



z/XDC[®]
RELEASE GUIDE

z/XDC[®] Release z1.6
for z/OS

David B. Cole

z/XDC® z1.6 RELEASE GUIDE

PREFACE

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(Preface)

Our snail mail address is:

Address: **Cole Software, LLC**
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USA

Our home page provides the following services:

- General information about z/XDC.
- E-mail links to both Marketing, Technical Support, and Customer Services.
- FTP links for uploading diagnostic information and other files to Technical Support.
- FTP links for downloading current maintenance for z/XDC.
- Links permitting existing customers to download a full set of z/XDC's documentation.
- An order form for obtaining an upgrade of XDC to its current version (z/XDC) and release (z1.6).

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ADDITIONAL MANUALS

z/XDC customers may make as many copies of this manual as they feel is necessary for the legitimate use of z/XDC within their organization. Existing customers may download from our web site (www.colesoft.com) printable copies of all of z/XDC's manuals. Each manual is available in PDF format.

In addition, all manuals (except the Installation Guide) can be printed directly from within z/XDC itself. To print your own set of manuals, start an z/XDC debugging session (example: XDCCALL IEFBR14), then issue the following commands:

```
PRINT HELP USERGUIDE;SET PRINT CLOSE
PRINT HELP COMMANDS;SET PRINT CLOSE
PRINT HELP MESSAGES;SET PRINT CLOSE
PRINT HELP WHATSNEW Z16;SET PRINT CLOSE
```

Alternatively, you also can print these manuals by issuing z/XDC's **READ** command to run the MANUALS member of z/XDC's script library. Example: **READ DBCOLE¹.XDCZ16.XDCCMDS(MANUALS)**.

You also may print a **Quick Reference** for z/XDC by issuing z/XDC's **READ** command to run the QUICKREF member of z/XDC's script library. Example: **READ DBCOLE.XDCZ16.XDCCMDS(QUICKREF)**.

For more information about using the PRINT HELP and related commands, see **HELP HELP PRINTING**.

¹The library's high level qualifier may be different at your data center. Please ask your Systems Programmer.

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INTRODUCTION

Cole Software has pursued the goal of making z/XDC's online documentation as comprehensive as possible. Towards that end, we have devoted considerable effort to greatly expanding the amount of information online and to improving the accessibility of that information and the navigability of the Online Help database as a whole.

This manual is nothing more than a printout of a section of the Online Help database. It is provided for those people (like myself) who steadfastly prefer looking at paper instead of glass. (It's hard to write margin notes on glass.)

The information in the Online Help database has been segmented into five printed documents:

- **z/XDC[®] User Guide**
Contains comprehensive tutorials about the many features and capabilities of z/XDC.
- **z/XDC[®] Commands**
Contains the detailed syntax, usage descriptions, and examples of all of z/XDC's commands.
- **z/XDC[®] Messages**
Contains descriptions of all of the messages that can be issued by z/XDC and all of its various components.
- **z/XDC[®] z1.6 Release Guide**
Contains a history of all changes and upgrades made in the current release of z/XDC.
- **z/XDC[®] Quick Reference**
Contains brief lists of z/XDC commands, built-in equates, and other information.

There are a couple of important structural differences between the Online Help and these manuals:

- When the Help panels are displayed online, a large number of "hyperlinks" are available for easily pursuing subjects related to the current information. These hyperlinks do not exist in the printed manuals.
- The printed manuals contain comprehensive indexes to help you quickly find the specific information that you may be looking for. These indexes do not exist online.
- The PDF copies of the printed manuals can be searched using typical PC-style searching commands.
- "Release Guides" for older versions and releases of z/XDC are available online via the "HELP WHATSNEW" command.

A Roadmap

The structure of this manual follows the structure of the Online Help database. A consequence of this is that the sequence of information in this book, over all, is decidedly non-sequential. For those of you who prefer to read a manual from beginning to end, please accept my apologies. However, please let me make some suggestions.

