CA JARS® Resource Accounting

Interfaces Guide

Release 12.7

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This document references the following CA products:

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- CA Auditor for z/OS
- CA Common Services for z/OS
- CA MICS® Resource Management
- CA Service Desk
- CA SMF Director®
- CA Top Secret® for z/OS

Documentation Changes

The following documentation updates have been made since the last release of this documentation:

Note: In PDF format, page references identify the first page of the topic in which a change was made. The actual change may appear on a later page.

- Updated The DB2 Interface (see page 89) section.

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Chapter 1: The ADABAS Interface

The ADABAS Interface is distributed as part of the CA JARS Resource Accounting family of programs. It provides users of Software AG's ADABAS database management package with the reporting capabilities of CA JARS. Through the use of this interface, you can use the Report Writer to report on ADABAS log records.

This section contains the following topics:

User Tables

Execution of the ADABAS Interface requires that you create, assemble, and link-edit several tables. These *user tables* contain specific information describing your installation. Sample user tables, that may be used as a basis for customization can be found in the CAJRSAMP library. The macros required for assembly can be found in CAJRMAC. A general description of each of these user tables is now provided.

Environment Table

The Environment Table is built by assembling and linking a set of QENVR macro statements. It defines the run time environment for the ADABAS Interface. Using this table you specify:

- the data elements on which you wish to have the ADABAS log records sorted and summarized
- the job name(s) for the teleprocessing monitors used at your installation(s) to distinguish online and batch usage
- the default format buffer length needed to compute the estimated CPU time.

CPU Table

The CPU Table lists the instruction speed of several CPUs from various manufacturers. The interface uses the CPU instruction speed to compute the estimated CPU time according to formulas described in Software AG's SAGTIP009.

The CPU Table is built by assembling and linking a set of QCPU macro statements.

Each entry in the CPU Table is also assigned:

- an *installation correction factor* that you compute.
- a *one-character CPU ID* that you specify at run time via CAIJRIN to select a predetermined entry from this table. This CPU ID mechanism allows you to process ADABAS data from several CPUs through multiple runs of the interface without reassembling the CPU Table.

Account Code Table

The Account Code Table gives you the ability to assign *account codes* to combinations of job names and user IDs.

The Account Code Table is built by assembling and linking a set of QAACT macro statements.

The ADABAS Interface scans the Account Code Table for an entry whose job name and user ID match an ADABAS log record's job name and user ID. Each Account Code Table entry is compared character-by-character. An asterisk (*) in any position of the job name or user ID forces the remaining characters of the job name and/or user ID to be treated as a match. The account code from the first entry to match the log record is inserted into the CA JARS output record. If no match is found, the output account code is left blank.

Record Descriptions and Processing Rules

ADABAS Command Log Record Description

The following table describes the ADABAS Version 5 command log record. The corresponding DSECT can be found in CAJRSAMP member ADAEXIT. The ADABAS Interface can also process Version 4 command log records. When Version 4 command log records are encountered, they are internally converted to the Version 5 format.

ADABAS Command Log Record Layout:

Field Name	Field Position	Field Length	F*	Description
LOGRTYPE	1	2	b	Record Type
LOGVER	3	2	a	Log Version c'52'
LOGTIMI	5	8	b	Time Command Completed
LOGBUFT	13	1	b	Buffer Type
LOGPRTY	14	1	b	OS Dispatching Priority
LOGCTYPE	15	1	b	Command Type
LOGNECBS	16	1	b	Number of posted ECB's
LOGTHDNR	17	1	b	Thread Number
LOGBFLAG	18	1	b	User Buffer Flag
LOGNUPDS	19	2	b	Descriptors Updated
LOGJNAME	21	8	a	Job Name
LOGCPUID	29	8	b	Hex CPU ID
LOGVMJD	37	8	b	VM ID
LOGOSJD	45	4	b	OS ID
LOGUSER	49	8	a	User ID
LOGDUR	57	4	b	Duration, in units of 16 microseconds
LOSSEQNO	61	4	b	Command Sequence number
LOSDBID	65	2	b	Database ID
LOGASSOI	67	2	b	No. Associator I/Os
LOGDATAI	69	2	b	No. Data I/Os

Field Name	Field Position	Field Length	F*	Description
LOGWORKI	71	2	b	No. Work I/Os
LOGSIBAI	73	2	b	No. Siba I/Os
LOGARCH	75	1	b	Architecture Type
RESERVED	76	3	b	Reserved
	79	2	b	Slack Byte
LOGREV	81	4	b	Review
LOGNUCID	85	2	b	SMP/ADAPLEX NUC ID
RESERVED	87	2	b	Reserved
RESERVED	89	2	a	Reserved
LOGCMD	91	2	a	Command Code
LOGCID	93	4	a	Command ID
LOGFNR	97	2	b	File Number
LOGRSP	99	2	b	Response Code
LOGISN	101	4	b	Internal Sequence Number
LOGISL	105	4	b	ISN Lower Limit
LOGISQ	109	4	b	ISN Quantity
LOGFBL	113	2	b	Format Buffer Length
LOGRBL	115	2	b	Record Buffer Length
LOGSBL	117	2	b	Search Buffer Length
LOGVBL	119	2	b	Value Buffer Length
LOGIBL	121	2	b	ISN Buffer Length
LOGOP1C	123	1	c	Command Options 1
LOGOP2C	124	1	c	Command Options 2
LOGAD1	125	8	c	Additions 1 Field
LOGAD2C	133	4	c	Additions 2 Field
LOGAD3	137	8	c	Additions 3 Field
LOGAD4	145	8	c	Additions 4 Field
LOGAD5	153	8	a	Additions 5 Field
LOGCMTM	161	4	b	Command Time

Field Name	Field Position	Field Length	F*	Description
LOGUSFLD	165	4	b	User Field
Format Indicator a=alphameric b=binary c=character				

CA JARS Data Element Assignments for ADABAS

The following table associates a processing rule with each of the fields in the CA JARS record supplied by the ADABAS Interface.

Processing rule IDs (column 3) are described on the next page.

CA JARS Data Element Assignments For ADABAS Data:

CA JARS Element	Source ADA/Literal	Processing Rule ID
CPU ID	'S'	9
File ID	'7'	9
Reader Start Date	LOGTIMI-LOGDUR	2
Reader Start Time	LOGTIMI-LOGDUR	2
Job Name	LOGJNAME	1
Job/Step Ind	'11'	9
Step Number		3
Processing ID	'C'	9
Record ID	'*ADABAS*'	9
Start Time	LOGTIMI-LOGDUR	2
Start Date	LOGTIMI-LOGDUR	2
Job Class	LOGCMD	1
Stop Time	LOGTIMI	4
Programmer Name	LOGPHUID+LOGJNAME+LOGCMD	5
Step Name	LOGPHUID	1
Program Name	LOGCMD+LOGFNR	5
Elapsed Time	LOGDUR	6
Estimated CPU Time		7
Rdr I/O Count	LOGASSOI	10

CA JARS Element	Source ADA/Literal	Processing Rule ID
Prt I/O Count	LOGWORKI	10
Other I/O Count	LOGDATAI	10
Total I/O Count	LOGASSOI+LOGWORKI+LOGDAT	10
Day of Week Code	LOGTIMI-LOGDUR	8
Reserved Field 1	'YNNNNN'	9

Processing Rules

1. Straight Move: For character fields, left-justified if possible, low-order character truncation of blank filling; for numeric field, type conversion is permitted; high-order digit truncation may be possible but is considered unlikely; scale must not change.
2. Derive date and time from STCK start time. Keep the minimum start date and time from the log records that created the summary record.
3. Number of log records that created the summary record.
4. Derive the date and time from STCK end time. Keep the maximum end time from the log records that created the summary record.
5. Concatenate items with dashes.
6. Convert units in 16 microseconds to JARS MINUTES, DEC=5.
7. Compute estimated CPU time according to the formulas described in SAGTIP009.
8. Derive day of week code from result of rule 2.
9. Constant
10. Accumulated according to user-specified keys in QENVR table.

Estimated CPU Time

The calculation of *estimated CPU time* is represented by instruction path counts within ADABAS commands and the executing CPU instruction execution, per second, factored by the ADABAS job CPU time as logged by SMF.

The *estimated CPU time* element is approximated by the interface as documented by Software AG's SAGTIP009. Its accuracy ultimately depends on:

1. The reliability of the user-supplied factors.
2. The stability of ADABAS itself. (As enhancements are made to ADABAS, the instruction paths change.)

Operating Instructions

User Table Customization

You must supply installation-specific information to the ADABAS Interface through *user tables*. The Environment and CPU Tables are required; the Account Code Table is optional. Each table corresponds to a set of QENVR, QCPU, or QAACT macro statements. These are described in this section.

Sample user tables, which may be used as a starting point for your installation, can be found in CAJRSAMP. These should be modified to suit your needs and assembled with //SYSLIB pointing or concatenated to CAJRMAC. At linkage editor time, the ENTRY and NAME statements should be used with the appropriate table. For example:

```
ENTRY  JSIQENVR
NAME   QENVR(R)
```

These statements should be used to link QENVR. User table load modules must reside in one of the following libraries:

- SYS1.LINKLIB
- the library in which the ADABAS Interface resides (that is, STEPLIB)
- a library concatenated to the library corresponding to STEPLIB for ADABAS Interface processing

Note: The load library contains user tables that are meaningful only for the Installation Verification Procedure.

QENVR Environment Macro

```
             Macro      Operands

 name        QENVR      KEYS=(element name,...,...)
                        [,DEFFBL=-nn|50-]
                        [,TPNAMES=(name,...,...)]
```

name

is the name of the generated CSECT. The default name is JSIQENVR.

KEYS=

specifies, in a sublist, the element names on which the ADABAS log records are to be sorted and summarized. Valid element names are: JOBNAME, USERID, CMDCODE, and FILENUM.

DEFFBL=

specifies the default format buffer length in case you run ADABAS with LOGCB=NO.

TPNAMES=

specifies, in a sublist, the job name(s) for the teleprocessing monitor(s) used at your installation(s).

Usage Notes:

1. The four data elements JOBNAME, USERID, CMDCODE, and FILENUM provide you with options for summarizing the ADABAS log records. These data elements can be specified in any order or combination on the KEYS parameter.
2. It should be noted that the greater the detail of summarization (number of keys), the greater the number of records written by the ADABAS Interface. Processing time also increases.
3. For most utilization requirements, JOBNAME, USERID, and CMDCODE should be quite sufficient.
4. The TPNAMES operand must be coded to cause translation of the ADABAS user ID for teleprocessing users when processing Version 4 ADABAS log records. ADABAS log records in Version 5 (CLOGLAYOUT=5) format do not require translation and will be passed as they are found in the log records.

The following is a sample Environment Table that you can modify and assemble. It is included as member JSIQENVR in the source library. The load module name for the Environment Table must be QENVR.

```
JSIQENVR QENVR KEYS=(JOBNAME,USERID,CMDCODE),                        *
               DEFFBL=50,                                            *
               TPNAMES=COMPLETE
*
         END
```

QCPU CPU Macro

```
              Macro       Operands
  name        QCPU        TYPE=INITIAL   (generates a header for the CPU Table)

              QCPU        TYPE=ENTRY,    (generates a CPU Table entry)
                          MODEL='cpu model name',
                          IPS=nnnnnnnnn,
                          CORRFCT=nnnnnnnnn,
                          CPUID=a

              QCPU        TYPE=FINAL     (generates a trailer for the CPU Table)
```

name

is the name of the generated CSECT. The default name is JSIQCPU.

MODEL=

specifies, in a quoted string, the CPU model that this entry defines (1-16 characters alphanumeric).

IPS=

specifies this entry's instruction speed in IPS (Instructions Per Second) in decimal (1 to 9 digits).

CORRFCT=

specifies the installation correction factor (1 to 9 digits). Initially, the correction factor should be set to a value of '1'. After processing data for an entire ADABAS session, obtain the total Estimated CPU Time (ECPU) using the sample ADABAS Utilization Report as shown in Figure 1-3. The total Estimated CPU time (ECPU) in conjunction with the total CPU Time captured by SMF (SCPU) for the same ADABAS session, can be used to compute your installation correction factor (CORRFCT) as follows:

CORRFCT = CSPU / ECPU

CPUID=

specifies the assigned identifier for this entry (1 character alphanumeric).

