CA IDMS™/DB Analyzer

User Guide

Release 18.5.00

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Chapter 1: General Information

This section contains the following topics:

Overview (see page 9)
What Does CA IDMS/DB Analyzer Do? (see page 10)
CA IDMS/DB Analyzer and Database I/O (see page 13)

Overview

CA IDMS/DB Analyzer is a parameter-driven utility for CA IDMS that produces a series of analytical reports describing the physical organization of a database. These reports give you the necessary statistical basis for both planning and assessing database reorganization. With CA IDMS/DB Analyzer you can analyze an entire database or a portion of a database. CA IDMS/DB Analyzer also allows you to compare current physical organization conditions with past ones, or two sets of past conditions with each other.

The Physical Analysis/Reorganization Challenge

The physical organization of your database plays a crucial role in determining efficient and cost-effective application performance. But, because of the dynamic nature of corporate information, the effectiveness of even the most carefully structured database deteriorates over time. Application performance decreases, operating costs increase, and the DBA is confronted with a formidable challenge—database analysis and reorganization.

Computer Associates International, Inc. meets this challenge with two companion software products—CA IDMS/DB Analyzer and CA IDMS/DB Reorg.

CA IDMS/DB Analyzer Meets Your Needs

CA IDMS/DB Analyzer is a comprehensive database analysis tool. It replaces the less comprehensive utilities previously available for understanding the physical organization of a database.

CA IDMS/DB Analyzer gives you the analytical capability necessary for performing timely, accurate, and easy to justify database reorganization. It is specifically designed to help you:

- Manage the database environment using meaningful physical organization information
- Forecast the performance of proposed applications
- Monitor database growth
- Establish the need for database expansion
- Identify undesirable trends in the database environment
- Assess the benefits derived from database reorganization.

What Does CA IDMS/DB Analyzer Do?

CA IDMS/DB Analyzer is a parameter-driven batch utility that examines the physical structure of a database, creates an iterative statistical data file based on this examination and then produces a series of user-requested analytical reports.

CA IDMS/DB Analyzer examines a database and collects data on important physical characteristics within areas, within record and set types, and within the index or indexes associated with the database.

This data is stored in the statistical data file. Since the statistical file is iterative, storing several generations of historical data, CA IDMS/DB Analyzer can compare current statistics with historical statistics or two different sets of historical statistics with each other. This capability allows you to detect trends in the database over a period of time or to assess the effects of reorganization.

CA IDMS/DB Analyzer creates reports by using information either taken directly from the database or computed from the contents of the statistical file.

Statistic Collection

CA IDMS/DB Analyzer produces statistics that provide a firm foundation for decision making. These statistics show raw counts, percentages, means, minimum and maximum values, and the distribution of values across page ranges and other types of ranges. Statistics are collected at four different levels of physical organization—AREA, RECORD, SET, and INDEX. These statistics permit:

An analysis by **AREA** and **RECORD TYPE** of such characteristics as:

- Total record occurrences
- Relocated record occurrences
- Fragmented record occurrences
- Logically deleted record occurrences
- Savings due to record compression
- Space used

An analysis by **AREA** of characteristics such as:

- Space allocated for pointers, data, line indexes, and headers/footers
- Free space
- Physically and logically full pages
- Space management pages
- Empty pages

An analysis by **SET TYPE** of such characteristics as:

- Owner record occurrences
- Owner occurrences with one or more members
- Page distribution of set occurrences
- Member record occurrences on target page
- Member record occurrences on overflow
- Page changes when set walking

An analysis by **INDEX SET** of such characteristics as:

- Upper level blocks, page spread, and table entries
- Upper level blocks stored inside and outside bottom level offset
- Bottom level blocks, page spread, and table entries
- Number of index levels.

Reporting with Quick Reference Histograms

CA IDMS/DB Analyzer produces four different reports: Area, Record, Set, and SR8 Index—which include quick reference histograms. CA IDMS/DB Analyzer can also produce a comparative version of each of these four reports.

Area Reports—CA IDMS/DB Analyzer can produce an Area Report for every area in your database. This report is composed of four sections. The Area Statistics Section provides you with raw counts and percentages for a comprehensive list of area characteristics. The distribution of certain characteristics over meaningful ranges (page ranges, for example) is shown in the Distribution Section. The Histogram Section displays Distribution Section information in the form of a histogram or bar chart for easy reference.

The Analysis by Record Section provides summary statistics by record type for both active and logically deleted records.

Record Reports—A three-section report for each record type in your database can be produced. Statistics for distribution of selected characteristics is shown in the Distribution Section and displayed as a bar chart in the Histogram Section.

Set Reports—Statistics for each set type in your database are shown in Set Reports. A Set Report consists of four sections. The Set Statistics Section, Distribution Section, and Histogram Section, which apply to set type characteristics, are similar to those in the Area and Record Reports.

The Multi-Member Set Analysis Section shows an analysis of each record type in a multi-member set.

SR8 Index Reports—A three-section SR8 Index Report can be produced for each SR8 index set in your database. Index definition; upper and bottom level statistics; table entry distributions; and histograms are shown in the SR8 Index Report. Integrated index sets (indexed sets) are referred to as SR8 sets in this user guide.

Comparative Reports—Area, Record, Set, and SR8 Index Reports are each available in a comparative version.

If you want to compare the status of a specific area at two different times, you can produce a Comparative Area Report. Comparative reports draw information from two different statistical files. Old and new values, as well as the variance or difference between them, are shown.

Parameter Statement Syntax Checking

CA IDMS/DB Analyzer is driven by one mandatory and four optional parameter statements. These parameter statements make it easy for you to perform processing that meets your exact needs no matter how general or specific they may be.

In addition, you can check the syntax of all entered parameter statements before processing is begun. This makes it possible for you to run CA IDMS/DB Analyzer over a weekend, or at some other time when you are not present, without the possibility of abnormal termination of a program because of a syntax error. If CA IDMS/DB Analyzer does encounter a syntax error during a processing run, it checks all other parameter statement syntax for correctness before terminating abnormally. Consequently, you can correct *all* syntax errors before requesting another processing run.

CA IDMS/DB Analyzer and Database I/O

CA IDMS/DB Analyzer uses the following features of CA IDMS database I/O:

- XA database buffers and control blocks
- Memory cache support
- Dynamic database file allocation
- Unrestricted SEGMENT name usage as database names

See *CA IDMS Database Administration Guide* and *CA IDMS System Operations Guide*. Additionally, features of the CA IDMS database engine and SYSIDMS PREFETCH parameter for read-ahead and EXCP I/O processing perform the functions once defined by the FASTSCAN and GSDTPARM installation defaults, respectfully. Refer to *CA IDMS Common Facilities Guide* for details.

Chapter 2: System Output

This section contains the following topics:

CA IDMS/DB Analyzer Reports (see page 15)
Reading This Chapter (see page 16)
Area Report (see page 16)
Comparative Area Report (see page 32)
Record Report (see page 40)
Comparative Record Report (see page 48)
Set Report (see page 53)
Comparative Set Report (see page 64)
SR8 Index Report (see page 70)
Comparative SR8 Index Report (see page 76)
Audit Report (see page 80)

CA IDMS/DB Analyzer Reports

The CA IDMS/DB Analyzer produces individual reports for database areas, record types, set types, and SR8 index sets. Statistics for these reports are drawn from a statistical file that you specify by using parameter statements. This option also produces reports that compare the data generated from a database structure at two different times. This chapter explains all reports in detail.

Important statistical information about the physical characteristics of four database structures--areas, record types, set types, and index sets--is collected by CA IDMS/DB Analyzer. This information is provided through individual and comparative reports. See Chapter 3, "Parameters".

Individual Reports

You can produce an individual report for every area, record type, set type, and index set in your database, provided you have created a CA IDMS/DB Analyzer statistical file containing the information necessary for each report.

Comparative Reports

In addition, you can produce a comparative report for each of the four structures (area, record type, set type, and index set). A comparative report is similar to an individual report, except that it shows information about a particular structure at two different times. Consequently, CA IDMS/DB Analyzer must draw statistics from two different statistical files to produce this type of report. A comparative report also displays changes between new statistical values and old statistical values.

Reading This Chapter

This chapter describes both individual and comparative Area, Record, Set, and SR8 Index Reports. A description of each comparative report follows that of its corresponding individual report. For example, the Comparative Area Report description follows the Area Report description. When reading this chapter, be sure you are familiar with the description of an individual report before reading about its corresponding comparative report.

Area Report

You can produce an Area Report for every area, or portion of an area, in a database for which statistics have been accumulated. You cannot produce reports for areas, or portions of areas, excluded from accumulation by an AREA parameter statement. An Area Report is divided into three sections: the Area Statistics Section, the Distribution Section, and the Analysis by Record Section.

Area Report fields are shown in following screen displays. In this section are descriptions of two report identification fields plus fields used in the Area Statistics, Distribution, Histogram, and Analysis by Record Sections of the Area Report. The item numbers preceding each field name and description correspond with those in the referenced exhibits. When a percentage is given, the derivation is shown. The percentage is calculated by dividing the value indicated in the numerator by the value indicated in the denominator and multiplying the result by 100 (the asterisk indicates multiplication). The item number for each value used in calculating the percentage is given in parentheses after the name of the item.

Area Report Field Descriptions

The Area Statistic Section of the Area Report is shown in following two screen displays. Descriptions of the Identification and Statistic Section fields are provided following the exhibits.

```
     CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                                DATE          TIME     PAGE
                         Rnn.nn                    AREA REPORT                                  dd/mm/yy      hh:mm:ss   nnnn
                                              AREA STATISTICS SECTION

 1 ►    AREA NAME:  STUDENT-REGION
 2. ►    FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
        ITEM                                                          TOTAL                PCT
     ---------------------------------------------------------    -------------------------    ------
 3 ►    PAGE SIZE  -  IN BYTES                                          3,156
 4 ►    AREA  -  LOW PAGE                                              91,001
 5 ►    AREA  -  HIGH PAGE                                             91,080
 6 ►    AREA  -  TOTAL PAGES                                               80
 7 ►    AREA  -  TOTAL SPACE                                          252,480
 8 ►    SWEEP  -  LOW PAGE                                             91,001
 9 ►    SWEEP  -  HIGH PAGE                                            91,080
10►     SWEEP  -  TOTAL PAGES                                              80
11►     SWEEP  -  TOTAL SPACE                                         252,480              100
12►     BYTES USED  -  POINTERS                                         3,908                2
13►     BYTES USED  -  DATA                                             5,420                2
14►     BYTES USED  -  LINE INDICES                                     1,664                1
15►     BYTES USED  -  HEADERS/FOOTERS                                  2,560                1
16►     BYTES USED  -  SR7 RECORDS                                          0                0
17►     BYTES USED  -  SR8 RECORDS                                      2,228                1
18►     BYTES USED  -  SMPS                                             3,124                1
19►     BYTES USED  -  TOTAL                                           18,904                7
        FREE SPACE                                                    233,576               93
          AVG/PAGE                                                   2,956.66
          MAX/PAGE                                                      3,056
          MIN/PAGE                                                        800
20-21► FREE SPACE LESS PAGE RESERVE                                   233,576               93
          AVG/PAGE                                                   2,956.66
          MAX/PAGE                                                      3,056
          MIN/PAGE                                                        800
22►     PAGES PHYSICALLY FULL                                               0                0
23►     PAGES LOGICALLY FULL                                                0                0
24►     PAGES EMPTY                                                        61               77
25►     SPACE MANAGEMENT PAGES                                              1                1
```

```
      CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                                DATE          TIME     PAGE
                          Rnn.nn                    AREA REPORT                                  dd/mm/yy      hh:mm:ss   nnnn
                                                AREA STATISTICS SECTION

        AREA NAME:  STUDENT-REGION
        FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
        ITEM                                                          TOTAL                PCT
     ---------------------------------------------------------    ------------------------    ------
 26►   NUMBER OF RECORD OCCURRENCES                                     208
 27►   RECS OUT OF PHYSICAL SEQUENCE                                      0                 0
 28►   LDEL RECORDS.................
 0                0
 29►       BYTES TO STORE                                                 0                 0
 30►   RELOCATED RECORDS............                                      0                 0
  31►       BYTES TO STORE                                                0                 0
  32►       BYTES THAT COULD BE RETURNED                                  0                 0
  33►   FRAGMENTED RECORDS                                                0                 0
  34►       BYTES TO STORE                                                0                 0
  35►       BYTES THAT COULD BE RETURNED                                  0                 0
  36►     FRAGMENTS PER OCCURRENCE
            AVG                                                         0.00
            MAX                                                            0
            MIN                                                            0
  37►     TOTAL FRAGMENTS IN AREA                                          0
  38►   COMPRESSED DATA RECORDS........                                  56                27
  39►     SAVINGS DUE TO COMPRESSION                                  20,776                 8
            AVG                                                       371.00
            MAX                                                          408
            MIN                                                            0
  40►   SR8 RECORDS...................                                  51                25
  41►   DECOMPRESSED BYTES TO STORE                                   2,228
  42►   COMPRESSED BYTES TO STORE                                     2,228
  43►   SAVINGS DUE TO COMPRESSION                                   0                 0
```

Note: In a case where only a portion of an area has been swept for statistical accumulation, the field values described pertain only to the portion of the area swept. Exceptions are items 3, 4, 5, 6, and 7,which pertain to the entire area regardless of whether it was actually swept.

1 AREA NAME--The name of the area for the reported statistics.

2 FILE CREATION DATA--The date and time that the statistical file used for this report was created. This information is important for identifying which statistical file is being used since there can be more than one file in storage.

3 PAGE SIZE - IN BYTES--The number of bytes allocated to each page in the area.

4 AREA - LOW PAGE--The page number of the beginning page for the entire area.

5 AREA - HIGH PAGE--The page number of the ending page for the entire area.

6 AREA - TOTAL PAGES--The number of pages in the entire area.

7 AREA - TOTAL SPACE--The total number of bytes allocated to the entire area. It is equivalent to the number of pages in the area (item 6) multiplied by the page size (item 3).

8 SWEEP - LOW PAGE--The lowest page number when a portion of an area was swept. If the entire area was swept, this page number is identical to the AREA - LOW PAGE number (item 4).

9 SWEEP - HIGH PAGE--The highest page number when a portion of an area was swept. If the entire area was swept, this page number is identical to the AREA - HIGH PAGE number (item 5).

10 SWEEP - TOTAL PAGES--The total number of pages swept in the area.

11 SWEEP - TOTAL SPACE--The total number of bytes allocated to the swept portion of the area and the percentage of space allocated to the swept portion of the area. The total equals the sum of BYTES USED - TOTAL (item 19) and BYTES OF FREE SPACE (item 20).

```
PCT=100     *          SWEEP,TOTAL SPACE (11)
                       AREA,TOTAL SPACE (7)
```

If the entire area was swept, the first value is identical to that shown for AREA - TOTAL SPACE (item 7) and the percentage is 100.

12 BYTES USED - POINTERS--The number of bytes used by pointers in the swept area and the percentage of space used by pointers.

```
PCT=100     *          BYTES USED,POINTERS (12)
                       SWEEP,TOTAL SPACE (11)
```

13 BYTES USED - DATA--The compressed number of bytes used by data (record occurrences) and the percentage of space used by data.

```
PCT=100     *          BYTES USED,DATA (13)
                       SWEEP,TOTAL SPACE (11)
```

14 BYTES USED - LINE INDICES--The number of bytes used by line indexes and the percentage of space used by line indexes.

```
PCT=100     *          BYTES USED,LINE INDICES (14)
                       SWEEP,TOTAL SPACE (11)
```

15 BYTES USED - HEADERS/FOOTERS--The number of bytes used by page headers plus the number of bytes used by page footers and the percentage of space used by both page headers and footers. Since each header uses 16 bytes and each footer uses 16 bytes, and there is one header and one footer per page, the first value is equivalent to 32 multiplied by the total number of pages swept in the area (item 10).

```
PCT=100     *          BYTES USED,HEADERS/FOOTERS(15)
                       SWEEP,TOTAL SPACE (11)
```

16 BYTES USED - SR7 RECORDS--The number of bytes used by SR7 records and the percentage of space used by SR7 records.

17 BYTES USED - SR8 RECORDS--The number of bytes used by SR8 records and the percentage of space used by SR8 records.

18 BYTES USED - SMPS--The number of bytes used by space management pages minus the number of bytes used for headers and footers for those pages and the percentage of space used by space management pages.

```
PCT=100     *          BYTES USED,SMPS (18)
                       SWEEP,TOTAL SPACE (11)
```

19 BYTES USED - TOTAL--The total number of bytes used in the area and the percentage of space used for this storage. The total number of bytes used is the sum of items 12, 13, 14, 15, 16, 17, and 18.

```
PCT=100     *          BYTES USED,TOTAL (19)
                       SWEEP,TOTAL SPACE (11)
```

20 BYTES OF FREE SPACE--The actual free space found in the area and the percentage of actual free space found in the area. Bytes of free space is the sum of the space available values located in the header record of each page swept in the area.

```
PCT=100     *          FREE SPACE (20)
                       SWEEP,TOTAL SPACE (11)
```

Also exhibited are the average number of bytes of free space on a page (AVG/PAGE), the maximum number of bytes of free space on a page that is not empty (MAX/PAGE), and the minimum number of bytes of free space on a page that is not full (MIN/PAGE).

```
AVG/PAGE  =    BYTES FREE SPACE (20)
               TOTAL PAGES(10) - SMPS (23)
```

Note: The AVG/PAGE may exceed the MAX/PAGE if the area has a sufficient number of empty pages.

Bytes of free space values indicate area density. Poor performance for some database update functions may occur when area density is 80% or greater.

21 BYTES OF FREE SPACE LESS PAGE RESERVE --The number of bytes available for data storage and the percentage of bytes available for data storage. The values represent the actual free space found in the area minus the page reserve.

```
PCT=100    *       FREE SPACE-PAGE RESERVE (21)
                   SWEEP,TOTAL SPACE (11)
```

22 PAGES PHYSICALLY FULL--The number of pages whose header record space available values are zero and the percentage of pages whose space available values are zero.

```
PCT=100    *       PAGES PHYSICALLY FULL(22)
                   TOTAL PAGES (10) - SMPS (23)
```

When pages become physically full, records will overflow to pages with available space. Performance degradation due to overflow records is likely to become significant as the percentage of physically full pages increases beyond 50%.

23 PAGES LOGICALLY FULL--The number of pages containing the maximum data record occurrences and the percentage of pages containing the schema defined maximum record occurrences.

```
PCT=100    *       PAGES LOGICALLY FULL (23)
                   TOTAL PAGES (10) - SMPS (25)
```

A large number of logically full pages indicates that the page size is too large for the record types being stored in the area.

24 PAGES EMPTY--The number of pages that contain no record occurrences and the percentage of pages that contain no record occurrences.

```
PCT=100    *       PAGES EMPTY (24)
                   TOTAL PAGES (10) - SMPS (25)
```

25 SPACE MANAGEMENT PAGES--The number of space management pages and the percentage of space management pages.

```
PCT=100    *       SPACE MANAGEMENT PAGES (25)
                   TOTAL PAGES (10)
```

A space management page is a CA IDMS generated administrative page that contains records showing the number of bytes available for each page in a series of pages in an area.

26 NUMBER OF RECORD OCCURRENCES--The total number of record occurrences in the area swept, including logically deleted (LDEL) records.

27 RECORDS OUT OF PHYSICAL SEQUENCE--As of Release 12.0, this value is always zero.

28 LDEL RECORDS IN AREA--The number of logically deleted record occurrences in the area swept and the percentage of logically deleted record occurrences in the area swept.

```
PCT=100     *          LDEL RECORDS IN AREA (28)
                       RECORD OCCURRENCES (26)
```

LDEL records cause unnecessary update and retrieval overhead. This overhead increases with the number of LDEL records.

29 BYTES TO STORE (LDEL RECORDS)--The number of bytes used to store all logically deleted record occurrences and the percentage of bytes used for LDEL records.

```
PCT=100     *          BYTES TO STORE (29)
                       SWEEP,TOTAL SPACE (11)
```

30 RELOCATED RECORDS IN AREA--The number of relocated record occurrences in the area swept and the percentage of relocated records.

```
PCT=100     *          RELOCATED RECORDS (30)
                       RECORD OCCURRENCES (26)
```

Relocated records cause performance overhead. If the percentage of relocated records is greater than 20% and the percentage of bytes that could be returned (see item 32) exceeds 50%, consider reorganizing the database. If the percentage of relocated records is greater than 20% but the percentage of bytes that could be returned is less than 50%, consider expanding the database.

31 BYTES TO STORE (RELOCATED RECORDS)--The number of bytes used to store all relocated record occurrences (and associated pointers) and the percentage of bytes used for relocated records (SR2 and SR3 records).

```
PCT=100     *          BYTES TO STORE REL RECS (31)
                       SWEEP,TOTAL SPACE (11)
```

32 BYTES THAT COULD BE RETURNED (RELOCATED RECORDS)--The number of bytes of relocated record storage that could be returned to the target page were a reorganization to take place and the percentage of bytes that could be returned.

```
PCT=100     *          BYTES COULD BE RETURNED (32)
                       BYTES TO STORE REL RECS (31)
```

33 FRAGMENTED RECORDS--The number of fragmented record occurrences and the percentage of fragmented record occurrences.

```
PCT=100     *          FRAGMENTED RECORDS (33)
                       RECORD OCCURRENCES (26)
```

Record fragments cause performance overhead. If the percentage of fragments is greater than 20% and the percentage of bytes that could be returned (see item 35) exceeds 50%, consider reorganizing the database. If the percentage of record fragments is greater than 20% but the percentage of bytes that could be returned is less than 50%, consider expanding the database.

34 BYTES TO STORE (FRAGMENTED RECORDS)--The number of bytes used to store all record fragments and the percentage of bytes used to store all record fragments.

```
PCT=100     *          BYTES TO STORE (FRAG RECS)(34)
                       BYTES USED,TOTAL (19)
```

35 BYTES THAT COULD BE RETURNED (FRAGMENTED RECORDS)--The number of bytes of fragmented records that could be returned to the target page, were a reorganization to take place, and the percentage of bytes that could be returned.

```
PCT=100     *          BYTES COULD BE RETURNED(35)
                       BYTES TO STORE (FRAG RECS) (34)
```

36 FRAGMENTS PER OCCURRENCE--The number of fragments for each fragmented record occurrence expressed as the average number of fragments per occurrence (AVG), the greatest number of fragments into which a record occurrence is divided (MAX), and the least number of fragments into which a record occurrence is divided (MIN).

```
AVG         =          TOTAL FRAGMENTS (37)
                       FRAGMENTED RECORDS (33)
```

37 TOTAL FRAGMENTS IN AREA--The total number of record fragments in the area swept.

38 NUMBER OF RECORDS COMPRESSED--The number of compressed record occurrences and the percentage of compressed record occurrences. This does not include SR8 record compression.

```
PCT=100     *          RECORDS COMPRESSED (38)
                       RECORD OCCURRENCES (26)
```

This statistic is valid only if IDMSCOMP was used as the compression routine.

39 SAVINGS DUE TO COMPRESSION--The number of bytes saved due to the compression of record occurrences (decompressed bytes minus compressed bytes) and the percentage of savings due to compression. The compression of SR8 records is not included in this statistic.

```
PCT=100     *          SAVINGS DUE COMPRESSION (39)
                       AREA,TOTAL SPACE (7)
```

Also included are the average number of bytes of savings per compressed record (AVG), the greatest number of bytes of savings in a compressed record (MAX), and the least number of bytes of savings in a compressed record (MIN).

```
AVG         =          SAVINGS DUE COMPRESSION (39)
                       RECORDS COMPRESSED (38)
```

This statistic is valid only if IDMSCOMP was used as the compression routine.

40 SR8 RECORDS--The total number of SR8 records located in this area, and the percentage of the records in the area that are SR8 records.

```
PCT=100     *          SR8 RECORDS (40)
                       RECORD OCCURRENCES (26)
```

41 DECOMPRESSED BYTES TO STORE--The maximum number of bytes required to store the SR8 records for this area when the automatic CA IDMS compression feature and the user-specified compression option are not used. You can expect to gain storage savings through compression when you specify SYMBOLIC KEY for the sort type.

42 COMPRESSED BYTES TO STORE--The number of bytes actually required to store the SR8 records for this area.

43 SAVINGS DUE TO COMPRESSION--The number of bytes saved through use of the CA IDMS automatic compression feature and/or the user-specified compression option.

```
PCT=100   *      SAVINGS DUE TO COMPRESSION(43)          COMPRESSED BYTES
TO STORE(41)
```

Distribution Section Fields

The Distribution Section of the Area Report is shown in the following display. This section of the report displays the distribution of the following selected area features.

```
CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                                DATE         TIME     PAGE
                  Rnn.nn                    AREA REPORT                                 dd/mm/yy     hh:mm:ss   nnnn
                                       AREA STATISTICS SECTION
   AREA NAME:  STUDENT-REGION
   FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
    ITEM                                                RANGE                TOTAL          PCT
    ------------------------------------      ----------------------------   -------------   ----
1 ►    PERCENT OF PAGE FULL                        PERCENT RANGE              PAGES
                                                      0 -    10                  64           81
                                                     11 -    20                   7            9
                                                     21 -    30                   3            4
                                                     31 -    40                   3            4
                                                     41 -    50                   0            0
                                                     51 -    60                   1            1
                                                     61 -    70                   0            0
                                                     71 -    80                   1            1
                                                     81 -    90                   0            0
                                                     91 -    100                  0            0
2 ►    RECORD OCCURRENCES                            PAGES                  OCCURRENCES
                                                   91001 -    91008               61           29
                                                   91009 -    91016               71           34
                                                   91017 -    91024               24           12
                                                   91025 -    91032                0            0
                                                   91033 -    91040                0            0
                                                   91041 -    91048                1            0
                                                   91049 -    91056                0            0
                                                   91057 -    91064                0            0
                                                   91065 -    91072                0            0
                                                   91073 -    91080                0            0
3 ►    FRAGMENTS                                     PAGES                   FRAGMENTS
                                                   91001 -    91008                0            0
                                                   91009 -    91016                0            0
                                                   91017 -    91024                0            0
                                                   91025 -    91032                0            0
                                                   91033 -    91040                0            0
                                                   91041 -    91048                0            0
                                                   91049 -    91056                0            0
                                                   91057 -    91064                0            0
                                                   91065 -    91072                0            0
                                                   91073 -    91080                0            0
4 ►    FREE SPACE                                    PAGES                    BYTES
                                                   91001 -    91008           16.880            7
                                                   91009 -    91016           18,944            8
                                                   91017 -    91024           22,876           10
                                                   91025 -    91032           24,992           11
                                                   91033 -    91040           24,992           11
                                                   91041 -    91048           24,924           11
                                                   91049 -    91056           24,992           11
                                                   91057 -    91064           24,992           11
                                                   91065 -    91072           24,992           11
                                                   91073 -    91080           24,992           11
5 ►    SAVINGS DUE TO COMPRESSION                   BYTES SAVED             OCCURRENCES
                                                      0 -    0                    0            0
                                                      1 -    50                   4            2
                                                     51 -    100                  0            0
                                                    101 -    150                  0            0
                                                    151 -    200                  1            0
                                                    201 -    250                  0            0
                                                    251 -    300                  0            0
                                                    301 -    350                  0            0
                                                    351 -    400                 28           13
                                                    401 -    450                 23           11
```

Note: In a case where only a portion of an area has been swept for statistical accumulation, the field values described pertain only to the portion of the area swept.

1 PERCENT OF PAGE FULL--The distribution of pages by range of percent physically full is shown here. Ranges of percent full are listed under the column headed RANGE. The number of pages found in each range of percent full is listed under the column headed TOTAL. The percentage of pages found in each page range is listed under the column headed PCT.

```
PCT=100     *          NUMBER OF PAGES IN RANGE
                       SWEEP,TOTAL PAGES (Area Stats 10)
```

The distribution of pages by percent of page full is based upon data taken from the SR1 record for each page in the area swept.

2 RECORD OCCURRENCES--The distribution of record occurrences by page range is shown here. Page ranges are listed under the column headed RANGE. The number of occurrences found in each page range is listed in the column headed TOTAL. The percentage of occurrences found in each page range is listed in the column headed PCT.

```
PCT=100     *          OCCURRENCES IN PAGE RANGE
                       RECORD OCCURRENCES (Area Stats 26)
```

3 FRAGMENTS--The distribution of record fragments by page range is shown here. Page ranges are listed in the column headed RANGE. The total number of fragments found in each page range is listed in the column headed TOTAL. The percentage of fragments found in each page range is listed in the column headed PCT.

```
PCT=100     *          FRAGMENTS IN PAGE RANGE
                       FRAGMENTS, AREA (Area Stats 37)
```

4 FREE SPACE--The distribution of free space by page range is shown here. Page ranges are listed in the column headed RANGE. The amount of free space (in numbers of bytes) found in each page range is listed in the column headed TOTAL. The percentage of free space found in each page range is listed in the column headed PCT.

```
PCT=100     *          FREE SPACE IN PAGE RANGE
                       FREE SPACE IN AREA(Area Stats 20)
```

5 SAVINGS DUE TO COMPRESSION--The distribution of compressed record occurrences by range of bytes saved is shown here. Ranges of bytes saved are listed in the column headed RANGE. The number of compressed record occurrences found in each range is listed in the column headed TOTAL. The percentage of compressed record occurrences found in each range is listed in the column headed PCT.

```
PCT=100     *          SAVINGS DUE TO COMPRESSION
                       RECS COMPRESSED (Area Stats 38)
```

This statistic is valid only if IDMSCOMP was used as the compression routine.

Histogram Section Fields

The Histogram Section of the Area Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Distribution Section. Distribution Section percentages are shown for each range in the form of a bar chart.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                      AREA REPORT                          dd/mm/yy      hh:mm:ss   nnnn
                                       HISTOGRAM SECTION
AREA NAME:  STUDENT-REGION
FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
 PERCENT RANGE      PERCENT OF PAGE FULL - PERCENTAGE BY DISTRIBUTION RANGE
              0----+----10----+----20----+----30----+----40----+----50----+----60----+----70----+----80----+----90----+----100
   0 -  10    .NNNN
```

Analysis by Record Section Fields

The Analysis by Record Section of the Area Report is shown in the following display. This section of the report provides summary statistics by record type for both active and logically deleted (LDEL) records. A description of each field is given below.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                                  DATE          TIME     PAGE
                Rnn.nn                      AREA REPORT                                   dd/mm/yy      hh:mm:ss   nnnn
                                     ANALYSIS BY RECORD SECTION

AREA NAME:  STUDENT-REGION
FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
RECORD NAME    LOC    ***********************************ACTIVE RECORDS*********************************  *******LDEL RECORDS***
               MODE    *-OCCURRENCES-*    *-SPACED USED-*    *---LENGTH--* *-FRAGMENTS-*    COMPRESSION        *-SPACED USED-*
                       COUNT    PCT    BYTES    PCT    AVG    MAX    MIN    COUNT    PCT    BYTES SAVED    COUNT    BYTES    PCT
----------    -----    -----    ---    -----    ---    ---    ---    ---    -----    ---    -----------    -----    -----    ---
DREPORTV      V          2      1       88      1      44     44     44      0       0           72         0        0      0
GREPORT       V          3      1      148      2      49     52     48      0       0          212         0        0      0
SCHEDULE      V         98     47    4,312     46      44     44     44      0       0            0         0        0      0
SPORTS        C          3      1      180      2      60     60     60      0       0            0         0        0      0
STUDENT       C         51     25    4,600     49      90     96     84      0       0       20,492         0        0      0
```

Note: In a case where only a portion of an area has been swept for statistical accumulation, the field values described pertain only to the portion of the area swept.

1 RECORD NAME--Listed under this heading is the record name for each record type in the area swept.

2 LOCATION MODE--The location mode under which the record is stored. The value will be either V(VIA), C(CALC), or D(DIRECT).

3 OCCURRENCES--The values listed under this heading are the total number of active record occurrences and the percentage of active record occurrences for each record type.

```
PCT=100     *          OCCURRENCES PER RECORD TYPE
                       REC OCCURRENCES (Area Stats 26)
```

4 SPACE USED--The values listed under this heading are the total number of bytes used by active record occurrences and the percentage of bytes used by active record occurrences for each record type.

```
PCT=100     *          SPACE USED PER RECORD TYPE
                       BYTES,PNTRS (12) + BYTES,DATA (13)
```

5 LENGTH--The values listed under this heading are the average, maximum, and minimum lengths (number of bytes used) of active record occurrences for each record type. Fixed length record types show identical average, maximum, and minimum values.

6 FRAGMENTED RECORDS--The values listed under this heading are the total number of active fragmented record occurrences and the percentage of active fragmented record occurrences for each record type.

```
PCT=100     *          FRAGMENTS PER RECORD TYPE
                       FRAGMENTED REC (Area Stats 33)
```

7 COMPRESSION BYTES SAVED--The values listed under this heading are the total number of bytes saved by active compressed record occurrences for each record type.

8 COUNT--The values listed under this heading are the total number of logically deleted record occurrences for each record type.

9 SPACE USED--The values listed under this heading are the total number of bytes used by logically deleted records and the percentage of space used by logically deleted records for each record type.

```
PCT=100     *          SPACE USED PER RECORD TYPE
                       BYTES USED,TOTAL (Area Stats 19)
```

Comparative Area Report

A Comparative Area Report is used to assess changes that have occurred in the physical organization of an area, or portion of an area. Consequently, this type of report uses data from two different statistical files. The data from these files describe the area at two different points in time.

Similar to the Area Report, the Comparative Area Report is divided into four sections--the Area Statistics Section, the Distribution Section, the Histogram Section, and the Analysis by Record Section.

The format of each section in this report is the same as that of an Area Report except that fields have been added to show "old" and "new" statistical file values and, when possible, the amount of change between these values.

Comparative Area Report Fields are shown in the following screen displays. Fields at the top of the Comparative Area Report are described below. See Area Report Field Descriptions (see page 17).