If you are an experienced z/XDC user, then start with the **z/XDC[®] z1.6 Release Guide**. This will tell you what's new in this release of z/XDC. Online, the Release Guide can be reached by typing HELP WHATSNEW. You can then use hyperlinks to pursue the specific information that is of interest to you.

For new users, turn to the **z/XDC[®] User Guide**, and examine its Table of Contents carefully. You will see that there are about two dozen major topics arranged alphabetically: Addressing, Attentions, Breakpoints, ..., Virtmem, XDCCALL. Information within topics is presented more or less sequentially. The following **User Guide** topics are of particular interest:

- Perhaps the first topic that should be read is named "**DEBUGGING**". This and its subtopics give comprehensive information about whether and to what extent you may have to modify your program in order to use z/XDC.
- Another topic that should be read early on is named "**XDCCALL**". XDCCALL is a utility program that can be used to start a debugging session for your program.
- If you plan to debug programs that run as batch jobs or system tasks, then read the "**CDF**" topic. "Cross Domain Facility" is the component of z/XDC that permits user terminals to connect to debugging sessions for background jobs.

For z/XDC command information, turn to the **z/XDC[®] Commands** manual. Start with the basic commands. The DISPLAY, FORMAT, and LIST commands display storage and important program related structures. The AT and TRAP commands set breakpoints. You can use the TRACE command to step execution through your program slowly. The ZAP command allows you

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(Introduction)

to change storage and registers.

If you wish to play with z/XDC's terminal and user interfaces, read the "**FULLSCREEN**" section of the **User Guide**. Also, try the **PROFILE** command for displaying and changing a very large number of session parameters.

Generally, the best approach is to plan your reading using the Table of Contents. And of course, if you can't find the information that you are looking for, call us. There's no charge, and we will be glad to help! Our number is 800-XDC-5150 (USA: 928-771-2003). If the information that you want is in the book, we will explain what you want to know and tell you where to find complete information. If it is not, then we will add it for our next release.

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Online Help Panels

Help Whatsnew

XDC's Change History: For detailed information, type S at the left, then press ENTER. The information presented will be the most useful to experienced XDC users who want a concise summary of what has changed and a road map of where to look for more specific information.

```
z/XDC    z1.6 - (10/04) Support for:
                    HL-ASM R1.5's ADATA
                    z/OS   R1.6's ALRF
                    Storage protection protection

z/XDC    z1.3 - (05/04) Autocloning, complete program object support, etc.
z/XDC    z1.2 - (10/03) Z/Architecture support (64-bit addressing, etc.)
XDC/SE   S2.0 - (12/00) Incremental changes implemented via maintenance.
XDC/SE   S2.0 - (08/00) New release: Source Level Debugging Support!
XDC/SE   S1.0 - (11/98) New version! PDS/E support! XMS Support! Etc.
XDC      X3.3 - (10/97) Incremental fixes and additions
XDC      X3.2 - (12/96) Incremental fixes and additions
XDC      X3.1 - (04/95) Beta-test release of X3.2
XDC      X3.0 - (06/94) MVS/ESA support
```

Help Whatsnew Z16

z/XDC z1.6 includes all maintenance fixes to z1.3 and the following additional changes. For detailed information, you can select the following topics directly, or you can use HELP *NEXT to proceed sequentially. Use HELP *FORWARD to skip.

- ADATA** - z/XDC now fully supports the new format of ADATA file records for Release V1R5 of HL-ASM (High Level Assembler). z/XDC remains backwards compatible with all older ADATA formats. Select this topic for more information.
- ALRF** - Select this topic for information about updates to z/XDC supporting the new Address Space Number and Linkage Index Reuse Facility (ALRF) in z/OS R1.6.
- COMMANDS** - Select this topic for information about z/XDC commands that are new or changed with this release.
- EXITS** - Improvements have been made to z/XDC's support of user written exit routines.
- XDCMAPS** - Several improvements have been made in both the performance of and the usability of loading dsect maps from the XDCMAPS module.
- INCOMPATIBILITIES** - Select this topic for information about incompatibilities with prior XDC's that have been introduced in z/XDC z1.6.
- MISCELLANEOUS** - Select this topic for information about miscellaneous minor changes to z/XDC.

