

Enterprise COBOL for z/OS  
6.4

*Customization Guide*



**Note**

Before using this information and the product it supports, be sure to read the general information under [“Notices” on page 91](#).

**Seventh edition (28 April 2026 update)**

This edition applies to Version 6.4 of IBM® Enterprise COBOL for z/OS® (program number 5655-EC6) and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure that you are using the correct edition for the level of the product.

You can view or download softcopy publications free of charge in the [Enterprise COBOL for z/OS library](#). Because Enterprise COBOL for z/OS supports the continuous delivery (CD) model and publications are updated to document the features delivered under the CD model, it is a good idea to check for updates once every two months.

It is our intention to update the product documentation for this release periodically, without updating the order number. If you need to uniquely refer to the version of your product documentation, refer to the order number with the date of update.

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# Preface

## About this information

This information is intended for systems programmers who are responsible for customizing IBM Enterprise COBOL for z/OS for their location. It provides information needed to plan for and customize Enterprise COBOL under z/OS. This information can also help you assess the value of Enterprise COBOL to your organization.

In this information, the generic term "operating system" is used to refer to z/OS.

To use this information, and ensure successful customization, you should have a knowledge of Enterprise COBOL and of your system's operating environment.

## How to read the syntax diagrams

This section describes how to read the syntax diagrams in this information.

- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following table shows the meaning of symbols at the beginning and end of syntax diagram lines.

Symbol	Indicates
▶—	The syntax diagram starts here
—▶	The syntax diagram is continued on the next line
▶—	The syntax diagram is continued from the previous line
—▶▶	The syntax diagram ends here

Diagrams of syntactical units other than complete statements start with the ▶— symbol and end with the —▶ symbol.

- Required items appear on the horizontal line (the main path).

▶ STATEMENT — required item ▶▶

- Optional items appear below the main path.

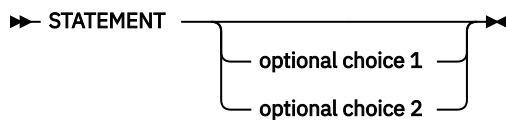
▶ STATEMENT — optional item ▶▶

- When you can choose from two or more items, they appear vertically in a stack.

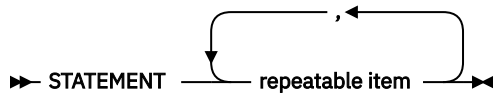
If you *must* choose one of the items, one item of the stack appears on the main path. The default, if any, appears above the main path and is chosen by the IGYCOPT macro if you do not specify another choice. In some cases, the default is affected by the system in which the program is being run.

▶ STATEMENT — default-item — required choice 1 — required choice 2 — ▶▶

If choosing one of the items is optional, the entire stack appears below the main path.



- An arrow returning to the left above the main line indicates an item that can be repeated.



A repeat arrow above a stack indicates that you can make more than one choice from the stacked items, or repeat a single choice.

- Keywords appear in uppercase letters (for example, PRINT). They must be spelled exactly as shown. Variables appear in an italic font (for example, *item*). They represent user-supplied names or values.
- If punctuation marks, parentheses, arithmetic operators, or such symbols are shown, they must be entered as part of the syntax.
- Use at least one blank or comma to separate parameters.

For a description of the meaning of the asterisk (\*) in syntax diagrams, and for further information, see [“Compiler options syntax and descriptions” on page 13.](#)

## How to use examples

This information shows numerous examples of sample COBOL statements, program fragments, and small programs to illustrate the coding techniques being described. The examples of program code are written in lowercase, uppercase, or mixed case to demonstrate that you can write your programs in any of these ways.

To more clearly separate some examples from the explanatory text, they are presented in a monospace font.

COBOL keywords and compiler options that appear in text are generally shown in SMALL UPPERCASE. Other terms such as program variable names are sometimes shown in *an italic font* for clarity.

If you copy and paste examples from the PDF format documentation, make sure that the spaces in the examples (if any) are in place; you might need to manually add some missing spaces to ensure that COBOL source text aligns to the required columns per the COBOL reference format in the *Enterprise COBOL Language Reference*. Alternatively, you can copy and paste examples from the HTML format documentation and the spaces should be already in place.

## Using the macro planning worksheets

The planning worksheets in this information ([“IGYCDOPT worksheet for compiler options” on page 2](#)) will help you prepare to customize Enterprise COBOL. By completing the worksheets, you will be able to easily identify those values that you want to change from the IBM-supplied defaults. You might then want to use the worksheets as a source from which to customize the IBM-supplied default values.

The headings in each worksheet differ somewhat from each other. See the following list of definitions for an explanation of the column headings in the worksheet for compiler options.

### Compiler option

The options contained within a specific installation macro. This column represents the options exactly as they are in the macro.

### Enter \* for fixed

The options that cannot be overridden by an application programmer. Enter an asterisk (\*) only for those options that you want to be fixed.

**Enter selection**

The value associated with each option. In the space provided, enter the value that you want to assign to each option. To assist you in selecting the appropriate value, see the reference in the **Syntax description** column.

**IBM-supplied default**

The value that is supplied for the specified installation macro if the option is not altered. If the IBM-supplied default is the value that you want, you do not need to modify that option within that specific macro.

**Syntax description**

The topic that contains the syntax diagram and more specific information about the given option.

After you have completed the worksheets, identify those options that are different from the IBM-supplied defaults. These are the items that you must code in the installation macros. The worksheet entries are positioned such that the order of the entries is consistent with the actual coding semantics.

## Summary of changes

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This section lists the key changes that have been made to this document since Enterprise COBOL for z/OS 6.4.

For a complete list of new and improved features in Enterprise COBOL for z/OS 6.4 and COBOL 6.4 with PTFs installed, see *What is new in Enterprise COBOL for z/OS 6.4 and COBOL 6.4 with PTFs installed in the Enterprise COBOL for z/OS What's New*.

## Enterprise COBOL for z/OS 6.4

### Compiler option changes

- The following compiler option is new:
  - SMARTBIN: Use SMARTBIN to instruct the compiler to generate modules containing additional binary metadata that enables them to be optimized by IBM Automatic Binary Optimizer (ABO) for z/OS 2.2. ([“SMARTBIN” on page 60](#))
  - PH50296: CONDCOMP: The new CONDCOMP option is introduced to control how conditional code will be displayed in the listing. ([CONDCOMP](#))
- The following compiler options are modified:
  - ARCH: ARCH=8 and ARCH=9 are no longer accepted. A new higher level of ARCH=14 is accepted. ARCH=10 is the default. ([“ARCH” on page 17](#))
  - TUNE: TUNE=8 and TUNE=9 are no longer accepted. A new higher level of TUNE=14 is accepted. TUNE=10 is the default if ARCH is not specified. ([“TUNE” on page 71](#))

## How to send your comments

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Your feedback is important in helping us to provide accurate, high-quality information. If you have comments about this information or any other Enterprise COBOL documentation, send your comments to: [compilers@ibm.com](mailto:compilers@ibm.com).

Be sure to include the name of the document, the publication number, the version of Enterprise COBOL, and, if applicable, the specific location (for example, the page number or section heading) of the text that you are commenting on.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way that IBM believes appropriate without incurring any obligation to you.



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# Chapter 1. Planning to customize Enterprise COBOL

When you plan the customization of Enterprise COBOL, you need to consider whether to modify compiler-option default values and whether to create an additional reserved-word table.

The following information helps you plan your customization:

- [“Making changes after installation: why customize?” on page 1](#)
- [“Planning to modify compiler option default values” on page 1](#)
- [“Planning to create an additional reserved word table” on page 7](#)
- [“Using product registration to enable or disable Enterprise COBOL” on page 9](#)

If you're installing IBM Debug for z/OS (formerly IBM Debug for z Systems® and IBM Debug Tool for z/OS), you can decide whether to place its modules in shared storage, and whether to set up your CICS® environment to work with the debugger.

For the actual customization procedures, see [Chapter 3, “Customizing Enterprise COBOL,” on page 81](#).

This information also contains worksheets to help you plan modifications to the IBM-supplied default values within macros. For an explanation about the planning sheets, see [“Using the macro planning worksheets” on page xii](#).

**Important:** Confer with the application programmers at your site while you plan the customization of Enterprise COBOL. Doing so will ensure that the modifications you make serve their needs and support the applications being developed.

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## Making changes after installation: why customize?

When you install Enterprise COBOL, you receive IBM-supplied defaults for compiler options, and for the reserved word table. You might want to customize Enterprise COBOL to better suit the needs of application programmers at your site.

After you install Enterprise COBOL, you can:

- Modify the default values of compiler options: see [“Planning to modify compiler option default values” on page 1](#).
- Make compiler options fixed: see [“Overriding compiler options that are fixed” on page 7](#).
- Create additional reserved word tables: see [“Planning to create an additional reserved word table” on page 7](#).

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## Planning to modify compiler option default values

IBM provides a default setting for each compiler option. You can accept the IBM-supplied compiler option values when you install Enterprise COBOL, or you can modify them to better suit the needs of programmers at your location. You can also choose whether your application programmers will have the ability to override an option default (meaning the option default is not fixed) or will be restricted from overriding an option default (meaning the option default is fixed). The IGYCDOPT program lets you set and fix the defaults for the compiler options.

Compiler option defaults is set in the IGYCDOPT program.

IGYCDOPT is link-edited with AMODE 31 and RMODE ANY during installation.

For compiler option defaults set in the IGYCDOPT program, see [Table 1 on page 3](#).

When you assemble COBOL customization parts, such as IGYCDOPT, you need access to a system MACLIB. Typically, the MACLIB is found in SYS1.MACLIB. You also need access to the COBOL MACLIB IGY.V6R3M0.SIGYMAC.

**Note:** The high-level qualifier IGY.V6R3M0 might have been changed when Enterprise COBOL was installed.

## Modifying compiler options

IBM provides a default setting for each compiler option which can be modified to better suit your needs at your location.

The compiler options and their defaults are described in [“IGYCDOPT worksheet for compiler options” on page 2](#). Review these options and their default values to determine the values that are most suitable for your applications.

If you plan to modify the values for compiler options, use the following IGYCOPT syntax format.

**Note:** Prefacing an option's value with an asterisk will set that option's value as "fixed", meaning that it cannot be overridden at compile time, unless special steps are taken to do so. See [“Overriding compiler options that are fixed” on page 7](#) for more information on how options whose defaults are set as fixed can be overridden later at compiler time if needed.

### IGYCOPT format

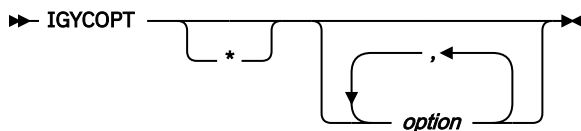


Figure 1. Syntax format for IGYCOPT compiler options macro

## IGYCDOPT worksheet for compiler options

The IGYCDOPT worksheet will help you plan and set the compiler options portion in the IGYCDOPT program.

The IBM-supplied default values are shown in the "IBM-supplied default" column. The default is also visible following the syntax diagram by clicking on the option in the "Syntax description" column. For more information about the syntax diagrams, see [“How to read the syntax diagrams” on page xi](#).

To complete the worksheet, fill in the "Enter \* for fixed" and the "Enter selection" columns.

### Note:

- Coding the asterisk [ \* ] when you modify a compiler option default value indicates that the option is to be fixed and cannot be overridden by an application programmer. An attempt to override a fixed option at compile time will result in a diagnostic message with a nonzero compiler return code. For special circumstances where a compiler option value that you chose to set as fixed needs to be overridden by an application programmer, see [“Overriding compiler options that are fixed” on page 7](#).
- The ALOWCBL, DBCSXREF, and NUMCLS options cannot be overridden at compile time. Therefore, the "Enter \* for fixed" worksheet entries for these options are blank.
- The IBM-supplied default value for ADEXIT, INEXIT, LIBEXIT, MSGEXIT, and PRTEXTIT is null. Therefore, the "IBM-supplied default" entries for these options are blank.
- The DUMP compiler option cannot be set through the IGYCDOPT program. Unless changed at compile time, DUMP is always set to NODUMP.
- The OPTFILE compiler option cannot be set through the IGYCDOPT program.

Table 1. IGYCDOPT worksheet for options.

This table explains IGYCDOPT worksheet for options.

Compiler option	Enter * for fixed	Enter selection	IBM-supplied default	Syntax description
ADATA=	----	-----	<u>NO</u>	<u>“ADATA” on page 13</u>
ADEXIT=	----	-----		<u>“ADEXIT” on page 14</u>
ADV=	----	-----	<u>YES</u>	<u>“ADV” on page 14</u>
AFP=	----	-----	<u>NOVOLATILE</u>	<u>“AFP” on page 15</u>
ALLOWCBL=	----	-----	<u>YES</u>	<u>“ALLOWCBL” on page 15</u>
ALLOWCOPYLOC=	----	-----	<u>YES</u>	<u>“ALLOWCOPYLOC” on page 16</u>
ALLOWDEFINE=	----	-----	<u>YES</u>	<u>“ALLOWDEFINE ” on page 16</u>
ARCH=	----	-----	<u>8</u>	<u>“ARCH” on page 17</u>
ARITH=	----	-----	<u>COMPAT</u>	<u>“ARITH” on page 18</u>
AWO=	----	-----	<u>NO</u>	<u>“AWO” on page 19</u>
BLOCK0=	----	-----	<u>NO</u>	<u>“BLOCK0” on page 19</u>
BUF=	----	-----	<u>4K</u>	<u>“BUF” on page 20</u>
CICS=	----	-----	<u>NO</u>	<u>“CICS” on page 20</u>
CODEPAGE=	----	-----	<u>1140</u>	<u>“CODEPAGE” on page 21</u>
COMPILE=	----	-----	<u>NOC(S)</u>	<u>“COMPILE” on page 21</u>
CONDCOMP=	----	-----	<u>NOSKIPSRC</u>	<u>“CONDCOMP” on page 22</u>
COPYRIGHT=	----	-----	<u>NO</u>	<u>“COPYRIGHT” on page 22</u>
CURRENCY=	----	-----	<u>NO</u>	<u>“CURRENCY” on page 22</u>
DATA=	----	-----	<u>31</u>	<u>“DATA” on page 23</u>
DBCS=	----	-----	<u>Yes</u>	<u>“DBCS” on page 24</u>
DBCSXREF=	----	-----	<u>NO</u>	<u>“DBCSXREF” on page 25</u>
DECK=	----	-----	<u>NO</u>	<u>“DECK” on page 26</u>
DIAGTRUNC=	----	-----	<u>NO</u>	<u>“DIAGTRUNC” on page 26</u>
DISPSIGN=	----	-----	<u>COMPAT</u>	<u>“DISPSIGN” on page 26</u>
DLL=	----	-----	<u>NO</u>	<u>“DLL” on page 27</u>
DYNAM=	----	-----	<u>NO</u>	<u>“DYNAM” on page 28</u>
EXPORTALL=	----	-----	<u>NO</u>	<u>“EXPORTALL” on page 28</u>
FASTSRT=	----	-----	<u>NO</u>	<u>“FASTSRT” on page 29</u>
FLAG=	----	-----	<u>(I,I)</u>	<u>“FLAG” on page 29</u>
FLAGSTD=	----	-----	<u>NO</u>	<u>“FLAGSTD” on page 30</u>
HGPR=	----	-----	<u>PRESERVE</u>	<u>“HGPR” on page 32</u>
INEXIT=	----	-----		<u>“INEXIT” on page 32</u>

Table 1. IGYCDOPT worksheet for options.

This table explains IGYCDOPT worksheet for options.

(continued)

Compiler option	Enter * for fixed	Enter selection	IBM-supplied default	Syntax description
INITCHECK=	----	-----	<u>NO</u>	<a href="#">“INITCHECK” on page 33</a>
INITIAL=	----	-----	<u>NO</u>	<a href="#">“INITIAL” on page 34</a>
INLINE=	----	-----	<u>YES</u>	<a href="#">“INLINE” on page 34</a>
INTDATE=	----	-----	<u>ANSI</u>	<a href="#">“INTDATE” on page 35</a>
INVDATA=	----	-----	<u>NO</u>	<a href="#">“INVDATA” on page 36</a>
LANGUAGE=	----	-----	<u>EN</u>	<a href="#">“LANGUAGE” on page 39</a>
LIBEXIT=	----	-----		<a href="#">“LIBEXIT” on page 40</a>
LINECNT=	----	-----	<u>60</u>	<a href="#">“LINECNT” on page 40</a>
LIST=	----	-----	<u>NO</u>	<a href="#">“LIST” on page 41</a>
LITCHAR=	----	-----	<u>QUOTE</u>	<a href="#">“LITCHAR” on page 41</a>
LP=	----	-----	<u>32</u>	<a href="#">LP</a>
LSACHECK	----	-----	<u>NO</u>	<a href="#">“LSACHECK” on page 42</a>
MAP=	----	-----	<u>NO</u>	<a href="#">“MAP” on page 43</a>
MAXPCF=	----	-----	<u>100000</u>	<a href="#">“MAXPCF” on page 43</a>
MDECK=	----	-----	<u>NO</u>	<a href="#">“MDECK” on page 44</a>
MSGEXIT=	----	-----		<a href="#">“MSGEXIT” on page 45</a>
NAME=	----	-----	<u>NO</u>	<a href="#">“NAME” on page 45</a>
NSYMBOL=	----	-----	<u>NATIONAL</u>	<a href="#">“NSYMBOL” on page 46</a>
NUM=	----	-----	<u>NO</u>	<a href="#">“NUM” on page 46</a>
NUMCHECK=	----	-----	<u>(NO)</u>	<a href="#">“NUMCHECK” on page 46</a>
NUMCLS=	----	-----	<u>PRIM</u>	<a href="#">“NUMCLS” on page 50</a>
NUMPROC=	----	-----	<u>NOPFD</u>	<a href="#">“NUMPROC” on page 51</a>
OBJECT=	----	-----	<u>YES</u>	<a href="#">“OBJECT” on page 51</a>
OFFSET=	----	-----	<u>NO</u>	<a href="#">“OFFSET” on page 52</a>
OPTIMIZE=	----	-----	<u>0</u>	<a href="#">“OPTIMIZE” on page 52</a>
OUTDD=	----	-----	<u>SYSOUT</u>	<a href="#">“OUTDD” on page 53</a>
PARMCHECK=	----	-----	<u>(NO)</u>	<a href="#">“PARMCHECK” on page 53</a>
PGMNAME=	----	-----	<u>COMPAT</u>	<a href="#">“PGMNAME” on page 54</a>
PRTEXIT=	----	-----		<a href="#">“PRTEXIT” on page 55</a>
QUALIFY=	----	-----	<u>COMPAT</u>	<a href="#">“QUALIFY” on page 55</a>
RENT=	----	-----	<u>YES</u>	<a href="#">“RENT” on page 56</a>
RMODE=	----	-----	<u>AUTO</u>	<a href="#">“RMODE” on page 56</a>

Table 1. IGYCDOPT worksheet for options.

This table explains IGYCDOPT worksheet for options.

(continued)

Compiler option	Enter * for fixed	Enter selection	IBM-supplied default	Syntax description
RULES=	----	-----	<u>(NO)</u>	<a href="#">“RULES” on page 58</a>
SEQ=	----	-----	<u>YES</u>	<a href="#">“SEQ” on page 59</a>
SERVICE=	----	-----	<u>NO</u>	<a href="#">“SERVICE” on page 60</a>
SOURCE=	----	-----	<u>YES</u>	<a href="#">“SOURCE” on page 61</a>
SPACE=	----	-----	<u>1</u>	<a href="#">“SPACE” on page 62</a>
SQL=	----	-----	<u>NO</u>	<a href="#">“SQL” on page 62</a>
SQLCCSID=	----	-----	<u>YES</u>	<a href="#">“SQLCCSID” on page 63</a>
SQLIMS=	----	-----	<u>NO</u>	<a href="#">“SQLIMS” on page 63</a>
SSRANGE=	----	-----	<u>NO</u>	<a href="#">“SSRANGE” on page 64</a>
STGOPT=	----	-----	<u>NO</u>	<a href="#">“STGOPT” on page 65</a>
SUPPRESS=	----	-----	<u>YES</u>	<a href="#">“SUPPRESS” on page 65</a>
TERM=	----	-----	<u>NO</u>	<a href="#">“TERM” on page 66</a>
TEST=	----	-----	<u>(NO, NODWARF)</u>	<a href="#">“TEST” on page 66</a>
THREAD=	----	-----	<u>NO</u>	<a href="#">“THREAD” on page 68</a>
TRUNC=	----	-----	<u>STD</u>	<a href="#">“TRUNC” on page 70</a>
TUNE=	----	-----	<u>8, if ARCH is not specified. The default TUNE level must match the ARCH level if ARCH is specified.</u>	<a href="#">“TUNE” on page 71</a>
VBREF=	----	-----	<u>NO</u>	<a href="#">“VBREF” on page 72</a>
VLR=	----	-----	<u>STANDARD</u>	<a href="#">“VLR” on page 72</a>
VSAMOPENFS=	----	-----	<u>COMPAT</u>	<a href="#">“VSAMOPENFS” on page 75</a>
WORD=	----	-----	<u>NO</u>	<a href="#">“WORD” on page 75</a>
XMLPARSE=	----	-----	<u>XMLSS</u>	<a href="#">“XMLPARSE” on page 77</a>
XREFOPT=	----	-----	<u>FULL</u>	<a href="#">“XREFOPT” on page 77</a>
ZWB=	----	-----	<u>YES</u>	<a href="#">“ZWB” on page 79</a>

## Sample installation jobs to modify IGYCDOPT compiler option defaults

Enterprise COBOL provides two sample installation jobs that you can modify and then use to change the defaults for compiler options. The first sample job, IGYWDOPT, provides an example of how to change the IBM-supplied defaults for compilers. This job then uses SMP/E to install the newly built compiler option default module, IGYCDOPT, into SIGYCOMP. The second sample job, IGYWUOPT, provides an example of how to override compiler options that have been fixed. This job will place the newly built compiler

option default module, IGYCDOPT, into an application execution data set, that can then be included in the application's STEPLIB DD in the compile JCL. These jobs are located in the COBOL sample data set IGY.V6R3M0.SIGYSAMP.

## IGYWDOPT

This sample installation job can be used to change the IBM-supplied compiler option defaults. It will create a new IGYCDOPT module and then apply it into SIGYCOMP using SMP/E. If SMP/E is used to install the COBOL compiler, then use this sample installation job to change the IBM-supplied compiler option defaults.

If IGYWDOPT is being run for the first time, complete the following steps:

1. Change the job card to meet your system requirements.
2. Change these items:
  - #globalcsi (Make it the CSI name of the installation site)
  - #tzone (Make it the TARGET ZONE name of the installation site)
3. Copy member SIGYSAMP(IGYCDOPT) into SIGYSAMP(IGYWDOPT) in place of the comment lines following the ++ SRC statement in step DOPT.
4. Modify the IGYCDOPT text that was just copied in so that it contains the list of compiler options that need to be overridden. For example:

```
COPY IGYCDOPT
  IGYCDOPT CSECT
  IGYCDOPT AMODE ANY
  IGYCDOPT RMODE ANY
  IGYCOPT ARCH=10, X
  OPTIMIZE=*2, X
  NUMCHECK=(ZON,PAC,BIN,MSG), X
  INVDATA=NO
END IGYCDOPT
```

Use the continuation "X" in column 72 as needed.

5. Run IGYWDOPT to receive and apply the usermod to create a customized version of MOD(IGYCDOPT).
6. **Important:** Save a copy of the modified SIGYSAMP(IGYWDOPT) for future reference.

**CAUTION:** Do not ACCEPT the usermod! Accepting the usermod makes it impossible to RESTORE it later in SMP/E when needed.

If MOD(IGYCDOPT) is being changed by an IBM PTF and requires a rerun of the SIGYSAMP(IGYWDOPT) job, complete the following steps:

1. RESTORE the usermod created by the IGYWDOPT job. This is done via the SMP/E command RESTORE SELECT (IGYWDOP). Doing this will restore MOD(IGYCDOPT) back to the previous IBM PTF level, which will then allow the new IBM PTF to apply properly.
2. Apply the IBM PTF.
3. Change the rework date by changing the REWORK parameter on the ++ USERMOD statement to the date the changes are being made.
4. Add the proper "PRE()" statement after the "FMID()" statement. This is typically the PTF number that was just applied. See the [technote](#) to determine what PRE statement to add if an error occurs.
5. Using the SIGYSAMP(IGYWDOPT) backup member as a reference and referring to any options that may have been added or modified in SIGYMAC(IGYCOPT), update IGYWDOPT so that it contains the list of compiler options that need to be overridden.
6. Rerun IGYWDOPT to receive and apply the usermod to recreate a customized version of MOD(IGYCDOPT).
7. **Important:** Save off a copy of the modified SIGYSAMP(IGYWDOPT) for future reference.

IGYWDOPT should run with a condition code of 0.

Check the IGYNNNN informational messages in the ASSEMBLER SYSPRINT data set to verify the options that will be in effect when the new IGYCDOPT module is used.

### **IGYWUOPT**

This sample installation job can be used to change the IBM-supplied compiler option defaults. If SMP/E is not used to install the COBOL compiler, which is a rare case, then this sample installation job can be used to change the IBM-supplied defaults and copy the new IGYCDOPT module into SIGYCOMP. This job can also be used to create an IGYCDOPT compiler option default module that can be placed into an application execution data set and then referenced by the application in the STEPLIB DD in the compile JCL. In this way, compiler option defaults in SIGYCOMP (IGYCDOPT) that are fixed and cannot normally be overridden can be overridden.

## **Overriding compiler options that are fixed**

At installation time, the IGYCDOPT program (sample jobs SIGYSAMP(IGYWD OPT & IGYWUOPT) can be used to specify that a compiler option is fixed and cannot be changed or overridden at compile time. This means that at compile time, an attempt to override the fixed option will result in a diagnostic message with a nonzero compiler return code.

However, there may be special conditions that require the ability to override a fixed option. For example, if OPT=2 is fixed at the installation level (indicating that you always want the COBOL compiler to generate optimized object code), and you have an immediate need to compile without optimization, then you would need a way to override the fixed OPT=2 option, so that OPT=0 could be used instead.

This change can be made by assembling a temporary copy of the IGYCDOPT program to contain a (non-fixed) default for the compiler option and then placing that copy of IGYCDOPT into an application's data set. At compile time, programmers can then use a JOBLIB or STEPLIB to point to the data set that contains the modified IGYCDOPT module to bypass the fixed compiler option.

