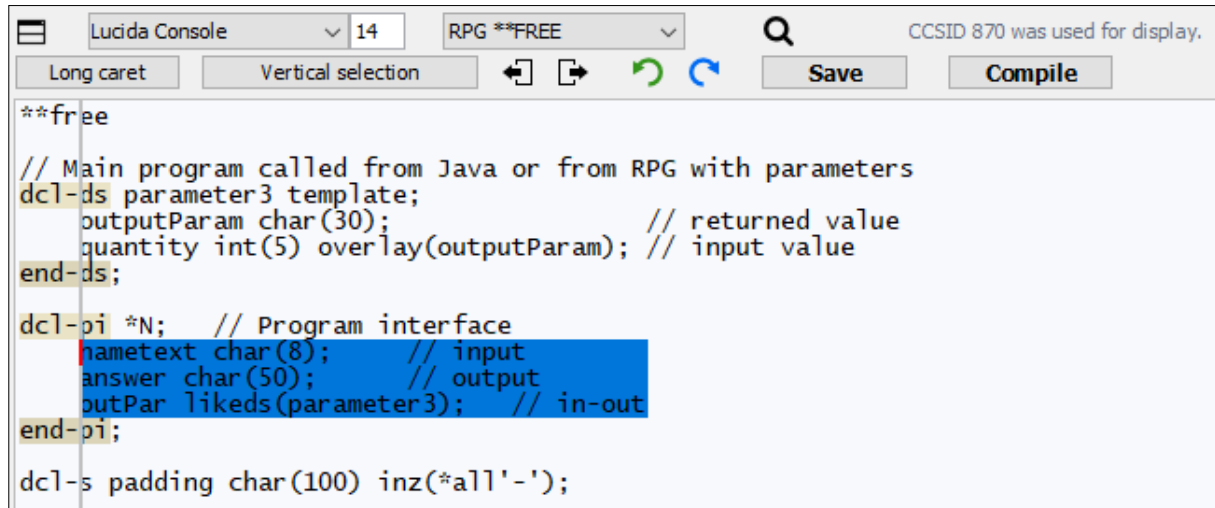
## Vertical selection

The selected *rectangle* shifts *left* by one position if there remains at least one column of spaces in the unselected part on the left of the rectangle. The rectangle *overwrites* the columns on the left and leaves a column of spaces behind (on the right).

The selected *rectangle* shifts *right* and leaves a column of spaces behind (on the left). The rectangle is shifted right as long as there is a space on the right.

## Example

Vertical selection (rectangular) was made:



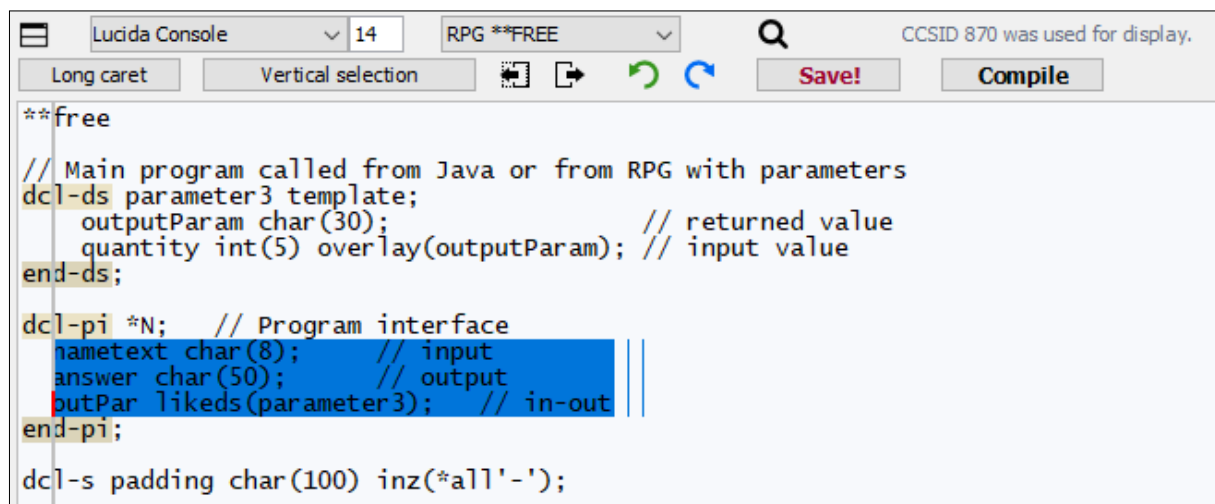
The screenshot shows the Lucida Console editor with the file 'RPG \*\*FREE' open. A vertical selection is active, highlighted in blue, covering the lines: `nametext char(8); // input`, `answer char(50); // output`, and `putPar likeds(parameter3); // in-out`. The toolbar at the top includes buttons for 'Long caret', 'Vertical selection', and navigation arrows. The status bar indicates 'CCSID 870 was used for display.'

```
**free
// Main program called from Java or from RPG with parameters
dcl-ds parameter3 template;
  outputParam char(30); // returned value
  quantity int(5) overlay(outputParam); // input value
end-ds;

dcl-pi *N; // Program interface
  nametext char(8); // input
  answer char(50); // output
  putPar likeds(parameter3); // in-out
end-pi;

dcl-s padding char(100) inz(*all'-');
```

The selection was shifted *left* 2 positions after 2 after 2 clicks on the  button.



The screenshot shows the same Lucida Console editor with the vertical selection now shifted two positions to the left. The selected text is: `ametext char(8); // input`, `answer char(50); // output`, and `utPar likeds(parameter3); // in-out`. The toolbar and status bar are the same as in the previous screenshot.

```
**free
// Main program called from Java or from RPG with parameters
dcl-ds parameter3 template;
  outputParam char(30); // returned value
  quantity int(5) overlay(outputParam); // input value
end-ds;

dcl-pi *N; // Program interface
  ametext char(8); // input
  answer char(50); // output
  utPar likeds(parameter3); // in-out
end-pi;

dcl-s padding char(100) inz(*all'-');
```

## Copy, cut and paste selected text

Common command shortcuts **Ctrl-C**, **Ctrl-X**, **Ctrl-V** are used to copy, cut and paste selected text. In macOS, the **Cmd** key is used instead of Ctrl.

Copy and Cut operations store the selected text in the *operating system clipboard*.

Paste operation reads data from the clipboard and inserts it to the desired place. This may be in the editor area or elsewhere in PC.

Results of these operations may be undone or redone.

### Horizontal selection

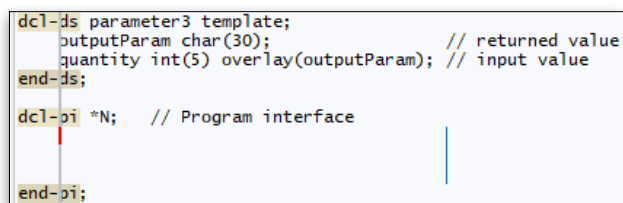
All these operations work as usual in PC.

### Vertical selection

**Copy** operation copies the selection into an internal area and also into the system clipboard.

**Cut** operation copies the selection into an internal area and also into the system clipboard, then *clears* (puts spaces in) *the rectangle area*.

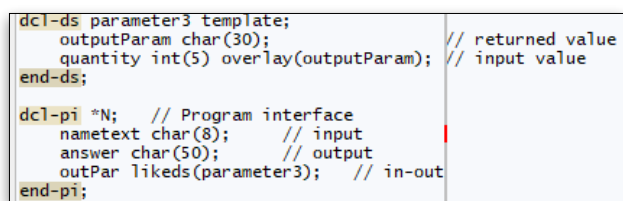
For example, the rectangle from the picture above was cut:



```
dcl-ds parameter3 template;
outputParam char(30); // returned value
quantity int(5) overlay(outputParam); // input value
end-ds;
dcl-pi *N; // Program interface
end-pi;
```

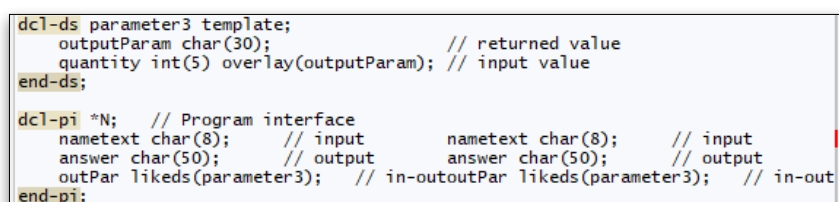
Note the *caret* position, it stands at the *beginning* of the cut rectangle area. The blue line at right denotes the right edge of the rectangle. If desired, a following *paste operation* inserts the erased data back into its original positions.

**Paste** operation replaces the editor area right and down from the *caret position*. It may be the originally copied or cut area.



```
dcl-ds parameter3 template;
outputParam char(30); // returned value
quantity int(5) overlay(outputParam); // input value
end-ds;
dcl-pi *N; // Program interface
nametext char(8); // input
answer char(50); // output
outPar likeds(parameter3); // in-out
end-pi;
```

This time the *caret* stands at the *right top edge* of the rectangle. An immediate following paste operation inserts data on the right of the caret.



```
dcl-ds parameter3 template;
outputParam char(30); // returned value
quantity int(5) overlay(outputParam); // input value
end-ds;
dcl-pi *N; // Program interface
nametext char(8); // input
answer char(50); // output
outPar likeds(parameter3); // in-out
end-pi;
```

If the editor area is shorter than the inserted rectangle, extra empty lines are appended and the pasted data is inserted in the extra lines (behind the area).

```

dcl-ds parameter3 template;
  outputParam char(30);           // returned value
  quantity int(5) overlay(outputParam); // input value
end-ds;

dcl-pi *N; // Program interface
  nametext char(8); // input
  answer char(50); // output
  outPar likeds(parameter3); // in-out
end-pi;

dcl-s padding char(100) inz(*all'-');

answer = 'ANSWER(50): ' + %char(outPar.quantity) + padding; // output
outPar.outputParam =
  'NAME+QUANTITY: ' + nametext + '+' + %char(outPar.quantity) + padding; // output

dump(a) 'TESTPROG';

return;
nametext char(8); // input
answer char(50); // output
outPar likeds(parameter3); // in-out

```

### Help for form-based languages

Languages RPG III, older versions of RPG IV, COBOL and DDS use forms to enter specifications. *Form headings* are available in *Help menu* which may be copied and inserted in the edited text at suitable places as a comment and lead the programmer to enter program specifications in proper columns. For example, you can insert file description format at a suitable place in an RPG III program

```
.....F*filenameIPEAF....RlenLK1AIOvKlocEDevice+.....KOptionEntry+A....U1.....
```

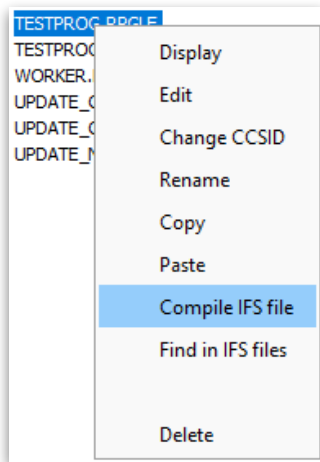
or format DSPF in the DDS specification

```
.....A*N01N02N03T.Name+++++Rlen++TDpBLinPosFunctions+++++.....
```

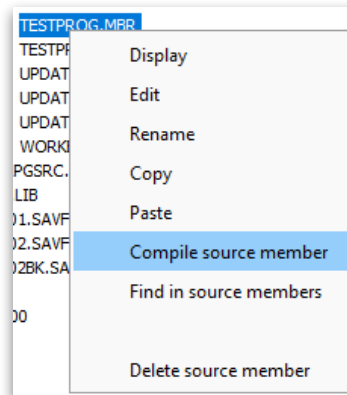
## Compilation

Context menu on some files in IBM i contains a command for compilation. For IFS stream files choose command *Compile IFS file*, for source members choose command *Compile source member*.

