

Source Listing Display

CICS InterTest

Source Listing Display

Chapter 2:

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Objectives

You will learn:

- How to invoke a source listing.
- How to list ProtSym datasets.
- How to use the source listing.
- Configuring the InterTest profile.
- Line commands.

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Features

- The Source Listing facility provides the capability to debug a program while viewing source code.
- ITST, CNTL, CORE, FILE, HELP and SYMD can be accessed directly from the Source Listing facility using menus or single-line commands.

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Program Preparation

- In order to prepare a program for source listing testing and symbolic testing, it will be necessary to modify the compile or assemble JCL to include an CA-InterTest post-processor step.
- For source listing testing, the LISTER parameter of the post-processor is required.

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Start CA-InterTest

- AllFusion CA-InterTest for CICS is generally started once a day.
- At many sites, AllFusion CA-InterTest automatically starts during CICS initialization.
 - Additionally, AllFusion CA-InterTest automatically starts whenever a monitoring-related request from the Monitoring Menus or Submenus (Option 2 on the Primary Option Menu) is completed.
- In order to start AllFusion CA-InterTest for CICS or to verify that AllFusion CA-InterTest for CICS is running, sign on to CICS and issue the following command on a Clear screen:

CNTL=START

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Start a Test Session

- In order to begin testing, it will be necessary to ensure that:
 - a program has been compiled or assembled with a post-processor step using the LISTER parameter.
 - monitoring and breakpoints have been set in the program.
- Then perform the following steps:
 - Perform CICS sign on.
 - Display the source code.
 - Set monitoring.
 - Set breakpoints.
- Initiate the program and begin testing.

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Display the Source Code

- The CA-InterTest Source Listing facility can be accessed using the following methods to view the compiled or assembled listing of a program:
 - ITST Primary Menu Option access, Option 1 Source
 - LIST=progrname
- From this screen the monitoring and breakpoints can be set.

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Display the Source Code

- If a message states that the listing is not available, check whether the:
 - Program name is correct,
 - Program is in the AllFusion CA-InterTest for CICS Symbolic File.
 - Program was compiled or assembled with the LISTER option.

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Set Monitoring

- While viewing the program listing, enter monitor in the top Command Line.
 - This is the same as pressing PF5 Monitor.

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Set Breakpoints

- Setting breakpoints provides the capability to control program execution.
- CA-InterTest for CICS halts program execution when the program reaches a breakpoint.
 - This allows AllFusion CA-InterTest for CICS facility to be used on a program before continuing execution.

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Initiate the Program and Begin Testing

- In order to exit to CICS, press PF3 End or Clear to terminate the Source Listing facility.
- If entry was made through the menus, then exit the menus using =X or PF3 End.
- In order to begin testing, execute the program normally.
 - In a secure CICS region, be sure to sign on to CICS before executing the program.

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Source Selection List

This menu has two uses.

The following items can be displayed:

- Listing or a list of listings; by typing a 1 in the Option field.
- A symbolic file or a list of symbolic files; by typing a 2 in the Option field
 - then select a Symbolic file to display the Program Listings for that file.

```
----- CA-InterTest r8 SOURCE MENU -----  
OPTION ==>
```

Select a member list type, specifying optional criteria below.

```
1 Source listings - Display/select program source listings  
2 Symbolic files - Display/select program source SYMBOLIC files
```

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Source Selection List

- Once a listing, file or mask has been specified and Enter invoked, AllFusion CA-InterTest for CICS displays the Source Listing Selection menu, showing all the files or listings meeting the criteria that has been specified on the Source Menu.
- Type an S next to the specified file or listing and press Enter to display that file or listing in the Source Listing display.

