

# zCOBOL

## User Guide

v1.5.00



Automated Software Tools Corporation.

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## Getting Started

So you want to try compiling and executing some COBOL programs on Windows using zCOBOL. First go to [www.z390.org](http://www.z390.org) and download and install z390 version v1.5.00 or later. Also install [J2SE java runtime version 6 update 12](#) which is the latest version which zCOBOL release 1 was regression tested on. Both installs use InstallShield for Windows. There are also file image install options available for Linux users. Be sure you uninstall any old versions of J2SE such as 1.4.2 or 5.0 as they may conflict with the later 6.0+ required version.

Now you should have a z390 desktop icon which you can double click to start the z390 GUI Interface. And now you can compile, link, and execute your first zCOBOL program by entering the following [zCOBOL command](#):

```
zc390clg zcobol\demo\HELLO
```

The above command uses the zCOBOL to HLASM compile, link, and execute command to compile the COBOL hello world program zcobol\demo\HELLO.CBL into an executable HLASM compatible assembler program zcobol\demo\HELLO.MLC which is assembled using zCOBOL macro libraries zcobol+zcobol\z390 and linked into z390 executable load module HELLO.390 which is then executed to generate WTO display of "Hello World" on the GUI display log and on the console log file HELLO.LOG.

To run all the [zCOBOL demo programs](#), you can enter the command zcrt390 which will compile and execute them. You can then view the log file for each demo program to see the output produced. For more examples, you can also run all the [zCOBOL regression tests](#) using the command ZCRTTEST and look at the source code and generated output.

## Running your program

You can compile, link, and execute a COBOL program in any directory by specifying the path and name of the program in the ZC390CLG command. The source COBOL program must be in ASCII format and have the suffix CBL. You can use the compiler command ZC390C to compile to relocatable object form, and the compiler command ZC390CL to compile and link to 390 load module form with statically linked z390 and/or zCOBOL programs included. Once the programs have been successfully linked, then you can use the z390 EXEC command to execute a load module. For more about all the options available for z390 executable programs visit [www.z390.org](http://www.z390.org) and read the [z390 user guide](#).

## zCOBOL Demo Programs in zcobol\demo

HELLO	Display "Hello World" and STOP RUN
DATETI ME	ACCEPT current date and time and display month, day of week, and year
COPYFIL E	Read line sequential ASCII file and copy it to an output line sequential file
POWERS	Calculate and display powers of 2 up to 2**31

## zCOBOL Regression Tests in zcobol\test

TESTASM4.MLC	Assembler module statically linked with TESTCAL3.CBL
TESTCAL1	CALL TESTCAL2 statically linked
TESTCAL2	CALL TESTCAL3 dynamically
TESTCAL3	Dynamically loaded zCOBOL module which calls statically linked TESTASM4 assembler routine
TESTCMP1	ADD, SUBTRACT, MULTIPLY, and DIVIDE all formats
TESTCPY1	COPY
TESTCPY2	nested COPY
TESTDSP1	DISPLAY all formats
TESTFUN1	ACCEPT, TRANSFORM, NUMERIC, etc.
TESTGO1	GO TO DEPENDING ON
TESTIF1	Compound IF requiring use of intermediate T/F flags
TESTISP1	INSPECT TALLYING, REPLACING, TRANSFORMING
TESTMOV1	MOVE all formats
TESTPM1	PERFORM VARYING and PERFORM TIMES
TESTSIX1	Multiple subscripts
TESTTRC1	TRUNC
TESTTRC2	NOTRUNC with ONSIZE
TESTTRC3	TRUNC and NOR64 to test use of DXR versus DSG
TESTWS1	Working storage REDEFINE and OCCURS with padding

## zCOBOL Compiler Errors

The first release of zCOBOL distributed as part of z390 v1.5.00 will be presented at [SHARE session 8194](#) Tuesday, March 3, 2009. zCOBOL is an open source project and is expected to continue to evolve for many years to come. There are still a number of missing functions in zCOBOL, and until such time as zCOBOL successfully passes the [NIST ANSI COBOL 1985 Test Suite](#), zCOBOL should be considered to still be in a beta test state. Once zCOBOL gets beyond the NIST tests, zCOBOL will continue to add extensions and enhancements based on user requests including COBOL 2002 standard features along with other requests to support different dialect options provided by [IBM](#), [Micro Focus](#), [Open COBOL](#), [Veryant](#), and other COBOL compiler providers. The current list of pending fixes and enhancements for upcoming z390 and zCOBOL are [here](#). You can use this [online form](#) to submit new fix and enhancement requests. All users of zCOBOL are encouraged to join the [zcobol user group](#) where users can ask questions and get answers and suggestions from developers and other users. COBOL, Java, C, and assembler developers interested in joining the zCOBOL open source project and helping with the development are welcome.

## Debugging your program

Once you have successfully compiled a COBOL program into a z390 load module, you can run it with the command EXEC filename. If the program aborts or fails to produce the expected results, the next step is to debug the problem. The zCOBOL option TRACE can be specified to generate a WTO display of the name of each COBOL paragraph when it is entered. Sometimes that along with listing of the program is enough to figure out why the program did not work.

If it is necessary to examine the generated HLASM compatible assembler code, there are several steps that can be taken:

- First the assembly listing with suffix PRN produced by the zCOBOL compiler command can be examined to see if the generated assembler instructions perform the correct operation specified in the COBOL statement which precedes the generated code as a comment statement. See zcobol\demo\HELLO.PRN as an example. If the generated code is simply wrong, submit an [RPI](#) to get it fixed, and if you choose, you can assist by going to the code generation macro, changing it, testing it, and submitting a suggested fix along with the RPI.
- Next an execution trace of every assembler instruction executed along with the data values associated with each instruction can be produced by adding the option TRACE(E) which results in file with TRE suffix. If you also specify TRACE option, the WTO for every paragraph will also appear in the TRE trace file which can be handy for finding the start of code in a particular paragraph. For example, if you run the command ZC390CLG zcobol\demo \POWERS TRACE(E) then you can view the resulting executing trace file zcobol\demo\POWERS.TRE as well as the log file zcobol\demo\POWERS.LOG.
- If the execution trace fails to pinpoint the problem, another option is to include debug test and display statements in the program to further isolate where the problem is occurring.
- If it appears that a specific instruction is not performing the expected operation, the z390 pz390.java source code for that instruction can be examined and if necessary, [eclipse](#) can be used to step through each java instruction within the z390 instruction in question. But that's complicated so first you might want to create a cut down sample program with the problem and post it on the [zcobol user group](#) email list to get a quicker resolution to the problem.
- If you have suggestions on how to improve and/or extend this initial list of debugging aides, please post them on the user group or send an email to [Don Higgins](#).

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## Credits

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Z390 version :