Comparative Area Report Field Descriptions

The Report Identification fields and the Area Statistics Section fields are described below and are shown in the Comparative Area Report.

```
CA-TOOLS        RELEASE              CA IDMS/DB ANALYZER                          DATE         TIME     PAGE
                Rnn.nn                    AREA REPORT                          dd/mm/yy     hh:mm:ss   nnnn
                                   AREA STATISTICS SECTION
                                        COMPARATIVE

AREA NAME:  STUDENT-REGION
NEW FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
OLD FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
ITEM                              NEW     PCT          OLD     PCT        VARIANCE    PCT
------------------------------     ---    ----         -----    ---        --------    ---
PAGE SIZE - IN BYTES             3,156                3,156                       0
AREA - LOW PAGE                 91,001               91,001                       0
AREA - HIGH PAGE                91,080               91,080                       0
AREA - TOTAL PAGES                  80                   80                       0
AREA - TOTAL SPACE             252,480              252,480                       0
SWEEP - LOW PAGE                92,001               91,001                       0
SWEEP - HIGH PAGE               91,080               91,080                       0
SWEEP - TOTAL PAGES                 80                   80                       0
SWEEP - TOTAL SPACE             52,480     100       252,480    100             0
BYTES USED - POINTERS            1,392       1         3,908      2         2,516      1
BYTES USED - DATA                3,900       2         5,420      2        -1,520      0
BYTES USED - LINE INDICES          896       1         1,664      1          -768      1
BYTES USED - HEADERS/FOOTERS     2,560       1         2,560      1             0      0
BYTES USED - SR7 RECORDS             0       0             0      0             0      0
BYTES USED - SR8 RECORDS             0       0             0      0             0      0
BYTES USED - SMPS                3,124       1         3,124      1             0      0
BYTES USED - TOTAL              11,872       5        18,904      7        -7,032      2
FREE SPACE PLUS PAGE RESERVE   240,608      95       233,576     93        +7,032      2
    AVG/PAGE                 3,045.67             2,956.66                 +89.01
    MAX/PAGE                    3,056                3,056                       0
    MIN/PAGE                    1,984                  800                 +1,184
FREE SPACE LESS PAGE RESERVE   240,608      95       233,576     93        +7,032      2
    AVG/PAGE                 3,045.67             2,956.66                 +89.01
    MAX/PAGE                    3,056                3,056                       0
    MIN/PAGE                    1,984                  800                 +1,184
PAGES PHYSICALLY FULL                0       0             0      0             0      0
PAGES LOGICALLY FULL                 0       0             0      0             0      0
PAGES EMPTY                         66      84            61     77            +5      7
SPACE MANAGEMENT PAGES               1       1             1      1             0      0
NUMBER OF RECORD OCCURRENCES       112                   208                   -96
RECS OUT OF PHYSICAL SEQUENCE        0       0             0      0             0      0
LDEL RECORDS.................        0       0             0      0             0      0
  BYTES TO STORE                     0       0             0      0             0      0
RELOCATED RECORDS............        0       0             0      0             0      0
  BYTES TO STORE                     0       0             0      0             0      0
  BYTES THAT COULD BE RETURNED       0       0             0      0             0      0
FRAGMENTED RECORDS..........         0       0             0      0             0      0
  BYTES TO STORE                     0       0             0      0             0      0
  BYTES THAT COULD BE RETURNED       0       0             0      0             0      0
  FRAGMENTS PER OCCURRENCE
    AVG                           0.00                  0.00                    0.00
    MAX                              0                     0                       0
    MIN                              0                     0                       0
    TOTAL FRAGMENTS IN AREA          0                     0                       0
COMPRESSED DATA RECORDS.....       109      97            56     27           +53      0
  SAVINGS DUE TO COMPRESSION    15,192       6        20,776      8        -5,584      2
    AVG                         139.38               371.00                -231.62
    MAX                            404                  408                      -4
    MIN                              0                    0                       0
SR8 RECORDS.................         0       0            51     25           -51     25
  DECOMPRESSED BYTES TO STORE        0                 2,228                 -2,228
  COMPRESSED BYTES TO STORE          0                 2,228                 -2,228
  COMPRESSION SAVINGS                0       0             0      0             0      0
```

1 AREA NAME--The name of the area whose change in physical organization is to be assessed.

2 NEW FILE CREATION DATA--The date and time of creation of the statistical file listed in the z/OS and OS/390 JCL as STAT1, and in the VSE/ESA JCL as SYS010.

3 OLD FILE CREATION DATA--The date and time of creation of the statistical file listed in the z/OS and OS/390 JCL as STAT2, and in the VSE/ESA JCL as SYS011.

4 NEW PCT--The values listed under this heading are raw counts and percentages taken from the new statistics file (item 2). See Area Report Field Descriptions (see page 17) for a description of each field listed.

5 OLD PCT--The values listed under this heading are raw counts and percentages taken from the old statistics file (item 3). See Area Report for a description of each field listed.

6 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the new and old values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old.

Distribution Section Fields

The Distribution Section of the Comparative Area Report is shown in the following display. See Area Report Field Descriptions (see page 17) for descriptions of fields not discussed here.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                                DATE          TIME      PAGE
                Rnn.nn                     AREA REPORT                                  dd/mm/yy      hh:mm:ss    nnnn
                                       DISTRIBUTION SECTION
                                           COMPARATIVE

AREA NAME:  STUDENT-REGION
NEW FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
OLD FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
ITEM                              RANGE            NEW    PCT      OLD     PCT   VARIANCE    PCT
----------------------------    -------           ---    ---      ---     ---   --------    ---
PERCENT OF PAGE FULL            PERCENT RANGE     PAGES
                                  0 - 10           69      87       64      81       +5       6
                                 11 - 20            5       6        7       9       -2       3
                                 21 - 30            4       5        3       4       +1       1
                                 31 - 40            1       1        3       4       -2       3
                                 41 - 50            0       0        0       0        0       0
                                 51 - 60            0       0        1       1       -1       1
                                 61 - 70            0       0        0       0        0       0
                                 71 - 80            0       0        1       1       -1       1
                                 81 - 90            0       0        0       0        0       0
                                 91 - 100           0       0        0       0        0       0
RECORD OCCURRENCES              PAGES                        OCCURRENCES
                             91001 - 91008         42      38       61      29      -19       9
                             91009 - 91016         55      49       71      34      -16      15
                             91017 - 91024         14      13       24      12      -10       1
                             91025 - 91032         0       0        0       0        0       0
                             91033 - 91040         0       0        0       0        0       0
                             91041 - 91048         1       1        1       0        0       1
                             91049 - 91056         0       0        0       0        0       0
                             91057 - 91064         0       0        0       0        0       0
                             91065 - 91072         0       0        0       0        0       0
                             91073 - 91080         0       0        0       0        0       0
FRAGMENTS                       PAGES                        FRAGMENTS
                             91001 - 91008         0       0        0       0        0       0
                             91009 - 91016         0       0        0       0        0       0
                             91017 - 91024         0       0        0       0        0       0
                             91025 - 91032         0       0        0       0        0       0
                             91033 - 91040         0       0        0       0        0       0
                             91041 - 91048         0       0        0       0        0       0
                             91049 - 91056         0       0        0       0        0       0
                             91057 - 91064         0       0        0       0        0       0
                             91065 - 91072         0       0        0       0        0       0
                             91073 - 91080         0       0        0       0        0       0
FREE SPACE                       PAGES                        BYTES
                             91001 - 91008    19,556       8   16,880       7   +2,676       1
                             91009 - 91016    21,960       9   18,944       8   +3,016       1
                             91017 - 91024    24,216      10   22,876      10   +1,340       0
                             91025 - 91032    24,992      10   24,992      11        0       1
                             91033 - 91040    24,992      10   24,992      11        0       1
                             91041 - 91048    24,924      10   24,924      11        0       1
                             91049 - 91056    24,992      10   24,992      11        0       1
                             91057 - 91064    24,992      10   24,992      11        0       1
                             91065 - 91072    24,992      10   24,992      11        0       1
                             91073 - 91080    24,992      10   24,992      11        0       1
SAVINGS DUE TO COMPRESSION   BYTES SAVED                    OCCURRENCES
                                0 - 0             0       0        0       0        0       0
                                1 - 50            0       0        4       2       -4       2
                               51 - 100          45      40        0       0      +45      40
                              101 - 150          48      43        0       0      +48      43
                              151 - 200           0       0        1       0       -1       0
                              201 - 250           0       0        0       0        0       0
                              251 - 300           0       0        0       0        0       0
                              301 - 350           0       0        0       0        0       0
                              351 - 400          13      12       28      13      -15       1
                              401 - 450           3       3       23      11      -20       8
```

1 NEW PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the new (STAT1) statistics file. See Comparative Area Report Identification Fields, item 2.

2 OLD PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the old (STAT2) statistics file. See Comparative Area Report Identification Fields, item 3.

3 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the old and new values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old.

For variance to be meaningful, both the old and new statistical files must contain identical ranges. If they do not, no values are listed under this heading.

Histogram Section Fields

A portion of the Histogram Section of the Comparative Area Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Distribution Section. Old (O) and new (N) values of Distribution Section percentages for each range are shown on two lines in the form of a bar chart.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                      AREA REPORT                          dd/mm/yy      hh:mm:ss   nnnn
                                          HISTOGRAM SECTION
                                            COMPARATIVE

 AREA NAME: STUDENT-REGION
 NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
 OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss
  PERCENT RANGE      PERCENT OF PAGE FULL - PERCENTAGE BY DISTRIBUTION RANGE
              0----+----10----+----20----+----30----+----40----+----50----+----60----+----70----+----80----+----90----+----100
     0 - 10   .NNNN
```

Analysis by Record Section Fields

The Analysis by Record Section of the Comparative Area Report is shown in the following display. This section of the report is identical to its Area Report counterpart except that it lists statistics from both the old and new statistical files. See Area Report Field Descriptions (see page 17) for a description of fields in this section.

```
 CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                                  DATE          TIME     PAGE
                 Rnn.nn                      AREA REPORT                                   dd/mm/yy      hh:mm:ss   nnnn
                                     ANALYSIS BY RECORD SECTION
                                            COMPARATIVE

 AREA NAME:  DEPT-REGION
 FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
 RECORD NAME    LOC    ***********************************ACTIVE RECORDS*******************************  *******LDEL RECORDS***
                MODE    *-OCCURRENCES-*    *-SPACED USED-*    *---LENGTH--* *-FRAGMENTS-*    COMPRESSION        *-SPACED USED-*
                        COUNT    PCT    BYTES    PCT    AVG    MAX    MIN    COUNT    PCT    BYTES SAVED    COUNT    BYTES    PCT
 ----------    -----    -----    ---    -----    ---    ---    ---    ---    -----    ---    -----------    -----    -----    ---
1 DEPT           C        6        7      480      5     80     80     80      0       0           0           0       0       0
    PREREQ       V       17       19      476      5     28     28     28      0       0           0           0       0       0
    SUBJECT      C       32       36    4,280     47    134    280    116      0       0           0           0       0       0
    TEACHER      C       35       39    3,780     42    108    108    108      0       0           0           0       0       0

2 DEPT           C        3        4      240      5     80     80     80      0       0           0           0       0       0
    PREREQ       V       11       16      308      6     28     28     28      0       0           0           0       0       0
    SUBJECT      C       12       18    1,512     29     79    188     56      0       0           0          25   1,400      27
    TEACHER      C       16       24    1,728     33    108    108    108      0       0           0           0       0       0
```

1 Listed by record type are statistics from the new (STAT1) statistical file.

2 Listed by record type are statistics from the old (STAT2) statistical file.

Record Report

A Record Report can be produced for every record type residing in an area, or portion of an area, for which statistics have been accumulated. Reports for record types residing in an area, or portion of an area, excluded from statistical accumulation by an AREA statement cannot be produced.

A Record Report is divided into three sections: the Record Statistics Section, the Distribution Section, and the Histogram Section.

Record Report Field Descriptions

Record Report fields are shown in the following screen displays. Following are descriptions of two report identification fields plus fields used in the Record Statistics and Distribution Sections of the Record Report.

```
     CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                                  DATE         TIME     PAGE
                       Rnn.nn                  RECORD REPORT                                   dd/mm/yy     hh:mm:ss   nnnn
                                           RECORD STATISTICS SECTION

 1 ►    RECORD ID/NAME:            1002 - SUBJECT
 2 ►    FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
        ITEM                                    TOTAL             PCT
        ----------------------------           -------           -----
 3 ►    RECORD LOCATION MODE                     CALC
 4 ►    NUMBER OF OCCURRENCES                      37
 5 ►    BYTES TO STORE ALL OCCURRENCES          2,912
 6 ►    RECS OUT OF PHYSICAL SEQUENCE               0              0

 7 ►    NUMBER OF LDEL OCCURRENCES                 25             68
 8 ►    BYTES TO STORE LDEL RECORDS             1,400             48

 9 ►    OCCURRENCE LENGTH
          COMPRESSED
          AVG                                      79
          MAX                                     188
          MIN                                      56
          DECOMPRESSED
          AVG                                      79
          MAX                                     188
          MIN                                      56

10►   RELOCATED OCCURRENCES                          0              0
11►   BYTES TO STORE RELOCATED RECS                  0              0
12►   BYTES THAT COULD BE RETURNED                   0              0
13►   OCCURRENCES WITH FRAGMENTS                     0              0
14►   FRAGMENTS PER OCCURRENCE
          AVG                                        0.00
          MAX                                        0
          MIN                                        0
15►   NUMBER OF FRAGMENTS                         0
16►   BYTES TO STORE ALL FRAGMENTS                   0              0
17►   BYTES THAT COULD BE RETURNED                   0              0

18►   NUMBER OF RECORDS COMPRESSED                   0              0
19►   SAVINGS DUE TO COMPRESSION                  0
          AVG                                        0.00
          MAX                                        0
          MIN                                        0
```

Note: In a case where only a portion of an area has been swept for statistical accumulation, the field values described pertain only to the portion of the area swept. Remember that statistics shown on the Record Report apply only to the record type indicated in the RECORD ID/NAME field of the report (item 1).

1 RECORD ID/NAME--The identification number and name of the record type for the reported statistics.

2 FILE CREATION DATA--The date and time that the statistical file used for this report was created. This information helps identify which statistical file is being used since there can be more than one file in storage.

3 RECORD LOCATION MODE--The location mode for the record type as defined in the schema is shown here.

4 NUMBER OF OCCURRENCES--The total number of record occurrences. This value includes logically deleted (LDEL) records.

5 BYTES TO STORE ALL OCCURRENCES--The total number of bytes used to store all record occurrences.

6 RECORDS OUT OF PHYSICAL SEQUENCE--As of Release 12.0, this value is always zero.

```
PCT=100     *          RECS OUT OF PHYS SEQUENCE(6)
                       NUMBER OF OCCURRENCES (4)
```

7 NUMBER OF LDEL OCCURRENCES--The number of logically deleted record occurrences in the area swept for this record type and the percentage of total records of this type that are logically deleted.

```
PCT=100     *          NUMBER OF LDEL OCCURRENCES(7)
                       NUMBER OF OCCURRENCES (4)
```

8 BYTES TO STORE LDEL RECORDS--The number of bytes used to store all logically deleted record occurrences and the percentage of total bytes used for this record type that are for logically deleted occurrences.

```
PCT=100     *          BYTES TO STORE LDEL RECS(8)
                       BYTES TO STORE ALL OCS (5)
```

9 OCCURRENCE LENGTH (if fixed)--If occurrences for the record type are of fixed length and are not compressed, the number of bytes used for occurrence length is shown here.

If the record type is of variable length or is compressed, the fixed occurrence length is not shown on the report. For variable length, see next item.

9 OCCURRENCE LENGTH (if variable)--If occurrences for the record type are of variable length or are compressed, the average, maximum, and minimum number of bytes used for both compressed and decompressed occurrence lengths is shown here. The decompressed occurrence length is only valid if IDMSCOMP was used as the compression routine.

If the record type is of fixed length and is not compressed, these fields are not shown on the report.

10 RELOCATED OCCURRENCES--The total number of relocated record occurrences and the percentage of relocated record occurrences.

```
PCT=100     *          RELOCATED OCCURRENCES (10)
                       NUMBER OF OCCURRENCES (4)
```

11 BYTES TO STORE ALL RELOCATED RECS--The total number of bytes used to store all relocated record occurrences (and associated pointers) and the percentage of bytes used for relocated record occurrences.

```
PCT=100     *          BYTES,STORE ALL RELOC RECS(11)
                       BYTES TO STORE ALL OCS (5)
```

12 BYTES THAT COULD BE RETURNED(RELOCATED RECORDS)--The total number of bytes of relocated records that could be returned to the target page, were a reorganization to take place, and the percentage of bytes that could be returned.

```
PCT=100     *          BYTES COULD BE RET,RELOC RECS(12)
                       BYTES TO STORE ALL RELOC RECS (11)
```

13 OCCURRENCES WITH FRAGMENTS--The total number of fragmented record occurrences and the percentage of fragmented record occurrences.

```
PCT=100     *          OCCURRENCES WITH FRAGMTS(13)
                       NUMBER OF OCCURRENCES (4)
```

If the record is a fixed length record, this field is not shown on the report since fixed length records cannot be fragmented.

14 FRAGMENTS PER OCCURRENCE--The number of fragments for each fragmented record occurrence expressed as the average number of fragments per occurrence (AVG), the greatest number of fragments into which a record occurrence is divided (MAX), and the least number of fragments into which a record occurrence is divided (MIN).

```
AVG         =          NUMBER OF FRAGMENTS (15)
                       NUMBER OF OCCURRENCES (4)
```

If the record is a fixed length record, this field is not shown on the report since fixed length records cannot be fragmented.

15 NUMBER OF FRAGMENTS--The total number of record fragments. If the record is a fixed length record, this field is not shown on the report since fixed length records cannot be fragmented.

16 BYTES TO STORE ALL FRAGMENTS--The number of bytes used to store all fragments and the percentage of bytes used to store all fragments.

```
PCT=100     *          BYTES TO STORE ALL FRAGMTS(16)
                       BYTES TO STORE ALL OCS (5)
```

If the record is a fixed length record, this field is not shown on the report since fixed length records cannot be fragmented.

17 BYTES THAT COULD BE RETURNED (FRAGMENTED RECORDS)--The total number of bytes of fragmented records that could be returned to the target page were a reorganization to take place and the percentage of bytes that could be returned.

```
PCT=100     *          BYTES COULD BE RET,FRAGRECS(17)
                       BYTES TO STORE ALL FRAGMTS(16)
```

If the record is a fixed length record, this field is not shown on the report since fixed length records cannot be fragmented.

18 NUMBER OF RECORDS COMPRESSED--The number of compressed records and the percentage of compressed records.

```
PCT=100     *          NUMBER RECS COMPRESSED (18)
                       NUMBER OF OCCURRENCES (4)
```

This statistic is valid only if IDMSCOMP was used as the compression routine.

19 SAVINGS DUE TO COMPRESSION--The total number of bytes saved due to the compression of certain record occurrences.

Also included are the average number of bytes of savings per compressed record (AVG), the greatest number of bytes of savings in a compressed record (MAX), and the least number of bytes of savings in a compressed record that has compression savings (MIN).

```
AVG         =          SAVINGS DUE TO COMPRESSION (19)
                       NUMBER RECORDS COMPRESSED (18)
```

If the record is a fixed length record, this field is not shown on the report because compressed records are defined internally as variable length.

This statistic is valid only if IDMSCOMP was used as the compression routine.

Distribution Section Fields

The Distribution Section of the Record Report is shown in the following display. This section of the report displays the distribution of the following selected record characteristics.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                                DATE          TIME     PAGE
                Rnn.nn                    RECORD REPORT                                 dd/mm/yy      hh:mm:ss   nnnn
                                       DISTRIBUTION SECTION

       RECORD ID/NAME:           1002  -  SUBJECT
       FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
       ITEM                                                  RANGE                  TOTAL          PCT
       ------------------------------------      ----------------------------    -------------    ----
1 ►    RECORD OCCURRENCES                                PAGES              # OF OCCURRENCES
                                                          88001 - 88002                  7            19
                                                          88003 - 88004                  0             0
                                                          88005 - 88006                  5            14
                                                          88007 - 88008                  4            11
                                                          88009 - 88010                  4            11
                                                          88011 - 88012                  5            14
                                                          88013 - 88014                  6            16
                                                          88015 - 88015                  6            16
2 ►    FRAGMENTS                                         PAGES              # OF FRAGMENTS
                                                          88001 - 88002                  0             0
                                                          88003 - 88004                  0             0
                                                          88005 - 88006                  0             0
                                                          88007 - 88008                  0             0
                                                          88009 - 88010                  0             0
                                                          88011 - 88012                  0             0
                                                          88013 - 88014                  0             0
                                                          88015 - 88015                  0             0
3 ►    SAVINGS DUE TO COMPRESSION                       BYTES SAVED        # OF OCCURRENCES
                                                              0 - 0                      0             0
                                                              1 - 22                     0             0
                                                             23 - 44                     0             0
                                                             45 - 66                     0             0
                                                             67 - 88                     0             0
                                                             89 - 110                    0             0
                                                            111 - 132                    0             0
                                                            133 - 154                    0             0
                                                            155 - 176                    0             0
                                                            177 - 198                    0             0
```

Note: In a case where only a portion of an area has been swept for statistical accumulation, the field values described pertain only to the portion of the area swept.

Remember that statistics shown on the Record Report apply only to the record type indicated in the RECORD ID/NAME field of the report. See Record Report Field Descriptions (see page 41), Identification Fields, item 1.

1 RECORD OCCURRENCES--The distribution of record occurrences by page range is shown here. Page ranges are listed under the column headed RANGE. The number of occurrences found in each page range is listed under the column headed TOTAL. The percentage of occurrences found in each page range is listed under the column headed PCT.

```
PCT=100     *          OCCURRENCES IN PAGE RANGE
                       NUMBER OF OCCURRENCES (Rec Stats 4)
```

2 FRAGMENTS--The distribution of record fragments by page range is shown here. Page ranges are listed under the column headed RANGE. The number of fragments found in each page range is listed under the column headed TOTAL. The percentage of fragments found in each page range is listed under the column headed PCT.

```
PCT=100     *          FRAGMENTS IN PAGE RANGE
                       NUMBER OF FRAGMENTS (Rec Stats 15)
```

If the record is a fixed length record, this field is not shown on the report since fixed length records cannot be fragmented.

3 SAVINGS DUE TO COMPRESSION--The distribution of compressed record occurrences by range of bytes saved is shown here. Ranges of bytes saved are listed in the column headed RANGE. The number of compressed record occurrences found in each range is listed in the column headed TOTAL. The percentage of compressed record occurrences found in each range is listed in the column headed PCT.

```
PCT=100     *          OCCURRENCES IN BYTE RANGE
                       NUMBER RECS COMPRESSED (Rec Stats 18)
```

If the record is a fixed length record, this field is not shown on the report, since fixed length records cannot be compressed. This statistic is valid only if IDMSCOMP was used as the compression routine.

Histogram Section Fields

The Histogram Section of the Record Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Distribution Section. Distribution Section percentages are shown for each range in the form of a bar chart.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                    RECORD REPORT                          dd/mm/yy      hh:mm:ss   nnnn
                                        HISTOGRAM SECTION
RECORD ID/NAME:     1002 - SUBJECT
FILE CREATION DATA: mm/dd/yy - hh:mm:ss
   PAGES      RECORD OCCURRENCES - PERCENTAGE BY DISTRIBUTION RANGE
              0----+----10----+----20----+----30----+----40----+----50----+----60----+----70----+----80----+----90----+----100
88001 - 88002 .NNNN
```

Comparative Record Report

A Comparative Record Report is used to assess changes that have occurred in the physical organization for a record type. Consequently, this type of report uses data from two different statistical files. The data from these files describes the area at two different points in time.

Similar to the Record Report, the Comparative Record Report is divided into three sections--the Record Statistics Section, the Distribution Section, and the Histogram Section.

The format of each section in this report is the same as that of a Record Report except that fields have been added to show "old" and "new" statistical file values and, when possible, the amount of change between these values.

Comparative Report Field Descriptions

Comparative Record Report Fields are shown in the following screen displays. Fields near the top of the Comparative Record Report are described below. See Area Report Field Descriptions (see page 17) descriptions of the other fields.

```
CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                          DATE        TIME     PAGE
                  Rnn.nn                  RECORD REPORT                          dd/mm/yy    hh:mm:ss    nnnn
                                  RECORD STATISTICS SECTION
                                       COMPARATIVE

RECORD ID/NAME:         1002 - SUBJECT
NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss

ITEM                                  NEW     PCT          OLD     PCT       VARIANCE       PCT
-----------------------------          ---    ----         -----    ---       --------       ---

RECORD LOCATION MODE                 CALC                 CALC

NUMBER OF OCCURRENCES                  37                   32                 +5
BYTES TO STORE ALL OCCURRENCES        2,912                4,280              -1,368
RECS OUT OF PHYSICAL SEQUENCE             0       0            0      0             0         0

NUMBER OF LDEL OCCURRENCES               25      68            0      0           +25        68
BYTES TO STORE LDEL RECORDS           1,400      48            0      0         +1,400       48

OCCURRENCE LENGTH
 COMPRESSED
 AVG                                     79                  134                 -55
 MAX                                    188                  280                 -92
 MIN                                     56                  116                 -60
 DECOMPRESSED
 AVG                                     79                  134                 -55
 MAX                                    188                  280                 -92
 MIN                                     56                  116                 -60
RELOCATED OCCURRENCES                     0       0            0      0             0         0
BYTES TO STORE RELOCATED RECS             0       0            0      0             0         0
BYTES THAT COULD BE RETURNED              0       0            0      0             0         0

OCCURRENCES WITH FRAGMENTS                0       0            0      0             0         0
FRAGMENTS PER OCCURRENCE
 AVG                                   0.00                 0.00                0.00
 MAX                                      0                    0                   0
 MIN                                      0                    0                   0
NUMBER OF FRAGMENTS                       0                    0                   0
BYTES TO STORE ALL FRAGMENTS              0       0            0      0             0         0
BYTES THAT COULD BE RETURNED              0       0            0      0             0         0

NUMBER OF RECORDS COMPRESSED              0       0            0      0             0         0
SAVINGS DUE TO COMPRESSION                0                    0                   0
 AVG                                   0.00                 0.00                0.00
 MAX                                      0                    0                   0
 MIN                                      0                    0                   0
```

1 RECORD ID/NAME--The name of the record type whose change in physical organization is to be assessed.

2 NEW FILE CREATION DATA--The date and time of creation of the file which is listed in the JCL as STAT1.

3 OLD FILE CREATION DATA--The date and time of creation of the statistical file which is listed in the JCL as STAT2.

4 NEW PCT--The values listed under this heading are raw counts and percentages taken from the new statistics file (item 2). See Record Report for descriptions of each field listed.

5 OLD PCT--The values listed under this heading are raw counts and percentages taken from the new statistical file (item 3). See Record Report for a description of each field listed.

6 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the old and new values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old.

Distribution Section Fields

The Distribution Section of the Comparative Record Report is shown in the following display. See Area Report Field Descriptions (see page 17), for descriptions of fields not discussed here.

```
CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                          DATE        TIME     PAGE
                  Rnn.nn                  RECORD REPORT                          dd/mm/yy    hh:mm:ss   nnnn
                                       DISTRIBUTION SECTION
                                           COMPARATIVE

RECORD NAME:  1002 - SUBJECT
NEW FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
OLD FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
ITEM                                   RANGE            NEW     PCT          OLD     PCT        VARIANCE    PCT
----------------------------       -------------        ---    ----         -----    ---        --------    ---
RECORD OCCURRENCES                      PAGES         # OF OCCURRENCES
                                   88001 - 88002         7      19           3       9           +4         10
                                   88003 - 88004         0       0           2       6           -2          6
                                   88005 - 88006         5      14           2       6           +3          8
                                   88007 - 88008         4      11           3       9           +1          2
                                   88009 - 88010         4      11           7      22           -3         11
                                   88011 - 88012         5      14           3       9           +2          5
                                   88013 - 88014         6      16           2       6           +4         10
                                   88015 - 88015         6      16          10      31           -4         15
FRAGMENTS                               PAGES          # OF FRAGMENTS
                                   88001 - 88002         0       0           0       0           0          0
                                   88003 - 88004         0       0           0       0           0          0
                                   88005 - 88006         0       0           0       0           0          0
                                   88007 - 88008         0       0           0       0           0          0
                                   88009 - 88010         0       0           0       0           0          0
                                   88011 - 88012         0       0           0       0           0          0
                                   88013 - 88014         0       0           0       0           0          0
                                   88015 - 88015         0       0           0       0           0          0
SAVINGS DUE TO COMPRESSION          BYTES SAVED       # OF OCCURRENCES
                                      0 -  0             0       0           0       0           0          0
                                      1 - 22             0       0           0       0           0          0
                                     23 - 44             0       0           0       0           0          0
                                     45 - 66             0       0           0       0           0          0
                                     67 - 88             0       0           0       0           0          0
                                     89 - 110            0       0           0       0           0          0
                                    111 - 132            0       0           0       0           0          0
                                    133 - 154            0       0           0       0           0          0
                                    155 - 176            0       0           0       0           0          0
                                    177 - 198            0       0           0       0           0          0
```

1 NEW PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the new statistics file. See Comparative Record Report (see page 48) Identification Fields, item 2.

2 OLD PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the old statistics file. See Comparative Record Report Identification Fields, item 3.

3 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the old and new values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old. For a variance to be meaningful, both the old and new statistical files must contain identical ranges. If they do not, no values are listed under this heading.

Histogram Section Fields

The following screen display shows a portion of the Histogram Section of the Comparative Record Report. This section is a graphic representation and a quick reference version of the Distribution Section. Old (O) and new (N) values of Distribution Section percentages for each range are shown on two lines of a bar chart.

```
CA-TOOLS              RELEASE               CA IDMS/DB ANALYZER                    DATE          TIME     PAGE
                      Rnn.nn                   RECORD REPORT                    dd/mm/yy      hh:mm:ss   nnnn
                                            HISTOGRAM SECTION
                                               COMPARATIVE
  RECORD ID/NAME:     1002 - SUBJECT
 NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
 OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss
   PAGES         RECORD OCCURRENCES - PERCENTAGE BY DISTRIBUTION RANGE
                 0----+----10---+----20---+----30---+----40---+----50----+---60----+---70----+---80----+----90----+----100
88001 - 88002    .NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN     .          .          .          .          .          .
88001 - 88002    .OOOOOOOOOOOOOOO     .          .          .          .          .          .          .          .          .
88003 - 88004    .         .          .          .          .          .          .          .          .          .          .
88003 - 88004    .OOOOOOOOOO          .          .          .          .          .          .          .          .          .
88005 - 88006    .NNNNNNNNNNNNNNNNNNNNNNNNNNN  .          .          .          .          .          .          .          .
88005 - 88006    .OOOOOOOOOOOO        .          .          .          .          .          .          .          .          .
88007 - 88008    .NNNNNNNNNNNNNNNNN   .          .          .          .          .          .          .          .          .
88007 - 88008    .OOOOOOOOOOOO        .          .          .          .          .          .          .          .          .
88009 - 88010    .NNNNNNNNNNNNNNNNN   .          .          .          .          .          .          .          .          .
88009 - 88010    .OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO     .          .          .          .          .          .          .
88011 - 88012    .NNNNNNNNNNNNNNNNNNNNN        .          .          .          .          .          .          .          .
88011 - 88012    .OOOOOOOOOOOOOOOO     .          .          .          .          .          .          .          .          .
88013 - 88014    .NNNNNNNNNNNNNNNNNNNNNNNNN    .          .          .          .          .          .          .          .
88013 - 88014    .OOOOOO     .          .          .          .          .          .          .          .          .          .
88015 - 88015    .NNNNNNNNNNNNNNNNNNNNNNNNN    .          .          .          .          .          .          .          .
88015 - 88015    .OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO .          .          .          .          .          .
                 0----+----10---+----20---+----30---+----40---+----50----+---60----+---70----+---80----+----90----+----100
    PAGES             FRAGMENTS - PERCENTAGE BY DISTRIBUTION RANGE
                 0----+----10---+----20---+----30---+----40---+----50----+---60----+---70----+---80----+----90----+----100
88001 - 88002    .          .          .          .          .          .          .          .          .          .          .
88001 - 88002    .          .          .          .          .          .          .          .          .          .          .
88003 - 88004    .          .          .          .          .          .          .          .          .          .          .
88003 - 88004    .          .          .          .          .          .          .          .          .          .          .
88005 - 88006    .          .          .          .          .          .          .          .          .          .          .
88005 - 88006    .          .          .          .          .          .          .          .          .          .          .
88007 - 88008    .          .          .          .          .          .          .          .          .          .          .
88007 - 88008    .          .          .          .          .          .          .          .          .          .          .
88009 - 88010    .          .          .          .          .          .          .          .          .          .          .
88009 - 88010    .          .          .          .          .          .          .          .          .          .          .
88011 - 88012    .          .          .          .          .          .          .          .          .          .          .
88011 - 88012    .          .          .          .          .          .          .          .          .          .          .
88013 - 88014    .          .          .          .          .          .          .          .          .          .          .
88013 - 88014    .          .          .          .          .          .          .          .          .          .          .
88015 - 88015    .          .          .          .          .          .          .          .          .          .          .
88015 - 88015    .          .          .          .          .          .          .          .          .          .          .
                 0----+----10---+----20---+----30---+----40---+----50----+---60----+---70----+---80----+----90----+----100
```

Set Report

A Set Report can be produced for every set type (including SR8 index sets) for which statistics have been accumulated.

Set statistics are accumulated for a set type when all owner records in the set type reside in an area swept for statistical accumulation and all member records in the set type reside either in an area swept or in an area that is accessible.

An accessible area is an area that you have *not* excluded by using the NOMEMBERSET option in an AREA parameter statement when processing a database for statistical accumulation.

If a member record in any set occurrence in a set type resides in an inaccessible area (excluded by using the NOMEMBERSET option), no statistics for the entire set type are accumulated. Consequently, a Set Report for such a set type is not available. In addition, a Set Report for a set type excluded from processing by a SET parameter statement cannot be produced. See Chapter 3, "Parameters".

A Set Report is divided into four sections--the Set Statistics Section, the Distribution Section, Histogram Section and the Multi-Member Set Analysis Section.

Set Report fields are shown in the following screen displays. Following are descriptions of two report identification fields plus fields used in the Set Statistics, Distribution, Histogram, and Multi-Member Set Analysis Sections of the Set Report. The item numbers preceding each field name and description correspond with those in the referenced exhibits.

