Debug Tool for z/OS

Reference Summary

Version 9.1

GC23-9538-01

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Version 9.1

GC23-9538-01

Note!

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 57.

| This edition applies to Debug Tool for z/OS, Version 9.1 (Program Number 5655-U27) with the PTF for APAR
| PK74749, which supports the following compilers:

- AD/Cycle® C/370™ Version 1 Release 2 (Program Number 5688-216)
- C/C++ for MVS/ESA™ Version 3 (Program Number 5655-121)
- C/C++ feature of OS/390® (Program Number 5647-A01)
- C/C++ feature of z/OS (Program Number 5694-A01)
- OS/VS COBOL, Version 1 Release 2.4 (5740-CB1) - with limitations
- VS COBOL II Version 1 Release 3 and Version 1 Release 4 (Program Numbers 5668-958, 5688-023) - with limitations
- COBOL/370™ Version 1 Release 1 (Program Number 5688-197)
- COBOL for MVS & VM Version 1 Release 2 (Program Number 5688-197)
- COBOL for OS/390 & VM Version 2 (Program Number 5648-A25)
- Enterprise COBOL for z/OS and OS/390 Version 3 (Program Number 5655-G53)
- High Level Assembler for MVS & VM & VSE Version 1 Release 4 and Version 1 Release 5 (Program Number 5696-234)
- OS PL/I Version 2 Release 1, Version 2 Release 2, Version 2 Release 3 (Program Numbers 5668-909, 5668-910) - with limitations
- PL/I for MVS & VM Version 1 Release 1 (Program Number 5688-235)
- VisualAge® PL/I for OS/390 Version 2 Release 2 (Program Number 5655-B22)
- | Enterprise PL/I for z/OS and OS/390 Version 3.8 or earlier (Program Number 5655-H31)

This edition also applies to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

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You can find out more about Debug Tool by visiting the IBM Web site for Debug Tool at: http://www.ibm.com/software/awdtools/debugtool

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Contents

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About this document

Debug Tool combines the richness of the z/OS® environment with the power of Language Environment® to provide a debugger for programmers to isolate and fix their program bugs and test their applications. Debug Tool gives you the capability of testing programs in batch, using a nonprogrammable terminal in full-screen mode, or using a workstation interface to remotely debug your programs.

This document contains a summary of commands, built-in functions, and EQAOPTS options provided by Debug Tool. Each topic contains the name of the command, built-in function, or EQAOPTS option and then a syntax diagram. For more information about each command or built-in function, refer to *Debug Tool Reference and Messages*. For more information about each EQAOPTS option, see *Debug Tool Customization Guide*.

Who might use this document

This document is intended for programmers using Debug Tool to debug high-level languages (HLLs) with Language Environment and assembler programs either with or without Language Environment. Throughout this document, the HLLs are referred to as C, C++, COBOL, and PL/I.

Debug Tool runs on the z/OS operating system and supports the following subsystems:

- CICS®
- DB2®
- IMS™
- JES batch
- TSO
- UNIX® System Services in remote debug mode or full-screen mode through a VTAM terminal only
- WebSphere® in remote debug mode or full-screen mode through a VTAM terminal only

To use this document and debug a program written in one of the supported languages, you need to know how to write, compile, and run such a program.

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LookAt is an online facility that lets you look up explanations for most of the IBM messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can use LookAt from the following locations to find IBM message explanations for z/OS elements and features, z/VM®, VSE/ESA™, and Clusters for AIX® and Linux®:

- The Internet. You can access IBM message explanations directly from the LookAt Web site at http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/.
- Your z/OS TSO/E host system. You can install code on your z/OS or z/OS.e systems to access IBM message explanations, using LookAt from a TSO/E command line (for example, TSO/E prompt, ISPF, or z/OS UNIX System Services running OMVS).
- Your Microsoft® Windows® workstation. You can install code to access IBM message explanations on the *z/OS Collection* (SK3T-4269), using LookAt from a Microsoft Windows command prompt (also known as the DOS command line).
- Your wireless handheld device. You can use the LookAt Mobile Edition with a handheld device that has wireless access and an Internet browser (for example, Internet Explorer for Pocket PCs, Blazer, or Eudora for Palm OS, or Opera for Linux handheld devices). Link to the LookAt Mobile Edition from the LookAt Web site.

You can obtain code to install LookAt on your host system or Microsoft Windows workstation from a disk on your *z/OS Collection* (SK3T-4269), or from the LookAt Web site (click **Download**, and select the platform, release, collection, and location that suit your needs). More information is available in the LOOKAT.ME files available during the download process.

How to read syntax diagrams

This section describes how to read syntax diagrams. It defines syntax diagram symbols, items that may be contained within the diagrams (keywords, variables, delimiters, operators, fragment references, operands) and provides syntax examples that contain these items.

Syntax diagrams pictorially display the order and parts (options and arguments) that comprise a command statement. They are read from left to right and from top to bottom, following the main path of the horizontal line.

Symbols

The following symbols may be displayed in syntax diagrams:

Symbol	Definition
▸▸—	Indicates the beginning of the syntax diagram.
—▸	Indicates that the syntax diagram is continued to the next line.
▸—	Indicates that the syntax is continued from the previous line.
—▸◂	Indicates the end of the syntax diagram.

Syntax items

Syntax diagrams contain many different items. Syntax items include:

- Keywords - a command name or any other literal information.
- Variables - variables are italicized, appear in lowercase and represent the name of values you can supply.
- Delimiters - delimiters indicate the start or end of keywords, variables, or operators. For example, a left parenthesis is a delimiter.
- Operators - operators include add (+), subtract (-), multiply (*), divide (/), equal (=), and other mathematical operations that may need to be performed.
- Fragment references - a part of a syntax diagram, separated from the diagram to show greater detail.
- Separators - a separator separates keywords, variables or operators. For example, a comma (,) is a separator.

Keywords, variables, and operators may be displayed as required, optional, or default. Fragments, separators, and delimiters may be displayed as required or optional.

Item type	Definition
Required	Required items are displayed on the main path of the horizontal line.
Optional	Optional items are displayed below the main path of the horizontal line.
Default	Default items are displayed above the main path of the horizontal line.

Syntax examples

The following table provides syntax examples.

Table 1. Syntax examples

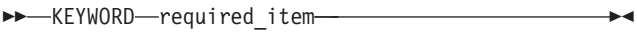
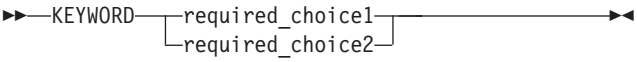
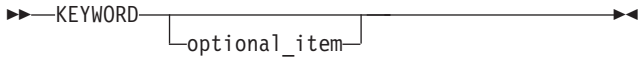
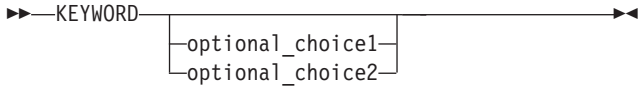
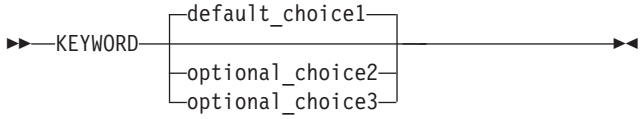
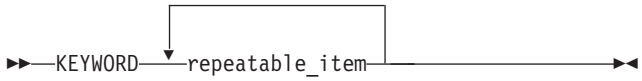
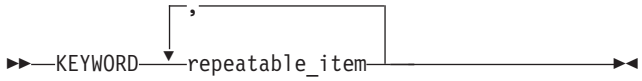
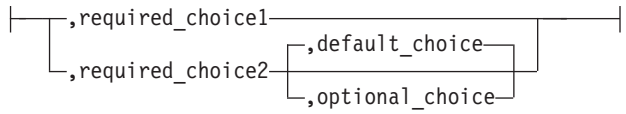
Item	Syntax example
Required item. Required items appear on the main path of the horizontal line. You must specify these items.	
Required choice. A required choice (two or more items) appears in a vertical stack on the main path of the horizontal line. You must choose one of the items in the stack.	

Table 1. Syntax examples (continued)

Item	Syntax example
Optional item. Optional items appear below the main path of the horizontal line.	
Optional choice. An optional choice (two or more items) appears in a vertical stack below the main path of the horizontal line. You may choose one of the items in the stack.	
Default. Default items appear above the main path of the horizontal line. The remaining items (required or optional) appear on (required) or below (optional) the main path of the horizontal line. The following example displays a default with optional items.	
Variable. Variables appear in lowercase italics. They represent names or values.	
Repeatable item. An arrow returning to the left above the main path of the horizontal line indicates an item that can be repeated. A character within the arrow means you must separate repeated items with that character. An arrow returning to the left above a group of repeatable items indicates that one of the items can be selected, or a single item can be repeated.	 
Fragment. The ┤ fragment ├ symbol indicates that a labelled group is described below the main syntax diagram. Syntax is occasionally broken into fragments if the inclusion of the fragment would overly complicate the main syntax diagram.	 **fragment:** 

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- Fill out the Readers' Comment Form at the back of this document, and return it by mail or give it to an IBM representative. If the form has been removed, address your comments to:

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Summary of changes

This section lists the key changes made to Debug Tool for z/OS.

Changes introduced with the PTF for APAR PK74749

- C/C++ expression support has been enhanced.

  Usage notes for some commands in the *Debug Tool Reference and Messages* have been updated and an example has been removed from the *Debug Tool User's Guide*.
- Debug Tool now supports using the `STEP OVER` command in assembler compile units to step over subroutines within the same compile unit. You can enable this support by entering the `SET ASSEMBLER STEPOVER EXTINT` command.

  A new command has been added to the *Debug Tool Reference and Messages* and the title of "SET ASSEMBLER" was changed to "SET ASSEMBLER ON/OFF".
- A new CICS transaction has been added (DTSC) that can make it easier to assign a terminal to Debug Tool.

  The *Debug Tool Customization Guide* and *Debug Tool User's Guide* have been updated.
- The `LOADDEBUGDATA` command has been enhanced so that you can qualify the name of a compile unit with the name of the load module.

  The description of the `LOADDEBUGDATA` command in the *Debug Tool Reference and Messages* has been updated.
- The syntax diagram for the `QUERY` command has been modified to make it easier to read.
- The `SET INTERCEPT` command can now be used in remote debug mode while you debug COBOL programs.

  The description of the `SET INTERCEPT` and `SET REWRITE` command has been updated in the *Debug Tool Reference and Messages*. `SET INTERCEPT` and `SET REWRITE` commands have been added to "Appendix B. Debug Tool commands supported in remote debug mode" in *Debug Tool Reference and Messages*.
- The `SET IGNORELINK` command can now be used in remote debug mode.

  The description of the `SET IGNORELINK` command has been updated in the *Debug Tool Reference and Messages*. `SET IGNORELINK` command has been added to "Appendix B. Debug Tool commands supported in remote debug mode" in *Debug Tool Reference and Messages*.
- A new sample, EQAWSVST, is available that you can use to set up saving and restoring settings, breakpoints, and monitor specifications.

  A section in the *Debug Tool User's Guide* describes this new sample.
- Minor updates have been made to improve clarity.

Changes introduced with the PTF for APAR PK72833

- You can now debug programs loaded from library lookaside (LLA). For instructions on how to do this, see "Debugging programs loaded from library lookaside (LLA)" in *Debug Tool User's Guide*.

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Changes introduced with Debug Tool V9.1

The removal of references to Debug Tool Utilities and Advanced Functions are not marked with revision bars so that they do not distract from the technical changes.

The following changes, if applicable, are marked with revision bars:

- A new command, `CALL %FM`, has been added so that you can start IBM File Manager for z/OS from your CICS debugging session.

  See "CALL %FM" on page 8 for more information.
- The `SET AUTOMONITOR` command has been enhanced so you can display the value of variables on the statement Debug Tool is about to run and the statement that it ran previously.

  "SET AUTOMONITOR" on page 34 has been updated to show the new parameters you can specify for this command.
- Support for AMode(64) assembler and disassembly programs has been added. You can now run debugging functions, like stopping at breakpoints or stepping through a program, in AMode(64) programs, program segments, or both. You can now include AMode(64) addressable data in assembler and disassembly expressions, and display or alter 64-bit addressable storage by using the `LIST STORAGE`, `STORAGE`, and `MEMORY` commands.

  The Summary of Changes in *Debug Tool Reference and Messages* has a list of topics that have been updated to describe how you specify and how Debug Tool handles 64-bit addresses.
- New parameters are now available on the `LIST CONTAINER` and `LIST STORAGE` commands to format the contents of an XML document stored in a container or storage.

  Debug Tool uses the z/OS XML parser to verify the syntax of the document. If the syntax is valid, Debug Tool formats and writes the XML to the log file. The syntax diagrams of the following commands have been updated:

  – "LIST CONTAINER" on page 22
  – "LIST STORAGE" on page 25

  This feature is not available in remote debug mode.
- New prefix commands that can be entered through the prefix area of the Source window have been added to make it easier to display the value of a variable and add variables to the Monitor window.

  The `L` prefix command displays the value of a variable. The `M` prefix command adds a variable to the Monitor window. These commands are available when your program is compiled with the following compilers:

  – Enterprise PL/I for z/OS, Version 3.6 or 3.7 with the PTF for APAR PK70606, or later
  – Enterprise COBOL

  The following topics have been updated or added to describe the new prefix commands:

  – "L expression prefix" on page 23
  – "MONITOR prefix command" on page 27
  – "Prefix commands (full-screen mode)" on page 30
- Debugging profiles created by DTCN can now be stored in a VSAM file.

  See *Debug Tool User's Guide* for a description of the differences between storing the debugging profile in a temporary storage queue or a VSAM file, and how to save the debugging profile in one or the other.

- The FIND command has been enhanced so that you can specify the first and last columns to search through in the Source window. The SET FIND BOUNDS and QUERY FIND BOUNDS commands have been added.

  The following commands have been updated so that you can specify the boundaries of a column of text in the Source window:

  – "FIND command" on page 18
  – "SET FIND BOUNDS" on page 38
  – "QUERY command" on page 30
- A new %IF command has been added that is *programming language neutral*. The %IF command can help you write commands that can be used in programs written in different programming languages.

  "%IF command (programming language neutral)" on page 20 has been added to describe this new command.
- The DTCN transaction has been updated to include another resource that you can use to identify the program or transaction that you want to debug.

  See *Debug Tool User's Guide* for instructions on how to specify the data in the COMMAREA or a container that can help identify which program or transaction to debug.
- Additional commands that were previously available only in full-screen mode are now available in remote debug mode. A list of Debug Tool commands supported in remote debug mode has been moved from *Debug Tool User's Guide* to "Debug Tool commands supported in remote debug mode" in *Debug Tool Reference and Messages*. This topic has been updated to include instructions on how to enter these commands in the remote debugger.
- New parameters, OLD and MOD, are now available on the SET LOG ON FILE command to control whether the previous contents of the file are overwritten or whether the new information is appended.

  "SET LOG" on page 40 has been updated.
- A new Debug Tool variable has been added: %RSTDSETS.

  You can use this variable in the condition of an IF or %IF statement to determine if the SET values have been restored. See *Debug Tool Reference and Messages* for a description of %RSTDSETS.
- The AT ENTRY and AT STATEMENT commands have been enhanced with a WHEN conditional clause. You can now indicate that you want Debug Tool to stop at an entry point or a specific statement only after a condition is met.

  The descriptions of the AT ENTRY and AT EXIT commands have been separated. The AT ENTRY command includes information about the WHEN conditional clause. See "AT ENTRY" on page 4. The description of the AT STATEMENT command includes information about the WHEN conditional clause. See "AT STATEMENT" on page 6.
- In Debug Tool Setup Utilities, support for specifying generation data groups (GDG) where you specify data set names has been expanded to include debug sessions that run in the foreground. This support was available previously only for debug sessions that run in batch mode. For more information about GDG, see *z/OS DFSMS™ Using Data Sets*.
- In CICS, you can now debug User Replaceable Modules (URMs).

  A user-replaceable program (or User Replaceable Module, URM) is a CICS-supplied program that is always invoked at a particular point in CICS processing, as if it were part of the CICS code. Because it can be considered part

of the CICS code, you should think carefully before choosing to debug these programs. For a description of user-replaceable programs, see *CICS Transaction Server for z/OS Customization Guide*.

See *Debug Tool User's Guide* for instructions on how to indicate that you want debug URMs.

- Saving and restoring of monitors now saves local monitors as well as global monitors. In addition, when the compile unit for a local monitor is deleted, any local monitors for that compile unit are suspended and automatically restored if the compile unit reappears later in the same debugging session. See *Debug Tool Reference and Messages* for more information.
- You can now use the EQAUEDAT user exit to specify the location of the file generated by the `DWARF` suboption of the C/C++ compiler. See *Debug Tool Customization Guide* for instructions on how to use the EQAUEDAT user exit.
- With DTCN, you can now have Debug Tool start at a program boundary for a CICS task that has already started.
- A new utility has been added to Debug Tool Utilities, called **JCL for Batch Debugging**, which can help you start a debugging session from your JCL.

  See *Debug Tool Customization Guide* for more information.
- SMP/E USERMODs are now available for some customizations.

  The *Debug Tool User's Guide* and *Debug Tool Customization Guide* have been updated to indicate when a USERMOD is available for a particular customization.
- A new command called `SET IGNORELINK` has been added. This command can help improve performance for CICS programs that create many nested enclaves. See *Debug Tool Reference and Messages* for more information.

