



Control/DCD Quick Reference Guide

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Introduction to Control/DCD Quick Reference Guide

Purpose and Scope:

The Control/DCD Quick Reference Guide is designed for use by the programmer who wants to get a head start on using Control/DCD.

Additionally, the Guide is a reference point for understanding the functionality of Control/DCD, its components and how each component relates to each other. This Guide covers all of the components which are:

1. The Digital Documentation Manual (the DDM)
2. The Alternate Compile Listing (ACL)
3. The COBOL Source Editor (CSE)
4. Analyze a COBOL Application
5. Abend Analysis for Data Field Errors
6. Verify JCL Accuracy Within an Application

When involved in a COBOL 6.2 the programmer will easily find The Control/DCD specific features in each of the components that will assist in the migration to IBM's COBOL 6 compiler.

Using the Guide:

The Table of Contents is interactive. By clicking on the section heading the Programmers is immediately taken to the desired information on best use of Control/DCD functionality.

User Comments:

Please send any comments or suggestions dealing with the Control/DCD Quick Reference Guide to Support@marblecomputer.com

Full Data Name Analysis

Use **&** ahead of data-field to get Data Analysis

From DDM (in pdf reader search box)

&IPT-NBR-ENTRIES

From CSE (from ISPF)

F &IPT-NBR-ENTRIES

Search Results show:

Data Division Information,
and **Procedure Division activity to this name,**
and **Performed Routine hosting each reference.**
and **Forward Tracing of routines where activity exists. (*for DDM only*)**

```
(0163) &IPT-NBR-ENTRIES      &163&          ==>  Data Attributes  <==
      In 5-8 of IPT-INTERNAL-HOLD-TBL
      in WORKING-STORAGE
      05  IPT-NBR-ENTRIES
           Pic S9(8)  Value ZERO
           Usage is COMP
      Used in Depending on IPT-NBR-ENTRIES

      01  PROGRAM-ENTRY          ==>  Forward Tracing  <==
      02    C-INITAIL-READ-FILE
      02    N-SORT-INPUT-PROCEDURE
      03    P-LOOK-FOR-MATCH

      C-INITIAL-READ-FILE          ==>  Activity by Routine <==
      Move +45 to IPT-NBR-ENTRIES (260)
      N-SORT-INPUT-PROCEDURE
      Move WS-CURR-HOLD-NBR @125 to IPT-NBR-ENTRIES (342)
      Set IPT-INDEX @166 to IPT-NBR-ENTRIES (344)
      P-LOOK-FOR-MATCH
      Move IPT-NBR-ENTRIES to CPY-NBR-ENTRIES @131 (C2/32)
```

Four Steps to Understanding DATA NARRATIVE

STEP ONE - Shows data attributes and procedure division activity.

```
Data Attributes==>      (0089) INV-CODE
                        In 63-65 of 01 INV-RECORD
                        in WORKING-STORAGE
                        05 INV-CODE
                                Pic 9(03)

Forward-Tracing==>    01  VB-UPDATE-INV-FILE --> (Perform/UNTIL)
                        02      VE-DO-200-CODES (No Activity)
                        03      |  VEA-DO-CODE-250-299 --> (Perform/TIMES)
                        02      VF-DO-300-CODES

Activity by Routine=>  VB-UPDATE-INV-FILE --> (Perform/UNTIL)
                        If INV-CODE not numeric (658)
                        If INV-CODE < 200 (682)
                        If INV-CODE > 300 (682)
                        If INV-CODE < 300 (690)
                        If INV-CODE > 400 (690)
                        VEA-DO-CODE-250-299 --> (Perform/TIMES)
                        If INV-CODE not = 261 (758), 262 (758)
                        VF-DO-300-CODES
                        Move INV-CODE to WK-INV-CODE (771)
                        Move 352 to INV-CODE (774)
```

STEP TWO - Lists related performed routine.

```
Data Attributes==>      (0089) INV-CODE
                        In 63-65 of 01 INV-RECORD
                        in WORKING-STORAGE
                        05 INV-CODE
                                Pic 9(03)

Forward-Tracing==>    01  VB-UPDATE-INV-FILE --> (Perform/UNTIL)
                        02      VE-DO-200-CODES (No Activity)
                        03      |  VEA-DO-CODE-250-299 --> (Perform/TIMES)
                        02      VF-DO-300-CODES

Activity by Routine=>  VB-UPDATE-INV-FILE --> (Perform/UNTIL)
                        If INV-CODE not numeric (658)
                        If INV-CODE < 200 (682)
                        If INV-CODE > 300 (682) <-- P-D line number
                        If INV-CODE < 300 (690)
                        If INV-CODE > 400 (690)
                        VEA-DO-CODE-250-299 --> (Perform/TIMES)
                        If INV-CODE not = 261 (758), 262 (758)
```

VF-DO-300-CODES

Move INV-CODE to WK-INV-CODE (771)
Move 352 to INV-CODE (774)

STEP THREE - Show abbreviated forward tracing for referenced routine.

Data Attributes==> (0089) INV-CODE
In 63-65 of 01 INV-RECORD
in WORKING-STORAGE
05 INV-CODE
Pic 9(03)

Forward-Tracing==> 01 VB-UPDATE-INV-FILE --> (Perform/UNTIL)
02 VE-DO-200-CODES (No Activity)
03 | VEA-DO-CODE-250-299 --> (Perform/TIMES)
02 VF-DO-300-CODES

Activity by Routine==> VB-UPDATE-INV-FILE --> (Perform/UNTIL)
If INV-CODE not numeric (658)
If INV-CODE < 200 (682)
If INV-CODE > 300 (682)
If INV-CODE < 300 (690)
If INV-CODE > 400 (690)
VEA-DO-CODE-250-299 --> (Perform/TIMES)
If INV-CODE not = 261 (758), 262 (758)
VF-DO-300-CODES
Move INV-CODE to WK-INV-CODE (771)
Move 352 to INV-CODE (774)

STEP FOUR - Forward Tracing shows full tracing for abbreviated routines structure.

Control/DCD's **Forward-Tracing** is a **hierarchical listing** of **Performed Routines**

```
1 271 PROGRAM-ENTRY
2 308 A-OPEN-TWO-FILES
3 325 C-BUILD-NARR-FILE-TO-MERGE
4 342 E-CLEAR-OUT-ES-RECORD
5 357 M-MERGE-THREE-FILES-TO-ONE
6 399 . N-SORT-INPUT-PROCEDURE
7 524 . P-SORT-OUTPUT-PROCEDURE
8 538 . P110-CLEAR-QVW-LINE --> (Perform/UNTIL)
9 352 G-BUILD-OPEN-NARR-TO-MERGE
10 631 V-UPDATE-INV-CODE
11 655 VB-UPDATE-INV-FILE --> (Perform/UNTIL)
12 706 VC-DO-SPECIAL-EXTENSIONS
13 731 VD-DO-OTHER-ASSOC-ACCTS
14 748 VE-DO-200-CODES
15 755 . VEA-DO-CODE-250-299 --> (Perform/TIMES)
16 778 . VW-WRITE-AND-READ-NEXT-REC
17 769 VF-DO-300-CODES
18
```

[Click Here to Return to Index](#)

Forward Tracing Chart

From DDM (in pdf reader search box)

&FORWARD-TRACING

From CSE (from ISPF)

F &FORWARD-TRACING

Search Results show:

#FORWARD	TRACING	&FORWARD-TRACING
1	229	PROGRAM-ENTRY
2	265	C-BUILD-NARR-FILE-TO-MERGE
3	487	MERGE-THREE-FILES-TO-ONE
4	554	FILEIO-ERROR-ROUTINE --> (4 Performs)
5	588	FILEIO-RTN-2 --> (Perform/VARYING)
6	612	N-SORT-INPUT-PROCEDURE
7	653	N220-LOOK-FOR-MATCH --> (Perform/UNTIL)
(See #4)		FILEIO-ERROR-ROUTINE --> (2 Performs)
8	892	P-SORT-OUTPUT-ROUTINE
9	1021	G-BUILD-OPEN-NARR-TO-MERGE

Notes on Forward Tracing

- Forward tracing shows the structure of PERFORMs in the program in **indented** format.
- Multiple PERFORMs **OR** different types of Performs, such as UNTIL, VARYING, or TIMES are noted.
- Sequence numbers (229, 265, 487 etc.) above show where the PERFORMed routine resides.
- **(See #4)** refers to a performed routine that has been performed before AND tracing further is not shown after the first occurrence of **FILEIO-ERROR-ROUTINE**.

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&Operand – Searching made easy Use of & Character

Inserting an & character just ahead of a selectable operand goes right to that Analysis.

See 'Search Operands' for all available operands

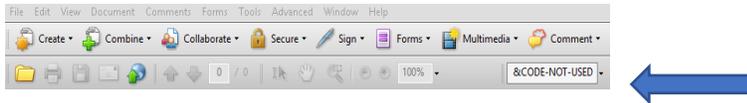
Example below shows one operand (CODE-NOT-USED)

From DDM (in pdf reader search box)

&CODE-NOT-USED

From CSE (from ISPF)

F &CODE-NOT-USED



Search Results show:

#CODE-NOT-USED

&CODE-NOT-USED

&Unreferenced PARAGRAPHS and SECTIONS for IPTPROG
Before removing routine, check FALL THRU's not intended

Unused SECTIONS

Seq Number	Section/Paragraph Name	Message or Warning
543	R-ENTRY-TO-SUB-ACCT-2	NO Direct Refs to SECTION

Before removing routine, check FALL THRU's not intended

Unused PARAGRAPHS

Seq Number	Section/Paragraph Name	Message or Warning
544	R010-BEGIN-SUB-ACCT-2	NO Direct Refs to PARAGRAPH

&Unused 01 Records and 77 Entries for Prog: IPTPROG

Seq Number	Lvl	Field Name
146	01	WS-COUNT-SEQS
175	01	S1-RECORD

&Unused Data Names for Prog: IPTPROG

Seq Number	Lvl	Field Name
(39)	***01**WS-AW-RECORD****	contains unused fields **
41	10	WS-AW-SORT-PREFIX-ID

Notes on types of Unused Information

- These three reports show **DEAD** Procedure Division Code, **Unused 01** records and **Unused (non-COPY Member)** fields.
- In the 01 RECORD unused report, if a redefined record is used, it is reported.