Set Report Field Descriptions

Identification and Set Statistic Section fields are described below.

```
    CA-TOOLS            RELEASE              CA IDMS/DB ANALYZER                                  DATE          TIME     PAGE
                        Rnn.nn                    SET REPORT                                    dd/mm/yy      hh:mm:ss   nnnn
                                             SET STATISTICS SECTION

 1 ►    SET NAME:  ACTIVITY - TYPES
 2 ►    FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
        ITEM                                    TOTAL            PCT
        ----------------------------            -------          -----
 3 ►    OWNER RECORD NAME                       ACTIVITY
 4 ►    MEMBER RECORD NAME                   MULTI-MEMBER SET
 5 ►    SET OCCURRENCES                            3
 6 ►    SET OCCURRENCES WITH MEMBERS               3           100
 7 ►    MEMBER RECORD OCCURRENCES                  9
 8 ►    LDEL OCCURRENCES                           0             0
 9 ►    LENGTH OF SET OCCURRENCES
            AVG                                    3.00
            MAX                                    3
            MIN                                    3
10►     BYTES TO STORE OWNERS                    180            27
11►     BYTES TO STORE MEMBERS                   480            73
12►     BYTES TO STORE LDELS                       0             0
13►     TOTAL BYTES TO STORE SET                 660
14►     CLUSTER PAGE SPREAD
            AVG                                    1.67
            MAX                                    3
15►     MEMBERS ON TARGET PAGE                     6            67
            AVG                                    2.00
            MAX                                    3
            MIN                                    3
16►     MEMBERS ON OVERFLOW                        0             0
            AVG                                    0.00
            MAX                                    0
            MIN                                    0
17►     MEMBERS NOT VIA THIS SET                   3            33
            AVG                                    1.00
            MAX                                    3
            MIN                                    3
18►     OCCURRENCES W/O PAGE CHANGES               0             0
19►     PAGE CHANGES
            AVG                                    1.67
            MAX                                    3
            MIN                                    1
```

```
   CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                                  DATE         TIME     PAGE
                     Rnn.nn                    SET REPORT                                     dd/mm/yy     hh:mm:ss   nnnn
                                          SET STATISTICS SECTION

       SET NAME:  IX - STUD - LNAME
       FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
       ITEM                                    TOTAL           PCT
       ----------------------------            -------         -----
       OWNER RECORD NAME                       SR7
       MEMBER RECORD NAME                     STUDENT
       SET OCCURRENCES                            1
       SET OCCURRENCES WITH MEMBERS               1           100
       MEMBER RECORD OCCURRENCES                 51
       LDEL OCCURRENCES                           0             0
       LENGTH OF SET OCCURRENCES
        AVG                                      51.00
        MAX                                      51
        MIN                                      51
       BYTES TO STORE OWNERS                     32             0
       BYTES TO STORE MEMBERS                 4,600            69
       BYTES TO STORE LDELS                       0             0
20►  BYTES TO STORE SR8 RECORDS               2,060            31
       TOTAL BYTES TO STORE SET               6,692
       CLUSTER PAGE SPREAD
        AVG                                   18.00
        MAX                                      18
       OCCURRENCES W/O PAGE CHANGES               0             0
       PAGE CHANGES
        AVG                                  102.00
        MAX                                     102
        MIN                                     102
```

1 SET NAME--The name of the set type for the reported statistics. CALC sets are identified as such and reported by area.

2 FILE CREATION DATA--The date and time that the statistical file used for this report was created. This information helps identify which statistical file is being used since there can be more than one file in storage.

Note: In a case where only a portion of an area has been swept for statistical accumulation, set report field values pertain only to the portion of the area swept. In other words, as long as member records reside in accessible areas, set statistics are accumulated when only a portion of an area is swept. However, statistics for any set occurrences whose owner records reside outside the portion of the area swept are not accumulated and are not reflected in the values whose descriptions follow.

Remember that statistics shown on the Set Report apply only to the set indicated in the SET NAME field of the report. See Set Report Identification Fields, item 1.

3 OWNER RECORD NAME--The name of the owner record in this set. For the CALC set, the owner name will be listed as SR1.

4 MEMBER RECORD NAME--The name of the member record in this set. For multi-member sets, the member name will be listed as Multi-member Set. All of the member names in a multi-member set will be listed in the multi-member set analysis section.

5 SET OCCURRENCES--The total number of owner record occurrences.

6 SET OCCURRENCES WITH MEMBERS--The total number of owner record occurrences that own at least one member record occurrence and the percentage of these non-null occurrences.

```
PCT=100     *        SET OCCURRENCES WITH MBRS(6)
                     SET OCCURRENCES (5)
```

7 MEMBER RECORD OCCURRENCES--The total number of member record occurrences.

8 LDEL OCCURRENCES--The number of logically deleted member record occurrences for the set type and the percentage of all member occurrences that are logically deleted.

```
PCT=100     *        LDEL OCCURRENCES (8)
                     MEMBER RECORD OCCURRENCES(7)
```

9 LENGTH OF SET OCCURRENCES--The average (AVG), maximum (MAX), and minimum (MIN) number of member record occurrences (set length) for owner record occurrences that own at least one member record.

```
AVG         =        MEMBER RECORD OCCURRENCES (7)
                     SET OCCURRENCES WITH MEMBERS (6)
```

Set types in *sorted* order with high average lengths and high average cluster page spread (item 14) are likely to have unwanted performance overhead during update operations. In such a case, consider reorganization or database expansion.

10 BYTES TO STORE OWNERS--The number of bytes used to store owner record occurrences and the percentage of bytes used to store owner record occurrences.

```
PCT=100     *        BYTES TO STORE OWNERS (10)
                     TOTAL BYTES TO STORE SET (13)
```

11 BYTES TO STORE MEMBERS--The number of bytes used to store member record occurrences and the percentage of bytes used to store member record occurrences.

```
PCT=100     *        BYTES TO STORE MEMBERS (11)
                     TOTAL BYTES TO STORE SET (13)
```

12 BYTES TO STORE LDELS--The number of bytes used to store logically deleted record occurrences and the percentage of bytes used to store logically deleted record occurrences.

```
PCT=100     *        BYTES TO STORE LDELS (12)
                     TOTAL BYTES TO STORE SET (13)
```

13 TOTAL BYTES TO STORE SET--The total number of bytes used to store owner, member, and logically deleted record occurrences. It is the sum of items 10, 11, and 12 (and, if the set is an SR8 index set, item 20).

14 CLUSTER PAGE SPREAD--The average (AVG) and maximum (MAX) number of different pages on which member record occurrences reside for all set occurrences.

```
AVG         =          PAGES WITH SET MEMBERS
                       SET OCCURRENCES WITH MEMBERS (6)
```

where PAGES WITH SET MEMBERS is derived by taking the number of different **overflow** pages (on which member records reside) for each set occurrence, and then finding the sum of those numbers of pages for all set occurrences in the set type.

Note: Only those set occurrences that have members residing on overflow pages are included in this statistic.

Determine the optimum average cluster page spread by dividing the average set length by the number of record occurrences that can fit on one page. If the actual average cluster page spread value is significantly higher than the optimum, performance when retrieving an entire set occurrence is likely to be poor due to excessive input/output operations. In such a case, consider database reorganization.

15 MEMBERS ON TARGET PAGE--The total number of member record occurrences residing on target page and the percentage of member occurrences residing on target page. (A target page is the page on which the system designated that a record be located if there is space available.)

```
PCT=100     *          MEMBERS ON TARGET PAGE(15)
                       MEMBER RECORD OCCURRENCES(7)
```

Also included are the average number of member occurrences on target page (AVG), the maximum number of member occurrences on target page for a single set occurrence (MAX), and the minimum number of member occurrences on target page for a single set occurrence (MIN) that had at least one member on the target page.

```
AVG         =          MEMBERS ON TARGET PAGE (15)
                       SET OCCURRENCES WITH MEMBERS (6)
```

These fields appear only when at least one set member is stored via this set.

Note: If there are a large number of set occurrences without members, it is possible for the AVG members on target page to be less than the MIN members on target page.

16 MEMBERS ON OVERFLOW--The total number of member record occurrences on overflow and the percentage of member occurrences on overflow. (A record occurrence located on a page other than its target page is said to be on overflow.)

```
PCT=100     *          MEMBERS ON OVERFLOW (16)
                       MEMBER RECORD OCCURRENCES (7)
```

Also included are the average number of member records on overflow (AVG), the maximum number of member records on overflow for a single set occurrence (MAX), and the minimum number of member records on overflow for a single set occurrence that had at least one member on overflow (MIN).

```
AVG         =          MEMBERS ON OVERFLOW (16)
                       SET OCCURRENCES WITH MEMBERS (6)
```

These fields appear only when at least one set member is stored VIA this set.

Note: If there are a large number of set occurrences without members, it is possible for the AVG members on overflow to be less than the MIN members on overflow.

17 MEMBERS NOT VIA THIS SET--The total number of member record occurrences that are members of this set but are not VIA this set and the percentage of the total number of member records that are not VIA this set.

```
PCT=100     *          MEMBERS NOT VIA THIS SET (17)
                       MEMBER RECORD OCCURRENCES(7)
```

Also included are the average number of member records not VIA this set (AVG), the maximum number of member records not VIA this set for a single set occurrence (MAX), and the minimum number of member records not VIA this set for a single set occurrence that had at least one member not VIA the set (MIN).

This field appears only on multi-member set reports.

```
AVG        =          MEMBERS NOT VIA THIS SET (17)
                      SET OCCURRENCES WITH MEMBERS (6)
```

This field will only be printed for non-CALC, VIA sets.

Note: If there are a large number of set occurrences without members, it is possible for the AVG number of members not VIA this set to be less than the MIN number of members not VIA this set.

18 OCCURRENCES W/O PAGE CHANGES--The number of set occurrences whose members are contained on the same page as their owner records (hence no page changes while walking the set) and the percentage of total set occurrences with members that do not have page changes while walking the set occurrence.

```
PCT=100    *          OCCURRENCES W/O PAGE CHNGS(18)
                      SET OCCURRENCES WITH MBERS(6)
```

19 PAGE CHANGES--The average number of page changes required to walk set occurrences (AVG), the greatest number of page changes required to walk a single set occurrence (MAX), and the fewest number of page changes required while walking a set occurrence with at least one page change (MIN). If any of the member records are fragmented, the user may encounter more page changes when walking the set in CA IDMS; CA IDMS/DB Analyzer does not recompose fragments during SET-WALK processing.

```
AVG        =          PAGE CHANGES,ALL SET OCS
                      SET OCCURRENCES WITH MEMBERS (6)
```

If the average number of page changes is significantly higher than the optimum average cluster page spread (see item 14), performance when retrieving an entire set occurrence is likely to be poor. In such a case, consider database reorganization.

Note: If there are a large number of set occurrences with no page changes, it is possible for the AVG page changes to be less than the MIN page changes.

20 BYTES TO STORE SR8 RECORDS--The number of bytes used to store SR8 index record occurrences and the percentage of bytes used to store SR8 record occurrences.

```
PCT=100    *          BYTES TO STORE SR8 RECORDS(20)
                      TOTAL BYTES TO STORE SET (13)
```

This field will only be present if the report is for an SR8 (integrated index) set.

Distribution Section Fields

The Distribution Section of the Set Report is shown in the following display. This section of the report displays the distribution of the following set features.

```
   CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                          DATE         TIME     PAGE
                     Rnn.nn                     SET REPORT                          dd/mm/yy     hh:mm:ss   nnnn
                                          DISTRIBUTION SECTION

      SET NAME:  IX - STUD - LNAME
      FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
      ITEM                                  RANGE            TOTAL         PCT
      ---------------------------           -------          -------      -----
1 ►   CLUSTER PAGE SPREAD                    PAGES           # SET OCCURRENCES
                                           1 -         1        0            0
                                           2 -         2        0            0
                                           3 -         3        0            0
                                           4 -         4        0            0
                                           5 -         5        0            0
                                           6 -         7        0            0
                                           8 -        10        0            0
                                           11 -       15        0            0
                                           16 -       20        1          100
                                           21 - 99999999        0            0
2 ►   LENGTH OF SET OCCURRENCES            MBR OCCURRENCES  # SET OCCURRENCES
                                           0 -         0        0            0
                                           1 -        10        0            0
                                           11 -       20        0            0
                                           21 -       30        0            0
                                           31 -       40        0            0
                                           41 -       50        0            0
                                           51 -       60        1          100
                                           61 -       70        0            0
                                           71 -       80        0            0
                                           81 - 99999999        0            0
```

Note: In a case where only a portion of an area has been swept for statistical accumulation, set report field values pertain only to the portion of the area swept. In other words, as long as member records reside in accessible areas, set statistics are accumulated when only a portion of an area is swept. However, statistics for any set occurrences whose owner records reside outside the portion of the area swept are not accumulated and are not reflected in the values whose descriptions follow.

Remember that statistics shown on the Set Report apply only to the set type indicated in the SET NAME field of the report. See Set Report Identification Fields, item 1.

1 CLUSTER PAGE SPREAD--The distribution of set occurrences by number of different **overflow** pages on which member record occurrences reside is shown here. The number of different overflow pages are listed under the column headed RANGE. The number of set occurrences with all members on the corresponding number of overflow pages is listed in the column headed TOTAL. The percentage of set occurrences found in each page range is listed in the column headed PCT.

```
PCT=100     *          SET OCS PER PAGE RANGE
                       SET OCS WITH MEMBERS (Set Statistics 6)
```

Note: Set occurrences with all members on the target page are not included in this statistic.

2 LENGTH OF SET OCCURRENCES--The distribution by number of member record occurrences per set occurrence is shown here. Ranges of member occurrences are listed under the column headed RANGE. The number of set occurrences whose member record count falls within each range is listed in the column headed TOTAL.

The percentage of set occurrences falling within each range is listed in the column headed PCT.

```
PCT=100     *          SET OCS PER LENGTH RANGE
                       SET OCS (Set Statistics 5)
```

Histogram Section Fields

The Histogram Section of the Set Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Set Report Distribution Section. Distribution Section percentages are shown for each range in the form of a bar chart.

```
CA-TOOLS        RELEASE               CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                     SET REPORT                          dd/mm/yy      hh:mm:ss   nnnn
                                       HISTOGRAM SECTION

SET NAME:    IX - STUD - LNAME
FILE CREATION DATA: mm/dd/yy - hh:mm:ss
MBR OCCURRENCES         CLUSTER PAGE SPREAD - PERCENTAGE BY DISTRIBUTION RANGE
              0----+----10---+----20---+----30---+----40---+----50---+----60---+----70---+----80---+----90---+----100
    1 -    1   .         .         .         .         .         .         .         .         .         .         .
    2 -    2   .         .         .         .         .         .         .         .         .         .         .
    3 -    3   .         .         .         .         .         .         .         .         .         .         .
    4 -    4   .         .         .         .         .         .         .         .         .         .         .
    5 -    5   .         .         .         .         .         .         .         .         .         .         .
    6 -    7   .         .         .         .         .         .         .         .         .         .         .
    8 -   10   .         .         .         .         .         .         .         .         .         .         .
    11 -  15   .         .         .         .         .         .         .         .         .         .         .
    16 -  20   .NNNN
```

Note: When only a portion of an area has been swept for statistical accumulation, set report field values pertain only to the portion of the area swept; i.e., as long as member records reside in accessible areas, set statistics are accumulated when only a portion of an area is swept. However, statistics for any set occurrences whose owner records reside outside the portion of the area swept are not accumulated and are not reflected in the values described below.

Remember that statistics shown on the Set Report apply only to the set indicated in the SET NAME field of the report. See Set Report Identification Fields, item 1.

1 RECORD ID--Listed under this heading are the record identification numbers for those record types whose occurrences act as member records for this set.

2 RECORD NAME--Listed under this heading are the record names for each record type.

3 OCCURRENCES--The values listed under this heading are the total number of active multi-member record occurrences for each record type and the percentage of active multi-member record occurrences.

```
PCT=100     *          OCCURRENCES PER RECORD TYPE
                       MEMBER REC OCS (Set Stats 7)
```

4 SPACE USED--The values listed under this heading are the total number of bytes used by active multi-member record occurrences and the percentage of bytes used by active multi-member record occurrences for each record type.

```
PCT=100     *          ACTIVE SPACE USED PER REC TYPE
                       BYTES STORE MEMBERS (Set Statistics 11)
```

5 MEMBERS PER SET OCCURRENCE--The values listed under this heading are the average number of active multi-member record occurrences in a set occurrence (AVG), the number of active multi-member record occurrences in the set occurrence with the greatest number of multi-member record occurrences (MAX), and the number of active multi-member record occurrences in the set occurrence with the least number of multi-member record occurrences (MIN) for each record type.

```
AVG         =          OCCURRENCES PER RECORD TYPE (3)
                       SET OCS,MEMBERS (Set Statistics 6)
```

Note: If there are a large number of set occurrences without members, it is possible for the AVG number of members per set occurrence to be less than the MIN number of members per set occurrence.

6 OCCURRENCES--The values listed under this heading are the total number of logically deleted multi-member record occurrences for each record type.

7 SPACE USED--The values listed under this heading are the total number of bytes used by logically deleted multi-member record occurrences and the percentage of bytes used by logically deleted multi-member record occurrences for each record type.

```
PCT=100     *          LDEL SPACE USED PER REC TYPE
                       BYTES TO STORE LDELS (Set Statistics 12)
```

Comparative Set Report

A Comparative Set Report is used to assess changes that have occurred in the physical contents for a set type. Consequently, this type of report uses data from two different statistical files. The data from these files describes the set type at two different points in time.

Similar to the Set Report, the Comparative Set Report is divided into four sections: the Set Statistics Section, the Distribution Section, the Histogram Section, and the Multi-Member Set Analysis Section.

The format of each section in this report is the same as that of a Set Report except that fields have been added to show "old" and "new" statistical file values and, when possible, the amount of change between these values.

Set Comparative Report Fields are shown in the following screen displays. Fields near the top of the Comparative Set Report are described below. See Set Report (see page 53) for descriptions of fields identical to those found in the Set Report.

Set Statistic Section Fields

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                              DATE          TIME     PAGE
                Rnn.nn                      SET REPORT                                 dd/mm/yy      hh:mm:ss   nnnn
                                     STATISTICS SECTION
                                        COMPARATIVE
SET NAME:         ACTIVITY-TYPES
NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss

ITEM                                  NEW      PCT          OLD      PCT        VARIANCE      PCT
----------------------------          ---      ----         -----    ---        --------      ---
OWNER RECORD NAME                  ACTIVITY             ACTIVITY
MEMBER RECORD NAME               MULTI-MEMBER SET     MULTI-MEMBER SET
SET OCCURRENCES                          3                    3                    0
SET OCCURRENCES W/MEMBERS                3      100           3      100           0          0
MEMBER RECORD OCCURRENCES                9                    9                    0
LDEL OCCURRENCES                         0        0           0        0           0          0
LENGTH OF SET OCCURRENCES
  AVG                                  3.00                 3.00                           0.00
  MAX                                    3                    3                    0
  MIN                                    3                    3                    0
BYTES TO STORE OWNERS                  180       27         180       27           0          0
BYTES TO STORE MEMBERS                 480       73         480       73           0          0
BYTES TO STORE LDELS                     0        0           0        0           0          0
TOTAL BYTES TO STORE SET               660                  660                    0
CLUSTER PAGE SPREAD
  AVG                                  1.67                 1.67                           0.00
  MAX                                    3                    3                    0
MEMBERS OF TARGET PAGE                   6       67           6       67           0          0
  AVG                                  2.00                 2.00                           0.00
  MAX                                    3                    3                    0
  MIN                                    3                    3                    0
MEMBERS ON OVERFLOW                      0        0           0        0           0          0
  AVG                                  0.00                 0.00                           0.00
  MAX                                    0                    0                    0
  MIN                                    0                    0                    0
MEMBERS NOT VIA THIS SET                 3       33           3       33           0          0
  AVG                                  1.00                 1.00                           0.00
  MAX                                    3                    3                    0
  MIN                                    3                    3                    0
OCCURRENCES W/O PAGE CHANGES             0        0           0        0           0          0
PAGE CHANGES
  AVG                                  1.67                 1.67                           0.00
  MAX                                    3                    3                    0
  MIN                                    1                    1                    0
CLUSTER PAGE SPREAD
  AVG                                 11.00                18.00                          -7.00
  MAX                                   11                   18                          -7
OCCURRENCES W/O PAGE CHANGES             0        0           0        0           0          0
PAGE CHANGES
  AVG                                 32.00               102.00                          -70.00
  MAX                                   32                  102                          -70
  MIN                                   32                  102                          -70 Exhibit 2.19a:  Comparative Set
Report, Set Statistics Section Non-Index Sets
CA-TOOLS          RELEASE                CA-IDMS/DB ANALYZER                              DATE          TIME     PAGE
                  Rnn.nn                      SET REPORT                                 dd/mm/yy      hh:mm:ss   nnnn
                                     STATISTICS SECTION
                                        COMPARATIVE
  SET NAME:         IX-STUD-LNAME
  NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
  OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss
ITEM                                  NEW     PCT          OLD       PCT        VARIANCE        PCT
----------------------------          ---     ---          -----     ---        --------        ---
OWNER RECORD NAME                     SR7                  SR7
MEMBER RECORD NAME                    STUDENT              STUDENT
SET OCCURRENCES                          1                    1                   10
SET OCCURRENCES W/MEMBERS                1      100           1      100           0          0
MEMBER RECORD OCCURRENCES               16                   51                  -35
LDEL OCCURRENCES                         0        0           0        0           0          0
LENGTH OF SET OCCURRENCES
  AVG                                 16.00                51.00                  -35.00
  MAX                                   16                   51                  -35
  MIN                                   16                   51                  -35
BYTES TO STORE OWNERS                   32        2          32        0           0          2
```

BYTES TO STORE MEMBERS	1,464	70	4,600	69	-3,136	1
BYTES TO STORE LDELS	0	0	0	0	0	0
BYTES TO STORE SR8 RECORDS	588	28	2,060	31	-1,472	3
TOTAL BYTES TO STORE SET	2,084		6,692		-4,608	
CLUSTER PAGE SPREAD						
AVG	11.00		18.00		-7.00	
MAX	11		18		-7	
OCCURRENCES W/O PAGE CHANGES	0	0	0	0	0	0
PAGE CHANGES						
AVG	32.00		102.00		-70.00	
MAX	32		102		-70	
MIN	32		102		-70	

1 SET NAME--The name of the set type whose change in physical organization is to be assessed.

2 NEW FILE CREATION DATA--The date and time of creation of the statistical file listed in the z/OS and OS/390 JCL as STAT1, and in the VSE/ESA JCL as SYS010.

3 OLD FILE CREATION DATA--The date and time of creation of the statistical file listed in the z/OS and OS/390 JCL as STAT2, and in the VSE/ESA JCL as SYS011.

4 NEW PCT--The values listed under this heading are raw counts and percentages taken from the new statistical file (item 2). See Set Report (see page 53) for descriptions of each field listed.

5 OLD PCT--The values listed under this heading are raw counts and percentages taken from the old statistical file (item 3). See Area Report Field Descriptions (see page 17) for a description of each field listed.

6 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the old and new values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old.

Distribution Section Fields

The Distribution Section of the Comparative Set Report is shown in the following display. See Area Report Field Descriptions (see page 17) for descriptions of fields not discussed here.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                      SET REPORT                           dd/mm/yy      hh:mm:ss   nnnn
                                       DISTRIBUTION SECTION
                                            COMPARATIVE

SET NAME:  IX-STUD-LNAME
NEW FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
OLD FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
ITEM                            RANGE          NEW     PCT          OLD     PCT        VARIANCE    PCT
-----------------------------  ----------       ---    ----         -----    ---        --------    ---
CLUSTER PAGE SPREAD               PAGES      # OF OCCURRENCES
                                1 -      1        0       0           0      0            0        0
                                2 -      2        0       0           0      0            0        0
                                3 -      3        0       0           0      0            0        0
                                4 -      4        0       0           0      0            0        0
                                5 -      5        0       0           0      0            0        0
                                6 -      7        0       0           0      0            0        0
                                8 -     10        0       0           0      0            0        0
                               11 -     15        1     100           0      0           +1      100
                               16 -     20        0       0           1    100           -1      100
                               21 - 99999        0       0           0      0            0        0
LENGTH OF SET OCCURRENCES    MBR OCCURRENCES    # SET OCCURRENCES
                                0 -      0        0       0           0      0            0        0
                                1 -     10        0       0           0      0            0        0
                               11 -     20        1     100           0      0           +1      100
                               21 -     30        0       0           0      0            0        0
                               31 -     40        0       0           0      0            0        0
                               41 -     50        0       0           0      0            0        0
                               51 -     60        0       0           1    100           -1      100
                               61 -     70        0       0           0      0            0        0
                               71 -     80        0       0           0      0            0        0
                               81 - 99999        0       0           0      0            0        0
```

1 NEW PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the new statistical file. See Comparative Set Report (see page 64) Identification Fields, item 2.

2 OLD PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the old statistical file. See Area Report Field Descriptions (see page 17) Identification Fields, item 3.

3 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the old and new values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old.

For variance to be meaningful, both the old and new statistical files must contain identical ranges. If they do not, no values are listed under this heading.

Histogram Section Fields

A portion of the Histogram Section of the Comparative Set Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Distribution Section. Old (O) and new (N) values of Distribution Section percentages for each range are shown on two lines in the form of a bar chart.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                      SET REPORT                          dd/mm/yy      hh:mm:ss   nnnn
                                          HISTOGRAM SECTION
                                            COMPARATIVE

 SET NAME:    IX - STUD - LNAME
 NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
 OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss
 MBR OCCURRENCES         CLUSTER PAGE SPREAD - PERCENTAGE BY DISTRIBUTION RANGE
             0----+----10----+----20----+----30----+----40----+----50----+----60----+----70----+----80----+----90----+----100
1 -     1    .          .          .          .          .          .          .          .          .          .          .
1 -     1    .          .          .          .          .          .          .          .          .          .          .
2 -     2    .          .          .          .          .          .          .          .          .          .          .
2 -     2    .          .          .          .          .          .          .          .          .          .          .
3 -     3    .          .          .          .          .          .          .          .          .          .          .
3 -     3    .          .          .          .          .          .          .          .          .          .          .
4 -     4    .          .          .          .          .          .          .          .          .          .          .
4 -     4    .          .          .          .          .          .          .          .          .          .          .
5 -     5    .          .          .          .          .          .          .          .          .          .          .
5 -     5    .          .          .          .          .          .          .          .          .          .          .
6 -     7    .          .          .          .          .          .          .          .          .          .          .
6 -     7    .          .          .          .          .          .          .          .          .          .          .
8 -    10    .          .          .          .          .          .          .          .          .          .          .
8 -    10    .          .          .          .          .          .          .          .          .          .          .
11 -   15    .NNNN
```

Multi-Member Set Analysis Section Fields

The Multi-Member Set Analysis Section of the Comparative Set Report is shown in the following display. This section of the report is identical to its Set Report counterpart except that it lists statistics from both the old and new statistical files. See Set Report (see page 53) for a description of fields in this section.

```
    CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                                  DATE          TIME     PAGE
                    Rnn.nn                      SET REPORT                                    dd/mm/yy      hh:mm:ss   nnnn
                                    MULTI-MEMBER SET ANALYSIS SECTION
                                             COMPARATIVE

    SET NAME:  STUDENT-REPORTS
    NEW FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
    OLD FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
    RECORD    RECORD     ********************************ACTIVE RECORDS************** *******LDEL RECORDS********
CA-TOOLS      NAME        *-OCCURRENCES-* *-SPACED USED-*  *--MEMBERS PER SET OCCURRENCE-* *-OCCURRENCES-* *-SPACED USED-*
                          COUNT    PCT    BYTES     PCT    AVG          MAX         MIN    COUNT          BYTES    PCT
    -------   --------    -----    ---    -----     ---    ---          ---         ---    -----          -----    ---
1   8110      DREPORT       2       40       88      37     1            1           1       0              0       0
    8109      GREPORT       3       60      148      63     1            2           1       0              0       0

2   8110      DREPORT      45       48    1,260      35     3            3           3       0              0       0
    8109      GREPORT      48       52    2,388      65     3            3           3       0              0       0
```

1 Listed by record type are statistics from the new statistical file.

2 Listed by record type are statistics from the old statistical file.

SR8 Index Report

You can produce an SR8 Index Report for every SR8 index set for which statistics have been accumulated. Reports for SR8 index sets excluded from accumulation by a SET parameter statement cannot be produced.

Additional information about each SR8 (integrated index) set can be found in the Set Report.

An SR8 Index Report is divided into three sections: the SR8 Index Statistics Section, the Table Entry Distribution Section, and the Histogram Section.

SR8 Index Report Fields

SR8 Index Report fields are shown in the following screen displays. Following are descriptions of two report identification fields plus fields used in the Index Statistics, Distribution, and Histogram Sections of the Index Report. The item numbers preceding each field name and description correspond with those in the referenced exhibits.

```
    CA-TOOLS        RELEASE              CA IDMS/DB ANALYZER                                  DATE          TIME     PAGE
                     Rnn.nn                 SR8 INDEX REPORT                                 dd/mm/yy      hh:mm:ss   nnnn
                                      SR8 INDEX STATISTICS SECTION

 1 ►  INDEX  NAME:         IX-STUD-LNAME
 2 ►  FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
      ITEM                                          TOTAL
      ---------------------------------             -------
 3 ►  OWNER RECORD NAME                             SR7
 4 ►  MEMBER RECORD NAME                            STUDENT
 5 ►  MEMBERSHIP OPTION                             MANDATORY AUTO
 6 ►  DUPLICATES OPTION                             DUPS NOT
 7 ►  SEQUENCE OPTION                               DESCENDING SEQ
 8 ►  COMPRESSION OPTION                            NO
 9 ►  SET ORDER OPTION                              SORTED
10►  SORT TYPE                                      SORTED DBKEY
11►  MAX NUMBER OF TABLE ENTRIES                          3
12►  MAX LENGTH OF TABLE ENTRY                            8
13►  SYMBOLIC KEY LENGTH                                  4
14►  MAX SR8 RECORD SIZE                                 72
15►  TOTAL BYTES TO STORE INDEX                       2,060
16►  PAGE NUMBER - 1ST SR8                           92,129
17►  NUMBER OF BOTTOM SR8 IN TOP                          0
18►  SR8 DISPLACEMENT                                     0
19►  NUMBER OF LEVELS                                     5
20►  TOTAL ORPHAN COUNT                                 124

      UPPER LEVEL STATISTICS
21►  SR8 RECORDS                                         16
22►  PAGE SPREAD                                          1
23►  USED TABLE ENTRIES                                  37
         AVG                                              2.31
         MAX                                              3
         MIN                                              2
24►  ORPHAN COUNT                     26
         AVG                                              1.63
         MAX                                              3
         MIN                                              1

      BOTTOM LEVEL STATISTICS
25►  SR8 RECORDS                                         22
26►  PAGE SPREAD                                          1
27►  USED TABLE ENTRIES                                  51
         AVG                                              2.32
         MAX                                              3
         MIN                                              2
28►  ORPHAN COUNT                                        98
         AVG                                              4.45
         MAX                                             10
```

1 INDEX NAME--The name of the SR8 index set for the reported statistics.

2 FILE CREATION DATA--The date and time that the statistical file used for this report was created. This information helps identify which statistical file is being used since there can be more than one file in storage.

3 OWNER RECORD NAME--The name of the index owned by the system or specified by the user.

4 MEMBER RECORD NAME--The name of the record type that is being indexed.

5 MEMBERSHIP OPTION--The name of the actual membership option for the index set. One of the following four options appears on the report:

```
MANDATORY-AUTO
OPTIONAL-AUTO
OPTIONAL-MAN
MANDATORY-MAN
```

6 DUPLICATES OPTION--The name of the duplicates option specified in the source code for the set section of the schema. One of four options appears on the report:

```
N/A
DUPS FIRST
DUPS LAST
DUPS NOT
```

7 SEQUENCE OPTION--Either ASCENDING or DESCENDING depending on the order in which member record occurrences are to be stored in the index set.

8 COMPRESSION OPTION--Either YES or NO, depending on whether front-end db-key compression was specified.

9 SET ORDER OPTION--The name of the sort option specified for the SR8 index set. One of three options appears on the report:

```
SORTED
NEXT/FIRST
PRIOR/LAST
```

10 SORT TYPE--The name of the sort type specified for the SR8 index set. One of three options appears on the report:

```
SORTED DBKEY
SORTED SYMBOLIC KEY
UNSORTED
```

11 MAX NUMBER OF TABLE ENTRIES--The maximum number of table entries that can be made in an SR8 index record.

12 MAX LENGTH OF TABLE ENTRY--The maximum length of each entry that can be entered into an SR8 index record. The length depends upon which sort type is specified.

13 SYMBOLIC KEY LENGTH--The maximum number of bytes defined for the sort key specified.

14 MAX SR8 RECORD SIZE--The size of the largest SR8 index record encountered in this SR8 index set.

15 TOTAL BYTES TO STORE INDEX--The total storage space requirements for all SR8 and SR7 or user-specified owner records of the index set.

16 PAGE NUMBER - 1ST SR8--The page number of the first SR8 record encountered that is pointed to by an owner record.

17 NUMBER OF BOTTOM SR8 IN TOP--The number of bottom level SR8 records stored in the top level of the index set.

18 SR8 DISPLACEMENT--The number of pages the bottom level SR8 index records are stored from their owners.

19 NUMBER OF LEVELS--The maximum number of levels in the hierarchy for any owner occurrence within this SR8 index set.

20 TOTAL ORPHAN COUNT--The total number of orphan counts within this SR8 index set. This number is the sum of the upper level (item 24) and bottom level (item 28) orphan counts.

21 SR8 RECORDS--The number of SR8 index record occurrences in the upper level of the index set.

22 PAGE SPREAD--The number of pages on which upper level SR8 index record occurrences occur.

23 USED TABLE ENTRIES--The number of filled table entries for all upper level SR8 record occurrences in the SR8 index set.

Also included are the average (AVG) number of filled table entries, the greatest number of filled table entries (MAX), and the fewest number of filled table entries (MIN) in an upper level SR8 index record occurrence that had at least one filled table entry.

```
AVG      =      USED TABLE ENTRIES (23
                Upper SR8 INDEX RECORDS (21)
```

24 ORPHAN COUNT--The total number of orphan counts for all SR8 records within the upper level of this set.

Also included are the average (AVG) number of orphans per upper level SR8 index record occurrence, the greatest number of orphans (MAX), and the fewest number of orphans (MIN) per upper level SR8 index record occurrence.

```
AVG        =        Upper ORPHAN COUNT (24)
                    Upper SR8 INDEX RECORDS (21)
```

25 SR8 RECORDS--The number of SR8 index record occurrences in the bottom level of the index set.

26 PAGE SPREAD--The number of pages on which bottom level SR8 record occurrences occur.

27 USED TABLE ENTRIES--The number of filled table entries for all bottom level SR8 index record occurrences in the index set.

Also included are the average (AVG) number of filled table entries, the greatest number of filled table entries (MAX), and the fewest number of filled table entries (MIN) in a bottom level SR8 index record occurrence that had at least one filled table entry.

```
AVG        =        USED TABLE ENTRIES (27)
                    Bottom SR8 Index RECORDS (25)
```

28 ORPHAN COUNT--The total number of orphan counts for all SR8 records within the bottom level of this set.

Also included are the average (AVG) number of orphans per bottom level SR8 index record occurrence, the greatest number of orphans (MAX), and the fewest number of orphans (MIN) per bottom level SR8 index record occurrence.

```
AVG        =        Bottom ORPHAN COUNT (28)
                    Bottom SR8 INDEX RECORDS (25)
```

Table Entry Distribution Section Fields

The Distribution Section of the SR8 Index Report is shown in the following display. This section of the report displays the distribution of the following selected SR8 index features.