Chapter 1. Debug Tool commands

Debug Tool provides the following commands:

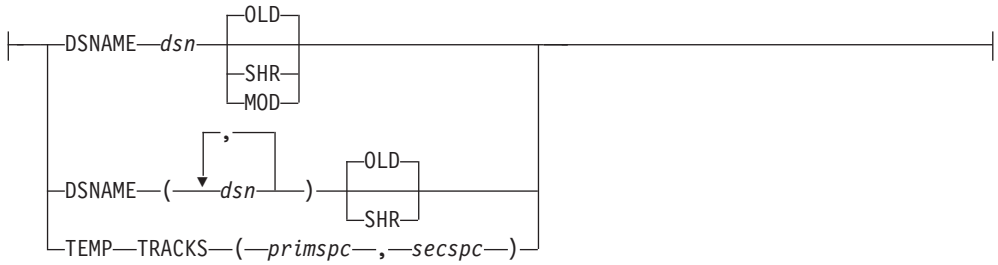
? command

Displays a list of all commands or, if used in combination with a command, displays a list of options that you can specify for that command.

ALLOCATE command

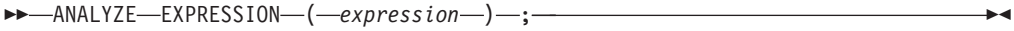
The ALLOCATE command allocates a file (*ddname*) to an existing data set, a concatenation of existing data sets, or a temporary data set.

attributes:



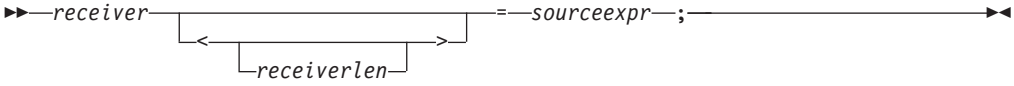
ANALYZE command (PL/I)

The ANALYZE command displays the process of evaluating an expression and the data attributes of any intermediate results.



Assignment command (assembler and disassembly)

The Assignment command copies the value of an expression to a specified memory location or register.



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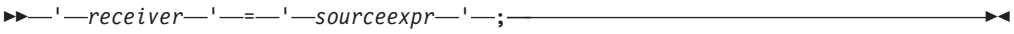
Assignment command (non-Language Environment COBOL)

The Assignment command assigns the value of an expression to a specified reference. It is the equivalent of the COBOL COMPUTE statement.

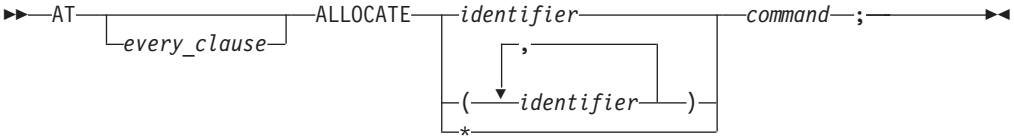


Assignment command (PL/I)

The `Assignment` command copies the value of an expression to a specified reference.

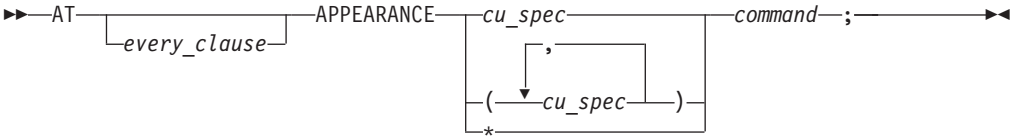
AT ALLOCATE (PL/I)

`AT ALLOCATE` gives Debug Tool control when storage for a named controlled variable or aggregate is dynamically allocated by PL/I.



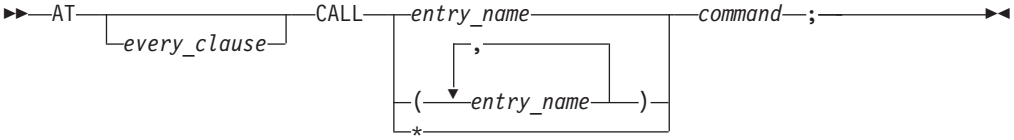
AT APPEARANCE

Gives Debug Tool control when the specified compile unit is found in storage.



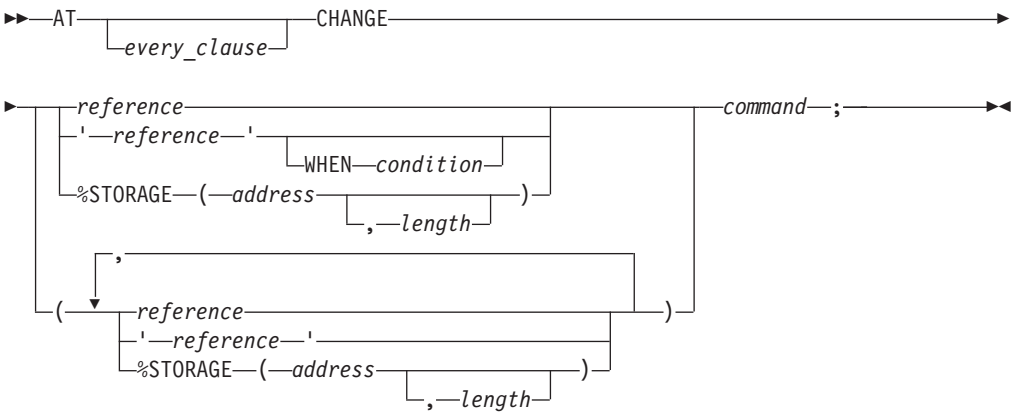
AT CALL

Gives Debug Tool control when the application code attempts to call the specified entry point.



AT CHANGE

Gives Debug Tool control when either the program or Debug Tool command changes the specified variable value or storage location, and, optionally, when the specified condition is met.



AT CHANGE (remote)

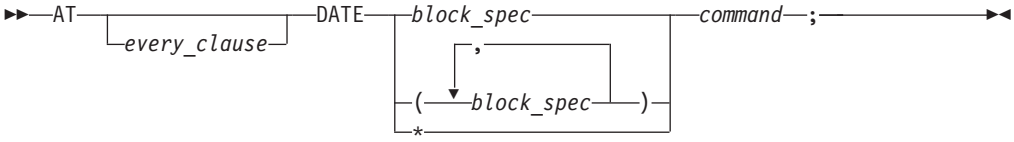
Gives Debug Tool control when either the program or Debug Tool command changes the specified variable value.

AT CURSOR (full-screen mode)

Provides a cursor controlled method for setting a statement breakpoint.

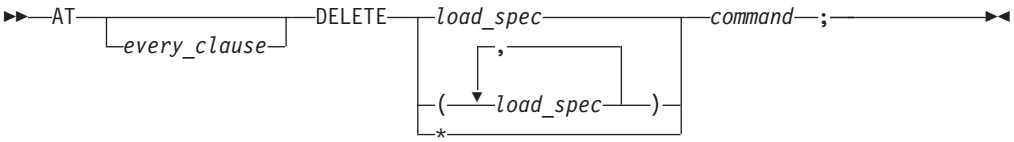
AT DATE (COBOL)

Gives Debug Tool control for each date processing statement within the specified block.



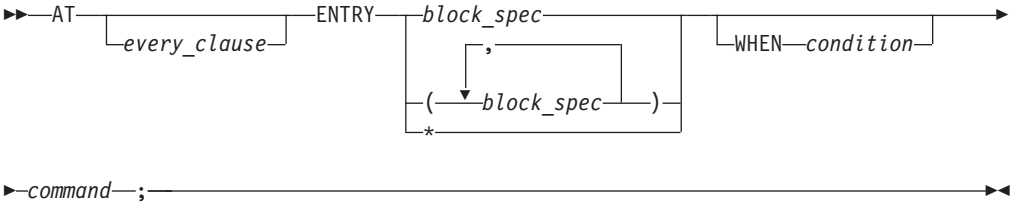
AT DELETE

Gives Debug Tool control when a load module is removed from storage by a Language Environment delete service, such as on completion of a successful C `release()`, COBOL `CANCEL`, or PL/I `RELEASE`.



AT ENTRY

Defines a breakpoint at the specified entry point in the specified block.

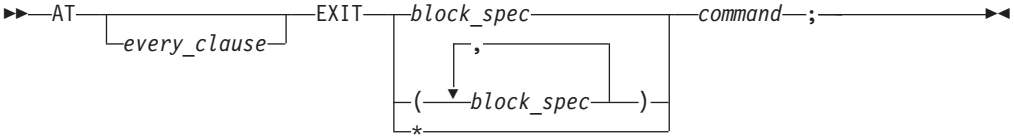


AT ENTRY (remote)

Defines a breakpoint at the specified entry point in the specified block.

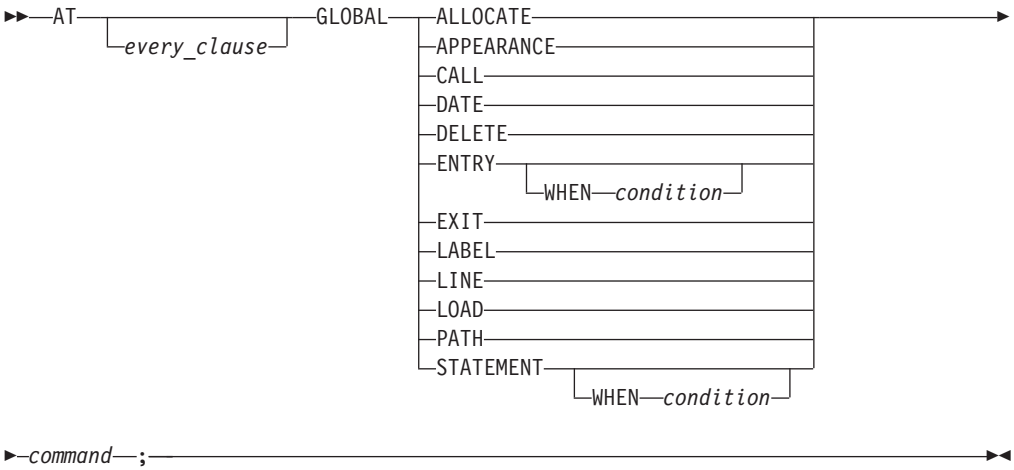
AT EXIT

Defines a breakpoint at the specified exit point in the specified block.



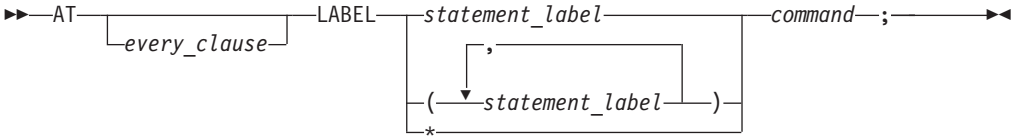
AT GLOBAL

Gives Debug Tool control for every instance of the specified `AT`-condition.



AT LABEL

Gives Debug Tool control when execution has reached the specified statement label or group of labels.

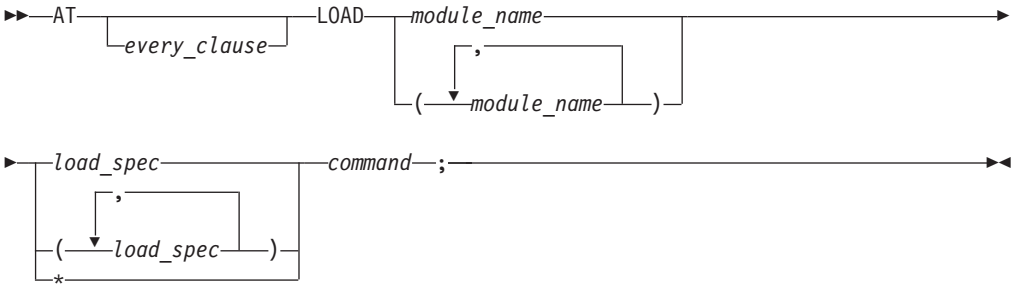


AT LINE

Gives Debug Tool control at the specified line. See "AT STATEMENT" on page 6.

AT LOAD

Gives Debug Tool control when the specified load module is brought into storage.

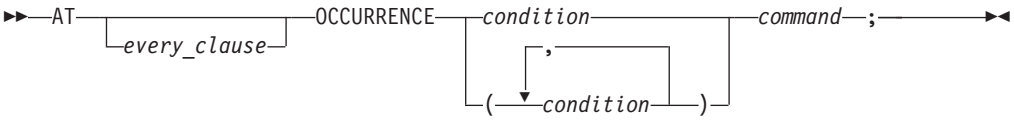


AT LOAD (remote)

Gives Debug Tool control when the specified load module is brought into storage.

AT OCCURRENCE

Gives Debug Tool control on a language or Language Environment condition or exception.

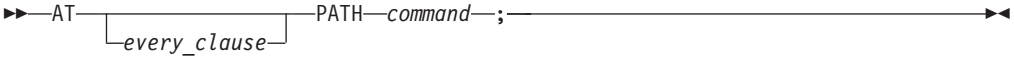


AT OFFSET (disassembly)

Gives Debug Tool control at the specified offset in the disassembly view.

AT PATH

Gives Debug Tool control when the flow of control changes (at a path point). `AT PATH` is identical to `AT GLOBAL PATH`.

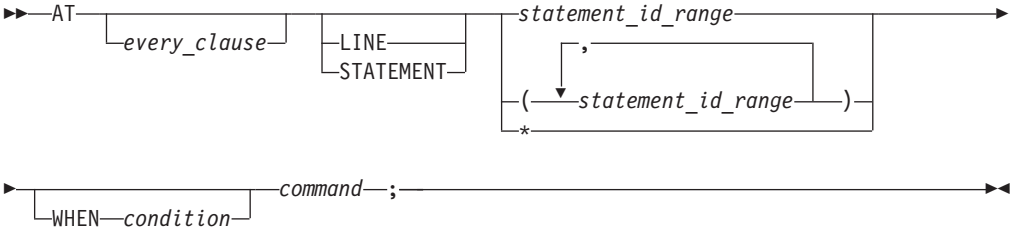


AT Prefix (full-screen mode)

Sets a statement breakpoint when you issue this command through the Source window prefix area.

AT STATEMENT

Gives Debug Tool control at each specified statement or line within the given set of ranges, and, optionally, when the specified condition is met.



AT STATEMENT (remote)

Gives Debug Tool control at each specified statement or line.

AT TERMINATION

Gives Debug Tool control when the application program is terminated.

BEGIN command

BEGIN and END delimit a sequence of one or more commands to form one longer command.

block command (C and C++)

The block command allows you to group any number of Debug Tool commands into one command.

break command (C and C++)

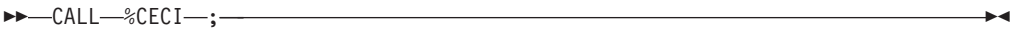
The break command allows you to terminate and exit a loop (that is, do, for, and while) or switch command from any point other than the logical end.

CALL %CEBR

Starts the CICS Temporary Storage Browser Program.

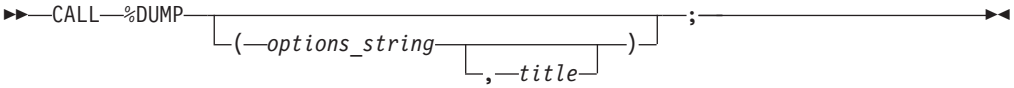
CALL %CECI

Starts the CICS Command Level Interpreter Program.



CALL %DUMP

Calls the Language Environment dump service to obtain a formatted dump.

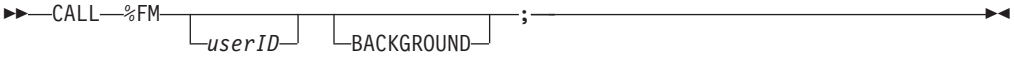


CALL %FA

Starts and instructs IBM Fault Analyzer to provide a formatted dump of the current machine state.

CALL %FM

Starts IBM File Manager for z/OS.



CALL %HOGAN

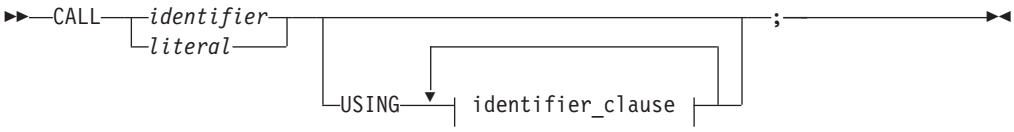
Starts Computer Sciences Corporation's KORE-HOGAN application, also known as SMART (System Memory Access Retrieval Tool).

CALL %VER

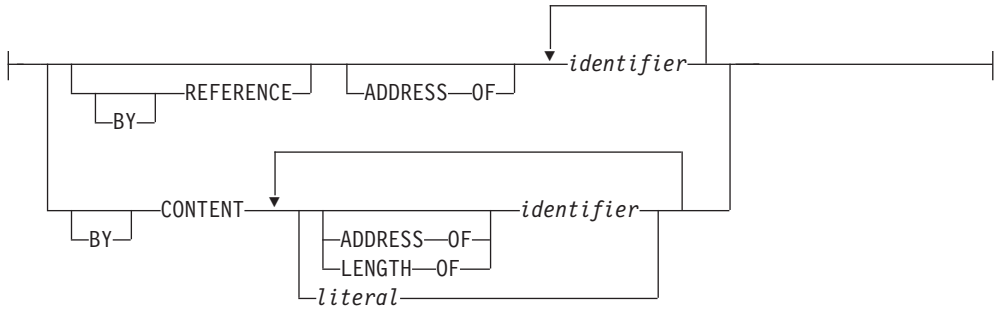
Adds a line to the log describing the maintenance level of Debug Tool that you have installed on your system..