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Source Selection List

----- CA-InterTest for CICS r8 SOURCE LISTING SELECTION -----
COMMAND ==>

Name	File	Created	Size	Attributes
_	CICSCOB	PRTSYM1 09/20/94 16:38	29	COBOL II, no purge
_	CICSCOB	PRTSYM1 09/20/94 16:13	21	COBOL II, no purge
_	COBDEML	PROTSYM 07/07/94 09:32	17	COBOL, no purge, composite
_	COBDEMO	PROTSYM 07/07/94 09:25	70	COBOL, no purge
_	COB2DEML	PROTSYM 07/07/94 09:33	25	COBOL II, no purge, composite
_	COB2DEMO	PROTSYM 07/21/94 10:34	158	COBOL II, no purge
_	COB2DMLX	PRTSYM1 09/21/94 16:10	26	COBOL II, no purge, composite

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Source Listing Display

```
CA-InterTest - PROTDEM FILE SOURCE LISTING DISPLAY
COMMAND ==>
Program= COBDEMO Option #      Stmt #                      Margin=01
Nested=                        Search=
OPTS 1 Proc div  2 Work-stor 3 Link sect 4 D-map   5 Clst/Pmap More:  +
      6 Data xref 7 Proc xref 8 Err msgs  9 Srch fwd 10 Srch bwd
PFKS 1 Help      2          3 End       4 Profile 5 Monitor 6 Menu
      7 Backward 8 Forward  9          10         11         12 Status
-----
_ 00001 ID DIVISION.
_ 00002 PROGRAM-ID. COBDEMO.
_ 00003 ENVIRONMENT DIVISION.
_ 00004 DATA DIVISION.
_ 00005 WORKING-STORAGE SECTION.
_ 00006 77 S999-FIELD1          PIC S9(3).
_ 00007 77 S999-FIELD2          PIC S9(3) VALUE +50.
_ 00008 77 999-FIELD1           PIC 9(3).
_ 00009 77 999-FIELD2           PIC 9(3) VALUE 50.
_ 00010 77 FIRST-SCREEN-LEN     PIC S9(4) COMP VALUE +1696.
_ 00011 77 MSG-SCREEN-LEN      PIC S9(4) COMP VALUE +1040.

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```

Source Listing Display

- **COMMAND**
 - Enter any AllFusion CA-InterTest for CICS transaction, transaction-based command, or a Source Listing Display command.
 - Enter =X.Y.Z for fast-path menu access to Primary Option Menu X.Y.Z.
- **Program=**
 - Change the program whose code displays.
- **Option #**
 - Enter an option listed on OPTS lines by number, or enter shortcut codes for CNTL functions.
- **Stmt #**
 - Display a specific statement.

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Source Listing Display

- **Nested=**
 - Indicates the displayed COBOL nested program or the program to be searched.
- **Margin=**
 - Adjust the display margins to view code past position 80.
- **Search=**
 - Instruct AllFusion CA-InterTest for CICS to search for a data name or string.

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Single-letter Commands

- A**
Automatic; AllFusion CA-InterTest for CICS generated.
- U**
Unconditional
- C**
Conditional
- V**
Variable-change; COBOL and Assembler.
- R**
Request

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Source Listing Command Line

- **ABEND**
 - Display the Abend Breakpointed Task screen.
- **ABI ON**
 - Default. Turn Abend Intercept on - intercepts all CICS abends and produces an automatic breakpoint screen providing that there a CICS HANDLE ABEND LABEL/PROGRAM is not active.
 - If there is a requirement to intercept CICS abends for programs that have an active CICS HANDLE LABEL/PROGRAM, then the ABI FORCE command will be helpful.
- **ABI OFF**
 - Turn Abend Intercept off.
- **ABI FORCE**
 - Turn Abend Intercept on for all CICS ABENDS even if a program has an outstanding HANDLE ABEND active or issues a CICS HANDLE ABEND command.

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Source Listing Command Line

- **ADVANCE n,ADV n,A n**
 - Advances n entries in the statement trace table and displays the resulting statement
- **AUTOSTEP x y,AS x y**
 - Resume execution x verbs at a time displaying the current source statement for a y interval of time.
- **BOTTOM,BOT**
 - GO to bottom of source.
- **BPO**
 - Jump to Breakpoint Option screen.
- **BWD**
 - PF7 Scrolls backward.
 - he scroll amount is set on the Source Listing Profile.

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Source Listing Command Line

- CALLTRACE
 - Shows the program call flow leading up to the currently breakpointed program.
- CHANNEL
 - Displays the currently allocated channel and the containers in the channel.
- CNTL
 - Displays the CNTL Command Menu.
- COMPOSITE
 - Set composite monitoring options for monitoring of sub-programs.

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Source Listing Command Line

- CORE
 - Displays the Main Storage menu.
- COUNTS SHOW
 - Turns the Code Coverage COUNTER display on.
- COUNTS NOSHOW
 - None Turns the Code Coverage COUNTER display off.

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Source Listing Command Line

- **COUNTS RESET**
 - Resets the program Code Coverage statement counters to zero.
- **COUNTS op value**