The sample job, SIGYSAMP(IGYWUOPT) can be used to accomplish this task. Carefully follow the instructions in the comments in SIGYSAMP(IGYWUOPT) to tailor that sample job.

### **Note:**

- //SYSLMOD should point to the application data set where the new IGYCDOPT module will reside.
- If SIGYSAMP(IGYWD OPT) was used at installation time to set the defaults, it is recommended to copy the compiler option overrides from that job into SIGYSAMP(IGYWUOPT) and then change the desired option to the new default. In this way, the application will retain all the installation defaults, except the one they chose to alter.

## **Planning to create an additional reserved word table**

---

The following sections describe why you might want to create additional reserved word tables, explain how you can restrict the use of nested programs by modifying a reserved word table, and list the reserved word tables supplied with Enterprise COBOL.

You can create additional reserved word tables after installation. During compilation, the value of the WORD compiler option determines which reserved word table is used.

## **Why create additional reserved word tables?**

This section describes the benefits of creating additional reserved word tables.

You can create additional reserved word tables to:

- Translate the reserved words into another language, such as French or German.
- Prevent application programmers from using a particular Enterprise COBOL instruction, such as GO TO.
- Control the usage of nested programs.
- Flag words that are not supported under CICS, such as READ and WRITE.

## Controlling use of nested programs

To restrict the use of nested programs without restricting any other COBOL language features, modify the reserved word table.

Do this by using the INFO and RSTR control statements. For instructions on how to make these modifications, see [“Creating or modifying a reserved word table”](#) on page 84.

## Reserved word tables supplied with Enterprise COBOL

Enterprise COBOL provides reserved word tables on the installation medium.

The reserved word tables are:

- Default reserved word table
- CICS reserved word table

### Default reserved word table (IGYCRWT)

About the default reserved word table provided for your entire facility, see *Reserved words* in the *Enterprise COBOL Language Reference*.

### CICS reserved word table (IGYCCICS)

Enterprise COBOL provides an alternate reserved word table for CICS application programs so that COBOL words that are not supported under CICS are flagged by the compiler.

The CICS reserved word table is the same as the default reserved word table except that the following COBOL words are marked as restricted (RSTR):

- CLOSE
- DELETE<sup>3</sup>
- FACTORY
- FD
- FILE<sup>1</sup>
- FILE-CONTROL<sup>1</sup>
- INPUT-OUTPUT<sup>1</sup>
- INVOKE
- I-O-CONTROL
- MERGE
- METHOD
- OBJECT
- OPEN
- READ
- RERUN
- REWRITE
- SD<sup>1, 2</sup>
- SELF
- START
- SUPER
- WRITE

#### Notes:

1. If you intend to use the SORT statement under CICS (COBOL supports an interface for the SORT statement under CICS), you must change the CICS reserved-word table to remove the words from the list of words marked as restricted.
2. The SORT keyword is not restricted, but the SD keyword is. This allows you to use the format 2 (table) sort statement but not the format 1 (file) sort statement.
3. If you restrict the DELETE keyword, you may still use the DELETE function of BASIS processing.

### **Using the table**

To use the CICS reserved word table, you must specify the WORD(CICS) compiler option.

To have the CICS reserved word table used as the default, you must set the default value of the WORD compiler option to WORD=CICS.

### **Location of the table**

The data used to create the CICS reserved word table is in member IGY8CICS in IGY.V6R3M0.SIGYSAMP.

**Note:** The high-level qualifier IGY.V6R3M0 might have been changed when Enterprise COBOL was installed.

## **Using product registration to enable or disable Enterprise COBOL**

---

The default behavior for Enterprise COBOL V6 is to run on every z/OS system, but you can use the IFAPRDxx member of SYSx.PARMLIB to disable COBOL V6 from running on selected z/OS systems.

If you want to disable COBOL V6, add the following code to the active IFAPRDxx member:

```
PRODUCT OWNER('IBM CORP')
NAME('ENTERPRISE COBOL')
ID(5655-EC6)
VERSION(06) RELEASE(*) MOD(*)
FEATURENAME(*)
STATE(DISABLED)
```

In this case, the compiler stops with RC=16 and a write-to-operator message.

If you want to explicitly enable COBOL V6, add the following code to the active IFAPRDxx member:

```
PRODUCT OWNER('IBM CORP')
NAME('ENTERPRISE COBOL')
ID(5655-EC6)
VERSION(06) RELEASE(*) MOD(*)
FEATURENAME(*)
STATE(ENABLED)
```

However, because COBOL V6 is enabled by default, you don't have to explicitly enable COBOL V6 by adding the previous statements to the active IFAPRDxx member.



---

## Chapter 2. Enterprise COBOL compiler options

This information describes the compiler options whose default values can be changed.

The notes that accompany some of the descriptions provide additional information about these options, such as how they interact with other options during compilation.

This information might help you to make decisions about which default values are appropriate for your installation.

For more information about the compiler options, see *Compiler options* in the *Enterprise COBOL Programming Guide*.

### Important:

Confer with the application programmers at your site while you plan the customization of Enterprise COBOL. Doing so will ensure that the modifications you make serve their needs and support the applications that are being developed.

---

## Specifying COBOL compiler options

When you specify compiler options in the IGYCOPT macro, be sure to follow the assembler syntax described in the subsequent sections. This assembler syntax is not the same as the option syntax used with the compiler itself.

Always assemble your IGYCOPT macro source with the \*.SIGYMAC library of the compiler for which you are preparing the default options. This will ensure that the resulting options module is consistent with the expectations of the compiler, for example when options are added or withdrawn.

---

## Conflicting compiler options

If you specify certain compiler option values, a conflict with other compiler options might result. This topic describes possible conflicts between compiler options.

Compiler option	Conflicts with:
AFP=VOLATILE	LP=64
CICS=YES	DYNAM=YES LP=64 RENT=NO
DATA=24	LP=64
DBCS=NO	NSYMBOL=NATIONAL
DBCSXREF=(other than NO)	XREFOPT=NO
DLL=NO	EXPORTALL=YES
DLL=YES	DYNAM=YES RENT=NO

Table 2. Conflicting compiler options (continued)

Compiler option	Conflicts with:
DYNAM=YES	CICS=YES DLL=YES EXPORTALL=YES
EXPORTALL=YES	DLL=NO DYNAM=YES RENT=NO
FLAGSTD=(other than NO)	WORD=xxxx
HGPR=NOPRESERVE	LP=64
LIST=YES	OFFSET=YES
LP=64	AFP=VOLATILE CICS=YES DATA=24 HGPR=NOPRESERVE RENT=NO RMODE=24 SMARTBIN=YES SQLIMS=YES THREAD=YES
NSYMBOL=NATIONAL	DBCS=NO
OBJECT=NO	TEST=(other than NO)
OFFSET=YES	LIST=YES
RENT=NO	CICS=YES DLL=YES EXPORTALL=YES LP=64 THREAD=YES
RMODE=24	LP=64
SMARTBIN=YES	LP=64
SQLIMS=YES	LP=64
THREAD=YES	INITIAL=YES LP=64 RENT=NO
WORD=xxxx	FLAGSTD=(other than NO)
XREFOPT=NO	DBCSXREF=(other than NO)

## Compiler options for standards conformance

---

Several compiler options are required to conform with the 85 COBOL Standard.

For details, see *Option settings for 85 COBOL Standard conformance* in the *Enterprise COBOL Programming Guide*.

## Compiler options syntax and descriptions

---

The syntax diagrams in the following topics describe each modifiable compiler option. The text after each diagram describes the effect of selecting a specific parameter.

### Note:

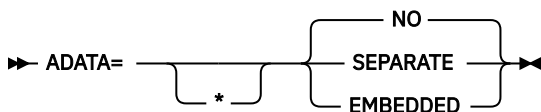
- The DUMP option is not in this list. Unless you change DUMP at compile time, it is always set to NODUMP. This option is not for general use; it is used only at the request of an IBM representative.
- The OPTFILE option is not in this list. It can be specified only as a compiler invocation PARM option, or in a PROCESS or CBL statement in the COBOL source program.
- Coding the asterisk (\*) when you modify a compiler option default value indicates that the option is to be fixed and cannot be overridden by an application programmer.

## ADATA

---

Use ADATA to specify whether the compiler generates an Associate Data file or embeds the Associated Data as binary metadata in the module.

### Syntax



### Default

ADATA=NO

### NO

Does not generate records of additional compilation information to be stored in a SYSADATA file or to be embedded in the object program.

### SEPARATE

Records of additional compilation information are written to the specified SYSADATA file.

### EMBEDDED

Records of additional compilation information are written into a NOLOAD section of the object program as binary metadata.

### Note:

- The Associated Data file contains sufficient information to reconstruct the original source code. When you specify ADATA (EMBEDDED), the generated module provides access to this information.
- The ADATA option can be specified only at invocation either through the option list, on the PARM field of JCL, as a command option, or as an installation default.
- Selection of the Japanese language option might result in DBCS characters being written to the Associated Data file.
- Specification of NOCOMPILE(W|E|S) might stop compilation prematurely, resulting in a loss of specific Associated Data records.
- If the INEXIT option is specified, the compilation source module is not identified in the SYSADATA (Associated Data) information.

## Runtime consideration

When you specify `ADATA (EMBEDDED)`, `ADATA` is embedded in the program object, which increases the object size and requires additional space. However, the system does not load this data at run time, so it does not affect performance.

## ADEXIT

---

`ADEXIT` designates a module to be called for each record that is written to the `SYSADATA` file.

### Syntax

➔ `ADEXIT=` 

### Default

No exit is specified. Equivalent to specifying the `NOADEXIT` suboption of the `EXIT` compiler option. If `ADEXIT=*` is coded without the `name` parameter, `NOADEXIT` cannot be overridden.

### name

Identifies a module to be used with the `EXIT` compiler option. If the suboption for this user exit is specified, the compiler loads the named module and calls it for each record that is written to the `SYSADATA` file.

For more information about the `EXIT` compiler option, see *EXIT compiler option* in the *Enterprise COBOL Programming Guide*.

## ADV

---

`ADV` affects `WRITE ... ADVANCING` statements, determining whether one byte is added to the record length for the printer control character.

### Syntax

➔ `ADV=` 

### Default

`ADV=YES`

### YES

Adds one byte to the record length for the printer control character. This option might be useful to programmers who use `WRITE ... ADVANCING` in their source files. The first character of the record does *not* have to be explicitly reserved by the programmer.

### NO

Does not adjust the record length for `WRITE ... ADVANCING`. The compiler uses the first character of the specified record area to place the printer control character. The application programmer must ensure that the record description allows for this additional byte.

### Note:

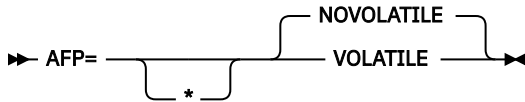
- With `ADV=YES`, the record length on the physical device is one byte larger than the record description length in the source program.
- If the record length for the output file is not defined in the source code, COBOL ensures that the DCB parameters are appropriately set.
- If `ADV=YES` is specified, and the record length for the output file has been defined in the source code, the programmer *must* specify the record description length as one byte larger than the source program record description. The programmer *must* also specify the block size in correct multiples of the larger record size.

- If the LINAGE clause is specified in a file description (FD), the compiler treats that file as if ADV=YES has been specified.

## AFP

The AFP option controls the compiler usage of the Additional Floating Point (AFP) registers that are provided by IBM z/Architecture processors.

### Syntax



The Enterprise COBOL compiler generates code that uses the full complement of 16 floating point registers (FPR) provided by an IBM z/Architecture processor. These FPRs are as follows:

- Original FPRs, which are numbered 0, 2, 4, and 6
- AFP registers, which are numbered 1, 3, 5, 7, and 8-15

### Default

AFP=NOVOLATILE

### VOLATILE

If you specify AFP=VOLATILE, the AFP registers 8-15 are considered volatile, which means that they might be changed by a called subprogram. Therefore, the COBOL compiler generates additional code to protect the values in these registers.

### NOVOLATILE

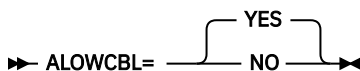
If you specify AFP=NOVOLATILE, the AFP registers 8-15 are considered nonvolatile, which means that they are known to be unchanged or preserved by every called subprogram. Therefore, the compiler can generate more efficient code sequences for programs with floating point operations. It is the normal z/OS architecture convention.

**AMODE 64 considerations:** When the LP=64 compiler option is in effect, the AFP=VOLATILE option is not supported. If the option is specified explicitly by the user, an informational message is issued and the setting is ignored.

## ALOWCBL

ALOWCBL affects whether PROCESS (or CBL) statements can be used in COBOL programs.

### Syntax



### Default

ALOWCBL=YES

### YES

Allows the use of the PROCESS (or CBL) statements in COBOL programs.

### NO

Diagnoses the use of PROCESS (or CBL) statements in a program as an error.

### Note:

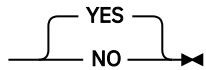
- ALOWCBL cannot be overridden at compile time because it cannot be included in the PROCESS (or CBL) statement.
- The PROCESS (or CBL) statement specifies compiler-option parameters within source programs. If your installation requirements do not allow compiler options to be specified in a source program, specify ALOWCBL=NO.

## ALLOWCOPYLOC

---

ALLOWCOPYLOC affects whether COPYLOC options can be used when compiling COBOL programs.

### Syntax

►► ALLOWCOPYLOC= 

### Default

ALLOWCOPYLOC=YES

### YES

Allows the specification of COPYLOC options when compiling COBOL programs.

### NO

Diagnoses the specification of any COPYLOC options as an error.

### Note:

- ALLOWCOPYLOC cannot be overridden at compile time because it cannot be included in the PROCESS (or CBL) statement.
- If your installation requirements do not allow COPYLOC compiler options to be specified in a source program, specify ALLOWCOPYLOC=NO.

### Related references

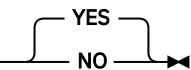
COPYLOC (*Enterprise COBOL Programming Guide*)

## ALLOWDEFINE

---

ALLOWDEFINE affects whether DEFINE options can be used when compiling COBOL programs.

### Syntax

►► ALLOWDEFINE = 

### Default

ALLOWDEFINE=YES

### YES

Allows the specification of DEFINE options when compiling COBOL programs.

### NO

Diagnoses the specification of any DEFINE options as an error.

### Note:

- ALLOWDEFINE cannot be overridden at compile time because it cannot be included in the PROCESS (or CBL) statement.
- If your installation requirements do not allow DEFINE compiler options to be specified in a source program, specify ALLOWDEFINE=NO.

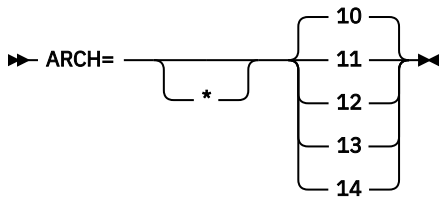
### Related references

DEFINE (*Enterprise COBOL Programming Guide*)

# ARCH

The ARCH option specifies the machine architecture for which the executable program instructions are to be generated.

## Syntax



If you specify a higher ARCH level, the compiler generates code that uses newer and faster instructions. Your application might abend if it runs on a processor with an architecture level lower than what you specify with the ARCH option. Use the ARCH level that matches the lowest machine architecture where your application runs.

Current supported architecture levels and groups of models are as follows:

## Default

ARCH=10

## 10

Produces code that uses instructions available on the 2827-xxx (IBM zEnterprise® EC12) and 2828-xxx (IBM zEnterprise BC12) models in z/Architecture mode.

Specifically, these ARCH=10 machines and their follow-ons add instructions supported by the following facilities:

- Execution-hint facility
- Load-and-trap facility
- Miscellaneous-instructions-extension facility
- Transactional-execution facility
- Enhanced decimal floating point facility that enables more efficient conversions between zoned decimal data items and decimal floating point data items. Instead of converting zoned decimal data items to packed decimal data items to perform arithmetic when conditions permit it and the optimization level is greater than 0, the compiler converts zoned decimal data items directly to decimal floating point data items, and then back again to zoned decimal data items after the computations are complete.

## 11

Produces code that uses instructions available on 2964-xxx (IBM z13®) and 2965-xxx (IBM z13s®) models in z/Architecture mode.

Specifically, these ARCH=11 machines and their follow-ons add instructions with support of the following facilities:

- Enhanced decimal floating point facility that enables more efficient conversions between packed-decimal data items and decimal floating point intermediate result data items when the surrounding conditions are optimal and the optimization level is greater than 0.
- Exploitation of the vector extension facility (SIMD) instructions for some INSPECT REPLACING and INSPECT TALLYING statements.

To use the vector extension facility (SIMD) instructions, the code must be executed on a machine running on z/OS V2.2, or z/OS V2.1 with the PTFs for APARs OA43803 and PI12412 installed.

## 12

Produces code that uses instructions available on 3906-xxx (IBM z14) and 3907-xxx (IBM z14 ZR1) models in z/Architecture mode.

Specifically, these ARCH=12 machines and their follow-ons add instructions that support the vector packed-decimal facility, which accelerates packed and zoned decimal computation by storing intermediate results in vector registers instead of in memory.

### 13

Produces code that uses instructions available on the 8561-xxx (IBM z15) and 8562-xxx (IBM z15 T02) models in z/Architecture mode.

Specifically, these ARCH=13 machines and their follow-ons add instructions supported by the following facilities:

- Vector packed-decimal enhancement facility
- Vector-enhancements facility 2
- Miscellaneous instruction-extensions-facility 3
- Aligned vector load/store hints

### 14

Produces code that uses instructions available on the 3931-xxxx (IBM z16) model in IBM z/Architecture mode.

Specifically, this ARCH=14 machine and its follow-ons add instructions supported by the new Vector Packed Decimal Enhancement Facility 2. This new facility adds performance improvements for COBOL programs that contain one or more of the following types of statements:

- Exponentiation operations on packed or zoned decimal data items where the exponent is declared with one or more fractional digits
- Arithmetic statements involving mixed decimal and floating-point data items
- Statements using numeric-edited data items

**Note:** A higher ARCH level includes the facilities of the lower ARCH levels. For example, ARCH=14 includes all the facilities of the lower ARCH levels.

For more information about these facilities, see *z/Architecture Principles of Operation*.

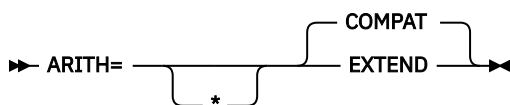
Use the ARCH option with the TUNE option. For more information about the interaction between ARCH and TUNE, see [“TUNE” on page 71](#).

## ARITH

---

ARITH affects the maximum number of digits that can be coded for integers, and the number of digits used in fixed-point intermediate results.

### Syntax



### Default

ARITH=COMPAT

### COMPAT

Specifies 18 digits as the maximum precision for decimal data.

### EXTEND

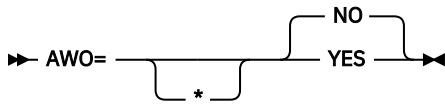
Specifies 31 digits as the maximum precision for decimal data.

## AWO

---

AWO affects whether the APPLY-WRITE-ONLY clause is activated for physical-sequential files that have variable blocked format.

### Syntax



### Default

AWO=NO

### YES

Activates the APPLY-WRITE-ONLY clause for any file within the program that is physical sequential with variable block format regardless of whether or not the APPLY-WRITE-ONLY clause is specified in the program.

**Performance consideration:** Using AWO=YES generally results in fewer calls to Data Management Services for runtime files when handling input and output.

### NO

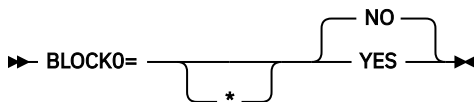
Does not activate the APPLY-WRITE-ONLY clause for any file within the program that is physical sequential with variable block format unless the APPLY-WRITE-ONLY clause is specified in the program.

## BLOCK0

---

BLOCK0 affects whether the default blocking specification for QSAM files is changed from unblocked to blocked.

### Syntax



### Default

BLOCK0=NO

### YES

Changes the default blocking specification for QSAM files that specify neither BLOCK CONTAINS nor RECORDING MODE U in the file description entry. BLOCK0=YES activates the BLOCK CONTAINS 0 clause for such files, causing them to have a system-determined block size at run time.

**Performance consideration:** Using BLOCK0=YES could result in enhanced processing speed and minimized storage requirements for QSAM output files. But see the following recommendation.

### NO

Does not activate the BLOCK CONTAINS 0 clause by default for any file.

**Recommendation:** Adding a BLOCK CONTAINS 0 clause to file descriptions in existing programs could result in a change of behavior in those programs, including some undesirable effects for files opened as INPUT. For this reason, it is recommended that BLOCK0=YES not be set as an installation default.

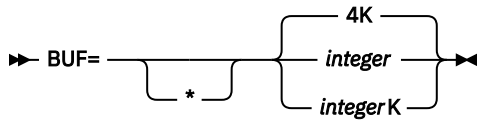
For further details, see *BLOCK0* in the *Enterprise COBOL Programming Guide*.

## BUF

---

BUF specifies the amount of dynamic storage to be used during compilation.

### Syntax



### Default

BUF=4K

### integer

Specifies the amount of dynamic storage, in bytes, to be allocated to each compiler work file buffer. The minimum value is 256 bytes.

**Performance consideration:** Using a high buffer size usually improves the performance of the compiler.

### integerK

Specifies the amount of dynamic storage to be allocated to buffers in increments of 1K (1024) bytes.

### Note:

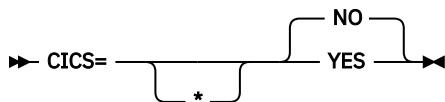
- BUF cannot exceed the track capacity for the device used, nor can it exceed the maximum allowed by data management services.

## CICS

---

CICS affects whether a COBOL source program that contains CICS statements is to be processed by the integrated CICS translator.

### Syntax



### Default

CICS=NO

### YES

If a COBOL source program contains CICS statements and has not been preprocessed by the CICS translator, the YES option must be specified.

### NO

When the NO option is specified, any CICS statements that are found in the source program are diagnosed and discarded.

### Note:

- The CICS compiler option can contain CICS suboptions. The CICS suboptions delimiters can be quotation marks or apostrophes. CICS suboptions cannot be specified as a COBOL installation default.
- You can specify the CICS compiler option in any of the compiler option sources: installation defaults, compiler invocation, or PROCESS (CBL) statements.
- When the LP(64) compiler option is in effect, the CICS option is not supported. A diagnostic message is emitted if the option is explicitly specified by the user.

## CODEPAGE

CODEPAGE affects the coded character set identifier (CCSID) for an EBCDIC code page for processing compile-time and runtime COBOL operations that are sensitive to character encoding.

### Syntax

➔ CODEPAGE=  ccsid ➔

### Default

CODEPAGE=1140

### ccsid

Specifies a valid coded character set identifier (CCSID) integer that identifies an EBCDIC code page.

The default CCSID 1140 is the equivalent of CCSID 37 (EBCDIC Latin-1, USA), but additionally includes the euro symbol.

**Recommendation:** To avoid unnecessary conversions and associated performance overhead on systems that use both COBOL and Db2, use the same CODEPAGE compiler option setting as in your Db2 subsystem parameters and application programming defaults (specify in DSNHDECP).

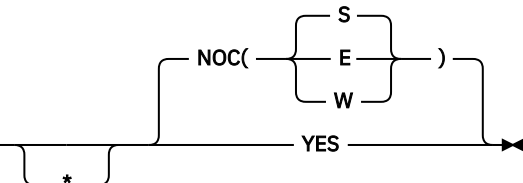
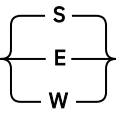
**Note:** If you specify the TEST option, you must set the CODEPAGE option to the CCSID that is used for the COBOL source program. In particular, programs that use Japanese characters in DBCS literals or DBCS user-defined words must be compiled with the CODEPAGE option set to a Japanese codepage CCSID.

For further details, see *CODEPAGE* in the *Enterprise COBOL Programming Guide*.

## COMPILE

COMPILE determines whether compilation continues if diagnostic messages of a specified severity occur.

### Syntax

➔ COMPILE=  NOC(  ) YES ➔

### Default

COMPILE=NOC(S)

### NOC

Indicates that you want only a syntax check.

### NOC(W)

### NOC(E)

### NOC(S)

Specifies an error message level: W is warning; E is error; S is severe. When an error of the level specified or of a more severe level occurs, compilation stops, and only syntax checking is done for the balance of the compilation.

### YES

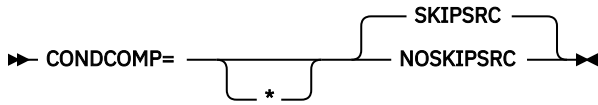
Indicates that you want full compilation, including diagnostics and object code.

Specifying NOCOMPILE might affect the Associated Data file by stopping compilation prematurely, resulting in loss of specific messages.

## CONDCOMP

CONDCOMP affects the behavior of conditional compilation directives and controls how conditional code will be displayed in the listing.

### Syntax



### Default

CONDCOMP=NOSKIPSRC

### NOSKIPSRC

If CONDCOMP=NOSKIPSRC is in effect, all source code and comments bounded by conditional compilation directives will be displayed in the listing. Sources lines in false branches of conditional code will be displayed as comments in the listing.

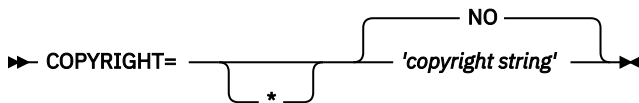
### SKIPSRC

If CONDCOMP=SKIPSRC is in effect, some source code and comments bounded by conditional compilation directives will be omitted from the listing. Sources lines and comments in false branches of conditional code will be omitted from the listing.

## COPYRIGHT

Use COPYRIGHT to place a string in the object module if the object module is generated. If the object is linked into a program object, the string is loaded into memory with this program object.

### Syntax



### Default

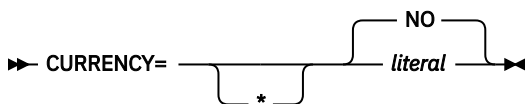
COPYRIGHT=NO

The *copyright string* is limited to 64 characters in length.

## CURRENCY

CURRENCY determines whether an alternate currency symbol will be used; the default is dollar sign (\$).

### Syntax



### Default

CURRENCY=NO

### *literal*

Represents the default currency symbol that you want to use in your program.