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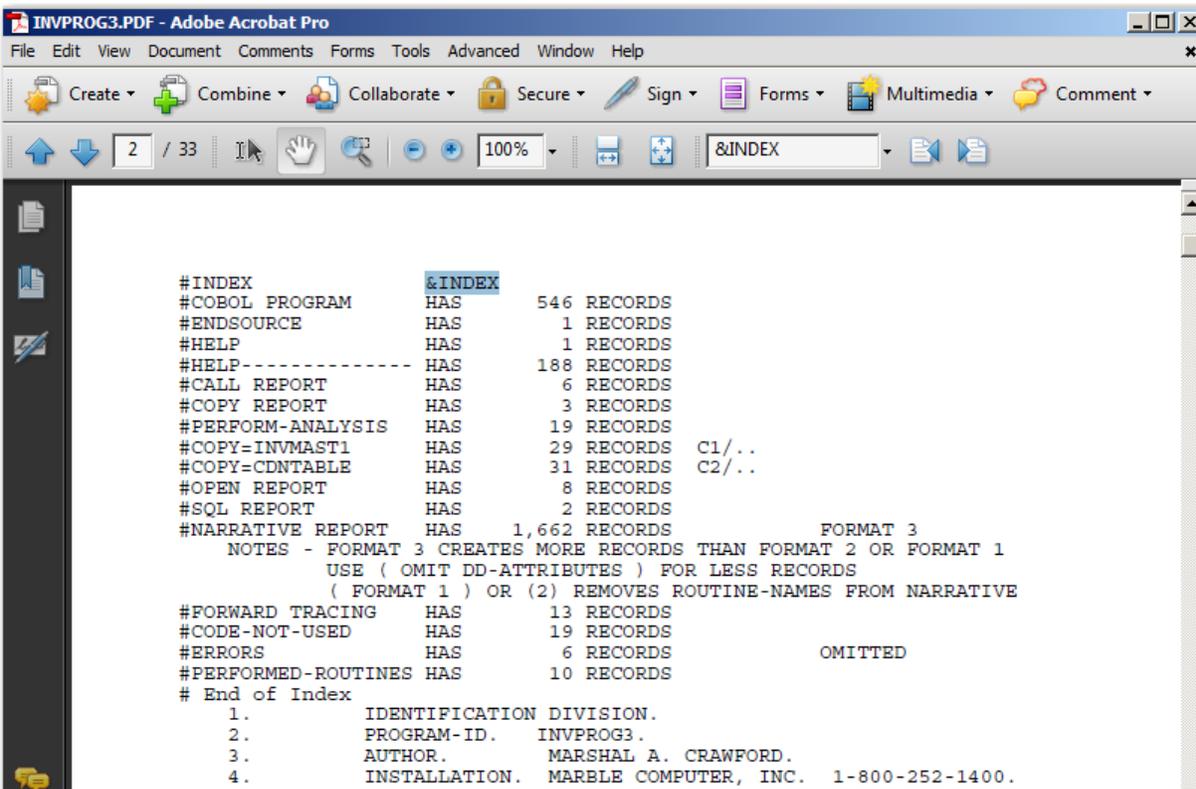
SEARCH Operands

(Searching with **&** immediately followed by **operand**)

OPERANDS to Choose From

1. any **data** field
2. any **Performed** paragraph or section
3. CALL
4. COPY
5. CODE-NOT-USED
6. ERRORS
7. FORWARD-TRACING
8. HELP
9. INDEX
10. OPEN
11. PERFORM-ANALYSIS
12. PERFORMED-ROUTINES
13. SQL
14. Cn/ (see HELP for explanation)
15. n (see HELP for explanation)
16. any COPY member

&INDEX points to DDM Index



&PERFORM-ERRORS shows a major Perform Error

```
Open Output INV-MAST-FILE-2 (168)
End of FD OPEN & SORT Info
#PERFORM-ANALYSIS &PERFORM-ANALYSIS &PERFORM-ERRORS
PERFORM Warnings & Major Errors
Count Type & Sequence Number(s)
01 GO TOs leaving the range of a PERFORM MAJOR PERFORM ERROR
544
02 Backward GO TO's MODERATE PERFORM ERROR
527 544
PERFORM & GO TO activity
Count Type & Sequence Number(s)
13 PERFORM SECTIONS
159 178 195 198 200 282 318
323 328 359 389 418 457
07 GO TO Paragraphs
474 481 485 495 504 527 544
#PERFORMED-ROUTINES &PERFORMED-ROUTINES
SEQ# Count Performed Routine
5 1 PROGRAM-ENTRY PROGRAM-ENTRY
7 1 PERFORM A-PROCESS-ALL-RECORDS UNTIL=1
```

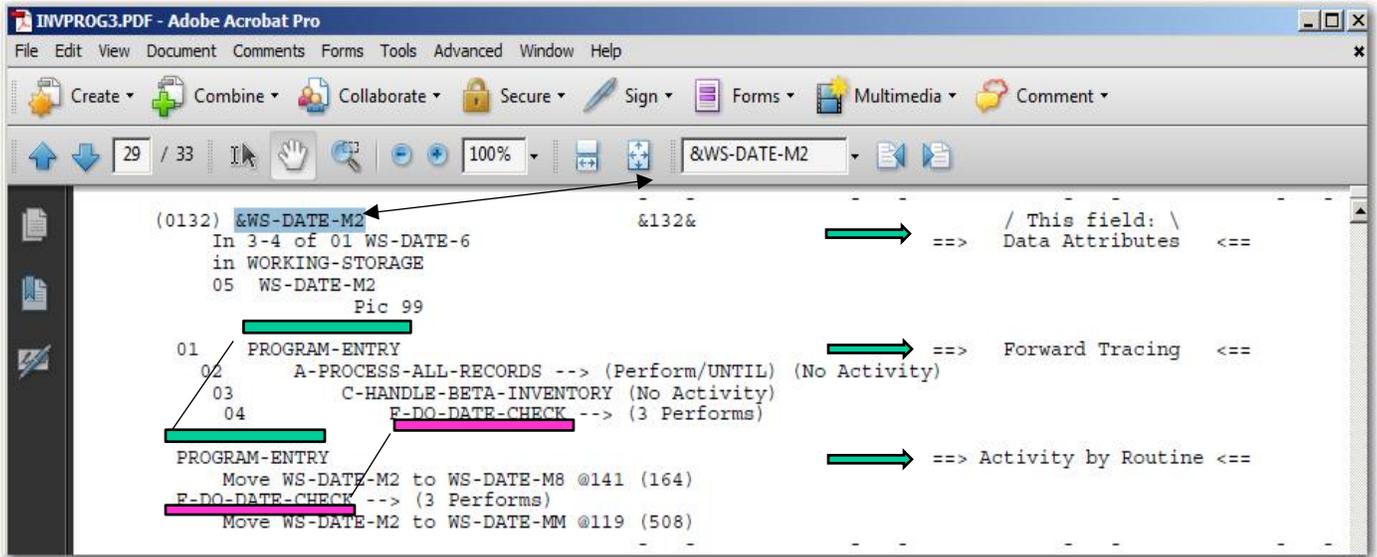
&Forward-Tracing of Performed Routines (allows maintaining structured code!)

&user-data-field

Find a selected data field example:

```
106 01 WS-HOLD-AREAS
C2/24 01 CD2-TABLE-OF-MOVE-LITERALS
#COPY REPORT &COPY
DATA DIVISION 112 COPY CDNTABLE
DATA DIVISION 95 COPY INVMAS1
#FORWARD TRACING &FORWARD-TRACING
1 155 &PROGRAM-ENTRY
2 531 &P-TEST-PARM-FIELD
3 187 &A-PROCESS-ALL-RECORDS --> (Perform/UNTIL)
4 214 &B-PROCESS-ALPHA-INVENTORY
5 422 &E-FORMAT-OUTPUT-RECORD
6 514 &G-VERIFY-3RD-DATE
7 286 &C-HANDLE-BETA-INVENTORY
8 469 &F-DO-DATE-CHECK --> (3 Performs)
(See #5) E-FORMAT-OUTPUT-RECORD
9 363 &D-FINISH-OTHER-INVENTORY
(See #8) F-DO-DATE-CHECK
(See #5) E-FORMAT-OUTPUT-RECORD
#OPEN REPORT &OPEN REPORT
(0031) &INV-MAST-FILE &31&
Open Input INV-MAST-FILE (168)
(0062) &INV-MAST-FILE-2 &62&
Open Output INV-MAST-FILE-2 (168)
```

1. Shows **Data Attributes**
2. Shows **Forward Tracing** relevant to this field use
3. Shows **Procedure Division** activity within Performed Routine