### *IFS file*



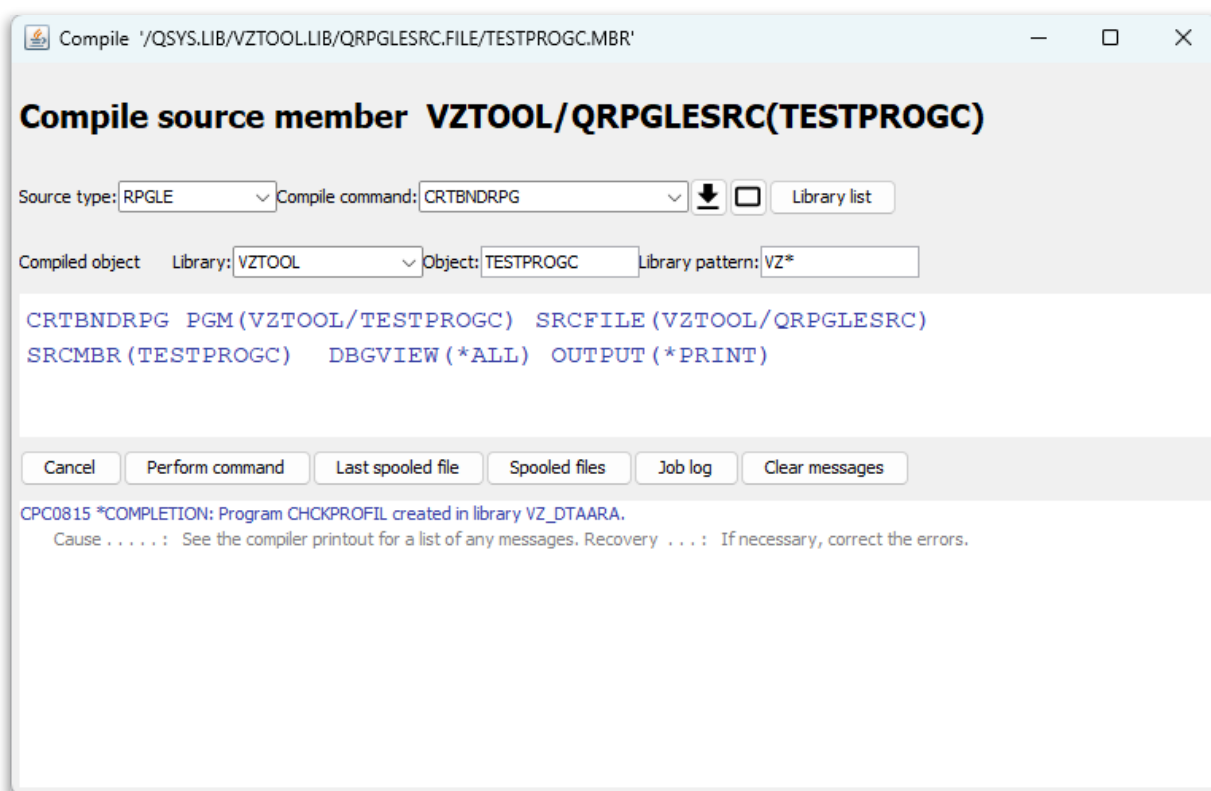
### *Source member*



Another way to originate compilation is clicking the *Compile* button in the text editor. The compilation window is displayed.

Note: Concept *compile* means creating objects by appropriate commands. Mostly they begin with letters CRT, e. g. CRTBNDRPG for creation of an RPG program. An exception is creation of an object from the SQL script, where the creating command is RUNSQLSTM.

A compile window is displayed.



The window is structured into a few sections.

1. *Path* to the source file or the IFS stream file (bold letters).
2. *Parameters for input* into compilation - source type, command name, library list selection.
3. Data identifying *output* of the compilation.
  - Target *Library* name.
  - Target *Object* name.
  - Selection *pattern* for limiting the list of libraries in the combo box – may be entered in the input field.
4. The *actual* text of the compilation command.
5. Buttons:
  - Cancel* – cancels the work. *ESC* key or closing the window also cancels the work.
  - Perform command* – performs (starts) the compilation command.
  - Last spooled file* – displays the most recently produced spooled file for the current user.
  - Spooled files* – gets a table of spooled files for the current user.
  - Job log* – prints the actual contents of the job log.
  - Clear messages* – clear all messages from the message area.
6. Space for messages.

**Note:** The compile command is normally started by the *Perform command* button. It is also possible to modify or completely overwrite the command by completely different command. This way, you can write any CL command and start it. Thus, for example, using the CALL command to run a non-interactive program. Any results may be found in a physical or print file, or in the job log.

## Source type

### Source members

The screenshot shows a software interface for managing source members. On the left, a 'Source type' dropdown menu is open, displaying a list of options: RPGLE, SQLC, SQLCPP, SQLCBL, SQLCBLLE, SQLRPG, SQLRPGLE, and SQL. The 'RPGLE' option is currently selected. To the right of the dropdown, the 'Compile command' is set to 'CRTBNDRPG'. Below the dropdown, the 'Compiled object' is set to 'SQL', the 'Object' is 'TESTPROG', and the 'Library pattern' is 'VZ\*'. At the bottom, there is a text area containing the following code: 

```
CRTBNDRPG ( *PRINT ) SRCFILE ( VZTOOL / QRPGLSRC ) SQL  
TPUT ( *PRINT )
```

Type of the source member is automatically set at the first display of the compile window. At the same time the corresponding compile command is set. It is possible to change it from the combo box or direct entry in the input field. This changed type is used to determine the appropriate compile command. The actual type of the source member is not changed.

Programs and description files of the following source types can be compiled:

CLLE, CLP,  
RPG, RPGLE, SQLRPG, SQLRPGLE,  
CBL, CBLLE, SQLCBL, SQLCBLLE,  
C, CPP, SQLC, SQLCPP,  
CMD,  
DSPF, LF, PF, PRTF,  
SQL,  
TBL

Source members in the displayed tree have actual types as suffixes.

Important: Changing type of a source member is only possible with CL command WRKMBRPDM.

### IFS stream files

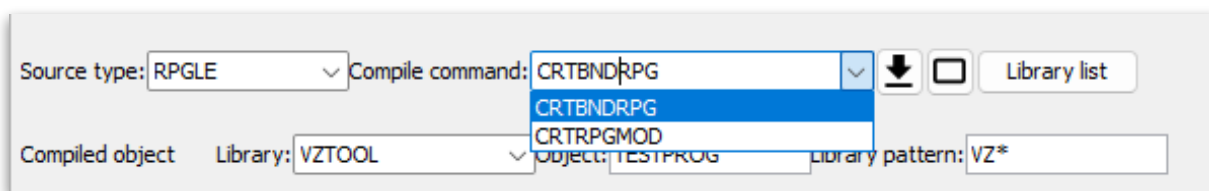
For IFS stream files, suffixes listed above must be explicitly written, not necessarily with capital letters. IFS stream files of the following source types *cannot be compiled*:

CLLE, CLP, CMD, RPG, CBL, SQLRPG, SQLCBL  
DSPF, LF, PF, PRTF,  
TBL



## Compile command

CL compile *command* can be left unchanged or it may be selected from the combo box. Changing is sometimes necessary because some source types may be compiled as a *program* or a *module* or a *service program*.





Program or module can be created from the ILE source types: CLLE, RPGLE, CBLLE, C, CPP, SQLRPGLE, SQLCBLLE, SQLC a SQLCPP.

Service program can be created from source types with SQL statements: SQLRPGLE, SQLCBLLE a SQLC.

## Keeping compile attributes

Two buttons with icons enable saving or clearing *attributes of compilation* (source type, compile command, target library, target object) selected from combo boxes and a text field.

The "Save" button that has two switchable icons  and , defines how the selected values are handled.

When the button has the *black* icon, the values are *saved* and assigned to each compiled file. Thus the *attributes of compilation* are fixed as a user defined default. They appear in the combo boxes each time the file is chosen for compilation, until changed by the user.

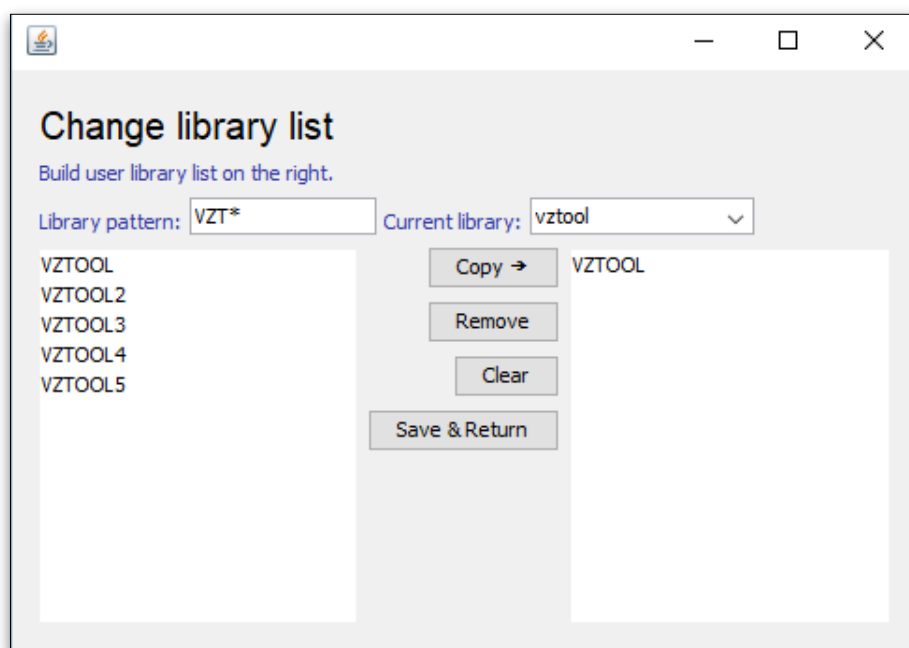
When the button has the *light gray* icon, the values are *not saved*.

The "Clear" button with  icon when clicked, *clears* saved values for all compiled files.

Note: Saved values are written in the file *CompileAttributes.lib* in directory *workfiles*.

## Change library list

This button invokes a window where user library list and the current library can be set.



### Library pattern

Entering a *search pattern* (see chapter [LIB, FILE, MBR input fields](#)) in the input field *Library pattern* and pressing the *Enter* key writes a list of libraries whose names conform to the pattern to the *left* frame. If the input field is empty (possibly after clearing the field and pressing *Enter* key), the list of all libraries will be shown.

### Current library

The current library can be selected from the *Current library* combo box or entered in the input field. The symbol *\*CRTDFT* is a special entry which means that the job library list does *not* contain a current library.

### Creating a user library list

A single library or multiple libraries can be selected from the left frame and copied to the right frame either by *drag and drop*, or by **Copy →** button. The right frame represents the *user library list* of the job.

The *Remove* button removes selected libraries from the right frame.

The *Clear* button clears the right frame.

The *Save & return* button saves the changes.

## Compiled object

Compiled object	Library: VZTOOL	Object: TESTPROG	Library pattern: VZTOOL
-----------------	-----------------	------------------	-------------------------

When compiling a *source member* default parameters in this line are derived from the path to the source member. They can be changed and saved by Enter key.

When compiling an *IFS file* it may be necessary to change these parameters because target library and object cannot be derived from the path like from the path to a source member. Default target library name is taken from the first item of the combo box list. Default target object name is taken from the *path* and is shorten to 10 characters.

### Library

The library can be selected from the list in the combo box or entered in the input field and press Enter key.

### Object

The object name can be left unchanged or entered in the input field.

### Library pattern

Entering a pattern in the input field and pressing the Enter key writes a list of libraries whose names match the pattern to the combo box for selection. The pattern may contain wildcards \* and ?.

## Perform command

The *Perform command* button runs the compilation. One or more messages are reported about the result of the compilation in the low part of the window, e. g.:

CPC0815 \*COMPLETION: Program CHCKPROFIL created in library VZ\_DTAARA.