IMPORTANT! Release z1.6 of z/XDC is required(!) in z/OS R1.6. All older versions and releases of XDC will fail in z/OS R1.6. (See HELP WHATSNEW Z16 ALRF for more information.)

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(Help Whatsnew Z16)

Help Whatsnew Z16 AData

In July 2004, IBM published release 1.5 of their High Level Assembler (HL-ASM). In that release, IBM made major changes to the structure of ADATA records. z/XDC z1.6 fully supports the new ADATA formats.

ADATA is a data file produced by the High Level Assembler that contains comprehensive information from the assembly process. HL-ASM can generate and write ADATA as either part of an object file output, as a separate file, or both. z/XDC can use the information contained in ADATA files to produce source level maps of programs and control blocks located in storage.

See HELP MAPS ADATA for more information about z/XDC and ADATA.

Help Whatsnew Z16 ALrf

z/XDC z1.6 fully supports the new Address Space Number and Linkage Index Reuse Facility (ALRF) in z/OS Release 1.6.

IBM's implementation of ALRF support in z/OS R1.6 is a significant change to the hardware and software architectures. ALRF allows the Operating System to permit the reuse of Address Space Numbers (ASNs) in circumstances where previously they could not be reused. If you're interested in the details, see IBM's "Principles of Operation" (SA22-7832-03 or newer).

The enablement of ALRF in the hardware affects many things, including the following:

- The high halves of control registers 3 and 4 are now used to contain secondary and primary (respectively) ASN "instance numbers". z/XDC z1.6 has been updated to show this information when CR3 and CR4 are displayed. (Also, a control flag for ALRF is shown when CR0 is displayed.) For more information, see HELP COMMANDS LIST CONTROLREGISTERS INDIVIDUAL.
- The format of PC numbers is changed when ALRF is enabled. z/XDC z1.6 understands this new format, and uses it when appropriate when decoding PC numbers.
- The layouts of several hardware control blocks are changed when ALRF is enabled. These include ASTEs and linkage stack entries among others.

Please note: **ALRF support changes in z/OS R1.6 exist regardless** of whether or not the hardware being used actually offers ALRF. Consequently, all older releases of z/XDC fail in all instances of z/OS R1.6 regardless of whether or not ALRF is present. Therefore z/XDC customers must upgrade to z/XDC z1.6 when they migrate to z/OS R1.6.

z/XDC z1.6, of course, remains backwards compatible with all older z/OSs.

You can use z1.6's LIST FEATURES command to display whether or not ALRF support is present in your system. For more information, see HELP COMMANDS LIST FEATURES.

Help Whatsnew Z16 Commands

The following commands are either new to z/XDC z1.6, changed in z/XDC z1.6, or newly documented in z/XDC z1.6.

- DMAP**
- When loading dsect maps from the XDCMAPS module, the DMAP command now makes use of a built in nicknames table so that maps for certain common system control blocks can be referenced either by their dsect name or by their common name. This applies only to those maps whose dsect names differ from their common name.

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(Help Whatsnew Z16 Commands)

Example: The map for the Data Control Block (DCB) is named IHADCB. The nicknames support allows that map to be loaded by either name: DCB or IHADCB. For more information, see HELP WHATSNEW Z16 XDCMAPS.