```
CA-TOOLS              RELEASE              CA IDMS/DB ANALYZER                                DATE         TIME     PAGE
                      Rnn.nn                 SR8 INDEX REPORT                               dd/mm/yy     hh:mm:ss   nnnn
                                      TABLE ENTRY DISTRIBUTION SECTION

       INDEX NAME:  IX-STUD-LNAME
       FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
       ITEM                                      RANGE            TOTAL        PCT
       ----------------------------              -------          -------      -----
1 ►    UPPER LVL TBL ENTRIES USED              TABLE ENTRIES    # OF OCCURRENCES
                                                 0 -    0             0           0
                                                 1 -    1             0           0
                                                 2 -    2            11          69
                                                 3 -    3             5          31

2 ►    BOTTOM LVL TBL ENTRIES USED             TABLE ENTRIES    # OF OCCURRENCES
                                                 0 -    0             0           0
                                                 1 -    1             0           0
                                                 2 -    2            15          68
                                                 3 -    3             7          32
                                                 401- 450            23          11
```

1 UPPER LVL TBL ENTRIES USED--The distribution of upper level SR8 index record occurrences by number of table entries used is shown here. Numbers of table entries used are listed under the column headed TABLE ENTRIES. The number of SR8 index record occurrences using the corresponding number of table entries is listed under TOTAL. The percentage of SR8 index records using each number of table entries is listed in the column headed PCT.

```
PCT=100     *        UP LVL TBL ENTS USED PER RANGE
                     Upper SR8 RECORDS (Index Stats 21)
```

2 BOTTOM LVL TBL ENTRIES USED--The distribution of bottom level SR8 index record occurrences by number of table entries used is shown here. Numbers of table entries used are listed under the column headed TABLE ENTRIES. The number of SR8 index record occurrences using the corresponding number of table entries is listed under TOTAL. The percentage of SR8 index records using each number of table entries is listed in the column headed PCT.

```
PCT=100     *        BOT LVL TBL ENTS USED PER RNGE
                     Bottom SR8 RECORDS (Index Stats 25)
```

Histogram Section Fields

The Histogram Section of the SR8 Index Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Distribution Section. Distribution Section percentages are shown for each range in the form of a bar chart.

```
CA-TOOLS        RELEASE              CA IDMS/DB ANALYZER                          DATE         TIME     PAGE
                Rnn.nn                 SR8 INCEX REPORT                       dd/mm/yy     hh:mm:ss   nnnn
                                      HISTOGRAM SECTION

INDEX NAME:    IX - STUD - LNAME
FILE CREATION DATA: mm/dd/yy - hh:mm:ss
TABLE ENTRIES         UPPER LVL TBL ENTRIES USED - PERCENTAGE BY DISTRIBUTION RANGE
            0---+----10----+---20----+---30----+---40----+----50----+---60----+----70----+----80----+----90----+----100
0 -    0    .          .          .          .          .          .          .          .          .          .
1 -    1    .          .          .          .          .          .          .          .          .          .
2 -    2    .NNNN
```

Comparative SR8 Index Report Fields

Comparative Index Report Fields are shown in the following screen displays. Identification and SR8 Index Statistic Section fields of the Comparative SR8 Index Report are described below. See SR8 Index Report (see page 70) for descriptions of fields identical to those found in the Comparative SR8 Index Report.

```
CA-TOOLS          RELEASE              CA IDMS/DB ANALYZER                          DATE         TIME     PAGE
                  Rnn.nn                 SR8 INDEX REPORT                        dd/mm/yy     hh:mm:ss   nnnn
                                  SR8 INDEX STATISTICS SECTION
                                          COMPARATIVE

INDEX NAME:         IX-STUD-LNAME
NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss

ITEM                                    NEW              OLD              VARIANCE
------------------------------        ---------------  ---------------  ----------
OWNER RECORD NAME                       SR7              SR7
MEMBER RECORD NAME                      STUDENT          STUDENT
MEMBERSHIP OPTION                       MANDATORY AUTO   MANDATORY AUTO
DUPLICATES OPTION                       DUPS LAST        DUPS NO
SEQUENCE OPTION                         DESCENDING SEQ   DESCENDING SEQ
COMPRESSION OPTION                      NO               NO
SET ORDER OPTION                        SORTED           SORTED
SORT TYPE                               SORTED DBKEY     SORTED DBKEY
MAX NUMBER OF TABLE ENTRIES                3                3                0
MAX LENGTH OF TABLE ENTRY                  8                8                0
SYMBOLIC KEY LENGTH                        4                4                0
MAX SR8 RECORD SIZE                       72               72                0
TOTAL BYTES TO STORE INDEX               588            2,060               -1,472
PAGE NUMBER - 1ST SR8                 92,129           92,129                0
NUMBER OF BOTTOM SR8 IN TOP                0                0                0
SR8 DISPLACEMENT                           0                0                0
NUMBER OF LEVELS                           3                5                -2
NUMBER OF ORPHANS                         24              124                0

UPPER LEVEL STATISTICS
----------------------
SR8 RECORDS                                4               16               -12
PAGE SPREAD                                1                1                0
USED TABLE ENTRIES                        10               37               -27
  AVG                                   2.50             2.31             +0.19
  MAX                                      3                3                0
  MIN                                      2                2                0
ORPHAN COUNT                               8               26                0
  AVG                                   2.00             1.63             +0.38
  MAX                                      3                3                0
  MIN                                      1                1                0

BOTTOM LEVEL STATISTICS
-----------------------
SR8 RECORDS                                7               22               -15
PAGE SPREAD                                1                1                 0
USED TABLE ENTRIES                        16               51               -35
  AVG                                   2.29             2.32             -0.03
  MAX                                      3                3                 0
  MIN                                      2                2                 0
ORPHAN COUNT                              16               98                 0
  AVG                                   2.29             4.45              -2.17
  MAX                                      6               10                 0
  MIN                                      1                1                 0
```

1 INDEX NAME--The name of the SR8 index set for the reported statistics.

2 NEW FILE CREATION DATA--The date and time of creation of the statistical file which is listed in the z/OS and OS/390 JCL as STAT1, and in the VSE/ESA JCL as SYS010.

3 OLD FILE CREATION DATA--The date and time of creation of the statistical file which is listed in the z/OS and OS/390 JCL as STAT2, and in the VSE/ESA JCL as SYS011.

4 NEW--The values listed under this heading are taken from the new statistics file (item 2). See SR8 Index Report for a description of each field listed.

5 OLD--The values listed under this heading are taken from the old statistical file (item 3). See SR8 Index Report for a description of each field listed.

6 VARIANCE--Listed under this heading are the differences between new and old raw counts. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old file values.

Table Entry Distribution Section Fields

The Distribution Section of the Comparative SR8 Index Report is shown in the following display. See the SR8 Index Report for descriptions of fields not discussed here.

```
CA-TOOLS        RELEASE              CA IDMS/DB ANALYZER                                DATE          TIME     PAGE
                Rnn.nn                 SR8 INDEX REPORT                               dd/mm/yy      hh:mm:ss   nnnn
                                TABLE ENTRY DISTRIBUTION SECTION
                                          COMPARATIVE

INDEX NAME:  IX-STUD-LNAME
NEW FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
OLD FILE CREATION DATA:  mm/dd/yy  -  hh:mm:ss
ITEM                            RANGE          NEW     PCT          OLD     PCT        VARIANCE    PCT
----------------------------  ----------       ---    ----         -----    ---        --------    ---
UPPER LVL TBL ENTRIES USED     TABLE ENTRIES    # OF OCCURRENCES
                                0 -    0         0       0            0       0            0        0
                                1 -    1         0       0            0       0            0        0
                                2 -    2         2      50           11      69           -9       19
                                3 -    3         2      50            5      31           -3       19
BOTTOM LVL TBL ENTRIES USED     TABLE ENTRIES    # OF OCCURRENCES
                                0 -    0         0       0            0       0            0        0
                                1 -    1         0       0            0       0            0        0
                                2 -    2         5      71           15      68          -10        3
                                3 -    3         2      29            7      32           -5        3
```

1 NEW PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the new statistics file. See Comparative SR8 Index Report Identification Fields, item 2.

2 OLD PCT--The values listed under this heading are raw counts and percentages for each range. These values are taken from the old statistics file. See Comparative SR8 Index Report Identification Fields, item 3.

3 VARIANCE PCT--Listed under this heading are the differences between new and old raw counts and the percent variance between the old and new values. Positive values indicate the amount by which new statistical file values are greater than old. Negative values indicate the amount by which new file values are less than old file values.

For variance to be meaningful, both the old and new statistical files must contain identical ranges. If they do not, no values are listed under this heading.

Histogram Section Fields

A portion of the Histogram Section of the Comparative SR8 Index Report is shown in the following display. This section of the report is a graphic representation and a quick reference version of the Distribution Section. Old (O) and new (N) values of Distribution Section percentages for each range are shown on two lines in the form of a bar chart.

```
CA-TOOLS        RELEASE                CA IDMS/DB ANALYZER                          DATE          TIME     PAGE
                Rnn.nn                   SR8 INDEX REPORT                        dd/mm/yy      hh:mm:ss   nnnn
                                        HISTOGRAM SECTION
                                          COMPARATIVE
INDEX NAME: IX-STUD-LNAME
NEW FILE CREATION DATA: mm/dd/yy - hh:mm:ss
OLD FILE CREATION DATA: mm/dd/yy - hh:mm:ss
 TABLE ENTRIES      UPPER LVL TBL ENTRIES USED - PERCENTAGE BY DISTRIBUTION RANGE
            0---+----10----+---20----+---30----+---40----+---50----+---60----+---70----+---80----+---90----+----100
0 -    0    .          .          .          .          .          .          .          .          .          .
0 -    0    .          .          .          .          .          .          .          .          .          .
1 -    1    .          .          .          .          .          .          .          .          .          .
1 -    1    .          .          .          .          .          .          .          .          .          .
2 -    2    .NNNN
```

Audit Report

The Audit Report contains a list of parameters used as input to CA IDMS/DB Analyzer and all messages (informative, warning, and error) dynamically generated by the Analyzer; it also provides a summary of all processing that occurred. See Chapter 5, "Messages" for a discussion of the three types of messages and information about specific messages.

The first part of the Audit Report, the Input Parameter Report, can include two categories of messages: Parameter Messages and Processing Messages. An Audit Report is shown in the following display. A column ruler appears at the top of the report.

```
CA-TOOLS        RELEASE              CA IDMS/DB ANALYZER                          DATE         TIME     PAGE
                Rnn.nn              INPUT PARAMETER REPORT                      dd/mm/yy     hh:mm:ss   nnnn

             V----+----1----+----2----+----3----+----4----+----5----+---6----+----7----V

NKWP0911    INPUT PARAMETER STATEMENT               PROCESS=REPORTS,SUBSCHEMA=DBRO1ALL,SELECTION=EXPLICIT,

NKWP009E    VALUE MUST BE "AUTOMATIC", OR "EXPLICIT" ********

NKWP0921    CONTINUATION STATEMENT                  COMPARE

NKWP0911    INPUT PARAMETER STATEMENT               REPORT=RECORD

NKWP0931    COMMENT STATEMENT                       *


NKWP0941    END OF PARAMETER INPUT

PARM0011   INPUT PARAMETER STATEMENT VALIDATING IS COMPLETE
```

1 COLUMN RULER--designates the active area for a parameter statement (first 72 positions).

2 PARAMETER MESSAGES--list all input parameters and also convey information about parameter processing.

Parameter messages appear in a two-column format. The left column contains the number and text of the message; the right column contains user input. Several parameter messages are shown in the screen display. An I at the end of the message code indicates an informative message; an E indicates an error message; a W indicates a warning message.

3 INPUT PARAMETERS

4 ERROR--The message code ends with the letter E. CA IDMS/DB Analyzer underlines parts of the input parameters with asterisks (*) to make it easy to find the location of an error. It may also underline parts of messages with a capital letter X to indicate portions of the parameter that were not checked because of a previous error.

5 COMMENT

6 PROCESSING MESSAGES--indicate successful or unsuccessful completion of steps, or list processing errors detected. If ACCUMULATION or ALL was specified in the PROCESS statement, there will be a message indicating completion of statistics accumulation.

Chapter 3: Parameters

This section contains the following topics:

CA IDMS/DB Analyzer Parameter Statements (see page 83)
Notation Conventions and Syntax Rules (see page 85)
PROCESS Statement (see page 89)
AUTOMATIC Mode (see page 93)
EXPLICIT Mode (see page 114)
EXPLICIT Mode (see page 138)

CA IDMS/DB Analyzer Parameter Statements

This chapter describes how to use CA IDMS/DB Analyzer parameter statements.

CA IDMS/DB Analyzer performs two basic functions: Statistics accumulation and report production. These two functions can be performed for any subschema by using a single PROCESS parameter statement.

The PROCESS statement can be used alone to generate a complete set of statistics and reports.

You can also limit or modify these functions by using three additional parameter statements: AREA, SET, and REPORT. These optional statements allow you to limit or modify the statistics collected, and to specify which reports you want generated.

The PROCESS statement initiates CA IDMS/DB Analyzer processing. It is a mandatory statement and must be entered first. By specifying a process and a subschema name, you can automatically analyze the entire database described by the subschema. Or, if you need to analyze only part of the database, you can specify explicitly the areas, sets, index sets and/or reports that you want to process.

You can use the PROCESS statement to:

- Request the accumulation of statistics, the production of reports, or both
- Specify the subschema to be analyzed
- Select either the AUTOMATIC or the EXPLICIT processing mode
- Request comparative reports
- Create a file of logically deleted record(s)(LDEL)

Before CA IDMS/DB Analyzer processes a database, you can check the syntax of your parameter statements by choosing the SYNTAX option in the PROCESS statement.

Processing Modes

The SELECTION parameter of the PROCESS statement allows you to process either all of the database described by a subschema or only the parts of the database you specify. When you choose to process all of the database, you can also specify parts of it to be excluded from processing.

SELECTION=AUTOMATIC directs CA IDMS/DB Analyzer to process the entire database described by a subschema, except for those parts that you specify for exclusion. You can exclude specific areas, sets, SR8 sets, and/or reports.

SELECTION=EXPLICIT directs CA IDMS/DB Analyzer to process only the areas, sets, SR8 index sets, and/or reports specified by using the optional parameter statements.

Optional Statements

The AREA, SET, and REPORT statements are optional. Their functions depend on the mode--AUTOMATIC or EXPLICIT--that you select in the PROCESS statement. Use of the optional statements is described in detail, separately for the AUTOMATIC mode and the EXPLICIT mode, after the description of the PROCESS statement in this chapter.

AUTOMATIC Mode

In the AUTOMATIC mode:

The AREA Statement allows you to exclude an area from processing, to limit processing to a portion of an area, or to specify the page ranges used in reporting the distribution of characteristics across an area.

The SET Statement is used to exclude a set type from processing, or to specify length ranges for reporting the distribution of set occurrence lengths. Use this statement to exclude SR8 (integrated index) sets, as well as non-index sets.

The REPORT Statement is used to eliminate production of specific reports.

EXPLICIT Mode

In the EXPLICIT mode:

The AREA Statement allows you to include an area or part of an area in processing and to specify distribution page ranges.

The SET Statement is used to include a set type in processing and to specify length distribution ranges. Use this statement to include SR8 (integrated index) sets, as well as non-index sets.

The REPORT Statement is used to produce specific reports.

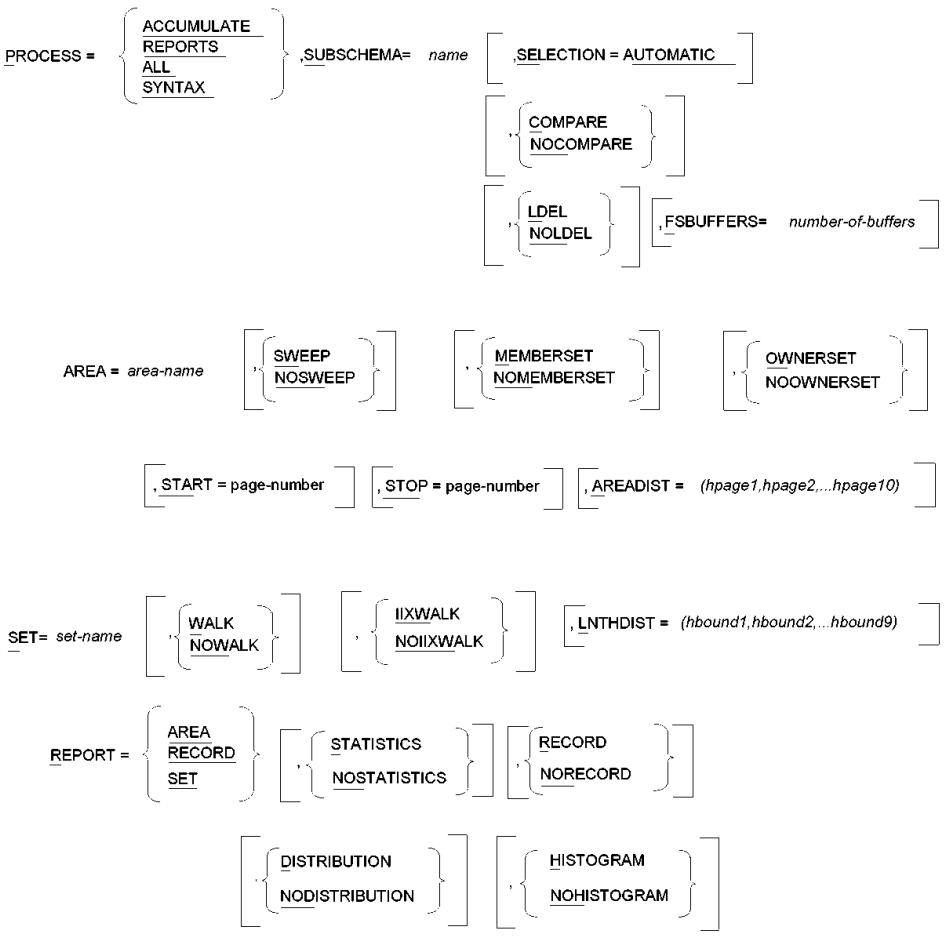
Notation Conventions and Syntax Rules

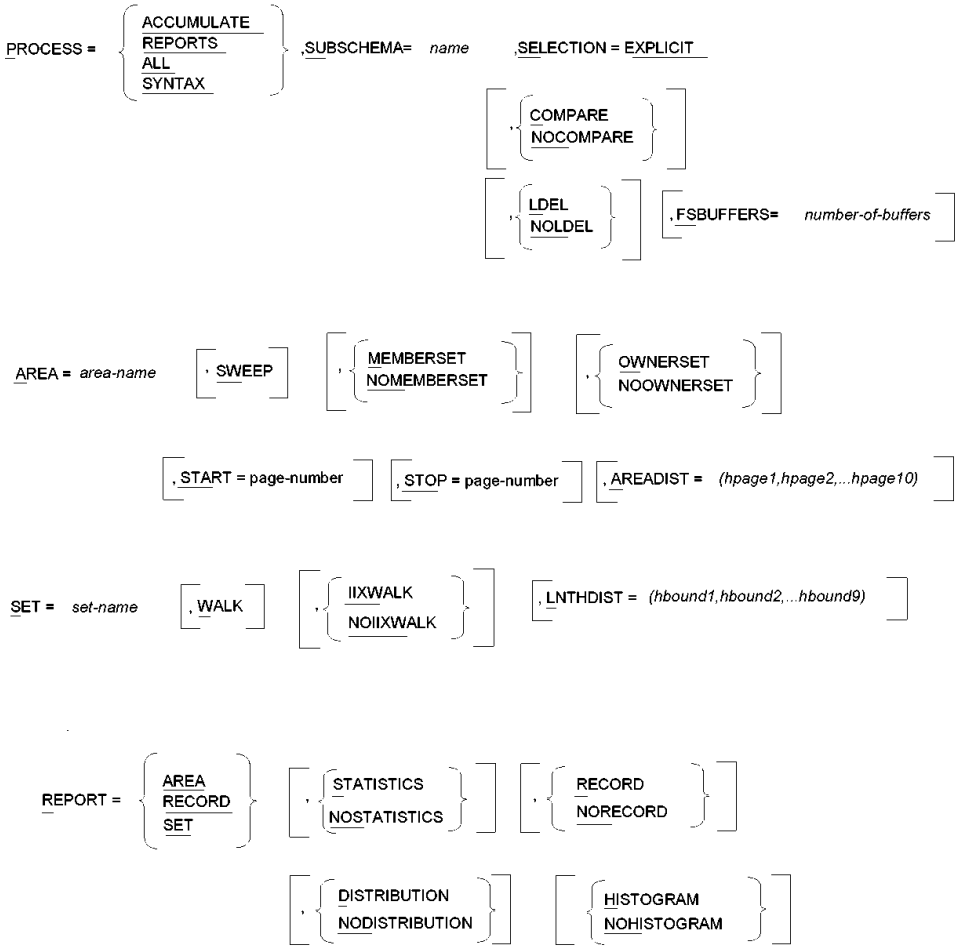
This section explains in detail how to use the parameter statements. Before using CA IDMS/DB Analyzer parameter statements, review the following exhibits carefully:

- Exhibit 3.1 Notation Conventions
- Exhibit 3.2 Parameter Syntax Rules
- Exhibit 3.3 Parameter Statements AUTOMATIC Mode
- Exhibit 3.4 Parameter Statements EXPLICIT Mode

Example	Function
PROCESS	Keywords appear in UPPERCASE. The minimum required portion of each keyword is UNDERSCORED. If a portion of or an entire keyword is not underscored, you can omit that portion or that keyword.
AREA=area-name	Variables appear in lowercase italics. You must substitute an appropriate value for each variable.
[START=page-number]	Brackets indicate optional clauses.
/ ACCUMULATE \ PROCESS = < REPORTS > | ALL | \ SYNTAX /	Braces enclose two or more options. You must select one of the options.
,AREADIST=(hpage1,hpage2,..hpage10)	Ellipses indicate that multiple variables can be specified, separated by commas.

Item	Rule
Order of Parameter Statements	You must enter the PROCESS statement first. You can enter all other parameter statements in any order.
Continuing a Parameter Statement	To continue a parameter statement onto the next record, key in a trailing comma. Do not split a keyword phrase between two records.
Entering Blanks In Parameter Statements	You can enter blanks (character spaces) between keywords to improve readability in a parameter statement without affecting processing. However, do not embed blanks within a keyword or value field.
Entering Parameter Statements	On an 80-character input record, you must enter all parameter syntax between positions 1 through 72.
Comments	Enter an asterisk (*) in column 1, to indicate a comment.
Series of Values	Parentheses are required around a series of values separated by commas.


PROCESS =
ACCUMULATE
REPORTS
ALL
SYNTAX
,SUBSCHEMA= name
,SELECTION = AUTOMATIC
,COMPARE
,NOCOMPARE
,LDEL
,NOLDEL
,FSBUFFERS= number-of-buffers
AREA = area-name
,SWEEP
,NOSWEEP
,MEMBERSET
,NOMEMBERSET
,OWNERSET
,NOOWNERSET
, START = page-number
, STOP = page-number
, AREADIST = (hpage1,hpage2,...hpage10)
SET= set-name
,WALK
,NOWALK
,IIXWALK
,NOIIXWALK
, LNTHDIST = (hbound1,hbound2,...hbound9)
REPORT =
AREA
RECORD
SET
,STATISTICS
,NOSTATISTICS
,RECORD
,NORECORD
,DISTRIBUTION
,NODISTRIBUTION
,HISTOGRAM
,NOHISTOGRAM


PROCESS =
ACCUMULATE
REPORTS
ALL
SYNTAX
,SUBSCHEMA= name
,SELECTION = EXPLICIT
,COMPARE
NOCOMPARE
,LDEL
NOLDEL
,FSBUFFERS= number-of-buffers
AREA = area-name
, SWEEP
,MEMBERSET
NOMEMBERSET
,OWNERSET
NOOWNERSET
, START = page-number
, STOP = page-number
, AREADIST = (hpage1,hpage2,...hpage10)
SET = set-name
, WALK
,IIXWALK
NOIIXWALK
, LNTHDIST = (hbound1,hbound2,...hbound9)
REPORT =
AREA
RECORD
SET
,STATISTICS
NOSTATISTICS
,RECORD
NORECORD
,DISTRIBUTION
NODISTRIBUTION
HISTOGRAM
NOHISTOGRAM

PROCESS Statement

Use the PROCESS parameter statement to initiate CA IDMS/DB Analyzer processing. This statement consists of parameters that control all processing for the Analyzer option. The PROCESS statement *must* be the first statement entered. The PROCESS statement is described as follows:

- *P***ROCESS =** initiates execution of CA IDMS/DB Analyzer and indicates that processing options follow.
- *ACCUMULATE* indicates that you want CA IDMS/DB Analyzer to accumulate statistics from the database into an archive file, but that you do not want reports to be produced at this time.
- *REPORTS* indicates that you want one or more reports produced using statistics from a previously accumulated statistical file.
- *ALL* indicates that you want a current set of statistics to be accumulated and you want one or more reports to be produced showing this current set of statistics.
- *SYNTAX* indicates that you want CA IDMS/DB Analyzer to validate parameter syntax. Use this option prior to a full run to eliminate premature termination due to syntax errors.

Default: There is no default. You must choose one of these options.

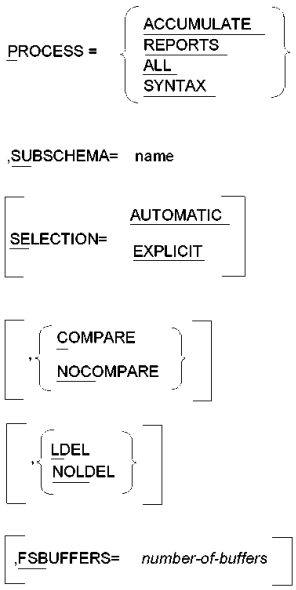


Exhibit 3.5: PROCESS Statement Syntax

SUBSCHEMA Parameter

,*SU***BSCHEMA**=name

SUBSCHEMA specifies the name that defines the database for which you want statistics accumulated. If you want to process the entire database, enter the name of a subschema that defines the entire database.

If the specified subschema is missing record definitions that are required to satisfy selected processing, database analysis may end prematurely with errors, including an 0361 error status.

Default: There is no default. You must supply a valid subschema name.

Rule: The subschema specified cannot contain native VSAM records.

SELECTION Parameter

,SELECTION= < AUTOMATIC >
\ EXPLICIT /

SELECTION specifies whether to accumulate statistics and create reports automatically for the whole database defined by the subschema (except those parts specifically excluded or limited), or to accumulate statistics and create reports only for explicitly specified parts of the database.

AUTOMATIC

AUTOMATIC indicates that statistics are to be accumulated for all areas, records, and sets (including index sets) in the subschema unless a subsequent parameter statement is used to limit the accumulation. It also indicates that all CA IDMS/DB Analyzer reports are to be produced unless REPORT statements are used to exclude the production of specific reports.

EXPLICIT

EXPLICIT indicates that you will specify the areas, records, and/or sets of the database for which you want statistical accumulation. You must specify these parts in a subsequent parameter statement or statements. Otherwise, statistics for the database will not be accumulated. It also indicates that you will specify the reports to be produced by using subsequent REPORT statements. If you do not include one or more REPORT statements, no reports will be produced.

Default: The default is AUTOMATIC.

You will find a complete description of all the parameters available in the AUTOMATIC Mode after this section on the PROCESS statement, followed by a complete description of all the parameters available in the EXPLICIT Mode.

COMPARE/NOCOMPARE Parameter

, < **COMPARE** >
\ NOCOMPARE /

The COMPARE/NOCOMPARE option allows you to create a comparative report or reports, comparing statistics accumulated at two different times. This option is applicable only when you are requesting the creation of reports by using the REPORTS option or the ALL option of the PROCESS parameter.

*C***OMPARE**

COMPARE indicates that you want to produce a comparative report.

*NOC***OMPARE**

NOCOMPARE indicates that you do not want to produce a comparative report.

Default: The default is NOCOMPARE.

LDEL/NOLDEL Parameter

, < **LDEL** >
\ NOLDEL /

The LDEL/NOLDEL option enables you to create a file containing the db-keys of database records that have been logically deleted. Each LDEL record may contain one to 20 db-keys. (For Release 10.2 or earlier, you can use this file of LDEL records as input to the IDMSLDEL utility.)

LDEL indicates that you want to create an LDEL file. The LDEL option is applicable only when you are requesting the accumulation of statistics from the subschema by using the ACCUMULATE option or the ALL option of the PROCESS parameter.

*NOL***DEL**

NOLDEL indicates that you do not want to create an LDEL file.

Default: The default is NOLDEL.

FSBUFFER Parameter

,FSBUFFER=number-of-buffers

FSBUFFER indicates how many buffers are to be reserved for the fast-scan buffer pool. Each buffer can store one page.

The FSBUFFER parameter is used during an area sweep. Using FSBUFFER can help reduce the amount of I/O wait time when an area being swept contains many pages.

It is difficult to define an ideal FSBUFFER value because of the many possible variations in a CA IDMS database. Furthermore, a large FSBUFFER value may cause CA IDMS/DB Analyzer to use additional CPU cycles to manage these buffers. The minimum FSBUFFER is 9. The maximum value is taken from the MAXBUF value in the GSDTPARM module.

Default: The default value is taken from the DEFBUF value in the GSDTPARM module.

AUTOMATIC Mode

Statistics for a subschema's areas, records, and sets are automatically accumulated in the AUTOMATIC Mode, except for those specifically excluded or modified with optional statements. At the end of the AUTOMATIC Mode subsection, Exhibits 3.10a-c show which set statistics will be collected with various combinations of parameters.

AREA Statement

In the AUTOMATIC Mode, an AREA statement is used to exclude or modify the accumulation of statistics for a specific area. An AREA statement is meaningful only if you selected either the ACCUMULATE option or the ALL option in the PROCESS statement.

Cross-Area Sets

A cross-area set is a set whose owner resides in one area and whose members reside in one or more other areas. Set statistics for cross-area sets, as well as for single-area sets, can be excluded by using the NOMEMBERSET and/or NOOWNERSET options of the AREA statement.

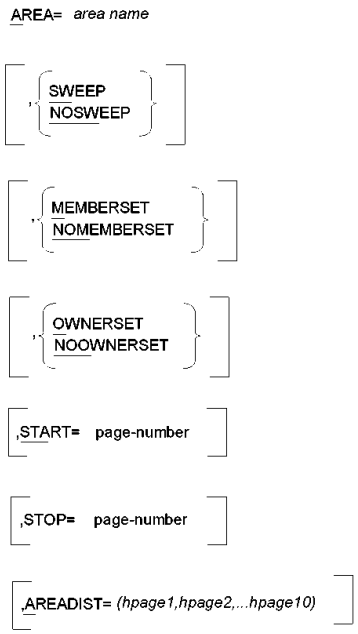


Exhibit 3.6: AREA Statement Syntax

AREA Parameter

*A***REA**=area-name

In the AUTOMATIC Mode, AREA identifies an area that you want to exclude or limit. The area you specify must be one that is defined by the subschema you are using to process the database.

Default Parameters

You do not have to specify default parameters such as SWEEP, MEMBERSET, and OWNERSET. They may, however, be coded for documentation purposes.

AREADIST Parameter

,AREADIST=(hpage1,hpage2,...hpage10)

AREADIST allows you to specify the high page numbers for up to 10 distribution ranges. For example, if the area started on page 1 and ended on page 100, AREADIST=(10,20,30) would represent page ranges of 1-10, 11-20, 21-30, and 31-100. These distribution ranges are used to show the spread of various physical characteristics across an area.

Default: The default ranges are 10 page ranges having equal numbers of pages. The number of pages in each range is equal to

$$\frac{(\textit{stop page} - \textit{start page} + 1)}{10}$$

Rules:

- You must enter values in numerical order from lowest to highest.
- The first entry must be equal to or greater than the number of the area start page. The last entry must be less than or equal to the number of the area stop page.
- If you enter 10 values, the tenth entry must be equal to the number of the area stop page.
- If you enter fewer than 10 values, CA IDMS/DB Analyzer inserts the number of the area stop page as an additional entry.

SWEEP/NOSWEEP Parameter

, < **SWEEP** >
\ NOSWEEP /

The SWEEP/NOSWEEP option allows you to specify whether statistics from the area are to be accumulated. See Exhibit 3.7 for an example.

*SW***EEP**

SWEEP indicates that you want to accumulate area, record, and set statistics for sets with owners residing in the named area.

In the AUTOMATIC Mode, specify an area to be swept when you want to change the parameters START, STOP, or AREADIST, or when you are using NOMEMBERSET or NOOWNERSET, but want some statistics from the area.

*NOSW***EEP**

NOSWEEP indicates that you do not want to accumulate area or record statistics, or set statistics for sets whose owners reside in the area. Member records for cross-area sets whose owners reside in another swept area will be processed unless NOMEMBERSET is specified along with NOSWEEP.

Default: The default is SWEEP.

MEMBERSET/NOMEMBERSET Parameter

, < **MEMBERSET** >
\ NOMEMBERSET /

The MEMBERSET/NOMEMBERSET option allows you to accumulate set statistics for member records whose owners reside in a sweep area. See Exhibit 3.7 for an example.

***M*EMBERSET**

MEMBERSET indicates that you want to accumulate statistics for cross-area sets whose member records are in this area. When you are in the AUTOMATIC Mode and are using an AREA statement to change one or more of the parameters STOP, START, and AREADIST, then MEMBERSET and SWEEP are set by default.

When you are using the AREA statement to exclude an area from processing by using NOSWEEP, MEMBERSET (set by default) will allow accumulation of set statistics for cross-area sets whose member records are in the specified area.

***NOM*EMBERSET**

NOMEMBERSET means that you do not want to accumulate statistics for sets whose member records are in the specified area.

Use NOMEMBERSET with NOSWEEP to completely exclude an area from processing.

Default: The default is MEMBERSET.

OWNERSET/NOOWNERSET Parameter

The OWNERSET/NOOWNERSET option allows you to control accumulation of set statistics for all sets whose owners reside in the area named in the AREA statement. See Exhibit 3.7 for examples.

***O*WNERSET**

OWNERSET specifies all sets whose owners reside in the area named in the area statement. NOSWEEP overrides OWNERSET.

***NOO*WNERSET**

NOOWNERSET indicates that you do not want to accumulate set statistics for any set whose owner resides in the area named in the AREA statement.

Default: The default is OWNERSET.

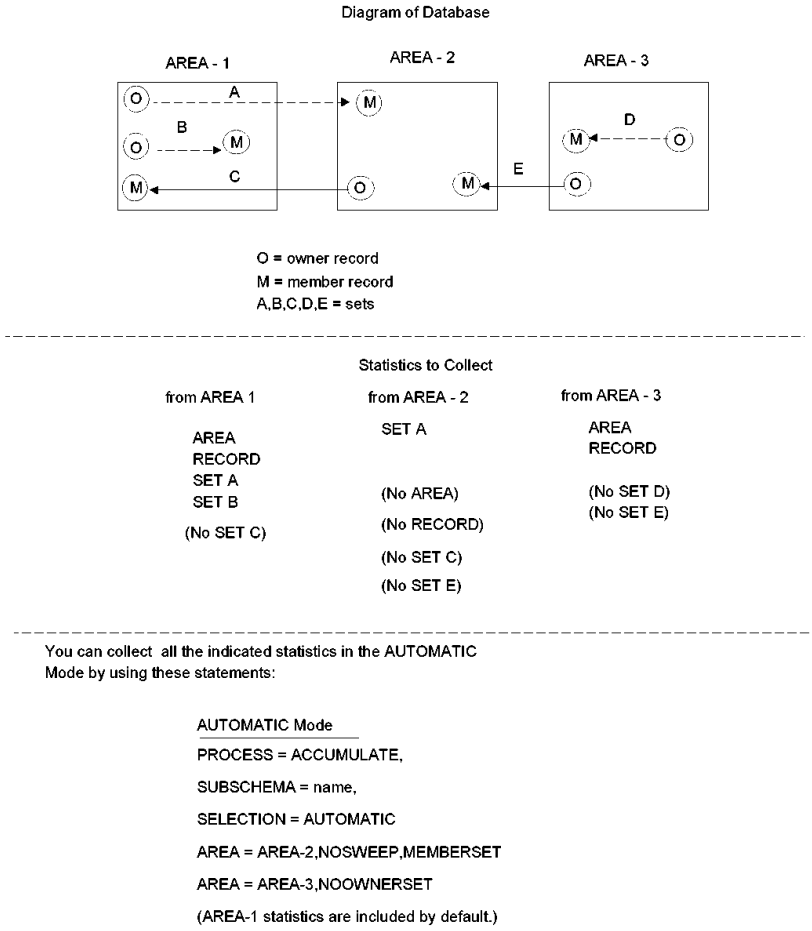


Exhibit 3.7: Use of Parameter Statements to Collect Statistics

START Parameter

,*STA***RT**=page-number

START limits processing to a specified portion of an area. You specify the beginning page number for the portion of the area you want to sweep.

Default: The default value is the lowest page number for the entire area.

STOP Parameter

,*STO***P**=page-number

STOP limits processing to a specified portion of an area. You specify the ending page number for the portion of the area you want to sweep.

Default: The default value is the highest page number for the entire area.

SET Statement

In the AUTOMATIC Mode, a SET statement is used to exclude or to modify the accumulation of statistics for a specific set type. Use this statement for SR8 (integrated index) sets.

To use the SET statement, you must select either the ACCUMULATE option or the ALL option of the PROCESS statement.

Exhibits 3.10a-c, at the end of the AUTOMATIC Mode subsection, show which set statistics are collected with each parameter combination.

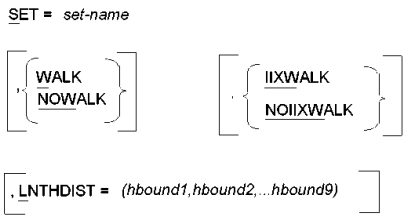


Exhibit 3.8: SET Statement Syntax

SET Parameter

S**ET**=set-name

SET identifies the set type or SR8 index set type that you want to exclude or modify.

WALK/NOWALK Parameter

, < WALK >

\ NOWALK /

The WALK/NOWALK option allows you to define whether statistics for a set type are to be accumulated.

***W*ALK**

WALK indicates that you want to accumulate statistics for a set type. WALK is set by default; it can be coded for documentation purposes.

In the AUTOMATIC Mode, use WALK when you are using a SET statement to specify the length distribution ranges for a set type. See LNTHDIST Parameter (see page 127).

***NOW*ALK**

NOWALK indicates that you do not want to accumulate statistics for a set type. Use NOWALK when you are in AUTOMATIC mode to exclude a set type from processing.

Default: The default is WALK.

Note: The meanings of AREA statements take precedence over those of SET statements. Therefore, to execute a SET statement whose purpose is to include a set type in processing, you must be sure that anyassociated AREA statements do not exclude access to owner or member records for the set type. If an AREA statement (using the NOMEMBERSET or NOOWNERSET options) excludes access to any part of a set, no statistics for the set will be collected and an error message will appear in the Audit Report.

IIXWALK/NOIIXWALK Parameter

, < IIXWALK >
\ NOIIXWALK /

The IIXWALK/NOIIXWALK option allows you to control access of integrated index set members.

*IIXW***ALK**- indicates that you want to accumulate statistics for the integrated index set members for this integrated index set. IIXWALK is a set by default; it can be coded for documentation purposes.

*NOIIXW***ALK** - indicates that you do not want to accumulate statistics for the integrated index set members of this integrated index set. Use NOIIXWALK when you are in automatic mode to bypass access of each IIX set member.

LNTHDIST Parameter

,LNTHDIST=(hbound1,hbound2,...hbound9)

LNTHDIST indicates upper limits for up to nine set length distribution ranges. Set length is defined as the number of member records in a given set occurrence. A set occurrence with nine member records falls within the distribution range 1-10. CA IDMS/DB Analyzer always sets 0-0 as the first distribution range. You can specify up to nine upper limits for other ranges.

Default: The default values are 10, 20, 30, 40, 50, 60, 70, 80, 99999999. These are the upper limits for the set length distribution ranges 1-10, 11-20, 21-30 ... 81-99999999.

Rule:

- You must enter numeric values from lowest to highest.

Cluster Distribution Ranges

In the AUTOMATIC Mode, statistics for reporting the page-spread of VIA clusters are automatically accumulated, unless a set type is excluded by using NOWALK. This reporting is done by means of program-defined page ranges called cluster distribution ranges. The cluster distribution ranges are 1, 2, 3, 4, 5, 6-7, 8-10, 11-15, 16-20, 21+. Each of the first five ranges consists of a single page. A cluster that is wholly contained on one page falls within range 1. A cluster spread across two pages falls within range 2. A cluster spread across nine pages falls within range 8-10. You cannot modify the cluster distribution ranges.

REPORT Statement

When you specify either PROCESS=REPORTS or PROCESS=ALL, in the AUTOMATIC Mode all CAIDMS/DB Analyzer reports are produced. In this case, use the REPORT statement to suppress the production of a specific CAIDMS/DB Analyzer report. Use a separate REPORT statement for each report you want to suppress.

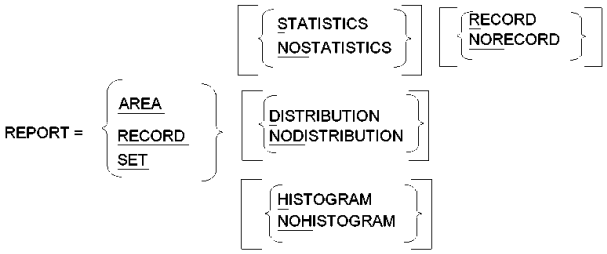


Exhibit 3.9: REPORT Statement Syntax

*R***EPORT**=

REPORT identifies the REPORT statement and is followed by the name of the CA IDMS/DB Analyzer report you want to suppress. Select only one report name for each REPORT statement that you use.

In AUTOMATIC Mode when none of the optional parameters are present:

AREA

AREA indicates that the Area Report is not to be produced.

RECORD

RECORD indicates that the Record Report is not to be produced.

SET

SET indicates that the Set Report is not to be produced. In addition, for an SR8 (integrated index) set the SR8 Index Report is not to be produced.

Use the NO version of the optional parameters to indicate that the report is to be produced, but the indicated selection of the report is to be bypassed.