CALL entry_name (COBOL)

Calls an entry name in the application program.



identifier_clause:



CALL procedure

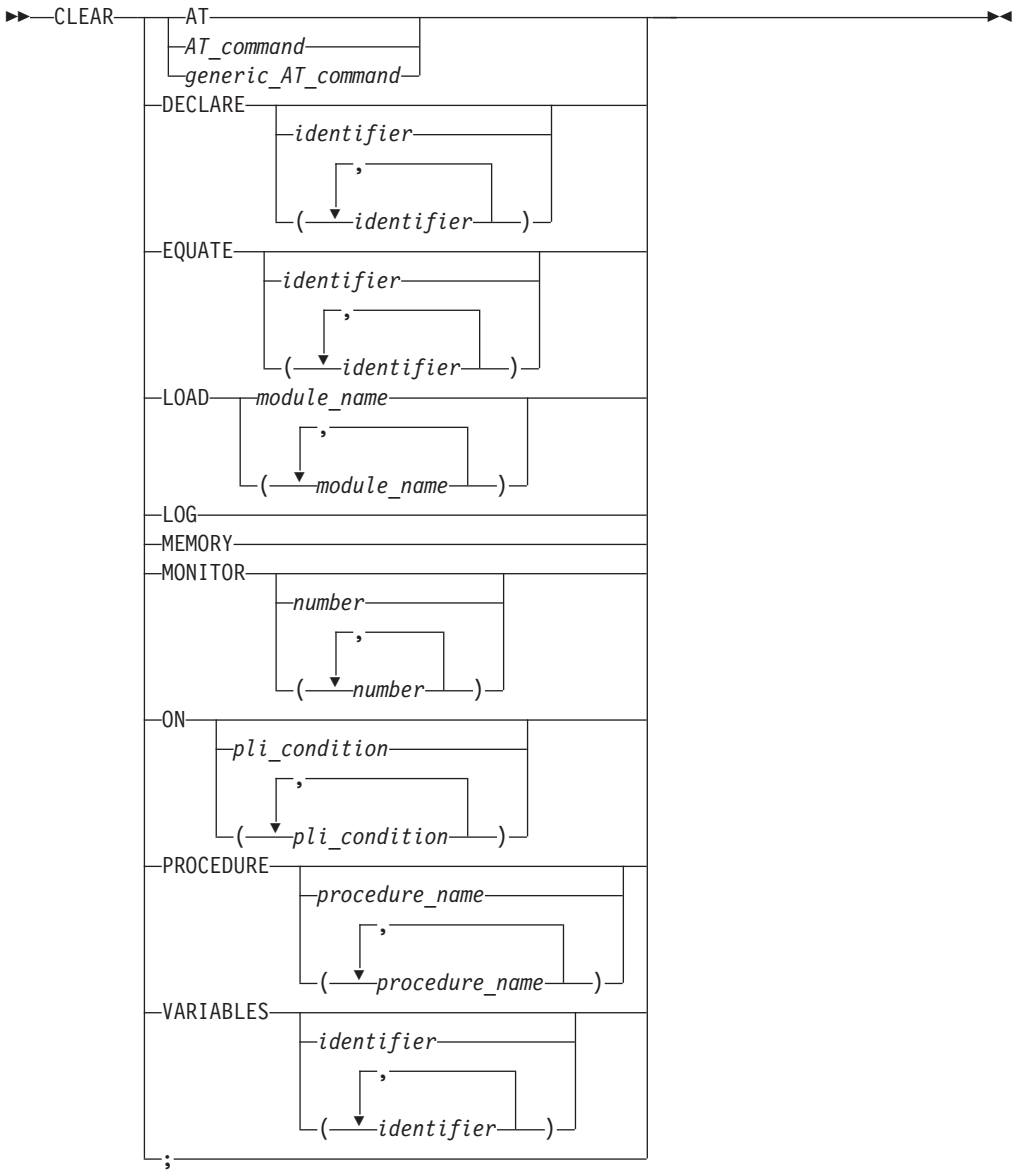
Calls a procedure that has been defined with the PROCEDURE command.

CHKSTGV

Check for a specific type of storage violation in the task you are currently debugging.

CLEAR command

The CLEAR command removes the actions of previously issued Debug Tool commands.



CLEAR prefix (full-screen mode)

Clears a breakpoint when you issue this command through the Source window prefix area.

COMMENT command

The COMMENT command can be used to insert commentary in to the session log.

COMPUTE command (COBOL)

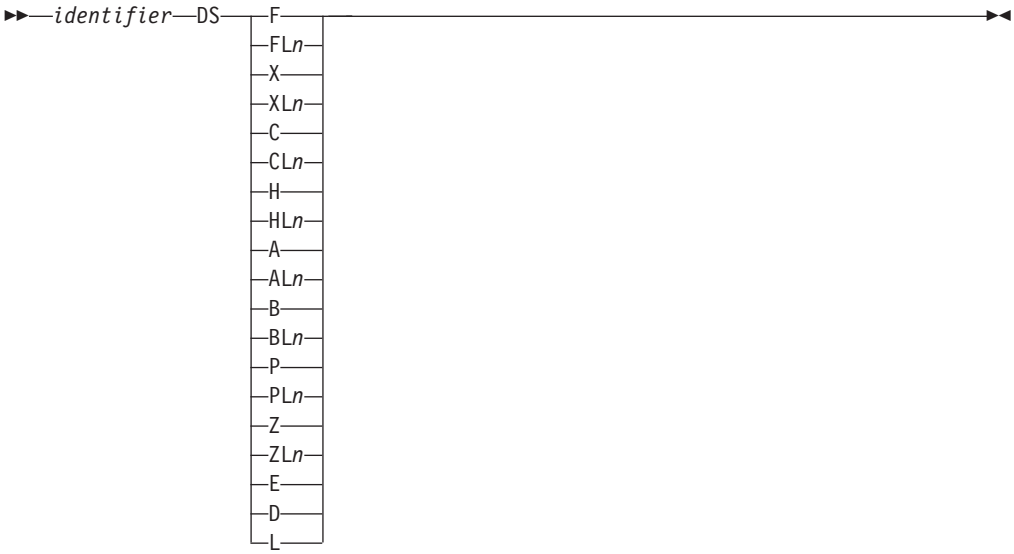
The COMPUTE command assigns the value of an arithmetic expression to a specified reference.

CURSOR command (full-screen mode)

The CURSOR command moves the cursor between the last saved position on the Debug Tool session panel (excluding the header fields) and the command line.

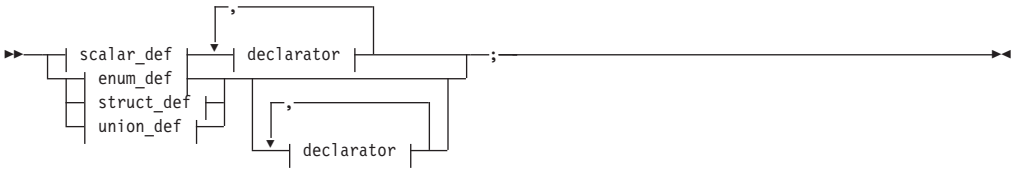
Declarations (assembler, disassembly, and non-Language Environment COBOL)

Use declarations to create session variables and tags effective during a Debug Tool session.

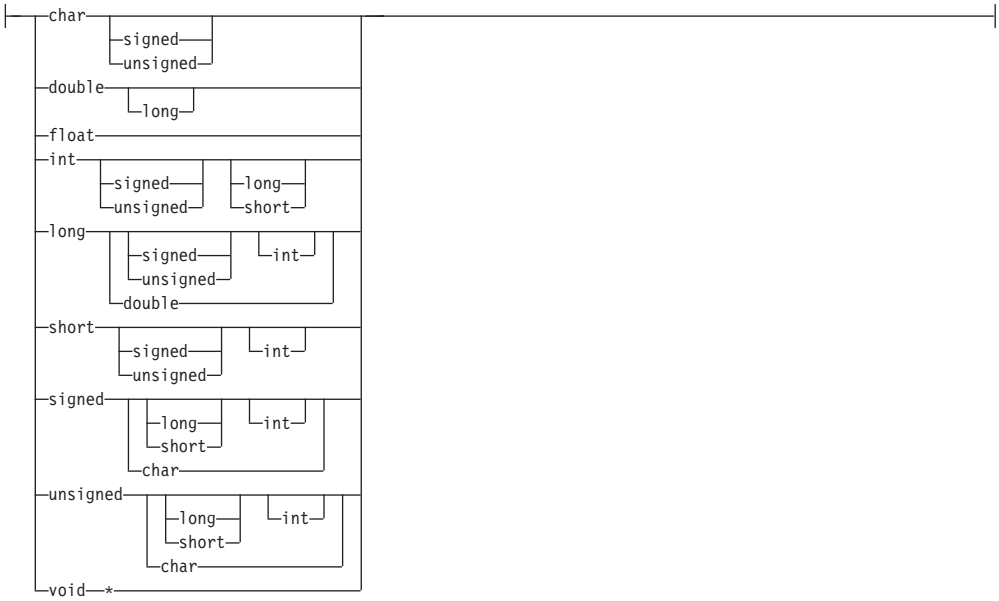


Declarations (C and C++)

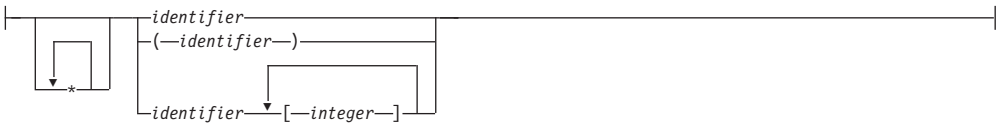
Use declarations to create session variables and tags effective during a Debug Tool session.



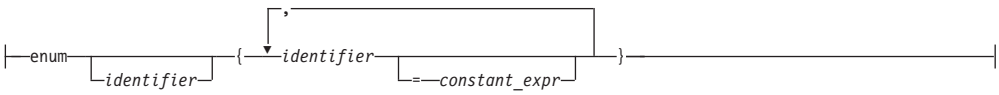
scalar_def:



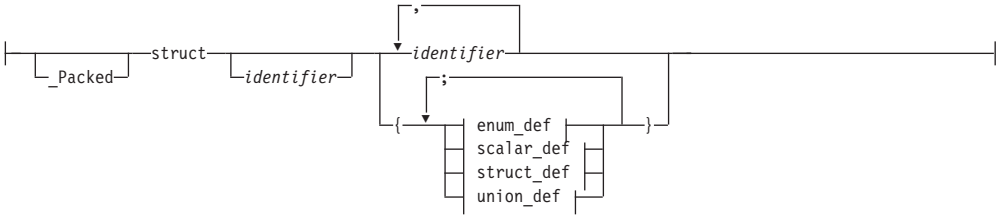
declarator:



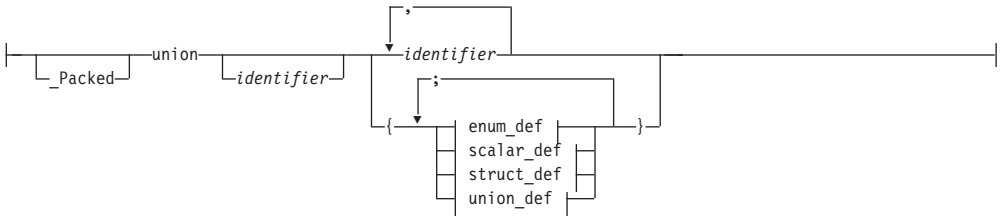
enum_def:



struct_def:

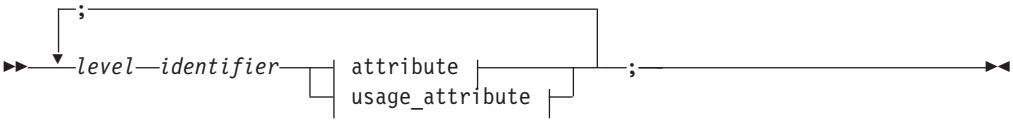


union_def:

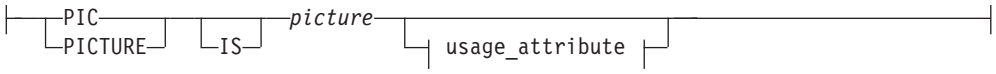


Declarations (COBOL)

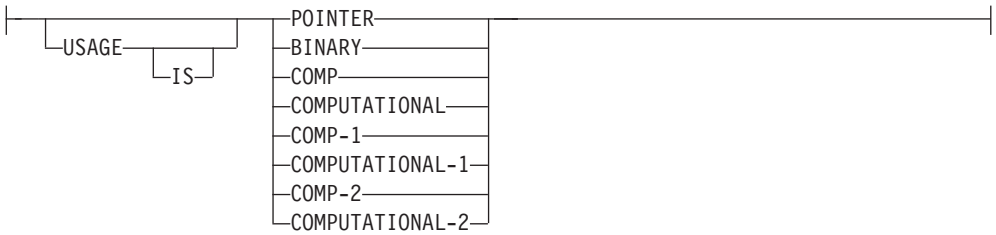
Use declarations to create session variables effective during a Debug Tool session.



attribute:

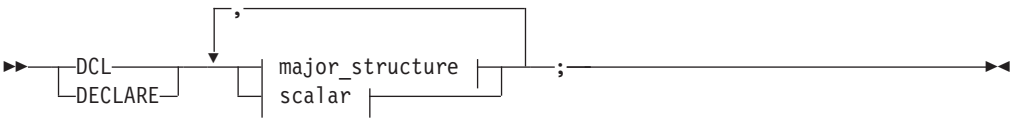


usage_attribute:

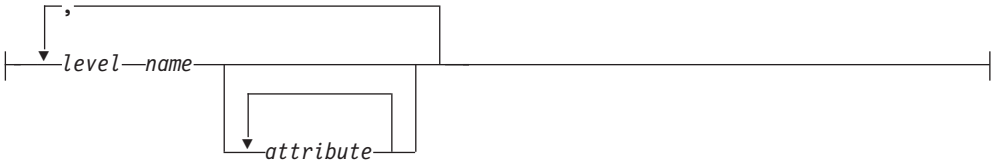


DECLARE command (PL/I)

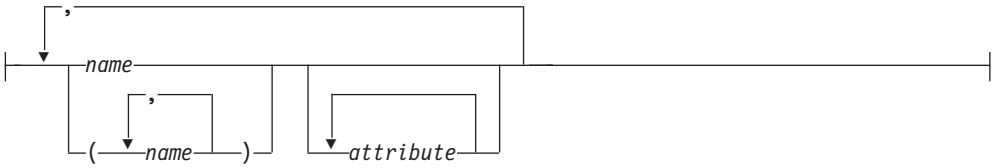
The DECLARE command creates session variables effective during a Debug Tool session.



major_structure:

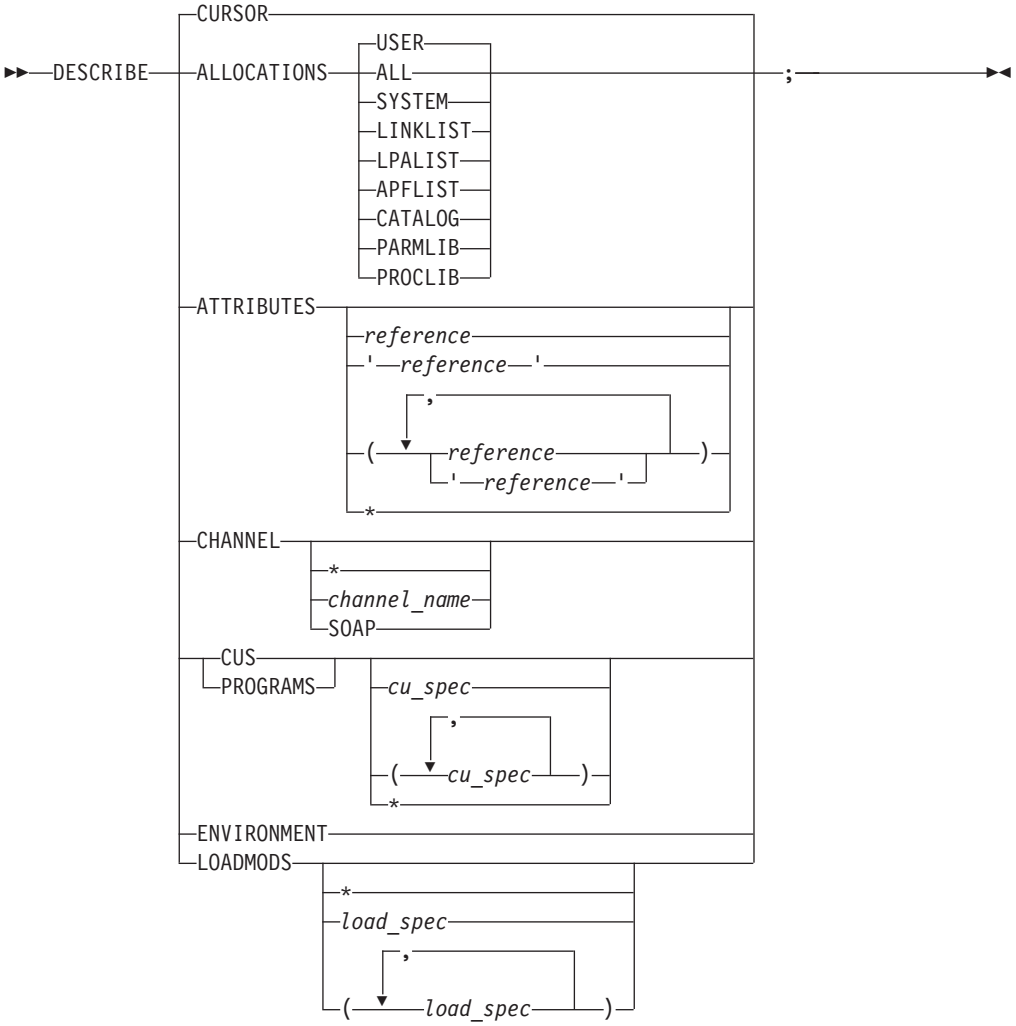


scalar:



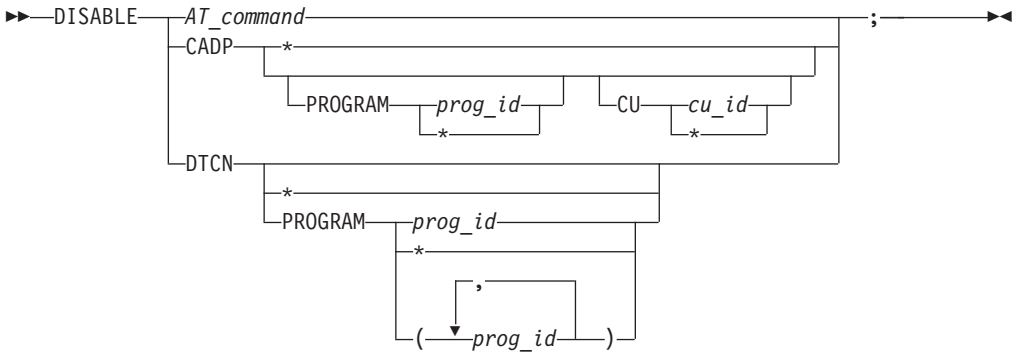
DESCRIBE command

The DESCRIBE command displays the file allocations or attributes of references, compile units, known load modules, and the run-time environment.