The following is a sample CPU Table that you can modify and assemble. It is included as member JSIQCPU in CAJRSAMP. The load module name for the CPU Table must be QCPU.

```
JSIQCPU  QCPU  TYPE=INITIAL
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='IBM 370/138',                                    *
               IPS=240000,                                             *
               CORRFCT=1,                                              *
               CPUID=1
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='IBM 370/148',                                    *
               IPS=500000,                                             *
               CORRFCT=1,                                              *
               CPUID=2

         QCPU  TYPE=ENTRY,                                             *
               MODEL='ESP-36',                                         *
               IPS=540000,                                             *
               CORRFCT=1,                                              *
               CPUID=3
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='ESP-41',                                         *
               IPS=750000,                                             *
               CORRFCT=1,                                              *
               CPUID=4
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='IBM 4341-1',                                     *
               IPS=750000,                                             *
               CORRFCT=1,                                              *
               CPUID=5
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='IBM 370/158-3',                                  *
               IPS=920000,                                             *
               CORRFCT=1,                                              *
               CPUID=6
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='IBM 3031',                                       *
               IPS=1200000,                                            *
               CORRFCT=1,                                              *
               CPUID=7
*
         QCPU  TYPE=ENTRY,                                             *
               MODEL='IBM 370/168-3',                                  *
```

```
                  IPS=2700000,                                        *
                  CORRFCT=1,                                          *
                  CPUID=8
*
         QCPU   TYPE=ENTRY,                                           *
                MODEL='IBM 3032',                                     *
                IPS=2700000,                                          *
                CORRFCT=1,                                            *
                CPUID=9
*
         QCPU   TYPE=ENTRY,                                           *
                MODEL='AMDAHL 470/V6',                                *
                IPS=4000000,                                          *
                CORRFCT=1,                                            *
                CPUID=A
*
         QCPU   TYPE=ENTRY,                                           *
                MODEL='IBM 3033',                                     *
                IPS=4530000,                                          *
                CORRFCT=1,                                            *
                CPUID=B
*
         QCPU   TYPE=ENTRY,                                           *
                MODEL='AMDAHL 470/V7',                                *
                IPS=4910000,                                          *
                CORRFCT=1,                                            *
                CPUID=C
*
*
         QCPU   TYPE=FINAL
         END
```

QAACT Account Code Macro

```
                 Macro     Operands
      name       QAACT     TYPE=INITIAL   (generates a header for the Account
                                          Code Table)

                 QAACT     TYPE=ENTRY,    (generates an Account Code Table entry)
                           JOBNAME=jobname,

                           USERID=nnnnn,

                              ZFILL= YES|NO ,

                           ACTCODE='account code'

                 QAACT     TYPE=FINAL     (generates a trailer for the Account
                                          Code Table)
```

name

is the name of the generated CSECT. The default name is JSIQAACT.

JOBNAME=

specifies the entry's job name. An asterisk (*) in any position treats the remaining characters of the job name as a match (1-8 characters alphanumeric).

USERID=

specifies the entry's user ID. An asterisk (*) in any position treats the remaining characters of the user ID as a match (1-8 digits).

ZFILL=

specifies whether this entry's user ID should be right-justified with zero-padding on the left (YES) or left-justified and padded with blanks on the right (NO, default). ZFILL=YES should only be specified if you are processing ADABAS Version 4 format records.

ACTCODE=

specifies, in a quoted string, the assigned account code for this combination of job name and user ID (1-16 characters alphanumeric).

The following is a sample Account Code Table that you can modify and assemble. It is included as member JSIQAACT in CAJRSAMP. The load module name for the Account Code Table must be QAACT.

```
JSIQAACT  QAACT TYPE=INITIAL
*
          QAACT TYPE=ENTRY,                                            *
                JOBNAME=COMPLETE,                                      *
                USERID=616,                                            *
                ZFILL=YES,                                             *
                ACTCODE='ANDRIANI'
          QAACT TYPE=ENTRY,                                            *
                JOBNAME=COMPLETE,                                      *
                USERID=527,                                            *
                ZFILL=YES,                                             *
                ACTCODE='GREEN'
           QAACT TYPE=ENTRY,                                           *
                 JOBNAME=COMPLETE,                                     *
                 USERID=604,                                           *
                 ZFILL=YES,                                            *
                 ACTCODE='BERGERIS'
           QAACT TYPE=ENTRY,                                           *
                 JOBNAME=CICS*,                                        *
                 USERID=L233,                                          *
                 ACTCODE='JOHNSON'
*
           QAACT TYPE=FINAL
           END
```

Operations

Execution of the ADABAS Interface requires a minimum region size of 200K. In addition, several interrelated files are also required. The following list describes these required data sets and their functions:

DDName	Description
STEPLIB	This statement describes the load library that was loaded from the distribution tape.
CAIJFPR	This statement describes the SYSOUT data set for generated display messages.
CAIJFSN	This statement describes a SYSOUT data set for generated SNAP dumps.
SYSUDUMP	This statement describes a SYSOUT data set for dump output in the case of an abnormal termination.

DDName	Description
CAIJRADA	This statement describes the ADABAS log file to be processed by the interface.
CAIJRJAR	This statement describes the output file written by the interface. It is this file that is later input to the Report Writer. This file must have the following attributes: RECFM=VB LRECL=612 BLKSIZE=6233
CAISACT	This optional DD statement indicates to the interface that EXTDATA records are to be written as well. The file must have these attibutes: RECFM=VB LRECL=8188 BLKSIZE=minimum 8192
SORTLIB	This statement describes the load library that contains the installation's SORT modules.
SORTMSG	This statement describes the SYSOUT data set for generated SORT messages.
SORTWKnn	These statements describe the temporary data sets used as sort work areas during the sort phase.
CAIJRIN	This statement describes the data set that contains the CPU-ID control statement.

The input CPU-ID is entered via CAIJRIN with a CPU-ID statement in the following format:

Field Name	Field Position	Field Length	Format	Notes
Statement Type	1-6	6	a	CPUID=
CPU-ID	7	1	a	CPU-ID from CPU Table

The following sample JCL can be used to execute the ADABAS Interface. It is included as member ADAINTR in CAJRJCL. Sample output from a run using a slightly modified version of this JCL can be found in in the Sample Reports section of this chapter.

Sample JCL for ADABAS Interface Execution:

```
//ADAINTR  JOB ...,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS ADABAS INTERFACE TO
//*        PRODUCE A JARS LEVEL 7 HISTORY FILE.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . SORTLIB  DSN= PDS CONTAINING THE SORT MODULE
//*          . CAIJRADA DSN= ADABAS COMMAND LOG FILE   (INPUT)
//*          . CAIJRJAR DSN= CA JARS LEVEL 7 HISTORY FILE (OUTPUT)
//*          . CAIJRIN  CPUID= 1 CHARACTER ALPHANUMERIC CPU IDENTIFIER
//*
//*        VOLUME AND UNIT DESIGNATORS WHICH POINT TO THE ACTUAL
//*        VOLUMES ON WHICH YOUR DATA SETS RESIDE AND SPACE
//*        PARAMETERS WHICH CORRESPOND TO THE SIZE OF YOUR DATA
//*        MUST ALSO BE MODIFIED.
//*
//*  REFER TO MEMBER ADAINTR IN THE CA JARS CAJRJCL LIBRARY
//*
//ADASTEP  EXEC PGM=JSI,PARM='JSQA0000'
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//SORTLIB  DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTMSG  DD  SYSOUT=*
//CAIJFPR  DD  SYSOUT=*
//CAIJFSN  DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SORTWK01 DD  SPACE=(CYL,(50)),UNIT=SYSDA
//SORTWK02 DD  SPACE=(CYL,(50)),UNIT=SYSDA
//SORTWK03 DD  SPACE=(CYL,(50)),UNIT=SYSDA
//SORTWK04 DD  SPACE=(CYL,(50)),UNIT=SYSDA
//SORTWK05 DD  SPACE=(CYL,(50)),UNIT=SYSDA
//SORTWK06 DD  SPACE=(CYL,(50)),UNIT=SYSDA
//CAIJRADA DD  DSN=CAI.ADABAS.LOGDATA,DISP=SHR
//CAIJRJAR DD  DSN=CAI.JARS.HISTORY.DATA,DISP=(,CATLG),
//  DCB=(RECFM=VB,LRECL=612,BLKSIZE=6233),
//  UNIT=uuuu,VOL=SER=vvvvvv,
//  SPACE=(TRK,(pp,ss),RLSE)
//CAIJSACT  DD DSN=CAI.ADABAS.EXTDATA,
//          DISP=(NEW,CATLG,DELETE),
//          UNIT=uuuu,
//          SPACE=(CYL,(pp,ss),RLSE),
//          DCB=(RECFM=VB,LRECL=8188,BLKSIZE=bbbb),
//          VOL=SER=vvvvvv
//CAIJRIN  DD  *
CPUID=A
```

```
/*
//
```

The following sample JCL can be used to create an ADABAS Utilization Report using the Report Writer. It is included as member ADAUTLR in CAJRJCL.

Sample JCL For ADABAS Utilization Report (1 of 2):

```
//ADAUTLR  JOB ...,TSOARS,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO PRODUCE
//*        AN ADABAS UTILIZATION REPORT.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . CAIJSHST DSN= CA JARS LEVEL 7 HISTORY FILE
//*
//*        SPACE PARAMETERS, APPROPRIATE TO THE SIZE OF YOUR
//*        DATA, SHOULD BE USED IN THE 'SORTWK' AND 'CAIJS'
//*        STATEMENTS.
//*
//*  REFER TO MEMBER ADAUTLR IN THE CA JARS CAJRJCL LIBRARY
//*
//JARSSTEP EXEC PGM=JSIMAIN
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//SORTMSG  DD  SYSOUT=*
//CAIJSPRT DD  SYSOUT=*
//CAIJSNAP DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SORTWK01 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK02 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK03 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT1 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT2 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSACT DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSHST DD  DSN=CAI.JARS.HISTORY.DATA,DISP=SHR
```

Sample JCL For ADABAS Utilization Report (2 of 2):

```
//CAIJSCIN DD  *
 CONFIG  0THE01F
 SELECT      1                                    0
0HEADER     A D A B A S    U T I L I Z A T I O N
0SORT    01608A2109908A2110708A1
0DISPLAY   021561401651661061121131F4
0DESCRIPT3****1381
0DESCRIPT2****0881
0DESCRIPT1****0181
0EDIT    06 L12 L13 HF4 D
0TITLE   02       TERM CM FILE JOBNAME ID  CD  NBR
0TITLE   56   CMD              COUNT
0TITLE   66 ESTIMATED          CPU  TIME
0TITLE   06MIN STRT               DATE
0TITLE   12MIN STRT               TIME
0TITLE   13 MAX END               TIME
0TITLE   F4    USER ACCOUNT               CODE
/*
//
```

If you use the following control statements (CAIJSCIN) in place of those shown on the previous pages, the same report is produced. The QA in positions 10-11 of the DISPLAY statement (below) causes the Replacement Title Table (JSIRTTQA) for ADABAS to be used. Sample output from this run can be found in the Sample Reports section of this chapter.

```
 CONFIG  0THE01F
 SELECT      1                                    0
0HEADER     A D A B A S    U T I L I Z A T I O N
0SORT    01608A2109908A2110708A1
0DISPLAY QA0021561401651661061121131F4
0DESCRIPT3****1381
0DESCRIPT2****0881
0DESCRIPT1****0181
0EDIT    06 L12 L13 HF4 D
0TITLE   02       TERM CM FILE JOBNAME ID  CD  NBR
```

The following sample JCL can be used to produce an ADABAS Job Charge Detail Report using the Report Writer. It is included as member ADADETR in CAJRJCL.

Sample JCL For ADABAS Job Charge Detail Report:

```
//ADADETR  JOB ...,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO PRODUCE
//*        A CA JARS ADABAS JOB CHARGE DETAIL REPORT.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . CAIJSHST DSN= CA JARS LEVEL 7 HISTORY FILE
//*
//*        SPACE PARAMETERS, APPROPRIATE TO THE SIZE OF YOUR
//*        DATA, SHOULD BE USED IN THE 'SORTWK' AND 'CAIJS'
//*        STATEMENTS.
//*
//*  REFER TO MEMBER ADADETR IN THE CA JARS CAJRJCL LIBRARY
//*
//JARSSTEP EXEC PGM=JSIMAIN
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//SORTMSG  DD  SYSOUT=*
//CAIJSPRT DD  SYSOUT=*
//CAIJSNAP DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SORTWK01 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK02 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK03 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT1 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT2 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSACT DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSHST DD  DSN=CAI.JARS.HISTORY.DATA,DISP=SHR
//CAIJSCIN DD  *
 CONFIG  OTHE01F
 SELECT      1                                   0
0HEADER     A D A B A S    J O B    C H A R G E    D E T A I L
0SORT    01608A2109908A2110708A1
0DISPLAY   002156166144133134139140145146142
0RATE     1000500       100      001001         001
0DESCRIPT3****1381
0DESCRIPT2****0881
0DESCRIPT1****0181
0TITLE   02       TERM CM FILE JOBNAME ID  CD  NBR
0TITLE   56   CMD              COUNT
0TITLE   66 ESTIMATED          CPU  TIME
0TITLE   33ASSOCIATOR          I/O COUNT
0TITLE   34      WORK          I/O COUNT
0TITLE   39      DATA          I/O COUNT
```

```
/*
//
```

If you use the following control statements (CAIJSCIN) in place of those shown on the previous pages, the same report is produced. The QA in positions 10-11 of the DISPLAY statement causes the Replacement Title Table (JSIRTTQA) for ADABAS to be used. Sample output from this run can be found in the Sample Reports section of this chapter.

```
 CONFIG  OTHE01F
 SELECT      1                                   0
0HEADER     A D A B A S    J O B    C H A R G E    D E T A I L
0SORT    01608A2109908A2110708A1
0DISPLAY QA0021561661441331341391401451461142
0RATE     1000500      100      001001        001
0DESCRIPT3****1381
0DESCRIPT2****0881
0DESCRIPT1****0181
0TITLE   02      TERM CM FILE JOBNAME ID  CD  NBR
```

The following sample JCL can be used to produce an ADABAS Job Charge Summary Report using the Report Writer. It is included as member ADASUMR in CAJRJCL.