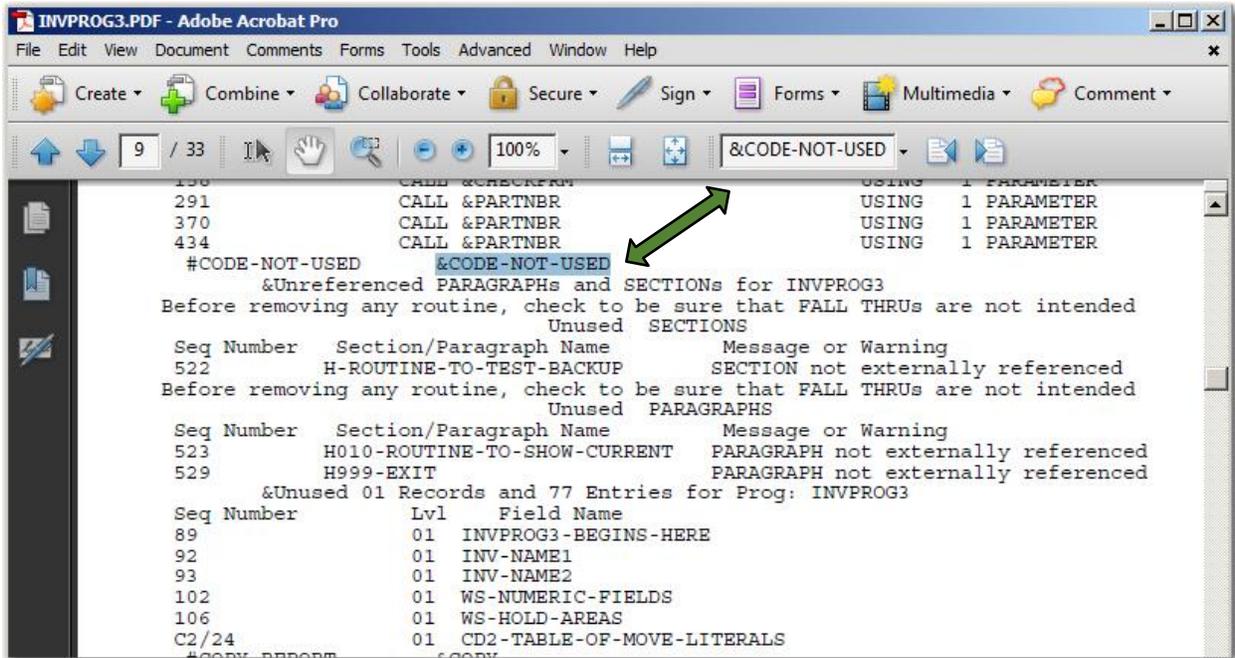


Activity by Routine within **Forward Tracing** tells a very complete story of this data usage

&CODE-NOT-USED

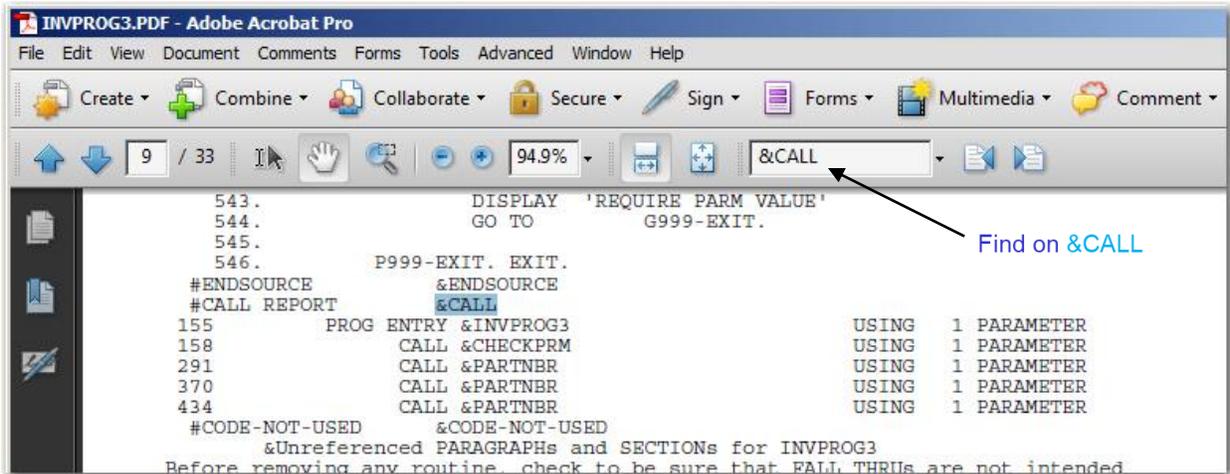
CODE NOT USED example shows:

1. Procedure Division DEAD CODE
2. Unused 01 records
3. Unused (non-COPY-member) data fields



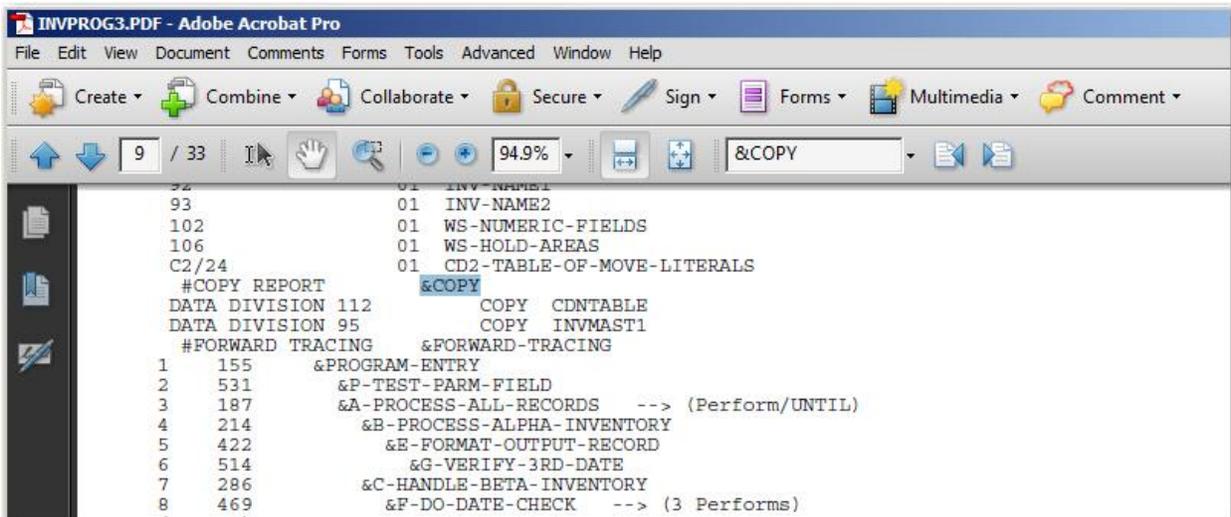
&CALL

Find CALL info example



Program-ENTRY and CALL information is provided at one glance **©**

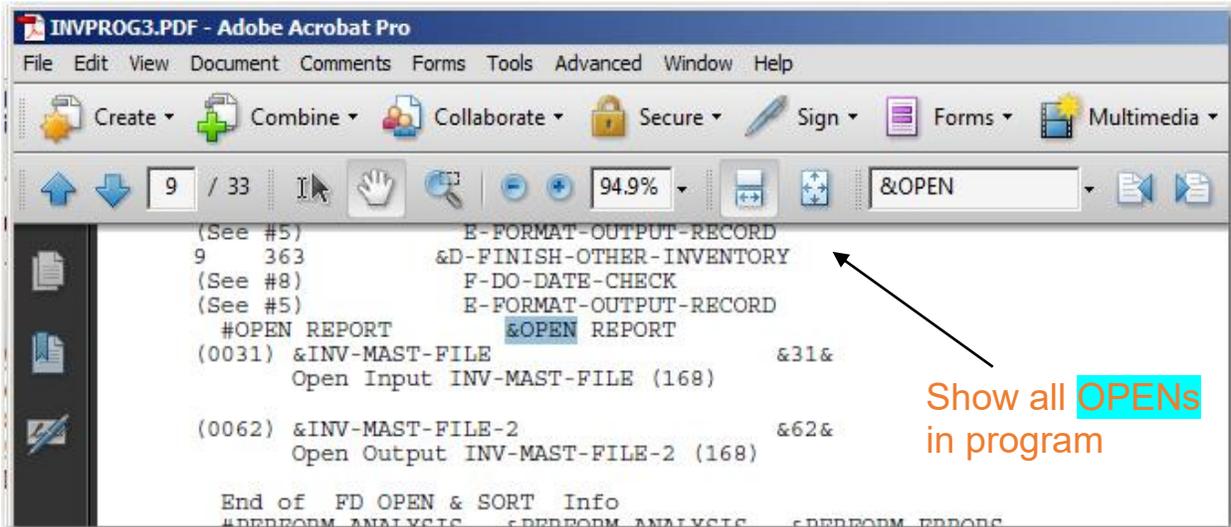
Find **COPY** information



All **COPY** members along with supporting information is given.

&OPEN

Get **OPEN** verb activity



Show all **OPENS** in program

Every **OPEN** statement in shown along with **OPEN INPUT**, **OUTPUT** or other type shown.

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PERFORM ERRORS – Finding PERFORM logic errors

From DDM (in pdf reader search box)

From CSE (from ISPF)

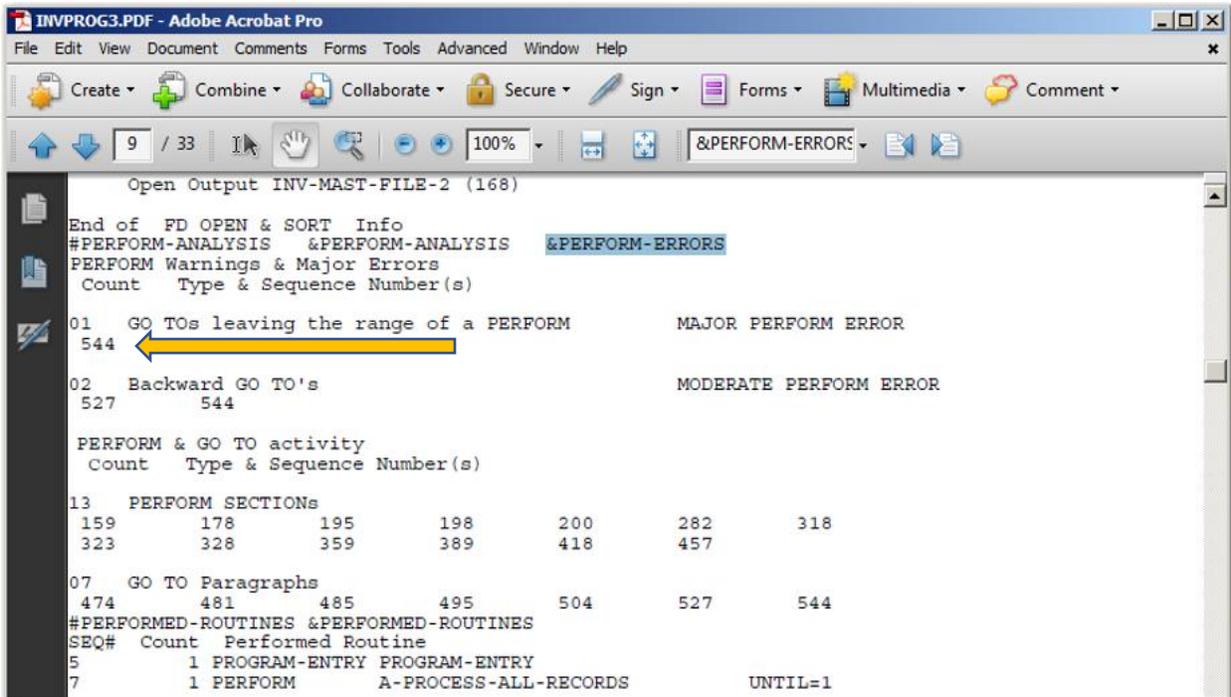
&PERFORM-ANALYSIS

F &PERFORM-ANALYSIS

Search Results show:

&PERFORM-ERRORS shows a major Perform Error

In example below, GO TO leaves PERFORM Range



The screenshot shows the Adobe Acrobat Pro interface with a search result for '&PERFORM-ERRORS'. The search results are displayed in a table format. The first result is highlighted with a yellow arrow pointing to the sequence number '544'.

```
Open Output INV-MAST-FILE-2 (168)
End of FD OPEN & SORT Info
#PERFORM-ANALYSIS  &PERFORM-ANALYSIS  &PERFORM-ERRORS
PERFORM Warnings & Major Errors
Count  Type & Sequence Number(s)
01  GO TOs leaving the range of a PERFORM      MAJOR PERFORM ERROR
544
02  Backward GO TO's                          MODERATE PERFORM ERROR
527      544
PERFORM & GO TO activity
Count  Type & Sequence Number(s)
13  PERFORM SECTIONS
159      178      195      198      200      282      318
323      328      359      389      418      457
07  GO TO Paragraphs
474      481      485      495      504      527      544
#PERFORMED-ROUTINES &PERFORMED-ROUTINES
SEQ#  Count  Performed Routine
5      1  PROGRAM-ENTRY PROGRAM-ENTRY
7      1  PERFORM      A-PROCESS-ALL-RECORDS      UNTIL=1
```

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Conversion to COBOL 6

Control/DCD has 6 areas that assist in conversion to COBOL 6

COBOL 6.2 Migration Assistance in the DDM

1. INVALID DATA not flagged in earlier COBOL
Literal '1_3' containing 'F140F3'
IBM does not flag these fields
2. Excessive Compile Time with newer compilers
 - 5 to 10 times for smaller programs, more for larger!
 - An Efficient Pre-Compiler would save time!
 - Control/DCD Perform analysis can help increase compile speed
 - Forward-Tracing also helps
3. OCCURS / DEPENDING where existing code exceeds table size
 - Examine All Code for Possible Exceeding Table Size
4. Not initially assigning a VALUE in Working-Storage
 - Data Division Code Need to be Looked at Carefully

COBOL 6.2 Migration Assistance from Abend Analysis

1. PACKED and BINARY fields defined too small
 - A Way Needs To Be Found To Identify These Fields

COBOL 6.2 Migration Assistance from Multiple COBOL Program Analysis

1. COBOL PARAMETER inconsistencies
 - Parameter Sizes not the same or parameter missing
 - These Must Be Fixed

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Using ISPF panels to build the Analysis

Control/DCD may now be entirely run from ISPF panels

- We recommend using Enhanced ISPF Panels, over JCL when feasible.
- Normally only 2-3 panels need to be accessed to generate your output.

The Control DCD Main Menu

```
Host Edit View Setup Macros Language Help
Control/DCD The Ultimate COBOL Program and Application Analysis Tool
Option ==> 1 Enter 1-6, H or use F3 to exit)

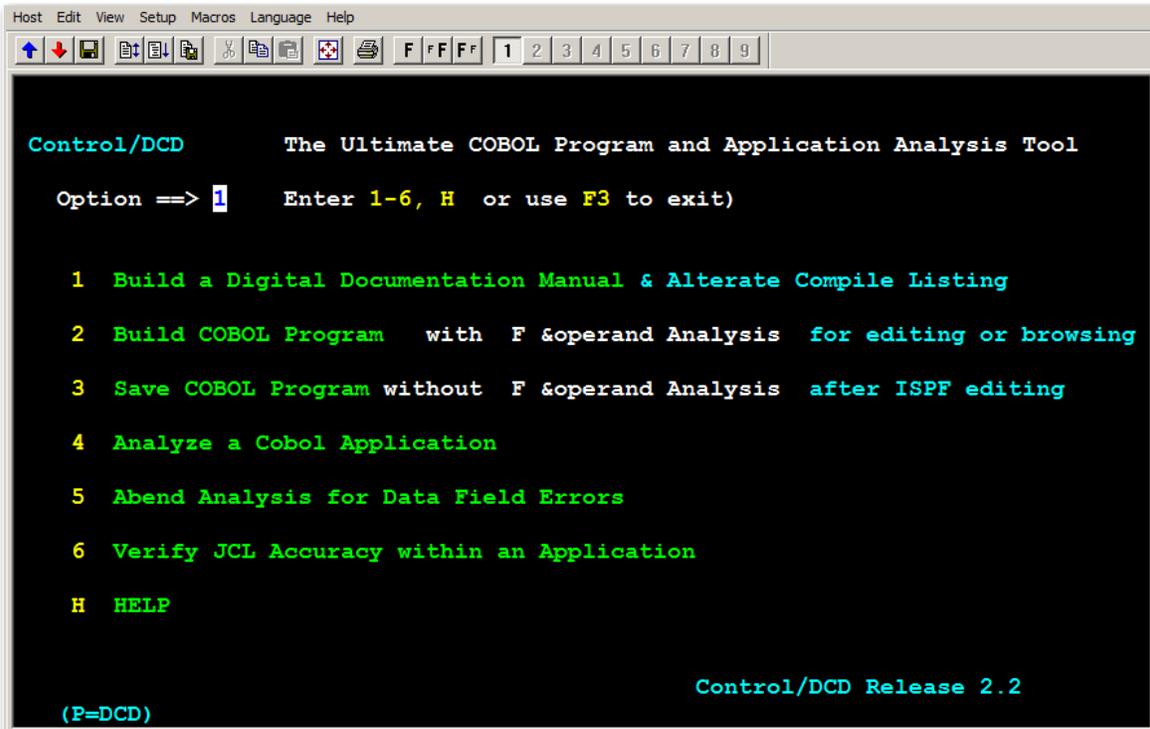
1 Build a Digital Documentation Manual & Alterate Compile Listing
2 Build COBOL Program with F &operand Analysis for editing or browsing
3 Save COBOL Program without F &operand Analysis after ISPF editing
4 Analyze a Cobol Application
5 Abend Analysis for Data Field Errors
6 Verify JCL Accuracy within an Application
H HELP

Control/DCD Release 2.2
(P=DCD)
```

Recap Main Menu

- Option 1 – Creates the DDM and “ACL”
- Option 2 – Edit and Browse the Source Code. Code includes the Narrative found in the DDM.
- Option 3 – Saves the Source Code without the Narrative.
- Option 4 – Analyzes a COBOL Application
- Option 5 - Abend Analysis
- Option 6 – JCL Accuracy Check
- Option H – Help Screens

Creating a Digital Documentation Manual in PDF format



The screenshot shows the main menu of the Control/DCD application. The title bar includes 'Host Edit View Setup Macros Language Help'. The menu items are as follows:

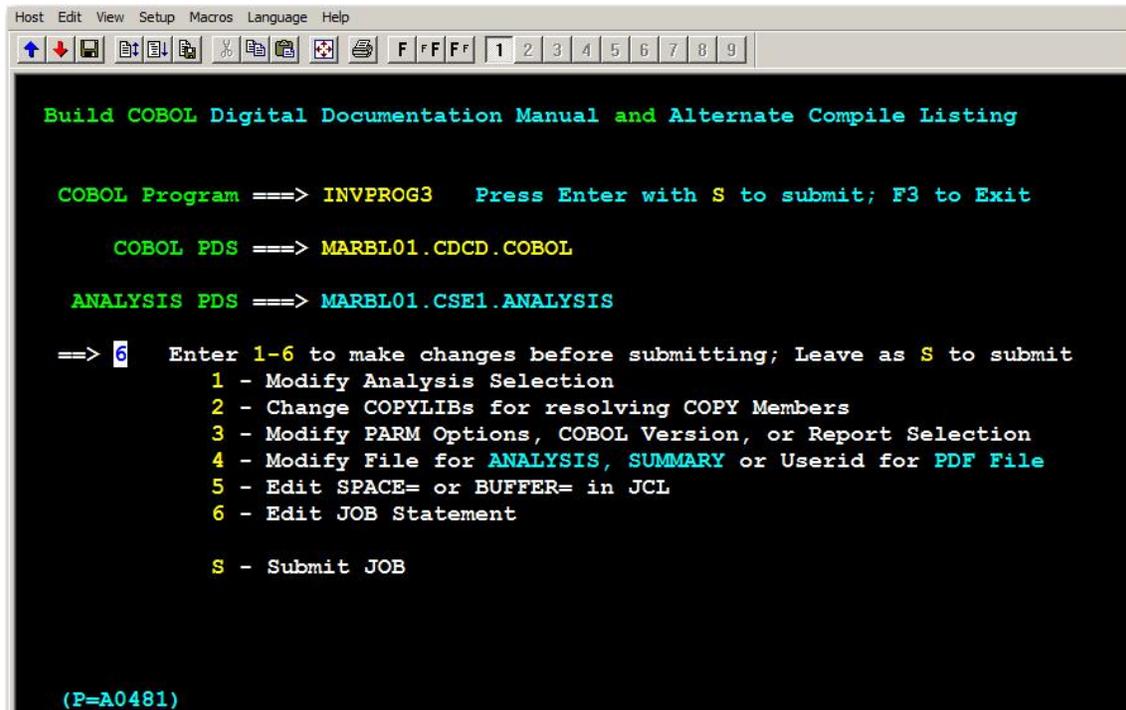
```
Control/DCD      The Ultimate COBOL Program and Application Analysis Tool
Option ==> 1    (Enter 1-6, H or use F3 to exit)

1  Build a Digital Documentation Manual & Alternate Compile Listing
2  Build COBOL Program with F &operand Analysis for editing or browsing
3  Save COBOL Program without F &operand Analysis after ISPF editing
4  Analyze a Cobol Application
5  Abend Analysis for Data Field Errors
6  Verify JCL Accuracy within an Application
H  HELP

Control/DCD Release 2.2
(P=DCD)
```

Select 1 and press enter

Use Option 6, to initially set up JOB Statement



The screenshot shows the configuration screen for 'Build COBOL Digital Documentation Manual and Alternate Compile Listing'. The title bar includes 'Host Edit View Setup Macros Language Help'. The configuration options are as follows:

```
Build COBOL Digital Documentation Manual and Alternate Compile Listing

COBOL Program ==> INVPROG3  Press Enter with S to submit; F3 to Exit
COBOL PDS ==> MARBL01.CDCD.COBOL
ANALYSIS PDS ==> MARBL01.CSE1.ANALYSIS

==> 6  Enter 1-6 to make changes before submitting; Leave as S to submit
      1 - Modify Analysis Selection
      2 - Change COPYLIBs for resolving COPY Members
      3 - Modify PARM Options, COBOL Version, or Report Selection
      4 - Modify File for ANALYSIS, SUMMARY or Userid for PDF File
      5 - Edit SPACE= or BUFFER= in JCL
      6 - Edit JOB Statement
      S - Submit JOB

(P=A0481)
```

Enter the JOB statement values according to Z/OS requirements and your installation standards. Use all 4 lines.