DISABLE command

The DISABLE command makes an AT breakpoint inoperative or prevents Debug Tool from being started by CADP or DTCN. However, the breakpoint is not cleared. Later, you can make the breakpoint operative or allow Debug Tool to be started by CADP or DTCN by using the ENABLE command.



DISABLE prefix (full-screen mode)

Disables a statement breakpoint or offset breakpoint when you issue this command through the Source window prefix area.

DO command (assembler, disassembly, and non-Language Environment COBOL)

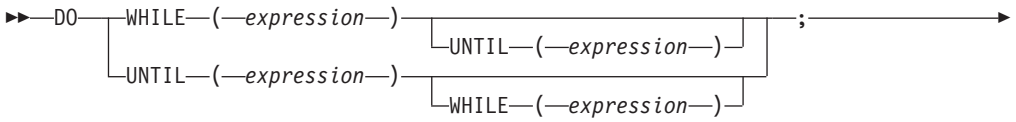
The DO command performs one or more commands that are collected into a group.

DO command (PL/I)

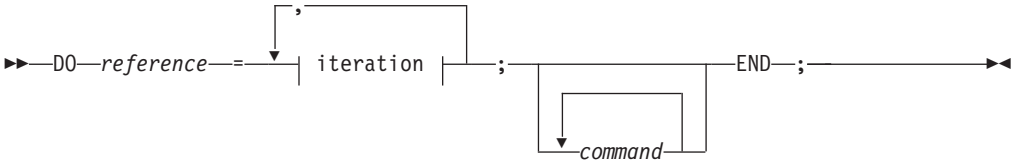
The DO command allows one or more commands to be collected into a group that can (optionally) be repeatedly executed.

Simple

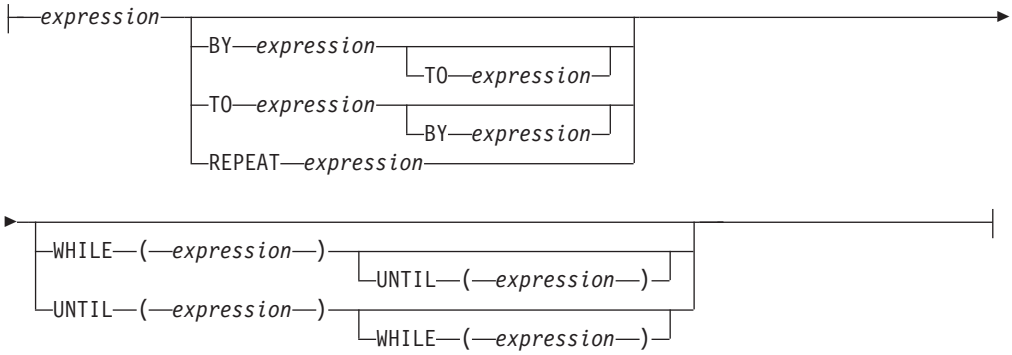
Repeating



Iterative

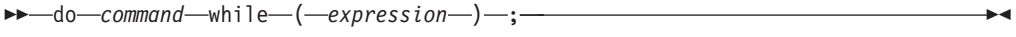


iteration:



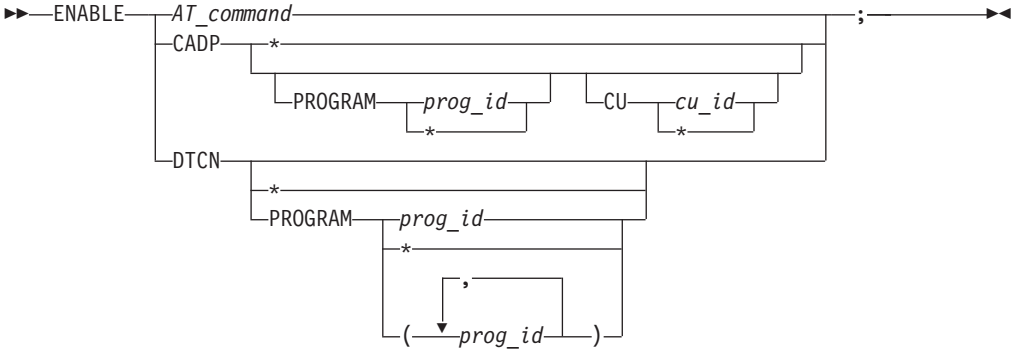
do/while command (C and C++)

The do/while command performs a command before evaluating the test expression.



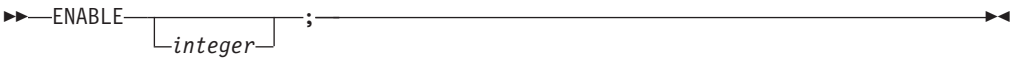
ENABLE command

The ENABLE command activates an AT or pattern match breakpoint after it was disabled.



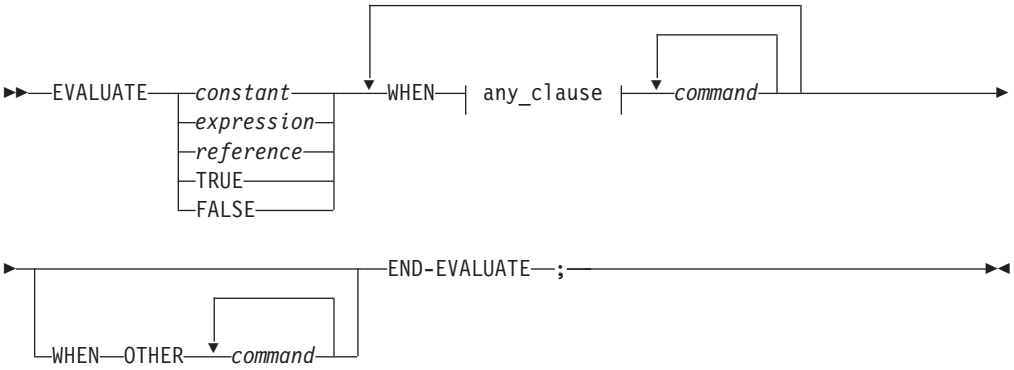
ENABLE prefix (full-screen mode)

Enables a disabled statement breakpoint or a disabled offset breakpoint when you issue this command through the Source window prefix area.

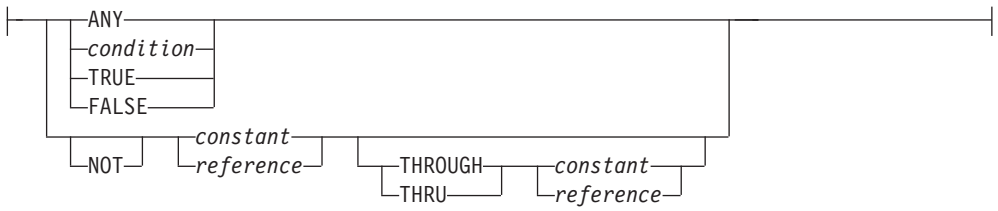


EVALUATE command (COBOL)

The EVALUATE command provides a shorthand notation for a series of nested IF statements.

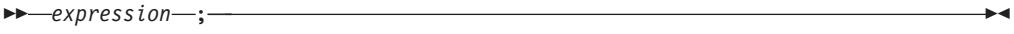


any_clause:



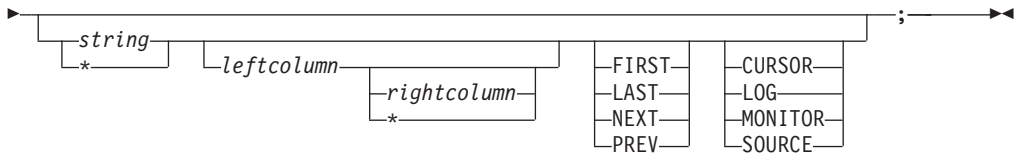
Expression command (C and C++)

The Expression command evaluates the given expression.



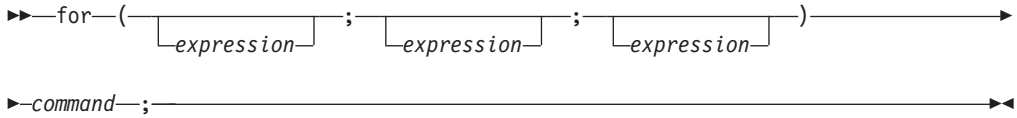
FIND command

The FIND command helps you search through the Source window in full-screen and batch mode, and through the Log and Monitor windows in full-screen mode.



for command (C and C++)

The for command provides iterative looping similar to the C and C++ for statement.



FREE command

The FREE command releases a file that is currently allocated.

GO command

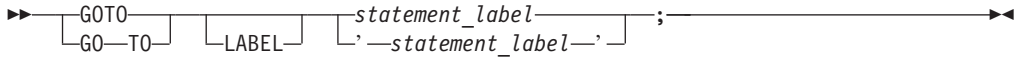
The GO command causes Debug Tool to start or resume running your program.

GOTO command

The GOTO command causes Debug Tool to resume program execution at the specified statement id.

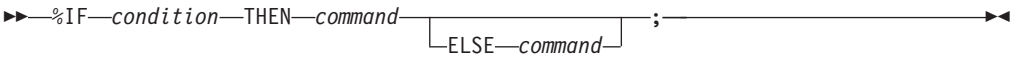
GOTO LABEL command

The GOTO LABEL command causes Debug Tool to resume program execution at the specified statement label. The specified label must be in the same block. If you want Debug Tool to return control to you at the target location, make sure there is a breakpoint at that location.



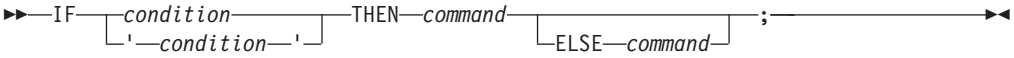
%IF command (programming language neutral)

The %IF command enables you write conditional statements that can be run in any supported programming language.



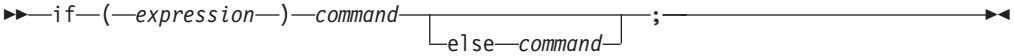
IF command (assembler, disassembly, and non-Language Environment COBOL)

The IF command lets you conditionally perform a command.



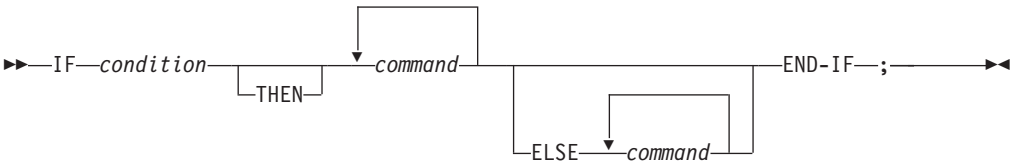
if command (C and C++)

The if command lets you conditionally perform a command.



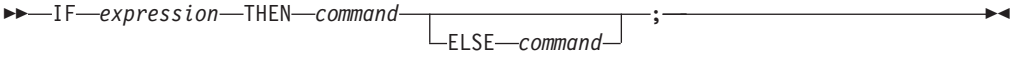
IF command (COBOL)

The IF command lets you conditionally perform a command.



IF command (PL/I)

The IF command lets you conditionally perform a command.



IMMEDIATE command (full-screen mode)

The IMMEDIATE command causes a command within a command list to be performed immediately.

INPUT command (C and C++ and COBOL)

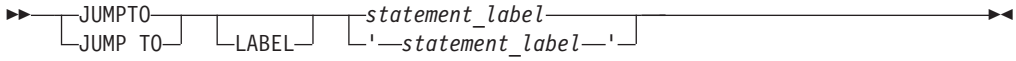
The INPUT command provides data for an intercepted read and is valid only when there is a read pending for an intercepted file.

JUMPTO command

The JUMPTO command moves the resume point to the specified statement but does not resume the program.

JUMPTO LABEL command

The JUMPTO command moves the resume point to the specified label but does not resume the program.

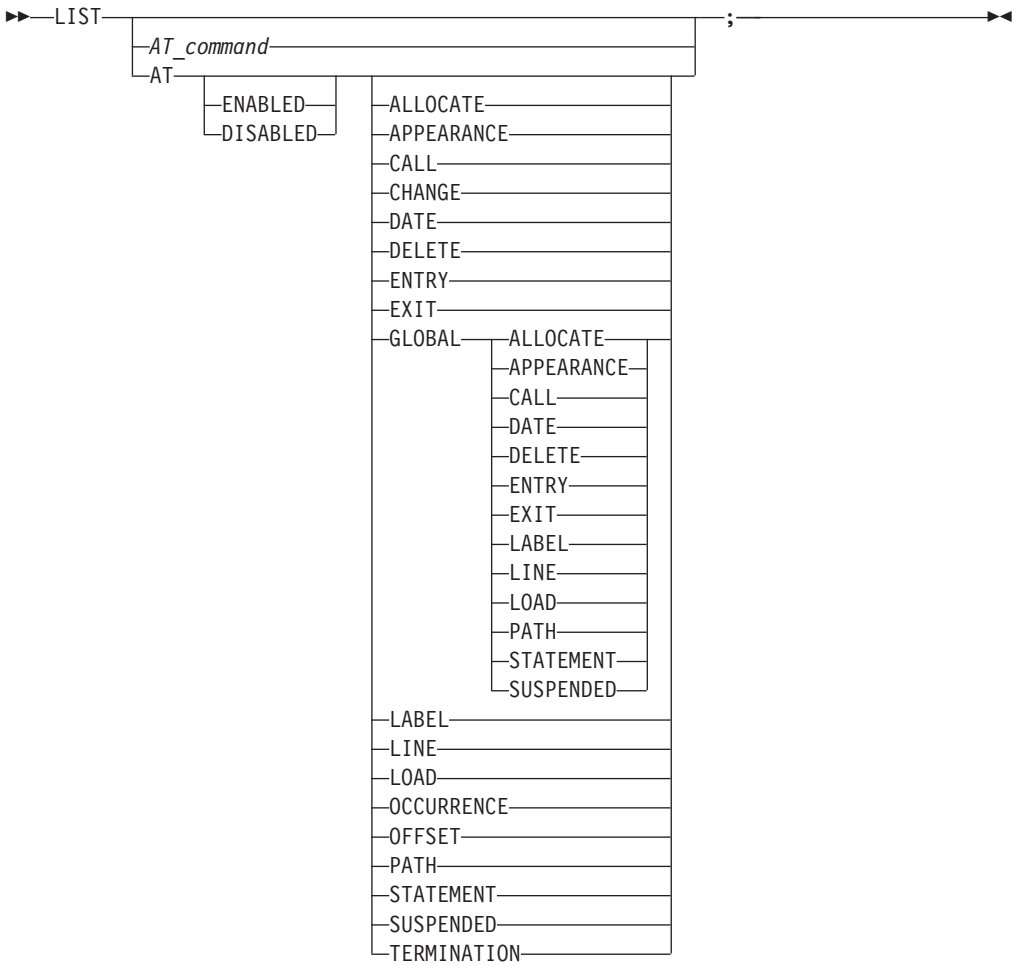


LIST (blank)

Displays the Source Identification panel, where associations are made between source listings or source files shown in the source window and their program units.

LIST AT

Lists the currently defined breakpoints, including the action taken when the specified breakpoint is activated.

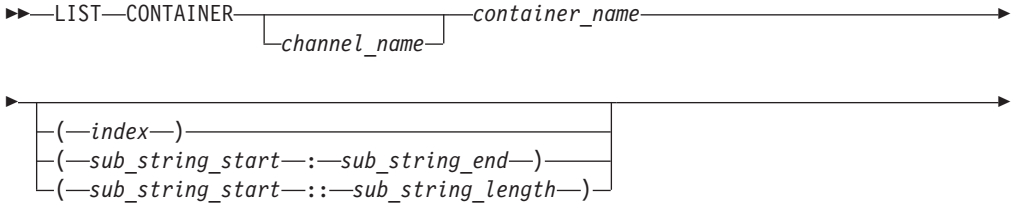


LIST CALLS

Displays the dynamic chain of active blocks.