- LIST FEATURES** - The display produced by this command has been updated to show whether or not the ALRF hardware feature is installed and whether or not ALRF support exists in the current operating system.
- In addition, the report produced by the this command is now sorted alphabetically. For more information, see HELP COMMANDS LIST FEATURES.
- LIST LSTACK** - This command has been changed to make it easier to use. Previously, when displaying linkage stack entries either located in other address spaces or queued from other TCBs in the current address space, it was required that **both** an LSE address and a TCB address be given. Now however, it is sufficient just to give the LSE address. z/XDC now has the ability to search for the TCB to which the LSE is queued.
- Also, the LIST LSTACK command now fully supports displays of z/Architecture Linkage Stack Elements. The entireties of the saved 64-bit general registers are displayed, as well as the entirety of the saved 128-bit PSW.
- LIST XMS** - The display produced by this command has been enlarged. See HELP COMMANDS LIST XMS for details.
- LIST ZAP** - This is a new command that displays the status of ZAP command related settings. For more information, see HELP COMMANDS LIST ZAP.
- Q** - This is a new line command that, when issued from a left-side input field (), causes a SET QUALIFIER command to be issued for the address with which that input field is associated. For more information, see HELP LINECMDS Q.
- SET ZAP** - This is an old command that previously was not fully implemented and not documented. When z/XDC is running authorized, this command can be used to control whether or not the ZAP command will be allowed to alter page protected storage. (z/XDC can never, of course, alter any protected storage when running non-authorized.) For more information, see HELP COMMANDS SET ZAP. (Note, this command is intended as an integrity feature, not a security feature.)
- SHOW** - This command has a previously undocumented capability for displaying individual z/XDC messages by message id number (DBCnnn). For more information, see HELP COMMANDS SHOW.

Help Whatsnew Z16 Exits

The following improvements have been made to z/XDC's interface to user written Commands Exits:

- z/XDC now saves and restores the high halves of the general registers (RH0-RH15) across the exit interface. This relieves the exit routine of having to do this itself.
- 64-bit support has been added to the interfaces by which a User Commands Exit calls z/XDC service routines. This support provides for:
 - The ability to read 64-bit storage.
 - The ability to zap 64-bit storage.
 - The ability to parse an address expression and receive a 64-bit result.

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(Help Whatsnew Z16 Exits)

For more information, see HELP EXITS USERCMDS.

Help Whatsnew Z16 Xdcmaps

The usability of XDCMAPS has been improved in two significant ways.

Performance: Previously, when a DMAP command was issued to load an ADATA version of an IBM control block, the first time that it was issued, it could take several minutes for the command to complete. This is because the ADATA file for XDCMAPS was around 70 megabytes long, and it would take a very long time to read that much data into z/XDC's in-storage cache.

This problem has been addressed by breaking up XDCMAP's ADATA into 26 alphabetic segments named XDCMAPSA, XDCMAPSB, ..., XDCMAPSZ. Each segment is very much smaller and so each segment can be loaded into cache in only seconds instead of minutes.

To access the ADATA segments, you must specify the name of the segment that is alphabetically correct for the dsect map you wish to load. In other words, the last letter of the XDCMAPSx segment's name must be the same as the first letter of the desired dsect's name. Examples:

```
DMAP XDCMAPSP.PSA
DMAP XDCMAPSI.IHADCB
DMAP XDCMAPSI.IFGRPL
```

Note, omitting the alphabetic segment letter will still work; however, the result of doing that has changed: A SYM data map will be loaded instead of an ADATA map. Examples:

```
DMAP XDCMAPS.PSA
DMAP XDCMAPS.IHADCB
DMAP XDCMAPS.IFGRPL
```

Nicknames: The dsect names for most IBM control blocks match the block's common name (PSA, XSB, ASCB, ASXB, etc.). However, for a handful of blocks, this is not the case (IHADCB for DCB, RBPRFX for RB, CVTFIX for CVT, etc.). This, of course makes remembering a control block's dsect name a bit of a problem.

To address this problem, z/XDC's DMAP command now has a built-in nickname table that allows a user to request these maps by either their dsect names or their common names. So now, the following commands will work as follows:

```
DMAP XDCMAPSA.ACB      will load IFGACB.
DMAP XDCMAPSA.BIND    will load ISTDBIND.
DMAP XDCMAPSA.CDE     will load CENTRY.
DMAP XDCMAPSA.CVT     will load CVTFIX.    <see note>
DMAP XDCMAPSA.EXLST  will load IFGEXLST.
DMAP XDCMAPSA.JSCB   will load IEZJSCB.
DMAP XDCMAPSA.NIB    will load ISTDNIB.
DMAP XDCMAPSA.RB     will load RBPRFX.    <see note>
DMAP XDCMAPSA.RPL    will load IFGRPL.
DMAP XDCMAPSA.SCVT   will load SCVTSECT.
DMAP XDCMAPSA.SRB    will load SRBSECT.
DMAP XDCMAPSA.TCB    will load TCBFIX.    <see note>
```

<Note> These control blocks (CVT, RB, and TCB) have prefix sections: data fields that are located preceding their customary zero points. The DMAP command's nickname support also includes support for assigning the map's zero point to the correct field. (Previously, the load form of the DMAP command would always assign the zero point to the map's first field, and the only way to assign a different zero point would be to use the DMAP command's cloning form to make a copy of the original map.)