Use Option 1-6, to Make Changes

```
Host Edit View Setup Macros Language Help
Build COBOL Digital Documentation Manual and Alternate Compile Listing

COBOL Program ==> INVEROG3   Press Enter with S to submit; F3 to Exit

COBOL PDS ==> MARBL01.CDCD.COBOL

ANALYSIS PDS ==> MARBL01.CSE1.ANALYSIS

==> 6   Enter 1-6 to make changes before submitting; Leave as S to submit
      1 - Modify Analysis Selection
      2 - Change COPYLIBS for resolving COPY Members
      3 - Modify PARM Options, COBOL Version, or Report Selection
      4 - Modify File for ANALYSIS, SUMMARY or Userid for PDF File
      5 - Edit SPACE= or BUFFER= in JCL
      6 - Edit JOB Statement

      S - Submit JOB

(P=A0481)
```

Enter 1 or 2 to Modify Options or Change COPYLIBS

The user may choose what type of analysis information will be included in the ISPF EDITFILE

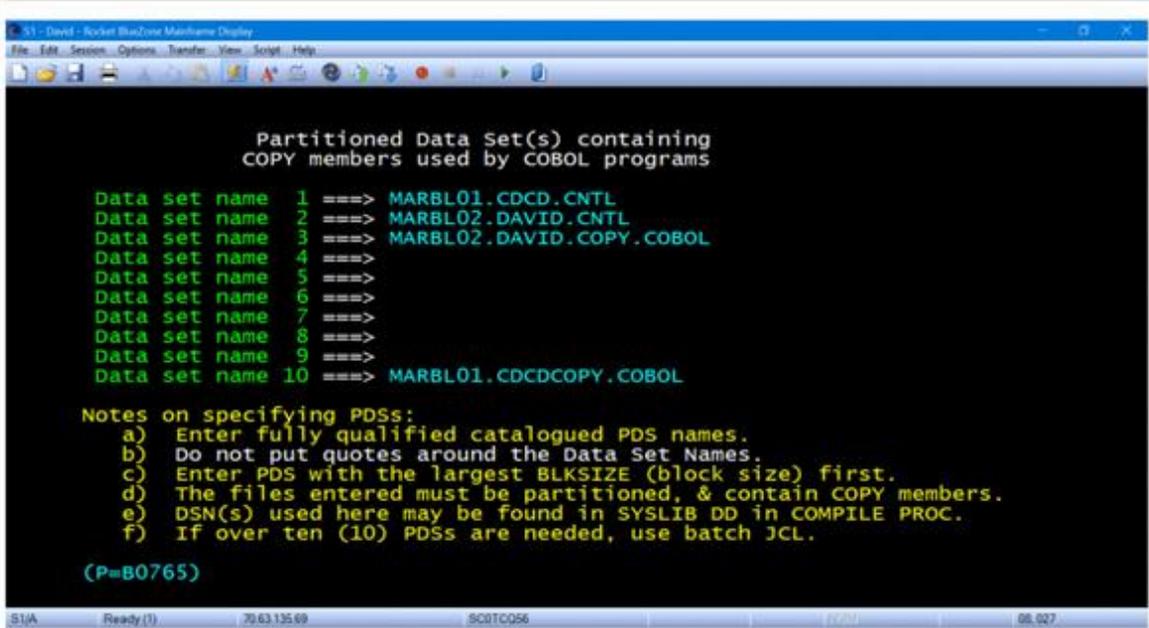
```
1: 172.126.122.51 - TN3270 Plus 3.6.6
Host Edit View Setup Macros Language Help
Modify Type Analysis provided
Summary Management Reports ==> N   (Y - Also sets SUMMARY options)
                                   (R - Resets to Original Defaults)

1. ==> Y   Add COPY Members          2. ==> Y   CALL Analysis
3. ==> Y   COBOL Source (add)        4. ==> Y   COPY Analysis
5. ==> N   CODE NOT USED (show)      6. ==> Y   DD info (PIC & more)
7. ==> I   ERRORS Y, N or I          8. ==> 3   FORMAT 1, 2 or 3
9. ==> Y   FORWARD TRACING           10. ==> Y  HELP (how to use)
11. ==> N  INDEXED BY (clause)       12. ==> N  INDIRECT REFERENCES
13. ==> N  OMIT Name (use #)         14. ==> Y  OCCURS and OPEN
15. ==> Y  PERFORM Errors             16. ==> N  PERFORMED ROUTINES
17. ==> Y  SQL (show SQL info)
18. ==> N  Use @-DD-number (of other name in P-D narrative)

- - Notes - -
Errors = I shows INVALID DATA and WORKING-STORAGE fields with NO VALUE
Add COPY Members: allows adding some or all COPY members
DD info has: FROM-TO, SECTION, Level, Name, PIC, VALUE, USAGE & more
Format = 1 :has Verb Sequence and NO Performed Routines in Narrative
Format = 2 :has P-D Sequence and NO Performed Routines in Narrativie
Format = 3 :has P-D Sequence and DOES show Performed Routines in Narrative
OMIT Name uses # as in: MOVE FIRST-NAME TO # (instead of THIS-FIELD)
Use @-DD-number uses @nnnn as in: MOVE FIRST-NAME @765 TO THIS-FIELD
(P=ASELE)
```

Examples for each type of ANALYSIS follow

Option 2 allows one time entering the correct COPYLIBs



```
Partitioned Data Set(s) containing
COPY members used by COBOL programs

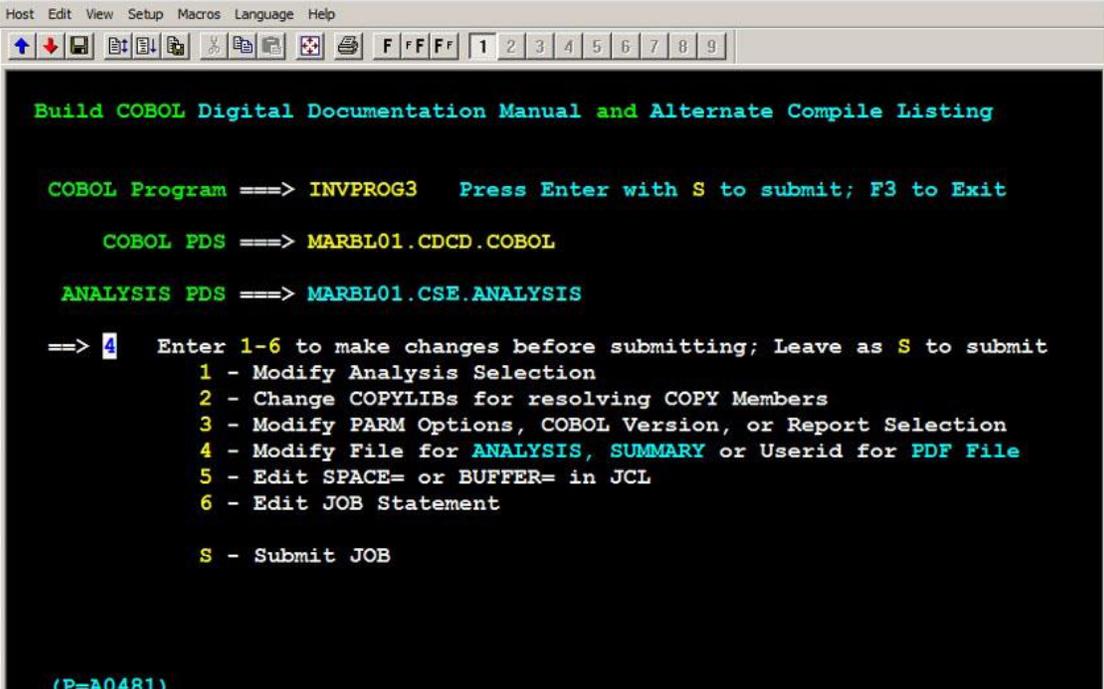
Data set name 1 ==> MARBL01.CDCD.CNTL
Data set name 2 ==> MARBL02.DAVID.CNTL
Data set name 3 ==> MARBL02.DAVID.COPY.COBOL
Data set name 4 ==>
Data set name 5 ==>
Data set name 6 ==>
Data set name 7 ==>
Data set name 8 ==>
Data set name 9 ==>
Data set name 10 ==> MARBL01.CDCDCOPY.COBOL

Notes on specifying PDSs:
a) Enter fully qualified catalogued PDS names.
b) Do not put quotes around the Data Set Names.
c) Enter PDS with the largest BLKSIZE (block size) first.
d) The files entered must be partitioned, & contain COPY members.
e) DSN(s) used here may be found in SYSLIB DD in COMPILE PROC.
f) If over ten (10) PDSs are needed, use batch JCL.

(P=B0765)
```

Press enter to return to the menu.