The literal must be an alphanumeric literal (optionally a hexadecimal literal) representing a 1-byte EBCDIC character that must not be any of the following items:

- Digits zero (0) through nine (9)
- Uppercase alphabetic characters: A B C D P R S V X Z
- Lowercase alphabetic characters a through z

- The space
- Special characters: \* + - / , . ; ( ) = "
- Uppercase alphabetic character G, if the COBOL program defines a DBCS item with the PICTURE symbol G. The PICTURE clause will not be valid for that DBCS item because the symbol G is considered to be a currency symbol in the PICTURE clause.
- Uppercase alphabetic character N, if the COBOL program defines a DBCS item with the PICTURE symbol N. The PICTURE clause will not be valid for that DBCS item because the symbol N is considered to be a currency symbol in the PICTURE clause.
- Uppercase alphabetic character E, if the COBOL program defines an external floating-point item. The PICTURE clause will not be valid for the external floating-point item because the symbol E is considered to be a currency symbol in the PICTURE clause.

The literal (including hex literal) syntax rules are as follows:

- The literal delimiters can be either quotation marks or apostrophes regardless of whether the APOST or QUOTE option is in effect.
- When an apostrophe (') is to be the currency sign, the embedded apostrophe must be doubled, that is, two apostrophes must be coded to represent one apostrophe within the literal. For example:

```
'''' OI ''''
```

- The format for a hex literal specification is as follows:

```
X'H1H2' OI X"H1H2"
```

where H1H2 is a valid hexadecimal value representing a 1-byte EBCDIC character conforming to the rules for the currency sign literal as described above. Alphabetic characters in the hex literal must be in uppercase.

**Note:** Hex values of X'20' or X'21' are not allowed.

## NO

Indicates that no alternate default currency sign is provided through the CURRENCY option, and the dollar sign will be used as the default currency sign for the program if the CURRENCY option is not specified at compile time.

The value NO provides the same results for the source program as omitting the CURRENCY SIGN clause in the COBOL source program.

### Note:

- You can use the CURRENCY option as an alternative to the CURRENCY SIGN clause (which is specified in the COBOL source program) for selecting the currency symbol that you use in the PICTURE clause of your COBOL program.
- When both the CURRENCY option and the CURRENCY SIGN clause are used in a program, the symbol that is specified in the CURRENCY SIGN clause is the currency symbol in a PICTURE clause when that symbol is used, even if the CURRENCY option is fixed (\*).

## DATA

DATA affects whether storage for dynamic data areas and other dynamic runtime storage is obtained from beyond or under the 16 MB line.

### Syntax



**Default**

DATA=31

**24**

Causes allocation of user data areas in virtual addresses under 16 MB in storage acquired by a GETMAIN with the LOC=BELOW option.

Specify DATA=24 for programs compiled with the RENT option that are passing data parameters to programs in 24-bit mode. This includes the following cases:

- A COBOL program is passing items in its WORKING-STORAGE to an AMODE 24 program.
- A COBOL program is passing, by reference, data items received from its caller to an AMODE 24 program. DATA=24 is required even when the data received is under the 16 MB line.

Otherwise, the data might not be addressable by the called program.

DATA does not affect the location of LOCAL-STORAGE data; the STACK runtime option controls that location instead, along with the AMODE of the program.

**31**

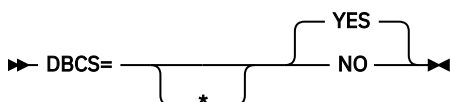
Causes allocation of user data areas, such as WORKING-STORAGE and FD record areas, from unrestricted storage or in space acquired by a GETMAIN with the LOC=ANY option. Specifying this option can result in storage being acquired in virtual addresses either beyond or under the 16 MB line. The operating system generally satisfies the request with space in virtual addresses beyond the 16 MB line, if it is available.

**Note:**

- If a program is compiled with the RENT option, the DATA option controls how space for WORKING-STORAGE and parameter lists is acquired.
- The DATA option has no effect on programs compiled with the NORENT option.
- The DATA option is ignored when LP(64) is in effect. If the user explicitly specifies the DATA option, an informational message is issued.
- The LOCAL-STORAGE section is allocated from stack storage, which is managed by Language Environment. LE allocates stack storage beyond the 2 GB bar in a 64-bit enclave.

## DBCS

DBCS affects whether the compiler recognizes X'0E' and X'0F' in an alphanumeric literal and treats them as shift-out and shift-in control characters for delimiting DBCS data.

**Syntax****Default**

DBCS=YES

**YES**

Recognizes X'0E' and X'0F' in an alphanumeric literal and treats them as shift-out and shift-in control characters for delimiting DBCS data.

**NO**

Does not recognize X'0E' and X'0F' as shift-out and shift-in control characters in an alphanumeric literal.

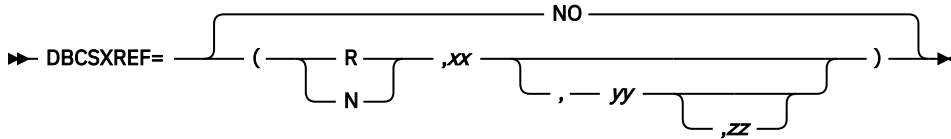
**Note:**

- The presence of DBCS data inside the alphanumeric literal might cause the compiler to disallow certain uses of that literal. For example, DBCS characters are not allowed as program names or DDNAMES.
- DBCS=NO conflicts with NSYMBOL(NATIONAL).

## DBCSXREF

DBCSXREF indicates that an ordering program is to be used for cross-referencing of DBCS names.

### Syntax



### Default

DBCSXREF=NO

### R

Specifies that the DBCS Ordering Support Program (DBCSOS) is loaded into the user region.

### N

Specifies that the DBCS Ordering Support Program (DBCSOS) is loaded into a shared system area such as the MLPA.

### xx

Names a program object of the relevant ordering program to produce DBCS cross-references. It must be eight characters in length.

### yy

Names an ordering type. It must be two characters in length. The default ordering type defined by the specified ordering program occurs if this parameter is omitted.

### zz

Names the encode table that the specified ordering type uses. It must be eight characters in length. The default encode table that is associated with the particular ordering type occurs if this parameter is omitted.

### NO

Specifies that no ordering program is used for cross-reference of DBCS names. If the XREF phase is specified, a cross-reference listing of DBCS names is provided based on their physical order in the program.

### Note:

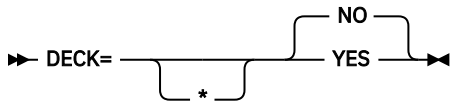
- The DBCS Ordering Support Program (DBCSOS) must be installed to specify anything other than DBCSXREF=NO.
- If R is specified, ensure that the user region is large enough to accommodate both the compiler and the ordering program.
- Specifying both XREFOPT=NO and DBCSXREF with an ordering program results in a nonzero return code while attempting to assemble the customization macro.
- The assembly process terminates when validation diagnoses:
  - A parameter length that is not valid
  - Characters other than 'R' and 'N'
  - Missing parameters after a comma
  - Missing yy when zz is specified

## DECK

---

DECK determines whether 80-column object-code records are produced in a file defined by the SYSPUNCH DD statement.

### Syntax



### Default

DECK=NO

### YES

Places the generated object code in a file defined by SYSPUNCH.

### NO

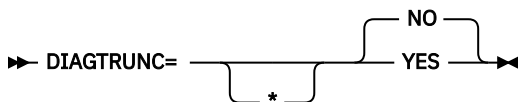
Sends no object code to SYSPUNCH.

## DIAGTRUNC

---

DIAGTRUNC affects whether the compiler issues a severity-4 (warning) diagnostic message for MOVE statements with numeric receivers when the receiving data item has fewer integer positions than the sending data item or literal.

### Syntax



### Default

DIAGTRUNC=NO

### YES

Causes the compiler to issue a severity-4 (warning) diagnostic message for MOVE statements with numeric receivers when the receiving data item has fewer integer positions than the sending data item or literal.

### NO

Does not cause the compiler to produce a severity-4 message.

### Note:

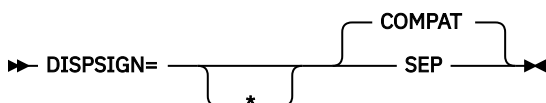
- The diagnostic message is also issued for moves to numeric receivers from alphanumeric data names or literal senders, except when the sending field is reference modified.
- There is no diagnostic message for COMP-5 receivers, nor for binary receivers when you specify the TRUNC(BIN) option.

## DISPSIGN

---

The DISPSIGN option controls output formatting for DISPLAY of signed numeric items.

### Syntax



### Default

DISPSIGN=COMPAT

## COMPAT

If you specify DISPSIGN=COMPAT, formatting for displayed values of signed numeric items is compatible with prior versions of Enterprise COBOL. Overpunch signs are generated in some cases.

## SEP

If you specify DISPSIGN=SEP, the displayed values for signed binary, signed packed-decimal, or overpunch signed zoned-decimal items are always formatted with a leading separate sign.

The following example shows the DISPLAY output with the DISPSIGN=COMPAT option or the DISPSIGN=SEP option specified:

*Table 3. DISPLAY output with the DISPSIGN=COMPAT option or the DISPSIGN=SEP option specified:*

Data items	DISPLAY output with the DISPSIGN=COMPAT option specified	DISPLAY output with the DISPSIGN=SEP option specified
Unsigned binary	111	111
Positive binary	111	+111
Negative binary	11J	-111
Unsigned packed-decimal	222	222
Positive packed-decimal	222	+222
Negative packed-decimal	22K	-222
Zoned-decimal unsigned	333	333
Zoned-decimal trailing positive	33C	+333
Zoned-decimal trailing negative	33L	-333
Zoned-decimal leading positive	C33	+333
Zoned-decimal leading negative	L33	-333

## DLL

DLL affects whether an object module generated by the compiler is enabled for dynamic link library (DLL) support.

### Syntax



### Default

DLL=NO

### YES

Generates an object module that is enabled for dynamic link library (DLL) support. DLL enablement is required if the program is part of a DLL, references DLLs, or contains object-oriented COBOL syntax (for example, INVOKE statements, or class definitions).

Specification of the DLL option requires that the NODYNAM option and RENT options are also used.

### NO

Generates an object module that is not enabled for DLL usage.

**Note:** When the LP(64) compiler option is in effect, the following cases occur:

- The DLL option is effectively ignored. Object files generated using LP(64) are DLL enabled. They can be linked as DLL or non-DLL.

- The EXPORTALL option is supported. Use this option to export symbols from programs when building DLLs.

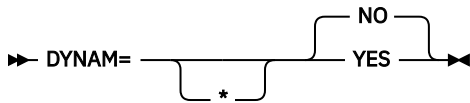
### Related references

CALLINTERFACE (*Enterprise COBOL Language Reference*)

## DYNAM

DYNAM affects whether the compiler dynamically loads subprograms that are invoked through the CALL *literal* statement.

### Syntax



### Default

DYNAM=NO

### YES

Dynamically loads subprograms that are invoked through the CALL *literal* statement.

**Performance consideration:** Using DYNAM=YES eases subprogram maintenance because the application is not relink-edited if the subprogram is changed. However, individual applications with CALL *literal* statements can experience some performance degradation due to a longer path length.

### NO

Includes, in the calling program, the text files of subprograms called with a CALL *literal* statement into a single program object.

### Note:

- The DYNAM option has no effect on the CALL *identifier* statement at compile time. The CALL *identifier* statement always compiles to a dynamic call.
- Do not specify DYNAM=YES for applications running under CICS.

For further details, see *DYNAM* in the *Enterprise COBOL Programming Guide*.

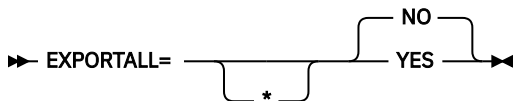
### Related references

CALLINTERFACE (*Enterprise COBOL Language Reference*)

## EXPORTALL

EXPORTALL affects whether the compiler automatically exports certain symbols when the object deck is link-edited to form a DLL.

### Syntax



### Default

EXPORTALL=NO

### YES

Automatically exports the program-name and alternate entry-point names when the object deck is link-edited to form a DLL.

Specification of EXPORTALL requires that the DLL, RENT, and NODYNAM options are also used.

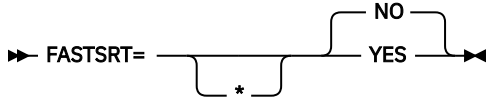
### NO

Does not export any symbols.

## FASTSRT

FASTSRT determines whether DFSORT or comparable product performs input and output for sort and merge, or whether they are performed by Enterprise COBOL. It applies only to sorting files by using the format 1 SORT statement.

### Syntax



### Default

FASTSRT=NO

### YES

Specifies that the IBM DFSORT licensed program or comparable product performs input and output when you use either the USING or GIVING option.

**Performance consideration:** Using FASTSRT=YES eliminates the overhead, in terms of CPU time usage, of returning to Enterprise COBOL after each record is processed. However, there are restrictions that you must follow if you choose to use this option. (For a detailed description of the restrictions, see *Improving sort performance with FASTSRT* in the *Enterprise COBOL Programming Guide*.)

### NO

Specifies that Enterprise COBOL does the input and output for the sort and merge.

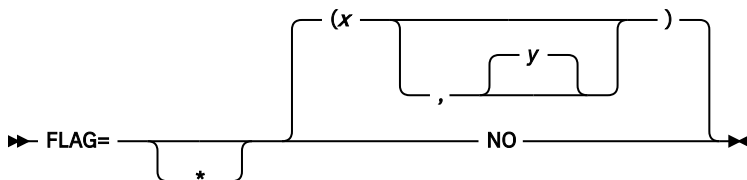
### Note:

- If FASTSRT is in effect at compile time, the compiler verifies that the FASTSRT interface can be used for all restrictions except these two:
  - A device other than a direct-access device must be used for sort work files.
  - The DCB parameter of the DD statement for the input file or output file must match the file description (FD) of the file.
- If FASTSRT cannot be used, the compiler generates a diagnostic message and prevents the sort program from performing I/O when using either the USING or GIVING options. Therefore, it might be to your advantage to specify YES as the default.

## FLAG

FLAG affects whether the compiler produces diagnostic messages at or beyond a specified severity level.

### Syntax



### Default

FLAG=(I,I)

**Note:** The second severity level used in this syntax must be equal to or higher than the first.

### x

I|W|E|S|U

Specifies that errors at or beyond the severity level specified are flagged and written at the end of the source listing.

ID	Type	Return code
I	Information	0
W	Warning	4
E	Error	8
S	Severe error	12
U	Unrecoverable error	16

**y**

I|W|E|S|U

The optional second severity level specifies the level of syntax messages embedded in the source listing in addition to being at the end of the listing.

**NO**

Indicates that no error messages are flagged.

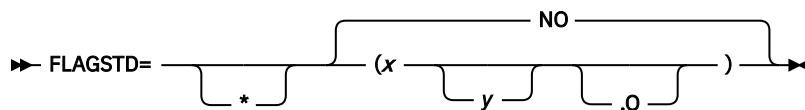
**Note:**

- If the messages are to be embedded, SOURCE must be specified at compile time. Embedded messages enhance productivity because they are placed after the referenced source statement.
- Specification of FLAG(W|E|S) might result in the loss of entire classes of messages from the Events records in the Associated Data (SYSADATA) file. For further details, see FLAG in the *Enterprise COBOL Programming Guide*.

## FLAGSTD

FLAGSTD affects the subset of the 85 COBOL Standard language elements that are regarded as conforming, and affects the flagging of informational messages about the language elements used.

**Syntax**



**Default**

FLAGSTD=NO

**x**

Can be M, I, or H to specify flagging for a FIPS COBOL subset or standard:

**M =**

ANS minimum subset of Standard COBOL

**I =**

ANS intermediate subset, composed of those additional intermediate subset language elements that are not part of the ANS minimum subset

**H =**

ANS high subset, composed of those additional high subset language elements that are not part of the ANS intermediate subset

**y**

Can be any one or two combinations of D, N, or S to further define the level of flagging produced:

**D**

Specifies ANS debug module level 1

**N**

Specifies ANS segmentation module level 1

**S**

Specifies ANS segmentation module level 2 (where S is a superset of N)

**O**

Specifies that obsolete elements occurring in any of the sets mentioned earlier are flagged

**NO**

Specifies that no FIPS flagging is to be done

**Note:**

- The following elements are flagged as nonconforming and nonstandard IBM extensions to the 85 COBOL Standard:

- Language syntax used by the COBOL automatic date-processing facilities
- Language syntax for object orientation and improved interoperability with Java™
- Use of the PGMNAME=LONGMIXED compiler option

For a complete list of nonconforming and nonstandard elements that is flagged, see *IBM extensions* in the *Enterprise COBOL Language Reference*.

- When FIPS flagging is specified, informational messages in the source program listing identify:
  - Whether the language element is obsolete, nonconforming standard, or nonconforming nonstandard (language elements that are both obsolete and nonconforming are flagged as obsolete only)
  - The clause, statement, or header containing the nonconforming or obsolete syntax
  - The source program line and an indication of the starting column within that line
  - The level or optional module to which the language element belongs
- FIPS flagging is suppressed when any error diagnosed as level E or higher occurs.
- Interaction of FLAGSTD and other compiler options:
  - If the following compiler options are explicitly or implicitly specified in a program, FLAGSTD=(other than NO) causes a compiler FIPS message to be issued :
    - ADV=NO
    - BLOCK0=YES
    - CICS=YES
    - DLL=YES
    - DYNAM=NO
    - EXPORTALL=YES
    - FASTSRT=YES
    - LITCHAR=APOST
    - NAME=NO
    - NUMPROC=PF
    - PGMNAME=LONGMIXED
    - QUALIFY=EXTEND
    - THREAD=YES
    - TRUNC=OPT or BIN
    - VLR=COMPAT
    - WORD=(other than NO or RWT)
    - INVDATA=(other than NO)
    - ZWB=NO
  - Specifying the following options together with FLAGSTD=(other than NO), while attempting to assemble the customization macro, results in a nonzero return code:

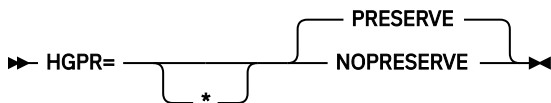
- ADV=NO
  - DBCS=YES
  - DYNAM=NO
  - LITCHAR=APOST
  - NUM=YES
  - NUMPROC=PFD
  - QUALIFY=EXTEND
  - SEQ=YES
  - TRUNC=OPT or BIN
  - VLR=COMPAT
  - WORD=(other than NO or RWT)
  - INVDATA=(other than NO)
  - ZWB=NO
- FLAGSTD might produce events records in the Associated Data file for FIPS standard conformation messages. Error messages are not guaranteed to be sequential with respect to source record numbers.

FLAGSTD messages can be converted into diagnostic messages, or suppressed. For details, see “MSGEXIT” on page 45.

## HGPR

The HGPR option controls the compiler usage of the 64-bit registers provided by z/Architecture processors.

### Syntax



Default is: HGPR=PRESERVE

The Enterprise COBOL compiler uses the 64-bit width of the z/Architecture General Purpose Registers (GPRs). HGPR stands for High-halves of 64-bit GPRs, which means the use of native 64-bit instructions.

### HGPR=PRESERVE

If you specify HGPR=PRESERVE, the compiler preserves the high halves of the 64-bit GPRs that a program is using, by saving them in the prolog for the function and restoring them in the epilog. The PRESERVE suboption is necessary only if the caller of the program is not Enterprise COBOL, Enterprise PL/I, or z/OS XL C/C++ compiler-generated code.

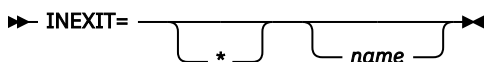
### HGPR=NOPRESERVE

If you specify HGPR=NOPRESERVE, the compiler omits preserving the high-halves of the 64-bit GPRs that a program is using, which improves performance.

## INEXIT

INEXIT designates a module to be called to obtain source statements instead of reading the SYSIN data set.

### Syntax



### Default

No exit is specified. Equivalent to specifying the NOINEXIT suboption of the EXIT compiler option. If INEXIT=\* is coded without the *name* parameter, NOINEXIT cannot be overridden.

### name

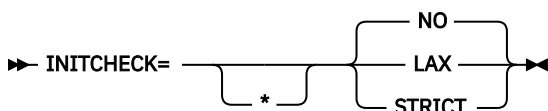
Identifies a module to be used with the EXIT compiler option. If the suboption for this user exit is specified, the compiler loads the named module and calls it to obtain source statements instead of reading the SYSIN data set. If the option is supplied, the SYSIN data set is not opened.

For more information about the EXIT compiler option, see *EXIT compiler option* in the *Enterprise COBOL Programming Guide*.

## INITCHECK

Use the INITCHECK option to have the compiler check for uninitialized data items and issue warning messages when they are used without being initialized.

### Syntax



### Default

INITCHECK=NO

### NO

The compiler will not issue any warning messages for uninitialized data items.

### LAX

The compiler will check for uninitialized data items and issue a warning message when a data item is used without being initialized. However, if a data item is initialized on at least one logical path to a statement, no warning message will be issued.

### STRICT

The compiler will still check for uninitialized data items and issue a warning message when a data item is used without being initialized. However, unlike INITCHECK=LAX, INITCHECK=STRICT will issue a warning message about uninitialized data for a data item used in a statement unless the data item is initialized on all logical paths to the statement.

Here is a sample program to illustrate the behavior differences between specifying INITCHECK=LAX versus INITCHECK=STRICT. Y and Z represent some data items, with no value clauses:

```
PROCEDURE DIVISION.  
IF Y > 5  
  MOVE 2 TO Z  
END-IF  
DISPLAY Z
```

Z is initialized on one path to the DISPLAY statement but not the other, so if INITCHECK=LAX is in effect, a warning message will be issued for Y only, while INITCHECK=STRICT will also issue a warning message for Z.

### Restrictions:

- The INITCHECK option analyzes data items in the WORKING-STORAGE SECTION and LOCAL-STORAGE SECTION only. In particular, it does not analyze data items in the LINKAGE SECTION or FILE SECTION.
- The INITCHECK analysis does not track external or global data items.
- The INITCHECK analysis does not track individual elements in tables independently. Instead, if one element of a table is initialized, all corresponding elements of the table are considered to be initialized. This applies to both fixed-length and variable-length tables.

- The INITCHECK analysis does not track the initialization of items if it happens through a pointer. For example, if a pointer to an uninitialized data item is created by using ADDRESS-OF, and that data item is initialized through that pointer, the INITCHECK analysis might also issue a warning message.
- For uninitialized data items being passed BY REFERENCE, no warning messages will be issued. However, the INITCHECK analysis will warn about uninitialized data items being passed BY CONTENT and BY VALUE.
- The INITCHECK option does not track individual bytes of reference-modified data items accurately. Instead, if a data item is accessed by using a reference modification, this data item is considered to be initialized.
- If a data item is in a group with other items that have had their address taken, for example, as the result of being an SQL host variable, then that data item will also be considered to have its address taken, and the set of all address taken data items is always considered to be set by any call to an external function.

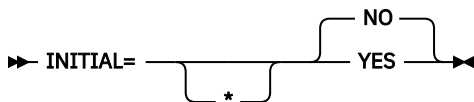
**Notes:**

- All of the INITCHECK analysis occur at compile time only.
- The INITCHECK option has no effect on the behavior or performance of the program after it has been compiled.
- Use of the INITCHECK option might increase compile time and memory consumption.
- The INITCHECK option reports and prints only the first uninitialized data item in a group. Subsequent data items that are also uninitialized will not be printed.
- INITCHECK is more accurate when used with OPT=1 or OPT=2, but it is also helpful when used with OPT=0.

## INITIAL

The INITIAL compiler option causes a program and all of its nested programs to behave as if the IS INITIAL clause was specified on the PROGRAM-ID paragraph.

**Syntax**



Default is: INITIAL=NO

**YES**

INITIAL=YES causes a program and all of its nested programs to behave as if the IS INITIAL clause was specified on the PROGRAM-ID paragraph.

**Note:** INITIAL=YES and the IS INITIAL clause have no effect on data items that do not have VALUE clauses.

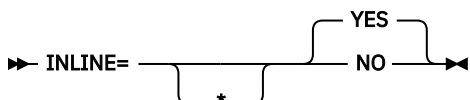
**NO**

INITIAL=NO will have no effect on programs that already have IS INITIAL on the PROGRAM-ID paragraph in the source.

## INLINE

The INLINE option controls whether the inlining of procedures (paragraphs or sections) referenced by PERFORM statements in the source program is allowed.

**Syntax**



Default is: `INLINE=YES`

## YES

If you specify `INLINE=YES`, when `OPTIMIZE(1)` or `OPTIMIZE(2)` is in effect, the compiler can inline procedures referenced by `PERFORM` statements in the source program. `INLINE` is a potential performance-boosting option. Note that `INLINE` was always in effect in COBOL 5.

## NO

If you specify `INLINE=NO`, the compiler is prevented from *inlining*<sup>1</sup> procedures referenced by `PERFORM` statements in the source program, regardless of the optimization level in effect. `INLINE=NO` should only be set as the default if a particular reason has been identified to eliminate all inlining of `PERFORM` statements in programs. This is rare and not recommended.

### Note:

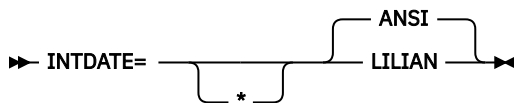
1. The word *inlining* here implies that the compiler might choose to replace the `PERFORM` of a procedure (paragraph or section) with a copy of that procedure's code. By inserting the procedure code at the location of the `PERFORM`, the compiler saves the overhead of branching logic to and from the procedure.

## INTDATE

---

`INTDATE` affects the starting date that is used for date intrinsic functions.

### Syntax



### Default

`INTDATE=ANSI`

### ANSI

Uses the ANSI COBOL Standard starting date for integer date format dates used with date intrinsic functions. Day 1 = Jan 1, 1601.

With `INTDATE(ANSI)`, the date intrinsic functions return the same results as in COBOL/370 Release 1.

### LILIAN

Uses the Language Environment Lilian starting date for integer date format dates used with date intrinsic functions. Day 1 = Oct 15, 1582.

With `INTDATE(LILIAN)`, the date intrinsic functions return results compatible with the Language Environment date callable services. These results are different from those in COBOL/370 Release 1.