LIST CONTAINER

Displays the contents of a CICS container.



LIST CURSOR (full-screen mode)

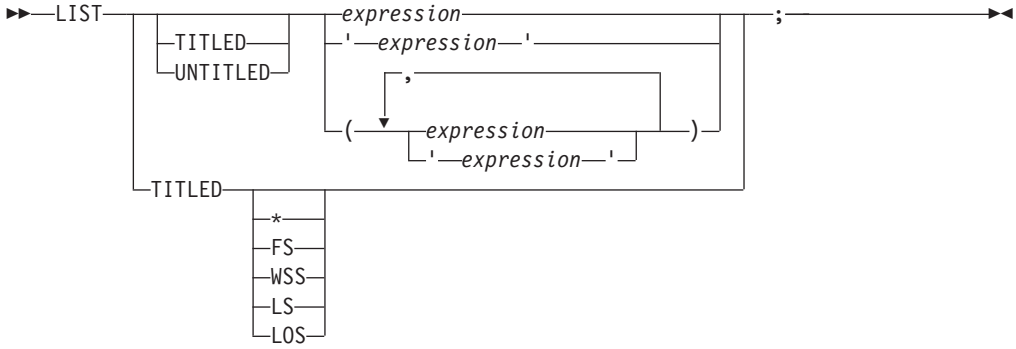
Provides a cursor controlled method for displaying variables, structures, and arrays.

LIST DTCN or CADP

List the programs and compile units that were disabled by the DISABLE command.

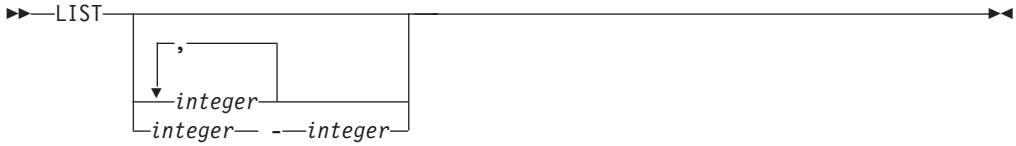
LIST expression

Displays values of expressions.



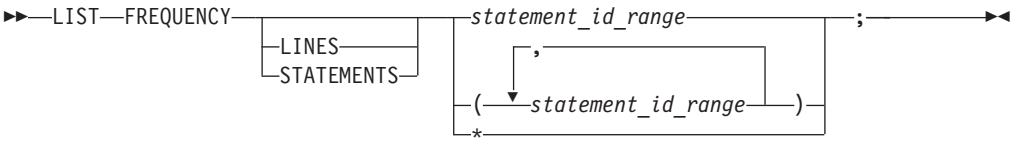
L expression prefix

Entered through the prefix area of the Source window, displays the value of a variable or variables on that line.



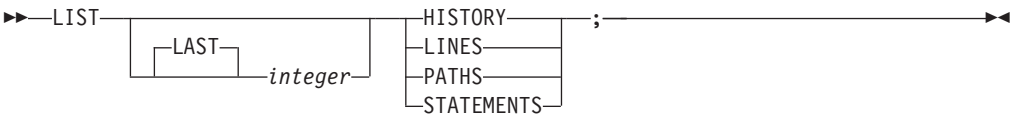
LIST FREQUENCY

Lists statement execution counts.



LIST LAST

Displays a list of recent entries in the history table.



LIST LINE NUMBERS

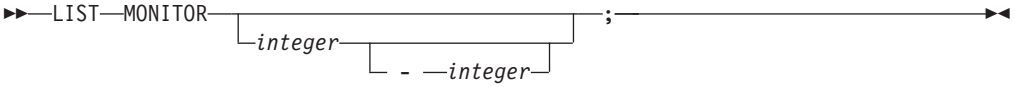
Equivalent to `LIST STATEMENT NUMBERS`.

LIST LINES

Equivalent to `LIST STATEMENTS`.

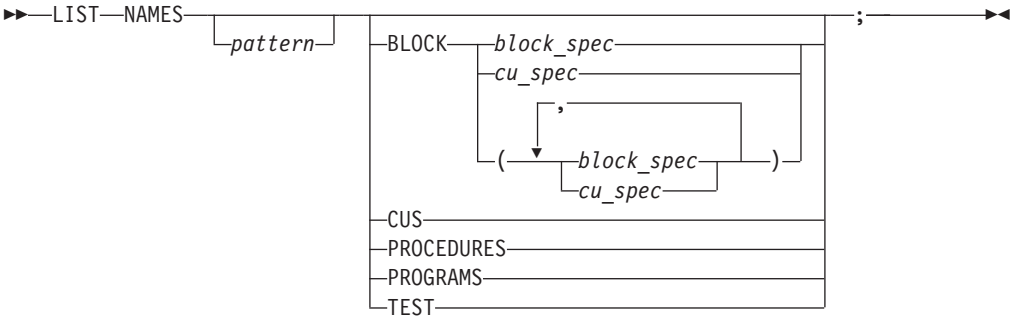
LIST MONITOR

Lists all or selected members of the current set of `MONITOR` commands.



LIST NAMES

Lists the names of variables, programs, or Debug Tool procedures.

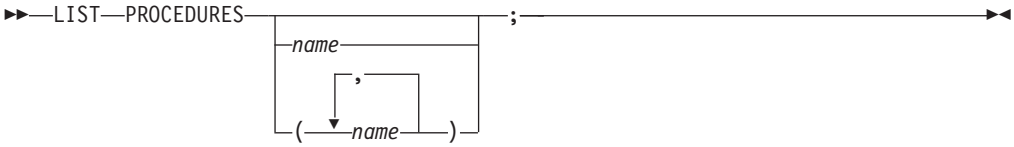


LIST ON (PL/I)

Lists the action (if any) currently defined for the specified PL/I conditions.

LIST PROCEDURES

Lists the commands contained in the specified Debug Tool `PROCEDURE` definitions.

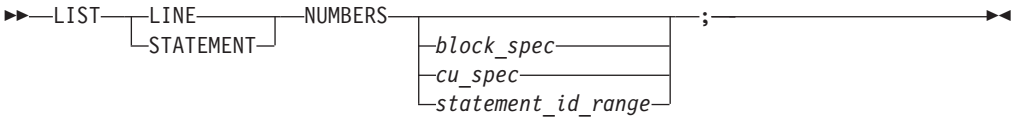


LIST REGISTERS

Displays the current register contents.

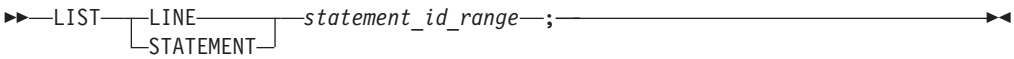
LIST STATEMENT NUMBERS

Lists all statement or line numbers that are valid locations for an `AT LINE` or `AT STATEMENT` breakpoint.



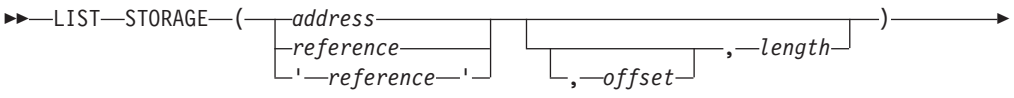
LIST STATEMENTS

Lists one or more statements or lines from a file.



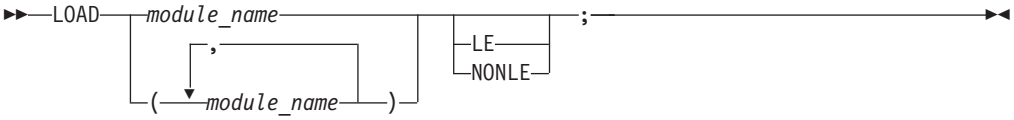
LIST STORAGE

Displays the contents of storage at a particular address in hex format.



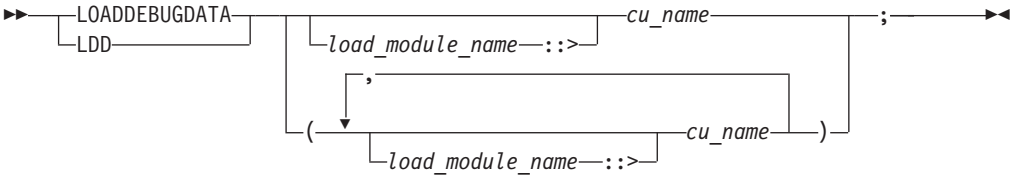
LOAD command

Specifies to load the named module using MVS™ LOAD services, EXEC CICS LOAD, or the Language Environment enclave-level load service for debugging purposes.



LOADDEBUGDATA (LDD)

The LOADDEBUGDATA command specifies that a compile unit is an assembler compile unit and loads the debug data that corresponds to that assembler compile unit.

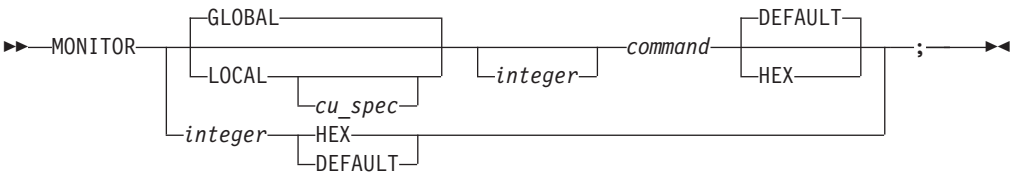


MEMORY

Identifies an address in memory and then display the contents of memory at that location in the Memory window. The Memory window displays memory in dump format.

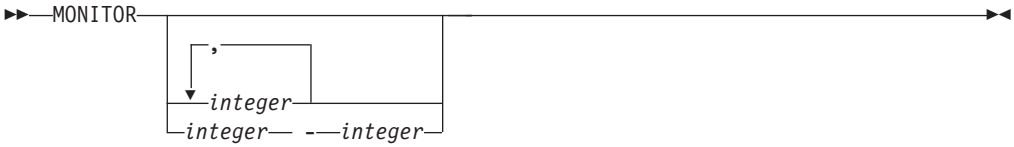
MONITOR command

The MONITOR command defines or redefines a command whose output is displayed in the monitor window (full-screen mode), terminal output (line mode), or log file (batch mode).



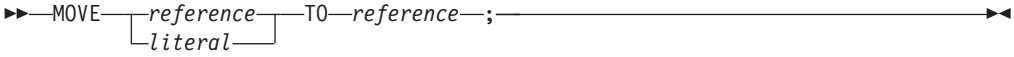
MONITOR prefix command

The MONITOR prefix command, which you enter through the prefix area of the Source window, adds variables on that line to the Monitor window.



MOVE command (COBOL)

The MOVE command transfers data from one area of storage to another.

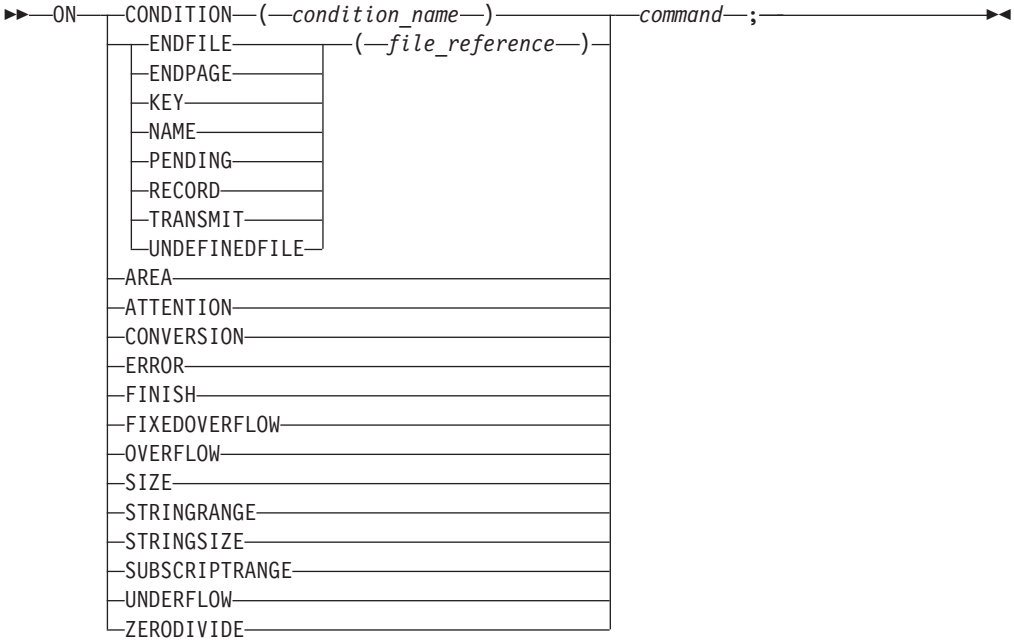


Null command

The Null command is a semicolon written where a command is expected.

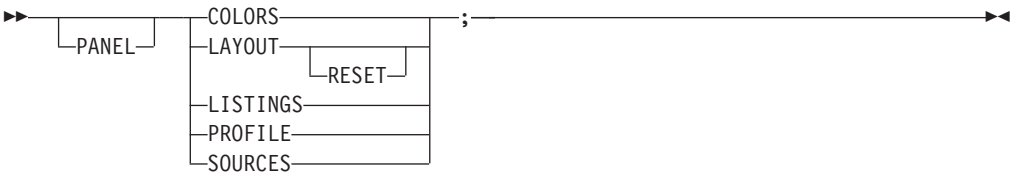
ON command (PL/I)

The ON command establishes the actions to be executed when the specified PL/I condition is raised.



PANEL command (full-screen mode)

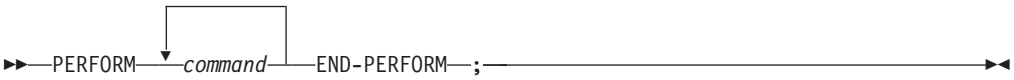
The PANEL command displays special panels.



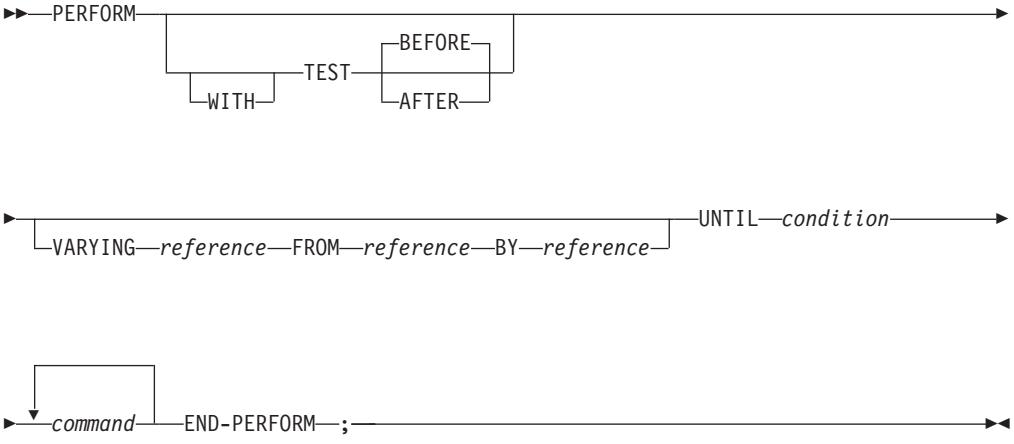
PERFORM command (COBOL)

The PERFORM command transfers control explicitly to one or more statements and implicitly returns control to the next executable statement after execution of the specified statements is completed.

Simple:



Repeating:

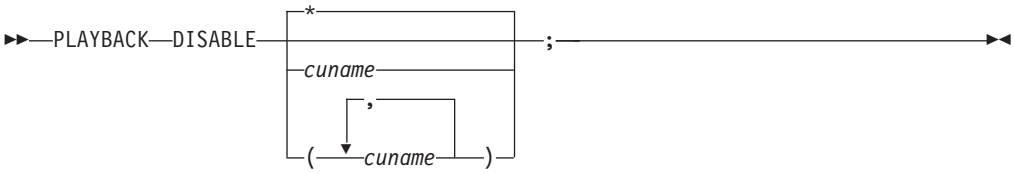


PLAYBACK BACKWARD command

The PLAYBACK BACKWARD command indicates to Debug Tool to perform STEP and RUNTO commands backward, starting from the current point and going to previous points.

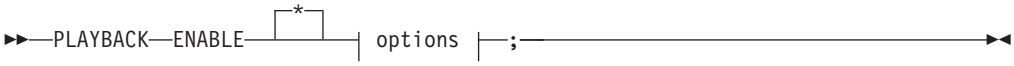
PLAYBACK DISABLE command

The PLAYBACK DISABLE command informs Debug Tool to stop recording run-time environment information and discard any information recorded thus far.

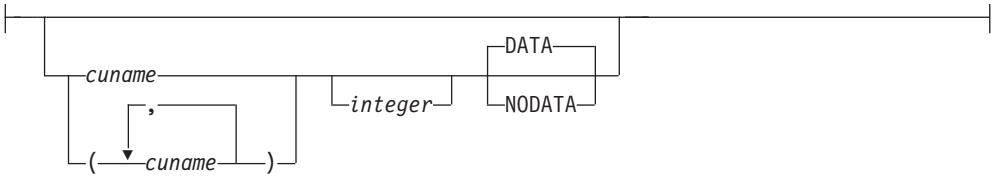


PLAYBACK ENABLE command

The PLAYBACK ENABLE command informs Debug Tool to begin recording the application run-time environment information (steps history and data history).



options:



PLAYBACK FORWARD command

The PLAYBACK FORWARD command indicates to Debug Tool to perform STEP and RUNTO commands forward, starting from the current point and going to the next point.