Sample JCL For ADABAS Job Charge Summary Report:

```
//ADASUMR  JOB ...,TSOARS,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO PRODUCE
//*        A CA JARS ADABAS JOB CHARGE SUMMARY REPORT.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . CAIJSHST DSN= CA JARS LEVEL 7 HISTORY FILE
//*
//*        SPACE PARAMETERS, APPROPRIATE TO THE SIZE OF YOUR
//*        DATA, SHOULD BE USED IN THE 'SORTWK' AND 'CAIJS'
//*        STATEMENTS.
//*
//*  REFER TO MEMBER ADASUMR IN THE CA JARS CAJRJCL LIBRARY
//*
//JARSSTEP EXEC PGM=JSIMAIN
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//SORTMSG  DD  SYSOUT=*
//CAIJSPRT DD  SYSOUT=*
//CAIJSNAP DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SORTWK01 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK02 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK03 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT1 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT2 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSACT DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSHST DD  DSN=CAI.JARS.HISTORY.DATA,DISP=SHR
//CAIJSCIN DD  *
 CONFIG  OTHE01F
 SELECT      1                                    0
0HEADER     A D A B A S    J O B    C H A R G E    S U M M A R Y
0SORT    01608A1109908A1
0DISPLAY   0020561661441331341391401451461 42
0RATE     1000500       100      001001         001
0DESCRIPT2****1281
0DESCRIPT1****0181
0TITLE   02          TERMINAL JOBNAME    ID
0TITLE   56   CMD               COUNT
0TITLE   66 ESTIMATED           CPU  TIME
0TITLE   33ASSOCIATOR           I/O COUNT
0TITLE   34      WORK           I/O COUNT
0TITLE   39      DATA           I/O COUNT
/*
```

```
//
```

If you use the following control statements (CAIJSCIN) in place of those shown previously, the same report is produced. The QA in positions 10-11 of the DISPLAY statement causes the Replacement Title Table (JSIRTTQA) for ADABAS to be used. Sample output from this run can be found in the Sample Reports section of this chapter.

```
 CONFIG  OTHE01F
 SELECT      1                                    0
0HEADER     A D A B A S    J O B    C H A R G E    S U M M A R Y
0SORT    01608A1109908A1
0DISPLAY QA002056166144133134139140145146142
0RATE     1000500       100      001001        001
0DESCRIPT2****1281
0DESCRIPT1****0181
0TITLE   02           TERMINAL JOBNAME    ID
```

The ADABAS Interface User Exit Routine

In order to accommodate installation-dependent requirements not supported by the standard ADABAS Interface, provision has been made for you to supply an exit routine, written in Assembler, to augment or modify actions normally taken. A sample routine upon which you can base your version of the exit is provided in the CAJRSAMP.

The name of the exit routine load module must be ADAEXIT. It must reside in one of the following libraries:

1. SYS1.LINKLIB
2. The library in which the ADABAS Interface resides, as indicated by the STEPLIB DD statement
3. A library concatenated to the library corresponding to STEPLIB

If ADAEXIT is not available, the ADABAS Interface processes the command log file as described earlier in this chapter.

The ADABAS Interface gives control to ADAEXIT after each sorted ADABAS command log record has been read and the following actions have been performed:

1. The record's start and stop dates and times have been converted to an internally meaningful representation.
2. The concatenated string of user-specified keys has been built for the record.
3. The estimated CPU time and number of instructions, based on the record's command code and Software AG's SAGTIP009, has been computed.

ADAEXIT is invoked according to standard linkage conventions with the following registers set:

Register	Description
13	Address of calling program's register save area
14	Return address of calling program
15	ADAEXIT's entry point address
1	Address of the parameter list passed to ADAEXIT

The parameter list passed to ADAEXIT has the following format:

Word	Description
1	Address of the command log record currently being processed by the ADABAS Interface
2	Address of a eight-character area in which your version of the terminal/user ID may be placed (the high-order byte of this word is set to x'80' to denote the end of the parameter list)

Upon entry to ADAEXIT, the contents of the field pointed to by word 2 of the parameter list contains one of the following:

- blanks for Version 4 format records if there was no match between the job name (LOGJNAME) in the command log record and any of TPNAMES specified by you in the QENVR macro. For Version 5 format records, the contents of LOGUSER will always be present.
- a printable numeric terminal/user ID, if there was a match, and Version 4 format records are printed. This is derived by considering the low-order two bytes of LOGPHUID in the command log record as a binary number, converting it to decimal, unpacking it, and ORing the rightmost byte with x'F0'. If processing Version 5 format records, it will contain an eight-byte userid field from the ADABAS log record field, LOGUSER.

In either case, you are free to examine and/or modify any of the original fields in the ADABAS command log record which is accessible via word 1 of the parameter list. You may also supply your own version of the eight-character terminal/user ID in the field pointed to by word 2. Upon return to the ADABAS Interface, your version of the terminal/user ID is initially moved to an internal summary record and eventually to the CA JARS history record, provided the return code in Register 15 is zero.

A zero in Register 15 upon return to the ADABAS Interface indicates that certain fields in the current ADABAS command log record are to be added to corresponding fields in what will eventually be the summarized history record. These include the following:

ADABAS Log Entry	Description
LOGDUR	Duration
LOGNECBS	Number of posted ECBs
LOGNUPDS	Number of descriptors updated
LOGASSOI	Number of associator I/Os
LOGDATAI	Number of data I/Os
LOGWORKI	Number of work I/Os
Total I/O count = LOGASSOI + LOGDATAI + LOGWORKI	

Minimum start and maximum end dates and times are adjusted, if necessary, and various alphanumeric fields (such as job name, terminal/user ID, command code, and file number) are placed in their respective slots in a temporary summary record. The counter denoting the number of ADABAS command log records accumulated in the current history record is increased by one, another sorted ADABAS command log record is read, and the process above is repeated. The factors contributing to the elapsed and estimated CPU times are accumulated internally and are calculated just before the history record is written.

If the user exit has determined that the current command log record is to be excluded from further processing by the ADABAS Interface (that is, current record's values are not to be accumulated), a nonzero value must be placed in Register 15 before returning. This being the case, the internal counter denoting the number of user-rejected records is increased by one, the next sorted ADABAS command log record is read, and the above process is repeated.

A sample user exit is provided on the following pages, and as member ADAEXIT in CAJRSAMP.

```
ADAEXIT  CSECT
         USING *,15               USE R15 AS BASE REGISTER TEMPORARILY
         B     ENTRY              BRANCH AROUND EYE-CATCHER
*
         DC    C'ADAEXIT-1.0-
&SYSDATE-.&SYSTIME'.             EYE-CATCHER
*
*   ENTRY LOGIC
*
ENTRY    DS    0H
         STM   14,12,12(13)       SAVE CALLER'S REGISTERS
*                                 SET UP BASE REGISTER
         DROP  15                   RELEASE TEMPORARY BASE REGISTER
         LR    11,15                LOAD WITH ENTRY ADDRESS
         USING ADAEXIT,11           USE IT AS ADAEXIT'S BASE REGISTER
*                                 CHAIN SAVE AREAS (STANDARD LINKAGE)
         ST    13,SAVEAREA+4        BACKWARD LINK IN ADAEXIT'S SAVEAREA
         LR    10,13                R10 = A(CALLER'S SAVEAREA)
         LA    13,SAVEAREA          R13 = A(ADAEXIT'S SAVEAREA)
         ST    13,8(,10)            FORWARD LINK IN CALLER'S SAVEAREA
*                                 GET ADDRESSABILITY TO PASSED PARMS
         USING ADALOG,9             R 9 = A(ADABAS LOG RECORD)
         LM    9,10,0(1)            R10 = A(USERID FIELD)
         LA    10,0(,10)            CLEAR R10'S HIGH BYTE
*
*   NOTE: A NON-ZERO VALUE IN R15 UPON RETURN WILL CAUSE THE CURRENT
*         ADABAS LOG RECORD TO BE EXCLUDED (REJECTED) FROM FURTHER
*         PROCESSING BY THE ADABAS INTERFACE.
*
*                                 ASSUME CURRENT RECORD WILL BE ACCEPTED
         SLR   15,15                ZERO RETURN CODE
*
*   PROCESSING LOGIC
*                                 CHECK FOR RECORD ACCEPTANCE
         CLC   LOG...,CONSTANT      DO WE WANT TO ACCEPT THIS RECORD ?
         BE    ACCEPT               YES..ON TO FURTHER EXIT PROCESSING
         LA    15,4                 NO...SET NON-ZERO RETURN CODE
         B     RESTORE              AND LEAVE
*
ACCEPT   DS    0H                 COME HERE IF RECORD WAS ACCEPTED
              .
              .                   USER EXIT PROCESSING
              .
         MVC   0(8,10),USERID       SUPPLY OWN VERSION OF USERID
              .
*
*   RETURN LOGIC
*
RESTORE  DS    0H
```

```
         L     13,SAVEAREA+4       RESTORE CALLER'S R13
         L     14,12(,13)          RESTORE CALLER'S R14
         LM    0,12,20(13)         RESTORE CALLER'S R0-R12
         BR    14                  RETURN TO CALLER
*
         DROP  9,11                RELEASE LOG RECORD & BASE REGISTER
         EJECT
*

  *   CONSTANTS AND WORK AREAS
  *
  CONSTANT DC    ...                 RECORD ACCEPTANCE TEST CONSTANT

  USERID   DC    CL8'.....'          USER'S VERSION OF USERID (THIS FIELD
  *                                  MUST BE NO LONGER THAN 8 BYTES)
  SAVEAREA DC    18F'0'              ADAEXIT'S SAVE AREA
           EJECT
  ***********************************************************************
  *                                                                     *
  *        ADABAS LOG RECORD                                            *
  *                                                                     *
  ***********************************************************************
  ADALOG   DSECT                     ADABAS LOG RECORD DSECT
  LOGRTYPE DS    H                          RECORD TYPE
  LORVERS  DS    XL2                        VERSION C'52'
  TLOFTIMI DS    XL8                        STCK
  TLOXRTYP DS    XL1                        BUFFER TYPES
  LOGPRTY  DS    X                          DISPATCHING PRIORITY
  LOGCTYPE DS    X                          COMMAND TYPE
  LOGNECBS DS    X                          # POSTED ECB'S
  LOGTHDNR DS    X                          THREAD NUMBER
  LOGBUF   DS    X                          USER BUFFER FLAG
  LOGNUPDS DS    H                          # DESCRIPTORS UPDATED
  LOGJNAME DS    CL8                        JOB NAME
  LORCOMID DS    0CL28                      COMMUNICATION ID
  LORCPUID DS    XL8                        CPUID
  LORVMID  DS    XL8                        VMID
  LOROSID  DS    XL4                        OS ID
  TLOXUSID DS    CL8                        USER ID
  LOGDUR   DS    F                          DURATION           (16MS FMT)
  LORSEQNR DS    F                          UNIQUE COMMAND SEQUENCE
  LORDBID  DS    H                          DATABASE ID
  LORNIOS  DS    0H
  LOGASSIO DS    H                          # ASSOCIATOR IO'S
  LOGDATAI DS    H                          # DATA IO'S
  LOGWORKI DS    H                          # WORK IO'S
  LOGSIBAI DS    H                          # SIBA IO'S
  LORARCH  DS    XL1                        ARCH TYPE
  LORESV1  DS    XL3                        RESERVED FIELD
  LORREV   DS    F                          REVIEW
```

```
  LORNUCID DS    H                           SMP / ADAPLEX ID
  LORRESV2 DS    H                           RESERVED
  LORACB   DS    0XL80                       ADABASE CONTROL BLOCK
  LORESV3  DS    CL2                         RESERVED
  LOGCMD   DS    CL2                         COMMAND CODE
  LOGCID   DS    CL4                         COMMAND ID
  LOGFNR   DS    XL2                         FILE NUMBER
  LOGRSP   DS    XL2                         RESPONSE CODE
  TLOFISN  DS    XL4                         ISN
  LOGISL   DS    XL4                         ISN LOWER LIMIT
  LOGISQ   DS    XL4                         ISN QUANTITY
  LOGFBL   DS    XL2                         FORMAT BUFFER LENGTH
  LOGRBL   DS    XL2                         RECORD BUFFER LENGTH
  LOGSBL   DS    XL2                         SEARCH BUFFER LENGTH
  LOGVBL   DS    XL2                         VALUE BUFFER LENGTH
  LOGIBL   DS    XL2                         ISN BUFFER LENGTH
  LOGOP1C  DS    CL1                         COMMAND OPTIONS 1

LOGOP2C  DS    CL1                         COMMAND OPTIONS 2
LOGAD1   DS    CL8                         ADDITIONS 1 FIELD
LOGAD2C  DS    CL4                         ADDITIONS 2 FIELD
LOGAD3   DS    CL8                         ADDITIONS 3 FIELD
LOGAD4   DS    CL8                         ADDITIONS 4 FIELD
LOGAD5   DS    CL8                         ADDITIONS 5 FIELD
LORCTIM  DS    XL4                         COMMAND TIME
TLOCUSA  DS    XL4                         USER FIELD
LOGQBRL  EQU   *-ADALOG          BASIC RECORD LENTH
*                                CONTROL BLOCK PORTION (RTYP=X'01')
         END
```