### Note:

- When `INTDATE(LILIAN)` is in effect, `CEECBLDY` is not usable because you have no way to turn an ANSI integer into a meaningful date using either intrinsic functions or callable services. If you code a `CALL` literal statement with `CEECBLDY` as the target of the call with `INTDATE(LILIAN)` in effect, the compiler diagnoses this and converts the call target to `CEEDAYS`.
- If you set your installation option to `INTDATE(LILIAN)`, you should recompile all of your COBOL/370 Release 1 programs that use intrinsic functions to ensure that all of your code uses the lilian integer date standard. This method is the safest, because you can store integer dates, pass them between programs, and even pass them from PL/I to COBOL to C programs and have no problems.

## INVDATA

The INVDATA option tells the compiler whether the data in USAGE DISPLAY and PACKED-DECIMAL data items is valid, and if not, what the behavior of the compiler should be.

Because most users have valid data in their USAGE DISPLAY and USAGE PACKED-DECIMAL data items, they should use NOINVDATA, even if they use NUMPROC=NOPFD. Even if you find that your programs are processing invalid data at run time with the NUMCHECK compiler option, you should change your programs to avoid processing invalid data and use NOINVDATA.

**Note:** The goal of the INVDATA option is to provide a behavior that is as compatible as possible with the behavior of programs compiled with COBOL V4 or earlier versions in cases of invalid numeric data. When discrepancies are found, this option will be updated in favor of making the behavior more closely match the behavior of COBOL V4 or earlier versions.

When the INVDATA option is in effect, the compiler will avoid performing known optimizations that might produce a different result than COBOL V4 or earlier versions when a zoned decimal or packed decimal data item has invalid digits or an invalid sign code, or when a zoned decimal data item has invalid zone bits.

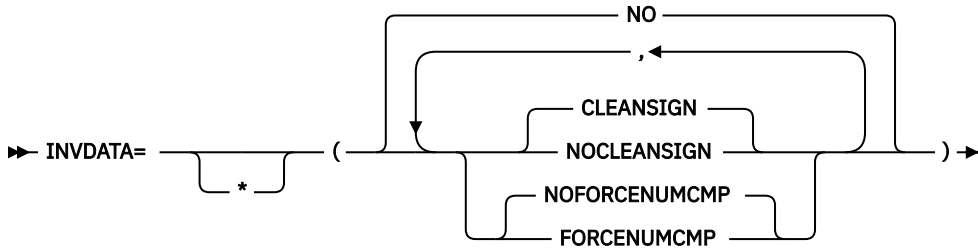
The following table provides a quick reference on how to set the INVDATA and NUMPROC options when migrating to COBOL V6.2 or later versions from earlier versions of COBOL, depending on the default value of the NUMPROC option that was used in the earlier version of COBOL and whether or not you have invalid data.

COBOL versions	Invalid data present?	NUMPROC/ZONEDATA used in COBOL V6.1 or earlier versions	INVDATA and NUMPROC settings in COBOL V6.2 or later versions
Pre-COBOL V5	No	NUMPROC=MIG	INVDATA=(NO),NUMPROC=NOPFD
Pre-COBOL V5	No	NUMPROC=NOPFD	INVDATA=(NO),NUMPROC=NOPFD
Pre-COBOL V5	No	NUMPROC=PFD	INVDATA=(NO),NUMPROC=PFD
Pre-COBOL V5	Yes	NUMPROC=MIG	INVDATA=(FORCENUMCMP, NOCLEANSIGN),NUMPROC=NOPFD
Pre-COBOL V5	Yes	NUMPROC=NOPFD	INVDATA=(NOFORCENUMCMP, CLEANSIGN),NUMPROC=NOPFD
Pre-COBOL V5	Yes	NUMPROC=PFD	INVDATA=(NOFORCENUMCMP, CLEANSIGN),NUMPROC=PFD
COBOL V5 or later	No	ZONEDATA=PFD	INVDATA=(NO)
COBOL V5 or later	Yes	ZONEDATA=NOPFD	INVDATA=(NOFORCENUMCMP, CLEANSIGN)
COBOL V5 or later	Yes	ZONEDATA=MIG	INVDATA=(FORCENUMCMP, CLEANSIGN) <sup>1</sup>

Table 4. Setting INVDATA and NUMPROC options when migrating from earlier COBOL versions (continued)

COBOL versions	Invalid data present?	NUMPROC/ZONEDATA used in COBOL V6.1 or earlier versions	INVDATA and NUMPROC settings in COBOL V6.2 or later versions
1. INVDATA=(FORCENUMCMP,NOCLEANSIGN) is a closer representation of the pre-COBOL V5 NUMPROC=MIG behavior than INVDATA=(FORCENUMCMP,CLEANSIGN) when invalid data is present. If you are not satisfied with the behavior of ZONEDATA=MIG in COBOL V5 or later versions when invalid data is present, then consider using INVDATA=(FORCENUMCMP,NOCLEANSIGN) to more closely mimic the pre-COBOL V5 NUMPROC=MIG behavior when invalid data is present.			

### Syntax



### Default

INVDATA=(NO)

Suboptions defaults are:

- If INVDATA is specified and neither FORCENUMCMP nor NOFORCENUMCMP is specified, default is NOFORCENUMCMP.
- If INVDATA is specified and neither CLEAN SIGN nor NOCLEANSIGN is specified, default is CLEAN SIGN.

### (NO)

When INVDATA=(NO) is in effect, the compiler assumes that all data in USAGE DISPLAY and PACKED-DECIMAL data items is valid, and generates the most efficient code possible. For example, the compiler might generate a string comparison to avoid numeric conversion.

### (FORCENUMCMP | NOFORCENUMCMP)

When INVDATA=(FORCENUMCMP) is in effect, the compiler generates instructions to do comparisons of zoned decimal data items that ignore the zone bits of each digit. For example, the zoned decimal value is converted to packed-decimal with a PACK instruction before the comparison.

When INVDATA=(NOFORCENUMCMP) is in effect, the compiler generates instructions for numeric comparisons or an alphanumeric comparison of zoned-decimal data in the same manner as COBOL V4 or earlier versions do when using NUMPROC=(NOPFD | PFD) with COBOL V4 or earlier versions:

- In the cases where COBOL V4 or earlier versions considered the zone bits, the compiler generates an alphanumeric comparison which will also consider the zone bits of each digit in zoned decimal data items. The zoned decimal value remains as zoned decimal.
- In the cases where COBOL V4 or earlier versions ignored the zone bits, the compiler generates numeric comparisons that ignore the zone bits of each digit in zoned decimal data items. The zoned-decimal value is converted to packed decimal with a PACK instruction before the comparison.

In order for the compiler to handle zone bits in the same way as COBOL V4 or earlier versions did when generating comparisons of zoned-decimal data, the NUMPROC suboption used in COBOL V6 must match the NUMPROC suboption used in COBOL V4 or earlier versions:

- To get the COBOL V4 or earlier versions NUMPROC=(NOPFD) behavior in COBOL V6, use INVDATA=(NOFORCENUMCMP) and NUMPROC=(NOPFD) in COBOL V6.

- To get the COBOL V4 or earlier versions NUMPROC=(PFD) behavior in COBOL V6, use INVDATA=(NOFORCENUMCMP) and NUMPROC=(PFD) in COBOL V6.

**Note:** The sign code must be a valid sign code according to the NUMPROC compiler option setting. In addition, the low-order byte must have a valid zone (x'F') for unsigned and signed with either SIGN IS LEADING or SIGN IS SEPARATE.

### (CLEANSIGN | NOCLEANSIGN)

CLEANSIGN is the default when INVDATA is specified and neither CLEANSIGN nor NOCLEANSIGN is specified.

When the INVDATA=(CLEANSIGN) option is in effect, the compiler generates code to clean the sign nibble of USAGE DISPLAY and USAGE PACKED-DECIMAL data items on input to compare, add, subtract, multiply, and divide operations.

**Note:** CLEANSIGN does not apply to USAGE DISPLAY items defined with SIGN IS SEPARATE.

When the INVDATA=(NOCLEANSIGN) option is in effect, the compiler avoids generating code to clean the sign nibble of USAGE DISPLAY and USAGE PACKED-DECIMAL data items on input to compare, add, subtract, multiply, and divide operations, increasing the probability of a SOC7 abend when one of the operands of the operation contains an invalid sign nibble.

**Note:** The INVDATA option affects the behavior of MOVE statements, comparisons, and computations for USAGE DISPLAY or PACKED-DECIMAL data items that could contain invalid digits, an invalid sign code, or invalid zone bits.

In the following example, you can see a data item with an invalid zone bit 4 in the zone bits in the middle of data item VALUE1, forced in by REDEFINES:

```
77 VALUE0    PIC X(4) VALUE '00 0'.          *>  x'F0F040F0'
77 VALUE1    REDEFINES VALUE0 PIC 9(4).
PROCEDURE DIVISION.
  IF VALUE1 = ZERO
    DISPLAY 'INVDATA(FORCENUMCMP) is in effect ' VALUE1
  ELSE
    DISPLAY 'INVDATA(NOFORCENUMCMP) is in effect ' VALUE1
  END-IFCopy code
```

In this example,

- With COBOL V4 or earlier versions, the test is true if the NUMPROC=(MIG) option is used, and false for NUMPROC=(NOPFD | PFD).
- With COBOL V5 or later versions:
  - When using INVDATA=(NO), the test is true at OPT=(0) and false at OPT=(1 | 2).
  - When using INVDATA=(NOFORCENUMCMP), the test is false at any OPT setting.

In all, to ease your migration to COBOL V6:

- If your digits, sign codes, and zone bits are valid, use INVDATA=(NO), and if you used NUMPROC=PFD or NUMPROC=NOPFD in COBOL V4 or earlier versions, then use the same NUMPROC setting when using COBOL V6; if you used NUMPROC=(MIG) in COBOL V4 or earlier versions, then use NUMPROC=NOPFD when using COBOL V6.
- If you have invalid digits, invalid sign codes, or invalid zone bits in your data, change your programs or systems so that your programs do not have invalid data in numeric data items at run time.

When you have corrected your programs or systems, you can use the preferred INVDATA=(NO) option. Only if you cannot contain this work and must continue to run with invalid data, consider the following choices for INVDATA:

- If you used NUMPROC=(MIG) with COBOL V4 or earlier versions, use INVDATA=(FORCENUMCMP,NOCLEANSIGN) and NUMPROC=(NOPFD) with COBOL V6.
- If you used NUMPROC=(NOPFD) with COBOL V4 or earlier versions, use INVDATA=(NOFORCENUMCMP,CLEANSIGN) and NUMPROC=(NOPFD) with COBOL V6.

- If you used NUMPROC=(PFD) with COBOL V4 or earlier versions, use INVDATA=(NOFORCENUMCMP,CLEANSIGN) and NUMPROC=(PFD) with COBOL V6.

**Notes:**

- If you completed migration from COBOL V4 or earlier versions to COBOL V5 or V6 in the past and used the deprecated ZONEDATA=(MIG) option in COBOL V5 or V6 and are satisfied with the behavior, use INVDATA=(FORCENUMCMP,CLEANSIGN) now instead of ZONEDATA=(MIG).
- It is not always possible to entirely match the behavior of the old compiler even with these options when faced with clearly invalid data. For example, even for comparisons, INVDATA=(NOFORCENUMCMP) does not give the same result in all cases as COBOL V4 does.

**Performance consideration:** INVDATA=(NO) gives better runtime performance than INVDATA=(NOFORCENUMCMP | FORCENUMCMP,NOCLEANSIGN | CLEAN SIGN) does. INVDATA=(NOFORCENUMCMP | FORCENUMCMP,NOCLEANSIGN | CLEAN SIGN) disables some of the optimizations that NUMPROC=(PFD) can give.


**related references**

“NUMPROC” on page 51

## LANGUAGE

LANGUAGE affects the language used for compiler output messages.

**Syntax**

▶▶ LANGUAGE=  XX ▶▶

**Default**

LANGUAGE=EN

**XX**

Specifies the language for compiler output messages. Entries for this parameter might be selected from the following list.

*Table 5. Entries for the LANGUAGE compiler option*

Entry	Language
<b>EN</b> or <b>ENGLISH</b>	Mixed case U.S. English
<b>JA, JP,</b> or <b>JAPANESE</b>	Japanese
<b>UE</b> or <b>UENGLISH</b>	Uppercase U.S. English

**Notes:**

- The LANGUAGE option name must consist of at least the first two identifying characters. Other characters after the first two can be used; however, only the first two are used to determine the language name.
- This compiler option does not affect the language in which runtime messages are displayed. For more information about runtime options and messages, see the *z/OS Language Environment Programming Guide*.
- Some printers use only uppercase and might not accept output in mixed case (LANGUAGE=ENGLISH).
- To specify the Japanese language option, the Japanese National Language Feature must be installed.
- To specify the English language option (mixed-case English), the U.S. English Language Feature must be installed.
- If your installation provides a language other than those listed above, and you select it as your installation's default, you must specify at least the first two characters of the language name. These two characters must be alphanumeric.

- The selection of Japanese together with specification of the ADATA option might result in DBCS characters being written to error identification records in the Associated Data file.
- To change to uppercase English or Japanese compiler messages, in addition to using the LANGUAGE compiler option, you must also set the Language Environment runtime option NATLANG at compile time. We recommend using CEEOPTS DD in the compile JCL.

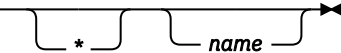
For example, to change messages to Japanese, use LANGUAGE=JA and also specify the NATLANG LE runtime option at compile time:

```
//CEEOPTS DD *
           NATLANG(JPN)
/*
```

## LIBEXIT

LIBEXIT designates a module to be called to obtain COPY statements instead of reading the SYSLIB or library-name data set.

### Syntax

►► LIBEXIT= 

### Default

No exit is specified. Equivalent to specifying the NOLIBEXIT suboption of the EXIT compiler option. If LIBEXIT=\* is coded without the *name* parameter, NOLIBEXIT cannot be overridden.

### *name*

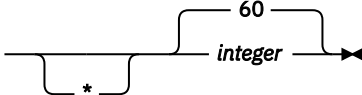
Identifies a module to be used with the EXIT compiler option. If the suboption for this user exit is specified, the compiler loads the named module and calls it to obtain COPY statements instead of reading the SYSLIB or library-name data set. If the option is supplied, the SYSLIB and library-name data sets are not opened.

For more information about the EXIT compiler option, see *EXIT compiler option* in the *Enterprise COBOL Programming Guide*.

## LINECNT

LINECNT affects the number of lines to be printed on each page of the compiler source listing.

### Syntax

►► LINECNT= 

### Default

LINECNT=60

### *integer*

Specifies the number of lines to be printed on each page of the compiler source code listing, and it must be an integer between 10 and 255, or 0. Three of the lines are used to generate headings. For example, if you specify LINECNT=60, 57 lines of source code are printed on each page of the output listing, and 3 lines are used for headings.

If you specify LINECNT=0, no page ejects are generated in the compilation listing.

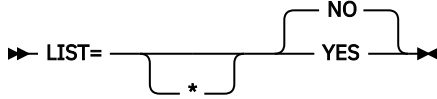
The LINECNT installation option is equivalent to the LINECOUNT compiler option.

## LIST

---

LIST affects whether an assembler-language expansion is produced in source listings.

### Syntax



### Default

LIST=NO

### YES

Produces a listing that includes:

- The assembler-language expansion of source code
- Constant area
- Program prolog areas (PPA1, PPA2, PPA3, PPA4)
- Time stamp, compiler version, and build level information
- Compiler options and program information
- Base locator table
- External symbols dictionary
- Initial heap storage maps
- Stack storage maps

### NO

Suppresses this listing.

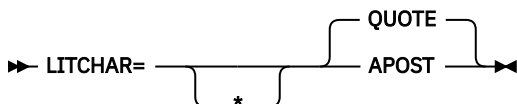
The LIST and OFFSET compiler options are mutually exclusive. Setting OFFSET=YES and LIST=YES results in a nonzero return code and an error message during assembly of the customization macro.

## LITCHAR

---

LITCHAR affects whether the QUOTE figurative constant represents quotation marks or apostrophes.

### Syntax



### Default

LITCHAR=QUOTE

### APOST

Use APOST if you want the figurative constant [ALL] QUOTE or [ALL] QUOTES to represent one or more apostrophe (') characters.

### QUOTE

Use QUOTE if you want the figurative constant [ALL] QUOTE or [ALL] QUOTES to represent one or more quotation mark (") characters. QUOTE conforms to the 85 COBOL Standard.

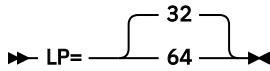
### Note:

- Either quotation marks or apostrophes can be used as literal delimiters, regardless of whether the APOST or QUOTE option is in effect.
- The delimiter character used as the opening delimiter for a literal must be used as the closing delimiter for that literal.

## LP

The LP compiler option affects whether a AMODE 31 (31-bit) or AMODE 64 (64-bit) program should be generated with the related language features enabled when compiling COBOL programs.

### Syntax



You can specify the LP option in the ways that you specify other compiler options. However, if you specify the option in a CBL (PROCESS) statement, you can only specify the LP option for the first program. You cannot change the value of the option for subsequent programs in the batch.

### Default

LP=32

### 32

Indicates that an AMODE 31 (31-bit) program should be generated with the related language features enabled.

### 64

Indicates that an AMODE 64 (64-bit) program should be generated with the related language features enabled.

**Runtime consideration:** Currently, Language Environment does not support mixing AMODE 64 and AMODE 31 programs in the same application. If one program is compiled with LP(64), all programs within the application should also be compiled with LP(64). For static CALLs, the binder will issue a message if it encounters mixing addressing modes during external name resolution. For dynamic CALLs, you would receive a run time error for a CALL between programs if one is AMODE 64 and one is AMODE 31 or 24.

When using the LP=64 compiler option, the compilation process includes a component that runs in POSIX(ON) mode. This implies that there must be an OMVS Segment established in RACF® (or equivalent in RACF alternatives) for each user executing the compiler with this option.

**Restrictions for programs using LP=64:** Programs compiled using the LP=64 compiler option cannot contain XML GENERATE or XML PARSE statements, JSON GENERATE or JSON PARSE statements, Object-oriented COBOL statements, ALTER statements, GO TO. statements, and DISPLAY ... UPON SYSPUNCH statements. In addition, AMODE 64 programs cannot run in CICS or IMS.

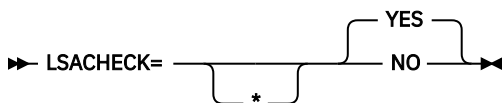
**Note:** Under LP(64), some compiler options are not applicable. For more information, see Using compiler options to compile AMODE 64 programs in the *Enterprise COBOL Programming Guide*.

## LSACHECK

Use the LSACHECK option (LSACHECK is short for Linkage Section Addressability Check) to prevent inadvertent use of LINKAGE-SECTION data items prior to establishing addressability.

The LSACHECK compiler option tells the compiler to generate code to initialize BLL cells (addresses for LINKAGE-SECTION data items) to x'7FFF000' instead of the previous default of x'00000000'. With NOLSACHECK the BLL cells will still be initialized to x'00000000'.

### Syntax



### Default

LSACHECK=NO

### YES

Tells the compiler to generate code to initialize BLL cells (addresses for LINKAGE-SECTION data items) to x'7FFF000'.

## NO

Tells the compiler to generate code to initialize BLL cells (addresses for LINKAGE-SECTION data items) to x'00000000'.

**Note:** Using LSACHECK=\*YES will set LSACHECK on for all compiles, and it will not be possible to override this compiler option.

## AMODE 64 implications

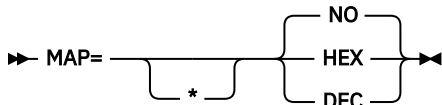
For programs compiled with LSACHECK and LP(64), the compiler generates code to initialize the BLLs to x'000000007FFFF000' to get similar behavior to LP(32) programs with BLLS set to x'7FFFF000'.

**Note:** Since there is already a way to get a report of uses of zero addresses without an ABEND or stoppage of the application (the z/OS "Zero Address Detection" feature), there is no need to duplicate that feature with an MSG suboption like some other compiler options have.

## MAP

The MAP option affects whether map information about the DATA DIVISION items and all implicitly declared items is shown in the listing. The option also controls whether hexadecimal or decimal offsets are shown for MAP output in the listing.

### Syntax



### Default

MAP=NO

### HEX or DEC

Maps items that are declared in the DATA DIVISION. Map output includes:

- DATA DIVISION map
- Nested program structure map, and program attributes
- Size of the program's WORKING-STORAGE and LOCAL-STORAGE and its location in the object code if the program is compiled with the NORENT option

If you specify MAP=HEX, data item offsets within groups will be in hexadecimal notation.

If you specify MAP=DEC, data item offsets within groups will be in decimal notation.

## NO

Mapping is not performed.

## MAXPCF

Use the MAXPCF option to specify a maximum program complexity factor value. The program complexity factor (PCF) is computed by the compiler and the computed value is in the listing file. If the PCF of your program exceeds the maximum value, the compiler will automatically reduce the optimization level to speed up the compilation and use less storage. Therefore, when you compile a suite of programs, you do not have to specify an OPTIMIZE option value for each program.

### Syntax



### Default

MAXPCF=100000

**n**

Must be an integer of 0 - 999999.

The aspects of the program taken into consideration when computing the complexity factor include:

- The number of COBOL statements in the PROCEDURE DIVISION, including generated statements from the CICS, SQL or SQLIMS options, and the expansion of COPY and REPLACE statements
- Initialization operations for WORKING-STORAGE or LOCAL-STORAGE data items with value clauses
- Operations for variable-length groups or subgroups in the DATA DIVISION, which compute their size at run time

**Note:** PCF is not a metric to measure how complex a program is. It is merely a count of COBOL items that can cause problems for optimization when there are a lot of them. To measure program complexity, you should use something like the [Metrics](#) feature provided by IBM Developer for z/OS.

For large and complex programs, you can use the MAXPCF option to set a threshold on the program complexity that the compiler attempts to optimize. You can reduce the MAXPCF value to reduce the optimization level, hence the compiler needs less memory and compilation time. Raise the MAXPCF value to attempt to optimize the programs at the cost of longer compilation time.

If you specify MAXPCF=0, no limit is enforced on the complexity of the program, and the MAXPCF option has no effect.

If you specify MAXPCF=*n* and *n* is not zero, when the program complexity factor exceeds *n*, any specification of OPTIMIZE(1) or OPTIMIZE(2) is reset to OPTIMIZE(0), and a warning message is generated.

If the COBOL source file contains a sequence of source programs (a batch compile), the MAXPCF limit is applied on a per program basis.

**Notes:**

- If the OPT=1 or OPT=2 option is set at installation time as a fixed, nonoverridable option, then MAXPCF=*n* with a nonzero *n* is an option conflict. In this case, the OPTIMIZE option takes precedence and the MAXPCF=0 option is forced on.
- If you attempt to optimize a program larger than the default threshold by raising the value of MAXPCF to *n* where *n* is greater than the default, or by specifying MAXPCF(0), the compiler might take excessive time to compile or fail to compile because of insufficient memory.

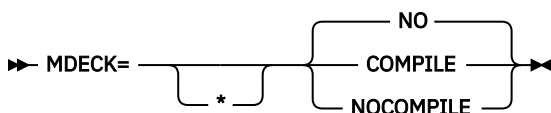
**Related references**

[“OPTIMIZE” on page 52](#)

## MDECK

The MDECK compiler option specifies that a copy of the updated input source after library processing (that is, the result of COPY, BASIS, REPLACE, EXEC SQL INCLUDE, EXEC SQLIMS INCLUDE, and conditional compilation directive statements) is written to a file.

**Syntax**



**Default**

MDECK=NO

**COMPILE**

Compilation continues normally after library processing and generation of the MDECK output file.

**NOCOMPILE**

Compilation ends after library processing is completed and the expanded source program file is written.

## NO


An MDECK output file is not produced.

## MSGEXIT

---

MSGEXIT designates a module to be called to enable customization of compiler messages.

### Syntax

►► MSGEXIT= 

### Default

No exit is specified. Equivalent to specifying the NOMSGEXIT suboption of the EXIT compiler option. If MSGEXIT=\* is coded without the *name* parameter, NOMSGEXIT cannot be overridden.

### *name*

Identifies a module to be used with the EXIT compiler option. If the suboption for this user exit is specified, the compiler loads the named module and calls it to enable customization of compiler messages. The severity of messages can be changed, messages can be suppressed, and FIPS messages resulting from the FLAGSTD compiler option can be converted into diagnostic messages.

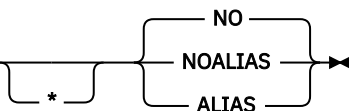
For more information about the EXIT compiler option, see *EXIT compiler option* in the *Enterprise COBOL Programming Guide*.

## NAME

---

NAME affects whether a program management binder NAME statement is appended to each object module and whether an ALIAS statement is created for each ENTRY statement.

### Syntax

►► NAME= 

### Default

NAME=NO

### ALIAS

Creates a program management binder ALIAS statement for each ENTRY statement in the program. The ALIAS statement is inserted preceding the NAME statement corresponding to the PROGRAM-ID.

### NOALIAS

Appends a program management binder NAME statement (NAME *modname*(R)) to each object module created in a batch compilation. The module name (*modname*) is derived from the PROGRAM-ID according to the rules for forming external module names.

### NO

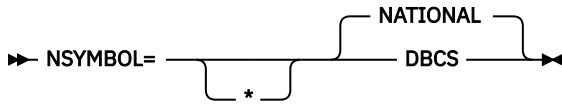
Does not append program management binder NAME statements.

The NAME option lets you create multiple modules in a program library with a single batch compilation, which can be useful for dynamic calls.

## NSYMBOL

NSYMBOL controls the interpretation of the N symbols used in PICTURE clauses, indicating whether national or DBCS processing is assumed.

### Syntax



### Default

NSYMBOL=NATIONAL

### DBCS

Use DBCS when data items are defined with the PICTURE clause consisting only of the PICTURE symbol N and without the USAGE clause. Such data items are treated as if the USAGE DISPLAY-1 clause were specified. Literals of the form N". ." or N'. .' are treated as DBCS literals.

### NATIONAL

Use NATIONAL when data items are defined with the PICTURE clause consisting only of the PICTURE symbol N and without the USAGE clause. Such data items are treated as if the USAGE NATIONAL clause were specified. Literals of the form N". ." or N'. .' are treated as national literals.