PLAYBACK START command

The PLAYBACK START command suspends normal debugging and informs Debug Tool to replay the steps it recorded.

PLAYBACK STOP command

The PLAYBACK STOP command stops replaying recorded statements and resumes normal debugging at the point where the PLAYBACK START command was entered.

Prefix commands (full-screen mode)

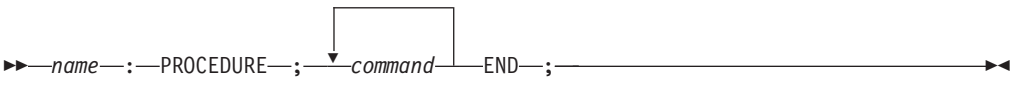
The Prefix commands apply only to source listing lines and are typed into the prefix area in the source window. For details, see the section corresponding to the command name.

The following table summarizes the forms of the Prefix commands.

"AT Prefix (full-screen mode)" on page 6	Defines a statement breakpoint through the Source window prefix area.
"CLEAR prefix (full-screen mode)" on page 10	Clears a breakpoint through the Source window prefix area.
"DISABLE prefix (full-screen mode)" on page 16	Disables a breakpoint through the Source window prefix area.
"ENABLE prefix (full-screen mode)" on page 18	Enables a disabled breakpoint through the Source window prefix area.
"LIST expression" on page 23	Displays the value of a variable or variables on that line.
"QUERY prefix (full-screen mode)" on page 32	Queries what statements have breakpoints through the Source window prefix area.
"RUNTO prefix command (full-screen mode)" on page 33	Runs the program to the location that the cursor or statement identifier indicate in the Source window prefix area.
"SHOW prefix command (full-screen mode)" on page 45	Specifies what relative statement or verb within the line is to have its frequency count shown in the suffix area.

PROCEDURE command

The PROCEDURE command allows the definition of a group of commands that can be accessed by using the CALL procedure command.

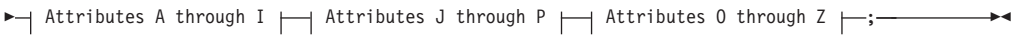


QUALIFY RESET

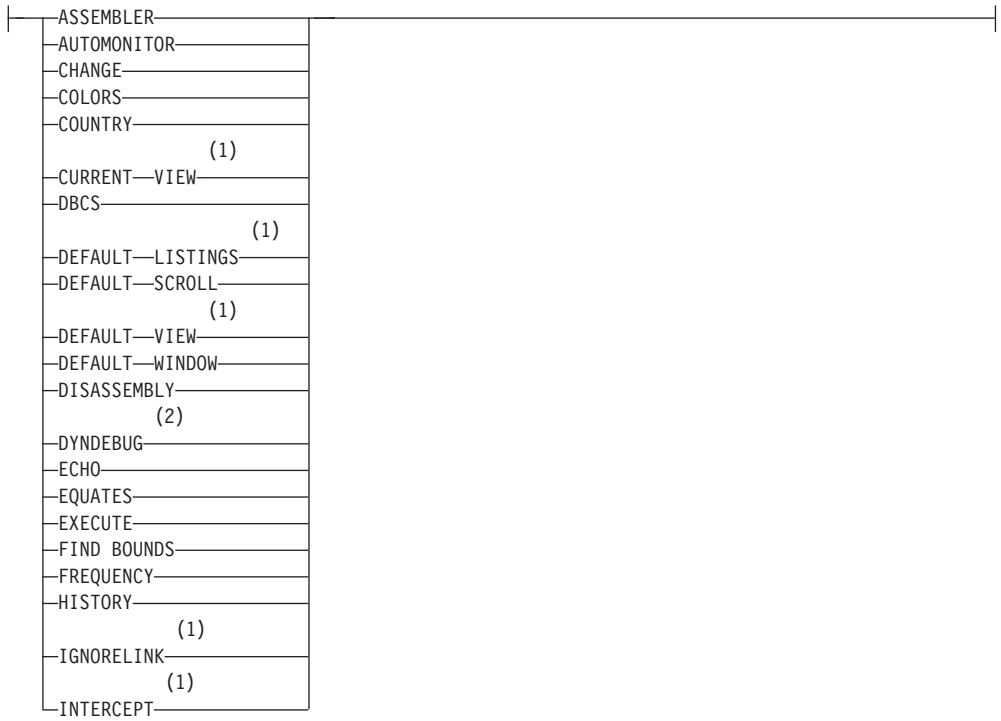
This command is equivalent to SET QUALIFY RESET.

QUERY command

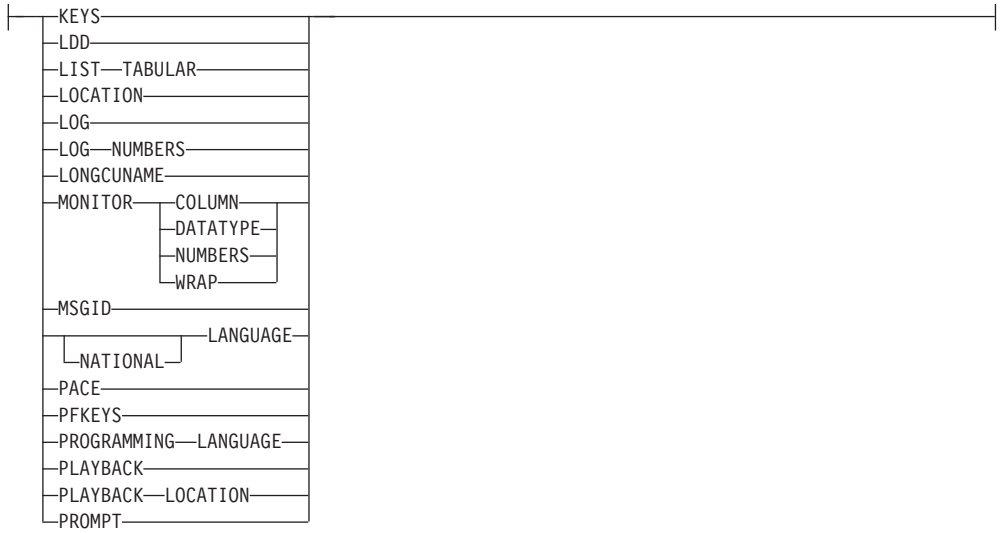
The QUERY command displays the current value of the specified Debug Tool setting, the current setting of all the Debug Tool settings, or the current location in the suspended program.



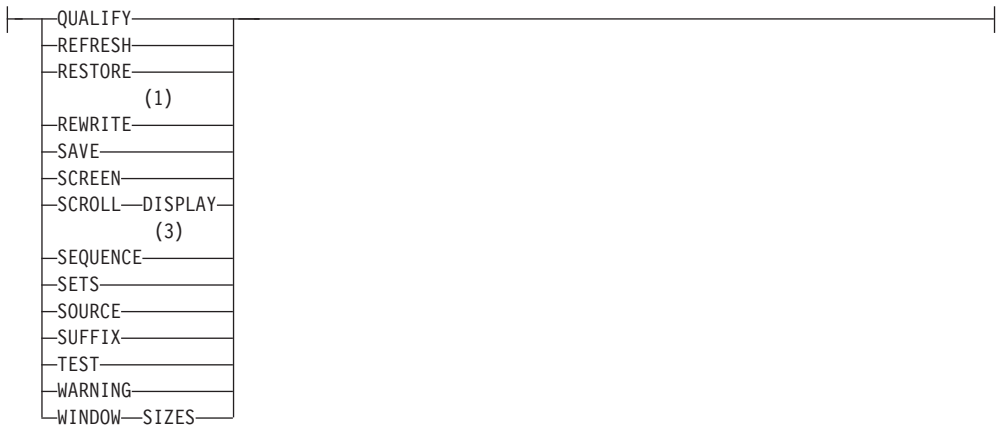
Attributes A through I:



Attributes J through P:



Attributes O through Z:



Notes:

1 You can use this command in remote debug mode.

2 Available only if the Dynamic Debug facility is installed.

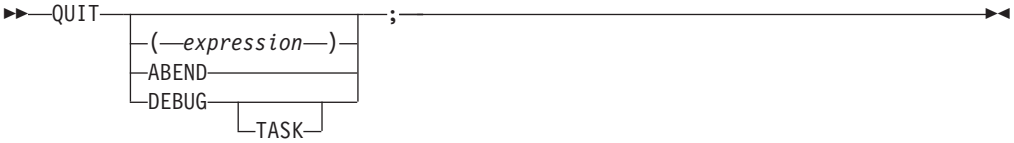
3 Only for PL/I.

QUERY prefix (full-screen mode)

Queries what statements on a particular line have statement breakpoints when you issue this command through the Source window prefix area.

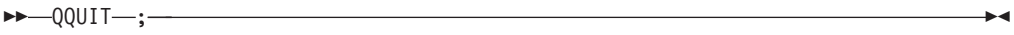
QUIT command

The QUIT command ends a Debug Tool session and if an expression is specified, sets the return code.



QQUIT command

The QQUIT command ends a Debug Tool session without further prompting.



RESTORE command

The RESTORE command enables you to explicitly restore the settings, breakpoints, and monitor specifications that were previously saved by the SET SAVE AUTO command when Debug Tool terminated.

RETRIEVE command (full-screen mode)

The RETRIEVE command displays the last command entered on the command line.

RUN command

The RUN command is synonymous to the GO command.

RUNTO command

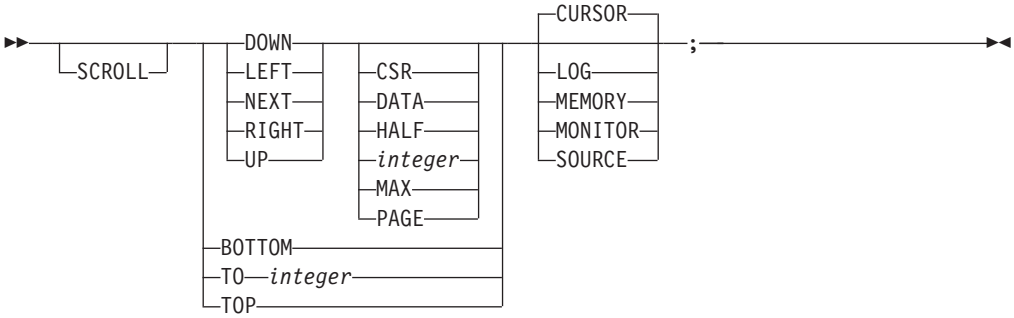
The RUNTO command runs your program to a valid executable statement without setting a breakpoint.

RUNTO prefix command (full-screen mode)

Runs to the statement when you issue this command through the Source window prefix area.

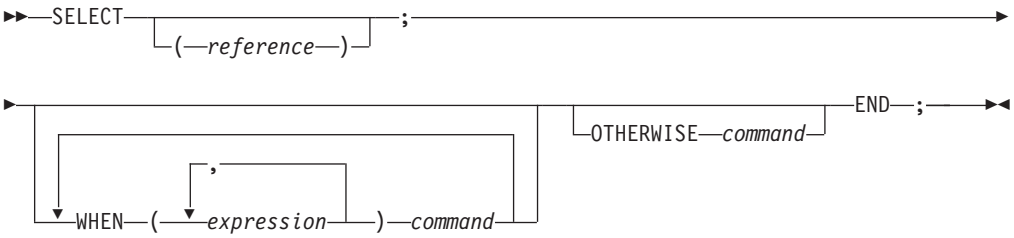
SCROLL command (full-screen mode)

The SCROLL command provides horizontal and vertical scrolling in full-screen mode.



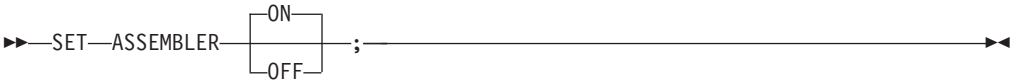
SELECT command (PL/I)

The SELECT command chooses one of a set of alternate commands.



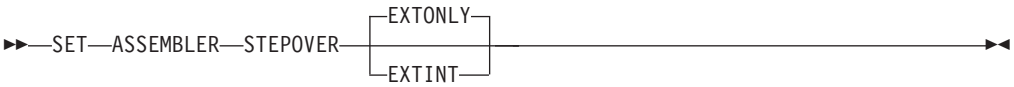
SET ASSEMBLER ON/OFF

The SET ASSEMBLER ON/OFF command displays additional information that is useful when you debug an assembler program.



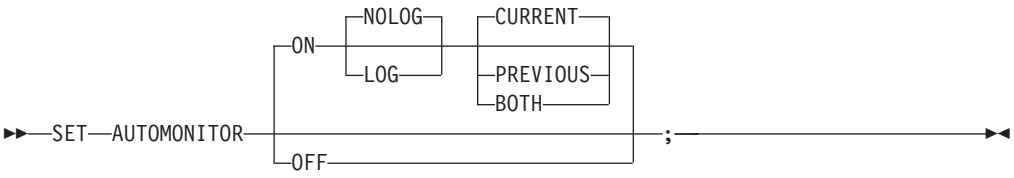
SET ASSEMBLER STEPOVER

The SET ASSEMBLER STEPOVER command specifies how Debug Tool processes STEP OVER commands in assembler compile units.



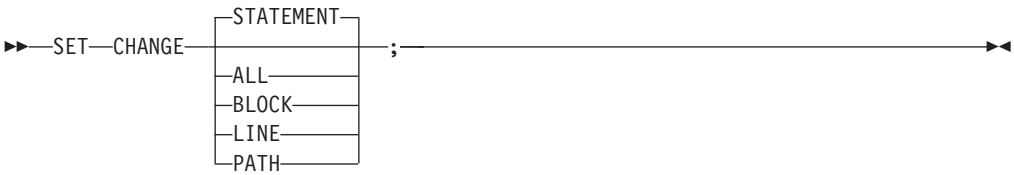
SET AUTOMONITOR

Controls the monitoring of data items at the statement that Debug Tool runs next, ran most recently, or both.



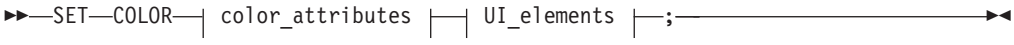
SET CHANGE

Controls the frequency of checking the AT CHANGE breakpoints.

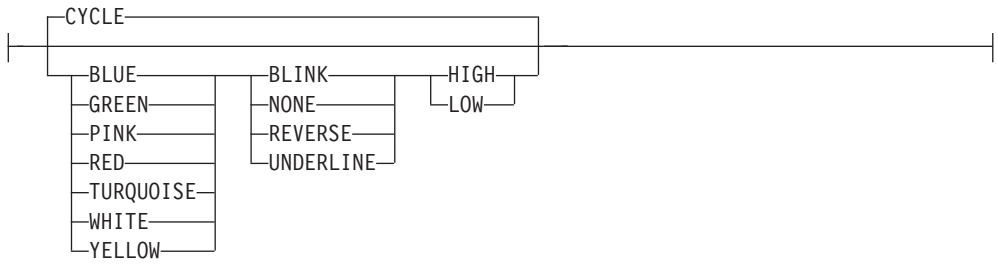


SET COLOR (full-screen and line mode)

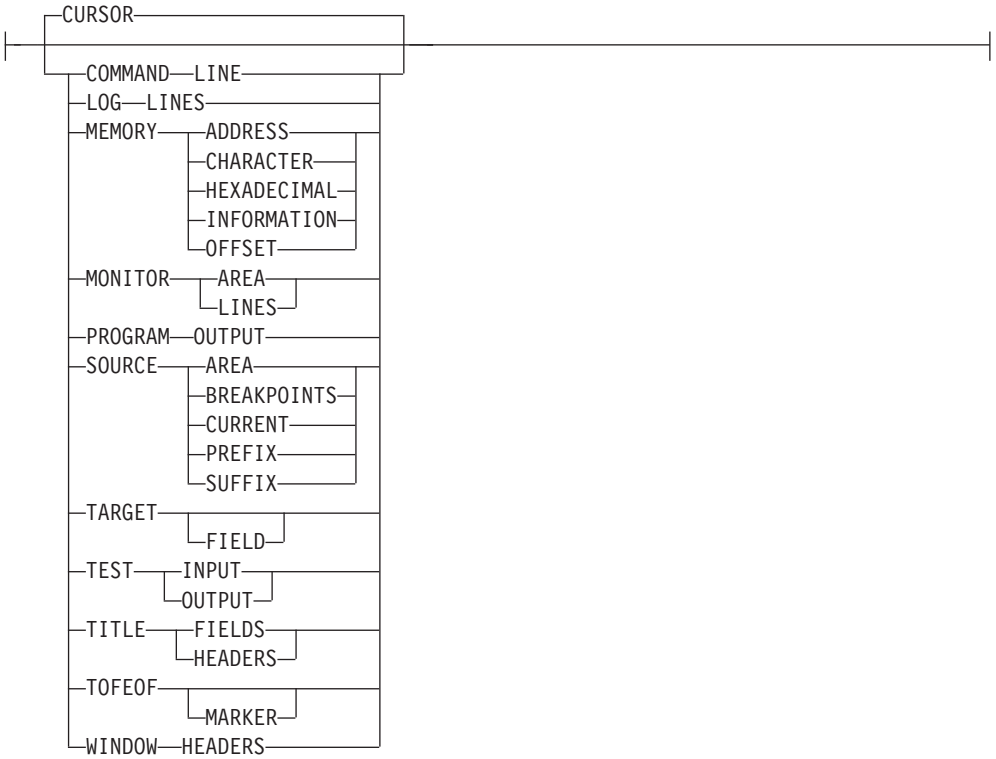
Provides control of the color, highlighting, and intensity attributes when the SCREEN setting is ON.



color_attributes:



UI_elements:



SET COUNTRY

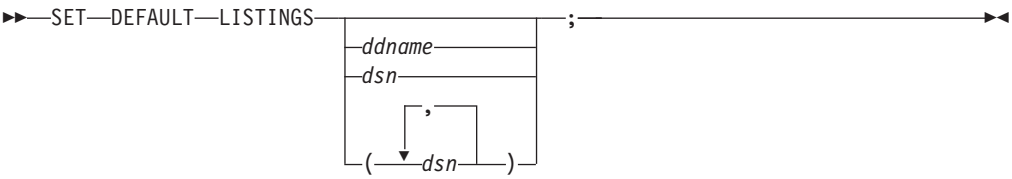
Changes the current national country setting for the application program.