Cause . . . . . : See the compiler printout for a list of any messages. Recovery . . . : If necessary, correct the errors.

A compilation protocol (listing) is printed in the print file QPRINT.

## Spooled files

The Spooled files button shows a table of spooled files for the *current user*. Selection, displaying, copying, and deleting is performed the same as in OUTQ object types (see [Spooled files](#) above).

The window contains the *Refresh* button which refreshes the table of the spooled files without using the Spooled files button repeatedly.

File name	File num.	Job name	User	Job num.	Date	Time	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="v"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="button" value="Refresh"/>

File name	File num.	Job name	User	Job num.	Date	Time	Output queue
CENY2	1	QPRTJOB	VZUPKA	029937	1170311	094622	QGPI/QPRINT

*ESC* key removes the spooled files window.

## Job log

The *Job log* button prints the actual contents of the job log in the print file QEZJOBLOG. This file can be found using the Spooled files button and displayed like other text files.

## Compilation example

Program OBJSTAT retrieves data from table function QSYS2.OBJECT\_STATISTICS and writes it to the printer file QSYSPRT.



```
// -----  
// List object statistics - similar to RTVOBJD API or DSPOBJD command  
// -----  
dcl-f QSYSPRT printer(120);  
  
dcl-s objname      varchar(10);  
dcl-s objtype      varchar(8) ;  
dcl-s objcreated   timestamp;  
dcl-s objsize      packed(15);  
  
Exec SQL declare CS cursor for  
      SELECT objname, objtype, objcreated, objsize  
      FROM TABLE ( QSYS2.OBJECT_STATISTICS  
      ('VZUPKA','PGM, MODULE, SRVPGM', 'FU_CEN_*') );  
  
Exec SQL open CS;  
  
Exec SQL fetch from CS  
      into :objname, :objtype, :objcreated, :objsize ;  
dow sqlstate < '02000';  
  except line;  
  Exec SQL fetch from CS  
      into :objname, :objtype, :objcreated, :objsize ;  
enddo;  
  
Exec SQL close CS;  
*inlr = *on;  
return;  
  
.....O*ilename++DF..N01N02N03Excnam++++B++A++Sb+Sa+.....  
QSYSPRT   E           line  
.....O*.....N01N02N03Field++++++YB.End++PConstant/editword/DTformat++  
O  
O           objname  
O           objtype  
O           objcreated  
O           objsize      Z
```

Button *Compile* shows the window with the compile command and the default parameters.

Compile 'QSYS.LIB/VZUPKA.LIB/QRPGLESRC.FILE/OBJSTAT.RPGLE'

### Compile source member VZUPKA/QRPGLESRC(OBJSTAT)

Source type:  Compile command:  Library list

Compiled object Library:  Object:  Library pattern:

```
CRTBNDRPG PGM(VZUPKA/OBJSTAT) SRCFILE(VZUPKA/QRPGLESRC) SRCMBR(OBJSTAT)
DBGVIEW(*ALL) OUTPUT(*PRINT)
```

Button *Perform command* runs compilation and shows the result.

```
RNS9308 *COMPLETION: Compilation stopped. Severity 30 errors found in program.
Cause . . . . . : The RPG compiler found at least one error in the program of severity greater than that specified in the GENLVL option on the CRT
RNS9310 *ESCAPE: Compilation failed. Program OBJSTAT not created in library VZUPKA.
Cause . . . . . : Compilation failure normally occurs when the severity of issued messages exceeds the value specified for the GENLVL parameter o
```

Error occurred because default type RPGLE taken from the actual type of the source member was incorrect. Since the program contains SQL commands, we change the source type to SQLRPGLE. A new compilation by *Perform command* creates the program.

Source type:



Compiled obj:

Source type:  Compile command:  Library list

Compiled object Library:  Object:  Library pattern:

```
CRTSQLRPGI OBJ( VZUPKA/OBJSTAT ) SRCFILE(VZUPKA/QRPGLESRC) SRCMBR(OBJSTAT)
OBJTYPE(*PGM) OUTPUT(*PRINT) DBGVIEW(*SOURCE)
```

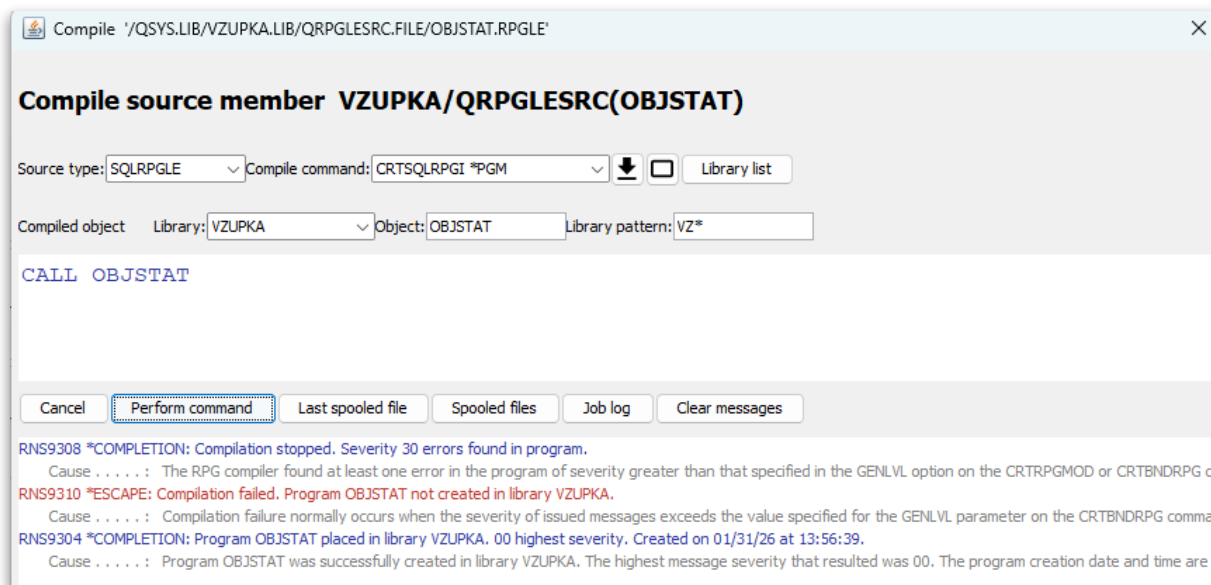
```
RNS9308 *COMPLETION: Compilation stopped. Severity 30 errors found in program.
Cause . . . . . : The RPG compiler found at least one error in the program of severity greater than that specified in the GENLVL option on the CRTRPGMOD or CRTBNDRPG c
RNS9310 *ESCAPE: Compilation failed. Program OBJSTAT not created in library VZUPKA.
Cause . . . . . : Compilation failure normally occurs when the severity of issued messages exceeds the value specified for the GENLVL parameter on the CRTBNDRPG comm
RNS9304 *COMPLETION: Program OBJSTAT placed in library VZUPKA. 00 highest severity. Created on 09/21/25 at 17:32:45.
Cause . . . . . : Program OBJSTAT was successfully created in library VZUPKA. The highest message severity that resulted was 00. The program creation date and time are
```

If the program is to be many times modified, this procedure need not be repeated. If the button  is switched to black color, application saves the compile command for this program in an item of the internal directory *workfiles*. It is kept there as long as the button  is pressed which clears all items from the directory.

Note: No matter the source type RPGLE in the input field, the compile command CRTSQLRPGI still keeps working.



## Running a CL command

The correctly compiled program can be run. Clear the compile command, write the comand `CALL OBJSTAT`, and press *Perform command*.



Compile: '/QSYS.LIB/VZUPKA.LIB/QRPGLESRC.FILE/OBJSTAT.RPGLE'

**Compile source member VZUPKA/QRPGLESRC(OBJSTAT)**

Source type:  Compile command:    Library list

Compiled object Library:  Object:  Library pattern:

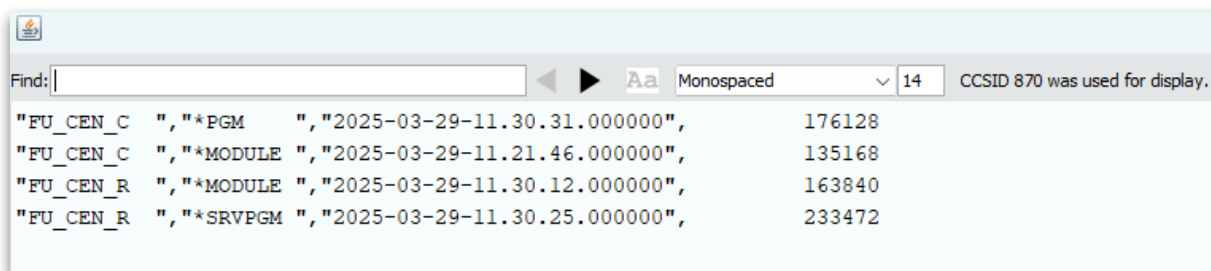
`CALL OBJSTAT`



Cancel **Perform command** Last spooled file Spooled files Job log Clear messages

RNS9308 \*COMPLETION: Compilation stopped. Severity 30 errors found in program.  
Cause . . . . . : The RPG compiler found at least one error in the program of severity greater than that specified in the GENLVL option on the CRTRPGMOD or CRTBNDRPG c  
RNS9310 \*ESCAPE: Compilation failed. Program OBJSTAT not created in library VZUPKA.  
Cause . . . . . : Compilation failure normally occurs when the severity of issued messages exceeds the value specified for the GENLVL parameter on the CRTBNDRPG comma  
RNS9304 \*COMPLETION: Program OBJSTAT placed in library VZUPKA. 00 highest severity. Created on 01/31/26 at 13:56:39.  
Cause . . . . . : Program OBJSTAT was successfully created in library VZUPKA. The highest message severity that resulted was 00. The program creation date and time are

No other message is shown because library list and the command was correct.

Button *Last Spooled File* displays data of the printer file QSYSPRT. Or with button *Spooled files* find it in the list and display its data.



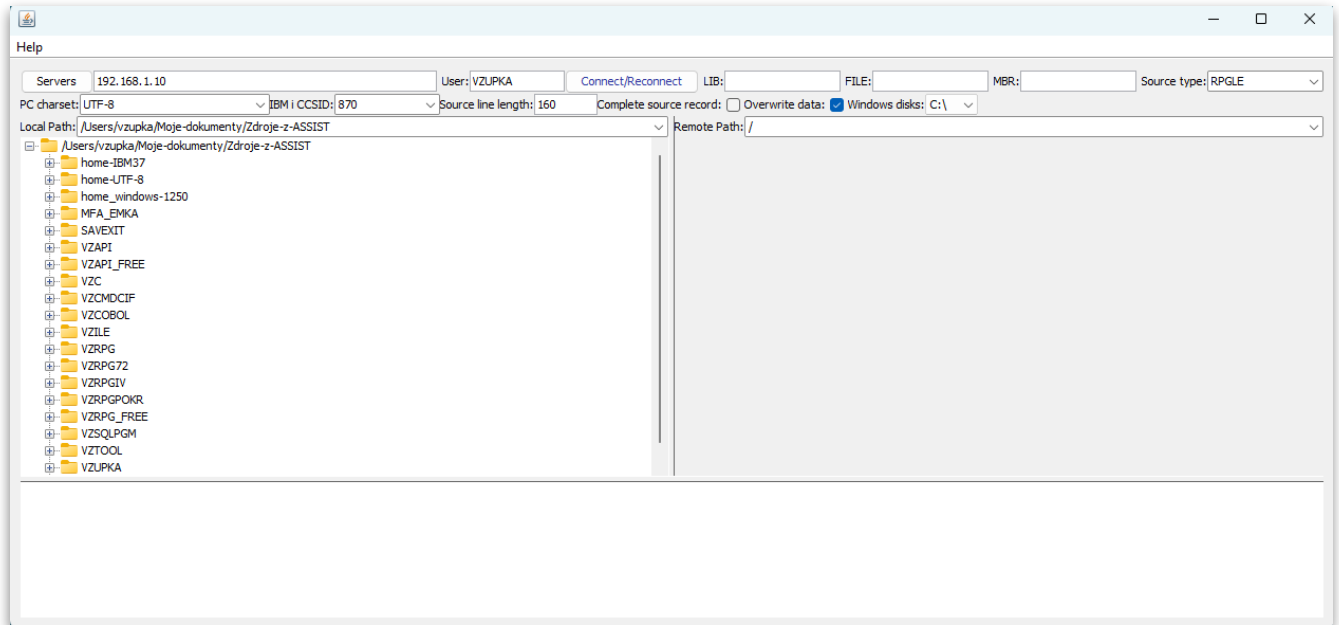
Find:    Aa Monospaced 14 CCSID 870 was used for display.