Option 4 is needed initially to provide USERID



```
Host Edit View Setup Macros Language Help
Build COBOL Digital Documentation Manual and Alternate Compile Listing

COBOL Program ==> INVPROG3 Press Enter with S to submit; F3 to Exit

COBOL PDS ==> MARBL01.CDCD.COBOL

ANALYSIS PDS ==> MARBL01.CSE.ANALYSIS

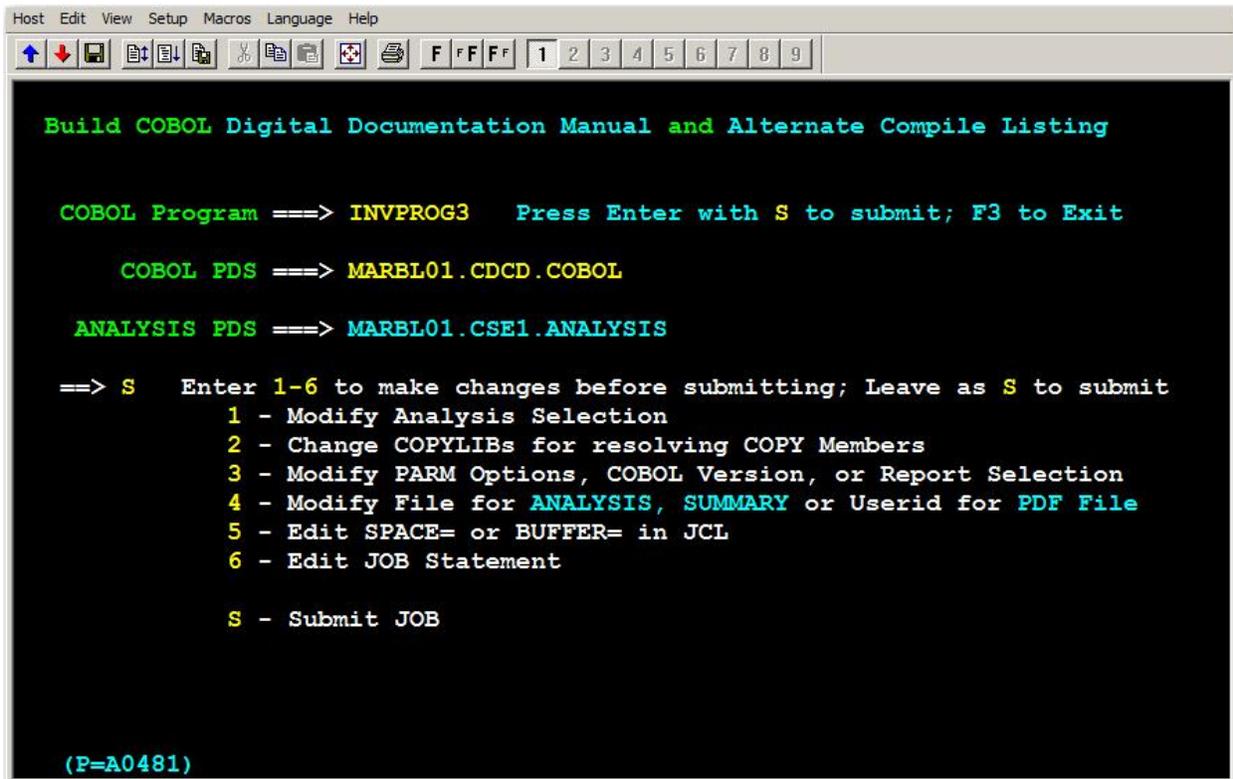
==> 4 Enter 1-6 to make changes before submitting; Leave as S to submit
    1 - Modify Analysis Selection
    2 - Change COPYLIBs for resolving COPY Members
    3 - Modify PARM Options, COBOL Version, or Report Selection
    4 - Modify File for ANALYSIS, SUMMARY or Userid for PDF File
    5 - Edit SPACE= or BUFFER= in JCL
    6 - Edit JOB Statement

    S - Submit JOB

(P=A0481)
```

Modifying Install file for **.ANALYSIS** & **.SUMMARY** is possible here!

1. Enter Program Name
2. Verify or change input COBOL PDS
3. Use 'S' option to submit job



The screenshot shows a terminal window with a menu for building COBOL digital documentation. The menu items are: COBOL Program (INVPROG3), COBOL PDS (MARBL01.CDCD.COBOL), and ANALYSIS PDS (MARBL01.CSE1.ANALYSIS). A list of options (1-6) is provided for modifying the installation before submitting. Option 4 is highlighted in the original image, indicating the user's choice to modify the file for ANALYSIS or SUMMARY.

```
Host Edit View Setup Macros Language Help
Build COBOL Digital Documentation Manual and Alternate Compile Listing

COBOL Program ==> INVPROG3   Press Enter with S to submit; F3 to Exit

COBOL PDS ==> MARBL01.CDCD.COBOL

ANALYSIS PDS ==> MARBL01.CSE1.ANALYSIS

==> S   Enter 1-6 to make changes before submitting; Leave as S to submit
      1 - Modify Analysis Selection
      2 - Change COPYLIBs for resolving COPY Members
      3 - Modify PARM Options, COBOL Version, or Report Selection
      4 - Modify File for ANALYSIS, SUMMARY or Userid for PDF File
      5 - Edit SPACE= or BUFFER= in JCL
      6 - Edit JOB Statement

      S - Submit JOB

(P=A0481)
```

Pressing enter with option S submits job

Recap

Run Time Options

1. Choose Analysis Options
2. Specify **COPYLIBs** (Initially used)
3. Modify PARM options (mostly unused)
4. Modify Analysis, Summary, **USERID** (Initially used)
5. Edit SPACE or Buffer Size (mostly unused)
6. Enter **JOB** Statement (Initially used)
5. Submit Command

Checking the Return Code for DDM

Check the **return code** after JOB finishes for return code of **0000**, **0004**, **0008**, **0012** or **0016** similar to return codes from a COBOL compile.

Also check for two additional Return codes of **0000** used to create file 'userid.MANUAL4.progname.PDF'

Do a binary transfer of file:
'userid.MANUAL4.progname.PDF'
from the mainframe to the PC or other platform.

[Click Here to Return to Index](#)

Using the Analysis in a PDF Reader

Overview of Digital Documentation Manual PDF (Many benefits)

Output is in PDF format available to any PDF reader

(PC, Adobe, MAC or any media)

Ideal for Analysis from anywhere

Doing a search with **&operand** is used in the DDM (Digital Documentation Manual) and in the Cobol Source Editor(Option 2)

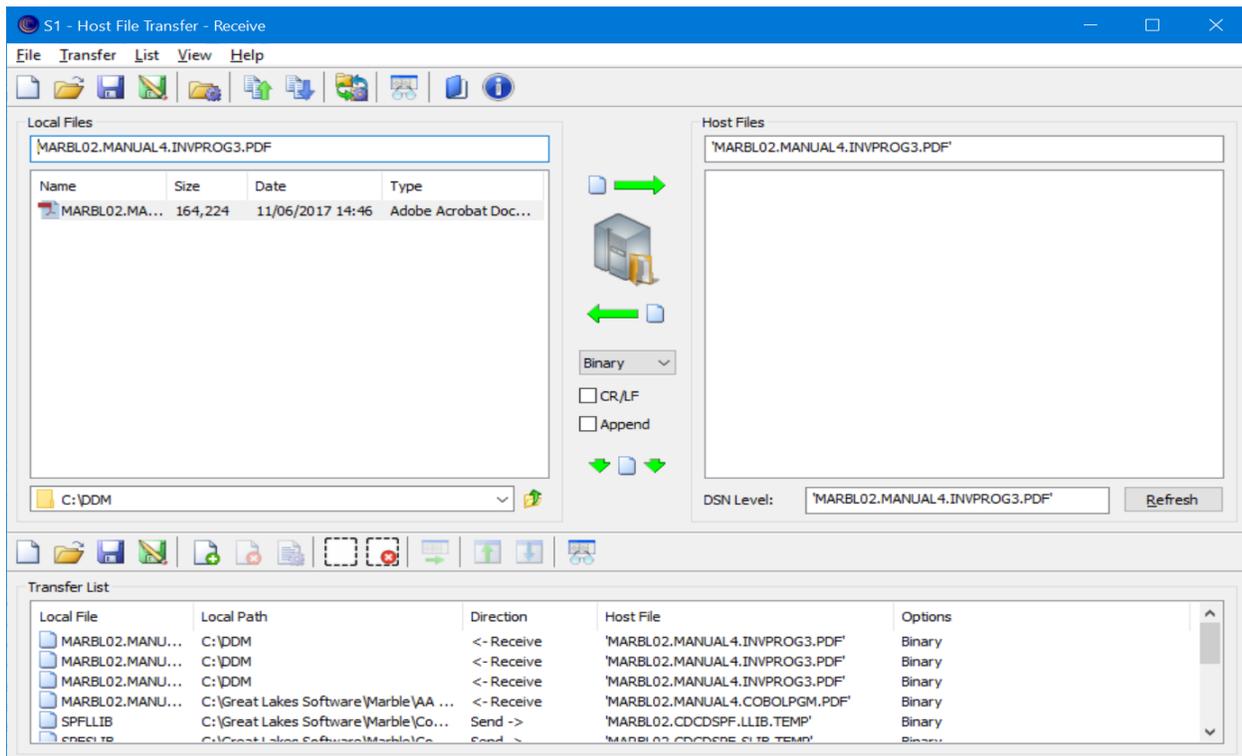
Only in DDM, **each data name** has its own **reduced Forward-Tracing chart**

The DDM is created on the mainframe in PDF format and the user transfers file off the mainframe **via a simple BINARY transfer**