 - Turns the Code Coverage COUNTER display on and highlights program statements that match the criteria.
 - Op can be: EQ or =, NE or <>, LT or <, GT or >, LE or <= or <=, GE or >= or =>
- **COUNTS NEXT**
 - Repositions the source listing to the next statement that matches the previously specified COUNT op value criteria.
- **COUNTS ALL**
 - Removes previously specified COUNT op value criteria and redisplay source listing without special COUNTER highlighting.

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Source Listing Command Line

- **DATAMON,DM**
 - Displays the Monitoring Command Builder menu to set and remove statement tracing and data monitoring.
- **DATAMON ON, DM ON**
 - Turns data monitoring on.
 - This causes AllFusion CA-InterTest for CICS to capture data values for each executed statement in the program.
- **DATAMON OFF,DM OFF**
 - Turns data monitoring off.
 - This causes AllFusion CA-InterTest for CICS to stop capturing data values for each executed statement in the program.

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Source Listing Command Line

- **DISPLAY data-item,D data-item**
 - Displays the storage of a data-name.
 - This command is available only at a breakpoint.
- **DOWN**
 - Shifts listing down.
- **END PF3**
 - Returns to the prior display or menu.
- **FILE**
 - Displays the Auxiliary Storage Menu.
 - Select an option to view a file or queue.
- **FIND,F**
 - Find a string.

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Source Listing Command Line

- **FP**
 - Find paragraph.
- **FS**
 - Find statement number.
- **FWD PF8**
 - Scrolls forward the amount indicated on the Source Listing Profile.
- **HELP PF1**
 - Displays help for the Source Listing Facility.

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Source Listing Command Line

- IC
 - Jump to Indirect Command screen.
- ITST
 - Displays the ITST Primary Option Menu.
- KEEP data-item,K data-item
 - None Add a data-item to the static keep window
- LEFT
 - Shift listing left.
- LOCATE,LOC,L
 - Locate line number, a label, or part of the listing.
- MARGIN,MAR
 - Shift listing to specific margin.

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Source Listing Command Line

- MENU PF6
 - Displays the high-level menu.
 - When not at a breakpoint, it is the ITST Primary Option Menu.
 - When at a breakpoint, it is the Breakpoint Primary Option Menu.
- MONITOR PF5
 - Sets monitoring for the current program using the CICS user ID displayed on the Profile.
- OFFALL
 - Removes all breakpoints set by active USER.
 - TERMINAL Active USERID is used if a valid USERID is signed on.
 - Otherwise, the active TERMINAL is used.
 - ALL breakpoints for ALL programs/transactions/ will be removed that were set by the active USERID or active TERMINAL.

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Source Listing Command Line

- OFFALL TERM
 - Removes all breakpoints set by active TERMINAL.
- OFFALL USER
 - Removes all breakpoints set by active USER.
- PO
 - Sets or removes storage protection options.
- PREV n,P n
 - Backs up n entries in the statement trace table and displays the resulting statement.

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Source Listing Command Line

- PROFILE PF4
 - Displays Source Listing Profile, where settings can be changed for the current session.
- RBP
 - Sets or removes Request Breakpoints.
- RIGHT
 - Shifts listing right.
- RO
 - Sets or removes replacement options.

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Source Listing Display

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Source Listing Command Line

- **RUN**
 - Resumes execution ignoring all breakpoints.
 - This command is available only at a breakpoint.
- **SET**
 - Initializes a data-item's value.
 - This command is available only at a breakpoint.
- **SO**
 - Sets or removes special options.
- **SDFDATA**
 - Set to display data in Structure Display Format for the current program.

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Source Listing Command Line

- **SDFHEX**
 - Set to display data in hexadecimal/ character format for the current program.
- **STATUS PF12**
 - Displays the Monitoring Status report; which is Option 2.4 on the Primary Option Menu for the current program.
 - Monitoring, breakpoints, and options can be removed directly from the Status display.
- **STATUS ALL**
 - Displays the Monitoring Status report for all programs, transactions, and terminals CA-InterTest for CICS is monitoring in the region.
- **STORAGE**
 - Displays a listing off all USER and CICS class storage associated with the currently breakpointed task.

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Source Listing Command Line

- TOP
 - Go to top of source.
- TRACE,TR