"FU_CEN_C	", "*PGM	", "2025-03-29-11.30.31.000000",	176128
"FU_CEN_C	", "*MODULE	", "2025-03-29-11.21.46.000000",	135168
"FU_CEN_R	", "*MODULE	", "2025-03-29-11.30.12.000000",	163840
"FU_CEN_R	", "*SRVPGM	", "2025-03-29-11.30.25.000000",	233472

## Application parameters

When the application starts, the main window is displayed, where the left side shows the tree representing the PC file system. The right side is empty, it fills only after connection to the system IBM i (using the button *Connect/Reconnect*).

The upper part of the window contains components that define application parameters. They have form of input text fields, combo boxes, and check boxes. Here is also the button *Connect/Reconnect* for connection to the IBM i server.



### IBM i server and user



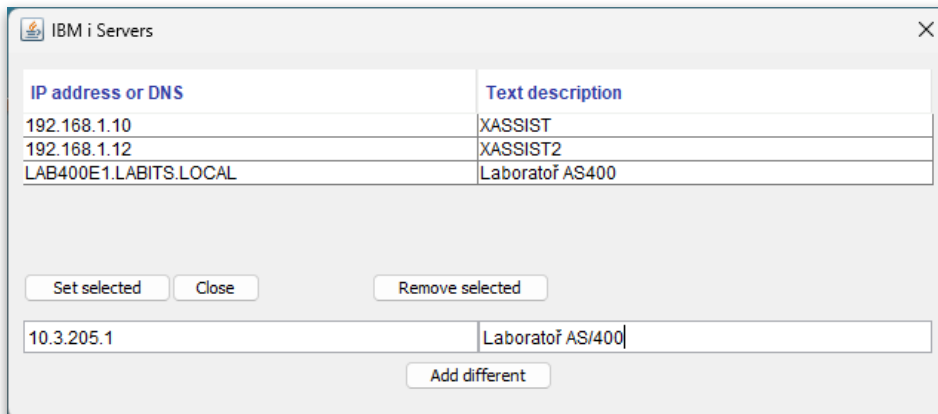
The user must enter his name in the input field *User*. An address of the IBM i server can be entered in the input field manually or using the button *Servers*. Then the user presses the button *Connect/Reconnect* to connect the server. The other parameters may be adjusted later.



## Servers

This button displays a window to maintain a list of IBM i servers to choose for connection.

- Button *Add different* adds the address and description of a new server from the two input fields below. Both values must not be blank and must not already be present in the list.



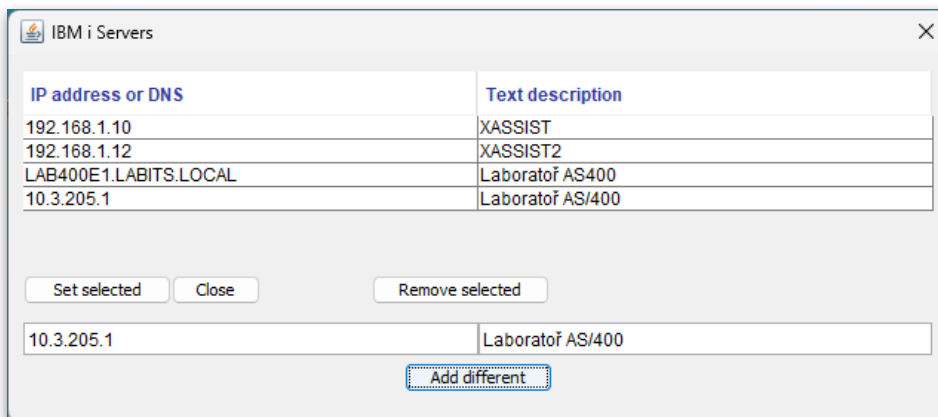
IBM i Servers

IP address or DNS	Text description
192.168.1.10	XASSIST
192.168.1.12	XASSIST2
LAB400E1.LABITS.LOCAL	Laboratoř AS400

Set selected Close Remove selected

10.3.205.1 Laboratoř AS/400

Add different



IBM i Servers

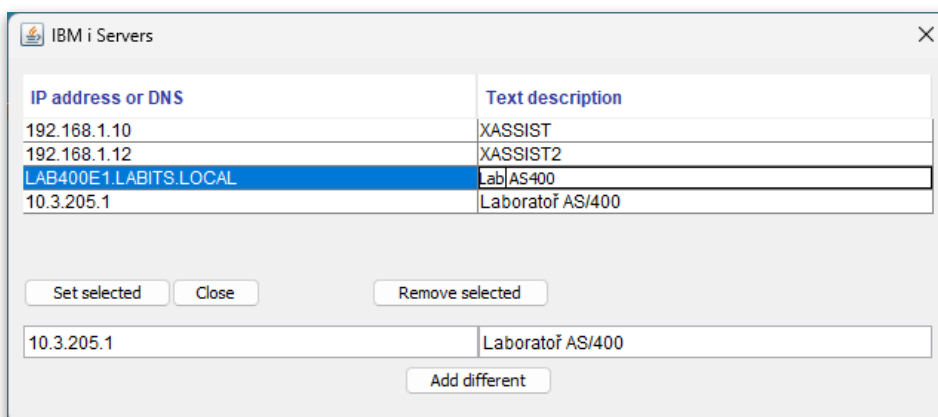
IP address or DNS	Text description
192.168.1.10	XASSIST
192.168.1.12	XASSIST2
LAB400E1.LABITS.LOCAL	Laboratoř AS400
10.3.205.1	Laboratoř AS/400

Set selected Close Remove selected

10.3.205.1 Laboratoř AS/400

Add different

Any cell in the selected row can be changed like in an input field by double click, entering data and pressing *Enter*:



IBM i Servers

IP address or DNS	Text description
192.168.1.10	XASSIST
192.168.1.12	XASSIST2
LAB400E1.LABITS.LOCAL	Lab AS400
10.3.205.1	Laboratoř AS/400

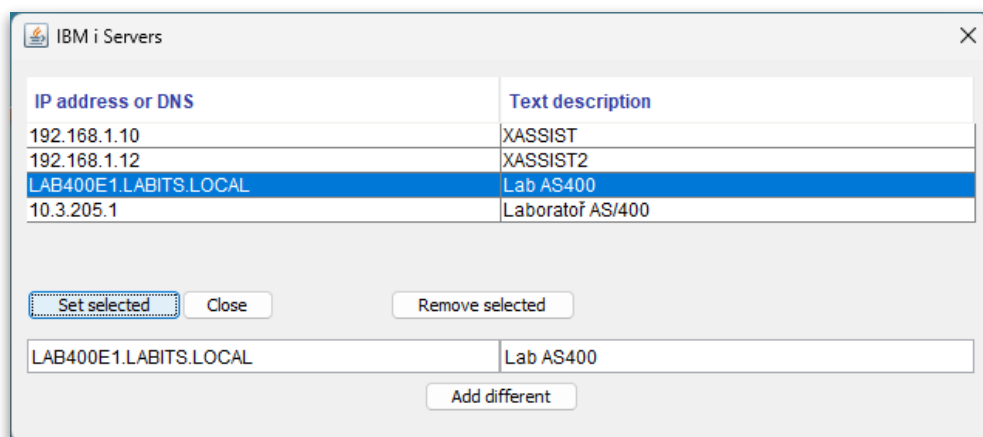
Set selected Close Remove selected

10.3.205.1 Laboratoř AS/400

Add different

•

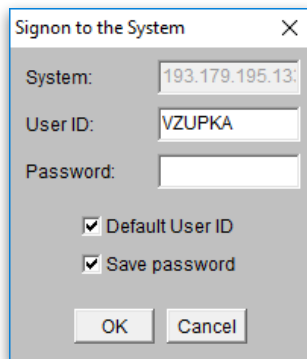
- Button *Set selected* copies the server selected from the list into both input fields below as well as into the input field in the main window. Thus the address is set for connection.



- Button *Remove selected* removes selected server from the list, but the address for connection does not change.

### **Connect/Reconnect button**

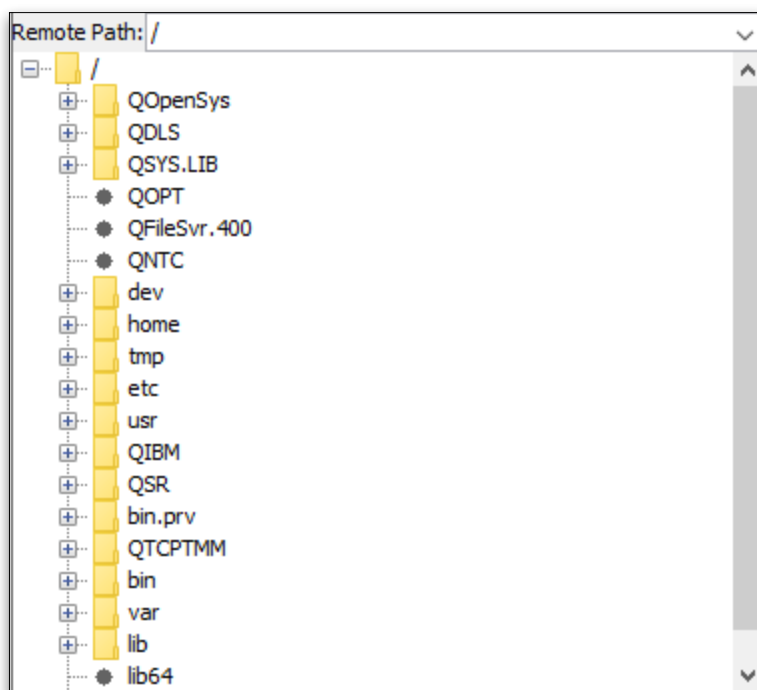
Button *Connect/Reconnect* displays the dialog *Signon to the System* where the user must enter the password.



The process of connection may last a while, according to the speed of the communication line. When the button is pressed next, the server is connected again. The new connection may pass the dialog and may last shorter, if the user keeps the server address.

The user can connect another server by changing the address (maybe using the button *Servers*) and pressing *Connect/Reconnect* or the *Enter* key.

A tree representing the IBM i file system is shown on the right side of the window after successful connection. All directories of the IFS file system are contained in the tree if the IFS root symbol (/ character) is contained in the *Remote Path* input field.



### **LIB, FILE, MBR input fields**

These input fields provide *selection* of objects within the node /QSYS.LIB (the system library). The user may select *libraries*, *files*, or *members* by entering a *search pattern* in the corresponding field. Selection is started by pressing the *Enter* key or clicking the button *Connect/Reconnect*.

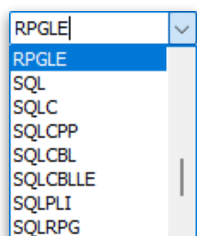
The search pattern may include special characters asterisk (\*) and question mark (?) beside normal characters.

- The \* character matches zero or more characters in the object name.
- The ? character matches one character in a *position* of the object name.