Sample Reports

ADABAS Interface Reports

The ADABAS Interface reports are produced from the execution of the ADABAS Interface. Two reports are produced:

- ADABAS Interface Listing
- Termination Summary Report

Samples of these reports are shown on the following pages. These reports were obtained by executing a modified version of member ADAINTR in CAJRJCL.

The user tables (used during the execution of the interface that produced these sample reports) were customized as follows:

```
JSIQENVR QENVR KEYS=(JOBNAME,USERID,CMDCODE,FILENUM),                *
               DEFFBL=50,                                            *
               TPNAMES=(CICS15X,ADABASX2)
*
         END

JSIQCPU  QCPU  TYPE=INITIAL
*
         QCPU  TYPE=ENTRY,MODEL='IBM 370/158-3',                     *
               IPS=3000000,                                          *
               CORRFCT=1,CPUID=A
*
         QCPU  TYPE=FINAL
*
         END

JSIQAACT QAACT TYPE=INITIAL
*
         QAACT TYPE=ENTRY,                                           *
               JOBNAME=ADABAS*,                                      *
               USERID=1541,                                          *
               ZFILL=YES,                                            *
               ACTCODE='ADABAS - USER  1'
*
         QAACT TYPE=ENTRY,                                           *
               JOBNAME=ADABAS*,                                      *
               USERID=17810,                                         *
               ACTCODE='ADABAS - USER  2'
*
         QAACT TYPE=ENTRY,                                           *
               JOBNAME=ADABAS*,                                      *
               USERID=*,                                             *
               ACTCODE='ADABAS-CATCH ALL'
*
         QAACT TYPE=ENTRY,                                           *
               JOBNAME=CICS*,                                        *
               USERID=*,                                             *
               ACTCODE='ALL  CICS  USERS'
*
         QAACT TYPE=ENTRY,                                           *
               JOBNAME=*,                                            *
               USERID=*,                                             *
               ACTCODE='ALL OTHER USERS '
*
         QAACT TYPE=FINAL
*
         END
```

Here are the sample reports.

ADABAS Interface Listing:

```
CA JARS r12                 A D A B A S   I N T E R F A C E   L I S T I N G                        PAGE    1
Resource Accounting SP0                                                                                15 AUG 1998 17

CAJR101I     2580 TOTAL ADABAS LOG RECORDS READ.
CAJR103I       83 JARS V4 HISTORY RECORDS WRITTEN.
```

Termination Report:

```
CA JARS r12                       T E R M I N A T I O N   R E P O R T                   CAIJFR99   PAGE    2
Resource Accountig SP0                                                                                15 AUG 1998 17

** PRODUCT RETURN CODE -- 0000

** MESSAGES -- ** NO MESSAGES PRODUCED **

** FILE USAGE --

   NAME- CAIJFPR                                                              RECORD COUNTS-
                  ACCESS - SAM                                                           0 -INPUT
                  BLKSIZE- 00133                                                        11 -OUTPUT
                  LRECL  - 00133                                                         0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED ANS-PR-CTL
                  USAGE  - OUTPUT MOVE
                  SYS    - LST
                  TAP.OPT- NONE

   NAME- CAIJRIN                                                              RECORD COUNTS-
                  ACCESS - SAM                                                           1 -INPUT
                  BLKSIZE- 00080                                                         0 -OUTPUT
                  LRECL  - 00080                                                         0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED BLOCKED
                  USAGE  - INPUT MOVE
                  SYS    - 000
                  TAP.OPT- STANDARD-LABEL REWIND

   NAME- CAIJRADA                                                             RECORD COUNTS-
                  ACCESS - SAM                                                       2,580 -INPUT
                  BLKSIZE- 04096                                                         0 -OUTPUT
                  LRECL  - 04092                                                         0 -UPDATED
                  CISIZE - 00000
                  RECFORM- VARIABLE BLOCKED
                  USAGE  - INPUT MOVE
                  SYS    - 000
                  TAP.OPT- STANDARD-LABEL REWIND

   NAME- CAIJRJAR                                                             RECORD COUNTS-
                  ACCESS - SAM                                                           0 -INPUT
                  BLKSIZE- 06124                                                        83 -OUTPUT
                  LRECL  - 00612                                                         0 -UPDATED
                  CISIZE - 00000
                  RECFORM- VARIABLE BLOCKED
                  USAGE  - OUTPUT MOVE
                  SYS    - 000
                  TAP.OPT- STANDARD-LABEL REWIND

** START TIME -- 17.06.02 END TIME -- 17.06.19 DURATION -- 00.00.17

** END OF JOB --
   HIGHEST RETURN CODE -- 0
```

CA JARS Reports

Three CA JARS sample reports are provided with the ADABAS Interface.

1. ADABAS Utilization Report
2. ADABAS Job Charge Detail Report
3. ADABAS Job Charge Summary Report

Samples of each report and the system and report control statements required to generate them are shown next.

ADABAS Utilization report

The sample ADABAS Utilization Report was obtained by executing a modified version of member ADAUTLR in the source library. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT      1                                   0
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT      1                                   0
0HEADER     A D A B A S    U T I L I Z A T I O N
0SORT    01608A2109908A2110708A1
0DISPLAY QA00215614016516610611121131F4
0DESCRIPT3****1381
0DESCRIPT2****0881
0DESCRIPT1****0181
0EDIT    06 L12 L13 HF4 D
0TITLE   02       TERM CM FILE JOBNAME ID  CD  NBR
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
```

The sample report (two pages) follows.

ADABAS Utilization Report (page 1 of 2):

```
                                 A D A B A S   U T I L I Z A T I O N
BEGIN DATE - 07/21/94                                                         RUN DATE - 08/15/94
END DATE   - 07/21/94                                                                    PAGE   1


       TERM CM FILE      CMD      TOTAL     ELAPSED  ESTIMATED MIN STRT MIN STRT  MAX END     USER ACCOUNT
JOBNAME ID  CD  NBR    COUNT  I/O COUNT        TIME  CPU  TIME     DATE     TIME     TIME             CODE

ADABASX2

       01541
            A1-00005       5          0    00:00:01   00:00:01 87/07/21 09:54:29 09:54:47 ADABAS - USER  1
            A4-00005      79         14    00:01:18   00:00:22 87/07/21 09:54:28 09:54:54 ADABAS - USER  1
            CL-00005       1         33    00:00:44   00:00:03 87/07/21 09:54:55 09:54:56 ADABAS - USER  1
            ET-00005      20         19    00:01:34   00:00:02 87/07/21 09:54:28 09:54:55 ADABAS - USER  1
            HI-00005       9          0    00:00:00   00:00:00 87/07/21 09:54:34 09:54:51 ADABAS - USER  1
            L3-00005       1          0    00:00:54   00:00:00 87/07/21 09:54:27 09:54:28 ADABAS - USER  1
            L4-00005     138          0    00:00:10   00:00:15 87/07/21 09:54:29 09:54:55 ADABAS - USER  1
            N1-00005      18          3    00:00:37   00:00:07 87/07/21 09:54:28 09:54:54 ADABAS - USER  1
            OP-00005       1          0    00:00:16   00:00:00 87/07/21 09:54:27 09:54:27 ADABAS - USER  1
            RC-00005      85          0    00:00:01   00:00:02 87/07/21 09:54:29 09:54:54 ADABAS - USER  1
            RI-00005      64          0    00:00:01   00:00:02 87/07/21 09:54:29 09:54:54 ADABAS - USER  1
            S2-00005      23         69    00:02:01   00:00:34 87/07/21 09:54:30 09:54:54 ADABAS - USER  1
            S4-00005     160          0    00:01:12   00:00:08 87/07/21 09:54:28 09:54:55 ADABAS - USER  1

       01541             604        138    00:08:48   00:01:36 87/07/21 09:54:27 09:54:56 ADABAS - USER  1

       02923
            A4-00005       9          2    00:00:14   00:00:03 87/07/21 09:53:33 09:53:37 ADABAS-CATCH ALL
            CL-00005       1         43    00:01:18   00:00:03 87/07/21 09:53:38 09:53:39 ADABAS-CATCH ALL
            ET-00005       2          2    00:00:07   00:00:00 87/07/21 09:53:37 09:53:38 ADABAS-CATCH ALL
            L4-00005      14          0    00:00:01   00:00:02 87/07/21 09:53:35 09:53:37 ADABAS-CATCH ALL
            N1-00005       1          0    00:00:00   00:00:00 87/07/21 09:53:37 09:53:37 ADABAS-CATCH ALL
            RC-00005       8          0    00:00:00   00:00:00 87/07/21 09:53:35 09:53:37 ADABAS-CATCH AL
            RI-00005       5          0    00:00:00   00:00:00 87/07/21 09:53:35 09:53:37 ADABAS-CATCH ALL
            S2-00005       1          3    00:00:04   00:00:02 87/07/21 09:53:37 09:53:37 ADABAS-CATCH ALL
            S4-00005      17          0    00:00:05   00:00:01 87/07/21 09:53:35 09:53:38 ADABAS-CATCH ALL

       02923              58         50    00:01:50   00:00:11 87/07/21 09:53:33 09:53:39 ADABAS-CATCH ALL

       17810
            A1-00005       2          0    00:00:00   00:00:00 87/07/21 09:53:46 09:53:46 ADABAS - USER  2
            A4-00005      49          7    00:00:34   00:00:14 87/07/21 09:53:46 09:54:08 ADABAS - USER  2
            CL-00005       1         32    00:00:55   00:00:03 87/07/21 09:54:10 09:54:11 ADABAS - USER  2
            ET-00005      16         15    00:01:23   00:00:02 87/07/21 09:53:46 09:54:10 ADABAS - USER  2
            L3-00005       1          0    00:00:00   00:00:00 87/07/21 09:53:46 09:53:46 ADABAS - USER  2
            L4-00005      92          0    00:00:09   00:00:10 87/07/21 09:53:47 09:54:08 ADABAS - USER  2
            N1-00005      14          4    00:00:21   00:00:05 87/07/21 09:53:46 09:54:07 ADABAS - USER  2
            OP-00005       1          0    00:00:00   00:00:00 87/07/21 09:53:46 09:53:46 ADABAS - USER  2
            RC-00005      65          0    00:00:01   00:00:02 87/07/21 09:53:47 09:54:07 ADABAS - USER  2
            RI-00005      40          0    00:00:01   00:00:01 87/07/21 09:53:47 09:54:07 ADABAS - USER  2
            S2-00005      13         39    00:01:37   00:00:19 87/07/21 09:53:47 09:54:07 ADABAS - USER  2
            S4-00005     122          0    00:00:42   00:00:06 87/07/21 09:53:46 09:54:10 ADABAS - USER  2

       17810             416         97    00:05:43   00:01:02 87/07/21 09:53:46 09:54:11 ADABAS - USER  2

ADABASX2               1,078        285    00:16:21   00:02:50 87/07/21 09:53:33 09:54:56 ADABAS - USER  2
```

ADABAS Utilization Report (page 2 of 2):

```
                                  A D A B A S    U T I L I Z A T I O N
BEGIN DATE - 07/21/94                                                           RUN DATE - 08/15/94
END DATE   - 07/21/94                                                                      PAGE   2