```
  < STATISTICS   >
, \ NOSTATISTICS /
```

Indicates whether the Statistics section of the report is to be produced.

Default: The default is STATISTICS and does not need to be specified.

```
   < RECORD   >
 , \ NORECORD /
```

Indicates whether the Record section of the report is to be produced.

Note: The RECORD/NORECORD parameter is only valid with the AREA report to bypass the Analysis By Record section, or with the SET report to bypass the Multi-member Set section.

Default: The default is RECORD and does not need to be specified.

```
   < DISTRIBUTION   >
 , \ NODISTRIBUTION /
```

Indicates whether the Distribution section of the report is to be produced.

Default: The default is DISTRIBUTION and does not need to be specified.

< **HISTOGRAM** >

, \ NOHISTOGRAM /

Indicates whether the Histogram section of the report is to be produced.

Default: The default is HISTOGRAM and does not need to be specified.

Automatic Mode Exhibits

This table shows (on several pages) which set statistics will be collected, from a database containing areas A1 and A2 and Set Z, by using the parameters in the left column. An X indicates that statistics will be collected for the set designated at the top of the column. You can locate the row of X's that corresponds to the set statistics you want to accumulate and then use the parameters shown in that row; or you can locate specific parameters in the left column and use the table to verify which statistics will be accumulated.

Area Statement		**Set Occurrences**		
AREA = A1	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1
(no coded parameters)	X	X	X	X
OWNERSET	X	X	X	X
NOOWNERSET			X	X
MEMBERSET	X	X	X	X
NOMEMBERSET		X	X	
OWNERSET, MEMBERSET	X	X	X	X
OWNERSET, NOMEMBERSET		X	X	
NOOWNERSET, MEMBERSET			X	X
NOOWNERSET, NOMEMBERSET			X	
NOSWEEP			X	X

Area Statement	Set Occurrences	
NOSWEEP, MEMBERSET	X	X
NOSWEEP, NOMEMBERSET	X	
NOSWEEP, OWNERSET	X	X
NOSWEEP, NOOWNERSET	X	X
NOSWEEP, OWNERSET, MEMBERSET	X	X
NOSWEEP, OWNERSET, NOMEMBERSET	X	
NOSWEEP, NOOWNERSET, MEMBERSET	X	X
NOSWEEP, NOOWNERSET, NOMEMBERSET	X	

Exhibit 3.10a: Use of Parameters to Collect Set Statistics in AUTOMATIC Mode

Set Statement	Set Occurrences				
SET = Z	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1	Set Z
(no coded parameters)	X	X	X	X	X
WALK	X	X	X	X	X
NOWALK	X	X	X	X	

Exhibit 3.10b: Use of Parameters to Collect Set Statistics in AUTOMATIC Mode

Area and Set Statements		**Set Occurrences**			
AREA = A1	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1	Set Z
OWNERSET SET = Z	X	X	X	X	X
MEMBERSET SET = Z	X	X	X	X	X
NOMEMBERSET SET = Z (1)		X	X		X
NOOWNERSET SET = Z (2)			X	X	X
MEMBERSET, OWNERSET SET = Z	X	X	X	X	X
NOMEMBERSET, OWNERSET SET = Z (1)		X	X		X
MEMBERSET, NOOWNERSET SET = Z (2)			X	X	X
NOMEMBERSET, NOOWNERSET SET = Z (3)			X		X
MEMBERSET SET = Z, NOWALK	X	X	X	X	
NOMEMBERSET SET = Z, (1) NOWALK		X	X		
NOOWNERSET SET = Z, (2) NOWALK			X	X	
MEMBERSET, OWNERSET SET = Z, NOWALK	X	X	X	X	

Area and Set Statements	Set Occurrences		
NOMEMBERSET, OWNERSET SET = Z (2) NOWALK	X	X	
MEMBERSET, NOOWNERSET SET = Z, (2) NOWALK	X	X	
NOMEMBERSET, NOOWNERSET SET = Z, (3) NOWALK	X		
NOSWEEP SET = Z, (2)	X	X	X
NOSWEEP SET = Z, (2) NOWALK	X	X	

NOTES:

(1)If a member of Set Z is in AREA A1, an error message is produced, and none of the other statistics are accumulated.

(2)If the owner of SET Z is in AREA A1, an error message is produced, and none of the other statistics are accumulated.

(3)If the owner or member of SET Z is in AREA A1, an error message is produced, and none of the other statistics are accumulated.

Exhibit 3.10c: Use of Parameters to Collect Set Statistics in AUTOMATIC Mode

Automatic Mode Exhibits

This table shows (on several pages) which set statistics will be collected, from a database containing areas A1 and A2 and Set Z, by using the parameters in the left column. An X indicates that statistics will be collected for the set designated at the top of the column. You can locate the row of X's that corresponds to the set statistics you want to accumulate and then use the parameters shown in that row; or you can locate specific parameters in the left column and use the table to verify which statistics will be accumulated.

Area Statement		**Set Occurrences**		
AREA = A1	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1
(no coded parameters)	X	X	X	X
OWNERSET	X	X	X	X
NOOWNERSET			X	X
MEMBERSET	X	X	X	X
NOMEMBERSET		X	X	
OWNERSET, MEMBERSET	X	X	X	X
OWNERSET, NOMEMBERSET		X	X	
NOOWNERSET, MEMBERSET			X	X
NOOWNERSET, NOMEMBERSET			X	
NOSWEEP			X	X
NOSWEEP, MEMBERSET			X	X
NOSWEEP, NOMEMBERSET			X	
NOSWEEP, OWNERSET			X	X
NOSWEEP, NOOWNERSET			X	X

Area Statement	Set Occurrences		
NOSWEEP, OWNERSET, MEMBERSET	X	X	
NOSWEEP, OWNERSET, NOMEMBERSET	X		
NOSWEEP, NOOWNERSET, MEMBERSET	X	X	
NOSWEEP, NOOWNERSET, NOMEMBERSET	X		

Exhibit 3.10a: Use of Parameters to Collect Set Statistics in AUTOMATIC Mode

Set Statement	Set Occurrences				
SET = Z	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1	Set Z
(no coded parameters)	X	X	X	X	X
WALK	X	X	X	X	X
NOWALK	X	X	X	X	

Exhibit 3.10b: Use of Parameters to Collect Set Statistics in AUTOMATIC Mode

Area and Set Statements	Set Occurrences				
AREA = A1	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1	Set Z
OWNERSET SET = Z	X	X	X	X	X
MEMBERSET SET = Z	X	X	X	X	X
NOMEMBERSET SET = Z (1)		X	X		X

Area and Set Statements		Set Occurrences			
NOOWNERSET SET = Z (2)			X	X	X
MEMBERSET, OWNERSET SET = Z	X	X	X	X	X
NOMEMBERSET, OWNERSET SET = Z (1)		X	X		X
MEMBERSET, NOOWNERSET SET = Z (2)			X	X	X
NOMEMBERSET, NOOWNERSET SET = Z (3)			X		X
MEMBERSET SET = Z, NOWALK	X	X	X	X	
NOMEMBERSET SET = Z, (1) NOWALK		X	X		
NOOWNERSET SET = Z, (2) NOWALK			X	X	
MEMBERSET, OWNERSET SET = Z, NOWALK	X	X	X	X	
NOMEMBERSET, OWNERSET SET = Z (2) NOWALK		X	X		
MEMBERSET, NOOWNERSET SET = Z, (2) NOWALK		X	X		
NOMEMBERSET, NOOWNERSET SET = Z, (3) NOWALK		X			

Area and Set Statements	Set Occurrences		
NOSWEEP SET = Z, (2)	X	X	X
NOSWEEP SET = Z, (2) NOWALK	X	X	

NOTES:

(1)If a member of Set Z is in AREA A1, an error message is produced, and none of the other statistics are accumulated.

(2)If the owner of SET Z is in AREA A1, an error message is produced, and none of the other statistics are accumulated.

(3)If the owner or member of SET Z is in AREA A1, an error message is produced, and none of the other statistics are accumulated.

Exhibit 3.10c: Use of Parameters to Collect Set Statistics in AUTOMATIC Mode

EXPLICIT Mode

In the EXPLICIT Mode, statistics for areas, records, and sets are only accumulated for areas or sets that you specify with optional statements. Area statistics and record statistics are accumulated for any SWEEP area. Accumulation of set statistics is controlled by the MEMBERSET and OWNERSET parameters of the AREA statement, and by the SET statement. At the end of the EXPLICIT mode section, Exhibits 3.15a-e show which set statistics will be collected with various combinations of parameters.

The REPORTS statement allows you to specify which reports you want produced.

AREA Statement

In the EXPLICIT Mode, the AREA statement is used to include an area, or a portion of an area, in processing. (CA IDMS/DB Analyzer will also sweep an area if the owner of a set specified in a SET statement resides in the area.) The AREA statement is meaningful *only* if you selected either ACCUMULATE or ALL in the PROCESS statement.

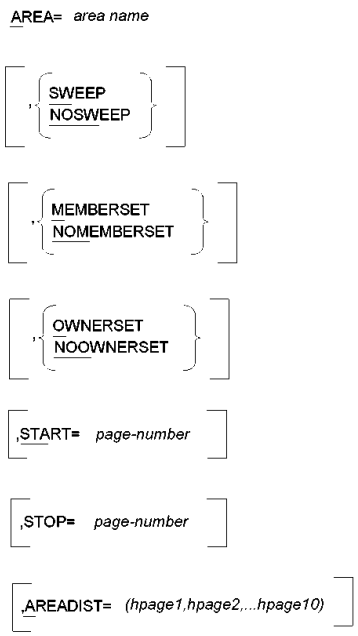


Exhibit 3.11: AREA Statement Syntax

AREA Parameter

***A*REA**=area-name

In the EXPLICIT mode, the AREA parameter identifies an area you want to include in processing. It must be an area that is defined in the subschema you are processing.

Default Parameters

You do not have to specify default parameters such as SWEEP. They may, however, be entered for documentation purposes.

SWEEP Parameter

,*SW*EEP

SWEEP indicates that you want to accumulate area and record statistics from the area.

In the EXPLICIT Mode, each area named is automatically swept even when you do not specify SWEEP. If you enter a SET statement, the area in which the owner resides is swept.

Default: The default is SWEEP.

Note: Do not use NOSWEEP in the EXPLICIT Mode. You will get an error message.

MEMBERSET/NOMEMBERSET Parameter

```
, < MEMBERSET  >
\ NOMEMBERSET  /
```

The MEMBERSET/NOMEMBERSET option allows you to control accumulation of set statistics for sets whose member records reside in the specified area.

***M*EMBERSET**

MEMBERSET indicates that you want to accumulate statistics for all sets whose member records are in this area and whose owner records are in an area being swept. No SET statement is necessary to explicitly name these sets.

***NOM*EMBERSET**

NOMEMBERSET indicates that you do not want to accumulate statistics for any sets whose member records are in the specified area, unless a SET statement explicitly names the set. Set statistics for sets whose owners are in an area designated OWNERSET are accumulated even if members are in a NOMEMBERSET area. (OWNERSET overrides NOMEMBERSET.)

Default: The default is NOMEMBERSET.

OWNERSET/NOOWNERSET Parameter

, < OWNERSET >
\ NOOWNERSET /

The OWNERSET/NOOWNERSET option allows you to control the accumulation of set statistics for all sets whose owners reside in the area named in the area statement.

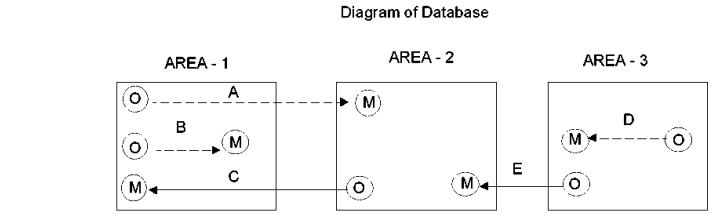
***O*WNERSET**

OWNERSET indicates that you want to accumulate set statistics for all sets whose owners reside in the area named in the area statement. No SET statement is necessary to explicitly name those sets.

***NOO*WNERSET**

NOOWNERSET indicates that you do not want to accumulate set statistics for any set whose owner resides in the area named in the area statement, unless a SET statement explicitly names the set. Statistics will be accumulated for a set whose owner resides in the specified area if any of its members are in an area for which MEMBERSET is specified. (MEMBERSET overrides NOOWNERSET.)

Default: The default is NOOWNERSET.



O = owner record
M = member record
A,B,C,D,E = sets

Statistics to Collect

from AREA 1	from AREA - 2	from AREA - 3
AREA RECORD SET A SET B (No SET C)	SET A (No AREA) (No RECORD) (No SET C) (No SET E)	AREA RECORD (No SET D) (No SET E)

You can collect all the indicated statistics in the EXPLICIT Mode by using these statements:

EXPLICIT Mode

PROCESS = ACCUMULATE,
SUBSCHEMA = name,
SELECTION =
AREA = AREA-1,OWNERSET
AREA = AREA-3

Exhibit 3.12: Use of Parameter Statements to Collect Statistics

START Parameter

,*STA*RT=page-number

START limits processing to a specified portion of an area. You specify the beginning page number for the part of the area you want to sweep.

Default: The default value is the lowest page number for the entire area.

STOP Parameter

,*STO*P=page-number

STOP limits processing to a specified portion of an area. It indicates the ending page number for the part of the area you want to sweep.

Default: The default value is the highest page number for the entire area.

AREADIST Parameter

,*A*READIST=(hpage1,hpage2,...hpage10)

AREADIST allows you to specify the high page numbers for up to 10 distribution ranges. For example, if the area started on page 1 and ended on page 100, AREADIST=(10,20,30) would represent page ranges of 1-10, 11-20, 21-30, and 31-100. These distribution ranges are used to show the spread of various physical characteristics across an area.

Default: The default ranges are 10 page ranges having equal numbers of pages. The number of pages in each range is equal to

$$\frac{(\textit{stop page} - \textit{start page} + 1)}{10}$$

Rules:

- You must enter values in numerical order from lowest to highest.
- The first entry must be equal to or greater than the number of the area start page. The last entry must be less than or equal to the number of the area stop page.
- If you enter 10 values, the tenth entry must equal the number of the area stop page.
- If you enter fewer than 10 values, CA IDMS/DB Analyzer inserts the number of the area stop page as an additional entry.

AREA Parameter

***A*REA**=area-name

In the EXPLICIT mode, the AREA parameter identifies an area you want to include in processing. It must be an area that is defined in the subschema you are processing.

Default Parameters

You do not have to specify default parameters such as SWEEP. They may, however, be entered for documentation purposes.

SWEEP Parameter

,*SW*EEP

SWEEP indicates that you want to accumulate area and record statistics from the area.

In the EXPLICIT Mode, each area named is automatically swept even when you do not specify SWEEP. If you enter a SET statement, the area in which the owner resides is swept.

Default: The default is SWEEP.

Note: Do not use NOSWEEP in the EXPLICIT Mode. You will get an error message.

MEMBERSET/NOMEMBERSET Parameter

, < **MEMBERSET** >

\ NOMEMBERSET /

The MEMBERSET/NOMEMBERSET option allows you to control accumulation of set statistics for sets whose member records reside in the specified area.

***M*EMBERSET**

MEMBERSET indicates that you want to accumulate statistics for all sets whose member records are in this area and whose owner records are in an area being swept. No SET statement is necessary to explicitly name these sets.

***NOM*EMBERSET**

NOMEMBERSET indicates that you do not want to accumulate statistics for any sets whose member records are in the specified area, unless a SET statement explicitly names the set. Set statistics for sets whose owners are in an area designated OWNERSET are accumulated even if members are in a NOMEMBERSET area. (OWNERSET overrides NOMEMBERSET.)

Default: The default is NOMEMBERSET.

OWNERSET/NOOWNERSET Parameter

, < OWNERSET >

\ NOOWNERSET /

The OWNERSET/NOOWNERSET option allows you to control the accumulation of set statistics for all sets whose owners reside in the area named in the area statement.

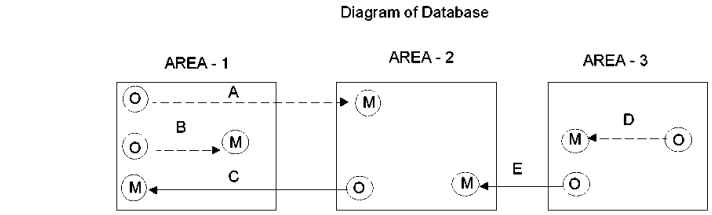
***O*WNERSET**

OWNERSET indicates that you want to accumulate set statistics for all sets whose owners reside in the area named in the area statement. No SET statement is necessary to explicitly name those sets.

***NOO*WNERSET**

NOOWNERSET indicates that you do not want to accumulate set statistics for any set whose owner resides in the area named in the area statement, unless a SET statement explicitly names the set. Statistics will be accumulated for a set whose owner resides in the specified area if any of its members are in an area for which MEMBERSET is specified. (MEMBERSET overrides NOOWNERSET.)

Default: The default is NOOWNERSET.



O = owner record
M = member record
A,B,C,D,E = sets

Statistics to Collect

from AREA 1	from AREA - 2	from AREA - 3
AREA RECORD SET A SET B (No SET C)	SET A (No AREA) (No RECORD) (No SET C) (No SET E)	AREA RECORD (No SET D) (No SET E)

You can collect all the indicated statistics in the EXPLICIT Mode by using these statements:

EXPLICIT Mode

```
PROCESS = ACCUMULATE,
SUBSCHEMA = name,
SELECTION =
AREA = AREA-1,OWNERSET
AREA = AREA-3
```

Exhibit 3.12: Use of Parameter Statements to Collect Statistics

START Parameter

,*STA*RT=page-number

START limits processing to a specified portion of an area. You specify the beginning page number for the part of the area you want to sweep.

Default: The default value is the lowest page number for the entire area.

STOP Parameter

,*STO*P=page-number

STOP limits processing to a specified portion of an area. It indicates the ending page number for the part of the area you want to sweep.

Default: The default value is the highest page number for the entire area.

AREADIST Parameter

,*A*READIST=(hpage1,hpage2,...hpage10)

AREADIST allows you to specify the high page numbers for up to 10 distribution ranges. For example, if the area started on page 1 and ended on page 100, AREADIST=(10,20,30) would represent page ranges of 1-10, 11-20, 21-30, and 31-100. These distribution ranges are used to show the spread of various physical characteristics across an area.

Default: The default ranges are 10 page ranges having equal numbers of pages. The number of pages in each range is equal to

$$\frac{(\textit{stop page} - \textit{start page} + 1)}{10}$$

Rules:

- You must enter values in numerical order from lowest to highest.
- The first entry must be equal to or greater than the number of the area start page. The last entry must be less than or equal to the number of the area stop page.
- If you enter 10 values, the tenth entry must equal the number of the area stop page.
- If you enter fewer than 10 values, CA IDMS/DB Analyzer inserts the number of the area stop page as an additional entry.

SET Statement

In the EXPLICIT Mode, the SET statement is used to accumulate statistics for a specific set type. Use this statement for SR8 (integrated index) sets, as well as non-index sets.

To use the SET statement, you must select either the ACCUMULATE option or the ALL option in the PROCESS statement.

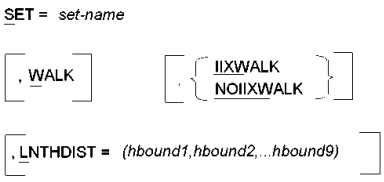


Exhibit 3.13: SET Statement Syntax

SET Parameter

*S***ET=set-name**

SET identifies the set type or SR8 index set type you want to include. The SET statement is not necessary if MEMBERSET is specified for the area containing the set members and the owner resides in an area being swept, or if OWNERSET is specified for the area containing the set owner.

When you use a SET statement, the area containing the set owner will always be swept, even though there is no AREA statement; area and record statistics will be accumulated for the area in which the owner of the set resides.

WALK Parameter

,*W***ALK**

WALK allows you to accumulate set statistics for a set type. WALK is set by default. It can be entered for documentation purposes.

Note: Do not use NOWALK in the EXPLICIT Mode. You will get an error message.

IIXWALK/NOIIXWALK Parameter

```
  < IIXW ALK   >
, \ NOIIXW ALK /
```

The IIXWALK/NOIIXWALK option allows you to control access of integrated index set members.

IIXW **ALK**- indicates that you want to accumulate statistics for the integrated index set members for this integrated index set. IIXWALK is a set by default; it can be coded for documentation purposes.

NOIIXW **ALK-** indicates that you do not want to accumulate statistics for the integrated index set members of this integrated index set. Use NOIIXWALK when you are in explicit mode to bypass access of each IIX set member.

LNTHDIST Parameter

,LNTHDIST=(hbound1,hbound2,...hbound9)

LNTHDIST indicates upper limits for up to nine set length distribution ranges. Set length is defined as the number of member records in a given set occurrence. A set occurrence with nine member records falls within the distribution range 1-10. CA IDMS/DB Analyzer always sets 0-0 as the first distribution range. You can specify up to nine upper limits for other ranges.

Default: The default values are 10, 20, 30, 40, 50, 60, 70, 80, 99999999. These are the upper limits for the set length distribution ranges 1-10, 11-20, 21-30 ... 81-99999999.

Rule:

- You must enter numeric values from lowest to highest.

Cluster Distribution Ranges

In the AUTOMATIC Mode, statistics for reporting the page-spread of VIA clusters are automatically accumulated, unless a set type is excluded by using NOWALK. This reporting is done by means of program-defined page ranges called cluster distribution ranges. The cluster distribution ranges are 1, 2, 3, 4, 5, 6-7, 8-10, 11-15, 16-20, 21+. Each of the first five ranges consists of a single page. A cluster that is wholly contained on one page falls within range 1. A cluster spread across two pages falls within range 2. A cluster spread across nine pages falls within range 8-10. You cannot modify the cluster distribution ranges.

SET Parameter

***S*ET=set-name**

SET identifies the set type or SR8 index set type you want to include. The SET statement is not necessary if MEMBERSET is specified for the area containing the set members and the owner resides in an area being swept, or if OWNERSET is specified for the area containing the set owner.

When you use a SET statement, the area containing the set owner will always be swept, even though there is no AREA statement; area and record statistics will be accumulated for the area in which the owner of the set resides.

WALK Parameter

,*W*ALK

WALK allows you to accumulate set statistics for a set type. WALK is set by default. It can be entered for documentation purposes.

Note: Do not use NOWALK in the EXPLICIT Mode. You will get an error message.

IIXWALK/NOIIXWALK Parameter

```
  < IIXWALK   >
, \ NOIIXWALK /
```

The IIXWALK/NOIIXWALK option allows you to control access of integrated index set members.

*IIXW***ALK** - indicates that you want to accumulate statistics for the integrated index set members for this integrated index set. IIXWALK is a set by default; it can be coded for documentation purposes.

*NOIIXW***ALK** - indicates that you do not want to accumulate statistics for the integrated index set members of this integrated index set. Use NOIIXWALK when you are in explicit mode to bypass access of each IIX set member.

LNTHDIST Parameter

,LNTHDIST=(hbound1,hbound2,...hbound9)

LNTHDIST indicates upper limits for up to nine set length distribution ranges. Set length is defined as the number of member records in a given set occurrence. A set occurrence with nine member records falls within the distribution range 1-10. CA IDMS/DB Analyzer always sets 0-0 as the first distribution range. You can specify up to nine upper limits for other ranges.

Default: The default values are 10, 20, 30, 40, 50, 60, 70, 80, 99999999. These are the upper limits for the set length distribution ranges 1-10, 11-20, 21-30 ... 81-99999999.

Rule:

- You must enter numeric values from lowest to highest.

Cluster Distribution Ranges

In the EXPLICIT Mode, statistics for reporting the page-spread of VIA clusters are accumulated for each set type specified. This reporting is done by means of program-defined page ranges called cluster distribution ranges. The cluster distribution ranges are 1, 2, 3, 4, 5, 6-7, 8-10, 11-15, 16-20, 21+. Each of the first five ranges consists of a single page. A cluster that is wholly contained on one page falls within range 1. A cluster spread across two pages falls within range 2. A cluster spread across nine pages falls within range 8-10.

You cannot modify the cluster distribution ranges.

REPORT Statement

When you specify either PROCESS=REPORTS or PROCESS=ALL, in the AUTOMATIC Mode all CAIDMS/DB Analyzer reports are produced. In this case, use the REPORT statement to suppress the production of a specific CAIDMS/DB Analyzer report. Use a separate REPORT statement for each report you want to suppress.

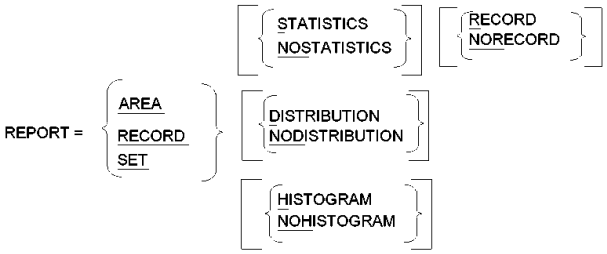


Exhibit 3.9: REPORT Statement Syntax

***R*EPORT=**

REPORT identifies the REPORT statement and is followed by the name of the CA IDMS/DB Analyzer report you want to suppress. Select only one report name for each REPORT statement that you use.

In AUTOMATIC Mode when none of the optional parameters are present:

AREA

AREA indicates that the Area Report is not to be produced.

RECORD

RECORD indicates that the Record Report is not to be produced.

SET

SET indicates that the Set Report is not to be produced. In addition, for an SR8 (integrated index) set the SR8 Index Report is not to be produced.

Use the NO version of the optional parameters to indicate that the report is to be produced, but the indicated selection of the report is to be bypassed.

```
  < STATISTICS   >
, \ NOSTATISTICS /
```

Indicates whether the Statistics section of the report is to be produced.

Default: The default is STATISTICS and does not need to be specified.

```
   < RECORD   >
 , \ NORECORD /
```

Indicates whether the Record section of the report is to be produced.

Note: The RECORD/NORECORD parameter is only valid with the AREA report to bypass the Analysis By Record section, or with the SET report to bypass the Multi-member Set section.

Default: The default is RECORD and does not need to be specified.