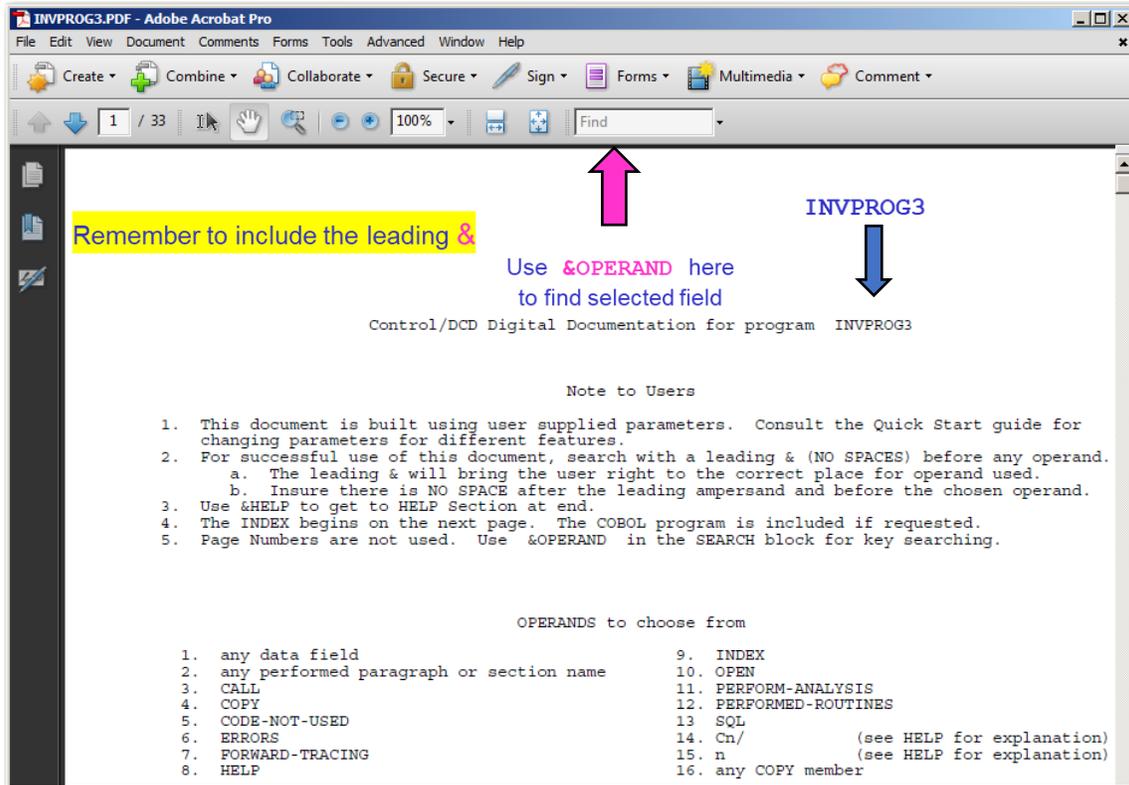
Documentation is now available off the mainframe

A PDF file prefixed with your USERID and a final suffix of PDF has been created on the mainframe and it is ready to download to the workstation. Use your installation's FTP product to transfer the file to the workstation.

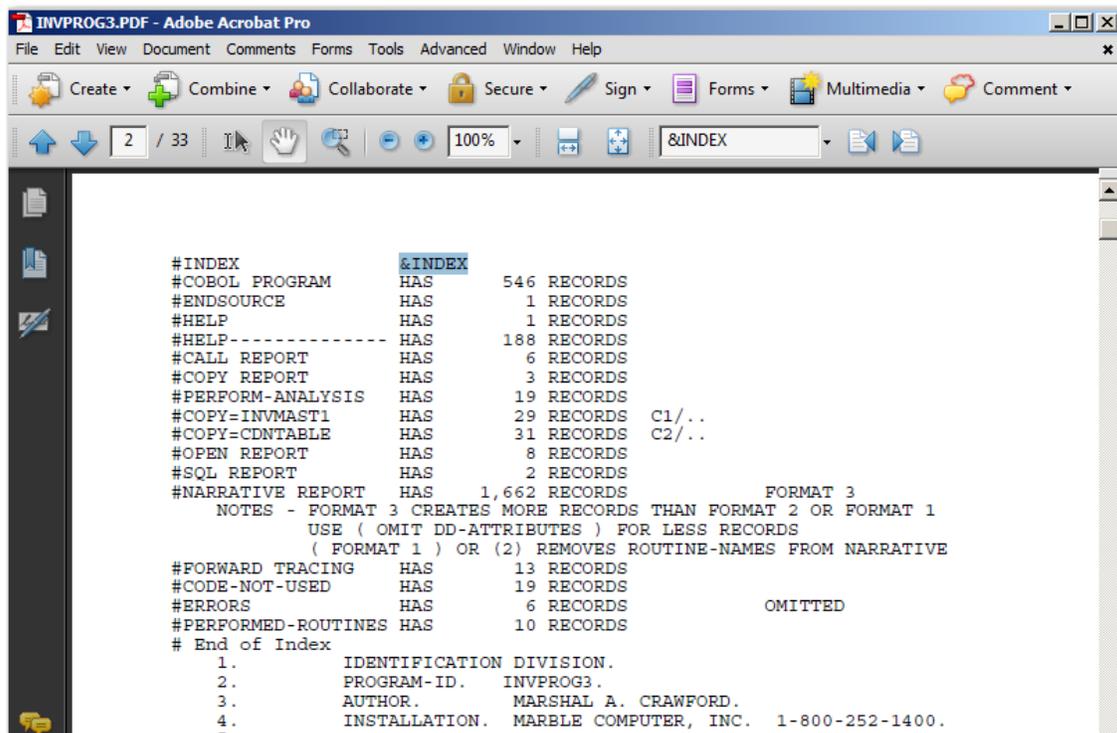
The download type must be set to BINARY!



Many benefits to using Adobe or any other PDF reader



&INDEX points to DDM Index



For examples see [Search Operands](#)

[Click Here to Return to Index](#)

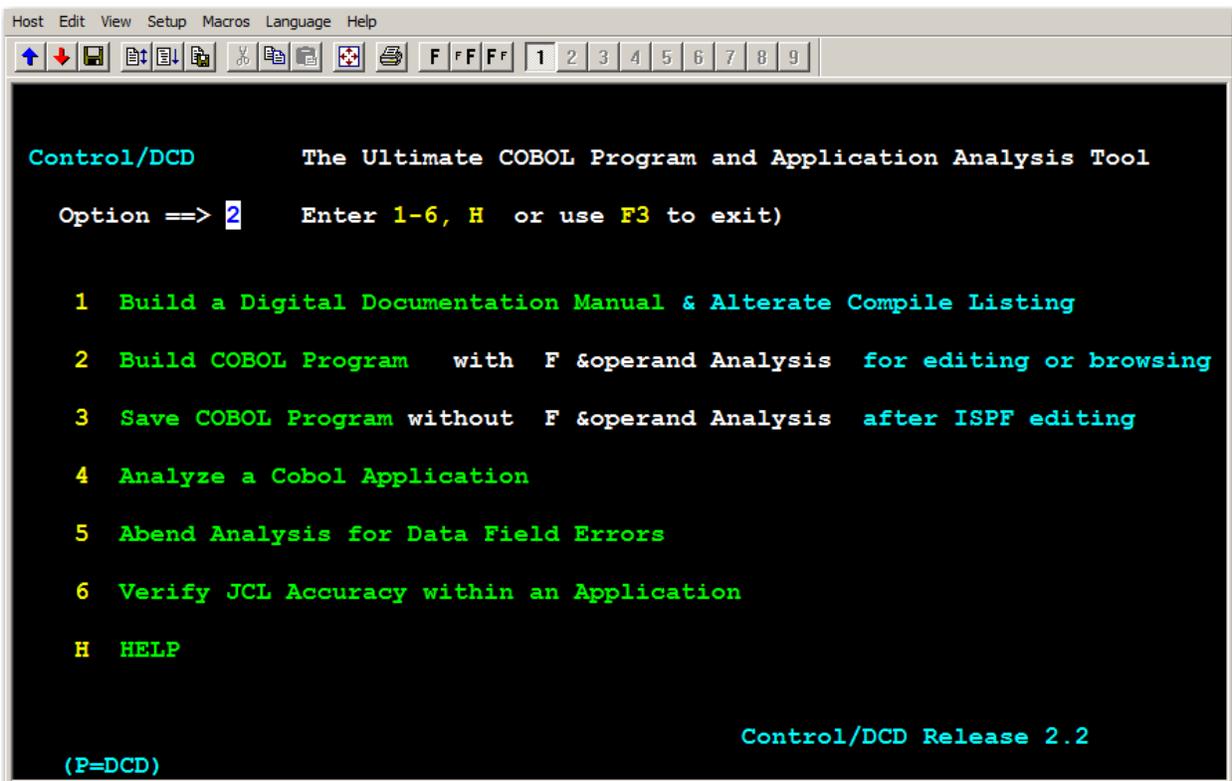
Using the Analysis on the Mainframe

Introducing the COBOL Source Editor

COBOL Source Editor in ISPF

A Control/DCD analytical PDS report is produced as a member on the EDITFILE PDS that can be browsed or edited using ISPF **using option 2**.

In this feature, ALL code, analytics, and reports remain on the mainframe.

A screenshot of the Control/DCD ISPF menu. The window title is "Control/DCD" and the subtitle is "The Ultimate COBOL Program and Application Analysis Tool". The menu is displayed on a black background with green and yellow text. The menu items are: 1 Build a Digital Documentation Manual & Alterate Compile Listing; 2 Build COBOL Program with F &operand Analysis for editing or browsing; 3 Save COBOL Program without F &operand Analysis after ISPF editing; 4 Analyze a Cobol Application; 5 Abend Analysis for Data Field Errors; 6 Verify JCL Accuracy within an Application; H HELP. The current selection is option 2, indicated by a yellow box around the number 2. The prompt "Option ==>" is followed by the selected option. The bottom right corner shows "Control/DCD Release 2.2" and the bottom left corner shows "(P=DCD)". The window has a standard ISPF menu bar with "Host Edit View Setup Macros Language Help" and a toolbar with various icons and function keys (F1-F9).