SET DBCS

Controls whether shift-in and shift-out codes are interpreted on input and supplied on DBCS output.

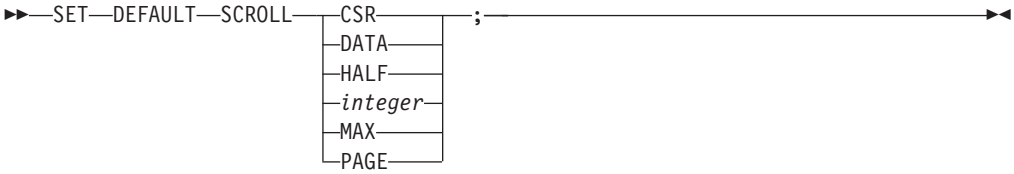
SET DEFAULT LISTINGS

Defines a default partitioned data set DD name or DS name whose members are searched for program source, listings, or separate debug files.



SET DEFAULT SCROLL (full-screen mode)

Sets the default scroll amount that is used when a SCROLL command is issued without the amount specified.

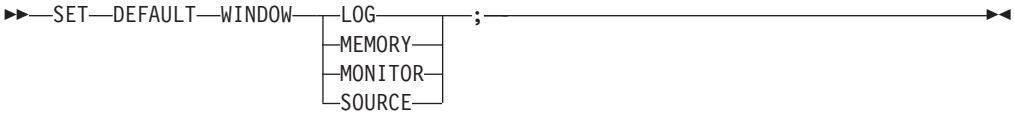


SET DEFAULT VIEW

Controls the default view for assembler compile units.

SET DEFAULT WINDOW (full-screen mode)

Specifies what window is selected when a window referencing command (for example, FIND, SCROLL, or WINDOW) is issued without explicit window identification and the cursor is outside the window areas.



SET DISASSEMBLY

Controls whether the disassembly view is displayed in the Source window.

SET DYNDEBUG

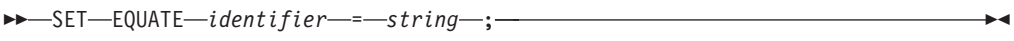
Controls whether to activate the Dynamic Debug facility.

SET ECHO

Controls whether GO and STEP commands are recorded in the log window when they are not subcommands.

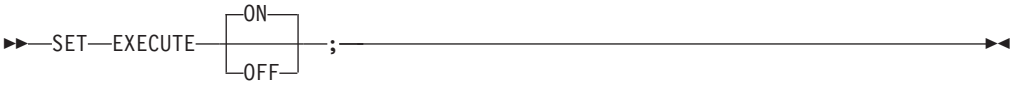
SET EQUATE

Equates a symbol to a string of characters.



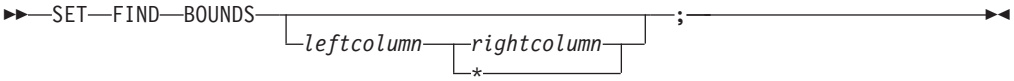
SET EXECUTE

Controls whether commands from all input sources are performed or just syntax checked (primarily for checking USE files).



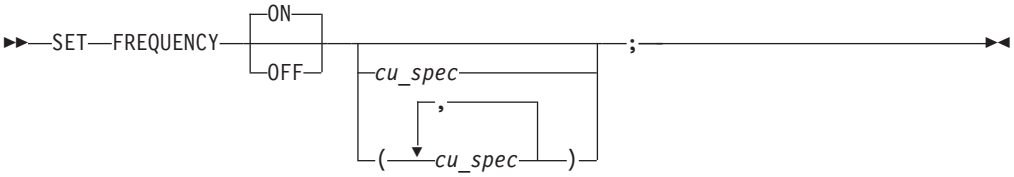
SET FIND BOUNDS

Specifies the default left and right columns for a FIND command in the Source window and in line mode that does not specify any columns information.



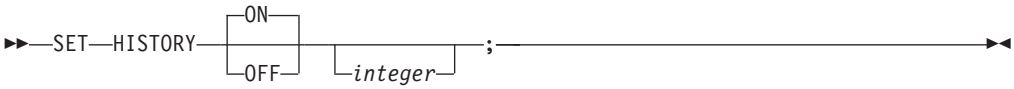
SET FREQUENCY

Controls whether statement executions are counted.



SET HISTORY

Specifies whether entries to Debug Tool are recorded in the history table and optionally adjusts the size of the table.

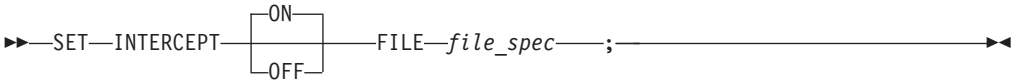


SET IGNORELINK

Specifies that any new LINK level (nested enclave) is ignored while the setting is ON.

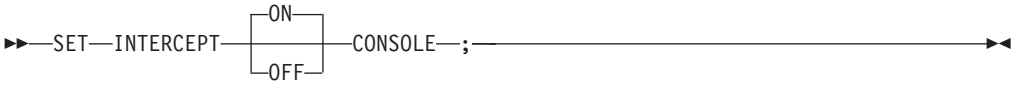
SET INTERCEPT (C and C++)

Intercepts input to and output from specified files.



SET INTERCEPT (COBOL, full-screen mode, line mode, batch mode)

Intercepts input to and output from the console.

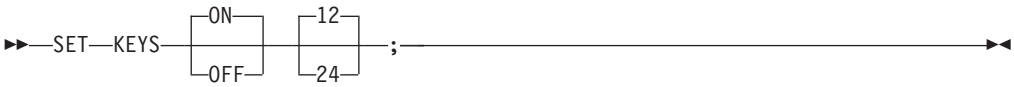


SET INTERCEPT (COBOL, remote debug mode)

Intercepts output from COBOL DISPLAY statements.

SET KEYS (full-screen and line mode)

Controls whether PF key definitions are displayed when the SCREEN setting is ON.



SET LDD

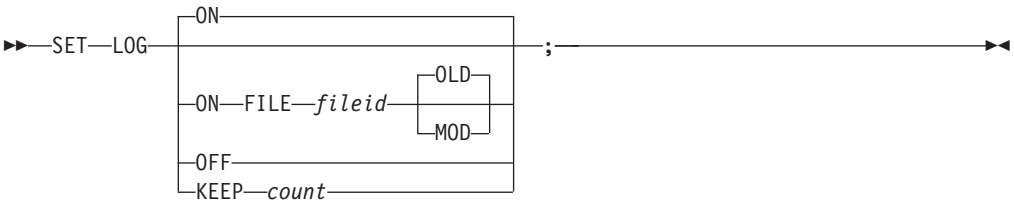
Controls how debug data is loaded for assemblies containing multiple CSECTs.

SET LIST TABULAR

Controls whether to format the output of the LIST command in a tabular format.

SET LOG

Controls whether each command that Debug Tool runs and the output of that command is stored in the log file. Defines (or redefines) the name and location of the file and whether the information is appended to an existing file or is written over existing information.



SET LOG NUMBERS (full-screen and line mode)

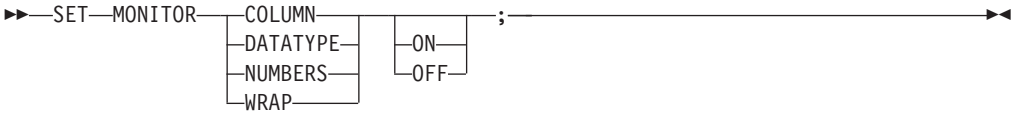
Controls whether line numbers are shown in the log window.

SET LONGCUNAME (C, C++, and PL/I)

Controls whether the CU name is displayed in short or long format.

SET MONITOR (full-screen and line mode)

Controls the format and layout of variable names and values displayed in the Monitor window.

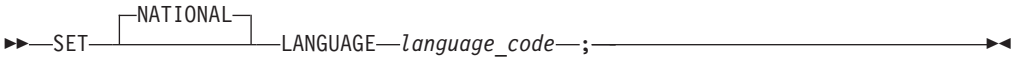


SET MSGID

Controls whether the Debug Tool messages are displayed with the message prefix identifiers.

SET NATIONAL LANGUAGE

Switches your application to a different run-time national language that determines what translation is used when a message is displayed.

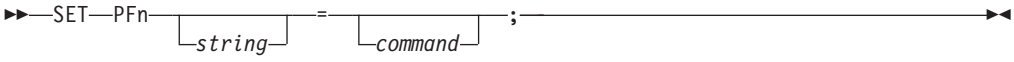


SET PACE

Specifies the maximum speed (in steps per second) of animated execution.

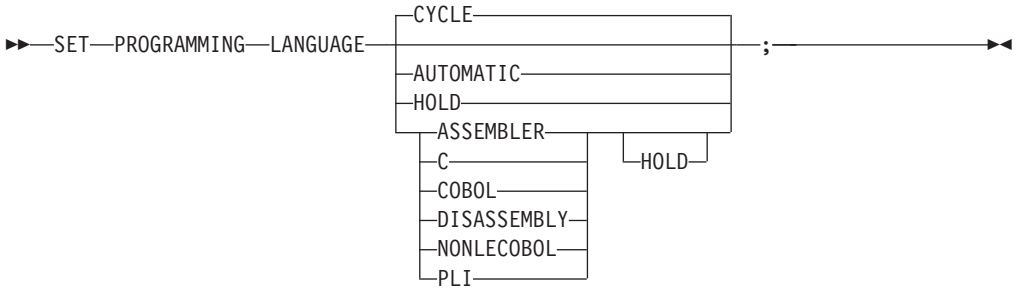
SET PFKEY

Associates a Debug Tool command with a Program Function key (PF key).



SET PROGRAMMING LANGUAGE

Sets the current programming language.

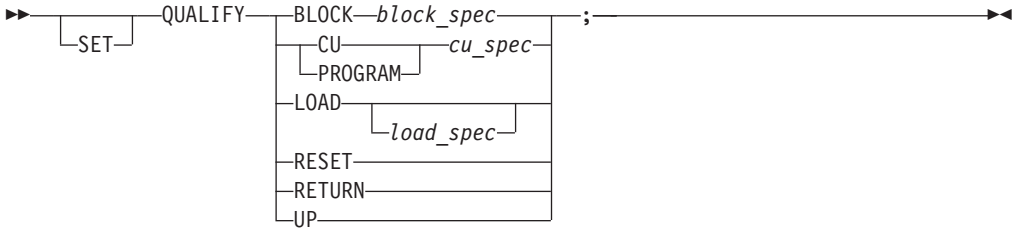


SET PROMPT (full-screen and line mode)

Controls whether the current program location is automatically shown as part of the prompt message in line mode.

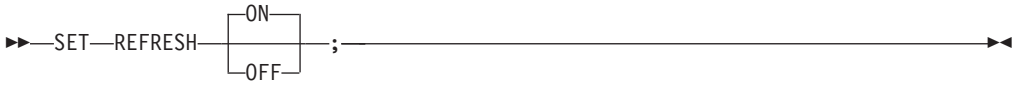
SET QUALIFY

Simplifies the identification of references and statement numbers by resetting the point of view to a new block, compile unit, or load module.



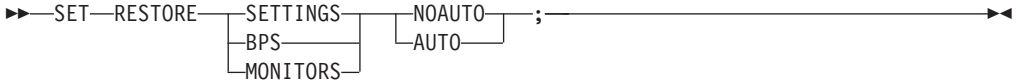
SET REFRESH (full-screen mode)

Controls screen refreshing.



SET RESTORE

Controls the restoring of settings, breakpoints, and monitor specifications.



SET REWRITE (full-screen mode)

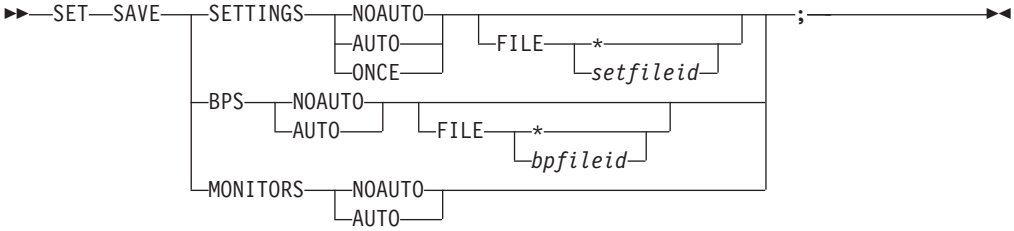
Forces a periodic screen rewrite during long sequences of output.

SET REWRITE (remote debug mode)

Sets the maximum number of COBOL DISPLAY statements that the remote debugger displays in the Debug Console.

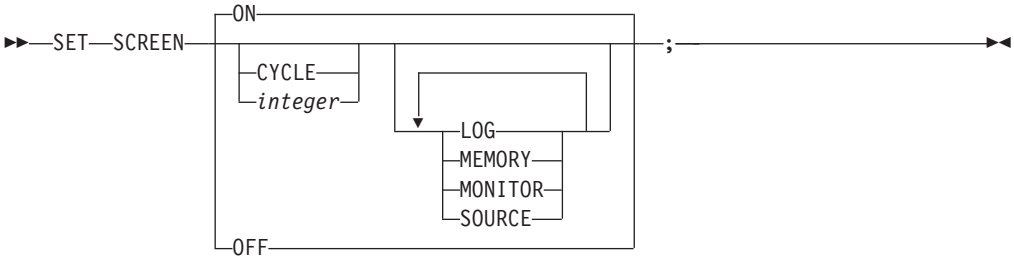
SET SAVE

Controls the saving of settings, breakpoints, and monitor specifications.



SET SCREEN (full-screen and line mode)

Controls how information is displayed on the screen.



SET SCROLL DISPLAY (full-screen mode)

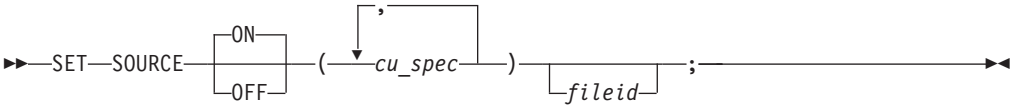
Controls whether the scroll field is displayed when operating in full-screen mode.

SET SEQUENCE (PL/I)

Controls whether Debug Tool interprets data after column 72 in a commands or preference file as a sequence number.

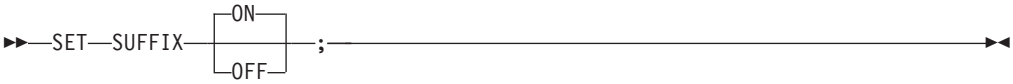
SET SOURCE

Associates a source file, compiler listing or separate debug file with one or more compile units.



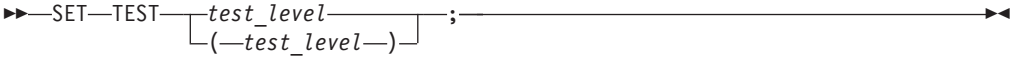
SET SUFFIX (full-screen mode)

Controls the display of frequency counts at the right edge of the Source window when in full-screen mode.



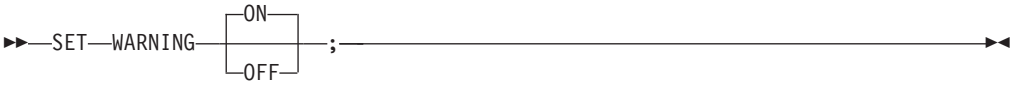
SET TEST

Overrides the initial TEST run-time options specified at invocation.



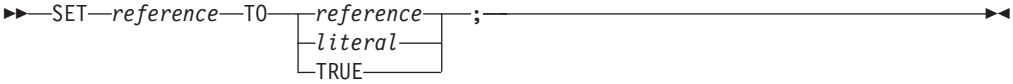
SET WARNING (C, C++, and PL/I)

Controls display of the Debug Tool warning messages and whether exceptions are reflected to the application program.



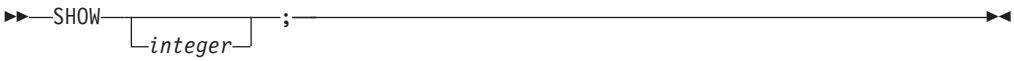
SET command (COBOL)

The SET command assigns a value to a COBOL reference.



SHOW prefix command (full-screen mode)

The SHOW prefix command specifies what relative statement (for C) or relative verb (for COBOL) within the line is to have its frequency count temporarily shown in the suffix area.