For example, entering the pattern V?T\* in a field selects names starting with V, containing any character in the second position, T in the third position, and any characters in remaining positions.

An empty field selects all names. Entering the exact object name as a pattern selects this specific object.

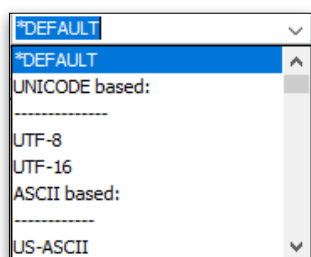
### **IBM i source type**



This combo box is used for specifying *type of the member* when creating a member of a source physical file. The user can select a type from this combo box, or enter a type directly in the input text field. Creating a member is performed when selecting command *New source physical file* in context menu on the node of a source physical file (see [later](#)). There the same combo box will show in the defining window which contain the same type. Both boxes are synchronized.

Note: This type can be change later only by the CL command WRKMBRPDM.

## PC charset

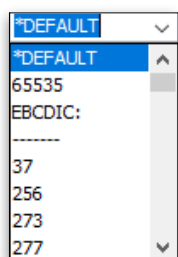


The *PC charset* parameter is applied when copying data and when displaying files in some situations. A special value *\*DEFAULT* is also in the combo box list. It is interpreted differently according to context. See details in following chapters.

The user can select a character set from the combo box or enter its code in the input text field.

Note: Unlike IFS files, PC files have no character set attribute. Therefore the *PC charset* parameter is not applied in creating a new PC file.

## IBM i CCSID



The *IBM i CCSID* parameter is applied when copying data and when displaying files. It is applied also in creating a new source physical file, in creating a new IFS stream file, or in displaying and copying spooled files. Details are explained in the next chapters.

The user can select a CCSID code ((Coded Character Set ID) from the combo box or enter a code in the input text field.

## Source line length

This value defines length of the source text line when *creating* a new *source physical file*. For example, for the source physical file QDDSSRC, length 80 is defined as a standard, for the file QRPGLSRC, length 100 is defined, etc. Different length can be entered and confirmed by the *Enter* key.

When copying a PC text file to a source member, the line (or its text part) of the PC file can be longer than the length of the data part in the source member (defined in creating the source file). Then the line is shorten so that it fits in the data part of the source record.

### ***Complete source record***

The check box, if checked, means that a 12-character data is prepended to each output line when copying a source member from IBM i to PC. This data contains the sequential number and the date from the source record.

If the check box is unchecked, only the data part from the source member is copied to PC.

Opposite, when copying a PC text file to a source member, this check box is *not applied*. The application is directed by the first line of the PC file. If the first two 6-character values are whole numbers, they are prepended to the source record.

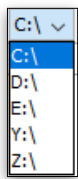
If not, missing data is derived as the computed sequential number (from 1.00 by 1.00) and the date of zero. These numbers are prepended to the line from the PC file and written together as a record to the source member.

Tip: The complete source record option is useful only if the numbers and dates are to be preserved later when restoring the member from the PC backup. The copy operation is rather slow in this case.

### ***Overwrite data***

The check box, if checked, means that it is allowed to overwrite data in existing files. If unchecked, data in existing files cannot be overwritten neither at copying nor at editing.

### ***Windows disks combo box***



The list of disks is available only in *Windows*. In fact, it is a list of root directories of the Windows file system. The user selects one from the list. Disk C:\ is default.

## File systems as trees

The PC file system on the left and the IBM i file system on the right are presented as trees. The *root* of the tree is placed in the first row.

The root of the file system is the root of the tree on the first start of the application.

- For Windows it is disk C:\.
- For unix type systems it is the forward slash / (called root).
- For IBM i it is the forward slash / like in unix type systems.

The user can change the tree root using the combo box. Gradually, as the user expands individual *nodes* of the tree, paths to corresponding objects are entered to the *list* of the *combo box*. If the user then selects a path from the list (usually a directory), the path becomes the root of the new tree and the new tree is shown.

The user may also enter the path to the object into the input field of the combo box manually and press *Enter* key. Thus the new root is set and a new tree is shown.

The application saves the actual root in its parameters. On the next start of the application, the recently saved root and the corresponding tree is displayed.

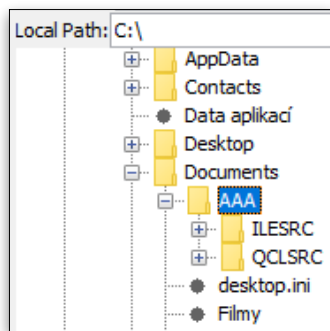
### Expanding nodes

Expand a node by *single click* on its *text* or *icon* with the left mouse button. This is necessary in order to load second level nodes with appropriate information for their further expansion.

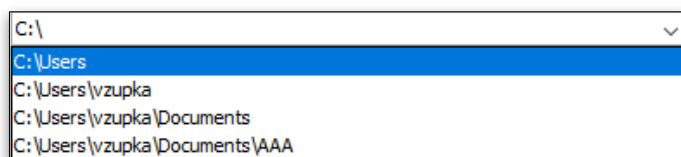
Warning: Do not use *double click* and do not use the *expansion symbol* (+ sign in a box in Windows or a little triangle in macOS)! This would work only after the node was regularly expanded before by clicking on its text or icon. After regular expansion, the node can be collapsed or expanded again.

### Left tree – PC

Clicking on a node (AAA in the picture) with the *left mouse button* reveals its objects (directories ILESRC and QCLSRC).

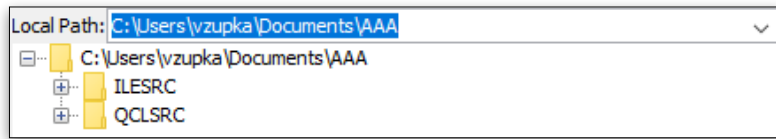


At the same time, the path leading to the node gets entered into the *combo box* list. Expanding the combo box "Local Path", will show all paths leading to the nodes that were expanded before:



If you select the last directory from the list, its path gets entered in the input field and a subtree is displayed from the new root:

C:\Users\vizupka\Documents\AAA.



### **Right tree – IBM i**

Selecting objects and a root is done the same as in the left tree. Use the "Remote path" *combo box* as described above with "Local path".

Moreover, library objects can be selected using *patterns* in the input fields *LIB*, *FILE*, *MBR*. To start the selection you click on the *Connect/Reconnect* button or press the *Enter key* (when the caret stays in an input field).

If you select library objects (within the node /QSYS.LIB) using solely the "Remote path" combo box, you get a subtree containing only these library objects. The other IFS objects get lost from view.

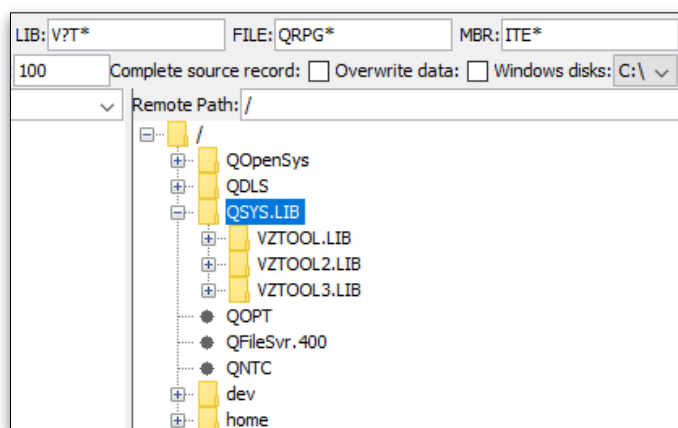
If you want to see also the other IFS objects, use input fields *LIB*, *FILE*, *MBR*. Then, if you expand the /QSYS.LIB node, you get a new tree with selected library objects along with the other IFS objects. This method may be useful when copying between library objects and other IFS objects.

Both methods may be combined.

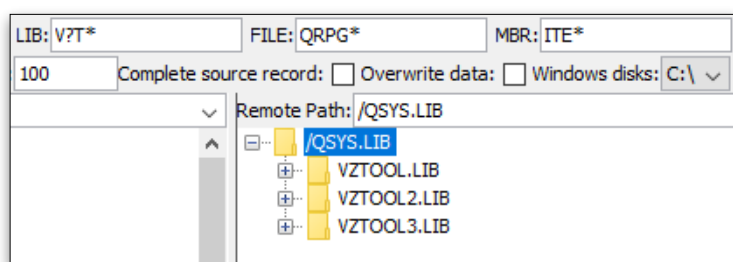


## Selecting library objects

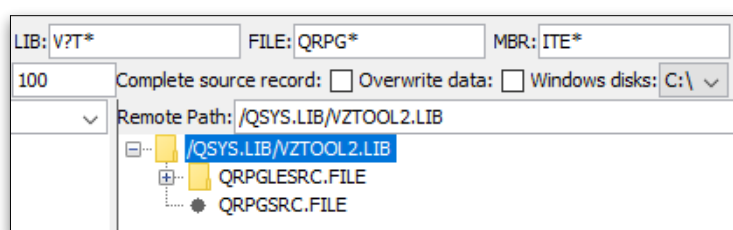
If you select objects using the LIB, FILE, MBR input fields only and having the IFS system root path (/) in the "Remote path" combo box input field, you get a subtree with selected library objects hidden in the node /QSYS.LIB. To see the objects, expand this and the next nodes. The other IFS objects are retained in view.



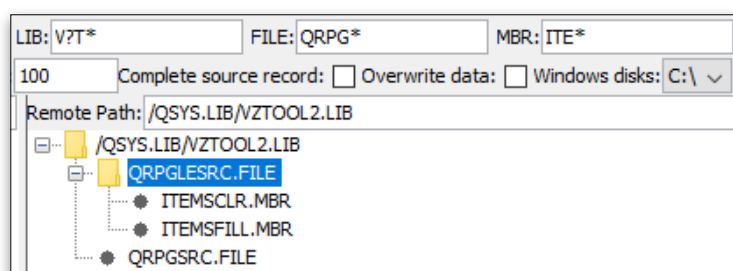
If you enter the *path* /QSYS.LIB into the "Remote path" combo box input field and *patterns* in the LIB, FILE, MBR input fields, you get subtree with the root /QSYS.LIB without other IFS objects:



If you enter the path /QSYS.LIB/VZTOOL2.LIB into the "Remote path" combo box input field and the patterns in the LIB, FILE, MBR input fields, you limit the tree to the single library VZTOOL2 with selected files



and selected members:

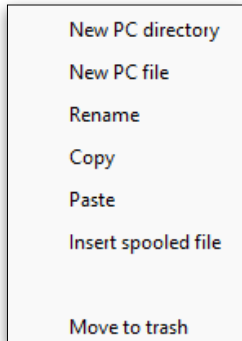


## Context menus for PC

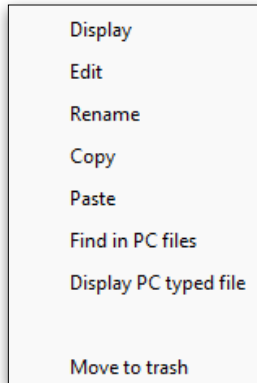
Click by right button of the mouse (*right click*) on a one or more *selected nodes* invokes a context menu with commands.

On the left side of the main window, only two kinds of menus are available.