 - None displays the Monitoring Command Builder menu to set and removes statement tracing and data monitoring.
- TRACE ON,TR ON
 - Turns statement tracing on.
 - The number of entries saved in the statement trace table is determined by the STMTTRCE option in IN25OPTS.
 - The default is 1000.
- TRACE OFF,TR OFF
 - Turns statement tracing off.
 - TRACE OFF forces DATAMON OFF.
- UP
 - Shift listing up.

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Using Breakpoints Line Commands

- U
 - Unconditional; sets an unconditional breakpoint.
- C
 - Conditional; sets a conditional breakpoint.
- V
 - Variable-change; sets a variable-change conditional breakpoint for COBOL or Assembler programs.
- X
 - Remove; removes a breakpoint or removes a variable from the keep window.

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Source Listing Display CICS InterTest

Breakpoints Activities Line Commands

- d
 - Display; displays program or variable storage at a breakpoint.
- k
 - Keep; keeps a variable in the keep window.
- m
 - Modify; modifies a variable at a breakpoint.
- @
 - Display; displays the main storage area pointed to by a data item for a 24-bit address.

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Breakpoints Activities Line Commands

- %
 - Display; displays the main storage area pointed to by a data item for a 31-bit address.
- g
 - Go to; resumes execution from a specified location at a breakpoint.
- b
 - Bypass; bypasses monitoring of an instruction at an automatic breakpoint.

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Source Listing Display CICS InterTest

CNTL Selection Menu Function

- =10s
 - Sets monitoring for the program displayed; same as PF5.
- =10r
 - Removes monitoring, breakpoints, and all other options for the program displayed.
- =11s and 11r
 - Sets and removes unconditional breakpoints.
- =12s and 12r
 - Sets and removes conditional breakpoints.
- =13s and 13r
 - Sets and removes request breakpoints.
- =14s and 14r
 - Sets and removes Segmented Monitoring On option.
- =15s and 15r
 - Sets and removes Segmented Monitoring Off option.
- =16s and 16r
 - Sets and removes statement tracing and data monitoring.

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CNTL Selection Menu Function

- =20s and 20r
 - Sets and removes Replace options.
- =21s and 21r
 - Sets and removes Protection options.
- =22s and 22r
 - Sets and removes Special options.
- =23s
 - Sets Composite Support.
- =24
 - Accesses the Indirect Commands facility.
- =30
 - Shows the Status Display screen.
- =31
 - Sets Utility Options screen.
- =33
 - Resumes task execution.

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Find a Definition or Search

- Use the Search= field to define or search for data.
- In order to display the definition of a data item:
 - Enter a data item name up to 31 characters in the Search= field.
 - Press Enter to begin the search.
 - AllFusion CA-InterTest for CICS highlights the data item and its definition.
- In order to search for a data item:
 - Enter up to 31 characters in the Search= field.
 - Specify the search direction in the Option # field.
 - Option # 9 is Search Forward.
 - Option # 10 is Search Backward.
 - Press Enter to begin the search.

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Position the Display

- When initiating the Source Listing Facility, the program can be named and positioned the display at any statement number with a single command:

LIST=progrname,#nnnnn

- progrname is the name of the program to be viewed.
- # is required.
- nnnnn is the statement number from 1 to 99999.

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Adjust the Margins

- Since certain compiler output extends beyond 80 positions, it might be necessary to adjust the display margins to view more of the program's Source Listing.
- In order to adjust the output display to view portions of the listing to the right of position 80, perform the following steps:
 - Enter the position number of the left margin in the Margin= field.
 - Valid entries are 1 through 50.
 - The screen displays the output beginning at the position specified.

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Source Listing Profile

- The Source Listing Profile provides the ability to set specific functions that help in testing.
 - In order to access the Profile, type profile on the command line and press Enter, or press PF4 while viewing the Source Listing or Breakpoint screen.
 - Each Profile option has a default setting; therefore, it is not necessary to change the options in the Profile screen unless the default settings are to be changed for a test session.

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Source Listing Profile