       TERM CM FILE      CMD      TOTAL     ELAPSED  ESTIMATED MIN STRT MIN STRT  MAX END     USER ACCOUNT
JOBNAME ID  CD  NBR    COUNT  I/O COUNT        TIME  CPU  TIME     DATE     TIME     TIME             CODE


CICS15X

       03085
              -00000       1          0   00:00:12   00:00:00 87/07/21 14:02:01 14:02:01 ALL  CICS  USERS
            BT-00004       1          0   00:00:00   00:00:00 87/07/21 14:02:06 14:02:06 ALL  CICS  USERS
            ET-00000       2          1   00:00:04   00:00:00 87/07/21 14:02:15 14:02:26 ALL  CICS  USERS
            L2-00001   1,004         48   00:04:37   00:00:45 87/07/21 14:05:55 14:06:07 ALL  CICS  USERS
            L2-00002     380         15   00:02:06   00:00:17 87/07/21 14:06:23 14:06:27 ALL  CICS  USERS
            L3-00004      52         30   00:07:37   00:00:03 87/07/21 14:02:03 14:06:23 ALL  CICS  USERS
            L9-00004       3          1   00:00:18   00:00:00 87/07/21 14:02:16 14:02:26 ALL  CICS  USERS
            N1-00004       1          0   00:00:08   00:00:00 87/07/21 14:02:15 14:02:15 ALL  CICS  USERS
            OP-00004       1          9   00:01:06   00:00:01 87/07/21 14:02:15 14:02:16 ALL  CICS  USERS
            RC-00000       4          0   00:00:00   00:00:00 87/07/21 14:02:15 14:06:07 ALL  CICS  USERS
            RC-00004      17          0   00:00:01   00:00:00 87/07/21 14:02:05 14:06:23 ALL  CICS  USERS
            S1-00004       6          9   00:01:39   00:00:02 87/07/21 14:02:14 14:06:23 ALL  CICS  USERS

       03085           1,472        113   00:17:48   00:01:09 87/07/21 14:02:01 14:06:27 ALL  CICS  USERS

CICS15X                1,472        113   00:17:48   00:01:09 87/07/21 14:02:01 14:06:27 ALL  CICS  USERS

KWL1PR05

            BT-00004       3          0   00:00:00   00:00:00 87/07/21 14:03:58 14:06:04 ALL OTHER USERS
            CL-00004       3          0   00:00:00   00:00:00 87/07/21 14:03:59 14:06:05 ALL OTHER USERS
            L3-00004       9          2   00:04:20   00:00:00 87/07/21 14:03:56 14:06:04 ALL OTHER USERS
            OP-00004       3          2   00:03:28   00:00:00 87/07/21 14:03:55 14:06:03 ALL OTHER USERS
            RC-00000       3          0   00:00:00   00:00:00 87/07/21 14:03:59 14:06:05 ALL OTHER USERS
            RC-00004       6          0   00:00:00   00:00:00 87/07/21 14:03:57 14:06:04 ALL OTHER USERS
            S1-00004       3          5   00:00:40   00:00:01 87/07/21 14:03:58 14:06:05 ALL OTHER USERS

                          30          9   00:08:29   00:00:02 87/07/21 14:03:55 14:06:05 ALL OTHER USERS

KWL1PR05                  30          9   00:08:29   00:00:02 87/07/21 14:03:55 14:06:05 ALL OTHER USERS

                       2,580        407   00:42:37   00:04:00 87/07/21 09:53:33 14:06:27 ALL OTHER USERS

CAJS003I NORMAL END OF PROCESSING
```

ADABAS Job Charge Detail Report

The sample ADABAS Job Charge Detail Report, shown on the next page was obtained by executing a modified version of member ADADETR in the source library. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT       1                                    0
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT      1                                  0
0HEADER     A D A B A S    J O B    C H A R G E    D E T A I L
0SORT    01608A2109908A2110708A1
0DISPLAY QA002156166144133134139140145146142
0RATE     1000500       100      001001        001
0DESCRIPT3****1381
0DESCRIPT2****0881
0DESCRIPT1****0181
0TITLE   02       TERM CM FILE JOBNAME ID  CD  NBR
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
```

The sample report consists of two pages.

ADABAS Job Charge Detail Report (1 of 2):

A D A B A S   J O B   C H A R G E   D E T A I L

BEGIN DATE - 07/21/94 RUN DATE - 08/15/94
END DATE - 07/21/94 PAGE 1

JOBNAME	TERM ID	CM CD FILE NBR	CMD COUNT	ESTIMATED CPU TIME	PROCESS CHARGE	ASSOCIATOR I/O COUNT	WORK I/O COUNT	DATA I/O COUNT	TOTAL I/O COUNT	I/O CHARGE	TOTAL CHARGE	PERCENT TOTAL
ADABASX2												
	01541											
		A1-00005	5	00:00:01	$.29	0	0	0	0	$.00	$.29	.235
		A4-00005	79	00:00:22	$6.16	6	8	0	14	$1.95	$8.11	6.572
		CL-00005	1	00:00:03	$.72	30	2	1	33	$4.59	$5.31	4.303
		ET-00005	20	00:00:02	$.59	0	19	0	19	$2.64	$3.23	2.617
		HI-00005	9	00:00:00	$.06	0	0	0	0	$.00	$.06	.049
		L3-00005	1	00:00:00	$.02	0	0	0	0	$.00	$.02	.016
		L4-00005	138	00:00:15	$4.22	0	0	0	0	$.00	$4.22	3.420
		N1-00005	18	00:00:07	$1.87	3	0	0	3	$.42	$2.29	1.856
		OP-00005	1	00:00:00	$.01	0	0	0	0	$.00	$.01	.008
		RC-00005	85	00:00:02	$.57	0	0	0	0	$.00	$.57	.462
		RI-00005	64	00:00:02	$.43	0	0	0	0	$.00	$.43	.348
		S2-00005	23	00:00:34	$9.55	0	69	0	69	$9.59	$19.14	15.509
		S4-00005	160	00:00:08	$2.31	0	0	0	0	$.00	$2.31	1.872
	01541		604	00:01:36	$26.80	39	98	1	138	$19.19	$45.99	37.267
	02923											
		A4-00005	9	00:00:03	$.77	0	2	0	2	$.28	$1.05	.851
		CL-00005	1	00:00:03	$.94	40	2	1	43	$5.97	$6.91	5.599
		ET-00005	2	00:00:00	$.06	0	2	0	2	$.28	$.34	.276
		L4-00005	14	00:00:02	$.43	0	0	0	0	$.00	$.43	.348
		N1-00005	1	00:00:00	$.10	0	0	0	0	$.00	$.10	.081
		RC-00005	8	00:00:00	$.05	0	0	0	0	$.00	$.05	.041
		RI-00005	5	00:00:00	$.03	0	0	0	0	$.00	$.03	.024
		S2-00005	1	00:00:02	$.42	0	3	0	3	$.42	$.84	.681
		S4-00005	17	00:00:01	$.25	0	0	0	0	$.00	$.25	.203
	02923		58	00:00:11	$3.05	40	9	1	50	$6.95	$10.00	8.104
	17810											
		A1-00005	2	00:00:00	$.12	0	0	0	0	$.00	$.12	.097
		A4-00005	49	00:00:14	$3.88	2	5	0	7	$.97	$4.85	3.930
		CL-00005	1	00:00:03	$.70	28	2	2	32	$4.45	$5.15	4.173
		ET-00005	16	00:00:02	$.47	0	15	0	15	$2.09	$2.56	2.074
		L3-00005	1	00:00:00	$.02	0	0	0	0	$.00	$.02	.016
		L4-00005	92	00:00:10	$2.81	0	0	0	0	$.00	$2.81	2.277
		N1-00005	14	00:00:05	$1.49	2	1	1	4	$.56	$2.05	1.661
		OP-00005	1	00:00:00	$.01	0	0	0	0	$.00	$.01	.008
		RC-00005	65	00:00:02	$.43	0	0	0	0	$.00	$.43	.348
		RI-00005	40	00:00:01	$.27	0	0	0	0	$.00	$.27	.219
		S2-00005	13	00:00:19	$5.40	0	39	0	39	$5.42	$10.82	8.768
		S4-00005	122	00:00:06	$1.76	0	0	0	0	$.00	$1.76	1.426
	17810		416	00:01:02	$17.36	32	62	3	97	$13.49	$30.85	24.997
ADABASX2			1,078	00:02:50	$47.21	111	169	5	285	$39.63	$86.84	70.368

ADABAS Job Charge Detail Report (2 of 2):

```
                                       A D A B A S    J O B    C H A R G E    D E T A I L
BEGIN DATE - 07/21/94                                                                                  RUN DATE - 08/15/94
END DATE   - 07/21/94                                                                                              PAGE    2

       TERM CM FILE     CMD  ESTIMATED      PROCESS ASSOCIATOR       WORK       DATA      TOTAL         I/O         TOTAL  PERCENT
JOBNAME ID  CD  NBR    COUNT  CPU  TIME       CHARGE  I/O COUNT  I/O COUNT  I/O COUNT  I/O COUNT      CHARGE        CHARGE    TOTAL


CICS15X

       03085
             -00000      1   00:00:00         $.00          0          0          0          0        $.00          $.00     .000
           BT-00004      1   00:00:00         $.01          0          0          0          0        $.00          $.01     .008
           ET-00000      2   00:00:00         $.04          0          1          0          1        $.14          $.18     .146
           L2-00001  1,004   00:00:45       $12.61          2          0         46         48       $6.72        $19.33   15.664
           L2-00002    380   00:00:17        $4.71          2          0         13         15       $2.10         $6.81    5.519
           L3-00004     52   00:00:03         $.76          6          0         24         30       $4.17         $4.93    3.995
           L9-00004      3   00:00:00         $.06          1          0          0          1        $.14          $.20     .162
           N1-00004      1   00:00:00         $.04          0          0          0          0        $.00          $.04     .032
           OP-00004      1   00:00:01         $.21          7          1          1          9       $1.25         $1.46    1.183
           RC-00000      4   00:00:00         $.03          0          0          0          0        $.00          $.03     .024
           RC-00004     17   00:00:00         $.11          0          0          0          0        $.00          $.11     .089
           S1-00004      6   00:00:02         $.45          3          1          5          9       $1.25         $1.70    1.378

       03085         1,472   00:01:09       $19.03         21          3         89        113      $15.77        $34.80   28.200

CICS15X              1,472   00:01:09       $19.03         21          3         89        113      $15.77        $34.80   28.200

KWL1PR05

           BT-00004      3   00:00:00         $.03          0          0          0          0        $.00          $.03     .024
           CL-00004      3   00:00:00         $.03          0          0          0          0        $.00          $.03     .024
           L3-00004      9   00:00:00         $.07          1          0          1          2        $.28          $.35     .283
           OP-00004      3   00:00:00         $.09          0          2          0          2        $.28          $.37     .300
           RC-00000      3   00:00:00         $.03          0          0          0          0        $.00          $.03     .024
           RC-00004      6   00:00:00         $.03          0          0          0          0        $.00          $.03     .024
           S1-00004      3   00:00:01         $.23          4          0          1          5        $.70          $.93     .753

                        30   00:00:02         $.51          5          2          2          9       $1.26         $1.77    1.432

KWL1PR05                30   00:00:02         $.51          5          2          2          9       $1.26         $1.77    1.432

                     2,580   00:04:00       $66.75        137        174         96        407      $56.66       $123.41  100.000

CAJS003I NORMAL END OF PROCESSING
```

ADABAS Job Charge Summary Report

The sample ADABAS Job Charge Detail Report, shown below, was obtained by executing a modified version of member ADASUMR in the source library. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT       1                                  0
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT       1                                  0
0HEADER     A D A B A S    J O B    C H A R G E    S U M M A R Y
0SORT    01608A1109908A1
0DISPLAY QA002056166144133134139140145146142
0RATE     1000500       100      001001        001
0DESCRIPT2****1281
0DESCRIPT1****0181
0TITLE   02          TERMINAL JOBNAME    ID
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
```

ADABAS Job Charge Summary Report:

```
                                     A D A B A S    J O B    C H A R G E    S U M M A R Y
BEGIN DATE - 07/21/94                                                                                          RUN DATE - 08/15/94
END DATE   - 07/21/94                                                                                                     PAGE   1

           TERMINAL    CMD  ESTIMATED     PROCESS ASSOCIATOR        WORK        DATA       TOTAL         I/O         TOTAL  PERCENT
JOBNAME    ID        COUNT  CPU  TIME      CHARGE  I/O COUNT  I/O COUNT  I/O COUNT  I/O COUNT      CHARGE        CHARGE    TOTAL