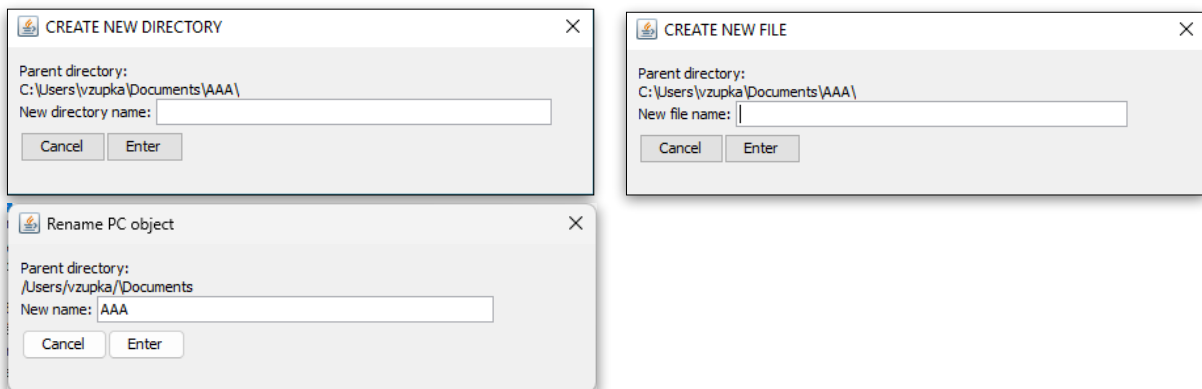
### *PC directory*



### *PC file*



Commands *New PC directory*, *New PC file*, *Rename* invoke a dialog of the unified form. Directories and files in the PC do not contain any information about a character set.



The command *Insert spooled file* is explained in the chapter [Spooled files](#).

- *Edit* command invokes the text editor (see chapter [Editing files](#)). The editor can be invoked also by *double click* on a *PC file node*.
- *Copy* command *remembers* files or directories from *selected nodes* (source nodes).
- *Paste* command *inserts* or *replaces* files or directories in a *target node*.
- *Find in PC files* command on *selected files* invokes a window where a text pattern can be entered. Files that contain the pattern are listed in the window. See chapter [Search in multiple files](#).
- *Display PC typed file* command displays also non-text file that has a standard type (ending) in the operating system, for example PDF, JPG, CSV, and more (see chapter [Displaying other files](#)).

**Note 1:** Beware of copying to multiple target nodes. Source nodes are copied *to the first* of the target nodes.

**Note 2:** Use Copy and Paste commands when both the source and target nodes are *not in the same view* and the method *drag and drop* cannot be used.

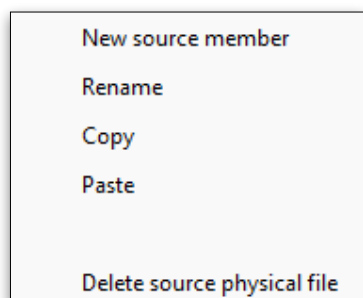
## Context menus for IBM i

On the right side of the main window, there are more context menus. Some of their commands have an analogous function like on the left side.

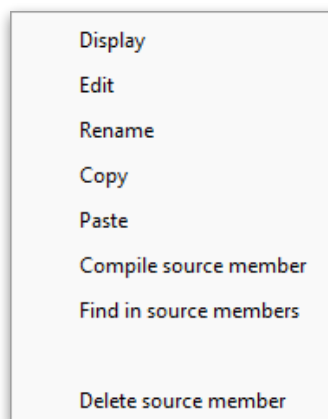
Context menus for *IFS stream file* and *Source member* have extra commands:

- *Change CCSID* (see chapter [Change coding in IFS](#))
- *Compile IFS file* and *Compile source member* (see chapter [Compilation](#))
- *Find in source members* and *Find in IFS files*. See chapter [Search in multiple files](#).

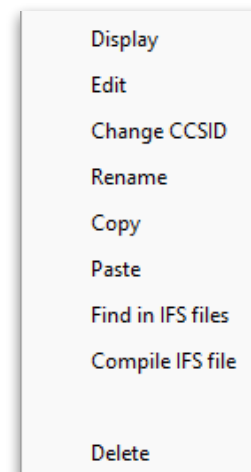
### *Source physical file*



### *Source member*

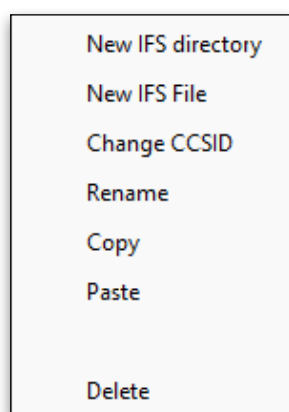


### *IFS stream file*

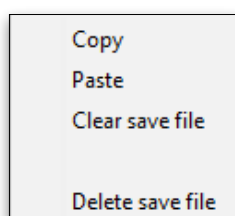


Other commands are self explaining.

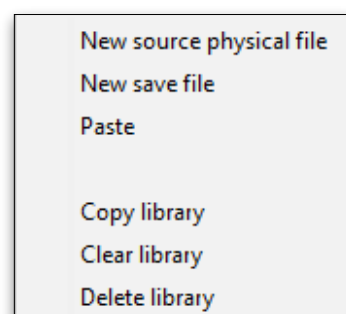
### *IFS directory*



### *Save file*



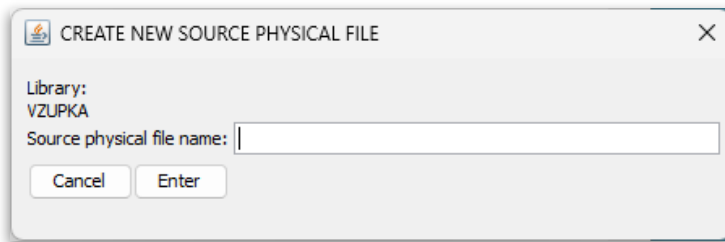
### *Library*



## Creating directories and files in IBM i

Select command *New...* from the [context menu](#) on a selected node in the right side of the main window.

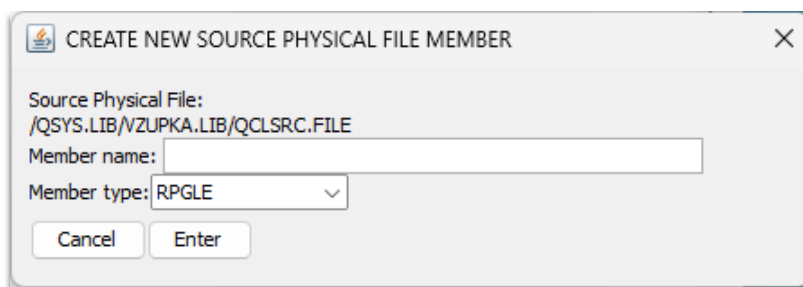
### Source physical file



The new *source physical file* gets its CCSID from the *IBM i CCSID* parameter.

- If the parameter is **\*DEFAULT** it is replaced by CCSID 500 (**EBCDIC** ISO-8859-1, Latin Alphabet No. 1).
- Length of the data in source records is obtained from *Source line length* parameter. The whole record is 12 bytes longer. A sequence number in the first 6 bytes and a date in the form YYDDMM in the next 6 bytes prepend the data.

### Source member



The new *source member* gets its type from the combo box *Member type*, that is also displayed in the combo box *Source type* in the main window. Both boxes are changed simultaneously when whichever of them is being changed.

Note: This type can be change later only by the CL command WRKMBRPDM.

The new *source member* gets its CCSID from its source physical file in which it is created as its attribute. Length of records is obtained from the source physical file "Maximum record length" attribute.

### IFS directory

The new *IFS directory* gets the CCSID from the *IBM i CCSID* parameter as its attribute. If the parameter is **\*DEFAULT** it is replaced by CCSID 819 (**ASCII** ISO-8859-1).

### IFS soubor

The new *IFS file* gets the CCSID from the *IBM i CCSID* parameter as its attribute. If the parameter is **\*DEFAULT** it is replaced by CCSID 819 (**ASCII** ISO-8859-1).

Note: CCSID value can be changed in the IFS file and IFS directory (see [here](#)).

## Copy methods

Files and directories can be copied in all directions:

- IBM i ↔ PC
- PC ↔ IBM i
- IBM i ↔ IBM i
- PC ↔ PC

Two copy methods can be used. The first method makes use of commands *Copy* and *Paste* in context menus. The other method is *drag and drop*.

### Copy from IBM i to PC

- source member → PC file
- source members → PC directory
- source physical files → PC directory
- IFS stream file → PC file
- IFS stream files → PC directory
- IFS directories → PC directory
- save file → PC file
- save files → PC directory

#### **Source member → PC file**

Data from the source member is first translated from character set defined in the *IBM i CCSID* parameter to an *auxiliary text* coded UTF-16 and then translated to the character set defined in the *PC charset* parameter.

- If *\*DEFAULT* is entered in the *IBM i CCSID* parameter, data is translated into the auxiliary text using *CCSID attribute* of the source member.
- If *\*DEFAULT* is entered in the *PC charset* parameter, data from the auxiliary text is translated using character set *ISO-8859-1* (Latin-1).

Note: The source physical file can be created with the CCSID attribute 1208. The source member created in this source physical file has the same attribute. Then, if the IBM i CCSID parameter or CCSID attribute is 1208 (UTF-8 equivalent) it is replaced by value 65535 in translation to the auxiliary text. Thus, data is not translated to UTF-16 as individual bytes but the whole UTF-8 characters.

**PC**

- ABCD
  - CHGOWNER.CLLE
  - CRTMENU2.CLLE
- home-IBM37
- home-UTF-8
- home\_windows-1250
- MFA\_EMKA
- SAVEXIT
- VZAPI

**IBM i**

- VZZAK.LIB
  - QCLSRC.FILE
    - ARITM.CLLE
    - CHGOWNER.CLLE
    - CRTDTAQ.CLLE
    - CRTMENU2.CLLE
    - CYKLY.CLLE
    - DARA.CLLE
    - DQRECEIVE.CLLE
    - DQSEND.CLLE
    - FUNKCE.CLLE

The figure illustrates the file structures on a PC and an IBM i system. On the PC side, a directory tree shows folders like VZC, VZCIS, VZCM, VZCO, VZILE, VZRP, VZRP, VZRP, VZRP, VZSQ, VZTO, VZUP, and VZZAK. A context menu is open for VZCIS, showing options: New PC directory, New PC file, Rename, Copy, Paste, Insert spooled file, and Move to trash. The 'Copy' option is highlighted. On the IBM i side, a directory tree shows folders like VZZAK.LIB, QCLSRC.FILE, QCMDSRC.FILE, QDSSRC.FILE, and QRPGLSRC.FILE. A context menu is open for QCMDSRC.FILE, showing options: New source member, Rename, Copy, Paste, and Delete source physical file. The 'Copy' option is highlighted.

Data from the *IFS stream file* is translated from the character set defined in the *IBM i CCSID* parameter to the character set defined in the *PC charset*.

Otherwise, data is translated using the *IBM i CCSID* parameter into an auxiliary text encoded in UTF-16 and then traslated using the *PC charset* parameter.

- Save file → PC file**

A save file is placed in a library as an object of type \*FILE with attribute SAVF. After copying to PC, the newly created file gets suffix *.savf*. Existing PC file must have suffix *.savf* in order that the save file can be copied to the file.

## Copy from PC to IBM i

- PC file → source member
- PC file → source physical file
- PC directory → source physical file
- PC directory → library
- PC file → IFS stream file
- PC files → IFS directory
- PC directories → IFS directory
- PC file → save file

### ***PC file → source member***

Data from the PC file is translated from the character set defined in *PC charset* parameter to the character set defined by the *CCSID attribute* of the source member. Parameter *IBM i CCSID* is ignored. Resulting characters need not be in compliance with the target character set.

Note 1: If an error is reported in copying files, an empty file may be created.

Note 2: Data transfer may last quite long, if character sets differ and the source member is long. The program must read individual input lines and translate each line before writing.

### ***PC file → IFS stream file***

Data from the PC file is translated from the character set defined in *PC charset* parameter to the character set defined by the *IBM i CCSID* parameter.

If *\*DEFAULT* is entered in both parameters, data is transferred without change (**binary**).

Otherwise, data is translated internally using the *PC charset* parameter into an auxiliary text encoded in UTF-16 which is then translated using the *IBM i CCSID* parameter.