```
CA-InterTest for CICS r8 - PROTDEM FILE SOURCE LISTING PROFILE
COMMAND ===>
Program= COBDEMO      Option #          Stmt #          Margin= 01
                        Search=
OPTS 1 Proc div 2 Work-stor 3 Link sect 4 D-map 5 Clst/Pmap More: +
      6 Data xref 7 Proc xref 8 Err msgs 9 Srch fwd 10 Srch bwd
PFKS 1 Help 2 3 End 4 Auto prms 5 Monitor 6 Menu
      7 Backward 8 Forward 9 10 11 12 Status
-----
Display titles      = R      Y (Titles), N (No titles), or R (Registers)
PF7/8 amount       = PAGE   PAGE, HALF, STOP, or a number from 1 to 9999
Step Timing        = AFTER  Stop Before or After the next verb is executed
Stepping amount    = 001    The number of verbs to execute
Auto-stepping      = OFF    ON to activate; press PF4 to change values
Source List BKPT   = ON     OFF to use the detailed breakpoint display
From terminal ID   = G001   Terminal ID where the program will execute
BKPT terminal ID   = G001   Terminal ID to receive the breakpoint displays
User ID            = .ANY   User ID who will execute this program
AutoKeep Display   = ON     OFF to deactivate
Code Counting      = OFF    ON to activate Code Coverage
SDF                = DATA  HEX for Hexadecimal/Character Format
```

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Automatic Single-Stepping

- Automatic single-stepping provides the capability to go through a source listing a specified number of steps at specified time intervals.

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Source Listing Display CICS InterTest

Breakpoint Display Mode

- AllFusion CA-InterTest for CICS has two breakpoint displays:
 - The Source Listing Breakpoint version allows testing to be done directly from a source listing.
 - The Detailed Breakpoint display requires the one-line CA-InterTest commands and other menus.
- The initial display mode depends on the setting chosen when AllFusion CA-InterTest for CICS was installed; however, the display mode can be changed at any time by using the Profile screen.
 - This change remains in effect until the Source List BKPT= setting is changed.
- The Source List BKPT= field shows the current setting.
 - Overtyping the current value with one of the following:
 - ON Displays the Source Listing Breakpoint.
 - OFF Displays the Detailed Breakpoint.

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Set the User ID

- CA-InterTest for CICS monitoring is sensitive to user IDs.
- Programs can be monitored, breakpoints set and other monitoring options utilized with the user ID set to .ANY, or the user ID set to a specific CICS user ID.
 - When the user ID is set to .ANY, everyone is monitored and the breakpoints and other monitoring options that have been set take effect only if the program executes from the terminal used to set the breakpoints.
 - When the user ID is set to a specific user ID, only that user is monitored, and the breakpoints and other monitoring options are directed to wherever the specified user is logged onto CICS.

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