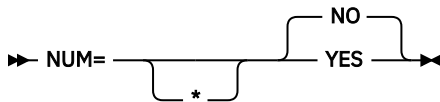
### Note:

- The NSYMBOL(DBCS) option is compatible with previous releases of IBM COBOL. The NSYMBOL(NATIONAL) option handles the N symbol consistently with the 2002 COBOL Standard.
- NSYMBOL(NATIONAL) forces the DBCS option.

## NUM

NUM affects whether source-program line numbers are used in error messages and procedure maps.

### Syntax



### Default

NUM=NO

### YES

Uses the line numbers from the source program rather than compiler-generated line numbers in error messages and procedure maps.

### NO

Uses the compiler-generated line numbers in error messages and procedure maps.

If COBOL programmers use COPY statements and NUM=YES is in effect, they must ensure that the source program line numbers and the COPY member line numbers are coordinated.

## NUMCHECK

The NUMCHECK compiler option tells the compiler whether to generate additional code to validate data items when they are used as sending data items. For zoned decimal (numeric USAGE DISPLAY) and packed decimal (COMP-3) data items, the compiler generates implicit numeric class tests for each sending field. For alphanumeric senders whose contents are being moved to a numeric receiver, the compiler treats the sender as a numeric integer so NUMCHECK generates an implicit numeric class test for each alphanumeric sender. For binary data items, the compiler generates SIZE ERROR checking to see whether the data item has more digits than its PICTURE clause allows.

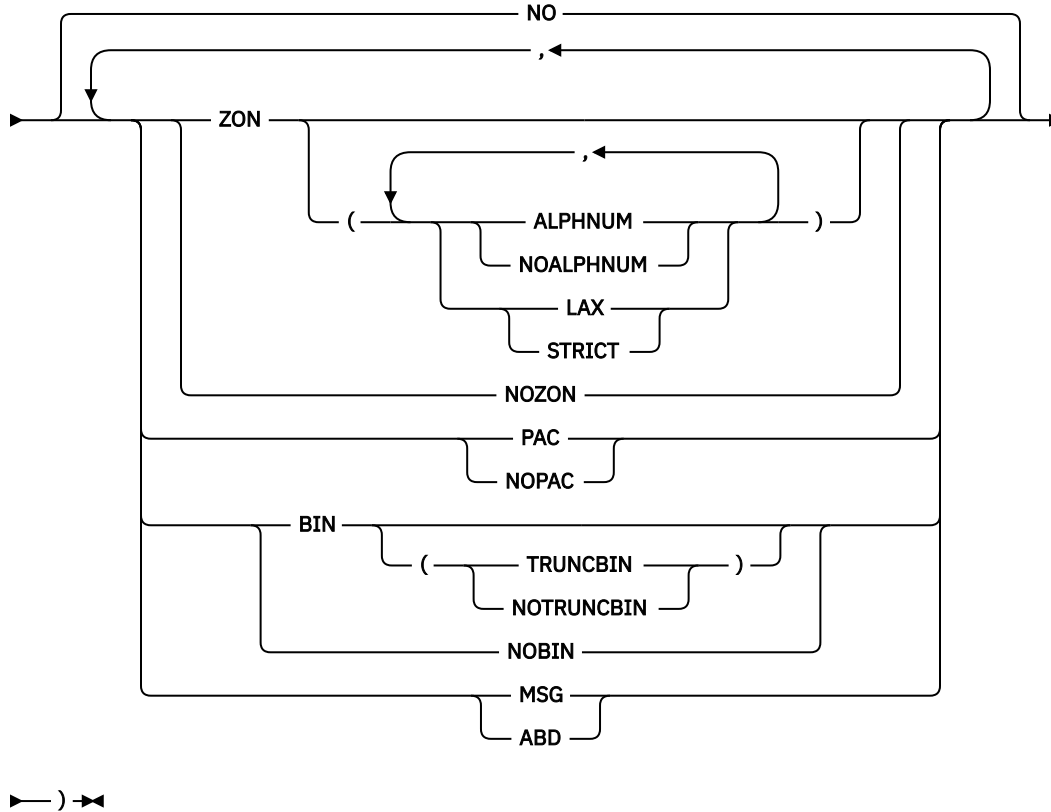
The NUMCHECK option is updated to remove redundant checks for invalid data, thus improving runtime performance. There may be fewer runtime messages than before.

The analysis done to remove redundant checks is more involved at OPT (1 | 2) than at OPT (0). OPT (0) does a simpler form of the analysis to keep compilation time as low as possible. There may be fewer messages at higher OPT levels.

When the compiler is able to determine at compile time that a check will always find invalid data, a compile-time message is produced and the runtime check is removed. (See MSG | ABD the following.)

### Syntax

➔ NUMCHECK=            ( ➔ )



### Default

NUMCHECK=(NO)

Suboption defaults are:

- If no suboption is specified, defaults are NUMCHECK=(ZON(ALPHNUM, STRICT), PAC, BIN(TRUNCBIN), MSG).
- If no datatype suboption is specified, default datatype suboptions are ZON(ALPHNUM, STRICT), PAC, and BIN(TRUNCBIN). For example, NUMCHECK=(ABD) has the same effect as NUMCHECK=(ZON(ALPHNUM, STRICT), PAC, BIN(TRUNCBIN), ABD).
- If only one datatype suboption is specified, defaults are NOZON, NOPAC, NOBIN, and MSG. For example, NUMCHECK=(BIN) has the same effect as NUMCHECK=(NOZON, NOPAC, BIN(TRUNCBIN), MSG).
- If all datatype suboptions are specified with NO, then the listing will show NONUMCHECK. For example, NUMCHECK=(NOZON, NOPAC, NOBIN) has the same effect as NUMCHECK=NO.

## ZON(ALPHNUM|NOALPHNUM,LAX|STRICT) | NOZON

Specifying ZON(ALPHNUM) causes the compiler to generate code for an implicit numeric class test for zoned decimal (numeric USAGE DISPLAY) data items that are used as sending data items in COBOL statements.

Specifying ZON(NOALPHNUM) causes the compiler to generate code for an implicit numeric class test for zoned decimal (numeric USAGE DISPLAY) data items that are used as sending data items in COBOL statements, except when they are used in a comparison with an alphanumeric data item, alphanumeric literal or alphanumeric figurative constant.

Receivers are not checked, unless they are both a sender and a receiver, such as data item B in the following sample statements:

```
ADD A TO B
```

```
DIVIDE A INTO B
```

```
COMPUTE B = A + B
```

```
INITIALIZE B REPLACING ALPHANUMERIC BY B
```

This checking is done before the data is used in each statement:

- If the data is NOT NUMERIC, either a warning message for NUMCHECK=(ZON,MSG) or a terminating message for NUMCHECK=(ZON,ABD) is issued.
- If the data is NUMERIC, the external behavior of the statement is the same as NUMCHECK=(NOZON), other than being slower.

Specifying ZON(LAX) causes the compiler to be more tolerant of invalid data in a zoned decimal data item. Three cases are considered by the compiler as follows:

- An unsigned zoned decimal data item redefines a signed trailing overpunch zoned decimal data item such that the last byte of the unsigned item overlaps the last byte of the signed item. In this case, the unsigned redefining item is treated as a signed zoned decimal item for the purposes of the NUMCHECK checking.

### Notes:

- The signed zoned decimal item that is redefined must be a level-01 or level-77 item. The unsigned zoned decimal item can be a level-01 or level-77 item or can be a subordinate item in a group.
- The unsigned zoned decimal item does not need to overlap the entire signed zoned decimal item. It is only necessary for the last byte of each item to overlap. For example:

```
01 NUM1 PIC S9(8).
01 NUM2 REDEFINES NUM1.
   03 NUM2-PART1 PIC 9(4).
   03 NUM2-PART2 PIC 9(2).
   03 NUM2-PART3 PIC 9(2).
```

In this case, data item NUM2-PART3 will be treated by NUMCHECK as a signed zoned decimal data item because its last byte overlaps the last byte of NUM1, which is a signed trailing overpunch zoned decimal item. Thus, the following values of NUM2-PART3 are all considered valid:

- x'F1F2F3F4F5F6F7F8'
- x'F1F2F3F4F5F6F7C8'
- x'F1F2F3F4F5F6F7D8'

- A zoned decimal data item redefines a numeric-edited data item that may contain leading spaces, as indicated by the Z symbol in the numeric-edited item's PICTURE string, and the leading bytes of the zoned decimal data item overlap some or all of the leading bytes of the numeric-edited item. In

this case, NUMCHECK will tolerate spaces in the leading bytes of the zoned decimal data item that overlap those bytes of the numeric-edited item that permit spaces.

**Notes:**

- The numeric-edited item that is redefined must be a level-01 or level-77 item. The zoned decimal item can be a level-01 or level-77 item or can be a subordinate item in a group.
- If the zoned decimal item is signed, it must be signed trailing overpunch.
- The first byte of the zoned decimal item must overlap the first byte of the numeric-edited item to be considered eligible for this treatment, but the zoned decimal item does not need to overlap the entire numeric-edited item. For example:

```
01 NUMED PIC ZZ99.99.  
01 NUM REDEFINES NUMED.  
03 INTVAL PIC 9(4).  
03 FILLER PIC X.  
03 DECVAL PIC 9(2).
```

In this case, NUMCHECK tolerates spaces in the first two bytes of INTVAL because it overlaps the first two bytes of NUMED which are defined with the Z symbol in its PICTURE string. Thus, the following values of INTVAL are all considered valid:

- x'F1F2F3F4'
- x'40F1F2F3'
- x'4040F1F2'

Note that for performance reasons, mixes of spaces and non-spaces are tolerated in the leading bytes, thus x'F140F1F2' is also considered valid.

- A zoned decimal data item is moved to another zoned decimal data item. In this case, NUMCHECK will not check the sender of the move. However, if the sender is subsequently used in a numeric context, it will be checked.

If ZON (STRICT) is specified, NUMCHECK does not consider any data items that a zoned decimal data item might redefine, and strict checking of the zoned decimal data is performed as usual.

**Note:** The ZON (LAXREDEF | STRICTREDEF) option is deprecated but is tolerated for compatibility, and it is replaced by the ZON (LAX | STRICT) option.

**PAC | NOPAC**

Specifying PAC causes the compiler to generate code for an implicit numeric class test for packed decimal (COMP-3) data items that are used as sending data items in COBOL statements. For packed decimal data items that have an even number of digits, the unused bits are checked for ones.

**Restriction:** For CALL statements, NUMCHECK=(ZON) and NUMCHECK=(PAC) check BY CONTENT data items that are zoned decimal or packed decimal, but they do not check BY REFERENCE parameters. (Neither zoned decimal nor packed decimal data items can be specified in a BY VALUE phrase.)

**BIN (TRUNCBIN | NOTRUNCBIN) | NOBIN**

Specifying BIN causes the compiler to generate code similar to ON SIZE ERROR to test if binary data items contents are larger than the PICTURE clause. This additional code will be generated only for binary data items that are used as sending data items, and COMP-5 data items will not get this ON SIZE ERROR code generated.

When BIN (TRUNCBIN) is in effect, the checking code is generated for binary data items, even when the TRUNC=(BIN) compiler option is in effect. Note that BIN (TRUNCBIN) is the default when no suboption for BIN is specified.

When BIN (NOTRUNCBIN) is in effect, the checking code is not generated for binary items when the TRUNC=(BIN) compiler option is in effect.

**Note:** BIN (NOTRUNCBIN) is useful for users who want to make NUMCHECK=(... , BIN, ...) a fixed option in their default options, but do not want the checking to be done for modules that are compiled with the TRUNC=(BIN) option in effect.

### MSG | ABD

Determines whether the message issued for invalid data is a warning level message to continue processing or a terminating level message to cause an abend:

- If MSG is in effect, a runtime warning message with the line number, data item name, data item content, and program name is issued. Also, the affected statements will still be executed.
- If ABD is in effect, a terminating message is issued that causes an abend.

When the compiler is able to determine at compile time that a check will always find invalid data, a compile-time error-level message is produced and the check is removed regardless of whether MSG or ABD is in effect.

### NO

No code is generated to validate data items when they are used as sending data items.

**Performance considerations:** NUMCHECK is much slower than NUMCHECK=NO, depending on how many zoned decimal (numeric USAGE DISPLAY) data items, packed decimal (COMP-3) data items, and binary data items are used in a COBOL program.

Since COBOL 6.2 with service applied, performance of NUMCHECK has been improved. However, performance is still best when specifying NONUMCHECK, and will be better at a higher OPT level.

ZONECHECK is deprecated and can no longer be specified in IGYCDOPT. NUMCHECK=(ZON (ALPHNUM)) gives the same results as ZONECHECK used to.

### Related references

[“NUMPROC” on page 51](#)

[“TRUNC” on page 70](#)

[“ZONECHECK” on page 78](#)

[“INVDATA” on page 36](#)

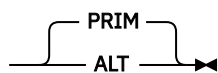
## NUMCLS

NUMCLS, in conjunction with NUMPROC, affects the numeric signs that the compiler treats as valid in numeric class tests.

NUMCLS specifies the sign representations that are recognized as valid by the numeric class test for data items that are defined with all of the following conditions:

- As signed (with an "S" in the PICTURE clause)
- Using DISPLAY or COMPUTATIONAL-3 (packed-decimal)
- No SEPARATE phrase on any SIGN clause

### Syntax

➔ NUMCLS= 

### Default

NUMCLS=PRIM

### ALT

Processing with ALT accepts hexadecimal A through F as valid.

### PRIM

Processing with PRIM accepts hexadecimal C, D, and F as valid.

### Note:

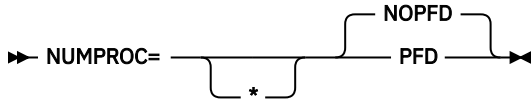
- The numeric class test is affected by how the NUMPROC and the NUMCLS options are specified.

- The NUMCLS option is effective only for NUMPROC=NOPFD. NUMPROC=PFD specifies more strict rules for valid sign configuration.

## NUMPROC

NUMPROC affects the treatment and processing of signs in internal decimal and zoned decimal data.

### Syntax



### Default

NUMPROC=NOPFD

### NOPFD

Repairs signs on input. After repair is performed, the signs meet the criteria for NUMPROC=PFD.

### PFD

Optimizes the generated code, especially when a non-zero OPTIMIZE level (OPT=1 or OPT=2) is specified. No explicit sign repair is performed. Note that NUMPROC=PFD has stringent criteria to produce correct results. To use NUMPROC=PFD:

- The sign position of unsigned numeric items must be X'F'.
- The sign position of signed numeric items must be either X'C' if positive or zero, or must be X'D' if negative.
- The sign position of separately signed numeric items must be either '+' if positive or zero, or '-' if otherwise.

Elementary MOVE and arithmetic statements in Enterprise COBOL always generate results with these preferred signs; however, group MOVEs and redefinitions might produce nonconforming results. The numeric class test can be used for verification. With NUMPROC=PFD, a numeric item fails the numeric class test if the signs do not meet the preferred sign criteria.

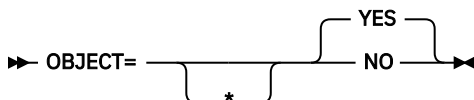
**Performance consideration:** Using NUMPROC=PFD generates significantly more efficient code for numeric comparisons. For most references to COMP-3 and DISPLAY numeric data items, using NUMPROC=NOPFD generates additional code because of sign "fix-up" processing. This additional code might also inhibit some other types of optimizations. Before setting this option, consult with your application programmers to determine the effect on the application program's output.

Both the NUMPROC and NUMCLS options affect the numeric class test. With NUMPROC=NOPFD, the results of the numeric class test are controlled by how NUMCLS is set. When NUMPROC=PFD, a data item must meet the preferred sign criteria to be considered numeric.

## OBJECT

OBJECT affects whether the generated object code is written to a file.

### Syntax



### Default

OBJECT=YES

### YES

Places the generated object code in a file, defined by the SYSLIN DD statement, to be used as input to the binder.

## NO

Places no object code in SYSLIN.

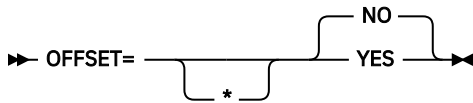
The OBJECT=NO option conflicts with all values for TEST other than NO.

## OFFSET

---

OFFSET affects whether a condensed PROCEDURE DIVISION listing is produced.

### Syntax



### Default

OFFSET=NO

### YES

Produces a condensed PROCEDURE DIVISION listing, which will contain line numbers, statement references, and the location of each block of instructions generated for a statement. The optimizer might inline paragraphs, move code around, or indeed place it after the body of the program if slightly used, such as the error message formatting code. As a result, there might be more than one entry in the OFFSET table of a given statement.

These items will also be written to the output listing:

- Constant area
- Program prolog areas (PPA1, PPA2, PPA3, PPA4)
- Time stamp and compiler version information
- Compiler options and program information
- Base locator table
- External symbols dictionary
- Initial heap storage maps
- Stack storage maps

### NO

Does not condense the listing or produce the items listed earlier.

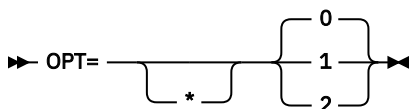
The LIST and OFFSET compiler options are mutually exclusive. Setting OFFSET=YES and LIST=YES results in a nonzero return code when you attempt to assemble the customization macro. For more information about conflict resolution, see [“Conflicting compiler options” on page 11](#).

## OPTIMIZE

---

OPTIMIZE affects the level of optimization that is made to object code, and can result in performance improvements.

### Syntax



### Default

OPT=0

### 0

Specifies limited optimizations, which result in the shortest compilation time. When the TEST option is specified, full debug capabilities are available.

1

Specifies optimizations that improve application runtime performance. Optimizations at this level include basic inlining, strength reduction, simplification of complex operations into equivalent simpler operations, removal of some unreachable code and block rearrangement. Also, OPT=1 includes some intrablock optimizations such as common subexpression elimination and value propagation. When the TEST option is specified, most debug capabilities are available.

2

Specifies further optimizations, which include more aggressive simplifications and instruction scheduling. Also, some interblock optimizations such as global value propagation and loop invariant code motion are included. When the TEST option is specified, some debug capabilities are available.

**Performance consideration:** Using OPT=1 or OPT=2 generally results in more efficient runtime code.

**Note:**

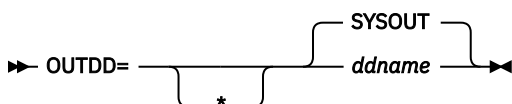
- The OPTIMIZE compiler option is fully supported for programs that use object-oriented syntax for Java interoperability.
- Optimization is set to 0 if an S-level error or U-level error occurs, or if the Program Complexity Factor exceeds the MAXPCF integer specified.

For further details, see *OPTIMIZE* in the *Enterprise COBOL Programming Guide*.

## OUTDD

OUTDD specifies the ddname to which DISPLAY output should be directed.

**Syntax**



**Default**

OUTDD=SYSOUT

**ddname**

Specifies the ddname of the file used for runtime DISPLAY output.

Change the default for this option if, at run time, you expect there could be a conflict with another product that requires SYSOUT as a ddname.

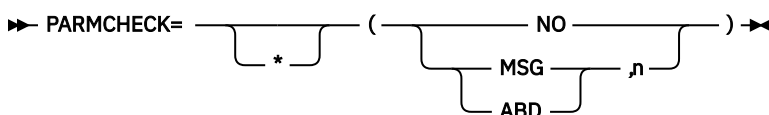
To understand how OUTDD interacts with the MSGFILE runtime option, see the description of MSGFILE in the *z/OS Language Environment Programming Reference*.

## PARMCHECK

The PARMCHECK option tells the compiler to generate an additional data item following the last item in WORKING-STORAGE. This buffer data item is then used at run time to check whether a called subprogram corrupted data beyond the end of WORKING-STORAGE.

When a calling program is compiled with PARMCHECK, the compiler generates a buffer following the last data item in the WORKING-STORAGE section. At run time, before each call, the buffer is set to ALL x'AA'. After each call, the buffer is checked to see whether it was changed. The PARMCHECK option can help with your migration from COBOL V4 and earlier compilers to COBOL V6 and later compilers, and can also be used to clean up and check for good programming practices.

**Syntax**



**Default**

PARMCHECK=(NO)

**MSG | ABD**

Determines whether the message issued for subprogram corruption of data is a warning level message to continue processing or a terminating level message to cause an abend:

- If MSG is in effect, a runtime warning message with the name of the parameter, the line number of the CALL statement, and the program name is issued. Also, this check is done after the affected CALL statement is executed.
- If ABD is in effect, a similar message is issued, but with a terminating level that causes an abend.

**n**

The size in bytes of the buffer to be added after the last item in WORKING-STORAGE. Must be an integer in the range of 1 to 9999.

**NO**

No buffer data item is generated following the last item in WORKING-STORAGE.

**Performance considerations:** PARMCHECK will cause the compiler to generate slower code for programs with CALL statements. NOPARMCHECK should be in effect for good performance.

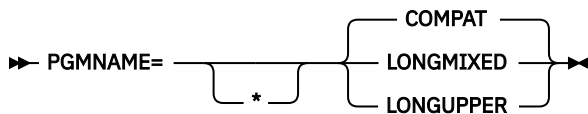
**Related references**

CALL statement (*Enterprise COBOL Language Reference*)

## PGMNAME

---

PGMNAME controls the handling of program-names and entry-point names.

**Syntax****Default**

PGMNAME=COMPAT

**COMPAT**

Program names are processed in a manner compatible with COBOL/370 Release 1 and VS COBOL II.

**LONGMIXED**

Program names are processed as is, without truncation, translation, or folding to uppercase.

**LONGUPPER**

Program names are folded to uppercase by the compiler but otherwise are processed as is, without truncation or translation.

The PGMNAME option controls the handling of names used in the following contexts:


- Program names defined in the PROGRAM-ID paragraph
- Program entry-point names in the ENTRY statement
- Program-name references in:
  - CALL statements that reference nested programs, statically linked programs, or DLLs
  - SET *procedure-pointer* or *function-pointer* statements that reference statically linked programs or DLLs
  - CANCEL statements that reference nested programs

For further details, see PGMNAME in the *Enterprise COBOL Programming Guide*.

## PRTEXIT

PRTEXIT designates a module to be called instead of output being written to the SYSPRINT data set.

### Syntax

►► PRTEXIT= 

### Default

No exit is specified. Equivalent to specifying the NOPRTEXIT suboption of the EXIT compiler option. If PRTEXIT=\* is coded without the *name* parameter, NOPRTEXIT cannot be overridden.

### *name*

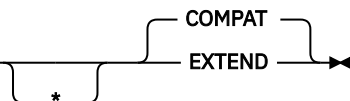
Identifies a module to be used with the EXIT compiler option. When the suboption for this user exit is specified, the compiler loads the named module and calls it instead of writing to the SYSPRINT data set. When the option is supplied, the SYSPRINT data set is not opened.

For more information about the EXIT compiler option, see *EXIT compiler option* in the *Enterprise COBOL Programming Guide*.

## QUALIFY

QUALIFY affects qualification rules and controls whether to extend qualification rules so that some data items that cannot be referenced under COBOL Standard rules can be referenced.

### Syntax

►► QUALIFY= 

### Default

QUALIFY=COMPAT

### COMPAT

If QUALIFY=COMPAT is in effect, the behavior will be the same as in previous COBOL compilers. A reference must be unique even if there is only one data item with exactly that complete set of qualifiers.

### EXTEND

If QUALIFY=EXTEND is in effect, qualification rules are extended so that some references that are not unique by COBOL standard rules can be unique. If every level in the containing hierarchy of a group of names is qualified, the set of qualifiers is called a *complete set of qualifiers*. If there is only one data item with a specific complete set of qualifiers, the reference resolves to that data item, even if the same set of qualifiers could match with another reference as an incomplete set of qualifiers.

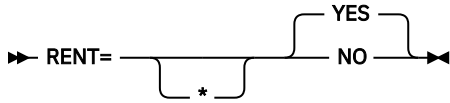
### Example

```
01 A.  
  02 B.  
    03 C PIC X.  
    02 C PIC X.  
.  
.  
Move space to C of A      *> Refers to 02 level C (unique only with QUALIFY(EXTEND))  
Move space to C of B of A *> Refers to 03 level C (unique by COBOL standard rules)  
Move space to C of B      *> Refers to 03 level C (unique by COBOL standard rules)
```

## RENT

RENT affects whether generated object code is reentrant.

### Syntax



### Default

RENT=YES

### YES

Indicates that generated object code is to be reentrant. Using RENT=YES enables the program to be placed in shared storage for running beyond the 16 MB line. However, this option causes the compiler to generate additional code to ensure that the application program is reentrant.

### NO

Indicates that generated object code is not to be reentrant.

### Note:

- Compile programs with RENT if they will be run in virtual storage addresses beyond 16 MB.
- Execution of nonreentrant programs beyond 16 MB is not supported. Programs compiled with NORENT must be RMODE 24.
- The RENT compiler option is required for programs that are run under CICS.
- The LP (64) compiler option implies RENT. If the user explicitly specifies NORENT, an informational message is issued and the setting is ignored.
- The RMODE assigned to a program depends on the RENT|NORENT and RMODE compiler options. Valid combinations are shown in the following table.

Table 6. Effect of RENT and RMODE on residency mode

RENT NORENT setting	RMODE setting	Residency mode assigned
RENT	AUTO	RMODE ANY
RENT	ANY	RMODE ANY
RENT	24	RMODE 24
NORENT	AUTO	RMODE 24
NORENT	ANY	Compiler option conflict
NORENT	24	RMODE 24

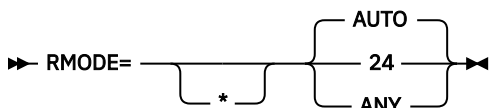
- If the THREAD compiler option is specified, the RENT compiler option must also be specified. If THREAD and NORENT are specified at the same level of precedence, the RENT option is forced on.

For further details, see *RENT* in the *Enterprise COBOL Programming Guide*.

## RMODE

RMODE affects the residency mode of generated object programs.

### Syntax



**Default**

RMODE=AUTO

**24**

Specifies that a program will have RMODE 24 whether NORENT or RENT is specified.

**ANY**

Specifies that a program will have RMODE ANY if RENT is specified, and will receive an error if NORENT is specified.