- For *\*DEFAULT* in the *PC charset* parameter, character set *ISO-8859-1* (ASCII ISO-8859-1, Latin Alphabet No. 1) is assigned.
- For *\*DEFAULT* in the *IBM i CCSID* parameter, value *819* (ASCII ISO-8859-1, Latin Alphabet No. 1) is assigned.
- If character sets correspond on both sides, data is transferred without translation in the following cases:
  - ISO-8859-1 → CCSID 819, CCSID 858
  - windows-1250, Cp1250 → CCSID 1250
  - windows-1251, Cp1251 → CCSID 1251
  - UTF-8 → CCSID 1208
  - UTF-16 → CCSID 1200, CCSID 13488
  - IBM500, Cp500 → CCSID 819
  - IBM870, Cp870 → CCSID 870

### ***PC file → save file***

Any PC file denoted by suffix *.savf* is considered a save file and can be copied as an object of type *\*FILE* with attribute *SAVF* in a library. The same PC file can also be copied to an IFS file or directory without changing the suffix, and still retain its content as a save file.

## Copy from IBM i to IBM i

- source member → source member
- source members → source physical file
- source physical files → library
- source member → IFS stream file
- source members → IFS directory
- source physical files → IFS directory
- IFS stream file → IFS stream file
- IFS stream files → IFS directory
- IFS directories → IFS directory
- save file → IFS stream file
- save files → IFS directory
- save files in IFS → library
- library → new library

Note: Copying IFS directories and files (but save files) to library is prohibited.

### **Source member → source member**

Source member data is *translated according to source physical files* in which they reside. That is, from the CCSID attribute of the input source physical file to the CCSID attribute of the output source physical file.

The *IBM i CCSID* parameter is *ignored*.

### **Source member → IFS stream file**

Data from the source member to an *existing* IFS stream file is translated to the CCSID attribute of the IFS stream file.

Data from the source member to an IFS stream file, that is *just being created*, is not translated and the new IFS stream file takes over the CCSID attribute from the *source physical file*, in which the source member resides.

In both cases the *IBM i CCSID* parameter is *ignored*.

### **IFS stream file → source member**

Data from IFS stream file is translated from the CCSID *attribute* of the IFS stream file into the CCSID *attribute* of the *source physical file*, no matter if the source member already exists or is just being created.

The *IBM i CCSID* parameter is *ignored*.

### **IFS stream file → IFS stream file**

If the *IBM i CCSID* parameter is \*DEFAULT or both files have identical CCSID attributes, data is transferred *without change (binary)*.

Otherwise, data of the input IFS file is translated from its CCSID attribute to the CCSID attribute of the output IFS file.

If a *non-existent* output file is *just being created*, the newly created IFS file takes the CCSID attribute of the input IFS file and data is thus transferred *without change (binary)*.



### **Save file in library → IFS**

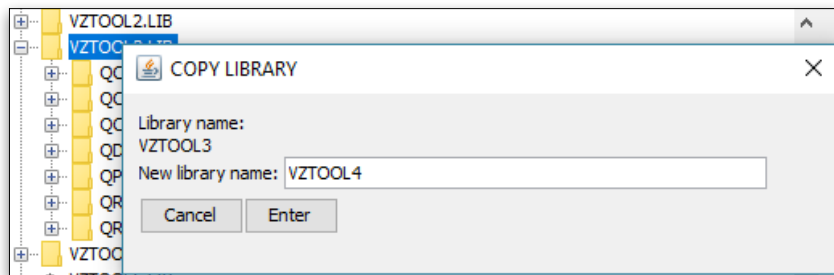
A save file in a library is an object of type \*FILE with attribute SAVF. If the output IFS stream file already exists, it must have suffix *.savf*. The newly created output IFS stream file gets suffix *.savf*.

### **Save file in IFS → library**

An IFS file with suffix *.savf* is considered save file. If the output save file already exists in the library, it has suffix *.SAVF*. The newly created save file gets suffix *.SAVF*.

### **Library → library**

A library can be copied under a different, user defined name.



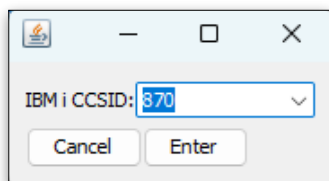
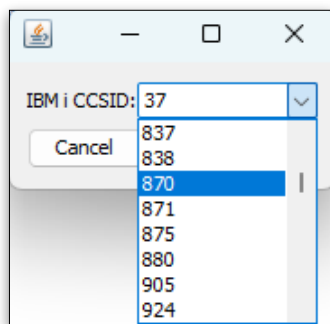
### **Copy from PC to PC**

- PC file → PC file
- PC file → PC directory
- PC directory → PC directory

No conversion is performed in copying data.

### **Change coding in IFS**

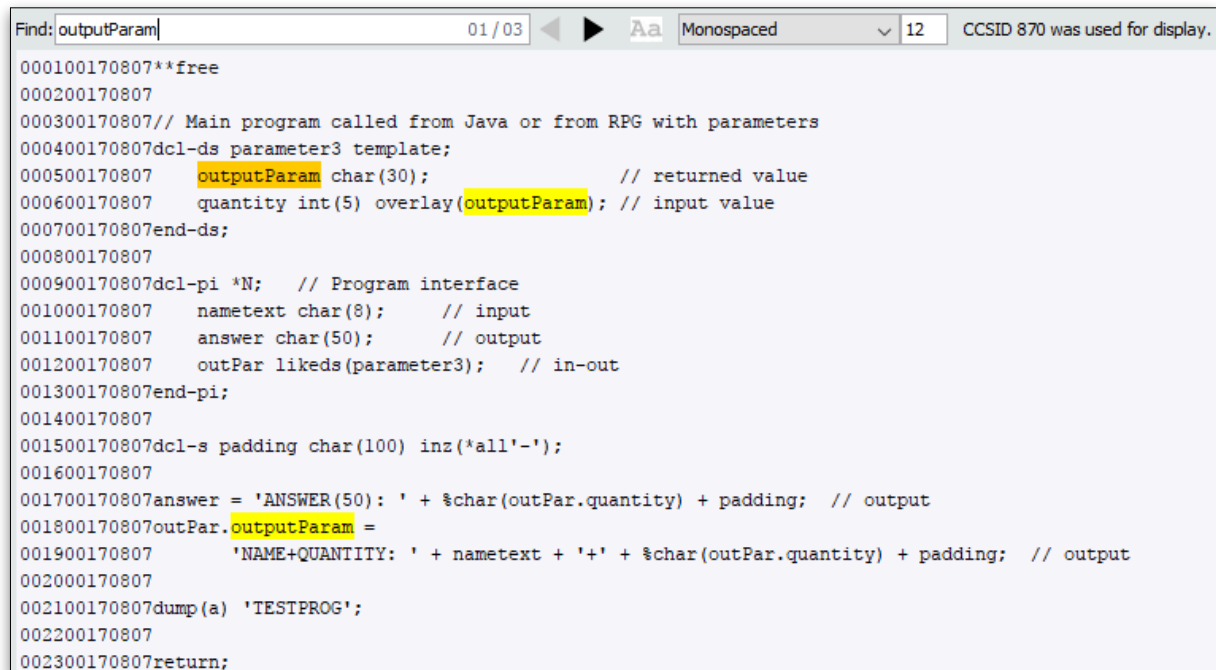
The following window with the combo box is displayed after the user selected the appropriated item from the context menu. The user can select a code from the context menu or write it in the input field. Press *Enter* button and the attribute CCSID in the IFS object will change. If the object is a directory the attribute changes in all sub-objects.



## Displaying text files

Text files in IBM i and PC can be displayed by choosing the *Display* command from a context menu.

Contents of the file are displayed in a separate window with the information about *character set* of the text in the file.



```
Find: outputParam 01/03 Aa Monospaced 12 CCSID 870 was used for display.
000100170807**free
000200170807
000300170807// Main program called from Java or from RPG with parameters
000400170807dcl-ds parameter3 template;
000500170807     outputParam char(30);           // returned value
000600170807     quantity int(5) overlay(outputParam); // input value
000700170807end-ds;
000800170807
000900170807dcl-pi *N; // Program interface
001000170807     nametext char(8); // input
001100170807     answer char(50); // output
001200170807     outPar likeds(parameter3); // in-out
001300170807end-pi;
001400170807
001500170807dcl-s padding char(100) inz(*all'-');
001600170807
001700170807answer = 'ANSWER(50): ' + %char(outPar.quantity) + padding; // output
001800170807outPar.outputParam =
001900170807     'NAME+QUANTITY: ' + nametext + '+' + %char(outPar.quantity) + padding; // output
002000170807
002100170807dump(a) 'TESTPROG';
002200170807
002300170807return;
```

Control components are placed on top of the window:

- *Find* – entering a text pattern in the field causes finding matching texts. Numbers in the field show sequence number of the current match and number of matches.
- ◀ ▶ *Arrow buttons* – find preceding or following matches in the file. An arrow gets black after clicking on it and indicates direction of searching. The opposite arrow gets gray. The same function is provided by keyboard shortcuts Ctrl ↑(previous) and Ctrl ↓(next).
- **Aa/Aa** *toggle button* – when light gray, the search is case insensitive, when black, the search is case sensitive.
- *Font size* – the input field defines font size of the text in the displayed file.

*ESC* key escapes display and removes the window.

Note: *Cmd* key is used instead of Ctrl in macOS.

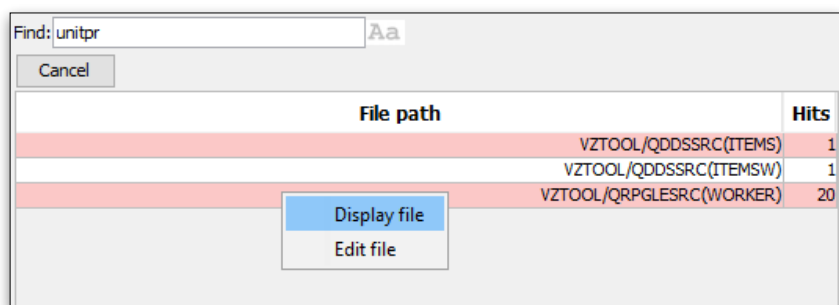
## Search in multiple files

Select one or more files (PC files, source members, IFS files) that may or may not be adjacent. Command *Find in . . .* from the context menu invokes a window where a text pattern is entered and Enter key pressed.

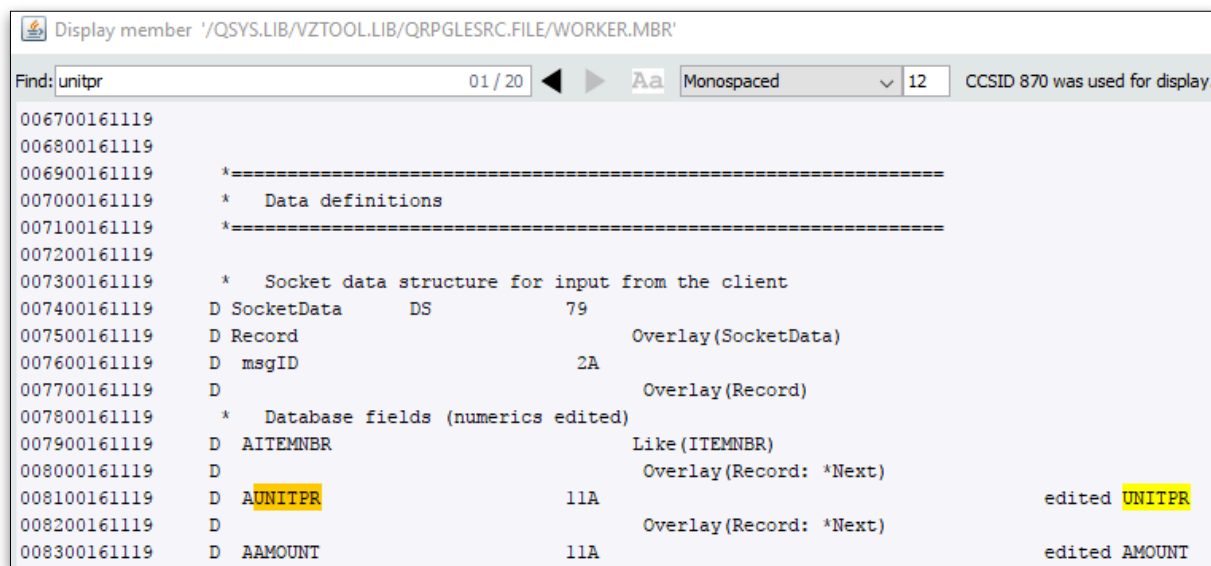
If the "Match case" (**Aa**) icon is light gray, search is done for any letter case. If it is black (**Aa**), search is done for the same letter case.