Select 2, and then press enter

Option 1 used to Modify Analysis Selection

Option 2 used to Change COPYLIBs for resolving COPYs

Examples for each type of ANALYSIS follow

This returns you to the Add Analysis to Cobol Member for ISPF editing sub menu.

```

Add Analysis to COBOL Member for ISPF editing
COBOL Program ==>> INVPROG3  Press Enter with S to submit; F3 to Exit
COBOL PDS ==>> MARBL02.CDCD.CNTL
EDITFILE PDS ==>> MARBL02.CSE.EDITFILE

==> S  Enter 1-6 to make changes before submitting; Leave as S to submit
      1 - Modify Analysis Selection
      2 - Change COPYLIBS for resolving COPY Members
      3 - Modify PARM Options, COBOL Version, or Report Selection
      4 - Modify File Name for EDITFILE, SUMMARY or BCKUPCOB
      5 - Edit SPACE= or BUFFER= in JCL
      6 - Edit JOB Statement

      S - Submit JOB

Sample Edit Entry Panel - - - >
to use after JOB finishes

ISPF Library
Project . . . . MARBL02
Group . . . . UserLib
Type . . . . EDITFILE
Member . . . . INVPROG3

(P=A0482)

```

Use **S** option to **submit** job, then check return code.

Then go to the Member built in EDITFILE to browse or edit.

Go to EDIT or BROWSE panel to see CODE with Narrative.

Use EDIT panel if user wants to edit source code for later saving.

In this example;

MARBL02.CSE.EDITFILE(INVPROG3)

```

File Edit Edit_Settings Menu Utilities Compilers Test Help

VIEW MARBL02.CSE.EDITFILE(INVPROG3) - 01.00 Columns 00001 00072
Command ==>> Scroll ==>> PAGE
***** Top of Data *****
000001 IDENTIFICATION DIVISION.
000002 PROGRAM-ID. INVPROG3.
000003 AUTHOR. MARSHAL A. CRAWFORD.
000004 INSTALLATION. MARBLE COMPUTER, INC. 1-800-252-1400.
000005
000006 ENVIRONMENT DIVISION.
000007 CONFIGURATION SECTION.
000008 SOURCE-COMPUTER. IBM-370.
000009 OBJECT-COMPUTER. IBM-370.
000010
000011 INPUT-OUTPUT SECTION.
000012 FILE-CONTROL.
000013
000014 *****
000015 *
000016 * THIS IS A MARBLE PROGRAM TO DEMONSTRATE THE TRACING *
000017 * CAPABILITY OF DCD. *
000018 *
000019 * IT ALSO CONTAINS REFERENCES TO 2 POS YEAR FIELDS. *

```

Using FIND command to get documentation

Unique analysis is available – Leading & is required.

Example of a simple FIND: **FIND ©**

List of operands available using a leading &.

Field Name	INDEX
Performed Routine	OPEN
CALL	PERFORM-ERRORS
COPY	PERFORMED-ROUTINES
CODE-NOT-USED	SQL
ERRORS	Cn/
FORWARD-TRACING	n FIRST
HELP	Copy-Member-Name

FIND &Data-Name Example – F &INV-1-PART-NBR

```
Host Edit View Setup Macros Language Help
[Icons] F F F F 1 2 3 4 5 6 7 8 9
File Edit Edit_Settings Menu Utilities Compilers Test Help
-----
EDIT MARBL01.CSE2.EDITFILE (INVPROG3) - 01.00 Columns 00001 00072
Command ==> Scroll ==> CSR
001029 (0036) &INV-1-PART-NBR &36&
001030 In 1-8 of 01 INV-1-RECORD-IN
001031 in FILE SECTION
001032 05 INV-1-PART-NBR
001033 Pic S9(8)
001034 B-PROCESS-ALPHA-INVENTORY
001035 Move INV-1-PART-NBR to INV-M-PART-NBR @C1/4 (219)
001036 C-HANDLE-BETA-INVENTORY
001037 Call 'PARTNBR' using INV-1-PART-NBR (291)
001038 Move INV-1-PART-NBR to INV-M-PART-NBR @C1/4 (292)
001039 D-FINISH-OTHER-INVENTORY
001040 Call 'PARTNBR' using INV-1-PART-NBR (370)
001041 Move INV-1-PART-NBR to INV-M-PART-NBR @C1/4 (371)
001042 E-FORMAT-OUTPUT-RECORD
001043 Call 'PARTNBR' using INV-1-PART-NBR (434)
001044 (0037) &INV-1-PART-NAME &37&
001045 In 9-28 of 01 INV-1-RECORD-IN
001046 in FILE SECTION
001047 05 INV-1-PART-NAME
001048 Pic X(20)
```

For examples see [Search Operands](#)

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Using the Alternate Compile Listing

- **Main** source listing with **Narrative**
- many small supporting reports
- **Condensed Data Division** cross reference
- Alternate Compile Listing is still available and can be useful, though newer features are highly recommended!

Condensed Procedure Division Lines

put **NARRATIVE** on the 133-character source listing

DCD Narrative Description

Part I

DCD Narrative on right:

70 01 **INV-2-RECORD-IN.** > Move SPACES to # **(444,555)**

indicates PROCEDURE DIVISION lines:

444 MOVE SPACES TO **INV-2-RECORD-IN.**

555 MOVE SPACES TO **INV-2-RECORD-IN.**

DCD Narrative Description

Part II

DCD Narrative:

71 05 **INV-2-PART-NBR** > Move INV-M-PART @**103** to # **(447)**

indicates the presence of:

103 05 **INV-M-PART**

and indicates PROCEDURE DIVISION line:

447 MOVE INV-M-PART TO **INV-2-PART-NBR.**

Alternate Compile Listing

DATA DIVISION

```

SQ-NBR 1--6  PROGRAM-ID YEAR2POS  mm/dd/yyyy ... 73--80  # REFERS TO DATA-NAME AT THIS LINE

66      FD INV-MAST-FILE-2                                > Close # (214)
                                                Open Output # (197)
67      RECORD CONTAINS  94 CHARACTERS
68      BLOCK CONTAINS   0 RECORDS
69      LABEL RECORDS ARE STANDARD.
70      01 INV-2-RECORD-IN.                            > Move SPACES to # (444)
                                                Write # (231)
71      05 INV-2-PART-NBR                                PIC S9(8). > Move INV-M-PART-NBR @103 to # (447)
72      05 INV-2-PART-NAME                                PIC X(20). > If 'NON-UNIFORM-PART' = # (450)
                                                Move 'MARK-TO-REMOVE' to # (451)
                                                INV-M-PART-NM @104 to # (448)
73      05 INV-2-ORIG-DATE.                               > Move INV-M-ORIG-DT @105 to # (453)
74      10 INV-2-ORIG-YEAR                                PIC 99.
75      10 INV-2-ORIG-MONTH                              PIC 99.
76      05 INV-2-ORIG-CONTACT-NAM PIC X(20).
                                                > Move INV-M-ORIG-NAM @108 to # (455)
    
```

Quick description of Alternate Compile Listing

Tracing between DIVISIONS

```

SQ-NBR 1-6  PROGRAM-ID DCDLOGIC                                73-80  # REFERS TO DATA-NAME AT THIS LINE

322 ← 05 WS-MAX- DIGITS    PIC S9(3) COMP.                > IF # = 3 (942,965,1022), 4 (945,968)
                                                IF # > WS-MAX-COLUMN @321 (1005)
                                                MOVE # TO WS-NBR-TIMES @324 (1017)
323      05 WS-NARR-CODE-INC PIC S9(3) COMP.                > COMPUTE WORK-NARR-CODE @299 = #
                                                (682,694,1302)
324      05 WS-NBR-TIMES    PIC S9(3) COMP-3.              > MOVE WS-MAX-DIGITS @322 TO # (1017)
                                                PERFORM-UNTIL # = ZERO (951,974,1031)
                                                SUBTRACT 1 FROM # (1040)

> MOVE WS-MAX- DIGITS @322 TO # (1017)

SQ-NBR 1-6  PROGRAM-ID DCDLOGIC                                73-80  SQ-NBR'S    LOGIC FLOW
1017 ← MOVE WS-MAX-DIGS    TO WS-NBR-TIMES.                322 324
1018      ADD 1
1019      ADD 1          TO WS-NEXT-COL.                    320
    
```

Alternate Compile Listing

PROCEDURE DIVISION

SQ-NBR	1—6	PROGRAM-ID	YEAR2POS	mm/dd/yyyy ...	73—80	SQ-NBRS	LOGIC FLOW
442		E-FORMAT-OUTPUT-RECORD		SECTION.			PERFORMED BY 300 373
443		E010-CLEAR-OUTPUT-RECORD.					
444		MOVE SPACES		TO INV-2-RECORD-IN.		70	
445							
446		E020-FORMAT-RECORD.					
447		MOVE INV-M-PART-NBR		TO INV-2-PART-NBR.	103	71	
448		MOVE INV-M-PART-NM		TO INV-2-PART-NAME.	104	72	
449							
450		IF 'NON-UNIFORM-PART' =		INV-2-PART-NAME		72	
451		MOVE 'MRK-REM'		TO INV-2-PART-NAME.		72	
452		PERFORM		P-TEST-PARM-FIELD.			PERFORM 523 THRU 538
453							
454		E999-EXIT. EXIT.					RETURN TO PERFORM AT 300 373

Recap for Alternate Compile Listing

- Original way DCD created **Narrative**
- Still available for user's comfortable with it
- Control/DCD expanded on this Narrative to create the previously discussed DDM and yet to be discussed COBOL Source Editor
- Require more paging than newer features

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Comparison Chart

Features	Control/DCD	DCD/IV
Abend Analysis	✓	✗
Alternate Compile Listing	✓	✓
Analysis of Multiple COBOL programs	✓	✓
Assist in Conversion to Cobol 6	✓	✗
Supports COBOL 6 code	✓	✗
COBOL Source Editor	✓	✗
Compile Mode	✗	✓
Dead Code Analysis	✓	✓
Digital Documentation Manual	✓	✗
<ul style="list-style-type: none"> • Abbreviated Forward Tracing 	✓	✗
Forward Tracing	✓	✗
INDEX	✓	✗
JCL Analysis	✓	✓
PERFORM Analysis and listing Errors	✓	✗
Procedure Division Narrative	✓	✓
<ul style="list-style-type: none"> • Performed Routine with activity 	✓	✗
Search by & character before operand	✓	✗
Simplified ISPF Panels	✓	✗
System Record Analysis across programs	✓	✓

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