**AUTO**

Specifies that a program will have RMODE 24 if NORENT is specified, and RMODE ANY if RENT is specified.

**Note:**

- Enterprise COBOL NORENT programs that pass data to programs running in AMODE 24 must be either compiled with the RMODE(24) option or link-edited with RMODE 24. The data areas for NORENT programs will be above the 16 MB line or below the 16 MB line depending on the RMODE of the program, even if DATA(24) has been specified. DATA(24) applies to programs compiled with the RENT option only.
- Programs compiled with Enterprise COBOL always have AMODE ANY. The RMODE assigned to a program depends on the RMODE and RENT|NORENT compiler options. Valid combinations are shown in the following table.

*Table 7. Effect of RMODE and RENT | NORENT on residency mode*

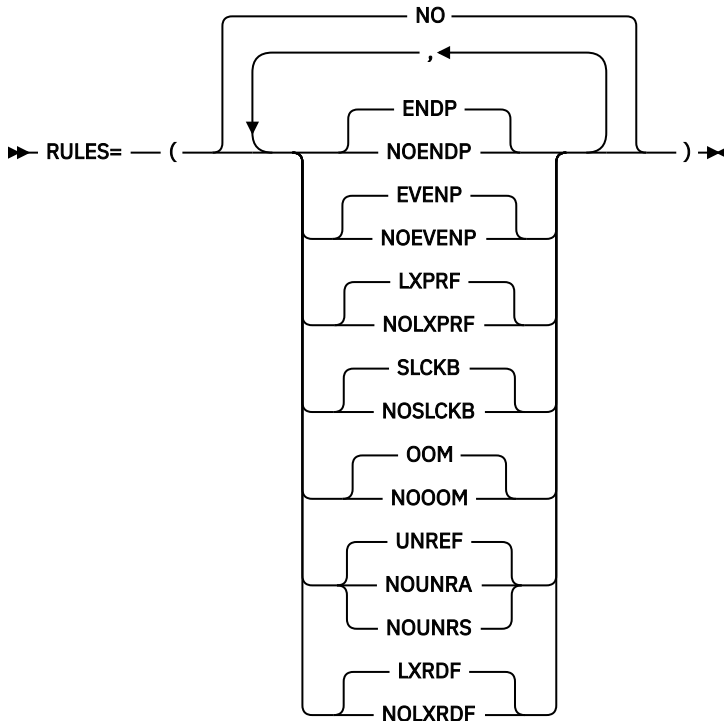
<b>RMODE setting</b>	<b>RENT NORENT setting</b>	<b>Residency mode assigned</b>
AUTO	RENT	RMODE ANY
AUTO	NORENT	RMODE 24
ANY	RENT	RMODE ANY
ANY	NORENT	Not applicable. A compiler error is issued.
24	RENT	RMODE 24
24	NORENT	RMODE 24

- The LP(64) compiler option implies RMODE(ANY). If the user explicitly specifies RMODE(24), an informational message is issued and the setting is ignored.

# RULES

You can use the RULES option to request information about your program from the compiler to improve the program by flagging certain types of source code at compile time.

## Syntax



## Default

RULES = (NO)

Has the same effect as RULES=(ENDP, EVENP, LXPRF, SLCKB, OOM, UNREF, LXRDF).

You can specify the following suboptions for RULES other than default ones:

### (NOENDP)

Causes the compiler to issue warning messages when the scope of a conditional statement is terminated by a period instead of an explicit scope terminator END-\*.

### (NOEVENP)

Causes the compiler to issue warning messages for any USAGE PACKED-DECIMAL (COMP-3) data items that have an even number of digits because those data items whose unused bits are not zero can lead to an unexpected program behavior.

### Notes:

- RULES=(NOEVENP) helps you identify USAGE PACKED-DECIMAL (COMP-3) data items that have unused extra space reserved for them. However, it is not necessary to change those data items to have an odd number of digits, it is only a slightly better way of programming.
- The compiler does not issue messages for even-digit PACKED-DECIMAL data items if the name starts with DFH, DSN, EYU, or SQL. That is, data items generated for/by CICS and Db2.

### (NOLXPRF)

Causes the compiler to issue warning messages for usage of inefficient COBOL features. These features might include USAGE DISPLAY numeric data items in arithmetic statements, substantial amounts of space padding in MOVE statements, inefficient compiler options, and other cases.

**(NOSLCKB)**

Causes the compiler to issue warning messages for any SYNCHRONIZED data items that cause the compiler to add slack bytes, either slack bytes within records or slack bytes between records. Each data item that causes slack bytes to be added gets a compiler diagnostic.

**(NOOOM)**

Causes the compiler to issue warning messages for any OCCURS DEPENDING ON clauses that are specified without *integer-1* (the minimum number of occurrences).

**(NOUNRA)**

When NOUNRA is specified, all level-01 and level-77 data items in the FILE SECTION, WORKING-STORAGE SECTION, LOCAL-STORAGE SECTION, and LINKAGE SECTION that are unreferenced, including no subordinate items referenced when the item is a group, are reported, regardless of whether the definition of the data item appears directly in the user source program or was included in the program from a copy member.

**(NOUNRS)**

When NOUNRS is specified, all level-01 and level-77 data items in the FILE SECTION, WORKING-STORAGE SECTION, LOCAL-STORAGE SECTION, and LINKAGE SECTION that are unreferenced, including no subordinate items referenced when the item is a group, are reported only if the definition of the data item appears directly in the user source program.

**Notes:**

- In COBOL, the definition of a single group item can spread across different files. When this occurs, and if the definition of the level-01 data item of the group is in the main source file, then those data items that are unreferenced will be reported when NOUNRS is in effect.
- Data items with the name prefix DFH, DSN, EYU, or SQL (that is, data items generated for/by CICS and Db2) will not be reported when NOUNRA or NOUNRS is in effect.

**(NOLXRDF)**

When NOLXRDF is specified, the compiler will issue warning messages when a data item is redefined by a smaller item on any level, including level-01.

**Notes:**

- It is not necessary to specify all of the suboptions for RULES. If a suboption is not specified, the default takes effect.
- RULES must be specified with at least one suboption for installation defaults.

## SEQ

---

SEQ affects whether the compiler verifies that source statements are in ascending order by sequence number.

**Syntax****Default**

SEQ=YES

**YES**

Checks that the source statements are in ascending alphanumeric order by line number.

**NO**

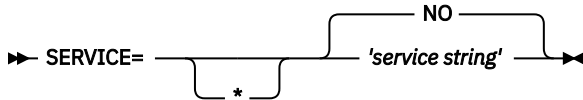
Does not perform sequence checking.

If both SEQ and NUM are in effect at compile time, the sequence is checked according to numeric, rather than alphanumeric, collating sequence.

## SERVICE

Use SERVICE to place a string in the object module if the object module is generated. If the object module is linked into a program object, the string is loaded into memory with this program object. If the Language Environment dump includes a traceback, this string is included in that traceback.

### Syntax



### Default

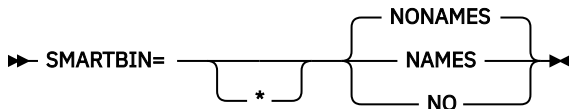
SERVICE=NO

The *service string* is limited to 64 characters in length.

## SMARTBIN

Use SMARTBIN to instruct the compiler to generate modules containing additional binary metadata that can be optimized by IBM Automatic Binary Optimizer (ABO) for z/OS 2.2 or higher.

### Syntax



### Default

SMARTBIN=NONAMES when LP=32 is in effect.

**Note:** SMARTBIN is not supported when LP=64 is in effect.

**Note:** The NAMES suboption is supported in ABO 2.3 or higher.

**Note:** SMARTBIN=YES is supported for backward compatibility. When specified, it activates the SMARTBIN(NONAMES) compiler option.

When SMARTBIN=(NAMES|NONAMES) is in effect, the additional binary metadata is placed in a NOLOAD segment of the module. To generate the SMARTBIN metadata, compile times may increase by up to 21% at OPT=0 and 2-3% at OPT=1 and OPT=2 on an IBM z15<sup>®</sup> (or later) machine with zEnterprise Data Compression (zEDC) enabled (hardware compression turned on). This is in comparison to an increase of up to 33% at OPT=0 and 10% at OPT=1 and OPT=2 on an IBM z15 (or later) machine without zEDC enabled (hardware compression turned off). The additional metadata will also increase the size of the module on disk, requiring larger load libraries, but will not increase the size in memory when the program is running since it is not loaded. The size increase on disk will be approximately 2 times to 3 times the size of the original binary.

SMARTBIN=NONAMES is the default when LP=32 is in effect. You can change the option to SMARTBIN=NO; however, without the additional binary metadata, COBOL modules built with Enterprise COBOL 6.5 will be ineligible for ABO optimization and you would need to recompile and test your modules in the future to maximize benefit from IBM Z hardware improvements. If you use ABO or plan to in the future, the SMARTBIN=NONAMES option is recommended.

When SMARTBIN=NAMES is specified, information about the names of the user symbols will be added to the additional binary metadata. Compiling with NAMES will improve the analysis output of *IBM watsonx Code Assistant for Z Code Optimization Advice*. NAMES is not required for ABO optimization.

### Notes:

- IBM Automatic Binary Optimizer for z/OS 2.2 or higher can optimize CSECTs within program modules that were generated by the following COBOL compilers:
  - Enterprise COBOL for z/OS 6

Newly eligible as of ABO 2.2. ABO 2.2 or higher can optimize COBOL 6.4 or higher modules if the SMARTBIN(NONAMES) is in effect. ABO 2.3 can optimize COBOL 6.5 modules if the SMARTBIN(NAMES) option is in effect. ABO 2.2 or higher can optimize COBOL 6.1, 6.2, and 6.3 modules without requiring special COBOL compiler options to be set.

– Enterprise COBOL for z/OS 5

Newly eligible as of ABO 2.2. ABO 2.2 or higher can optimize COBOL 5 modules without requiring special COBOL compiler options to be set.

– Enterprise COBOL for z/OS 4

– Enterprise COBOL for z/OS 3

– COBOL for OS/390® & VM 2

– COBOL for MVS & VM 1.2

– COBOL/370 1.1

– VS COBOL II 1.4.0

– VS COBOL II 1.3.x

- COBOL modules that have been processed by CA-Optimizer cannot be optimized by ABO. For these types of modules, it is recommended to use ABO to optimize the original module created by the COBOL compiler before it was processed by CA-Optimizer.

For more information about ABO benefits, see [IBM Automatic Binary Optimizer for z/OS product page](#).

### Related concepts

Storage and its addressability (*Enterprise COBOL Programming Guide*)

### Related references

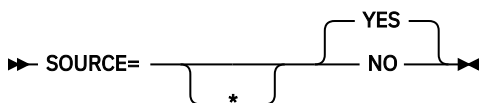
“LP” on page 42

## SOURCE

---

SOURCE affects whether source statements are included in compiler listings.

### Syntax



### Default

SOURCE=YES

### YES

Indicates that you want a listing of the source statements in the compiler-generated output. This listing also includes any statements embedded by COPY. SOURCE=YES will result in the SOURCE(DEC) compiler option being in effect.

**Note:** You can specify SOURCE(HEX) as a compiler invocation option or in the PROCESS or CBL statement in your COBOL source program, but SOURCE=HEX cannot be specified as an installation default.

### NO

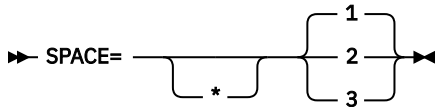
Source statements do not appear in the output.

The SOURCE compiler option must be in effect at compile time if you want embedded messages in the source listing.

## SPACE

SPACE affects whether single-, double-, or triple-spacing is used in source listings.

### Syntax



### Default

SPACE=1

#### 1

Provides single spacing for the source statement listing.

#### 2

Provides double spacing for the source statement listing.

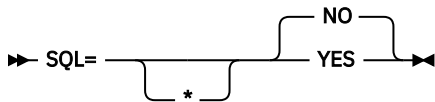
#### 3

Provides triple spacing for the source statement listing.

## SQL

SQL affects whether the Db2 coprocessor is enabled and whether Db2 options can be specified.

### Syntax



### Default

SQL=NO

### YES

Use to enable the Db2 coprocessor and to specify Db2 options. When the LP(64) compiler option is in effect, you must specify the SQL option if your COBOL source program contains SQL statements, and Db2 precompiler is not supported in LP(64).

The Db2 coprocessor writes the database request module (DBRM) to ddname DBRMLIB.

### NO

Specify to have any SQL statements found in the source program diagnosed and discarded.

Use SQL=NO if your COBOL source programs do not contain SQL statements, or if the separate SQL precompiler will be used to process SQL statements before invocation of the COBOL compiler.

### Note:

- You can specify the SQL option in any of the compiler option sources: compiler invocation, PROCESS or CBL statements, OPTFILE, or installation defaults.
- Use either quotation marks or apostrophes to delimit the string of Db2 options.
- Db2 options cannot be specified as part of customizing the SQL option. (Db2 options are supported only if the SQL compiler option is specified as an invocation option or in a CBL or PROCESS statement.) However, default Db2 options can be specified when you customize the Db2 product installation defaults.

### Related tasks

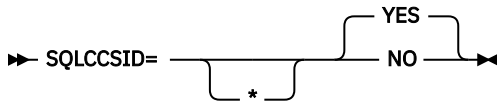
Compiling with the SQL option

(*Enterprise COBOL Programming Guide*)

## SQLCCSID

SQLCCSID controls whether the CODEPAGE compiler option influences the processing of SQL statements when the SQL compiler option is in effect.

### Syntax



### Default

SQLCCSID=YES

### YES

Indicates that the CODEPAGE compiler option setting will influence the processing of SQL statements within the source program when the integrated Db2 coprocessor (SQL compiler option) is used.

### NO

Indicates that the CODEPAGE compiler option setting will only be used as the encoding for string literals and the COBOL application source that includes converted SQL statements. Db2 (character string) host variables will not be affected by the CODEPAGE compiler option. Instead, the encoding for Db2 (character string) host variables will come from the CCSID value found in the DSNHDECP file, which means Db2 (via DSNHDECP) determines the encoding of the Db2 data (host variables).

### Notes:

- The SQLCCSID option is supported when the LP(64) compiler option is in effect, which behaves in the same way as in LP(32).
- The SQLCCSID option has an effect only when you use the integrated Db2 coprocessor (SQL compiler option).
- The NOSQLCCSID option is recommended for applications that require the highest compatibility with the behavior of the Db2 precompiler.

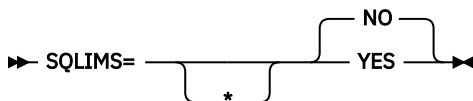
### Related references

SQLCCSID (*Enterprise COBOL Programming Guide*)

## SQLIMS

SQLIMS affects whether the IMS SQL coprocessor is enabled and whether Information Management System (IMS) suboptions can be specified.

### Syntax



### Default

SQLIMS=NO

### YES

Use to enable the IMS SQL coprocessor and to specify Information Management System (IMS) suboptions. You must specify the SQLIMS option if a COBOL source program contains SQLIMS statements.

### NO

Specify to have any SQLIMS statements found in the source program diagnosed and discarded.

Use SQLIMS=NO if your COBOL source programs do not contain SQLIMS statements.

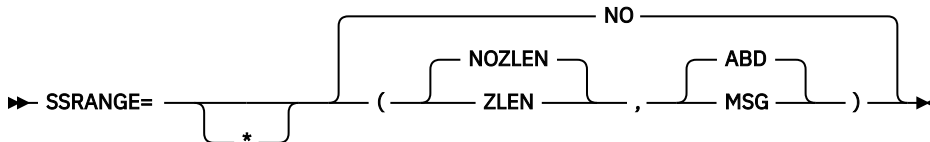
### Notes:

- You can specify the SQLIMS option in any of the compiler option sources: compiler invocation, PROCESS or CBL statements, or installation defaults.
- Use either quotation marks or apostrophes to delimit the string of IMS suboptions.
- You can partition a long suboption string into multiple suboption strings in multiple CBL statements.
- When the LP(64) compiler option is in effect, the SQLIMS option is not supported. If the option is specified explicitly by the user, a diagnostic message is emitted.

## SSRANGE

SSRANGE affects whether code is generated to check for out-of-range storage references.

### Syntax



### Default

SSRANGE=NO

### ZLEN | NOZLEN

Generates code that checks subscripts, reference modifications for non-UTF-8 data items and function values, variable-length group ranges, and indexes at run time to ensure that they do not refer to storage outside the area assigned. It also verifies that a table with ALL subscripting, specified as a function argument, contains at least one occurrence in the table.

The generated code also checks that variable-length items do not exceed their defined maximum length as a result of incorrect setting of the OCCURS DEPENDING ON object. For unbounded groups or their subordinate items, checking is done only for reference modification expressions. Subscripted or indexed references to tables subordinate to an unbounded group are not checked.

The ZLEN and NOZLEN suboptions control how the compiler checks reference modification lengths:

- If ZLEN is in effect, the compiler will generate code to ensure that reference modification lengths are greater than or equal to zero. Zero-length reference modification specifications will not get an SSRANGE error at run time.
- If NOZLEN is in effect, the compiler will generate code to ensure that reference modification lengths are greater than or equal to 1. Zero-length reference modification specifications will get an SSRANGE error at run time. This is compatible with how SSRANGE behaved in previous COBOL versions.

### MSG | ABD

The MSG and ABD suboptions control the runtime behavior of the COBOL program when a range check fails.

- If MSG is in effect and a range check fails, a runtime warning message will be issued. Also, the affected statements will still be executed. The program will continue and might potentially identify other out-of-range conditions.
- If ABD is in effect and a range check fails, the first out-of-range condition will result in a runtime error message and the program will abend. You can find the next potential out-of-range condition by fixing the first out-of-range condition and then recompiling and running the program again. To identify all other potential out-of-range conditions, you might need to repeat this process several times.

**Performance consideration:** If anything other than SSRANGE=NO is in effect at compile-time, the object code size will be increased, and the runtime overhead will also be increased to accomplish the range checking.

## NO

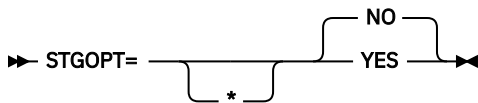
No code is generated to perform subscript or index checking at run time.

**Note:** If you specify anything other than SSRANGE=NO, range checks are generated by the compiler and the checks are always executed at run time. The compiled-in range checks cannot be disabled even if you specify the Language Environment runtime option CHECK(OFF).

## STGOPT

The STGOPT option controls storage optimization.

### Syntax



### Default

STGOPT=NO

### YES

If you specify STGOPT=YES, the compiler might discard any or all of the following data items, and does not allocate storage for them.

- Unreferenced LOCAL - STORAGE and WORKING - STORAGE level-77 and level-01 elementary data items
- Level-01 group items if none of their subordinate items are referenced
- Unreferenced special registers

**Note:** The STGOPT option is ignored for data items that have the VOLATILE clause. For details, see VOLATILE clause in the *Enterprise COBOL Language Reference*.

The compiler will not generate code to initialize discarded data items to the values in their VALUE clauses.

In addition, with STGOPT=YES, data items in the LOCAL - STORAGE SECTION can be reordered in memory to optimize performance.

## NO

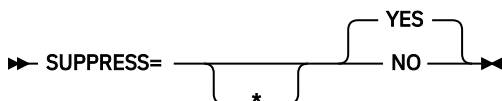
If you specify STGOPT=NO, the storage for all data items, including unreferenced data items, is allocated by the compiler, data items are never reordered to improve performance, and all data items defined with a VALUE clause are guaranteed to be initialized, even if they are unreferenced.

You can also use the RULES=(UNREF | NOUNRA | NOUNRS) option to control whether to issue warning messages for unreferenced data items. For details, see [“RULES” on page 58](#).

## SUPPRESS

Use the NOSUPPRESS option to ignore the SUPPRESS phrase of all COPY statements in a program so that copybook information can appear in the listing. The copybook information can be used by debuggers, tools, and so on, without users needing to modify their source code.

### Syntax



### Default

SUPPRESS=YES

**YES**

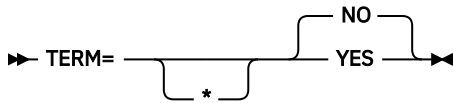
Enables the SUPPRESS phrase of COPY statements.

**NO**

Ignores the SUPPRESS phrase of COPY statements.

## TERM

TERM affects whether progress and diagnostic messages are sent to the SYSTERM device.

**Syntax****Default**

TERM=NO

**YES**

Specifies that the progress and diagnostic messages are sent to the SYSTERM file, which defaults to the user's terminal unless specified otherwise.

**NO**

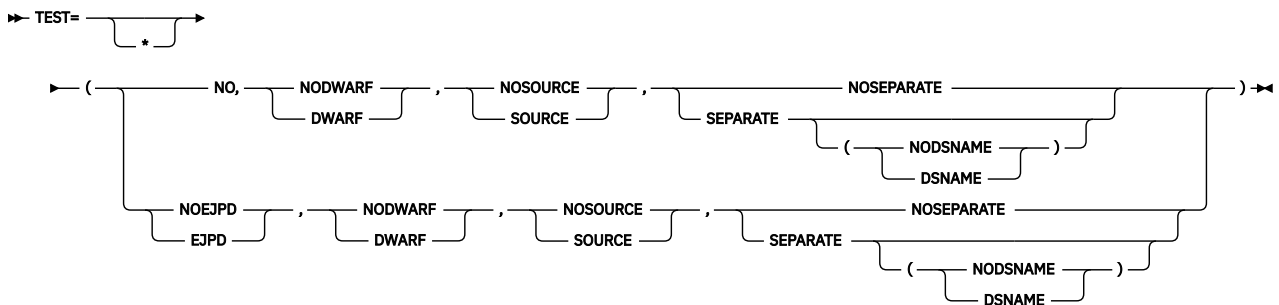
Specifies that no messages are sent to the SYSTERM file.

If TERM is specified in the source program, a SYSTERM DD statement must also be specified for each application program.

TERM corresponds to the TERMINAL compiler option.

## TEST

TEST affects the amount of debugging information that is produced in object code, which determines the level of debugging support that is available.

**Syntax**

**Note:** Unlike specifying this option in JCL or CBL/PROCESS, all suboptions are required and must be in the order shown in the syntax diagram.

**Default**

TEST=(NO, NODWARF, NOSOURCE, NOSEPARATE)

**(NO, DWARF, ...)**

If TEST=(NO, DWARF, . . .) is in effect, basic DWARF diagnostic information is included in the object program, or the separate debug file if SEPARATE is also in effect. This option enables application failure analysis tools, such as CEEDUMP and IBM Fault Analyzer. With TEST=(NO, DWARF, . . .), the debugging information is a subset of the DWARF information that is available with TEST=(DWARF, . . .). The DWARF diagnostic information that is produced when TEST=(NO, DWARF, . . .) is in effect cannot be used with IBM z/OS Debugger. Consider using TEST=(NO, DWARF, . . .) when use of the debugger is not needed and you want to avoid the

performance implications of the TEST option while having improved usability for application failure analysis tools, such as CEEDUMP and IBM Fault Analyzer.

Debugging information generated by the compiler is in the industry-standard DWARF format. For more information about DWARF, see *About Common Debug Architecture* in the *DWARF/ELF Extensions Library Reference*.

**(NO,NODWARF,...)**

If TEST=(NO,NODWARF,...) is in effect, DWARF diagnostic information is not included in the object program, nor written to a separate debug file.

**Note:** SOURCE and SEPARATE are not allowed with NODWARF.

**(NO,...,SOURCE,...)**

If you specify TEST=(NO,...,SOURCE,...), the DWARF debugging information generated by the compiler includes the expanded source code.

**Note:** SOURCE is not allowed with NODWARF.

**(NO,...,NOSOURCE,...)**

If you specify TEST=(NO,...,NOSOURCE,...), the generated DWARF debugging information does not include the expanded source code.

**(NO,...,SEPARATE(NODSNAME))**

If you specify TEST=(NO,...,SEPARATE(NODSNAME)), any generated DWARF debugging information will be stored in an external file and will not cause an increase in the size of the object program. The external file name, which is the name of the SYSDEBUG dataset, used during compilation will not be stored in the object program. The default is SEPARATE(NODSNAME) when SEPARATE is specified with no suboptions.

**Note:** SEPARATE is not allowed with NODWARF.

**(NO,...,SEPARATE(DSNAME))**

If you specify TEST=(NO,...,SEPARATE(DSNAME)), any generated DWARF debugging information will be stored in an external file and will not cause an increase in the size of the object program. The external file name, which is the name of the SYSDEBUG dataset, used during compilation will be stored in the object program. This name would be used as the default at run time when DWARF information is required.

**Note:** SEPARATE is not allowed with NODWARF.

**(NO,...,NOSEPARATE)**

If you specify TEST=(NO,...,NOSEPARATE), any generated DWARF debugging information will be stored in the object program.

**(other than NO)**

**(EJPD,...)**

If you specify TEST=(EJPD,...) and OPT=(1|2):

- The IBM z/OS Debugger commands GOTO and JUMPTO are enabled.
- Program optimization will be reduced. Optimization will be done within statements; most optimizations will not cross statement boundaries.

**(NOEJPD,...)**

If you specify TEST=(NOEJPD,...) and OPT=(1|2):

- The JUMPTO and GOTO commands are not enabled. However, you can still use JUMPTO and GOTO if you use the SET WARNING OFF IBM z/OS Debugger command. In this scenario, JUMPTO and GOTO will have unpredictable results.
- The normal amount of program optimization is done.

**(...,DWARF,...)**

If you specify TEST=(...,DWARF,...), complete DWARF diagnostic information is included in the object program, or a separate debug file, when the SEPARATE suboption is in effect. This

option enables the best usability for application failure analysis tools, such as CEEDUMP and IBM Fault Analyzer.

**(...,NODWARF,...)**

If you specify TEST=( . . . , NODWARF , . . . ), DWARF diagnostic information is not included in the object program, nor written to a separate debug file.

**Note:** SOURCE and SEPARATE are not allowed with NODWARF.

**(...,SOURCE,...)**

If you specify TEST=( . . . , SOURCE , . . . ), the DWARF debugging information generated by the compiler includes the expanded source code.

**(...,NOSOURCE,...)**

If you specify TEST=( . . . , NOSOURCE , . . . ), the generated DWARF debugging information does not include the expanded source code.