If one or more files from the selected ones contain the text pattern the files are listed in the window. The user can select one or more of them and make them displayed or edited. Clicking on right button reveals context menu with commands *Display file* and *Edit file*. These commands open display or edit window showing all pattern instances highlighted depending on the Match case button color.

For example, the user selected some non-adjacent source members suspected to contain pattern *unitpr* from two source physical files (QDDSSRC, QRPGLSRC) and chose the command *Find in source members* on one of them. Then the user entered the pattern in the *Find* input field and pressed Enter key. The pattern was found in three source members.



The user selected two rows and chose the command *Display file*. Two members, display file



ITEMS and program WORKER are displayed with all instances of the text found highlighted.

## Displaying other (non-text) files

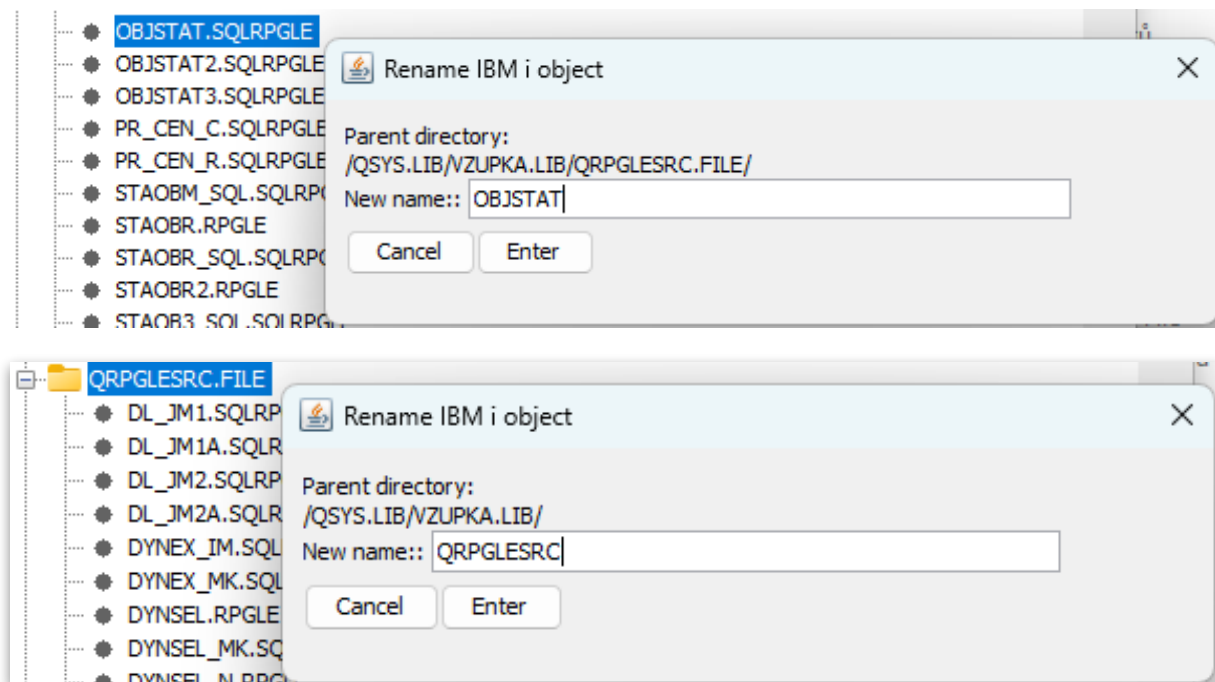
Files in PC denoted with a known ending, for example PDF, JPG, CSV and many others, can be displayed by selecting the command *Display PC typed file* from the context menu, if they have designated applications in the operating system.

Note: Files in the *macOS* system are not displayed whose path is not correctly encoded (directory or file name contains other characters than ASCII or spaces).

## Renaming objects

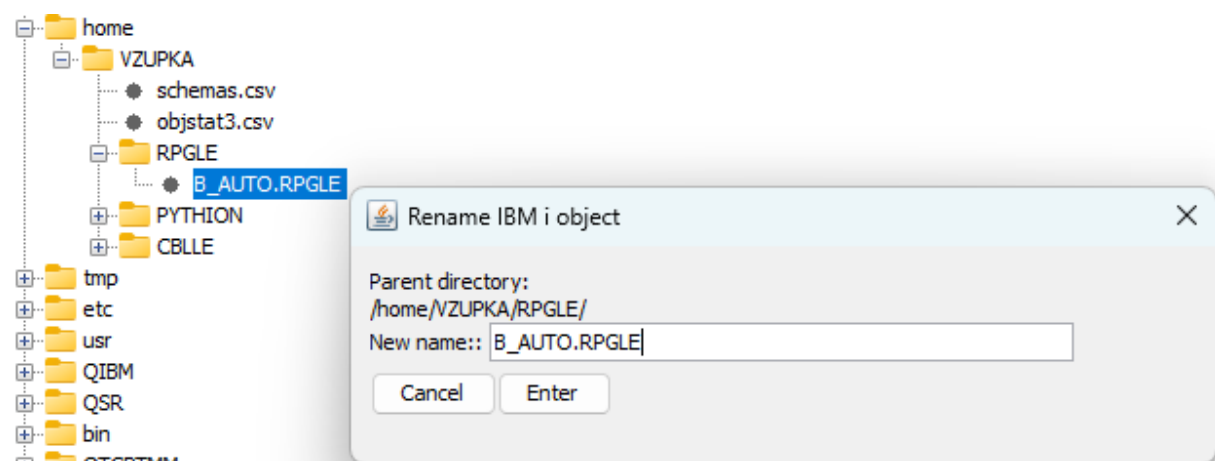
Command *Rename* in context menu prompts for changing the object name.

Library objects (/QSYS.LIB) do not allow changing type of object, only the bare name.



IFS objects (non-library) allow changing the whole text of the name.

PC objects allow changing the whole text of the name.



## Displaying and editing in PC – character sets

Files are displayed and edited using *PC charset* parameter. If \*DEFAULT is entered, *ISO-8859-1* is assigned. If the file contains invalid characters, an error message is reported. The user can change the parameter and try again.

## Displaying and editing in IBM i – character sets

*Source members* are displayed and edited using their *own CCSID attributes* without regard to the value of the IBM i CCSID parameter. Characters are displayed incorrectly if they do not conform to the CCSID.

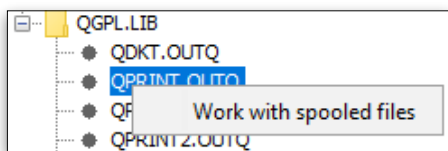
*IFS stream files* are displayed and edited using their *own CCSID attributes* without regard to the value of the IBM i CCSID parameter. Characters are displayed incorrectly if they do not conform to the CCSID.

*Spooled files* are displayed (but not edited) using the *IBM i CCSID* parameter. If incorrect characters are displayed, using \*DEFAULT or 65535 may help. The program then tries to guess a correct encoding.

## Spooled files

Spooled files can be displayed and can also copied to the PC. There are two ways how to get spooled files.

The first way requires knowledge about *what libraries* contain output queue objects (\*OUTQ type), for example libraries QGPL or QUSRSYS. Click with the right mouse button on the node having suffix .OUTQ, which invokes menu with a single command *Work with spooled files*.



The other way does not require library names. Use the system library QSYS.LIB instead. The system library does not contain any output queues directly but it serves here as a placeholder of the menu with the command *Work with spooled files*. Thus *all* spooled files can be accessed.

The command *Work with spooled files* invokes a window with a table of spooled files.

File name	File num.	Pages	Job name	User	Job num.	Date	Time	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
File name	File num.	Pages	Job name	QSYS VZUPKA	Job num.	Date	Time	Output queue
QPRINT	1	1	QSLPSVR	QSYS	032508	1170331	134516	QGPL/QPRINT
CENPOR	6	10	QPRTJOB	VZUPKA	033626	1170404	183428	QGPL/QPRINT
TESTPROG	7	7	QPRTJOB	VZUPKA	033626	1170405	102552	QGPL/QPRINT

End work with spooled files by the closing the window by *ESC* key.

To limit range of the table, enter conditions to input fields above the table and press *Enter* key. The text in the field is sought in the corresponding table column. Conditions entered in more fields are evaluated at the same time. An empty field does not limit the table.

The *User* field is a combo box of profiles (user names) to whom the spooled files belong. Selecting a user name limits the table to spooled files belonging to this user.

*Double click* on a selected row displays the *single* spooled file *directly* in a separate window (see [Displaying files](#) above).

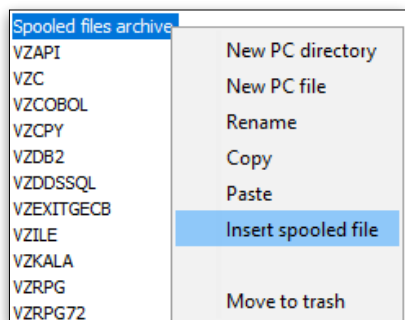
To further work with spooled files you can select *one* or *multiple* table rows by *left mouse click*. Contiguous rows are selected holding the *Shift* key, non-contiguous rows are selected holding the *Ctrl* key (*Cmd* in macOS). If you *right click* on the selected rows, the following menu with three commands will show:

QPJOBLOG	104	4	QPRTJOB	QSYS	1170414	000023	QUSRSYS/QEZJOBLOG	
QPJOBLOG	105	7	QPRTJOB	QSYS	1170414	000025	QUSRSYS/QEZJOBLOG	
QPJOBLOG	20	14	QPRTJOB	VZUPKA	1170414	094333	QUSRSYS/QEZJOBLOG	
QPJOBLOG	106	4	QPRTJOB	QSYS	1170415	000031	QUSRSYS/QEZJOBLOG	
QPJOBLOG	107	7	QPRTJOB	QSYS	1170415	000033	QUSRSYS/QEZJOBLOG	
VEKDS04	21	8	QPRTJOB	VZUPKA	033626	1170415	072849	QGPL/QPRINT

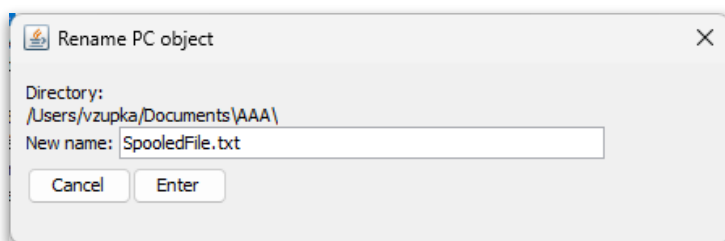
<i>Display</i>	display selected spooled files
<i>Copy</i>	copy spooled file (one or the last from selected)
<i>Delete</i>	delete selected spooled files

Commands *Display* and *Copy* write the spooled file text into an internal file *SpooledFile.txt* in directory *workfiles*. The *Display* command also displays the text in a separate window (see [Displaying files](#) above).

The internal file can be copied under the same or another name into a PC directory of choice so that it can be further manipulated (e. g. printed or sent by e-mail). Select command *Insert spooled file* from the menu under a PC directory node in the left tree:



A dialog prompting for a file name is shown:



After changing or leaving the name and pressing the Enter key the file is written to the directory.