For more information, see HELP MAPS XDCMAPS.

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Help Whatsnew Z16 Incompatibilities

Some changes to z/XDC have been made in release z1.6 that are incompatible with prior versions and releases of XDC.

- Support for OS/390 systems has been dropped. Release z1.6 of z/XDC can be used only in z/OS R1.1 and newer Operating Systems.
- When a DBCPARM block is passed to z/XDC (via the SDWAPARM field), a requirement that the block be doubleword aligned is now being enforced. (Previously, only fullword alignment was checked.) If a DBCPARM block is not doubleword aligned, it will be ignored. For more information, see HELP EXITS #DBCPARM.

Help Whatsnew Z16 Miscellaneous

New Messaging

In order for a debugging session of a batch job to work, it is necessary that z/XDC's Cross Domain Facility be up and running. Otherwise, when z/XDC (running in a batch job) can't find CDF, z/XDC's default action is to percolate theabend. In prior releases, this percolation occurred silently and without explanation, and that often led to confusion and unnecessary tech support calls.

So now when z/XDC fails to find CDF when it needs it, it will issue (via WTO) message DBC743E to alert both the customer (and me, if the truth be known) that the fundamental problem is that CDF is not up and running.

Online Help Implementation Change

The Online HELP support load module (xxxHELPM) is no longer built as a "Planned Overlay" module. Consequently, several product installation restrictions are lifted:

- The xxxHELPM module is now loaded into 31-bit storage, not 24-bit. This significantly reduces 24-bit storage constraint issues created by z/XDC.
- The BLKSIZE=6144 restriction on the DBCOLE.XDCZ16.XDCLINK load library is now lifted. (BLKSIZE=32760 can now be recommended.)
- The xxxHELPM load module can now be copied via ISPF's "Move/Copy Utility" (option =3.3).
- And at long last, IBM is now free to drop support for planned overlay load modules (at least as far as I'm concerned.) <grin>

Online Help Content Changes

BIND Images

Probably the biggest obstacle to using terminals with large display geometries is the improper setup of BIND Images by Systems Programmers. So a detailed discussion of BIND Images, and log mode table entries, including specific and relevant examples, has been brought together under one topic: HELP FULLSCREEN TERMINALS BINDIMAGES.

Cross Domain Facility

The documentation for z/XDC's Cross Domain Facility (CDF) has been revised and enlarged. Also, a new subtopic has been added to it that discusses using CDF for debugging TSO applications, and why and how you would do that.

HELP MESSAGES

Recently, I discovered that several dozen messages were not documented. So now

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(Help Whatsnew Z16 Miscellaneous)

they're documented. If you've ever been frustrated by not finding help for a message, then first of all, shame on you for not telling me. Second, it's there now. Just type HELP MESSAGES DBCnnn (or type a ? at the left of any displayed message).

Profile Menuing System

The documentation for z/XDC's Profile Menuing System has been enlarged and reorganized. The information describing the settings that can be displayed, changed, and saved has been removed from HELP FULLSCREEN PROFILE ITEMS, and substantially enlarged and reorganized into several subtopics of the HELP FULLSCREEN PROFILE MENU topic.

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INDEX

Please note that this index is sorted according to the ASCII collating sequence, not EBCDIC. In particular, this means that digits sort in front of (not behind) alphabets, and that only some special characters sort in front of alphabets. Others sort behind alphabets.

The word processing program that is used here supports only two levels of index entries: main topics and sub-topics. When a sub-topic entry says "**see major topics**", this indicates that you should look for the same index entry among the main topics.

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