```
   < DISTRIBUTION   >
 , \ NODISTRIBUTION /
```

Indicates whether the Distribution section of the report is to be produced.

Default: The default is DISTRIBUTION and does not need to be specified.

< HISTOGRAM >

, \ **NOHISTOGRAM /**

Indicates whether the Histogram section of the report is to be produced.

Default: The default is HISTOGRAM and does not need to be specified.

AREA Statement

In the EXPLICIT Mode, the AREA statement is used to include an area, or a portion of an area, in processing. (CA IDMS/DB Analyzer will also sweep an area if the owner of a set specified in a SET statement resides in the area.) The AREA statement is meaningful *only* if you selected either ACCUMULATE or ALL in the PROCESS statement.

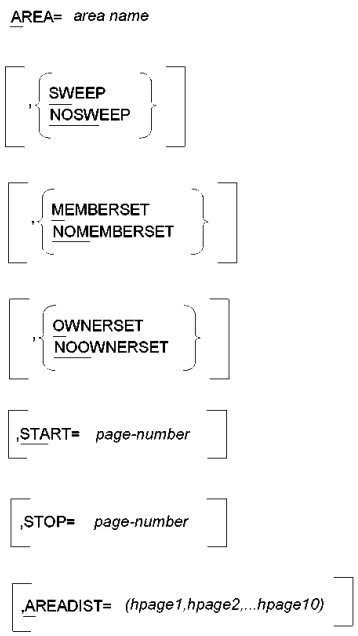


Exhibit 3.11: AREA Statement Syntax

SET Statement

In the EXPLICIT Mode, the SET statement is used to accumulate statistics for a specific set type. Use this statement for SR8 (integrated index) sets, as well as non-index sets.

To use the SET statement, you must select either the ACCUMULATE option or the ALL option in the PROCESS statement.

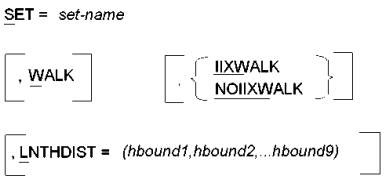


Exhibit 3.13: SET Statement Syntax

REPORT Statement

In the EXPLICIT Mode, use the REPORT statement to specify reports that you want generated. To use the REPORT statement, you must select either the REPORTS option or the ALL option of the PROCESS statement.

In the EXPLICIT Mode, you must include a REPORT statement for each report you want produced. If you do not enter any REPORT statements, no reports will be produced.

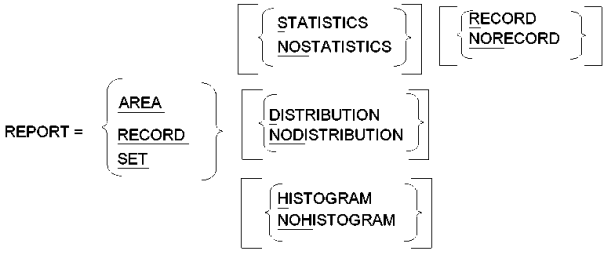


Exhibit 3.14: REPORT Statement Syntax

***R*EPORT**

REPORT identifies the REPORT statement and is followed by the names of the CA IDMS/DB Analyzer reports available. Select one and only one report name for each REPORT statement.

In the EXPLICIT Mode:

AREA

AREA indicates that you want to include the Area Report.

RECORD

RECORD indicates that you want to include the Record Report.

SET

SET indicates that you want to include the Set Report. For an SR8 (integrated index) set, in addition to the Set Report, the SR8 Index Report will be generated.

<STATISTICS >

, \NOSTATISTICS /

Explicit Mode Exhibits

This table shows (on several pages) which set statistics will be collected, from a database containing areas A1 and A2 and Set Z, by using the parameters shown in the left column. Set Z has neither owner nor members in A1 or A2. An X indicates that statistics will be collected for the set designated at the top of the column. You can locate the row of X's that corresponds to the set statistics you want to accumulate and then use the parameters shown in that row; or you can locate specific parameters in the left column and use the table to verify which statistics will be accumulated. Default parameters shown with an asterisk (*) need not be coded.

Area Statement		**Set Occurrences**		
AREA = A1	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1
(no coded parameters) (1)				

Area Statement		Set Occurrences
OWNERSET, MEMBERSET	X	X
OWNERSET, NOMEMBERSET*	X	X
NOOWNERSET,* MEMBERSET	X	
NOOWNERSET,* NOMEMBERSET*		
NOSWEEP (2)		

NOTES:

(1) An AREA statement without any parameters will produce no set statistics in EXPLICIT mode. (It will produce area and record statistics. See Exhibit 3.13)

(2) NOSWEEP is not used in the EXPLICIT Mode. If you use NOSWEEP, an error message will result.

Exhibit 3.15a: Use of Parameters to Collect Set Statistics in EXPLICIT Mode

Set Statement	Set Occurrences				
SET = Z	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1	Set Z
(no coded parameters)					X
WALK*					X
NOWALK (1)					

Note: (1) NOWALK is not used in the EXPLICIT Mode. An error message will result.

Exhibit 3.15b: Use of Parameters to Collect Set Statistics in EXPLICIT Mode

Statement	Set Occurrences				
SET = A1	Owner in A1 Member in A1	Owner in A1 Member in A2	Owner in A2 Member in A2	Owner in A2 Member in A1	Set Z

Statement		Set Occurrences	
MEMBERSET, OWNERSET SET = Z	X	X	X
NOMEMBERSET,* OWNERSET SET = Z	X	X	X
MEMBERSET, NOOWNERSET* SET = Z	X		X
NOMEMBERSET,* NOOWNERSET* SET = Z			X

Exhibit 3.15c: Use of Parameters to Collect Set Statistics in EXPLICIT Mode

EXPLICIT Mode

In the EXPLICIT Mode, statistics for areas, records, and sets are only accumulated for areas or sets that you specify with optional statements. Area statistics and record statistics are accumulated for any SWEEP area. Accumulation of set statistics is controlled by the MEMBERSET and OWNERSET parameters of the AREA statement, and by the SET statement. At the end of the EXPLICIT mode section, Exhibits 3.15a-e show which set statistics will be collected with various combinations of parameters.

The REPORTS statement allows you to specify which reports you want produced.

Chapter 4: Operations

This section contains the following topics:

CA IDMS/DB Analyzer JCL (see page 139)
z/OS and OS/390 Environment (see page 140)
VSE/ESA Environment (see page 144)
Sample z/VM EXEC Part 1—USNEXEC1 (see page 150)
Sample z/VM EXEC Part 2—USNEXEC2 (see page 154)
Sample z/VM EXEC Part 3—USNEXEC3 (see page 156)

CA IDMS/DB Analyzer JCL

This chapter contains the JCL necessary for executing CA IDMS/DB Analyzer in a z/OS, OS/390, VSE/ESA, or z/VM environment. It contains sample JCL for using various PROCESS options of CA IDMS/DB Analyzer. For each environment, a key to the variables is given, followed by JCL for the following options:

- Statistics Accumulation only
- Statistics Accumulation and Report Preparation
- Individual Report Preparation
- Comparative Report Preparation.

A summary of file use is given at the end of the chapter in Exhibit 4.1.

z/OS and OS/390 Environment

Samples of JCL for a z/OS or OS/390 environment are given on the following pages. A key to the user variables for all options precedes the JCL.

- **tool.loadlib**—The dataset name of the z/OS or OS/390 library into which you downloaded CA IDMS/DB Analyzer.
- **idms.loadlib**—The dataset name of the z/OS or OS/390 library in which your DMCL and subschema reside.
- **sort.loadlib**—The dataset name of the z/OS or OS/390 library in which your sort modules reside.
- **disk**—The unit address of the disk drive you want to use for the CA IDMS/DB Analyzer execution file or a generic assignment to indicate a disk drive allocation.
- **dbfil01/dbfilnn**—The DDNAMEs of the database files to be accessed.
- **user.dbfil01/user.dbfilnn**— The dataset names of the database files to be accessed.
- **a**—The appropriate SYSOUT class for your installation.
- **dbnlyzr.file1**—The dataset name assigned to your statistics file.
- **dbnlyzr.file2**—The dataset name assigned to your "old" statistics file for comparative reports. Only statistics from a single release of CA IDMS/DB Analyzer can be compared.
- **dbnlyzr.file3**—The dataset name assigned to your LDEL file.

Statistics Accumulation Only

The JCL for statistics accumulation only follows.

```
//*
//* THIS JCL IS FOR STATISTICS ACCUMULATION ONLY
//*
//DBANLYZR EXEC PGM=USNDRVR
//STEPLIB        DD  DSN=your.loadlib,DISP=SHR
//               DD  DSN=idms.loadlib,DISP=SHR
//SORTLIB        DD  DSN=sort.loadlib,DISP=SHR
//SORTWK01       DD  UNIT=disk,SPACE=(CYL,1)
//SORTWK02       DD  UNIT=disk,SPACE=(CYL,1)
//SORTWK03       DD  UNIT=disk,SPACE=(CYL,1)
//SORTMSG        DD  SYSOUT=a
//dbfil01        DD  DSN=user.dbfil01,DISP=SHR
//                  .
//                  .
//                  .
//dbfilnn        DD    DSN=user.dbfilnn,DISP=SHR
//SYSLST         DD    SYSOUT=a
//SYSPRINT       DD    SYSOUT=a
//DBMSDMP        DD    SYSOUT=a
//DBMSOUT        DD    SYSOUT=a
//SYSUDUMP       DD    SYSOUT=a
//OUTPUT         DD    SYSOUT=a
//STAT1          DD    DSN=dbnlyzr.file1,
//                     DISP=(,CATLG,DELETE),
//                     UNIT=disk,
//                     SPACE=(TRK,(1,2),RLSE)
//LDEL           DD    DSN=dbnlyzr.file3,
//                     DISP=(,CATLG,DELETE),
//                     UNIT=disk,
//                     SPACE=(TRK,(1,2),RLSE)
//SYSIPT         DD    *
  PROCESS=ACCUMULATE,...
/*
//SYSIDMS        DD    *
  SYSIDMS PARAMETERS...
/*
```

Statistics Accumulation and Report Preparation

JCL for statistics accumulation and report preparation follows. This JCL is identical to the JCL for statistics accumulation except for the PROCESS statement.

```
//*
//* THIS JCL IS FOR STATISTICS ACCUMULATION AND
//* REPORT PREPARATION
//*
//DBANLYZR EXEC PGM=USNDRVR
//STEPLIB        DD    DSN=your.loadlib,DISP=SHR
//               DD    DSN=idms.loadlib,DISP=SHR
//SORTLIB        DD    DSN=sort.loadlib,DISP=SHR
//SORTWK01       DD    UNIT=disk,SPACE=(CYL,1)
//SORTWK02       DD    UNIT=disk,SPACE=(CYL,1)
//SORTWK03       DD    UNIT=disk,SPACE=(CYL,1)
//sortmsg        DD    SYSOUT=a
//dbfil01        DD    DSN=user.dbfil01,DISP=SHR
//                     .
//                     .
//                     .
//dbfilnn        DD    DSN=user.dbfilnn,DISP=SHR
//SYSLST         DD    SYSOUT=a
//SYSPRINT       DD    SYSOUT=a
//DBMSDMP        DD    SYSOUT=a
//DBMSOUT        DD    SYSOUT=a
//SYSUDUMP       DD    SYSOUT=a
//OUTPUT         DD    SYSOUT=a
//STAT1          DD    DSN=dbnlyzr.file1,
//                     DISP=(,CATLG,DELETE),
//                     UNIT=disk,
//                     SPACE=(TRK,(1,2),RLSE)
//LDEL            DD   DSN=dbnlyzr.file3,
//                     DISP=(,CATLG,DELETE),
//                     UNIT=disk,
//                     SPACE=(TRK,(1,2),RLSE)
//SYSIPT          DD   *
  PROCESS=ALL,...
/*
//SYSIDMS         DD    *
  SYSIDMS PARAMETERS...
/*
```

Individual Report Preparation

The JCL for individual report preparation only follows.

```
//*
//* THIS JCL IS FOR THE PRODUCTION OF
//* INDIVIDUAL REPORTS ONLY
//*
//DBANLYZR EXEC PGM=USNDRVR
//STEPLIB        DD    DSN=your.loadlib,DISP=SHR
//               DD    DSN=idms.loadlib,DISP=SHR
//SYSLST         DD    SYSOUT=a
//SYSPRINT       DD    SYSOUT=a
//DBMSDMP        DD    SYSOUT=a
//DBMSOUT        DD    SYSOUT=a
//SYSUDUMP       DD    SYSOUT=a
//OUTPUT         DD    SYSOUT=a
//STAT1          DD    DSN=dbnlyzr.file1,DISP=SHR
//SYSIPT         DD    *
  PROCESS=REPORTS,...
/*
//SYSIDMS        DD    *
  SYSIDMS PARAMETERS...
/*
```

Comparative Report Preparation

JCL for comparative report preparation only follows. This JCL is identical to the JCL for individual report preparation except that the name of an additional statistical file has been added and the PROCESS statement includes the COMPARE option.

Note: Only statistics from a single release of CA IDMS/DB Analyzer can be compared.

```
//*
//* THIS JCL IS FOR THE PRODUCTION OF
//* COMPARISON REPORTS ONLY
//*
//DBANLYZR EXEC PGM=USNDRVR
//STEPLIB       DD    DSN=your.tool library,DISP=SHR
//              DD    DSN=your.idms.library,DISP=SHR
//SYSLST        DD    SYSOUT=a
//SYSPRINT      DD    SYSOUT=a
//DBMSDMP       DD    SYSOUT=a
//DBMSOUT       DD    SYSOUT=a
//SYSUDUMP      DD    SYSOUT=a
//OUTPUT        DD    SYSOUT=a
//STAT1         DD    DSN=dbnlyzr.file1,DISP=SHR
//STAT2         DD    DSN=dbnlyze.file2,DISP=SHR
//SYSIPT        DD    *
  PROCESS=REPORTS,COMPARE
/*
//SYSIDMS       DD    *
  SYSIDMS PARAMETERS...
/*
```

VSE/ESA Environment

Samples of JCL for a VSE/ESA environment are given on the following pages. A key to the user variables for all options precedes the JCL.

VSE/ESA File Assignments

Even if you use a storage management tool such as BrightStor CA-Dynam/T Tape Management for VSE, CA IDMS/DB Analyzer requires an ASSGN statement for every file except SORTWK*nn* (including STAT1, STAT2, LDEL, and diagnostics files). This ASSGN is required because CA IDMS/DB Analyzer has its own device-independent support which dynamically builds a DTF based on the device type indicated by the ASSGN. Unless the ASSIGN specifies VSAM or BDAM, the file may be defined with either DLBL or TLBL.

File Processing Alternate Method

Occasionally you will receive a message that a file is not VSAM. The message indicates that the dataset will be processed SAM instead of VSAM because CA IDMS/DB Analyzer was not able to find the dataset in the VSAM catalog. The allocation will not affect processing results.

- **sort.work1/sort.work4**— The file ID of each of the four sort work files.
- **volser**— The volume serial number or generic assignment of the disk volume on which the file, specified in the preceding DLBL statement, resides.
- **rel-trk-blk**— Relative track or relative block numbers: the starting position on the DASD for storage of the work file specified in the previous statement.
- **amount**— The space allocation you need to store the file specified in the previous statement.
- **dbfil01/dbfilnn**— The file name of each of the database files to be accessed.
- **user.dbfil01/user.dbfilnn** — The file ID of each of the database files to be accessed.
- **SYSnnn**— The programmer logical units of the database files to be accessed.
- **dbnlyzr.file1**— The file ID assigned to your "new" statistics file.
- **dbnlyzr.file2**— The file ID assigned to your "old" statistics file. Only statistics from a single release of CA IDMS/DB Analyzer can be compared.
- **dbnlyzr.file3**— The file ID assigned to your LDEL file.
- **#k**— The number of kilobytes of storage to be made available to the sort phase.
- **tool.loadlib**— The data set name of the library into which you installed CA IDMS/DB Analyzer.
- **idms.loadlib**— The data set name of the library in which your DMCL and subschema reside.
- **TOOL.sublib/IDMS.sublib**—The sublibrary names into which you installed the CA IDMS tools and CA IDMS products.

Statistics Accumulation Only

The JCL for statistics accumulation only follows.

```
// JOB DBNLYZR
// OPTION LOG,PARTDUMP
*
*       -------- WORK FILES -------------
// DLBL SORTWK1,'sort.work1',0,SD       SORT WORK #1
// EXTENT SYS001,,,rel-trk-blk,amount
// ASSGN  SYS001,DISK,VOL=volser,SHR
// DLBL SORTWK2,'sort.work2',0,SD       SORT WORK #2
// EXTENT SYS002,,,rel-trk-blk,amount
// ASSGN  SYS002,DISK,VOL=volser,SHR
// DLBL SORTWK3,'sort.work3',0,SD       SORT WORK #3
// EXTENT SYS003,,,rel-trk-blk,amount
// ASSGN  SYS003,DISK,VOL=volser,SHR
// DLBL SORTWK4,'sort.work4',0,SD       SORT WORK #4
// EXTENT SYS004,,,rel-trk-blk,amount
// ASSGN  SYS004,DISK,VOL=volser,SHR
*       -----DATABASE FILES -------------
// DLBL DBFIL01,'user.dbfil01',,DA     USER DATABASE FILE #01
// EXTENT SYSnnn,
// ASSGN  SYSnnn,DISK,VOL=volser,SHR
   .
   .
   .
// DLBL DBFILnn,'user.dbfilnn',,DA     USER DATABASE FILE #NN
// EXTENT SYSnnn
// ASSGN  SYSnnn,DISK,VOL=volser,SHR
*       -----ANALYZER FILES -------------
// DLBL   STAT1,'dbnlyzr.file1,0,SD    STATS ACCUMULATION FILE 1
// EXTENT SYS010,1,0,rel-trk-blk,amount
// ASSGN  SYS010,DISK,VOL=volser,SHR
// DLBL   STAT2,'dbnlyzr.file2',0,SD    STATS ACCUMULATION FILE 2
// EXTENT SYS011,1,0,rel-trk-blk,amount
// ASSGN  SYS010,DISK,VOL=volser,SHR
// ASSGN  SYS012,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// ASSGN  SYS013,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// ASSGN  SYS015,SYSLST       USNDRVR OUTPUT LIST FILE
// DLBL   LDEL,'dbnlyzr.file3',0,SD     LDEL FILE - OUTPUT
// EXTENT SYS014,1,0,rel-trk-blk,amount
// ASSGN  SYS014,DISK,VOL=volser,SHR
*
*       ---- LIBRARY DEFINITIONS --------

// DLBL TOOL,'tool.loadlib'
// EXTENT ,volser
// DLBL IDMS,'idms.loadlib'
// EXTENT ,volser
```

```
*
// LIBDEF *,SEARCH=(TOOL.sublib,IDMS.sublib)
*
// DLBL SYSIDMS,'#SYSIPT',0,SD
// EXEC USNDRVR,SIZE=(USNDRVR,NK)
*
*  Rxx.xx SYSIDMS PARAMETERS
/*
PROCESS=ACCUMULATE,...
   .
   .  (ADDITIONAL PARAMETER STATEMENTS)
   .
/*
/&
```

Statistics Accumulation and Report Preparation

The JCL for statistics accumulation and report preparation follows. This JCL is identical to the JCL for statistics accumulation except for the PROCESS statement.

```
// JOB DBNLYZR
// OPTION LOG,PARTDUMP
*       -------- WORK FILES -------------
// DLBL SORTWK1,'sort.work1',0,SD       SORT WORK #1
// EXTENT SYS001,,,rel-trk-blk,amount
// ASSGN  SYS001,DISK,VOL=volser,SHR
// DLBL SORTWK2,'sort.work2',0,SD       SORT WORK #2
// EXTENT SYS002,,,rel-trk-blk,amount
// ASSGN  SYS002,DISK,VOL=volser,SHR
// DLBL SORTWK3,'sort.work3',0,SD       SORT WORK #3
// EXTENT SYS003,,,rel-trk-blk,amount
// ASSGN  SYS003,DISK,VOL=volser,SHR
// DLBL SORTWK4,'sort.work4',0,SD       SORT WORK #4
// EXTENT SYS004,,,rel-trk-blk,amount
// ASSGN  SYS004,DISK,VOL=volser,SHR
*       -----DATABASE FILES -------------
// DLBL DBFIL01,'user.dbfil01',,DA     USER DATABASE FILE #01
// EXTENT SYSnnn,
// ASSGN  SYSnnn,DISK,VOL=volser,SHR
   .
   .
   .
// DLBL DBFILnn,'user.dbfilnn',,DA     USER DATABASE FILE #NN
// EXTENT SYSnnn
// ASSGN  SYSnnn,DISK,VOL=volser,SHR
*       -----ANALYZER FILES -------------
// DLBL   STAT1,'dbnlyzr.file1,0,SD    STATS ACCUMULATION FILE 1
// EXTENT SYS010,1,0,rel-trk-blk,amount
// ASSGN  SYS010,DISK,VOL=volser,SHR
// DLBL   STAT2,'dbnlyzr.file2',0,SD    STATS ACCUMULATION FILE 2
// EXTENT SYS011,1,0,rel-trk-blk,amount
// ASSGN  SYS010,DISK,VOL=volser,SHR
// ASSGN  SYS012,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// ASSGN  SYS013,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// ASSGN  SYS015,SYSLST       USNDRVR OUTPUT LIST FILE
// DLBL   LDEL,'dbnlyzr.file3',0,SD     LDEL FILE - OUTPUT
// EXTENT SYS014,1,0,rel-trk-blk,amount
// ASSGN  SYS014,DISK,VOL=volser,SHR
*       ---- LIBRARY DEFINITIONS --------
// DLBL TOOL,'tool.loadlib'
// EXTENT ,volser
// DLBL IDMS,'idms.loadlib'
// EXTENT ,volser
*
```

```
// LIBDEF *,SEARCH=(TOOL.sublib,IDMS.sublib)
*
// DLBL SYSIDMS,'#SYSIPT',0,SD
// EXEC USNDRVR,SIZE=(USNDRVR,NK)
*
*  Rxx.xx SYSIDMS PARAMETERS
/*
PROCESS=ALL,...
   .
   .  (ADDITIONAL PARAMETER STATEMENTS)
   .
/*
/&
```

Individual Report Preparation

The sample JCL for individual report preparation only follows.

```
// JOB DBNLYZR
// OPTION LOG,PARTDUMP
*
// DLBL   STAT1,'dbnlyzr.file1,0,SD    STATISTICS FILE - INPUT
// EXTENT SYS010,1,0,rel-trk-blk,amount
// ASSGN  SYS010,DISK,VOL=volser,SHR
// ASSGN  SYS012,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// ASSGN  SYS013,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// EXEC USNDRVR,SIZE=(USNDRVR,#k)
*
*  Rxx.xx SYSIDMS PARAMETERS
/*
PROCESS=REPORTS,...
/*
/&
```

Comparative Report Preparation

JCL for comparative report preparation only follows. This JCL is identical to the JCL for individual report preparation except that the name of an additional statistical file has been added and the PROCESS statement includes the COMPARE option.

Note: Only statistics from a single release of CA IDMS/DB Analyzer can be compared.

```
// JOB DBNLYZR
// OPTION LOG,PARTDUMP
*
// DLBL   STAT1,'dbnlyzr.file1,0,SD    "NEW" STATISTICS FILE - INPUT
// EXTENT SYS010,1,0,rel-trk-blk,amount
// ASSGN  SYS010,DISK,VOL=volser,SHR
// DLBL   STAT2,'dbnlyzr.file2,0,SD    "OLD" STATISTICS FILE - INPUT
// EXTENT SYS011,1,0,rel-trk-blk,amount
// ASSGN  SYS011,DISK,VOL=volser,SHR
// ASSGN  SYS012,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// ASSGN  SYS013,SYSLST       COMPUTER ASSOCIATES, DIAGNOSTICS - OUTPUT
// EXEC USNDRVR,SIZE=(USNDRVR,#k)
*
*  Rxx.xx SYSIDMS PARAMETERS
/*
PROCESS=REPORTS,COMPARE
/*
/&
```

Sample z/VM EXEC Part 1—USNEXEC1

The sample z/VM EXEC in the exhibit below can be used to accumulate statistics only or to accumulate statistics and prepare reports. You identify which of these functions you want using CA IDMS/DB Analyzer parameter statements. See Chapter 3, "Parameters." Variables (shown in **bold**) are explained in the key on the following page.

Statistics Accumulation and/or Report Preparation

```
/*  */
TRACE OFF; SIGNAL ON ERROR
/*                                                                  */
/*                                                                  */
TOOL_LOADLIB_FN     = 'toollib'
IDMS_LOADLIB_FN     = 'idmslib'
SORTLIB_FN          = 'sortlib'
/*                                                                  */
/* Link and access the Minidisks containing the required libraries */
/* and database file(s).                                            */
/*                                                                  */
 'CP SPOOL PRINTER NOCONT CLOSE'
 'CP SPOOL PRINTER TO * NOHOLD CONT FORM OFF DIST OFF'
 'GLOBAL  LOADLIB ' TOOL_LOADLIB_FN IDMS_LOADLIB_FN
 'GLOBAL  TXTLIB ' SORTLIB_FN
/*                                                                  */
/* Insert FILEDEFS as needed to define all required database files.  */
/*                                                                  */
 'FILEDEF dbfil01 DISK fn ft fm ( dcb'
 'FILEDEF dbfilnn DISK fn ft fm ( dcb'
/*                                                                  */
/* Product specific files.                                          */
/*                                                                  */
 'FILEDEF SYSLST   PRINTER'
 'FILEDEF SYSUDUMP PRINTER'
 'FILEDEF DBMSDMP  PRINTER'
 'FILEDEF DBMSOUT  PRINTER'
 'FILEDEF SORTMSG  PRINTER'
 'FILEDEF LDEL     DISK ldel_fn ldel_ft ldel_fm'
 'FILEDEF STAT1    DISK stat1_fn stat1_ft stat1_fm'
/*                                                                  */
```

Exhibit 4.11a: z/VM EXEC for Statistics Accumulation and/or Report Preparation

```
/*                                                                  */
/*  You must create a file 'SYSIDMS INPUT A' containing the SYSIDMS  */
/*  parameters you use to specify your runtime environment.         */
/*                                                                  */
 'FILEDEF SYSIDMS  DISK SYSIDMS INPUT A'
/*                                                                  */
/*                                                                  */
/*  You must create a file 'USNEXEC1 SYSIPT A' containing the input  */
/*  parameter statements prior to executing this EXEC.              */
/*                                                                  */
 'FILEDEF SYSIPT   DISK USNEXEC1 SYSIPT A'
/*                                                                  */
/*  Insert FILEDEF statements for SORT work space as required by    */
/*  your SORT product.                                              */
```

```
/*                                                                  */
SAY 'STARTING DATABASE ANALYZER'
SIGNAL OFF ERROR
 'EXECOS OSRUN USNDRVR'
 USNEXEC1_RC = RC
IF USNEXEC1_RC > 4
 THEN DO
  CALL ERROR
 END
 'CP SPOOL PRINTER NOCONT'
 'CP CLOSE PRINTER NAME DBNLYZR LISTING'
 'CP SPOOL PRINTER OFF'
 SAY 'USNEXEC FINISHED WITH A RETURN CODE OF' USNEXEC1_RC
 'GLOBAL LOADLIB'
 'GLOBAL TXTLIB'
 'FILEDEF * CLEAR'
 EXIT USNEXEC1_RC
/*                                                                  */
/*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ */
ERROR:
/*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ */
 ERROR_RC = RC
 TRACE OFF; SIGNAL OFF ERROR
 SAY 'NON-ZERO RETURN CODE ENCOUNTERED IN EXEC AT LINE' SIGL
'CP SPOOL PRINTER NOCONT'
'CP CLOSE PRINTER NAME USNLYZR LISTING'
'CP SPOOL PRINTER OFF'
 'GLOBAL LOADLIB'
 'GLOBAL TXTLIB'
 'FILEDEF * CLEAR'
 EXIT ERROR_RC
/*                                                                  */
```

- **toollib**—The file name of the load library into which you downloaded CA IDMS/DB Analyzer.
- **idmslib**—The file name of the load library containing your CA IDMS SUBSCHEMA and DMCL modules.
- **sortlib**—The file name of the text library containing your sort modules.
- **dbfil01/dbfilnn**—The name of each of the database files to be accessed.
- **fn fm ft**—The file name, file type, and file mode of the relevant file. The file mode number of your database files must be 6.
- **stat1_fn stat1_ft stat1_fm**—The file name, file type, and file mode assigned to your statistics file.
- **ldel_fn ldel_ft ldel_fm**—The file name, file type, and file mode assigned to your LDEL file.

- **dcb**—The data control block (DCB) information for the files.

Sample z/VM EXEC Part 2—USNEXEC2

The sample z/VM EXEC for preparing individual reports only is shown below. Variables (shown in **bold**) are explained in the key that follows.

```
/*  */
TRACE OFF; SIGNAL ON ERROR
CA_LOADLIB_FN       = 'yourlib'
IDMS_LOADLIB_FN     = 'idmslib'
SORTLIB_FN          = 'sortlib'
/*                                                                  */
/* Link and access the Minidisks containing the required libraries */
/*                                                                  */
 'CP SPOOL PRINTER NOCONT CLOSE'
 'CP SPOOL PRINTER TO * NOHOLD CONT FORM OFF DIST OFF'
 'GLOBAL  LOADLIB ' CA_LOADLIB_FN IDMS_LOADLIB_FN
 'GLOBAL  TXTLIB ' SORTLIB_FN
/*                                                                  */
/* Product specific files.                                          */
/*                                                                  */
 'FILEDEF SYSLST   PRINTER'
 'FILEDEF SYSUDUMP PRINTER'
 'FILEDEF DBMSDMP  PRINTER'
 'FILEDEF DBMSOUT  PRINTER'
 'FILEDEF SORTMSG  PRINTER'
 'FILEDEF STAT1    DISK stat1_fn stat1_ft stat1_fm'
/*                                                                  */
```

```
/*  You must create a file 'SYSIDMS INPUT A' containing the SYSIDMS  */
/*  parameters you use to specify your runtime environment.          */
/*                                                                   */
 'FILEDEF SYSIDMS  DISK SYSIDMS INPUT A'
/*                                                                   */
/*  You must create a file 'USNEXEC2 SYSIPT A' containing the input  */
/*  parameter statements prior to executing this EXEC.               */
/*                                                                   */
 'FILEDEF SYSIPT   DISK USNEXEC2 SYSIPT A'
/*                                                                   */
SAY 'STARTING DATABASE ANALYZER'
SIGNAL OFF ERROR
 'EXECOS OSRUN USNDRVR'
 USNEXEC2_RC = RC
IF USNEXEC2_RC > 4
 THEN DO
  CALL ERROR
```

```
 END
 'CP SPOOL PRINTER NOCONT'
 'CP CLOSE PRINTER NAME DBNLYZR LISTING'
 'CP SPOOL PRINTER OFF'
 SAY 'USNEXEC FINISHED WITH A RETURN CODE OF' USNEXEC2_RC
 'GLOBAL LOADLIB'
 'GLOBAL TXTLIB'
 'FILEDEF * CLEAR'
 EXIT USNEXEC2_RC
/*                                                                    */
/*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ */
ERROR:
/*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ */
 ERROR_RC = RC
 TRACE OFF; SIGNAL OFF ERROR
 SAY 'NON-ZERO RETURN CODE ENCOUNTERED IN EXEC AT LINE' SIGL
'CP SPOOL PRINTER NOCONT'
'CP CLOSE PRINTER NAME USNLYZR LISTING'
'CP SPOOL PRINTER OFF'
 'GLOBAL LOADLIB'
 'GLOBAL TXTLIB'
 'FILEDEF * CLEAR'
 EXIT ERROR_RC
/*                                                                    */
```

- **yourlib**—The file name of the load library into which you downloaded CA IDMS/DB Analyzer.
- **idmslib**—The file name of the load library containing your CA IDMS SUBSCHEMA and DMCL modules.
- **sortlib**—The file name of the text library containing your sort modules.
- **stat1_fn stat1_ft stat1_fm**—The file name, file type, and file mode assigned to your statistics file.

Sample z/VM EXEC Part 3—USNEXEC3

The sample z/VM EXEC for preparing comparative reports is shown below. Variables (shown in **bold**) are explained in the key that follows.

Note: Only statistics from a single release of CA IDMS/DB Analyzer can be compared.