**(...,SEPARATE(NODSNAME))**

If you specify TEST=( . . . , SEPARATE (NODSNAME) ), any generated DWARF debugging information will be stored in an external file and will not cause an increase in the size of the object program. The external file name, which is the name of the SYSDEBUG dataset, used during compilation will not be stored in the object program. The default is SEPARATE (NODSNAME) when SEPARATE is specified with no suboptions.

**(...,SEPARATE(DSNAME))**

If you specify TEST=( . . . , SEPARATE (DSNAME) ), any generated DWARF debugging information will be stored in an external file and will not cause an increase in the size of the object program. The external file name, which is the name of the SYSDEBUG dataset, used during compilation will be stored in the object program. This name would be used as the default at run time when DWARF information is required.

**Notes:**

- SEPARATE is not allowed with NODWARF.
- Support for debugging DWARF debugging information in the SYSDEBUG data set with the IBM debugger requires any of the tools at the following levels:
  - IBM Debug for z Systems V14.1 (5655-Q50) (formerly IBM Debug Tool for z/OS) or later
  - IBM Developer for z Systems V14.1 (5724-T07) or later
  - IBM Application Delivery Foundation for z Systems V3.1 (5655-AC6) or later

**(...,NOSEPARATE)**

If you specify TEST=( . . . , NOSEPARATE ), any generated DWARF debugging information will be stored in the object program.

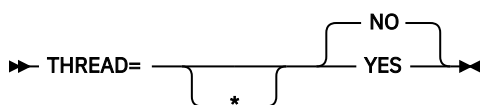
**Note:** If you specify the TEST option, you must set the CODEPAGE option to the CCSID that is used for the COBOL source program. In particular, programs that use Japanese characters in DBCS literals or DBCS user-defined words must be compiled with the CODEPAGE option set to a Japanese codepage CCSID. For more information, see [“CODEPAGE” on page 21](#).

## THREAD

---

THREAD controls whether programs are to be enabled for use in multithreaded applications.

**Syntax**



**Default**

THREAD=NO

**YES**

Use YES to indicate that programs are to be enabled for execution in Language Environment enclaves that have multiple POSIX threads or PL/I tasks.

**NO**

Use NO to indicate that programs are not to be enabled for execution in Language Environment enclaves that have multiple POSIX threads or PL/I tasks.

**Performance consideration:** If the THREAD compiler option is specified, runtime performance might be degraded because of the serialization logic that is automatically generated.

**Note:**

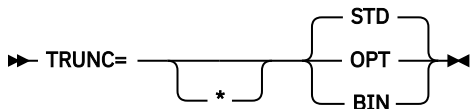
- The THREAD compiler option is ignored when LP(64) is in effect. If the user explicitly specifies the THREAD option, an informational message is issued.
- If the THREAD compiler option is specified, the program is enabled for use in a threaded application. However, THREAD can be used in nonthreaded applications. For example, you can run a program that was compiled with the THREAD option in the CICS environment if the application does not contain multiple POSIX threads or PL/I tasks at run time.
- If the THREAD compiler option is specified, the RENT compiler option must also be specified. If THREAD and NORENT are specified at the same level of precedence, RENT is forced on.
- For COBOL programs to run in a threaded application, all COBOL programs in the run unit must be compiled with the THREAD compiler option.
- If the THREAD compiler option is specified, the following language elements are not supported. If any of the following language elements are specified, they are diagnosed as errors:
  - ALTER statement
  - DEBUG-ITEM special register
  - GO TO statement without a procedure name
  - INITIAL phrase in the PROGRAM-ID paragraph
  - Nested programs
  - RERUN
  - Segmentation module
  - MERGE or Format 1 SORT statements
  - STOP *literal* statement
  - USE FOR DEBUGGING statement
- If you compile programs with the THREAD compiler option, the following special registers are allocated upon each invocation:
  - ADDRESS OF
  - JSON-CODE
  - JSON-STATUS
  - RETURN-CODE
  - SORT-CONTROL
  - SORT-CORE-SIZE
  - SORT-FILE-SIZE
  - SORT-MESSAGE
  - SORT-MODE-SIZE
  - SORT-RETURN
  - TALLY
  - XML-CODE
  - XML-EVENT

- XML-INFORMATION
- XML-NAMESPACE
- XML-NAMESPACE-PREFIX
- XML-NNAMESPACE
- XML-NNAMESPACE-PREFIX
- XML-NTEXT
- XML-TEXT

## TRUNC

TRUNC affects the way that binary data is truncated during MOVE and arithmetic operations.

### Syntax



### Default

TRUNC=STD

### BIN

Should not be used as an installation default. Specifies that:

- Output binary fields are truncated only at halfword, fullword, and doubleword boundaries, rather than at PICTURE-clause limits.
- Sending binary fields are treated as halfwords, fullwords, or doublewords, and no assumption is made that the values are limited to those implied by the PICTURE clause.
- DISPLAY converts and outputs the full content of binary fields with no truncation to the PICTURE description.

**Note:** When TRUNC(BIN) and NUMCHECK(BIN) are both in effect and an error message or an abend is generated, if you intend to switch to TRUNC(STD|OPT) later for better performance, you must correct the data; if not, you can turn off NUMCHECK(BIN) to reduce the execution time of the application and avoid an error message or an abend.

### OPT

The compiler assumes that the data conforms to PICTURE and USAGE specifications. The compiler manipulates the result based on the size of the field in storage (halfword or fullword).

TRUNC=OPT is recommended, but it should be specified only when data being moved into binary areas does not have a value with high precision than that defined by the binary item PICTURE clause. Otherwise, truncation of high-order digits might occur.

### STD

Conforms to the 85 COBOL Standard.

Controls the way arithmetic fields are truncated during MOVE and arithmetic operations. The TRUNC option applies only to binary (COMP) receiving fields in MOVE statements and in arithmetic expressions. When TRUNC=STD is in effect, the final intermediate result of an arithmetic expression, or of the sending field in the MOVE statement, truncates to the number of digits in the PICTURE clause of the binary receiving field.

**Performance consideration:** Using TRUNC=OPT does not generate additional code, and generally improves performance. However, both TRUNC=BIN and TRUNC=STD generate additional code whenever a BINARY data item is changed. TRUNC=BIN is usually the slower of these options.

### Recommendations:

- TRUNC=BIN is the recommended option for programs that use binary values set by other products. Other products, such as IMS, Db2, C/C++, FORTRAN, and PL/I, might place values in COBOL binary data items that do not conform to the PICTURE clause of those data items.
- You can use TRUNC=OPT with CICS programs provided that your data conforms to the PICTURE clause for the binary data items.
- Setting this option affects program runtime logic; that is, the same COBOL source program can give different results depending on the option setting. Verify whether your COBOL source programs assume a particular setting for correct running.

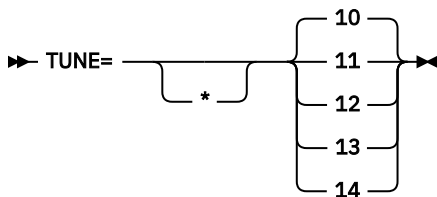
### Related references

[“NUMCHECK” on page 46](#)

## TUNE

The TUNE option specifies the architecture for which the executable program will be optimized.

### Syntax



### Default

The default TUNE level matches the ARCH level if ARCH is specified. If ARCH is not specified, both ARCH and TUNE default to 10.

Current supported architecture levels and groups of models are as follows:

#### 10

Generates code that is optimized for the 2827-xxx (IBM zEnterprise EC12) and 2828-xxx (IBM zEnterprise BC12) models in z/Architecture mode.

#### 11

Generates code that is optimized for the 2964-xxx (IBM z13) and 2965-xxx (IBM z13s) models in z/Architecture mode.

#### 12

Generates code that is optimized for the 3906-xxx (IBM z14) and 3907-xxx (IBM z14 ZR1) models in z/Architecture mode.

#### 13

Generates code that is optimized for the 8561-xxx (IBM z15) and 8562-xxx (IBM z15 T02) models in z/Architecture mode.

#### 14

Generates code that is optimized for the 3931-xxx (IBM z16) model in IBM z/Architecture mode.

The TUNE option specifies the architecture for which the executable program will be optimized. The TUNE level controls how the compiler selects the available machine instructions, while staying within the restrictions of the ARCH level in effect. The TUNE option does so to provide the highest performance possible on the given TUNE architecture, choosing from the instructions allowed by the given ARCH level.

**Note:** TUNE impacts performance only; it does not impact the processor model on which you will be able to run your application.

Select TUNE to match the architecture of the machine where your application will run most often. The TUNE level must always be greater or equal to the ARCH level because you will want to tune an application for a machine on which it can run. The compiler enforces this by adjusting TUNE up rather than ARCH down. TUNE does not specify where an application can run and it affects optimization only.

For example, if you have production machines that are z15 and disaster recovery (DR) machines that are z14, you should compile with ARCH (12) and TUNE (13). In this way, your programs will run well on the DR machines and run as fast as possible in production.

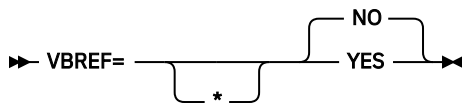
**Note:** If the specified TUNE level is less than the specified ARCH level, the compiler adjusts the TUNE level to match the ARCH level.

**Related references**  
[“ARCH” on page 17](#)

## VBREF

VBREF affects whether a cross-reference of statements to line numbers and a statement-usage summary is produced.

### Syntax



### Default

VBREF=NO

### YES

Produces a cross-reference of all statement types in a source program to the line numbers where they are found. VBREF=YES also produces a summary of how many times each statement was used in the program.

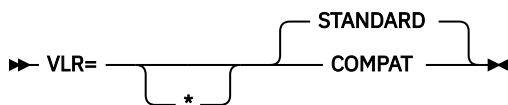
### NO

Does not produce a cross-reference or statement-summary listing.

## VLR

The VLR option affects the file status returned from READ statements for variable-length records when the length of record returned is inconsistent with the record descriptions. It eases your migration from earlier versions to Enterprise COBOL V6, if your programs have READ statements that result in a record length conflict.

### Syntax



### Default

VLR=STANDARD

After the execution of a READ statement:

- If the number of character positions in the record that is read is less than the minimum size specified by the record description entries for the file, the portion of the record area that is to the right of the last valid character read is undefined.
- If the number of character positions in the record that is read is greater than the maximum size specified by the record description entries for the file, the record is truncated on the right to the maximum size.

In either of these cases, the READ statement is successful, and the file status is set to either 00 (with VLR=COMPAT set, hiding the record length conflict condition) or 04 (with VLR=STANDARD set, indicating that a record length conflict has occurred).

## COMPAT

VLR=COMPAT checks the size of the read record against the "VARYING IN SIZE FROM min TO max" declaration of the FD clause. If you specify VLR=COMPAT, you get the status value of 00 when READ statements encounter a record length conflict.

**Note:** This setting can hide I/O problems that can arise with the wrong length read situation. Use the VLR=COMPAT option with caution, and check for correct READ statements.

## STANDARD

**Important:** You must add code to each READ statement to use VLR=STANDARD for testing file status.

VLR=STANDARD checks the size of the read record against the declaration of the FD level 01 clause. If you specify VLR=STANDARD, you get the status value of 04 when READ statements encounter a record length conflict.

VLR=STANDARD helps you avoid accessing undefined data in a record and also avoid getting protection exceptions for attempting to reference a part of the record that was truncated.

**Tip:** Alternatively, check if you get the compile-time information message IGYPG3178, which indicates that the sizes of the smallest and largest records do not match the range of the RECORD IS VARYING clause. If you do not get this message, you would get the status value of 00 rather than 04 with VLR=STANDARD. If you get the message, you have at least one record description with length outside the range of the RECORD IS VARYING clause. The compiler issues IGYPG3178 regardless of your VLR setting, and the message does not halt the compilation. For more information about IGYPG3178, see [Information message IGYPG3178](#).

The following example shows how the VLR option checks the size of the read record against the declaration of the FD clause and FD level 01 clause, with [Table 8 on page 73](#) illustrating the resulting file status (FS) of various lengths of records read. In this case a record read is a series of strings.

```
* The file contains two record definitions:
* REC-20: up to 20 characters
* REC-50: up to 50 characters
* Each record must contain between 10 to 80 characters in total.
FD MYDD
  block contains 0 records
  record varying in size from 10 to 80
  recording mode V.
01 REC-20
  02 PIC X(20).
01 REC-50.
  02 PIC X(50).
```

Length of record read	5	15	40	70	85
>= min varying (10)	X	✓	✓	✓	✓
<= max varying (80)	✓	✓	✓	✓	X
>= min level 01 (20)	X	X	✓	✓	✓
<= max level 01 (50)	✓	✓	✓	X	X
Valid data?	X	X	✓	X	X
COBOL 4	FS=04 X	FS=00 ✓	FS=00 ✓	FS=00 ✓	FS=00 ✓
COBOL 6 VLR (COMPAT)	FS=04 X	FS=00 ✓	FS=00 ✓	FS=00 ✓	FS=00 ✓



```
[5][6][7][8][9][0]
|<----- 70 ----->|
```

The record length of 70 is within the varying range 10-80, but larger than the max level 01 of 50, so the record is invalid under COBOL 6 VLR=STANDARD.

- A record length of 85 is represented as follows:

```
[A][B][C][D][E][F][G][H][I][J][K][L][M][N][O][P][Q][R][S][T]
[U][V][W][X][Y][Z][1][2][3][4][5][6][7][8][9][0][1][2][3][4]
[5][6][7][8][9][0][1][2][3][4][5][6][7][8][9][0][1][2][3][4]
[5][6][7][8][9][0][1][2][3][4][5][6][7][8][9][0][1][2][3][4]
[5][6][7][8][9][0][1][2][3][4][5][6][7][8][9][0]
|<----- 80 ----->| [X][X][X][X][X]
|<--Truncated-->|
```

The record length of 85 is larger than the max varying 80 and max level 01 of 50, so the record is truncated (X).

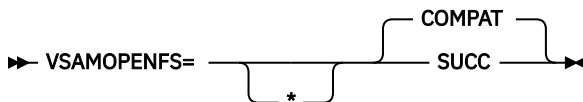
### Information message IGYPG3178

The information message IGYPG3178 can also help you avoid I/O problems by telling you if a program has a possibility of a "wrong length READ". This message can be used to assist with migration from VLR=COMPAT to VLR=STANDARD by indicating the possible "wrong length READ" that you can solve by correcting the File Definition (FD). You can also raise the severity of the message so that the program must be corrected in order to run. To do this, use the MSGEXIT suboption of the EXIT compiler option to change the severity of message IGYPG3178 from I (RC=0) to S (RC=12), E (RC=8), or W (RC=4). If you are not interested in seeing this message, you can suppress the message completely.

## VSAMOPENFS

The VSAMOPENFS option affects the user file status reported from successful VSAM OPEN statements that require verified file integrity check.

### Syntax



### Default

VSAMOPENFS=COMPAT

### COMPAT

If you specify VSAMOPENFS=COMPAT, the statement returns the file status 97 when a VSAM OPEN statement is successfully verified. This is compatible with pre-V6 COBOL runtime behavior.

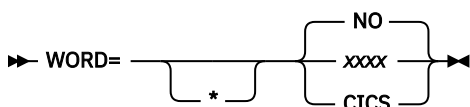
### SUCC

If you specify VSAMOPENFS=SUCC, the statement returns the file status 00 when a VSAM OPEN statement is successfully verified. This allows users to simply check for 0 in the first digit of the returned file status, as they usually do with other successful operations.

## WORD

WORD indicates which alternate reserved-word table is to be used during compilation.

### Syntax



### Default

WORD=NO

**CICS**

A CICS-specific word table, IGYCCICS, is provided as an alternate reserved word table. For a description, see [“CICS reserved word table \(IGYCCICS\)”](#) on page 8.

**XXXX**

Specifies an alternative default reserved word table to be used during compilation. **XXXX** represents the ending characters (can be 1 to 4 characters in length) of the name of the reserved word table used. The first 4 characters are IGYC. The last 4 characters cannot be any one of the character strings mentioned in the following list, nor can any of them contain the dollar sign character (\$).

- CBE
- DGEN
- DIAG
- DMAP
- DOPT
- ECWI
- FGEN
- INIT
- LIBO
- LIBR
- LSTR
- LVL0
- LVL1
- LVL2
- LVL3
- LVL8
- OSCN
- PGEN
- RCTL
- RDPR
- RDSC
- RWT
- SAW
- SCAN
- SIMD
- XREF

**NO**

Indicates that no alternative reserved word table is to be used as the default.

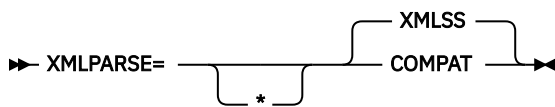
**Note:**

- Specification of WORD affects the interpretation of input reserved words. System names (such as UPSI and SYSPUNCH) and the intrinsic function names should not be used as aliases for reserved words. If a function name is specified as an alias through the reserved word table ABBR control-statement, that function name will be recognized and diagnosed by the compiler as a reserved word and the intrinsic function will not be performed.
- Changing the default value of the WORD=XXXX option conflicts with all values for FLAGSTD other than NO.

## XMLPARSE

XMLPARSE indicates which parser is to be used for processing XML input, and therefore which XML parsing capabilities are available.

### Syntax



### Default

XMLPARSE=XMLSS

### COMPAT

XML PARSE statements are processed using the XML parser that is a built-in component of the COBOL library. The XML PARSE statement results and operational behaviors are then compatible with those obtained with Enterprise COBOL Version 3, and also with Version 4 when XMLPARSE(COMPAT) was used.

### XMLSS

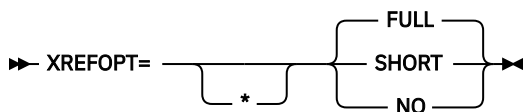
XML PARSE statements are processed using the z/OS XML System Services parser. The following XML parsing capabilities are available only when this suboption is in effect:

- Namespace processing enhancements
- The ENCODING, RETURNING NATIONAL, and VALIDATING phrases of the XML PARSE statement
- Support for direct parsing of XML documents encoded in UTF-8
- Support for parsing very large XML documents, a buffer of XML at a time
- Offloading of XML parsing to System z® Application Assist Processors (zAAPs)

## XREFOPT

XREFOPT sets the default value for the XREF compiler option, which affects the amount of cross-reference information produced in listings.

### Syntax



### Default

XREFOPT=FULL

### FULL

Produces a sorted cross-reference of the names used in the program, and indicates the lines where the names are defined. Also produces a COPY/BASIS cross-reference. If SOURCE=YES is also specified, embedded cross-reference information is printed on the same lines as the source.

### SHORT

Produces a sorted listing of only the explicitly referenced variables, and produces a COPY/BASIS cross-reference.

### NO

Suppresses the cross-reference listings.

### Note:

- XREFOPT=NO conflicts with values of DBCSXREF other than NO.
- It is recommended that you not change the default to XREFOPT=NO. If XREFOPT=NO, the COPY/BASIS cross-reference might in some cases be incomplete or missing.

For further details, see *XREF* in the *Enterprise COBOL Programming Guide*.

## ZONECHECK

ZONECHECK is deprecated and can no longer be specified in IGYCDOPT. NUMCHECK=(ZON(ALPHNUM)) gives the same results as ZONECHECK used to.

For details, see [“NUMCHECK” on page 46](#).

### Related references

[“NUMCHECK” on page 46](#)

[“NUMPROC” on page 51](#)

[“INVDATA” on page 36](#)

## ZONEDATA

The ZONEDATA option tells the compiler whether the data in USAGE DISPLAY and PACKED-DECIMAL data items is valid, and if not, what the behavior of the compiler should be.

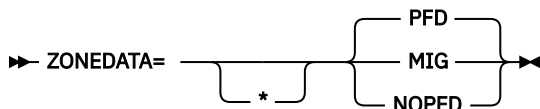
Since most users have valid data in their USAGE DISPLAY and USAGE PACKED-DECIMAL data items, most users should use ZONEDATA=PFDF. Even if you find that your programs are processing invalid data at run time (using the NUMCHECK compiler option), you should change your programs to avoid processing invalid data, and use ZONEDATA=PFDF.

**Note:** The ZONEDATA option is deprecated but is tolerated for compatibility, and it is replaced by the INVDATA option.

When the ZONEDATA option is specified, it is mapped to the equivalent INVDATA option as follows:

```
ZONEDATA=PFDF -> NOINVDATA
ZONEDATA=NOPFD -> INVDATA(NOFORCENUMCMP,CLEANSIGN)
ZONEDATA=MIG -> INVDATA(FORCENUMCMP,CLEANSIGN)
```

### Syntax



### Default

ZONEDATA=PFDF

### PFDF

When ZONEDATA=PFDF is in effect, the compiler assumes that all data in USAGE DISPLAY and PACKED-DECIMAL data items is valid, and generates the most efficient code possible to make numeric comparisons. For example, the compiler might generate a string comparison to avoid numeric conversion.

### MIG

When ZONEDATA=MIG is in effect, the compiler generates instructions to do numeric comparisons that ignore the zone bits of each digit in zoned decimal data items. For example, the zoned decimal value is converted to packed-decimal with a pack instruction before the comparison. The compiler will also avoid performing known optimizations that might produce a different result than COBOL V4 (or earlier versions) when a zoned decimal or packed decimal data item has invalid digits or an invalid sign code, or when a zoned decimal data item has invalid zone bits.

### NOPFD

When ZONEDATA=NOPFD is in effect, the compiler generates instructions for numeric comparisons or an alphanumeric comparison of zoned decimal data in the same manner as COBOL V4 (or earlier versions) does when using NUMPROC=NOPFD | PFDF with COBOL V4 (or earlier versions):

- In the cases where COBOL V4 (or earlier versions) considered the zone bits, the compiler generates an alphanumeric comparison which will also consider the zone bits of each digit in zoned decimal data items. The zoned decimal value remains as zoned decimal.
- In the cases where COBOL V4 ignored the zone bits, the compiler generates numeric comparisons that ignore the zone bits of each digit in zoned decimal data items. The zoned decimal value is converted to packed-decimal with a PACK instruction before the comparison.

In order for the compiler to handle zone bits in the same way as COBOL V4 (or earlier versions) did when generating comparisons of zoned decimal data, the NUMPROC suboption used in COBOL V6 must match the NUMPROC suboption used in COBOL V4 (or earlier versions):

- To get the COBOL V4 (or earlier versions) NUMPROC=NOPFD behavior in COBOL V6, use ZONEDATA=NOPFD and NUMPROC=NOPFD in COBOL V6.
- To get the COBOL V4 (or earlier versions) NUMPROC=PFD behavior in COBOL V6, use ZONEDATA=NOPFD and NUMPROC=PFD in COBOL V6.

The compiler will also avoid performing known optimizations that might produce a different result than COBOL V4 (or earlier versions) when a zoned decimal or packed decimal data item has invalid digits or an invalid sign code, or when a zoned decimal data item has invalid zone bits.

**Note:** The sign code must be a valid sign code according to the NUMPROC compiler option setting. In addition, the low-order byte must have a valid zone (x ' F ') for unsigned and signed with either SIGN IS LEADING or SIGN IS SEPARATE.

In all, to ease your migration to COBOL V6:

- If your digits, sign codes, and zone bits are valid, use ZONEDATA=PFD and the same NUMPROC setting that you used with COBOL V4 when using COBOL V6.
- If you have invalid digits, invalid sign codes, or invalid zone bits in your data, change your programs or systems so that your programs do not have invalid data in numeric data items at run time.

Once you have corrected your programs or systems, you can use the preferred ZONEDATA=PFD option. Only if you cannot contain this work and must continue to run with invalid data, consider the following choices for ZONEDATA:

- If you used NUMPROC=MIG with COBOL V4, use ZONEDATA=MIG and NUMPROC=NOPFD with COBOL V6.
- If you used NUMPROC=NOPFD with COBOL V4, use ZONEDATA=NOPFD and NUMPROC=NOPFD with COBOL V6.
- If you used NUMPROC=PFD with COBOL V4, use ZONEDATA=NOPFD and NUMPROC=PFD with COBOL V6.

**Note:** It is not always possible to entirely match the behavior of the old compiler even with these options when faced with clearly invalid data. For example, even for compares, ZONEDATA=NOPFD isn't going to give the same result in all cases as COBOL V4.

**Performance consideration:** ZONEDATA=PFD gives better runtime performance than ZONEDATA=NOPFD | MIG does. ZONEDATA=NOPFD | MIG disables some of the optimizations that NUMPROC=PFD can give.

## ZWB

ZWB determines whether the compiler removes the sign from signed zoned decimal fields before they are compared to alphanumeric fields at run time.

### Syntax



**Default**

ZWB=YES

**YES**

Removes the sign from a signed external decimal (DISPLAY) field when comparing this field to an alphanumeric field at run time.

**NO**

Does not remove the sign from a signed external decimal (DISPLAY) field when comparing this field to an alphanumeric field at run time.

**Note:**

- Setting this option affects program runtime logic; that is, the same COBOL source program can give different results, depending on the option setting. Verify whether your Enterprise COBOL source programs assume a particular setting to run correctly.
- Application programmers use ZWB=NO to test input numeric fields for SPACES.

---

## Chapter 3. Customizing Enterprise COBOL

The following sections describe the supplied user jobs and modules that you can modify to customize Enterprise COBOL.

You can make modifications to Enterprise COBOL only after installation of the product is complete.

One of the modifications is made using an SMP/E USERMOD. If you do not ACCEPT Enterprise COBOL into the distribution libraries before applying the USERMOD, you will not be able to use the SMP/E RESTORE statement to remove your USERMOD. Do not accept your USERMOD into the distribution libraries. You might want to remove your USERMOD if you find that it does not suit the needs of the programmers at your site.

You will have to remove your USERMOD before applying service to the modules that it changes. In this case, you will probably want to reapply your USERMOD after successful installation of the service.

**Important:** Make sure that Enterprise COBOL serves the needs of the application programmers at your site. Confer with them while you plan the customization of Enterprise COBOL. Doing so will ensure that the modifications you make at install time best support the application programs being developed at your site.

All information for installing Enterprise COBOL is included in the *Program Directory* provided with the product.

---

### Summary of user modifications

Installation of Enterprise COBOL places a number of sample modification jobs in the target data set IGY.V6R3M0.SIGYSAMP. However, these sample modification jobs are not customized for your particular system. You must customize them.