ADABASX2
           01541       604   00:01:36      $26.80         39          98           1         138      $19.19        $45.99   37.267
           02923        58   00:00:11       $3.05         40           9           1          50       $6.95        $10.00    8.104
           17810       416   00:01:02      $17.36         32          62           3          97      $13.49        $30.85   24.997
ADABASX2             1,078   00:02:50      $47.21        111         169           5         285      $39.63        $86.84   70.368

CICS15X
           03085     1,472   00:01:09      $19.03         21           3          89         113      $15.77        $34.80   28.200
CICS15X              1,472   00:01:09      $19.03         21           3          89         113      $15.77        $34.80   28.200

KWL1PR05
                        30   00:00:02        $.51          5           2           2           9       $1.26         $1.77    1.432
KWL1PR05                30   00:00:02        $.51          5           2           2           9       $1.26         $1.77    1.432

                     2,580   00:04:00      $66.75        137         174          96         407      $56.66       $123.41  100.000

CAJS003I NORMAL END OF PROCESSING
```

EXTDATA Reports

There are sample CA Earl and CA Easytrieve reports that will process the ADABAS Interface EXTDATA records.

Note: The EXTDATA record layout is described in the chapter "EXTDATA Reporting" in the *User Guide.*

```
OPTION LIST OFF
NOTE *****************************************************************
NOTE *  REPORT ID:      ERXTA001                                     *
NOTE *  REPORT NAME:    ADABAS COMMAND SUMMARY                       *
NOTE *  DESCRIPTION:    THIS SUMMARY REPORT WILL COLLATE AND SUMMARIZE*
NOTE *                  ADABAS ACTIVITY FROM AN ADABAS COMMAND LOG    *
NOTE *                  SUMMARIZING KEYS ARE THE ADABAS JOB NAME,     *
NOTE *                  THE CLIENT USER ID, THE FILE NUMBER AND       *
NOTE *                  COMMAND ID.  THE REPORT WILL SHOW THE NUMBER  *
NOTE *                  OF COMMANDS OF EACH TYPE, THE NUMBER OF       *
NOTE *                  DESCRIPTORS UPDATED, THE TOTAL NUMBER OF      *
NOTE *                  I/OS AND THE APPROXIMATE CPU TIME.            *
NOTE *                                                               *
NOTE *  RECORD TYPES:   MRXTHDR,                                     *
NOTE *                  MRXTSIEA                                     *
NOTE *                                                               *
NOTE *  EXTDATA RECORD: SIEA                                         *
NOTE *                                                               *
NOTE *  MACROS:                                                      *
NOTE *****************************************************************
OPTION PRINTER = 132
OPTION PAGE = 60
OPTION PRECISION = ALL
OPTION CPAGE = 60
HISTIN:  FILE JARS RECORD=3697
  DEF INAREA                  1-3697  X
  COPY MRXTHDR
  COPY MRXTSIEA
NOTE *****************************************************************
NOTE * SELECTING FROM HISTORY FILE EXTDATA, SPECIFICALLY SIEA        *
NOTE *****************************************************************
!
IF     PROCID NOT = ':' OR
       EXTTYPE NOT = 'SIEA'
       THEN GOTO START
ENDIF
!
NOTE *****************************************************************
NOTE *                REPORT PROCESSING SECTION                      *
NOTE *****************************************************************
!
```

```
REPORT 'ADABAS ACTIVITY SUMMARY'
TITLE ' '
TITLE @1 'REPORT ID: ERXTA001'    @54 'SYSTEM ID:'  SID
TITLE @1 'SOURCE   : ADABAS CLOG' @54 '   ADABAS:'  EXTSIEA_JOB_NAME
TITLE                             @54 '  USER ID:'  EXTSIEA_USER_ID
TITLE                             @54 '  ACCOUNT:'  EXTSIEA_ACCOUNTING
TITLE ' '
!
CONTROL    (EXTSIEA_JOB_NAME)  (EXTSIEA_USER_ID) SKIP
           (EXTSIEA_COMMAND)   (EXTSIEA_FILE_NUMBER)
!
PRINT TOTALS ONLY
      @1 ' '
         EXTSIEA_COMMAND
         EXTSIEA_FILE_NUMBER
        (EXTSIEA_REC_COUNT)
        (EXTSIEA_DESC_UPDATES)
        (EXTSIEA_TOTAL_IOS)
        (EXTSIEA_CPU_TIME)
END

LIST OFF
******************************************************************
*  REPORT ID:      EZXTA001                                      *
*  REPORT NAME:    ADABAS COMMAND SUMMARY                        *
*  DESCRIPTION:    THIS SUMMARY REPORT WILL COLLATE AND SUMMARIZE*
*                  ADABAS ACTIVITY FROM AN ADABAS COMMAND LOG    *
*                  SUMMARIZING KEYS ARE THE ADABAS JOB NAME,     *
*                  THE CLIENT USER ID, THE FILE NUMBER AND       *
*                  COMMAND ID.  THE REPORT WILL SHOW THE NUMBER  *
*                  OF COMMANDS THAT MATCH THE CRITERIA, THE      *
*                  NUMBER OF DESCRIPTORS UPDATED, THE TOTAL      *
*                  NUMBER OF I/OS AND THE APPROXIMATE CPU TIME.  *
*                                                                *
*  RECORD TYPES:   MZXTHDR,                                      *
*                  MZXTSIEA                                      *
*                                                                *
*  EXTDATA RECORD: SIEA                                          *
*                                                                *
******************************************************************
PARM ABEXIT (SNAP) DEBUG (FLDCHK STATE)
FILE EXTDATA
%MZXTHDR
%MZXTSIEA
*
JOB INPUT EXTDATA
IF     PROCID  = ':' AND EXTTYPE = 'SIEA'
       GOTO PROCESS_DATA
       ELSE
       GOTO JOB
```

```
END-IF
PROCESS_DATA
*
PRINT REPORT1
*
REPORT REPORT1 SUMMARY SPACE 0 PAGESIZE (60 60) LINESIZE 132 NOADJUST +
       SUMCTL DTLCOPY
*
SEQUENCE EXTSIEA_JOB_NAME EXTSIEA_USER_ID EXTSIEA_COMMAND            +
         EXTSIEA_FILE_NUMBER
*
CONTROL  EXTSIEA_JOB_NAME EXTSIEA_USER_ID NEWPAGE                    +
         EXTSIEA_COMMAND EXTSIEA_FILE_NUMBER
*
TITLE 01 COL 51 'ADABAS ACTIVITY SUMMARY'
TITLE 02 ' '
TITLE 03 COL 1 'REPORT ID: EZXTA001'    COL 54 'SYSTEM ID      ' SID
TITLE 04 COL 1 'SOURCE   : ADABAS'      COL 54 'ADABAS         '      +
                                        EXTSIEA_JOB_NAME
TITLE 05                                COL 54 'USER ID        '      +
                                        EXTSIEA_USER_ID
TITLE 06                                COL 54 'ACCOUNT        '      +
                                        EXTSIEA_ACCOUNTING
LINE   EXTSIEA_COMMAND     '   ' +
       EXTSIEA_FILE_NUMBER '   ' +
       EXTSIEA_REC_COUNT   '   ' +
       EXTSIEA_DESC_UPDATE '   ' +
       EXTSIEA_TOTAL_IOS   '   ' +
       EXTSIEA_CPU_TIME
```

The sample output looks like this:

```
108/01/04                                    ADABAS ACTIVITY SUMMARY

 REPORT ID: ERXTA001                           SYSTEM ID:     XAD1
 SOURCE   : ADABAS CLOG                           ADABAS:     ABEJUA1
                                                 USER ID:     TSU05326
                                                 ACCOUNT:     FITCH

 ---------------------------------------------------------------------------------------------------------------------------
                     COMMAND      FILE     COMMAND      DESCRIPTORS           TOTAL          CPU TIME
                     CODE       NUMBER       COUNT          UPDATED             I/OS             HOURS
 ---------------------------------------------------------------------------------------------------------------------------
                     CL              0           2                0                0           0.00017
                                          --------    -------------    -------------     -------------
                     CL                          2                0                0           0.00017
                                          --------    -------------    -------------     -------------
                     L3             11           7                0               22           0.00635
                     L3             14           4                0               13           0.00375
                                          --------    -------------    -------------     -------------
                     L3                         11                0               35           0.01010
                                          --------    -------------    -------------     -------------
                     L9             11           2                0                3           0.00109
                     L9             14           1                0                2           0.00068
                                          --------    -------------    -------------     -------------
                     L9                          3                0                5           0.00177
                                          --------    -------------    -------------     -------------
                     OP              0           2                0                3           0.00115
                                          --------    -------------    -------------     -------------
                     OP                          2                0                3           0.00115
                                          --------    -------------    -------------     -------------
                     RC              0          15                0                0           0.00125
                                          --------    -------------    -------------     -------------
                     RC                         15                0                0           0.00125
                                          --------    -------------    -------------     -------------
                     S1             11          21                0               35           0.02129
                     S1             14          20                0               22           0.01461
                                          --------    -------------    -------------     -------------
                     S1                         41                0               57           0.03590
                                          --------    -------------    -------------     -------------
                                          --------    -------------    -------------     -------------
                                                74                0              100           0.05034
                                          --------    -------------    -------------     -------------
                                          --------    -------------    -------------     -------------
                                                74                0              100           0.05034
                                          --------    -------------    -------------     -------------
```

Reporting Considerations

This section identifies those areas in the operation of the Report Writer that are affected by the introduction of ADABAS data. Specifically, the Basic Accounting Table and the Output Data Elements Table are replaced when producing reports with ADABAS data.

ADABAS Data Elements

The following is a list of ADABAS data elements:

```
Job Name
User ID
Command Code
File Number
Associator I/Os
Data I/Os
Work I/Os
Posted ECBs
Descriptors Updated
Command Duration (Elapsed Time)
Estimated CPU Time
Command Count
Minimum Start Date
Minimum Start Time
Maximum End Time
Day of Week Code
User Account Code
```

ADABAS Basic Accounting Table

The following table replaces the Basic Accounting Table for designing ADABAS reports:

ADABAS Basic Accounting Table:

Field Name	Field Position	Field Length	F*	Notes	DE ID
CPU Identification	1	1	a	'S'	57
Reserved	2-3	2	-		
Min Start Date	4-9	6	a	YYMMDD	60
Min Start Time	10-15	6	a	HHMMSS	61
Job Name	16-23	8	a		04
Reserved	24-25	2	-		
Command Count	26-27	2	b		56
Processing ID	28	1	a	'C'	03
Record ID	29-36	8	a	*ADABAS*	10
Min Start Time	37-42	6	a	HHMMSS	12

Field Name	Field Position	Field Length	F*	Notes	DE ID
Min Start Date	43-48	6	a	YYMMDD	06
Command Code	49-50	2	a		07
Max End Time	51-56	6	a	HHMMSS	13
Concatenation of Terminal ID, Job Name, Command Code	57-76	20	a		
Reserved	77-98	22	-		
Terminal ID/User ID	99-106	8	a		11
Concatenation of Command Code and File Number	107-114	8	a		
Reserved	115-170	56	-		
Elapsed Time	171-176	6	p	In minutes, to 5 decimal places	25,65,90
Estimated CPU Time	177-182	6	p		26,66,91
Reserved	183-212	30	-		
Associator I/O count	213-219	7	p		33
Work I/O Count	220-226	7	p		34
Reserved	227-247	21	-		
Data I/O Count	248-254	7	p		39
Total I/O Count	255-261	7	p		40
I/O Index	262-265	4	p		78
Reserved	266-295	30	-		
Group Code #1 Group Code #2 Group Code #3	296 297 298	1 1 1	a a a	Blank unless filled by grouping feature	84 85 86
Reserved	299-364	66	-		
Posted ECBS	365-368	4	p		A5
Descriptors Updated	369-372	4	p		A6
Reserved	373-417	45	-		
CPU Index	418-419	2	p		D0
Reserved	420-436	16	-		

Field Name	Field Position	Field Length	F*	Notes	DE ID
Day of Week Code	437	1	a		D5,D6
Group Code #4 Group Code #5 Group Code #6	438 439 440	1 1 1	a a a	Blank unless filled by grouping feature	D7 D8 D9
Reserved	441-518	76	-		
User Account Code	519-534	16	a	Blank unless JOBNAME and USERID match entry in QAACT table	F4
Reserved	535-550	16	-		
Processor Time	551-556	6	p	999999V99999C; hours	29,69
Processor Charge	557-562	6	p	999999999V99C; dollars	44
I/O Time	563-568	6	p	999999V99999C; hours	30,70
I/O Charge	569-574	6	p	999999999V99C; dollars	45
Reserved	575-584	10	-		
Total Charge	585-590	6	p	999999999V99C; dollars	46
Reserved	591-608	18	-		
F* Format Indicator a=alphanumeric b=binary p=packed decimal					

Contents of Target Libraries

CAJRMAC Macros:	QAACT	QCPU	QENVR	
CAJRSAMP Sample User Tables:	JSIQAACT	JSIQCPU	JSIQENVR	
CAJRSAMP Sample User Exit:	ADAEXIT			
CAJRJCL Sample JCL:	ADAINTR	ADAUTLR	ADADETR	ADASUMR
CAJREARL CA EARL Source:	MRXTSIEA			
CAJREZTR CA Easytrieve Source:	MZXTSIEA			

CAI.CAJRLOAD Library Members

Load Modules:	JSIRTTQA	JSQAPMSG	JSQA0000	JSQA1000
IVP User Tables:	QAACT	QCPU	QENVR	

Chapter 2: The Interface to CA Datacom/DB

The CA JARS interface to CA Datacom/DB is your tool for effectively analyzing database activity. It provides data that yields a thorough picture of system utilization.

The Interface lets you:

- measure user productivity
- evaluate software efficiency
- provide equitable customer billing and cost distribution

The Interface compiles information about database resource usage into a format that can be used for producing reports with the Report Writer. To accomplish this, the Interface reformats your CA Datacom/DB Accounting Table records, producing a CA JARS summary file. All relevant data required for you to monitor and allocate resource utilization is retained on the summary file. The Basic Accounting Table presented later in this chapter provides a detailed list of the data elements available for reporting.

This section contains the following topics:

Benefits of the Interface to CA Datacom/DB

The Interface permits chargeback and performance reporting by:

- jobname
- operator ID

The Interface uses the Report Writer as its reporting component. All report writer benefits, including combined batch and chargeback and reporting, are available as part of the Interface.

This interface can also be used to generate EXTDATA records. EXTDATA records can be used for reporting with CA EARL and CA Easytrieve. The layout and format of the EXTDATA records are described in the chapter "EXTDATA Reporting" in the *User Guide.*

In addition, the EXTDATA records can be used in conjunction with CA PMA Chargeback to create billing and chargeback systems for Datacom resource utilization.

Input and Output

The interface to CA Datacom/DB converts statistics from the CA Datacom/DB Accounting Table into a summary file. The Interface accomplishes this task by reformatting the CA Datacom/DB Accounting Facility record. The summary file contains level 7 history records with a processing ID of **C.** This processing ID is uniquely suited to software subsystems that execute transaction-oriented tasks, such as CA Datacom/DB.

The Interface to CA Datacom/DB will also generate EXTDATA records if the CAIJSACT DD Name is present and is able to be opened during processing.

Cost Center Identification

The Interface provides combined billing and reporting by placing a user-defined account code into the appropriate field of the summary record.

A User Account Table is provided to match a jobname and/or operator ID with an accounting table record and places a cost center identifier (account code) in the output record.

The Interface to CA Datacom/DB Components

The Interface consists of two major components:

Translate Component

The Translate Component reads the CA Datacom/DB Accounting Table and creates the CA JARS summary file. Translate Component use and customization is documented in the Creating The CA JARS Summary File section of this chapter.

Reporting Component

The Report Writer serves as the Interface reporting component and is documented in the *CA JARS User Guide.* The Report Writer uses the summary file created by the Translate Component as input.

System Requirements

To use the Interface, an Accounting Table must be defined specifically for the Interface. It must be defined with the following special accounting elements:

COMND	PRTY	UID01	EXCIX	LOGIO	WTIME
JNAME	RUNIT	ETIME	EXCPS	LOGIX	STIME
OPRID	TNAME	EXCDT	LOGDT	RTIME	SDATE

A sample table definition for the necessary accounting table, as well as a sample element definition, has been provided in CAJROPTN as member JARSDC1. If a full accounting table is needed, follow the directions in the -COM comment statements in JARSDC1. If you only need to add a few fields and elements to an existing accounting table, the appropriate FIELD and ELEMENT statements can be copied from JARSDC1 and placed in an existing definition. See the CA Datacom/DB Datadictionary Batch Guide for more information on table updating and for further information.

The elements listed in the previous table **must** be defined in the data dictionary using the names specified as the data dictionary element names. You can define a new Accounting Table, or an existing Accounting Table may be modified to meet the requirements of the Interface.

After the Interface Accounting Table has been defined, it must be opened for processing requests. This can be done automatically by CA Datacom/DB, by adding the name of the Accounting Table to the AXXSTS parameter list on the DBLSTBL macro.

The MAXELRQ parameter of the DBLSTBL must have a specified value of 20. This is necessary because the Interface accesses 20 elements during the translation process.

The Interface reads the Accounting Table via CA Datacom/DB services. Therefore, the Interface must have a User Requirements Table (URT) associated with it. Because the Interface makes use of the *dynamic user requirements* load method, two URTs are provided with the Interface. Both URTs may be found in CAJRSAMP. DCURT1 contains the required DBURINF and DBUREND macros. Review DCURT1 to modify the URT to meet installation standards. Do **not** modify the OPEN, URTABLE, and USRNTRY parameter values. DCURT2 contains the required DBURSTR, DBURTBL, and DBUREND macros. Review DCURT2 to modify the URT to meet installation standards. **Do not** modify the ACCESS parameter value.

Note: DCURT1 and DCURT2 should be assembled as non-reentrant. If non-reentrant is not specified on the assembly, execution of JSI results in a product return code 16, error code 4.

Creating the Summary File

The Translate Component

This section contains reference information and examples that show you how to run the Translate Component. The Translate Component *transforms* the Accounting Table into a CA JARS summary file.

The term *CA JARS summary file* should not be confused with a summary file as created by the CA JARS SORT statement. The summary file is actually a detail-level file. Consequently, the term can be misleading. It is referred to as a *summary file* because the output of the Translate Component *summarizes* CA Datacom/DB statistics into one CA JARS record. On the other hand, the CA JARS reporting component's summarization feature is a powerful and effective method of producing summary information based on user-defined summary criteria. For details, see the section on the CA JARS SORT statement in the *CA JARS User Guide.*

This chapter covers the following Translate Component topics:

- control statement use and syntax
- JCL
- specification of a User Account Code Table

The Translate Component uses the Accounting Table as input. The first part of this chapter documents the CA Datacom/DB System tasks for defining and activating the Accounting Table needed. This chapter assumes that the CA Datacom/DB System tasks for creating and activating the Accounting Table were completed as specified earlier in this chapter.

Preparing Translate Control Statements

The Translate Component uses the following control statements.

Control Statement	Purpose
Datacom	Supplies system parameters.
CRITERIA	Permits file segmentation by date.

Datacom

This parameter statement supplies the CA Datacom Interface with installation-dependent defaults.

```
Command            Keywords/Operands               Default

Datacom            [SNAP  nnnn]                    0010
                   [CPUID x   ]                    space
                   [ACCT  name]                    none
                   [DATABASE nnn]                  none
                   [TBLNAM xxx]                    none
```

SNAP nnnn

specifies the count of rejected or invalid records to be snap dumped. If omitted, the Interface displays the first 10 records that it is unable to process successfully. To suppress this option, specify SNAP 0.

CPUID x

specifies the one-character CPU identifier that is put in all summary records. This CPU identification can be used by the report program for various grouping and chargeback rate application functions. If omitted, the Interface places a blank in the CPU identifier in the summary records.

ACCT name

specifies the member name of the User Account Table. See the section Creating A User Accounting Table later in this chapter.

DATABASE nnn

specifies the three-character database identifier that contains the Accounting Table to be translated.

TBLNAM xxx

specifies the three-character table name of the Accounting Table to be translated.

CRITERIA

This parameter statement uses time as the criteria for selecting data for processing. The Accounting Table record selection is based on the start time and start date contained in the Accounting Table record.

```
Command          Keywords/Operands          Default

CRITERIA         [SDATE xx/xx/xx]           00/01/01
                 [EDATE xx/xx/xx]           12/31/99
                 [STIME nnnn    ]           0000
                 [ETIME nnnn    ]           2359
```

SDATE xx/xx/xx

specifies the beginning date for data selection. All Accounting Table records from the SDATE until EDATE are included for translation. The date must be specified in the format mm/dd/yy. Years 00-60 are treated as the years 2000-2060, 61-99 are treated as the years 1961-1999.

EDATE xx/xx/xx

specifies the end date for data selection. All Accounting Table records prior to this date but after SDATE are included for translation. The date must be specified in the format mm/dd/yy. Years 00-60 are treated as the years 2000-2060, 61-99 are treated as the years 1961-1999.

Note: EDATE and SDATE can be supplied individually or together. Together they delimit the date range. Specified independently they set the start or ending date. When their values are equal, a single day is selected. The value of EDATE must not precede SDATES value, except when specifying dates from the year 2000. For example, SDATE 01/01/95 EDATE 01/01/94 produces a syntax error message, whereas SDATE 12/01/99 EDATE 01/01/00 will not.

STIME nnnn

specifies the beginning time for data selection. All Accounting Table records from this time until ETIME are included for translation.

ETIME nnnn

specifies the end time for data selection. All Accounting Table records prior to this time but after STIME are included for translation.

Note: ETIME and STIME can be supplied individually or together. Together they delimit the time range. Specified independently they set the start or end time. When they are equal, a single minute is selected. When ETIME precedes STIME, EDATE and SDATE are required and EDATE must be greater than SDATE.

Creating a User Accounting Table

The Interface Translate Component creates CA JARS summary records from the Accounting Table. One item in this translation is the assignment of a cost center identification to each record.

For transaction activity, the Translate Component examines the two identifiers

- job name
- operator ID

and searches the table sequentially from beginning to end. The table is not sorted before the search. The user accounting information contained in the first entry that matches the Accounting Table record fields is inserted into the summary record. Any identifier that is omitted is considered a match. An asterisk can be used as a *wild-card* character.

Example

Suppose a table record has the following values for the identifiers:

Job Name	Operator
BAGJA01	JLB

All of the following identifiers for User Accounting Table entries produce a match.

Job Name	Operator
BAGJA01T	JLB
blank	J*
*******T	blank
blank	JLB
B*******	blank

Because the table is searched sequentially from top to bottom, the order of inclusion is significant. Although all the previous examples met the criteria, if all of them had been included in a single table, only the first one would be used to assign the cost center identification. The use of the asterisk as a *wild-card* character is illustrated by this example.

The User Accounting Table is built by assembling a set of macro instructions. You must follow the rules for coding Assembler Language macro statements when coding the table. During assembly, object code is generated as the statements are processed. If serious errors in the macro specification are detected, a message is issued and assembly continues even though the assembled module may not produce the intended results.

Initiating a User Accounting Table

The TYPE=INITIAL macro must be coded first, followed by one TYPE=ENTRY for each desired search key. The macros are terminated by a TYPE=FINAL.

```
Macro      Operand

CAIDC01    TYPE=INITIAL
```

TYPE=INITIAL

specifies the beginning of the User Accounting Table. This statement is required. Code only **one** TYPE=INITIAL.

Defining a User Accounting Table Cost Center

Use the TYPE=ENTRY statements to define your cost centers and have the Translate Component associate these with the desired Transaction, Terminal, User ID combinations.

There may be any number of TYPE=ENTRY statements.

```
Macro      Operands

CAIDC01    TYPE=ENTRY
           [,JOBNAME='cccccccc']
           [,OPRID='ccc']
           [,ACCT='cccccccccccccccc']
           [,DISP=DELETE|KEEP]
```

TYPE=ENTRY

specifies that this statement defines an entry in the table.

JOBNAME='cccccccc'

specifies the 1- to 8-character job name identifier of jobs whose execution is to be attributed to the cost center defined in this table entry.

OPRID='ccc'

specifies the 1- to 3-character operator identification of table records whose utilization statistics are to be attributed to the cost center defined in this table entry.

ACCT='cccccccccccccccc'

specifies the 1- to 16-character cost center identification that is placed in the user accounting information field of the summary record.

DISP=DELETE|KEEP

specifies the final record disposition when a match is found. When DISP=DELETE is coded, records are omitted from further processing.

Note: JOBNAME and OPRID are both optional. When not specified, the default is blanks, which is an automatic match.

Terminating a User Accounting Table

The assembly of the User Accounting Table is terminated when the assembler encounters the TYPE=FINAL. You must code one, and only one, TYPE=FINAL. This statement must be the last assembler statement in the assembler input. The TYPE=FINAL causes assembler statements necessary for proper table length calculations to be generated. It also generates the assembler END statement.