```
/*  */
TRACE OFF; SIGNAL ON ERROR
/*                                                                  */
CA_LOADLIB_FN       = 'yourlib'
IDMS_LOADLIB_FN     = 'idmslib'
SORTLIB_FN          = 'sortlib'
/*                                                                  */
/* Link and access the Minidisks containing the required libraries */
/*                                                                  */
 'CP SPOOL PRINTER NOCONT CLOSE'
 'CP SPOOL PRINTER TO * NOHOLD CONT FORM OFF DIST OFF'
 'GLOBAL  LOADLIB ' CA_LOADLIB_FN IDMS_LOADLIB_FN
 'GLOBAL  TXTLIB ' SORTLIB_FN
/*                                                                  */
/* Product specific files.                                          */
/*                                                                  */
 'FILEDEF SYSLST   PRINTER'
 'FILEDEF SYSUDUMP PRINTER'
 'FILEDEF DBMSDMP  PRINTER'
 'FILEDEF DBMSOUT  PRINTER'
 'FILEDEF SORTMSG  PRINTER'
 'FILEDEF STAT1    DISK stat1_fn stat1_ft stat1_fm'
 'FILEDEF STAT2    DISK stat2_fn stat2_ft stat2_fm'
/*                                                                  */




/*  You must create a file 'SYSIDMS INPUT A' containing the SYSIDMS  */
/*  parameters you use to specify your runtime environment.         */
/*                                                                  */
 'FILEDEF SYSIDMS  DISK SYSIDMS INPUT A'
/*                                                                  */
/*                                                                  */
/*  You must create a file 'USNEXEC3 SYSIPT A' containing the input  */
/*  parameter statements prior to executing this EXEC.              */
/*                                                                  */
 'FILEDEF SYSIPT   DISK USNEXEC3 SYSIPT A'
/*                                                                  */
SAY 'STARTING DATABASE ANALYZER'
SIGNAL OFF ERROR
```

```
 'EXECOS OSRUN USNDRVR'
 USNEXEC3_RC = RC
IF USNEXEC3_RC > 4
 THEN DO
  CALL ERROR
 END
 'CP SPOOL PRINTER NOCONT'
 'CP CLOSE PRINTER NAME DBNLYZR LISTING'
 'CP SPOOL PRINTER OFF'
 SAY 'USNEXEC FINISHED WITH A RETURN CODE OF' USNEXEC3_RC
 'GLOBAL LOADLIB'
 'GLOBAL TXTLIB'
 'FILEDEF * CLEAR'
 EXIT USNEXEC3_RC
/*                                                                    */
/*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ */
ERROR:
/*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ */
 ERROR_RC = RC
 TRACE OFF; SIGNAL OFF ERROR
 SAY 'NON-ZERO RETURN CODE ENCOUNTERED IN EXEC AT LINE' SIGL
'CP SPOOL PRINTER NOCONT'
'CP CLOSE PRINTER NAME USNLYZR LISTING'
'CP SPOOL PRINTER OFF'
 'GLOBAL LOADLIB'
 'GLOBAL TXTLIB'
 'FILEDEF * CLEAR'
 EXIT ERROR_RC
/*                                                                    */
```

- **yourlib**—The file name of the load library into which you downloaded CA IDMS/DB Analyzer.
- **idmslib**—The file name of the load library containing your CA IDMS SUBSCHEMA and DMCL modules.
- **sortlib**—The file name of the text library containing your sort modules.
- **stat1_fn stat1_ft stat1_fm**—The file name, file type, and file mode assigned to your statistics file.
- **stat2_fn stat2_ft stat2_fm**—The file name, file type, and file mode assigned to the statistics file used to produce comparative reports.

FILE	PROCESS	USE
SORTWK01-SORTWK03 or SORTWK1-SORTWK4	ACCUMULATE ALL	These are sort work files. ACCUMULATE and ALL cause statistics to be gathered and sorted.
SORTLIB	ACCUMULATE ALL	This PDS file contains your sort product.
sortmsg	ACCUMULATE ALL	This is the message file for your SORT product.
dbfil01-dbfilnn ALL	ACCUMULATE ALL	These are database files. ACCUMULATE and cause statistics to be gathered from the user database.
STAT1	ACCUMULATE ALL REPORTS	This is a file to which accumulated statistics are written. The sort function reads and rewrites STAT1 after statistics accumulation. The report functions always read STAT1.
STAT2	ALL ,COMPARE REPORTS	This is the "old" statistics file for comparative reports.
LDEL	ACCUMULATE ,LDEL ALL	LDEL is an output file containing the db-keys of database records that have been logically deleted. (For Release 10.2 or earlier, it is suitable for input to the IDMSLDEL utility.)
SYSPRINT		This file contains Pascal/VS run-time error messages.
SYSIPT		This file is always required for parameter statement input to be read.

FILE	PROCESS	USE
SYSIDMS		This file is always required for the CA IDMS physical environment parameter input to be read. For instance, DMCL=xxxxxxxx must be specified, where xxxxxxxx is the name of the specific DMCL. See the *CA IDMS Common Facilities Guide* for more detailed information.
SYSLST		This file is always required for audit report output to be written. Computer Associates internal diagnostic routines write output to SYS012 and SYS013. These programmer logical units should normally be assigned to SYSLST.

Chapter 5: Messages

This section contains the following topics:

Messages Generated by CA IDMS/DB Analyzer (see page 162)
Using the Audit Report (see page 163)
Message Listing (see page 164)

Messages Generated by CA IDMS/DB Analyzer

This chapter lists all messages generated by CA IDMS/DB Analyzer that appear in the Audit Report. Included are the codes for messages, the reasons for their occurrences, and suggestions for appropriate remedial actions.

All messages listed in the Audit Report are preceded by a unique eight-character code. The message code is in xxxxnnns format, where xxxx is the ID of the module issuing the message, nnn is a message number for the message within the module, and s is the severity code for the message. The severity code is either I, W, or E. Severity codes are explained below.

Informative—A code ending with the letter I indicates an informative message. Informative messages need no remedial action.

Warning—A code ending with the letter W indicates a warning. Warning messages report conflicting parameter data or various processing conditions.

Error—A code ending with the letter E indicates an error. Error messages report erroneous and conflicting parameter data that has caused processing to terminate or to create an irrecoverable processing condition. In most cases, when CA IDMS/DB Analyzer encounters an error condition, all processing terminates immediately. If the error is syntactic or semantic, however, CA IDMS/DB Analyzer will continue processing until the end of the current step before terminating processing.

At the end of the job, the following condition codes are set:

0—Only informational messages were produced. This indicates successful processing.

4—Warning messages were produced. Processing may have been successful but the circumstances must be evaluated.

8—Parameter error messages were produced. Processing was unsuccessful.

12 or 16—Other errors were detected. Processing was unsuccessful.

In the event of a user abend from USNDRVR:

1. Look for a message on the JES log or operator console. If none is present,
2. Ensure GSSANKR and GSSWTOR are available in the execution library. (R2 points to an informative message.)

Using the Audit Report

Messages are listed on the Audit Report in the sequence in which they were generated by CA IDMS/DB Analyzer.

Parameter-related messages appear in a two-column format. The left column contains the message code and text; the right column shows user input. Part of the information in the right column may be underscored by asterisks (*****) to show the precise location of the error.

Information may also be underscored by a series of *X*'s (XXXXX) to indicate portions of the parameter that were not checked because of a previous error. Processing messages appear in the left column.

For more information and an example of the Audit Report, see Chapter 2, "System Output."

VSE/ESA File Processing Alternate Method

Occasionally you will receive a message that a file is not VSAM. The message indicates that the dataset will be processed SAM instead of VSAM because CA IDMS/DB Analyzer was not able to find the dataset in the VSAM catalog. The allocation will not affect processing results.

Message Listing

ARPT001I AREA REPORTS COMPLETED SUCCESSFULLY

Reason: All area reports have been successfully written.

Action: None.

ARPT002W UNABLE TO WRITE AREA REPORT - NO AREA-TYPE RECORDS FOUND IN STATISTICS FILE (1/2)

Reason: The statistics file specified contains no records of the type required to produce the report requested.

Action: Verify that the file name specified is correct.

CALL901E PARAMETER LIST ERROR - PGM = module-name

Reason: The module could not be called because of an internal problem.

Action: Contact CA, Inc. Product Support.

CALL902E NOT FOUND IN LIBRARY - PGM = module-name

Reason: The module cannot be located in the available load or core-image libraries.

Action: Locate the load or core-image library that contains the module and make it available to the job.

CALL903E NOT ENOUGH STORAGE - PGM = module-name

Reason: The module cannot be loaded due to insufficient GETVIS area (VSE/ESA only).

Action: Resubmit the job with a smaller SIZE= parameter. A larger partition may also be required.

CALL904E ANCHOR TABLE LOAD FAILURE - PGM = GSSANKR

Reason: An internal error has been detected.

Action: Contact CA, Inc. Product Support.

CALL905E UNANTICIPATED RETURN CODE = n PGM = module-name

Reason: An internal error has been detected.

Action: Contact CA, Inc. Product Support.

DRVR001E ERROR CALLING module-name, CALL PARAMETER ERROR

Reason: The specified module cannot be called because of an internal error.

DRVR002E ERROR CALLING module-name, PROGRAM NOT FOUND

Reason: The specified program cannot be located in the available library.

Action: Locate the library that contains the module and make it available to the job. Resubmit the job.

DRVR003E ERROR CALLING module-name, NOT ENOUGH STORAGE TO LOAD PROGRAM

Reason: The specified program cannot be loaded because of insufficient region size.

Action: Increase the region size and resubmit the job.

DRVR004E UNANTICIPATED RETURN CODE r PGM = module name

Reason: An internal error has been detected.

Action: Contact CA, Inc. Product Support.

FILM001E GSSFILE RETURNED AN ERROR DURING file-function WITH FILE file-name, RETURN CODES ARE n1,n2,n3,n4

Reason: The file handler is unable to perform the file function with the specified file.

Action: Refer to the following table for an explanation of specific return codes and action.

Two types of errors can be reported by the return codes of n1, n2, n3, and n4—non-VSAM file errors and VSAM file errors. The error is described by n2 and n4. For VSAM file errors, n4 is always equal to 28. The error is described by n1, n2, and n3. A general return code is given by n4 for both non-VSAM and VSAM errors. All return codes are decimal values.

n4	Reason	Action
4	End-of-file	Call Product Support.
8	Open error or file is not open	Look for JCL errors or for the use of improper files.
12	An I/O error has occurred	Find cause for I/O error.
16	Request not recognized	Call Product Support.
20	File was already opened	Call Product Support.

n4	Reason	Action
24	Parameter list error	Call Product Support.
28	VSAM error n1=R15 return code from VSAM n2=low order byte from R0 GENCB/MODCB type of error n3=VSAM feedback byte error in I/O request	Use n1, n2, and n3 to check for possible user errors. If there are no user errors, call Computer Associates, Inc. Product Support.
32	Insufficient storage	Increase storage for job step.
36	SYNAD error occurred n1=byte 1 of DECB n2=byte 2 of DECB n3=byte 3 of DECB	For BDAM files.
40	BPAM FIND error n1=R15 n2=R0	Use n1 and n2 (as described in Data Management Macro Instructions) to check for errors.
44	BPAM STOW error n1=R15 n2=0	Use n1 and n2 (as described in Data Management Macro Instructions) to check for errors.
n2	Reason	Action
0	n4=8, use of unopened file n4=24, parameter list error	Call Product Support. Call Product Support.
1	JCL/label overrode parm list	Remove DCB information from JCL and ensure that the correct files are referenced.
2	Parm list overrode JCL/label	Remove DCB information from JCL and ensure that the correct files are referenced.
3	Unrecognized request	Call Product Support.
4	OS x13 ABEND trapped at open	Fix cause for x13 ABEND.
5	Tried to update seq. file	Call Product Support.
6	VSAM write at other than load	Call Product Support.

n4	Reason	Action
7	SOS table could not expand	Call Product Support.
8	OS DCB open failed	Call Product Support.
9	SOS table buffer pointer lost	Call Product Support.
10	SOS table file CB not built	Call Product Support.
11	OS DD statement Missing	Supply missing DD statement.
12	VSAM ACB open failed	Call Product Support.
13	Record format invalid	Call Product Support.
14	Macro format invalid	Call Product Support.
15	Record length not numeric	Call Product Support.
16	Record length too large	Call Product Support.
17	Block size not numeric	Call Product Support.
18	Block size too large	Call Product Support.
19	Invalid VSE/ESA sysname table	Assemble a valid sysname table.
20	VSE/ESA sysname table entry missing	Assemble a sysname table with an entry for the missing one.
21	VSE/ESA LU number too large	Use an LU number within range.
22	VSE/ESA sysname is not numeric or is misspelled	Correct to a valid sysname.
23	VSE/ESA sysname blank	Do not use blank sysname.
24	VSE/ESA LU not assigned	Call Product Support.
25	VSE/ESA DTF prototype missing	Call Product Support.
26	VSE/ESA logic module missing	Generate missing logic module.
27	VSE/ESA CCW mismatch	Call Product Support.
28	File is not a PDS	Allocate file to a PDS.

GSFL999I file-id IS NOT VSAM—WILL TRY QSAM

Reason: The indicated file is not a VSAM file (VSE/ESA only).

Action: CA IDMS/DB Analyzer attempted to open the indicated file for VSAM processing. No action is required.

IERR000E INTERNAL ERROR, module-name - description

Reason: An unrecoverable error condition was detected by the module. The description explains the error.

Action: Contact CA, Inc. Product Support.

IRPT001I SR8 INDEX REPORTS COMPLETED SUCCESSFULLY

Reason: All SR8 index reports were successfully written.

Action: None

IRPT002W UNABLE TO WRITE SR8 INDEX REPORT—NO SR8 INDEX-TYPE RECORD FOUND IN STATISTICS FILE (1/2)

Reason: The statistics file specified contains no records of the type required to produce the report requested.

Action: Verify that the file name specified is correct.

LMSG901E MESSAGE NOT IN TABLE.....message-id module-name

Reason: The indicated module does not contain the indicated message.

Action: Contact CA, Inc. Product Support.

LMSG902E MESSAGE TABLE NOT FOUND.....module-name

Reason: The module cannot be located in the available load or core-image libraries.

Action: Locate the load or core-image library that contains the module and make it available to the job.

LMSG903E NOT ENOUGH STORAGE FOR TABLE.module-name

Reason: The indicated module cannot be loaded due to insufficient GETVIS area (VSE/ESA only).

Action: Resubmit the job with a smaller SIZE= parameter. A larger partition may also be required.

LMSG904E BAD MESSAGE PARM OR TABLE....module-name

Reason: An internal processing error has been detected.

Action: Contact CA, Inc. Product Support.

LMSG905E UNANTICIPATED RETURN CODE....n

Reason: An internal processing error has been detected.

Action: Contact CA, Inc. Product Support.

NKWP001E UNRECOGNIZABLE MAJOR KEYWORD

Reason: The major keyword underscored by asterisks (*******) in the Audit Report is misspelled or is in error and cannot be processed.

Action: Correct the spelling of the keyword and resubmit the job.

NKWP002E DUPLICATE MINOR KEYWORD ENTERED

Reason: The minor keyword underscored by asterisks (*******) in the Audit Report has already been entered on the parameter statement underscored.

Action: Delete the duplicate minor keyword phrase and resubmit the job.

NKWP003E AN EQUAL SIGN (=) AND VALUE MUST FOLLOW THE KEYWORD

Reason: The required equal sign and value after the keyword are missing.

Action: At the location underscored by an asterisk (*) in the Audit Report, enter an equal sign followed by an appropriate value for the parameter. Resubmit the job.

NKWP005E MISSING RIGHT PARENTHESIS; PHRASE TERMINATED

Reason: A set of open and closed parentheses is required.

Action: Enter a right parenthesis to enclose the phrase or list, then resubmit the job.

NKWP006E REPEATED LIST IMPROPERLY CONTINUED

Reason: The last phrase on this statement is a list enclosed in parentheses that ends with a comma. However, the next statement entered does not continue the list.

Action: Supply a continuation card and resubmit the job.

NKWP007E MISSING CONTINUATION CARD

Reason: The previous statement ended with a comma, but this statement begins with a major keyword.

Action: Supply a continuation card and resubmit the job.

NKWP008E PRIORITY MUST CONTAIN NO MORE THAN 500 VALUES

Reason: You supplied more than 500 record types and/or record names in the priority list.

Action: Correct and resubmit the job.

NKWP009E VALUE MUST BE xxxxxxxxxxxxxxxxxxxx

Reason: The value underscored by an asterisk (*) in the Audit Report is incorrect for the keyword.

Action: Supply the appropriate value specified in the message and resubmit the job.

NKWP010E KEYWORD PHRASES NOT SEPARATED BY COMMA

Reason: Each keyword phrase must be separated by a comma.

Action: Supply a comma at the location underscored by an asterisk (*) in the Audit Report and resubmit the job.

NKWP011E UNRECOGNIZABLE MINOR KEYWORD

Reason: The minor keyword underscored by asterisks (*******) in the Audit Report is misspelled or is in error and was not processed.

Action: Correct the spelling of the minor keyword and resubmit the job.

NKWP012E MINOR KEYWORD OMITTED

Reason: A minor keyword was omitted at the location underscored by an asterisk (*) in the Audit Report.

Action: Enter the missing minor keyword and resubmit the job.

NKWP015E THESE KEYWORD(S) MUST BE SPECIFIED:xxxxxxxxxxxxxxxxxxxx

Reason: The minor keyword(s) listed in the message was omitted. CA IDMS/DB Analyzer cannot continue processing unless the keyword(s) shown is entered.

Action: Supply the missing keyword(s) and resubmit the job.

NKWP018E MISSING VALUE NEEDED xxxxxxxxxxxxx

Reason: A keyword was entered without a value. The acceptable values are listed in the variable portion of the error message.

Action: Enter the correct value at the location underscored by an asterisk (*) in the Audit Report and resubmit the job.

NKWP019E VALUE ENTERED PREVIOUSLY

Reason: The value underscored by asterisks (****) on the Audit Report was already entered in the list. CA IDMS/DB Analyzer cannot process this parameter unless you supply two different values.

Action: Correct the value and resubmit the job.

NKWP020E VALUE MUST BE ASCENDING

Reason: The value underscored by asterisks (******) on the Audit Report must be in ascending numerical sequence from the previous value in the list.

Action: Rearrange the values in the list in ascending sequence and resubmit the job.

NKWP021E VALUE MUST BE DESCENDING

Reason: The value underscored by asterisks (*******) on the Audit Report must be in descending numerical sequence from the previous value in the list.

Action: Rearrange the values in the list in descending sequence and resubmit the job.

NKWP024E SECOND-LEVEL PRIORITY MUST CONTAIN AT LEAST ONE VALUE.

Reason: A list or sublist cannot be empty. It must contain at least one valid record type for the record name.

Action: At the location underscored by an asterisk (*) in the Audit Report, insert one or more record types or record names in the priority statement.

NKWP027E SECOND-LEVEL-PRIORITY MUST CONTAIN NO MORE THAN 10 VALUES

Reason: You supplied more than 10 record types and/or record names in a single second level priority list. The eleventh entry is underscored by an asterisk (*) in the Audit Report.

Action: Break the second-level-priority list into several second-level priority lists and resubmit the job.

NKWP050E GSSNKWP INTERNAL ERROR. NOTIFY Computer Associates PRODUCT SUPPORT

Reason: An unrecoverable error has been detected.

Action: Contact CA, Inc. Product Support.

NKWP051E ERROR OCCURRED DURING CALL OF xxxxxxxx - GSSCALL RETURN CODE IS nn

Reason: A module call processor error occurred.

Action: Contact CA, Inc. Product Support.

NKWP052E ERROR OCCURRED DURING LOAD OF xxxxxxxx - GSSLOAD RETURN CODE IS nn

Reason: A module load processor error occurred.

Action: Contact CA, Inc. Product Support.

NKWP053E ERROR OCCURRED DURING WRITE OF xxxxxxxx - GSSPRINT RETURN CODE IS nn

Reason: An error occurred during a call of the printer module.

Action: Contact CA, Inc. Product Support.

NKWP061E DD STATEMENT MISSING FOR DDNAME: xxxxxxxx

Reason: A JCL DD card was not supplied.

Action: Correct the JCL and resubmit the job.

NKWP062E LOGICAL UNIT NOT ASSIGNED: xxxxxxxx

Reason: An ASSGN card was not supplied.

Action: Correct the JCL and resubmit the job.

NKWP063E SYSIPT LRECL MUST BE 80.

Reason: A parameter file with an LRECL other than 80 was supplied.

Action: Create a parameter file with an LRECL of 80 and resubmit the job.

NKWP064E ERROR OCCURRED DURING OPEN OF xxxxxxxx FILE - GSSFILE RETURN CODE IS n1,n2,n3,n4

Reason: The file handler is unable to open the file.

Action: See the table above for an explanation and appropriate action for the indicated return codes.

NKWP065E ERROR OCCURRED DURING READ OF xxxxxxxx FILE - GSSFILE RETURN CODE IS n1,n2,n3,n4

Reason: The file handler is unable to read the file.

Action: See the table above for an explanation and appropriate action for the indicated return codes.

NKWP066E ERROR OCCURRED DURING CLOSE OF xxxxxxxx FILE - GSSFILE RETURN CODE IS n1,n2,n3,nnn

Reason: The file handler is unable to close the file.

Action: See the table above for an explanation and appropriate action for the indicated return codes.

NKWP080W SKIPPING UNTIL NEXT RECOGNIZABLE STATEMENT

Reason: Because of a previous error, the phrase(s) underscored by the capital letter X in the Audit Report has not been processed.

Action: None.

NKWP081W SKIPPING UNTIL NEXT RECOGNIZABLE MINOR KEYWORD

Reason: Because of a previous error, the value(s) underscored by the capital letter X in the Audit Report has not been processed.

Action: None.

NKWP091I INPUT PARAMETER STATEMENT

Reason: A CA IDMS/DB Analyzer input parameter statement has been read. The entire 80-byte image is displayed. Columns 1-72 will be processed.

Action: None.

NKWP092I CONTINUATION STATEMENT

Reason: The parameter statement continues a previous statement entered.

Action: None.

NKWP093I COMMENT STATEMENT

Reason: The parameter statement contains an asterisk (*) as the first non-blank character. This indicates that this is a comment statement, and it will not be processed.

Action: None.

NKWP094I END OF PARAMETER INPUT

Reason: All parameters that were entered have been read and processed by CA IDMS/DB Analyzer.

Action: None.

NKWP095I BLANK PARAMETER STATEMENT

Reason: The parameter statement contains only blanks in columns 1-72 and will not be processed.

Action: Correct and resubmit the job.

NKWP096E UNMATCHED APOSTROPHE. NEED xxxxxxxxxxxx

Reason: A value was entered that contains an odd number of apostrophes. Literal values must begin and end with single apostrophes. To represent a single apostrophe within a literal, you must enter two apostrophes. The acceptable values are listed in the variable portion of the error message.

Action: Correct the value underscored by asterisks (****) and resubmit the job.

NKWP097E BAD LITERAL FORMAT. NEED xxxxxxxxxxxx

Reason: A literal value was entered with improperly placed apostrophes. Literal values must begin and end with single apostrophes. To represent a single apostrophe within a literal, you must enter two apostrophes. The acceptable values are listed in the variable portion of the error message.

Action: Correct the value underscored by asterisks (****) and resubmit the job.

NLYZ001E STATISTICS FILE file-name IS EMPTY, REPORTING CANNOT BE DONE

Reason: The first read of the specified file returned an END-OF-FILE condition. This error can be caused by improper JCL or by a corrupted statistics file.

Action: Verify that the file is a valid statistics file and that there are no JCL errors. Resubmit the job.

NLYZ002E FILE file-name IS NOT A VALID STATISTICS FILE, REPORTING CANNOT BE DONE

Reason: The specified file was not created by CA IDMS/DB Analyzer or is a legitimate statistics file that has been corrupted. This error could also be caused by improper JCL.

Action: Verify that the file is a valid statistics file and that there are no JCL errors. Resubmit the job.

NLYZ003E ERROR LINKING TO module-name, LINK PARAMETER ERROR

Reason: USNLYZR is unable to call the module due to an internal problem.

Action: Call CA, Inc. Product Support.

NLYZ004E ERROR LINKING TO module-name, PROGRAM NOT FOUND

Reason: The specified module cannot be located in the available load or core-image libraries.

Action: Locate the load or core-image library that contains the module and make it available to the job. Resubmit the job.

NLYZ005E ERROR LINKING TO module-name, NOT ENOUGH STORAGE TO LOAD PROGRAM

Reason: The specified module cannot be loaded due to insufficient GETVIS area (VSE/ESA only).

Action: Resubmit the job with a smaller SIZE= parameter. A larger partition may also be required.

NLYZ006I CA-IDMS/DB ANALYZER ENDED, CC=number

Reason: CA IDMS/DB Analyzer has completed execution with the designated condition code.

Action: None.

NRPT001I INDEX REPORTS COMPLETED SUCCESSFULLY

Reason: All index reports have been successfully written.

Action: None.

NRPT002W UNABLE TO WRITE INDEX REPORT - NO INDEX-TYPE RECORDS FOUND IN STATISTICS FILE (1/2)

Reason: The statistics file specified contains no records of the type required to produce the report requested.

Action: Verify that the file name specified is correct.

PARM001I INPUT PARAMETER STATEMENT VALIDATION IS COMPLETE

Reason: All input parameter statements were read and validated. Any parameter errors have been reported.

Action: None.

PARM003E MEMBER LOADED FOR subschema-name SUBSCHEMA IS NOT A SUBSCHEMA

Reason: The specified subschema is not a subschema. If the subschema name is correct then the subschema has been corrupted in the load or core-image library.

Action: Verify that the subschema name is correct. If the subschema is corrupted then recreate it. Resubmit the job.

PARM005E MEMBER LOADED FOR DMCL OF subschema-name SUBSCHEMA IS NOT A DMCL

Reason: The subschema's DMCL is invalid. If the DMCL name is correct then the DMCL has been corrupted in the load or core-image library.

Action: Verify that the DMCL name in the indicated subschema is correct. If DMCL is corrupted then recreate it. Resubmit the job.

PARM006E NOT ENOUGH STORAGE TO BUILD INTERNAL PROCESSING TABLE

Reason: There is insufficient storage for CA IDMS/DB Analyzer to execute.

Action: Under VSE/ESA, use a larger partition or a smaller SIZE= parameter. Under z/OS and OS/390, use a larger REGION. Resubmit the job.

PARM007E END-OF-FILE ON FIRST READ OF INPUT PARAMETER FILE, OR ONLY COMMENT OR BLANK RECORDS WERE READ

Reason: File SYSIPT was empty or no parameter statements were present in the input given.

Action: Place parameter statements in file SYSIPT. Resubmit the job.

PARM008E PROCESS PARAMETER STATEMENT WAS EXPECTED

Reason: CA IDMS/DB Analyzer expected a PROCESS statement, but instead received some other parameter statement type.

Action: A PROCESS statement is required and must be the first parameter statement in file SYSIPT. Correct and resubmit the job.

PARM009E PROCESS STATEMENT WAS NOT FIRST

Reason: CA IDMS/DB Analyzer found a PROCESS statement, but it was not the first parameter statement encountered.

Action: The PROCESS statement must be the first parameter statement in file SYSIPT. Correct and resubmit the job.

PARM010E PROCESS STATEMENT WAS NOT FOUND

Reason: CA IDMS/DB Analyzer did not find a PROCESS parameter statement in file SYSIPT.

Action: A PROCESS statement is required and must be the first parameter statement in file SYSIPT. Correct and resubmit the job.

PARM011E WHEN GIVEN, THE TENTH AREADIST VALUE MUST EQUAL THE AREA SWEEP STOP PAGE

Reason: Ten AREADIST values were given and the tenth one was not equal to the area sweep stop page.

Action: Change the tenth AREADIST value to equal the area sweep stop page or do not specify the tenth value. When only nine values are given, the tenth one will default to the area sweep stop page. Resubmit the job.

PARM012E DUPLICATE PROCESS STATEMENT DETECTED

Reason: More than one PROCESS statement was found in file SYSIPT. Only one PROCESS statement is allowed.

Action: Correct and resubmit the job.

PARM013E AREA area-name NOT IN SUBSCHEMA

Reason: The indicated area is not in the subschema specified on the PROCESS statement.

Action: Correct and resubmit the job.

PARM014E DUPLICATE AREA STATEMENT ENTERED FOR AREA area-name

Reason: More than one AREA statement was found for the indicated area in file SYSIPT. Only one AREA statement is allowed for each area.

Action: Correct and resubmit the job.

PARM015E NOSWEEP IS MUTUALLY EXCLUSIVE WITH THE AREA PROCESSING PARAMETERS OF START, STOP, AND AREADIST

Reason: An AREA statement with the NOSWEEP keyword also indicated a parameter of START, STOP, or AREADIST. START, STOP, and AREADIST are processing parameters that may not be included in the same statement with NOSWEEP.

Action: Correct and resubmit the job.

PARM016E START/STOP PAGE SPECIFIED ON PARAMETER STATEMENT IS GREATER/LESS THAN AREA HIGH-PAGE/LOW-PAGE

Reason: An AREA statement has one of the following conditions: Either the START page given is *greater* than the area's HIGH-PAGE, or the STOP page given is *less* than the area's LOW-PAGE.

Action: Correct and resubmit the job.

PARM017E STOP PAGE SPECIFIED ON PARAMETER STATEMENT IS LESS THAN SPECIFIED AREA SWEEP START PAGE

Reason: An AREA statement has a STOP page that is less than the indicated area sweep START page. The area STOP page must be greater than or equal to the area START page.

Action: Correct and resubmit the job.

PARM018E AN hpage SPECIFIED ON PARAMETER STATEMENT IS GREATER/LESS THAN AREA SWEEP STOP/START PAGE

Reason: An AREA statement has one of the following conditions: Either an hpage given is *greater* than the area's sweep STOP page, or an hpage given is *less* than the area's sweep START page.

Action: Correct and resubmit the job.

PARM019E DUPLICATE SET STATEMENT ENTERED FOR SET set-name

Reason: More than one SET statement was found for the indicated set in file SYSIPT. Only one SET statement is allowed for each set.

Action: Correct and resubmit the job.

PARM020E A PARAMETER STATEMENT FOR SET set-name WAS ENTERED THAT TRIED TO ACCESS AN AREA MARKED AS NOOWNERSET OR NOMEMBERSET

Reason: A SET statement for the indicated set attempted to turn on WALK within an area that has been set NOOWNERSET or NOMEMBERSET by a previous AREA statement.

Action: Change either the SET statement or the AREA statement to resolve the conflict. Resubmit the job.

PARM021E SET set-name NOT IN SUBSCHEMA

Reason: The indicated set is not in the subschema specified on the PROCESS statement.

Action: Correct and resubmit the job.

PARM022E NOWALK IS MUTUALLY EXCLUSIVE WITH THE SET PROCESSING PARAMETER OF LNTHDIST

Reason: A SET statement specifying NOWALK also specified LNTHDIST. LNTHDIST may not be specified in the same statement with NOWALK.

Action: Correct and resubmit the job.

PARM026E NOOWNERSET/NOMEMBERSET NOT ALLOWED, AREA area-name CONTAINS SET(S) NAMED FOR ACCESS BY PREVIOUS SET OR INDEX STATEMENTS

Reason: An AREA statement for the specified area attempts to turn off WALK within an area that contains sets named for WALK by previous SET statements.

Action: Change either the SET statement or the AREA statement to resolve the conflict. Resubmit the job.

PARM027E PROCESS SELECTION=EXPLICIT REQUIRES THAT AT LEAST ONE AREA OR SET STATEMENT BE ENTERED

Reason: The PROCESS statement specifies EXPLICIT processing but no AREA or SET statements were found in file SYSIPT. EXPLICIT processing requires that at least one AREA or SET statement be given.

Action: Correct and resubmit the job.

PARM029E FSTRIGGER MUST BE LESS THAN FSBUFFERS

Reason: The FSTRIGGER value is greater than or equal to the FSBUFFERS value.

Action: Reduce the FSTRIGGER value or increase the FSBUFFERS value as appropriate. Resubmit the job.

PARM030E AN AREA STATEMENT WITH NO PARAMETERS IS NOT ALLOWED DURING AUTOMATIC PROCESSING.

Reason: An AREA statement without any processing parameters was specified with AUTOMATIC Mode. AREA statements without processing parameters are normally only specified with the EXPLICIT Mode. Either AREA statement processing parameters were forgotten for AUTOMATIC processing or EXPLICIT processing was desired.

Action: Correct and resubmit the job.

PARM031E ERROR LINKING TO module-name, LINK PARAMETER ERROR

Reason: USNDRVR is unable to call the module due to an internal problem.

Action: Call CA, Inc. Product Support.

PARM032E ERROR LINKING TO module-name, PROGRAM NOT FOUND

Reason: The specified module cannot be located in the available load or core-image libraries.

Action: Locate the load or core-image library that contains the module and make it available to the job. Resubmit the job.

PARM033E ERROR LINKING TO module-name, NOT ENOUGH STORAGE TO LOAD PROGRAM

Reason: The specified module cannot be loaded due to insufficient GETVIS area (VSE/ESA only).

Action: Resubmit the job with a smaller SIZE= parameter. A larger partition may also be required.

PARM034E MEMBER LOADED FOR xxx SUBSCHEMA CONTAINS INTEGRITY ERRORS

Reason: The subschema specified in the PROCESS statement has a format or content error.

Action: Correct the subschema, or verify its name in the PROCESS statement, and resubmit the job.

PARM035I SUBSCHEMA subschema-name DOES NOT INCLUDE RECORD-ID record-id, STATISTICS MAY NOT REFLECT THE ENTIRE DATABASE

Reason: The indicated record ID is present in the database but is not part of the specified subschema. Statistics related to the indicated record ID will not be collected.

Action: None.

PARM036E MEMBER LOADED FOR xxx SUBSCHEMA CONTAINS nnn NATIVE VSAM FILES

Reason: The current release does not support the processing of Native VSAM Files.

Action: Create a subschema which does not include Native VSAM Files and resubmit the job using the changed subschema.

PARM037E NOSWEEP IS MUTUALLY EXCLUSIVE WITH THE SELECTION MODE OF EXPLICIT

Reason: An AREA statement including NOSWEEP was specified after a PROCESS statement designated SELECTION=EXPLICIT. NOSWEEP may not be specified when EXPLICIT is the selection mode.

Action: Correct the AREA statement and resubmit the job.

PARM038E NOWALK IS MUTUALLY EXCLUSIVE WITH THE SELECTION MODE OF EXPLICIT

Reason: NOWALK was specified in a SET statement after a PROCESS statement designated SELECTION=EXPLICIT. NOWALK may not be specified when EXPLICIT is the SELECTION mode.

Action: Correct the SET statement and resubmit the job.

PARM039E IIX SET setname NOT FOUND WITHIN YOUR SUBSCHEMA'S AREAS

Reason: The area associated with the SR7 of a system owned integrated index set is not within the subschema.

Action: Use a subschema that does not contain a partial view of the set.

PARM043E INVALID USER WORK AREA SIZE PASSED

Reason: The user work area size must be a value from 64 to 256 inclusive.

Action: Correct the user work area size and resubmit the job.

PARM044E SUBSCHEMA AREA NOT FOUND IN THE DMCL

Reason: All the areas in the subschema are not included in the DMCL.

Action: Use a DMCL that contains *all* the areas in the subschema.

PARM045E SUBSCHEMA subschema-name DEFINES AN SQL DATABASE - NOT SUPPORTED

Reason: CA IDMS/DB Analyzer does not currently support SQL databases.

Action: Do not run CA IDMS/DB Analyzer specifying a subschema that defines an SQL database.

PRNT910E A SEVERE ERROR OCCURRED DURING OUTPUT TO THE SYSLST FILE

Reason: GSSCALL experienced a problem invoking GSSPRNT.

Action: Ensure all necessary programs are available in your steplib or LIBDEF.

RRPT001I RECORD REPORTS COMPLETED SUCCESSFULLY

Reason: All record reports have been successfully written.

Action: None.

RRPT002W UNABLE TO WRITE RECORD REPORT - NO RECORD-TYPE RECORDS FOUND IN STATISTICS FILE (1/2)

Reason: The statistics file specified contains no records of the type required to produce the report requested.

Action: Verify that the file name specified is correct.

SORT001I SORT OF ACCUMULATED STATISTICS IS COMPLETE

Reason: The sorting of the gathered statistics has run to completion.

Action: None.

SORT002E SORT OF ACCUMULATED STATISTICS TERMINATED WITH RETURN CODE n

Reason: The call to the installation-provided sort program has resulted in a non-zero return code of n.

Action: See your installation's sort program documentation for an explanation of the return code and any other sort program messages. Correct and resubmit the job.

SORT003E ERROR LINKING TO module-name, LINK PARAMETER ERROR

Reason: USNSORT is unable to call the specified module due to an internal problem.

Action: Call CA, Inc. Product Support.

SORT004E ERROR LINKING TO module-name, PROGRAM NOT FOUND

Reason: The specified module cannot be located in the available load or core-image libraries.

Action: Locate the load or core-image library that contains module-name and make it available to the job. Resubmit the job.

SORT005E ERROR LINKING TO module-name, NOT ENOUGH STORAGE TO LOAD PROGRAM

Reason: The specified module cannot be loaded due to insufficient GETVIS area (VSE/ESA only).

Action: Resubmit the job with a smaller SIZE= parameter. A larger partition may also be required.

SRPT001I SET REPORTS COMPLETED SUCCESSFULLY

Reason: All set reports have been successfully written.

Action: None.

SRPT002W UNABLE TO WRITE SET REPORT - NO SET-TYPE RECORDS FOUND IN STATISTICS FILE (1/2)

Reason: The statistics file specified contains no records of the type required to produce the report requested.

Action: Verify that the file name specified is correct.

DBIO MAJOR ERROR STATUS CODES

FS = FAST-SCAN
GP = FIND/OBTAIN PAGE
PR = PAGE-RETURN

DBIO MINOR ERROR STATUS CODES

A1 = New page returned
A2 = Function not supported
A3 = Invalid page range
A4 = Invalid qualifier
A5 = Page not current of run unit
A6 = Area not bound
A7 = Page return not on
A8 = Page return already on
A9 = Fast scan not on
B1 = Fast scan already on
B2 = SR4 chain error
B3 = SR2/SR3 chain error
B4 = HDR/FTR page number mismatch
B5 = Error closing file
B6 = Record not logically deleted
B7 = SMP currency error with page return on
B8 = Bad 'line space used' length in footer
B9 = No space in page
C1 = Duplicate db-key
C2 = Invalid Store
C3 = Skipped index
C4 = Broken chain
C5 = IXDET member of multiple sets
C6 = Ignored page reserve
C7 = Invalid Length - discrepancy in RDW lengths encountered during attempted MODIFY RECORD
C8 = DMCL/SCHEMA IDMS release mismatch
C9 = Decompress error
D1 = Invalid record length
D2 = FSBUFFER less than minimum value
D3 = FSTRIGGER not less than FSBUFFER or FSTRIGGER equal to 0
D4 = Invalid page displacement

```
D5 = Invalid request
D6 = FSBUFFER exceeds maximum value
D7 = GSDTPARM cannot be loaded
D8 = Record not found in PSUB
D9 = segment named in DBNAME table entry is mismatched with current DMCL
DA = DBNAME not valid or segment name cannot be used as DBNAME