Table 9 on page 81 shows the names of the sample modification jobs, which are described in detail in the referenced information.

Copy members from IGY.V6R3M0.SIGYSAMP into one of your personal data sets before you modify and submit them so that you have an unmodified backup copy if you make changes that you want to abandon.

Descriptions of possible modifications appear in the comments in the JCL. You can use TSO to modify and submit the job.

---

*Table 9. Summary of user modification jobs for Enterprise COBOL*

Description	Job	See:
Changing the compiler options default module	IGYWDOPT	<a href="#">“Changing the compiler options default module” on page 82</a>
Overriding options specified as fixed	IGYWUOPT	<a href="#">“Overriding options specified as fixed” on page 83</a>
Changing reserved words	IGYWRWD	<a href="#">“Changing reserved words” on page 83</a>

---

### Changing the defaults for compiler options

You can change the defaults for compiler options, and can override fixed compiler options.

To change the defaults for compiler options:

1. Copy the source of options module IGYCDOPT from IGY.V6R3M0.SIGYSAMP into the appropriate job, IGYWDOPT or IGYWUOPT, in place of the two-line comment.
2. Change the parameters on the IGYCOPT macro call to match the compiler options that you have selected for your installation.

Observe the following requirements when coding the changed IGYCOPT macro call:

- Place continuation character (X in the source) in column 72 on each line of the IGYCOPT invocation except the last line. The continuation line must start in column 16. You can break the coding after any comma.
- Do not put a comma in front of the first option in the macro.
- Specify options and suboptions in uppercase. Only suboptions that are strings can be specified in mixed case or lowercase.
- If one of the string suboptions contains a special character (for example, an embedded blank or unmatched right or left parenthesis), the string must be enclosed in apostrophes ('), not in quotation marks ("). A null string can be specified with either contiguous apostrophes or quotation marks.

To obtain an apostrophe (') or a single ampersand (&) within a string, two contiguous instances of the character must be specified. The pair is counted as only one character in determining whether the maximum allowable string length has been exceeded and in setting the effective length of the string.

- Avoid unmatched apostrophes in any string that uses apostrophes. The error cannot be captured within IGYCOPT itself. Instead, the assembler produces a message such as:

```
IEV03 *** ERROR *** NO ENDING APOSTROPHE
```

This message bears no spatial relationship to the offending suboption. Furthermore, none of the options is properly parsed if this error is committed.

- Code only those options whose default value you want to change. The IGYCOPT macro generates the default value for any option that you do not code.

For a worksheet to help you plan your default compiler options, see [“IGYCDOPT worksheet for compiler options” on page 2](#). For descriptions of the options, see [Chapter 2, “Enterprise COBOL compiler options,” on page 11](#).

- Place an END statement after the macro instruction.

**Note:** When the assembler encounters an unknown keyword on any macro call, like the call to IGYCOPT in `igycopt.asm`, it treats the keyword as a positional parameter. Because the current version of the IGYCOPT macro did not check for positional parameters, those unknown keywords were completely ignored. Now, the IGYCOPT macro has been changed so that it detects these positional parameters and emits appropriate error messages. If you rebuild an existing customization macro that used to assemble RC=00, it might fail with assembly errors due to either unknown compiler options that were previously treated as positional parameters and thus ignored, or compiler options coded with incorrect syntax such as `OPTION()` instead of `OPTION=` in the COBOL customization macro. You must remove or correct these unknown or improperly coded options and rebuild the IGYCDOPT module.

For additional details about how to code macro calls, see the *High Level Assembler for z/OS Language Reference*.

## Changing the compiler options default module

To change the defaults for the Enterprise COBOL compiler options, modify the sample job IGYWDOPT.

To choose default values, use the information in [Chapter 2, “Enterprise COBOL compiler options,” on page 11](#).

To modify the JCL for IGYWDOPT, do these steps:

1. Add a job card appropriate for your site.
2. Add a JES ROUTE card if required for your site.
3. Replace the two comment lines in IGYWDOPT with a copy of the source for IGYCDOPT found in IGY.V6R3M0.SIGYSAMP.
4. Code parameters on the IGYCOPT macro statement in IGYCDOPT to reflect the values you have chosen for your installation-wide default compiler options.

5. Change #GLOBALCSI to the global CSI name.
6. Change #TZONE in the SET BDY statement to the target zone name.

After you modify the IGYWDOPT job, submit it. You will get a condition code of 0 if the job runs correctly. Also check the IGY $nnn$  informational messages in your listing to verify the defaults that will be in effect for your installation.

## Overriding options specified as fixed

Occasionally, you might have an application that needs to override one or more options that were specified as fixed.

You can provide other options by creating a temporary copy of the options module in a separate data set that can be accessed as a STEPLIB or JOBLIB (ahead of the IGY.V6R3M0.SIGYCOMP data set) when the application is compiled.

Sample job IGYWUOPT creates a default options module that is link-edited into a user-specified data set. The assembly and link-editing take place outside SMP/E control, so the standard default options module is not disturbed.

To modify the JCL for IGYWUOPT, do these steps:

1. Add a job card appropriate for your site.
2. Add a JES ROUTE card if required for your site.
3. Replace the two comment lines in IGYWUOPT with a copy of the source for IGYCDOPT found in IGY.V6R3M0.SIGYSAMP.
4. Change the parameters on the IGYCOPT macro statement in IGYWUOPT to reflect the values that you have chosen for this fixed option override compiler-options module.
5. If you chose to use a different prefix than the IBM-supplied one for the Enterprise COBOL target data sets, check the SYSLIB DD statement (marked with '<<<<<') to ensure that the data set names are correct.
6. Change DSNNAME=YOURLIB in the SYSLMOD DD statement to the name of the data set that you want your IGYCDOPT module bound into. Note that an IGYCDOPT module currently in the chosen data set will be replaced by the new version.

After you modify the IGYWUOPT job, submit it. Both steps return a condition code of 0 if the job runs successfully. Also check the IGY $nnn$  informational messages in your listing to verify the defaults that are in effect when this module is used in place of the standard default options module.

## Changing reserved words

---

To change the words that Enterprise COBOL treats as reserved, use the reserved word table utility.

The reserved words used by Enterprise COBOL are maintained in a table (IGYCRWT) provided with the product. A CICS-specific reserved word table (IGYCCICS) is provided as an alternate reserved word table (see [“CICS reserved word table \(IGYCCICS\)”](#) on page 8). You can change the reserved words by using the reserved word table utility (IGY8RWTU) to modify IGYCRWT or IGYCCICS, or by creating additional reserved word tables. You can also modify tables that you previously created.

The reserved word table utility accepts control statements to create or modify a reserved word table. The new table then contains the reserved words from the IBM-supplied table with all the changes that you have applied.

You can make the following types of changes to reserved word tables:

- Add words to be flagged with an informational message whenever they are used in a program. To produce these information messages, you must modify the IGYCRWT reserved word table and compile using the FLAGSTD option.
- Add words to be flagged with a severe error message whenever they are used in a program.

- Indicate that words currently flagged with an informational or error message should no longer be flagged.

Each reserved word table that you create must have a unique 1- to 4-character identifier. For a list of character strings that cannot be used, see [“WORD” on page 75](#).

At compile time, the value of the compiler option `WORD(xxxx)` identifies the reserved word table to be used. `xxxx` is the unique 1- to 4-character identification that you specified in the member name `IGYCxxxx`. You can create multiple reserved word tables, but only one can be specified at compile time.

**Note:** The total number of entries in a reserved word table should not exceed 1536 or 1.5 KB.

Because of the following example, when the IBM extension reserved word `ENTRY` is used in a program, it will be flagged with message 0086.

```
INFO  ENTRY
```

The following example restricts the use of `Boolean`, `XD`, and `PARENT`. Use of these will cause errors.

```
RSTR  BOOLEAN
      XD
      PARENT
```

The following example restricts the use of `GO TO` and `ALTER`. Use of these will cause errors.

```
RSTR  GO
      ALTER
```

In the following example, the reserved word table generated allows usage of all the 85 COBOL Standard language except nested programs.

```
RSTR IDENTIFICATION(1)  only allow 1 program per compilation unit
RSTR ID(1)              same for the short form
RSTR PROGRAM-ID(1)     only allow 1 program per compilation unit
RSTR GLOBAL             do not allow this phrase at all
```

## Creating or modifying a reserved word table

You can create or modify a reserved word table using one of these existing tables:

- Member `IGY8RWRD` in `IGY.V6R3M0.SIGYSAMP` (the IBM-supplied default reserved word table)
- Member `IGY8CICS` in `IGY.V6R3M0.SIGYSAMP` (the IBM-supplied CICS reserved word table)

You must also modify and invoke the appropriate non-SMP/E JCL.

The source file of the existing reserved word table should have four parts: Parts I, II, III, and IV. Follow these steps to modify the file and non-SMP/E JCL:

1. Make a private copy of the latest `IGY8RWRD` or `IGY8CICS`.

**Note:** `IGY8RWRD` or `IGY8CICS` might be updated with the addition of new reserved words either through a new release or continuous delivery PTFs. Be sure to rebuild your custom reserved word table using the latest version of `IGY8RWRD` or `IGY8CICS` as the basis.

2. Skip Part I (all lines up to and including the line with the keyword `MOD`). Make *no* alterations in this part of the file!
3. Edit Part II by placing asterisks in column 1 of the lines that contain reserved words for which you do not want informational messages issued.
4. Edit Part III by placing asterisks in column 1 of the lines that contain reserved words for which you do not want severe messages issued.

5. Edit Part IV by coding additional reserved word control statements that create the modifications that you want, as described in [“Coding control statements”](#) on page 85.
6. Modify and run the JCL, as described in [“Running JCL that creates a reserved word table”](#) on page 88. You also must create a unique 1- to 4-character identification for the new reserved word table and supply it in the JCL. Your user-defined reserved word table will be a program object in a PDSE dataset.

## Coding control statements

To create or modify a reserved word table, you must understand the syntax of the control statements that affect them.

The following figure illustrates the format for coding reserved word control statements.

```

ABBR   reserved-word: user-word [comments]
       [reserved-word: user-word [comments]]
       ?
INFO   COBOL-word [(@ | 1)] [comments]
       [COBOL-word [(@ | 1)] [comments]]
       ?
RSTR   COBOL-word [(@ | 1)] [comments]
       [COBOL-word [(@ | 1)] [comments]]
       ?

```

*Figure 2. Syntax format for reserved word control statements*

As shown in the preceding figure, the keywords you can use are:

### **ABBR**

Specifies an alternative form of an existing reserved word

### **INFO**

Specifies words that are to be flagged with an informational message whenever they are used in a program and the FLAGSTD compiler option is in effect

### **RSTR**

Specifies words that are to be flagged with an error message whenever they are used in a program

All words that you identify with the control statement keywords INFO and RSTR are flagged with a message in the source listing of the Enterprise COBOL program that uses them. Words that are abbreviated are not flagged in the source listing unless you have also specified them on the INFO or RSTR control statements.

## Rules for coding control statements

You need to follow the rules when you code your control statements.

These rules are:

- Begin the control statement in column 1.
- Place one or more spaces between the keyword and the first operand.
- When specifying a second operand, include a colon (:) and one or more spaces after the first operand.
- Continue a control statement by putting blanks in columns 1 through 5, followed by the operand or operands, to make additional specifications.
- Specify comments by putting an asterisk (\*) in column 1 of the control statements. You can also place comments on the same line as the control statement. In that case, however, there must be at least one space following the operand or operands before a comment begins.
- To specify more than one change within a single control statement, put each additional specification on a separate line.
- Do not add any blank lines.

## Coding operands in control statements

This topic shows the types of operands that you will be coding in the control statements.

### reserved-word

An existing reserved word.

### user-word

A user-defined COBOL word that is not a reserved word.

### comments

Any comments that you want to put on the same line with the control statement, or on a separate line that has an asterisk in column 1.

### COBOL-word

A word of up to 30 characters that can be a system name, a reserved word, or a user-defined word.

## Rules for coding control statement operands

Follow the rules when you code the control statement operands.

These rules are:

- A user-word can be used in only one ABBR statement in any particular reserved word table.
- A reserved-word specified in an ABBR statement can also be specified in either a RSTR or an INFO statement.
- A particular reserved-word can be specified only once in an ABBR statement.
- A particular COBOL-word can be specified only once in either a RSTR or an INFO statement.

## ABBR statement

The ABBR statement defines an alternative symbol for the reserved word specified. The symbol can be used when you code a program.

```
ABBR reserved-word: user-word [comments]
```

### Note:

- The user-word becomes a reserved word and can be used in place of the reserved-word specified in this statement.
- The reserved-word remains a reserved word with its original definition.
- The source listing shows the original source—the symbol as you coded it.
- The reserved word is used in compiler output—other listings, some messages, and so forth.

In the following example, REDEF and SEP become abbreviations that can be used in source programs. The appropriate reaction to the use of REDEFINES and SEPARATE takes place when the source program is compiled.

```
ABBR REDEFINES: REDEF  
SEPARATE: SEP
```

## INFO statement

The INFO statement specifies the COBOL words that are to be flagged by the compiler, and it can also be used to control the use of nested programs.

### INFO COBOL-word[(@ | 1)] [comments]

By selecting either 1 or 0, you can indicate whether a specific COBOL-word can be used only once, or not at all.

**0**

Indicates that whenever the specified COBOL-word is used, the 0086 informational message is issued if the FLAGSTD compiler option is in effect.

**1**

Indicates that the specified COBOL-word can be used once. If it is used more than once, informational message 0195 is issued.

The messages are handled as information (I) messages. The compilation condition is not changed.

## RSTR statement

The RSTR statement specifies COBOL words that cannot be used in a program, and it can also be used to control the use of nested programs.

### RSTR COBOL-word[@ | 1] [comments]

By selecting either 1 or 0, you can indicate whether a specific COBOL-word can be used only once, or not at all.

**0**

Indicates that whenever the specified COBOL-word is used, message 0084 is issued.

**1**

Indicates that the specified COBOL-word can be used once. If it is used more than once, severe message 0194 is issued.

The following reserved words can be restricted only by using option 1:

DATA  
ENVIRONMENT  
ID  
IDENTIFICATION  
PROGRAM-ID  
WORKING-STORAGE  
LOCAL-STORAGE  
LINKAGE

## Modifying and running non-SMP/E JCL

Use sample job IGYWRWD in IGY.V6R3M0.SIGYSAMP to create or modify a reserved word table.

The sample job uses a member based on IGY8RWRD or IGY8CICS in IGY.V6R3M0.SIGYSAMP as the input to the reserve word utility. It creates program object IGYCxxxx (where xxxx is the user identification) in IGY.V6R3M0.SIGYCOMP.

To modify the JCL for IGYWRWD, do these steps:

1. Modify the job statement for your site.
2. Add JES ROUTE records if required.
3. Change the data set name on the STEPLIB DD statement in STEP1 to match the compiler target data set name you used during installation.
4. To point to your modified reserved word table, do *only* one of the following steps:
  - Change the data set name in //RSWDREAD DD DSN=... to the data set name and member name of your modified reserved word table.
  - Replace the RSWDREAD DD with //RSWDREAD DD \* and insert your modified reserved table immediately following that line.

For specific instructions, see the comments in job IGYWRWD.

5. Change the name of the data set in the SYSLMOD DD statement in STEP3 to match the name of the data set to which you are adding your modified reserved word table. (The data set name in the

SYSLMOD DD statement should be the name of the compiler target data set.) Also, you must specify the name of your modified reserved word table in the parentheses that follow the data set name in the SYSLMOD DD statement.

After you run IGYWRWD, if you receive a nonzero return code from the table utility, use the error messages in the output data set specified on the RSWDPRNT DD statement to correct any mistakes and rerun the job.

## Running JCL that creates a reserved word table

The JCL that creates a reserved word table contains STEP1, STEP2, and STEP3.

The three steps do the following tasks, respectively:

1. Run the reserved word table utility with your modified table.
2. Assemble your modified reserved word table.
3. Produce a runtime program object from the object module.

After you run the job, a reserved word table is created, the library that you specified contains the new table, and the table has IGYC plus the 1- to 4-character identification that you specified.

## Tailoring the cataloged procedures to your site

---

You might want to tailor the cataloged procedures IGYWC, IGYWCL, or IGYWCLG for use at your site.

Consider these changes:

- Modifying the data set name prefixes if you used a different prefix than the IBM-supplied ones for Enterprise COBOL or Language Environment target data sets
- Removing the STEPLIB DD statements if you placed IGY.V6R3M0.SIGYCOMP, CEE.SCEERUN, and CEE.SCEERUN2 in the LNKST concatenation
- Changing the default region size for the GO steps if most of the programs at your site require a larger region for successful execution
- Changing the UNIT=parameter

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# Appendix A. Accessibility features for Enterprise COBOL for z/OS

Accessibility features assist users who have a disability, such as restricted mobility or limited vision, to use information technology content successfully. The accessibility features in z/OS provide accessibility for Enterprise COBOL for z/OS.

## Accessibility features

z/OS includes the following major accessibility features:

- Interfaces that are commonly used by screen readers and screen-magnifier software
- Keyboard-only navigation
- Ability to customize display attributes such as color, contrast, and font size

z/OS uses the latest W3C Standard, [WAI-ARIA 1.0](http://www.w3.org/TR/wai-aria/) (<http://www.w3.org/TR/wai-aria/>), to ensure compliance to [US Section 508](https://www.access-board.gov/ict/) (<https://www.access-board.gov/ict/>) and [Web Content Accessibility Guidelines \(WCAG\) 2.0](http://www.w3.org/TR/WCAG20/) (<http://www.w3.org/TR/WCAG20/>). To take advantage of accessibility features, use the latest release of your screen reader in combination with the latest web browser that is supported by this product.

The Enterprise COBOL for z/OS online product documentation in IBM Knowledge Center is enabled for accessibility. The accessibility features of IBM Knowledge Center are described at <http://www.ibm.com/support/knowledgecenter/en/about/releasenotes.html>.

## Keyboard navigation

Users can access z/OS user interfaces by using TSO/E or ISPF.

Users can also access z/OS services by using IBM Developer for z/OS.

For information about accessing these interfaces, see the following publications:

- *z/OS TSO/E Primer* (<http://publib.boulder.ibm.com/cgi-bin/bookmgr/BOOKS/ikj4p120>)
- *z/OS TSO/E User's Guide* (<http://publib.boulder.ibm.com/cgi-bin/bookmgr/BOOKS/ikj4c240/APPENDIX1.3>)
- *z/OS ISPF User's Guide Volume I* (<http://publib.boulder.ibm.com/cgi-bin/bookmgr/BOOKS/ispzug70>)
- *IBM Developer for z/OS Knowledge Center* ([http://www.ibm.com/support/knowledgecenter/SSQ2R2/rdz\\_welcome.html?lang=en](http://www.ibm.com/support/knowledgecenter/SSQ2R2/rdz_welcome.html?lang=en))

These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

## Interface information

The Enterprise COBOL for z/OS online product documentation is available in IBM Knowledge Center, which is viewable from a standard web browser.

PDF files have limited accessibility support. With PDF documentation, you can use optional font enlargement, high-contrast display settings, and can navigate by keyboard alone.

To enable your screen reader to accurately read syntax diagrams, source code examples, and text that contains period or comma PICTURE symbols, you must set the screen reader to speak all punctuation.

Assistive technology products work with the user interfaces that are found in z/OS. For specific guidance information, see the documentation for the assistive technology product that you use to access z/OS interfaces.

## **Related accessibility information**

In addition to standard IBM help desk and support websites, IBM has established a TTY telephone service for use by deaf or hard of hearing customers to access sales and support services:

TTY service  
800-IBM-3383 (800-426-3383)  
(within North America)

## **IBM and accessibility**

For more information about the commitment that IBM has to accessibility, see [IBM Accessibility](http://www.ibm.com/able) ([www.ibm.com/able](http://www.ibm.com/able)).

## Notices

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## Programming interface information

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IBM Enterprise COBOL for z/OS provides no macros that allow a customer installation to write programs that use the services of IBM Enterprise COBOL for z/OS.



**Attention:** Do not use as programming interfaces any IBM Enterprise COBOL for z/OS macros.

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# Glossary

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# List of resources

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## Enterprise COBOL for z/OS

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### COBOL for z/OS publications

You can find the following publications in the [Enterprise COBOL for z/OS library](#):

- *What's new*
- *Customization Guide*, SC27-8712-02
- *Language Reference*, SC27-8713-02
- *Programming Guide*, SC27-8714-02
- *Migration Guide*, GC27-8715-02
- *Performance Tuning Guide*, SC27-9202-01
- *Messages and Codes*, SC27-4648-01
- *Program Directory*, GI13-4526-02
- *Licensed Program Specifications*, GI13-4532-02

### Softcopy publications

The following collection kits contain Enterprise COBOL and other product publications. You can find them at <http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>.

- *z/OS Software Products Collection*
- *z/OS and Software Products DVD Collection*

### Support

If you have a problem using Enterprise COBOL for z/OS, see the following site that provides up-to-date support information: [https://www.ibm.com/support/home/product/B984385H82239E03/Enterprise\\_COBOL\\_for\\_z/OS](https://www.ibm.com/support/home/product/B984385H82239E03/Enterprise_COBOL_for_z/OS).

## Related publications

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### z/OS library publications

You can find the following publications in the [z/OS library](#).

#### Run-Time Library Extensions

- *Common Debug Architecture Library Reference*
- *Common Debug Architecture User's Guide*
- *DWARF/ELF Extensions Library Reference*

#### z/Architecture

- *Principles of Operation*

#### z/OS DFSMS

- *Access Method Services for Catalogs*
- *Checkpoint/Restart*

- *Macro Instructions for Data Sets*
- *Using Data Sets*
- *Utilities*

#### **z/OS DFSORT**

- *Application Programming Guide*
- *Installation and Customization*

#### **z/OS ISPF**

- *Dialog Developer's Guide and Reference*
- *User's Guide Vol I*
- *User's Guide Vol II*

#### **z/OS Language Environment**

- *Concepts Guide*
- *Customization*
- *Debugging Guide*
- *Language Environment Vendor Interfaces*
- *Programming Guide*
- *Programming Reference*
- *Run-Time Messages*
- *Run-Time Application Migration Guide*
- *Writing Interlanguage Communication Applications*

#### **z/OS MVS**

- *JCL Reference*
- *JCL User's Guide*
- *Programming: Callable Services for High-Level Languages*
- *Program Management: User's Guide and Reference*
- *System Commands*
- *z/OS Unicode Services User's Guide and Reference*
- *z/OS XML System Services User's Guide and Reference*

#### **z/OS TSO/E**

- *Command Reference*
- *Primer*
- *User's Guide*

#### **z/OS UNIX System Services**

- *Command Reference*
- *Programming: Assembler Callable Services Reference*
- *User's Guide*

#### **z/OS XL C/C++**

- *Programming Guide*
- *Run-Time Library Reference*

### **CICS Transaction Server for z/OS**

You can find the following publications in the [CICS library](#):

- *Developing CICS Applications*
- *API (EXEC CICS) Reference*
- *Developing CICS System Programs*
- *Global User Exit Reference*
- *XPI Reference*
- *Using EXCI with CICS*

## **COBOL Report Writer Precompiler**

- *Programmer's Manual, SC26-4301*
- *Installation and Operation, SC26-4302*

## **Db2 for z/OS**

You can find the following publications in the [Db2 library](#):

- *Application Programming and SQL Guide*
- *Command Reference*
- *SQL Reference*

## **IBM Debug for z/OS (formerly IBM Debug for z Systems and IBM Debug Tool for z/OS)**

You can find information about IBM Debug for z/OS in the [IBM Debug for z/OS library](#).

## **IBM Developer for z/OS (formerly IBM Developer for z Systems)**

You can find information about IBM Developer for z/OS in the [IBM Developer for z/OS library](#).

**Note:** IBM Developer for z/OS supersedes IBM Developer for z Systems and Rational Developer for z Systems.

You can find the following publications by searching their publication numbers in the [IBM Publications Center](#).

## **IMS**

- *Application Programming API Reference, SC18-9699*
- *Application Programming Guide, SC18-9698*

## **WebSphere Application Server for z/OS**

- *Applications, SA22-7959*

## **Softcopy publications for z/OS**

The following collection kit contains z/OS and related product publications:

- *z/OS CD Collection Kit, SK3T-4269*

## **Java**

- *IBM SDK for Java - Tools Documentation, [publib.boulder.ibm.com/infocenter/javasdk/tools/index.jsp](http://publib.boulder.ibm.com/infocenter/javasdk/tools/index.jsp)*
- *The Java 2 Enterprise Edition Developer's Guide, [download.oracle.com/javaee/1.2.1/devguide/html/DevGuideTOC.html](http://download.oracle.com/javaee/1.2.1/devguide/html/DevGuideTOC.html)*
- *Java 2 on z/OS, [www.ibm.com/servers/eserver/zseries/software/java/](http://www.ibm.com/servers/eserver/zseries/software/java/)*

- *The Java EE 5 Tutorial*, [download.oracle.com/javase/5/tutorial/doc/](http://download.oracle.com/javase/5/tutorial/doc/)
- *The Java Language Specification, Third Edition*, by Gosling et al., [java.sun.com/docs/books/jls/](http://java.sun.com/docs/books/jls/)
- *The Java Native Interface*, [download.oracle.com/javase/1.5.0/docs/guide/jni/](http://download.oracle.com/javase/1.5.0/docs/guide/jni/)
- *JDK 5.0 Documentation*, [download.oracle.com/javase/1.5.0/docs/](http://download.oracle.com/javase/1.5.0/docs/)

## **JSON**

- JavaScript Object Notation (JSON), [www.json.org](http://www.json.org)

## **Unicode and character representation**

- *Unicode*, [www.unicode.org/](http://www.unicode.org/)
- *Character Data Representation Architecture Reference and Registry*, SC09-2190

## **XML**

- *Extensible Markup Language (XML)*, [www.w3.org/XML/](http://www.w3.org/XML/)
- *Namespaces in XML 1.0*, [www.w3.org/TR/xml-names/](http://www.w3.org/TR/xml-names/)
- *Namespaces in XML 1.1*, [www.w3.org/TR/xml-names11/](http://www.w3.org/TR/xml-names11/)
- *XML specification*, [www.w3.org/TR/xml/](http://www.w3.org/TR/xml/)

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Product Number: 5655-EC6

SC27-8712-03