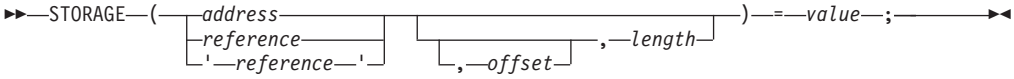


STEP command

The STEP command causes Debug Tool to dynamically step through a program, executing one or more program statements. In full-screen mode, it provides animated execution.

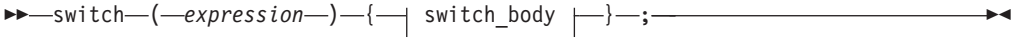
STORAGE command

The STORAGE command enables you to alter up to eight bytes of storage.

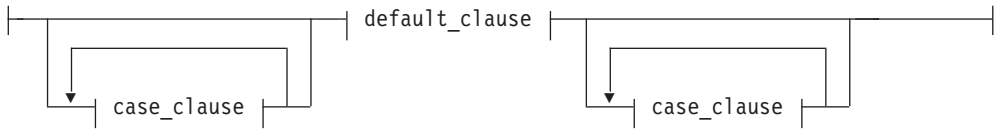


switch command (C and C++)

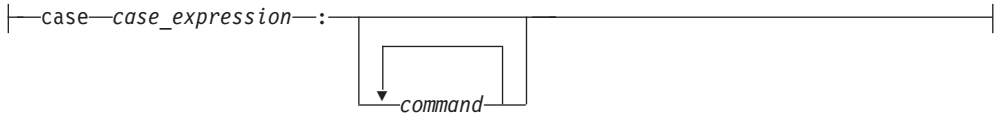
The switch command enables you to transfer control to different commands within the switch body, depending on the value of the switch expression.



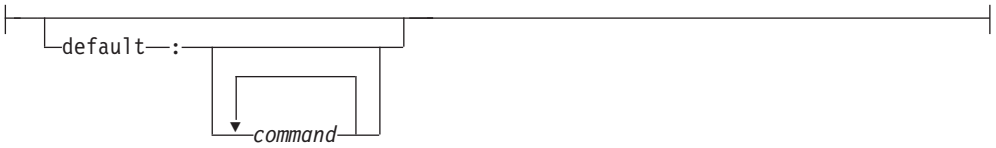
switch_body:



case_clause:



default_clause:

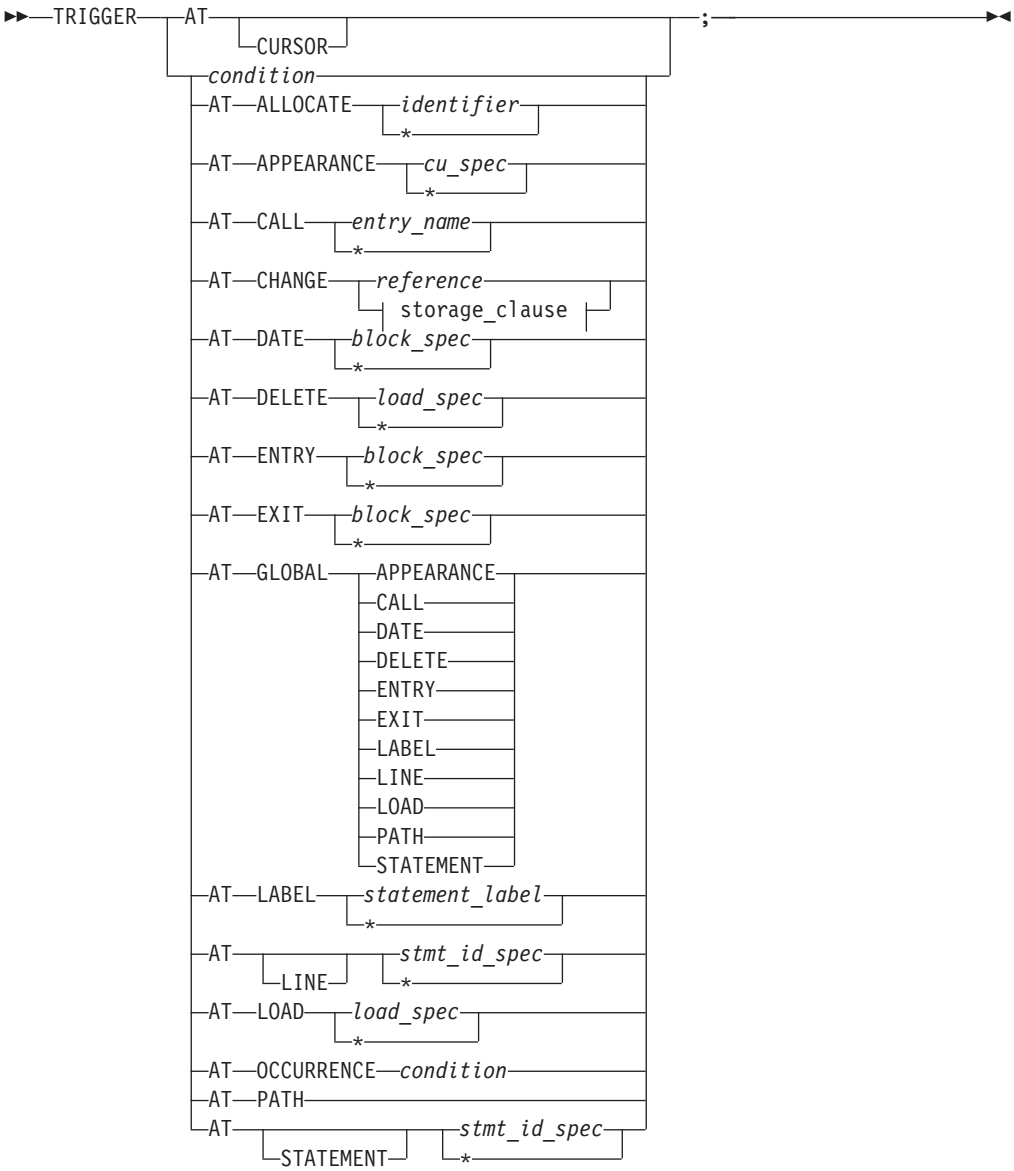


SYSTEM command

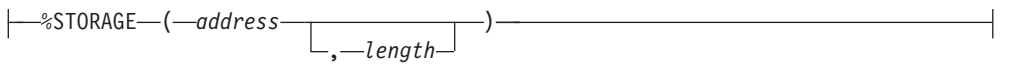
The SYSTEM command lets you issue TSO commands during a Debug Tool session.

TRIGGER command

The TRIGGER command raises the specified AT-condition in Debug Tool, or it raises the specified programming language condition in your program.

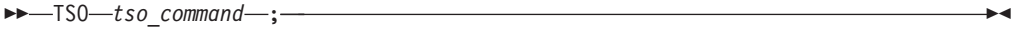


storage_clause:



TSO command (z/OS)

The TSO command lets you issue TSO commands during a Debug Tool session and is valid only in a TSO environment.



USE command

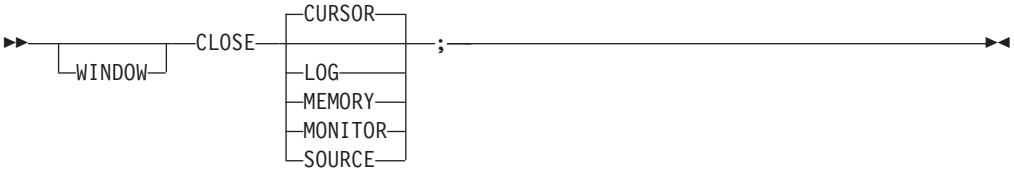
The USE command causes the Debug Tool commands in the specified file or data set to be either performed or syntax checked.

while command (C and C++)

The while command enables you to repeatedly perform the body of a loop until the specified condition is no longer met or evaluates to false.

WINDOW CLOSE

Closes the specified window in the Debug Tool full-screen session panel.

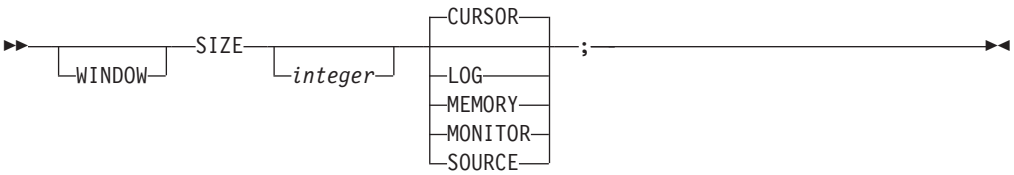


WINDOW OPEN

Opens a previously-closed window in the Debug Tool full-screen session panel.

WINDOW SIZE

Controls the relative size of currently visible windows in the Debug Tool full-screen session panel.

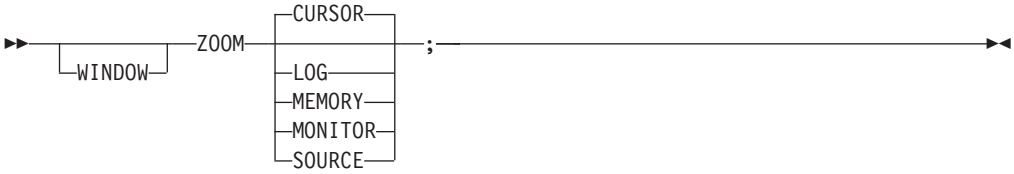


WINDOW SWAP

Replaces the logical window being displayed in a physical window with another logical window. The order of the operands is not important.

WINDOW ZOOM

Expands the indicated window to fill the entire screen or restores the screen to the currently defined window configuration.



Chapter 2. Debug Tool built-in functions

Debug Tool provides you with the following built-in functions:

%DEC (assembler, disassembly, and non-Language Environment COBOL)

Returns the decimal value of an operand.

%GENERATION (PL/I)

Returns a specific generation of a controlled variable in your program.

%HEX

Returns the hexadecimal value of an operand.

%INSTANCES (C, C++, and PL/I)

Returns the maximum value of %RECURSION (the most recent recursion number) for a given block.

%RECURSION (C, C++, and PL/I)

Returns a specific instance of an automatic variable or a parameter in a recursive procedure.

%WHERE (assembler, disassembly, and non-Language Environment COBOL)

Returns a string that is the address of the operand. %WHERE can be used *only* as the outermost expression in the LIST command.

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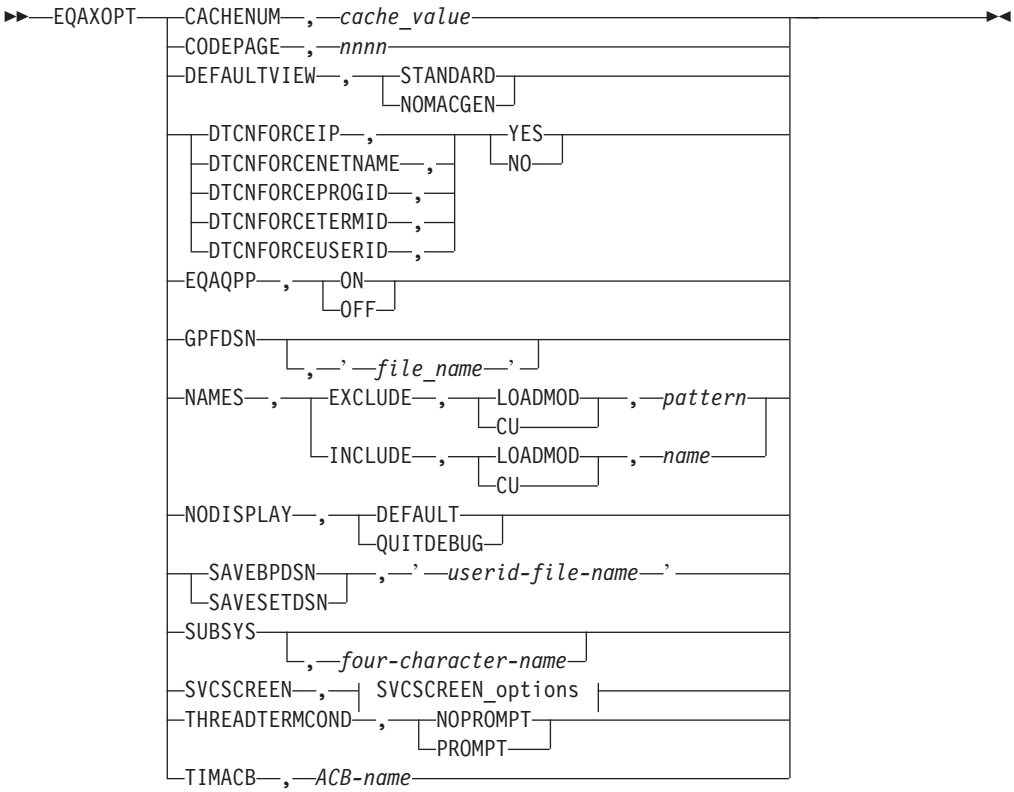
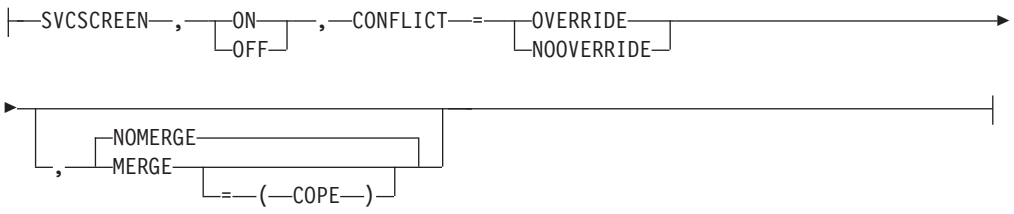
Chapter 3. EQAOPTS options

The EQAOPTS load module allows customization of certain Debug Tool functions, which can apply to the site, a group, or a single user. This topic summarizes the purpose of each EQAOPTS option. See *Debug Tool Customization Guide* for information on how to create the EQAOPTS load module and a complete description of each option.

The follow diagram describes the syntax of this option:



SVCSCREEN_options:



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CACHENUM

Specifies the maximum number of program items to be held in an in-memory cache for a CICS debug session. Increase this number to improve performance for applications which have many programs; however, a larger number also increases the storage usage by the debugged task.

Related tasks

"Overriding the default number of program elements held in cache" in *Debug Tool Customization Guide*

CODEPAGE

Indicates which code page to use so that NLS characters are properly communicated between Debug Tool and a remote debugger and properly displayed in full screen mode.

Related tasks

"Specifying a code page" in *Debug Tool Customization Guide*

DEFAULTVIEW

Provides a method of setting the initial value for the `SET DEFAULT VIEW` command.

Related tasks

"Setting the initial value for `SET DEFAULT VIEW`" in *Debug Tool Customization Guide*

DTCNFORCE*xxxxxx*

Controls DTCN behavior for the conditions described in Table 2. When you set a DTCNFORCE*xxxxxx* option to YES, DTCN forces users to specify the respective resource type. The default setting is NO.

Table 2. List of EQAXOPT options and its corresponding DTCN field

EQAXOPT option	DTCN field name
DTCNFORCETERMID	Terminal Id
DTCNFORCETRANID	Transaction Id
DTCNFORCEPROGID	Program Id(s)
DTCNFORCEUSERID	User Id
DTCNFORCENETNAME	NetName
DTCNFORCEIP	IP client name or address

Related tasks

"Requiring users to specify resource types" in *Debug Tool Customization Guide*

EQAQPP

Indicates the presence of Q++ programs.

Related tasks

"Configuring for debugging Q++ programs" in *Debug Tool Customization Guide*

GPFDSN

Specifies the data set name for the global preferences file.

Related tasks

"Specifying global preferences" in *Debug Tool Customization Guide*

NAMES

Provides a method of entering `NAMES` commands that apply before the first load module and any of the compile units contained in that load module are processed.

Related tasks

"Supplying NAMES commands for the initial load module" in *Debug Tool Customization Guide*

NODISPLAY

Controls Debug Tool behavior when the terminal using full-screen mode through a VTAM terminal or the remote debugger are not available.

Related tasks

"Modifying Debug Tool behavior when requested user interface is not available" in *Debug Tool Customization Guide*

SAVEBPDSN and SAVESETDSN

Specifies the data set names to be used to save the breakpoints (SAVEBPDSN) and settings (SAVESETDSN). One qualifier in each of these data set names should be `&&USERID`, which represents the user ID of the current user.

Related tasks

"Modifying the name of the default data sets that store settings, breakpoints, and monitor values" in *Debug Tool Customization Guide*

SUBSYS

Provides a 1 to 4 character subsystem name. If an Enterprise PL/I or C/C++ source file is found to have a DSORG of DA or VSAM and this parameter is supplied, then this parameter is passed to SVC 99 (dynamic allocation) through the SUBSYS text unit when Debug Tool allocates the source file.

Related tasks

"Specifying SUBSYS to access source code in a library system" in *Debug Tool Customization Guide*

SVCSCREEN

Controls Debug Tool's enablement of SVC screening.

Related tasks

"Setting the SVC screening option" in *Debug Tool Customization Guide*

THREADTERMCOND

Specifies whether Debug Tool should suppress the prompt it displays when the thread termination condition, FINISH condition, or CEE067 is raised by Language Environment.

Related tasks

"Suppressing the prompt Debug Tool displays for FINISH, CEE066, or CEE067 conditions" in *Debug Tool Customization Guide*

TIMACB

Specifies an alternate Terminal Information Manager ACB name.

Related tasks

"Running the Terminal Interface Manager on more than one LPAR on the same VTAM® network" in *Debug Tool Customization Guide*

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