Minor return codes prefixed with an I indicate an internal error:

I1 = Invalid parameter list
I2 = Function not supported
I3 = File already open/closed
I4 = Insufficient work space, record read is
     larger than subschema description
I5 = Invalid currency data
I6 = VSAM block error
I7 = Bad fast scan DMCL block
I8 = File not assigned
```

STAT002E IDMS ERROR RETURNED FROM program-name

Reason: A DBIO error has occurred. The program indicated was executing at the time the error occurred.

Action: The action required depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT003E ERROR STATUS WAS error-code

Reason: A DBIO error has occurred.

Action: To find the meaning of the first two digits of the error code refer to the list of CA IDMS/DB Analyzer major error codes found in the *CA IDMS Messages and Codes Guide* or the list of DBIO error codes displayed above. If the third and fourth digits of the error code fall within the ranges 00-99, refer to the list of CA IDMS/DB Analyzer minor error codes found in the *CA IDMS Messages and Codes Guide*. Otherwise, refer to the list of CA DBIO Error Codes listed above.

STAT004E CURRENT RECORD WAS record-name

Reason: A DBIO error has occurred. The record indicated was the last one processed successfully before the error occurred.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT005E CURRENT AREA WAS area-name

Reason: A DBIO error has occurred. The area indicated was the last one processed successfully before the error occurred.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT006E ERROR SET WAS set- name

Reason: A DBIO error has occurred. The set indicated was the one being processed when the error occurred.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT007E ERROR RECORD WAS record-name

Reason: A DBIO error has occurred. The record indicated was the one being processed when the error occurred.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT008E ERROR AREA WAS area-name

Reason: A DBIO error has occurred. The area indicated was the one being processed when the error occurred.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT009I STATISTICS ACCUMULATION COMPLETED SUCCESSFULLY

Reason: The accumulation of statistics has been successfully completed.

Action: None.

STAT010I DECOMPRESS ERROR FOUND ON RECORD WITH DBKEY=db-key

Reason: USNSTAT is unable to decompress a record that is defined in the subschema as compressed.

Action: Ignore statistics in these report fields: Savings Due to Compression, Occurrence Length (Decompressed), and Compression Bytes Saved. The data in these fields is inaccurate.

STAT011I DECOMPRESS STATISTICS ARE INVALID DUE TO A DECOMPRESS ERROR COUNT OF error-count

Reason: USNSTAT is unable to collect valid decompress statistics because it cannot decompress the problem records.

Action: Ignore statistics in these report fields: Savings Due to Compression, Occurrence Length (Decompressed), and Compression Bytes Saved. The data in these fields is inaccurate.

STAT012E CURRENT DBKEY.....dbkey

Reason: A DBIO error has occurred. The value of the current db-key when the error occurred is indicated.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT013E DIRECT DBKEY.....dbkey

Reason: A DBIO error has occurred. The value of the direct db-key when the error occurred is indicated.

Action: The required action depends on interpretation of the DBIO return code given in Message: STAT003E.

STAT014E SUBSCHEMA CONTAINS AREAS WITH MIXED PAGE GROUPS OR MIXED RADIUS— NOT SUPPORTED

Reason: An attempt was made to ready an area with a different page group from those already readied.

Action: The database analyzer cannot be run against a subschema that contains mixed page groups or mixed radius.

SYNC001E MODULE VERSIONS DO NOT MATCH, CA IDMS/DB Analyzer release-number 1 module-name release-number 2

Reason: The release numbers of CA IDMS/DB Analyzer's main program (USNLYZR) and module name do not match. Release-number 1 and release-number 2 indicate the respective release numbers. This error usually occurs only if a new release of CA IDMS/DB Analyzer is partially installed over a prior release, or if two releases of CA IDMS/DB Analyzer are present and the available load or core-image libraries cause mixed releases of the program modules to be used.

Action: Verify that CA IDMS/DB Analyzer is correctly installed and that the proper load or core-image libraries are used. Resubmit the job.

Appendix A: Statistics Accumulation File

Overview

This appendix shows the form of the CA IDMS/DB Analyzer Statistics Accumulation File. The structure of the file shown here allows you to use the data with other utilities or programs.

When the parameters ACCUMULATE or ALL are used in the PROCESS statement, CA IDMS/DB Analyzer creates a statistics file which can be used with other utilities or programs. You can create your own customized reports or use the file as input to a graphics utility.

Statistics Accumulation File Structure

This appendix comprises several figures which show the structure of the Statistics Accumulation File. The record length for each statistics record is shown in Exhibit A.1. Exhibits A.2-9 show the data type, the size in bytes, and the location of each field in the statistics file.

Fields are described for the following records:

- Exhibit A.2—Header Statistics Record
- Exhibit A.3a-d—Area Statistics Record, Area Record-Type
- Exhibit A.4a-d—Area Statistics Record, Record Record-Type
- Exhibit A.5—Record Statistics Record
- Exhibit A.6a-d—Set Statistics Record, Set Record-Type
- Exhibit A.7—Set Statistics Record, Member Record-Type
- Exhibit A.8a-d—SR8 Index Statistics Record, SR8 Index Record-Type
- Exhibit A.9—Footer Statistics Record

File Form

A statistics accumulation file that includes several areas contains the complete records for each area before beginning the next area. For example, the AREA-1 area record is followed by all the record records for AREA-1. Then the AREA-2 area record is followed by all the record records for AREA-2.

THE CA-IDMS/DB ANALYZER STATISTICS ACCUMULATION FILE IS OF THE FOLLOWING FORMAT

RECORD TYPE	RECORD VALUE	STATISTIC TYPE	STATISTIC VALUE	NUMBER OF OCCURRENCES	RECORD LENGTH
HEADER	00	HEADER	00	1	152
AREA	01	AREA	01	1 PER AREA	392
		RECORD	02	1 PER RECORD TYPE PER AREA	448
RECORD	02	RECORD	02	1 PER RECORD TYPE	448
SET	03	SET	03	1 PER SET	372
		MEMBER	04	1 PER MEMBER TYPE PER SET	136
SR8 INDEX	05	SR8 INDEX	05	1 PER SR8 INDEX	388
FOOTER	08	FOOTER	08	1	113

Exhibit A.1: Record Lengths of Statistics Records

HEADER RECORD

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	1	4	RDW (2 BYTES LRECL, 2 BYTES RECFM)
**********				SORT KEY **********
BINARY	1	5	5	RECORD TYPE; VALUE = 00 *
CHARACTER	18	6	23	VALUE = 'HEADER ' *
CHARACTER	18	24	41	VALUE = SPACES *
**********				**********
BINARY	1	42	42	STATISTIC TYPE; VALUE = 00
CHARACTER	8	43	50	NAME OF SUBSCHEMA FOR WHICH DATA WAS COLLECTED

```
CHARACTER    16    51   66  FILE ID;  VALUE = 'DB/ANALYZER     '

CHARACTER    16    67   82  DATE/TIME STATISTICS WERE ACCUMULATED

CHARACTER     5    83   87  RELEASE NUMBER

CHARACTER     1    88   88  NOT USED (ALIGNMENT)

BINARY        4    89   92  TOTAL NUMBER OF STATISTICS FILE RECORDS
                            WRITTEN

CHARACTER    60    93  152  FILLER
```

Exhibit A.2: Header Statistics Record

```
                              AREA RECORD


                          AREA STATISTIC-TYPE

DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
---------  ---- ----- ----  -----------------

BINARY        4     1    4  RDW (2 BYTES LRECL, 2 BYTES RECFM)

****************************** SORT KEY ******************************
BINARY        1     5    5  RECORD TYPE;  VALUE = 01                *
CHARACTER    18     6   23  AREA NAME                                *
CHARACTER    18    24   41  VALUE = SPACES                           *
**********************************************************************

BINARY        1    42   42  STATISTIC TYPE;  VALUE = 01

CHARACTER     2    43   44  NOT USED (FOR ALIGNMENT)

BINARY        4    45   48  PAGE NUMBER OF AREA LOW PAGE

BINARY        4    49   52  PAGE NUMBER OF AREA HIGH PAGE

BINARY        4    53   56  PAGE NUMBER FOR START OF AREA SWEEP

BINARY        4    57   60  PAGE NUMBER FOR END OF AREA SWEEP

BINARY        4    61   64  LENGTH OF PAGE IN BYTES

BINARY        4    65   68  NUMBER OF RECORD OCCURRENCES

BINARY        4    69   72  NUMBER OF LDEL RECORD OCCURRENCES
```

(CONTINUED)

Exhibit A.3a: Area Statistics Record, Area Record-Type

AREA RECORD

AREA STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
FLOAT PT	8	73	80	TOTAL NUMBER OF BYTES USED
BINARY	4	81	84	NUMBER OF FRAGMENTS
BINARY	4	85	88	GREATEST NUMBER OF BYTES OF ACTUAL FREE SPACE FOUND ON A SINGLE, NON-EMPTY PAGE
BINARY	4	89	92	FEWEST NUMBER OF BYTES OF ACTUAL FREE SPACE FOUND ON A SINGLE, NON-FULL PAGE
CHARACTER	4	93	96	NOT USED (FOR ALIGNMENT)
FLOAT PT	8	97	104	TOTAL BYTES OF FREE SPACE MINUS PAGE RESERVE
BINARY	4	105	108	GREATEST NUMBER OF BYTES OF FREE SPACE FOUND ON A SINGLE, NON-EMPTY PAGE AFTER SUBTRACTING THE PAGE RESERVE
BINARY	4	109	112	FEWEST NUMBER OF BYTES OF FREE SPACE FOUND ON A SINGLE, NON-FULL PAGE AFTER SUBTRACTING THE PAGE RESERVE
FLOAT PT	8	113	120	NUMBER OF BYTES USED FOR POINTERS
FLOAT PT	8	121	128	NUMBER OF BYTES USED FOR LINE INDEXES
BINARY	4	129	132	NUMBER OF BYTES USED FOR PAGE HEADERS

(CONTINUED)

Exhibit A.3b: Area Statistics Record, Area Record-Type

AREA RECORD

AREA STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	133	136	NUMBER OF BYTES USED FOR PAGE FOOTERS
FLOAT PT	8	137	144	NUMBER OF BYTES USED FOR DATA STORAGE
BINARY	4	145	148	NUMBER OF PAGES WITH A HEADER SPACE AVAILABLE COUNT OF ZERO
BINARY	4	149	152	NUMBER OF PAGES WITH SCHEMA DEFINED MAXIMUM NUMBER OF RECORDS
BINARY	4	153	156	NUMBER OF PAGES WITH 0 DATA RECORDS
BINARY	4	157	160	NUMBER OF SR7 RECORD OCCURRENCES
FLOAT PT	8	161	168	NUMBER OF BYTES USED TO STORE SR7 RECORDS
BINARY	4	169	172	NUMBER OF SR8 RECORD OCCURRENCES
CHARACTER	4	173	176	NOT USED (FOR ALIGNMENT)
FLOAT PT	8	177	184	NUMBER OF BYTES USED TO STORE SR8 RECORDS (COMPRESSED)
FLOAT PT	8	185	192	NUMBER OF BYTES USED TO STORE SR8 RECORDS (DECOMPRESSED)
CHARACTER	34	193	226	FILLER

(CONTINUED)

Exhibit A.3c: Area Statistics Record, Area Record-Type

AREA RECORD

AREA STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
CHARACTER	2	227	228	NOT USED (FOR ALIGNMENT)
BINARY	4	229	232	NUMBER OF SPACE MANAGEMENT PAGES
BINARY	40	233	272	TEN ELEMENT ARRAY IN WHICH EACH ELEMENT REPRESENTS A PAGE NUMBER THAT DELIMITS A RANGE OF PAGE NUMBERS USED TO GATHER DISTRIBUTION STATISTICS

```
BINARY       40   273  312  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS A RANGE BOUND OF NUMBER OF
                             BYTES SAVED DUE TO COMPRESSION

BINARY       40   313  352  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS THE NUMBER OF PAGES OCCURRING
                             WITHIN EACH PERCENTAGE RANGE.  RANGES
                             OCCUR IN 10% INCREMENTS

BINARY       40   353  392  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS A NUMBER OF BYTES OF FREE
                             SPACE FOR THAT SPECIFIC PAGE RANGE
```

Exhibit A.3d: Area Statistics Record, Area Record-Type

```
                              AREA RECORD


                          RECORD STATISTIC-TYPE

DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
_________  ____ _____ ____  _________________

BINARY        4     1    4  RDW (2 BYTES LRECL, 2 BYTES RECFM)

****************************** SORT KEY ******************************
BINARY        1     5    5  RECORD TYPE;  VALUE = 01                 *
CHARACTER    18     6   23  AREA NAME                                 *
CHARACTER    18    24   41  RECORD NAME                               *
**********************************************************************

BINARY        1    42   42  STATISTIC-TYPE;  VALUE = 02

CHARACTER     2    43   44  NOT USED (ALIGNMENT)

BINARY        4    45   48  RECORD ID

BINARY        1    49   49  LOCATION MODE;
                             00 = VIA
                             01 = CALC
                             02 = DIRECT

CHARACTER     3    50   52  NOT USED (ALIGNMENT)

BINARY        4    53   56  PAGE NUMBER FOR START OF AREA SWEPT

BINARY        4    57   60  PAGE NUMBER FOR END OF AREA SWEPT
```

BINARY	4	61	64	LENGTH OF PAGE IN BYTES
BINARY	1	65	65	FIXED LENGTH RECORD INDICATOR; 00 =VARIABLE 01 = FIXED
CHARACTER	3	66	68	NOT USED (ALIGNMENT)

(CONTINUED)

Exhibit A.4a: Area Statistics Record, Record Record-Type

AREA RECORD

RECORD STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	69	72	LENGTH OF RECORD, IF FIXED
FLOAT PT	8	73	80	TOTAL NUMBER OF BYTES USED TO STORE THIS RECORD TYPE (COMPRESSED BYTES DATA ONLY)
FLOAT PT	8	81	88	TOTAL NUMBER OF BYTES NEEDED TO STORE THIS RECORD TYPE IF COMPRESSED RECORDS WERE DECOMPRESSED ZERO FOR FIXED LENGTH (DECOMPRESSED BYTES)
BINARY	4	89	92	LARGEST COMPRESSED LENGTH OF ONE OCCURRENCE OF THIS RECORD TYPE
BINARY	4	93	96	SMALLEST COMPRESSED LENGTH OF ONE OCCURRENCE OF THIS RECORD TYPE
BINARY	4	97	100	LARGEST DECOMPRESSED LENGTH OF ONE OCCURRENCE OF THIS RECORD TYPE
BINARY	4	101	104	SMALLEST DECOMPRESSED LENGTH OF ONE OCCURRENCE OF THIS RECORD TYPE
BINARY	4	105	108	NUMBER OF OCCURRENCES WITH FRAGMENTS
BINARY	4	109	112	GREATEST NUMBER OF FRAGMENTS FOR ONE RECORD OCCURRENCE
BINARY	4	113	116	FEWEST NUMBER OF FRAGMENTS FOR ONE RECORD OCCURRENCE WITH FRAGMENTS
CHARACTER	4	117	120	NOT USED (ALIGNMENT)

(CONTINUED)

Exhibit A.4b: Area Statistics Record, Record Record-Type

```
AREA RECORD

RECORD STATISTIC-TYPE (CONTINUED)

DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
_________  ____ _____ ____  _________________

FLOAT PT      8   121  128  NUMBER OF BYTES TO STORE FRAGMENTS DATA ONLY

FLOAT PT      8   129  136  NUMBER OF BYTES THAT COULD BE RETURNED
                            TO HOME PAGE IF A REORG WAS PERFORMED
                            (FRAGMENT BYTES)

BINARY        4   137  140  NUMBER OF RECORDS THAT WERE COMPRESSED

CHARACTER     4   141  144  NOT USED (ALIGNMENT)

FLOAT PT      8   145  152  NUMBER OF BYTES SAVE BY COMPRESSION

BINARY        4   153  156  GREATEST NUMBER OF BYTES SAVED BY
                            COMPRESSION FOR A SINGLE RECORD OCCURRENCE

BINARY        4   157  160  FEWEST NUMBER OF BYTES SAVED BY
                            COMPRESSION FOR A SINGLE RECORD OCCURRENCE

BINARY        4   161  164  NUMBER OF OCCURRENCES THAT WERE RELOCATED

CHARACTER     4   165  168  NOT USED (ALIGNMENT)

FLOAT PT      8   169  176  NUMBER OF BYTES USED TO STORE RELOCATED
                            OCCURRENCES DATA ONLY

FLOAT PT      8   177  184  NUMBER OF BYTES THAT COULD BE RETURNED
                            TO HOME PAGE IF A REORG WAS PERFORMED
                            (RELOCATED BYTES)

BINARY        4   185  188  NUMBER OF OCCURRENCES THAT WERE LOGICALLY
                            DELETED

CHARACTER     4   189  192  FILLER

                       (CONTINUED)
```

Exhibit A.4c: Area Statistics Record, Record Record-Type

```
AREA RECORD

RECORD STATISTIC-TYPE (CONTINUED)
```

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
FLOAT PT	8	193	200	NUMBER OF BYTES USED TO STORE LDEL OCCURRENCES
BINARY	4	201	204	NUMBER OF OCCURRENCES STORE OUT OF PHYSICAL SEQUENTIAL
CHARACTER	44	205	248	FILLER
BINARY	40	249	288	TEN ELEMENT ARRAY IN WHICH EACH ELEMENT REPRESENTS A PAGE NUMBER THAT DELIMITS A RANGE OF PAGE NUMBERS USED TO GATHER DISTRIBUTION STATISTICS
BINARY	40	289	328	TEN ELEMENT ARRAY IN WHICH EACH ELEMENT DELIMITS A RANGE BOUND OF NUMBER OF BYTES SAVED DUE TO COMPRESSION
BINARY	40	329	368	TEN ELEMENT ARRAY IN WHICH EACH ELEMENT REPRESENTS THE NUMBER OF RECORDS OCCURRING WITHIN EACH PAGE RANGE
BINARY	40	369	408	TEN ELEMENT ARRAY IN WHICH EACH ELEMENT REPRESENTS THE NUMBER OF FRAGMENTS OCCURRING WITHIN EACH PAGE RANGE
BINARY	40	409	448	TEN ELEMENT ARRAY IN WHICH EACH ELEMENT REPRESENTS THE NUMBER OF RECORDS WITH COMPRESSION SAVINGS FOR EACH OF TEN RANGES

Exhibit A.4d: Area Statistics Record, Record Record-Type

RECORD RECORD

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	1	4	RDW (2 BYTES LRECL, 2 BYTES RECFM)
****************************** SORT KEY ******************************				
BINARY	1	5	5	RECORD TYPE; VALUE = 02 *
CHARACTER	18	6	23	RECORD NAME *
CHARACTER	18	24	41	VALUE = SPACES *
**********				

```
THE RECORD RECORD IS IDENTICAL TO THE AREA RECORD RECORD STATISTIC-TYPE
FROM BYTE 42 TO 448.
```

Exhibit A.5: Record Statistics Record

```
                              SET RECORD

                           SET STATISTIC-TYPE

DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
_________  ____ _____ ____  _________________

BINARY        4     1    4  RDW (2 BYTES LRECL, 2 BYTES RECFM)

****************************** SORT KEY ******************************
BINARY        1     5    5  RECORD TYPE;  VALUE = 03                 *
CHARACTER    18     6   23  SET NAME OR AREA NAME IF THE CALC SET    *
CHARACTER    18    24   41  VALUE = SPACES                           *
**********************************************************************

BINARY        1    42   42  STATISTIC TYPE;  VALUE = 03

BINARY        1    43   43  VIA SET INDICATOR;
                             00 = OWNS NO VIA RECORDS
                             01 = OWNS A VIA RECORD

BINARY        1    44   44  MULTI-MEMBER SET INDICATOR;
                             00 = NOT A MULTIMEMBER SET
                             01 = A MULTIMEMBER SET

BINARY        1    45   45  CALC SET INDICATOR;
                             00 = NOT THE CALC
                             01 = CALC SET

BINARY        1    46   46  SR8 INDEX SET INDICATOR;
                             00 = NOT IIX SET
                             01 = IIX SET

CHARACTER    18    47   64  OWNER RECORD NAME

CHARACTER    18    65   82  MEMBER RECORD NAME

CHARACTER     2    83   84  NOT USED (ALIGNMENT)

BINARY        4    85   88  NUMBER OF OWNER RECORD OCCURRENCES

FLOAT PT      8    89   96  NUMBER OF BYTES TO STORE ALL OWNER RECORDS

                        (CONTINUED)
```

Exhibit A.6a: Set Statistics Record, Set Record-Type

SET RECORD

SET STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	97	100	NUMBER OF MEMBER RECORD OCCURRENCES
CHARACTER	4	101	104	NOT USED (ALIGNMENT)
FLOAT PT	8	105	112	NUMBER OF BYTES TO STORE ALL MEMBER RECORDS
FLOAT PT	8	113	120	NUMBER OF BYTES TO STORE ALL SR8 RECORDS
BINARY	4	121	124	NUMBER OF LDEL RECORD OCCURRENCES
CHARACTER	4	125	128	NOT USED (ALIGNMENT)
FLOAT PT	8	129	136	NUMBER OF BYTES TO STORE ALL LDEL RECORDS
BINARY	4	137	140	GREATEST NUMBER OF MEMBER RECORDS ENCOUNTERED WHILE WALKING A SINGLE SET OCCURRENCE
BINARY	4	141	144	FEWEST NUMBER OF MEMBER RECORDS ENCOUNTERED WHILE WALKING A SINGLE SET OCCURRENCE
BINARY	4	145	148	THE SUM OF THE CLUSTER SPREADS FOR ALL SET OCCURRENCES (CLUSTER SPREAD = THE NUMBER OF DIFFERENT PAGES ON WHICH MEMBER RECORDS OCCUR WHILE WALKING A SET)
BINARY	4	149	152	GREATEST NUMBER OF DIFFERENT PAGES ENCOUNTERED WHILE WALKING A SINGLE SET OCCURRENCE

(CONTINUED)

Exhibit A.6b: Set Statistics Record, Set Record-Type

SET RECORD

SET STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	153	156	FEWEST NUMBER OF DIFFERENT PAGES ENCOUNTERED WHILE WALKING A SINGLE SET OCCURRENCE
BINARY	4	157	160	TOTAL NUMBER OF VIA RECORDS
BINARY	4	161	164	TOTAL NUMBER OF VIA RECORDS ON TARGET PAGE
BINARY	4	165	168	GREATEST NUMBER OF VIA RECORDS ON TARGET PAGE FOR A SINGLE SET OCCURRENCE
BINARY	4	169	172	FEWEST NUMBER OF VIA RECORDS ON TARGET PAGE FOR A SINGLE SET OCCURRENCE
BINARY	4	173	176	TOTAL NUMBER OF VIA RECORDS ON OVERFLOW
BINARY	4	177	180	GREATEST NUMBER OF VIA RECORDS ON OVERFLOW FOR A SINGLE SET OCCURRENCE
BINARY	4	181	184	FEWEST NUMBER OF VIA RECORDS ON OVERFLOW FOR A SINGLE SET OCCURRENCE
BINARY	4	185	188	TOTAL NUMBER OF TIMES THE PAGE NUMBER CHANGED WHILE WALKING ALL SET OCCURRENCES
BINARY	4	189	192	GREATEST NUMBER OF TIMES THE PAGE NUMBER CHANGED WHILE WALKING A SINGLE SET OCCURRENCE
BINARY	4	193	196	FEWEST NUMBER OF TIMES THE PAGE NUMBER CHANGED WHILE WALKING A SINGLE SET OCCURRENCE

(CONTINUED)

Exhibit A.6c: Set Statistics Record, Set Record-Type

SET RECORD

SET STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION

```
BINARY        4   197  200  NUMBER OF SET OCCURRENCES WITHOUT ANY
                            PAGE CHANGES WHILE WALKING THE MEMBERS
                            OF THE SET

BINARY        4   201  204  NUMBER OF MEMBER OCCURRENCES IN A NON-
                            CALC MULTI-MEMBER SET NOT STORED VIA
                            THE MULTI-MEMBER SET OWNER

BINARY        4   205  208  GREATEST NUMBER OF MEMBER OCCURRENCES
                            IN A NON-CALC MULTI-MEMBER SET NOT
                            STORED VIA THE MULTI-MEMBER SET OWNER
                            ENCOUNTERED WHILE WALKING A SINGLE
                            SET OCCURRENCE

BINARY        4   209  212  FEWEST NUMBER OF MEMBER OCCURRENCES
                            IN A NON-CALC MULTI-MEMBER SET NOT
                            STORED VIA THE MULTI-MEMBER SET OWNER
                            ENCOUNTERED WHILE WALKING A SINGLE
                            SET OCCURRENCE

BINARY       80   213  292  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                            REPRESENTS:
                              - THE NUMBER OF MEMBER OCCURRENCES
                                HI-BOUND (4 BYTES)
                              - THE NUMBER OF OWNER OCCURRENCES WHICH
                                FALL WITHIN THE RANGE (4 BYTES)

BINARY       80   293  374  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                            REPRESENTS:
                              - THE CLUSTER SPREAD HI-BOUND (4 BYTES)
                              - THE NUMBER OF SET OCCURRENCES WHICH
                                FALL WITHIN THE RANGE (4 BYTES)
```

Exhibit A.6d: Set Statistics Record, Set Record-Type

```
                          SET RECORD


                    MEMBER STATISTIC-TYPE

DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
---------  ---- ----- ----  -----------------

BINARY        4     1    4  RDW (2 BYTES LRECL, 2 BYTES RECFM)

***************************** SORT KEY ******************************
BINARY        1     5    5  RECORD TYPE;  VALUE = 03                 *
CHARACTER    18     6   23  SET NAME OR AREA NAME IF THE CALC SET    *
CHARACTER    18    24   41  MEMBER RECORD NAME                       *
```

```
*********************************************************************

BINARY        1    42   42  STATISTIC TYPE;  VALUE = 04

CHARACTER     2    43   44  NOT USED (ALIGNMENT)

BINARY        4    45   48  RECORD ID

BINARY        4    49   52  NUMBER OF MEMBER RECORD OCCURRENCES

CHARACTER     4    53   56  NOT USED (ALIGNMENT)

FLOAT PT      8    57   64  NUMBER OF BYTES TO STORE MEMBER RECORDS

BINARY        4    65   68  GREATEST NUMBER OF MEMBER OCCURRENCES OF
                            OF THIS RECORD TYPE ENCOUNTERED WHILE
                            WALKING A SINGLE SET OCCURRENCE

BINARY        4    69   72  FEWEST NUMBER OF MEMBER OCCURRENCES OF
                            OF THIS RECORD TYPE ENCOUNTERED WHILE
                            WALKING A SINGLE SET OCCURRENCE

BINARY        4    73   76  NUMBER OF LOGICALLY DELETED RECORDS

CHARACTER     4    77   80  NOT USED (ALIGNMENT)

FLOAT PT      8    81   88  NUMBER OF BYTES TO STORE LDEL RECORDS

CHARACTER    48    89  136  FILLER
```

Exhibit A.7: Set Statistics Record, Member Record-Type

SR8 INDEX RECORD

SR8 INDEX STATISTIC-TYPE

```
DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
---------  ---- ----- ----  -----------------

BINARY        4     1    4  RDW (2 BYTES LRECL, 2 BYTES RECFM)

****************************** SORT KEY ******************************
BINARY        1     5    5  RECORD TYPE;  VALUE = 05                *
CHARACTER    18     6   23  SR8 INDEX NAME                          *
CHARACTER    18    24   41  VALUE = SPACES                          *
*********************************************************************

BINARY        1    42   42  STATISTIC TYPE;  VALUE = 05
```

CHARACTER	18	43	60	RECORD NAME OF SR8 INDEX SET OWNER
CHARACTER	18	61	78	SR8 INDEXED RECORD NAME
CHARACTER	2	79	80	NOT USED (ALIGNMENT)
FLOAT PT	8	81	88	TOTAL SIZE OF SR8 INDEX SET IN BYTES
BINARY	4	89	92	MAXIMUM NUMBER OF BYTES FOR AN SR8 IN THIS INDEX SET
BINARY	4	93	96	MAXIMUM LENGTH OF ONE TABLE ENTRY NOT INCLUDING SYMBOLIC KEY LENGTH
BINARY	4	97	100	MAXIMUM LENGTH OF SYMBOLIC KEY
BINARY	4	101	104	HOME PAGE NUMBER FOR THIS INDEX SET

(CONTINUED)

Exhibit A.8a: SR8 Index Statistics Record, SR8 Index Record-Type

SR8 INDEX RECORD

SR8 INDEX STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
BINARY	4	105	108	DISPLACEMENT OF SR8 FOR HOME PAGE DEFINED IN SCHEMA
BINARY	2	109	110	MAXIMUM NUMBER OF ENTRIES IN AN SR8 AS DEFINED BY SUBSCHEMA
BINARY	2	111	112	MAXIMUM NUMBER OF LEVELS FOR A SINGLE OCCURRENCE OF AN INDEX SET
BINARY	4	113	116	NUMBER OF UPPER LEVEL SR8 RECORDS
BINARY	4	117	120	MAXIMUM NUMBER OF PAGES UPPER LEVEL IS SPREAD ACROSS
BINARY	4	121	124	NUMBER OF BOTTOM LEVEL SR8 RECORDS
BINARY	4	125	128	MAXIMUM NUMBER OF PAGES BOTTOM LEVEL IS SPREAD ACROSS

```
BINARY        1   129  129  SET MEMBERSHIP TYPE;
                            0 MA
                            1 MM
                            2 OA
                            3 OM

BINARY        1   130  130  DUPLICATE CONTROL OPTION;
                            0 DN
                            1 DF
                            2 DL

BINARY        1   131  131  SEQUENCE OPTION;
                            0 ASC
                            2 DES
                            2 MATCH
                            3 NOT SORTED

BINARY        1   132  132  COMPRESSED SYMBOLIC KEY OPTION;
                            O COMPRESSED
                            1 NOT COMPRESSED

BINARY        1   133  133  SET ORDER OPTION;
                            0 PRIOR/LAST
                            1 SORTED
                            2 NEXT FIRST

BINARY        1   134  134  SORTED SET TYPE;
                            0 UNSORTED
                            1 SORTED DBK
                            2 SORTED SYMK

                       (CONTINUED)
```

Exhibit A.8b: SR8 Index Statistics Record, SR8 Index Record-Type

```
SR8 INDEX RECORD

SR8 INDEX STATISTIC-TYPE (CONTINUED)

DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
_________  ____ _____ ____  ________________

CHARACTER     2   135  136  NOT USED (ALIGNMENT)

BINARY        4   137  140  NUMBER OF UPPER LEVEL TABLE ENTRIES USED
                            IN ALL SR8 RECORDS

BINARY        4   141  144  MAXIMUM NUMBER OF UPPER LEVEL TABLE
                            ENTRIES USED IN A SINGLE SR8 RECORD
```

BINARY	4	145	148	MINIMUM NUMBER OF UPPER LEVEL TABLE ENTRIES USED IN A SINGLE SR8 RECORD
BINARY	4	149	152	NUMBER OF BOTTOM LEVEL TABLE ENTRIES USED IN ALL SR8 RECORDS
BINARY	4	153	156	MAXIMUM NUMBER OF BOTTOM LEVEL TABLE ENTRIES USED IN A SINGLE SR8 RECORD
BINARY	4	157	160	MINIMUM NUMBER OF BOTTOM LEVEL TABLE ENTRIES USED IN A SINGLE SR8 RECORD
BINARY	4	161	164	MAXIMUM UPPER LEVEL SYMBOLIC KEY COMPRESSED LENGTH
BINARY	4	165	168	MAXIMUM BOTTOM LEVEL SYMBOLIC KEY COMPRESSED LENGTH
FLOAT PT	8	169	176	TOTAL NUMBER OF UPPER LEVEL ORPHAN COUNTS
FLOAT PT	8	177	184	TOTAL NUMBER OF BOTTOM LEVEL ORPHAN COUNTS
BINARY	4	185	188	NUMBER OF BOTTOM LEVEL SR8 RECORDS THAT ARE ALSO TOP LEVEL SR8 RECORDS

(CONTINUED)

Exhibit A.8c: SR8 Index Statistics Record, SR8 Index Record-Type

SR8 INDEX RECORD

SR8 INDEX STATISTIC-TYPE (CONTINUED)

DATA TYPE	SIZE	START	STOP	FIELD DESCRIPTION
CHARACTER	4	189	192	NOT USED (ALIGNMENT)
FLOAT PT	8	193	200	MAXIMUM NUMBER OF UPPER LEVEL ORPHANS FOR A SINGLE OWNER OCCURRENCE
FLOAT PT	8	201	208	MINIMUM NUMBER OF UPPER LEVEL ORPHANS FOR A SINGLE OWNER OCCURRENCE
FLOAT PT	8	209	216	MAXIMUM NUMBER OF BOTTOM LEVEL ORPHANS FOR A SINGLE OWNER OCCURRENCE
FLOAT PT	8	217	224	MINIMUM NUMBER OF BOTTOM LEVEL ORPHANS

```
                                FOR A SINGLE OWNER OCCURRENCE

CHARACTER     4   225  228  NOT USED (ALIGNMENT)

BINARY       40   229  268  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS THE HI-BOUND VALUES FOR
                             BOTTOM LEVEL TABLE ENTRIES

BINARY       40   269  308  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS THE HI-BOUND VALUES FOR
                             UPPER LEVEL TABLE ENTRIES

BINARY       40   309  348  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS THE NUMBER OF TABLE ENTRIES
                             USED IN THE UPPER LEVEL SR8 RECORDS
                             FOR A PARTICULAR RANGE

BINARY       40   349  388  TEN ELEMENT ARRAY IN WHICH EACH ELEMENT
                             REPRESENTS THE NUMBER OF TABLE ENTRIES
                             USED IN THE BOTTOM LEVEL SR8 RECORDS
                             FOR A PARTICULAR RANGE
```

Exhibit A.8c: SR8 Index Statistics Record, SR8 Index Record-Type

```
                                FOOTER RECORD


DATA TYPE  SIZE START STOP  FIELD DESCRIPTION
_________  ____ _____ ____  _________________

BINARY        4     1    4  RDW (2 BYTES LRECL, 2 BYTES RECFM)

****************************** SORT KEY ******************************
BINARY        1     5    5  RECORD TYPE;  VALUE = 08                 *
CHARACTER    18     6   23  VALUE = 'FOOTER          '               *
CHARACTER    18    24   41  VALUE = SPACES                           *
**********************************************************************

BINARY        1    42   42  STATISTIC TYPE;  VALUE = 08

CHARACTER     5    43   47  RELEASE NUMBER

CHARACTER     6    48   53  INSTALLATION TAPE ID

CHARACTER    60    54  113  FILLER
```

Exhibit A.9: Footer Statistics Record

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