```
Macro      Operand

CAIDC01    TYPE=FINAL
```

TYPE=FINAL

specifies the end of the User Accounting Table. This statement is required. You must code only one TYPE=FINAL immediately before the assembler END statement.

Invoking the User Accounting Table

To invoke the User Accounting Table lookup process in the Interface, the linkedited member name **must** be specified on the ACCT option of the Datacom statement.

More information:

Preparing Translate Control Statements (see page 59)

User Accounting Table Examples

Example 1. The user's configuration:

- Job BAGJA011 is assigned to 'OVERHEAD'. It is the computer operators' CA Datacom/DB backup job.
- Jobs BAGJA012 and BAGJA013 are assigned to 'ACCOUNTING'.
- Job BAGJA014 is assigned to 'PAYROLL'.

```
CAIDC01    TYPE=INITIAL
CAIDC01    TYPE=ENTRY,JOBNAME='BAGJA011',ACCT='OVERHEAD'
CAIDC01    TYPE=ENTRY,JOBNAME='BAGJA012',ACCT='ACCOUNTING'
CAIDC01    TYPE=ENTRY,JOBNAME='BAGJA013',ACCT='ACCOUNTING'
CAIDC01    TYPE=ENTRY,JOBNAME='BAGJA014',ACCT='PAYROLL'
CAIDC01    TYPE=FINAL
```

Example 2. The user's configuration:

- All jobs starting with a 'D' with operator IDs beginning with an 'L' should be assigned to 'DEVELOPMENT'.
- All operator IDs of 'OPM' should be assigned to 'OPERATIONS'.
- All operator IDs beginning with a 'P0' should be assigned to 'PAYROLL'.
- All jobs beginning with a 'C' should be assigned to 'OVERHEAD'.

```
CAIDC01     TYPE=INITIAL
CAIDC01     TYPE=ENTRY,JOBNAME='D*******',OPRID='L**',ACCT='DEVELOPMENT'
CAIDC01     TYPE=ENTRY,OPRID='OPM',ACCT='OPERATIONS'
CAIDC01     TYPE=ENTRY,JOBNAME='C*******',ACCT='OVERHEAD'
CAIDC01     TYPE=ENTRY,OPRID='P0*',ACCT='PAYROLL'
CAIDC01     TYPE=FINAL
```

Operations

Execution of the CA JARS Interface to CA Datacom/DB requires a minimum region size of 200K. In addition, several interrelated files are also required. The following list describes these required data sets and their functions:

DDName	Description
STEPLIB	This statement describes the load library that was loaded from the distribution tape.
CAIJFPR	This statement describes the SYSOUT data set for generated display messages.
CAIJFSN	This statement describes a SYSOUT data set for generated snap dumps.

DDName	Description
CAIJSACT	This statement describes the output EXTDATA data set. This file must have these attributes: RECFM=VB LRECL=8188 BLKSIZE=8192 or more
SYSUDUMP	This statement describes a SYSOUT data set for dump output in the case of an abnormal termination.
CAIDCS6	This statement describes the output file written by the interface. It is this file that is input to the Report Writer. This file must have the following attributes: RECFM=VB LRECL=612 BLKSIZE=6233
CAIJFIN	This statement describes the data set that contains the interface control statements.

The following sample JCL can be used to execute the Interface to CA Datacom/DB. It is included as member DCINTR in CAJRJCL. Sample output from a run using a slightly modified version of this JCL can be found in the Reporting Considerations section of this chapter.

Sample JCL For CA Datacom/DB Interface Execution:

```
//DCINTR  JOB ...,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS CA Datacom/DB INTERFACE TO
//*        PRODUCE A JARS LEVEL 7 HISTORY FILE.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION-DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . CAIDCS6  DSN= CA JARS LEVEL 7 HISTORY FILE (OUTPUT)
//*          . CAIJFIN  INTERFACE CONTROL STATEMENTS
//*
//*        VOLUME AND UNIT DESIGNATORS WHICH POINT TO THE ACTUAL
//*        VOLUMES ON WHICH YOUR DATA SETS RESIDE AND SPACE
//*        PARAMETERS WHICH CORRESPOND TO THE SIZE OF YOUR DATA
//*        MUST ALSO BE MODIFIED.
//*
//*  REFER TO MEMBER DCINTR IN THE CAJRJCL
//*
//DCSTEP  EXEC PGM=JSI,PARM='XXX00480,JSDC0000'
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//CAIJFPR  DD  SYSOUT=*
//CAIJFSN  DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//CAIDCS6  DD  DSN=CAI.JARS.HISTORY.DATA,DISP=(,CATLG),
//  DCB=(RECFM=VB,LRECL=612,BLKSIZE=6233),
//  UNIT=uuuu,VOL=SER=vvvvvv,
//  SPACE=(TRK,(pp,ss),RLSE)
//CAIJSACT  DD DSN=CAI.DATACOM.EXTDATA, -- Change to your needs
//          DISP=(NEW,CATLG,DELETE),
//          UNIT=uuuu,
//          SPACE=(CYL,(pp,ss),RLSE),
//          DCB=(RECFM=VB,LRECL=8188,BLKSIZE=bbbb),
//          VOL=SER=vvvvvv
//CAIJFIN  DD  *
Datacom DATABASE 005 TBLNAM A04 SNAP 25 CPUID D ACCT JSDCACCT
/*
//
```

The following sample JCL can be used to create an CA Datacom/DB Utilization Report using the Report Writer. It is included as member DCUTLR in CAJRJCL.

Sample JCL For CA Datacom/DB Utilization Report:

```
//DCUTLR  JOB ...,TSOARS,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO PRODUCE
//*        A CA Datacom/DB UTILIZATION REPORT.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION-DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . CAIJSHST DSN= CA JARS LEVEL 7 HISTORY FILE
//*
//*        SPACE PARAMETERS, APPROPRIATE TO THE SIZE OF YOUR
//*        DATA, SHOULD BE USED IN THE 'SORTWK' AND 'CAIJS'
//*        STATEMENTS.
//*
//*  REFER TO MEMBER DCINTR IN THE CAJRJCL
//*
//JARSSTEP EXEC PGM=JSIMAIN
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//SORTMSG  DD  SYSOUT=*
//CAIJSPRT DD  SYSOUT=*
//CAIJSNAP DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SORTWK01 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK02 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK03 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT1 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT2 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSACT DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSHST DD  DSN=CAI.JARS.HISTORY.DATA,DISP=SHR
//CAIJSCIN DD  *
 SELECT      1                                    0
0HEADER     D A T A C O M   U T I L I Z A T I O N
0SORT    01608A2112605A2107716A21                1
0DISPLAY   00210811415614016516610611211З
0DESCRIPT2****0851
0DESCRIPT1****0181
0EDIT    06 L12 L13 HF4 D
/*
//
```

If you use the following control statements (CAIJSCIN) in place of those shown on the previous page, the same report is produced. The DC in positions 10-11 of the DISPLAY statement (below) causes CA JARS to use the Replacement Title Table (JSIRTTDC) for CA Datacom/DB. Sample output from this run can be found the Reporting Considerations section of this chapter.

```
 SELECT       1                                   0
0HEADER     D A T A C O M   U T I L I Z A T I O N
0SORT    01608A2112605A2107716A21               1
0DISPLAY DC0021081141561401651661061121 13
0DESCRIPT2****0851
0DESCRIPT1****0181
0EDIT    06 L12 L13 HF4 D
```

The following sample JCL can be used to produce an CA Datacom/DB Job Charge Detail Report using the Report Writer. It is included as member DCDETR in CAJRJCL.

Sample JCL For CA Datacom/DB Job Charge Detail Report (1 of 2):

```
//DCDETR  JOB ...,CLASS=A,MSGCLASS=A
//*
//*
//*        THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO PRODUCE
//*        A CA JARS CA Datacom/DB JOB CHARGE DETAIL REPORT.
//*
//*        THE FOLLOWING STATEMENTS ARE INSTALLATION-DEPENDENT
//*        AND MUST BE MODIFIED ACCORDINGLY:
//*          . JOB      ACCOUNTING & CLASS INFORMATION
//*          . STEPLIB  DSN= CA JARS LOAD LIBRARY
//*          . CAIJSHST DSN= CA JARS LEVEL 7 HISTORY FILE
//*
//*        SPACE PARAMETERS, APPROPRIATE TO THE SIZE OF YOUR
//*        DATA, SHOULD BE USED IN THE 'SORTWK' AND 'CAIJS'
//*        STATEMENTS.
//*
//*  REFER TO MEMBER DCINTR IN THE CAJRJCL
//*
//JARSSTEP EXEC PGM=JSIMAIN
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//SORTMSG  DD  SYSOUT=*
//CAIJSPRT DD  SYSOUT=*
//CAIJSNAP DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SORTWK01 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK02 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//SORTWK03 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT1 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSCT2 DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSACT DD  SPACE=(CYL,(1,1)),UNIT=SYSDA
//CAIJSHST DD  DSN=CAI.JARS.HISTORY.DATA,DISP=SHR
//CAIJSCIN DD  *
 SELECT      1                                    0
0HEADER     D A T A C O M   J O B    C H A R G E    D E T A I L
0SORT    01608A2112605A2107716A21                1
0DISPLAY   002108156166144140145146142114
0RATE     1000          100      001001001001001001
0DESCRIPT2****0851
0DESCRIPT1****0181
/*
//
```

If you use the following control statements (CAIJSCIN) in place of those shown on the previous page, the same report is produced. The DC in positions 10-11 of the DISPLAY statement causes CA JARS to use the Replacement Title Table (JSIRTTDC) for CA Datacom/DB. Sample output from this run can be found in the Reporting Considerations section of this chapter.

```
 SELECT       1                                  0
0HEADER     D A T A C O M   J O B   C H A R G E   D E T A I L
0SORT    01608A2112605A2107716A21                1
0DISPLAY DC00215616614413313413914014514 6142
0RATE     1000         100      001001001001001001
0DESCRIPT2****0851
0DESCRIPT1****0181
```

Record Descriptions and Processing Rules

Accounting Table Record Description

The following table describes the Accounting Table Record.

Accounting Table Record Layout:

Field Name	Field Position	Field Length	Format	Description
COMND	1	5	c	CA Datacom/DB command
JNAME	6	8	c	Job name
RUNIT	14	4	b	CA Datacom/DB run unit
OPRID	18	3	c	Monitor operator ID
PRTY	21	1	b	Priority
TABLE	22	3	c	Data base table name
UID01	25	32	c	User information block
ETIME	57	8	p	Elapsed time in microseconds
EXCDT	65	4	b	Data area EXCP count
EXCIX	69	4	b	Index area EXCP count
EXCPS	73	4	b	Start I/O count
LOGDT	77	4	b	Data area logical I/O
LOGIO	81	4	b	Logical start I/O

Field Name	Field Position	Field Length	Format	Description
LOGIX	85	4	b	Index area logical I/O
RTIME	89	8	p	Run time in microseconds
WTIME	97	8	p	Wait time in microseconds
STIME	105	6	c	Start time (HHMMSS)
SDATE	111	6	c	Start date (YYMMDD)
Format Indicator: b=binary c=character p=packed decimal				

Data Element Assignments for CA Datacom/DB

The table below associates a processing rule with each of the fields in the CA JARS record supplied by the CA JARS CA Datacom/DB Interface.

Data Element Assignments For CA Datacom/DB Data:

CA JARS Element	Source/Literal	Processing Rule ID
CPU ID	' '	8
File ID	'7'	8
Reader Start Date	SDATE	2
Reader Start Time	STIME	2
Job Name	JNAME	1
Job/Step Ind	'11'	8
Step Number		3
Processing ID	'C'	8
Record ID	' '	8
Start Time	STIME	2
Start Date	SDATE	2
Job Class	PRTY	1
Stop Time	STIME+ETIME	4
Programmer Name	JNAME+RUNIT+OPRID	5
Step Name	'*Datacom*'	8

CA JARS Element	Source/Literal	Processing Rule ID
Program Name	UID01	1
Elapsed Time	ETIME	6
CPU Time	RTIME	6
Wait Time	WTIME	6
Rdr I/O Count	EXCDT	9
Prt I/O Count	EXCIX	9
Pun I/O Count	LOGDT	9
Tape I/O Count	LOGIX	9
Disk I/O Count	EXCPS-(EXCDT+EXCIX)	9
Other I/O Count	LOGIO-(LOGDT+LOGIX)	9
Total I/O Count	EXCDT+EXCIX+EXCPS+LOGDT+ LOGIX+ LOGIO	9
Day of Week Code	SDATE	7

Processing rule IDs (position 3) are described as follows.

Processing Rules

1. Straight Move: For character fields, left-justified if possible, low-order character truncation of blank filling; for numeric field, type conversion is permitted; high-order digit truncation may be possible but is considered unlikely; scale must not change.
2. The minimum start date and time from the accounting table records that created the summary record.
3. Number of log records that created the summary record.
4. Derive the time from the start time (STIME) plus the elapsed time (ETIME). This is a calculated estimated time. The maximum time is kept.
5. Concatenate items.
6. Convert units in microseconds to JARS MINUTES, DEC=5.
7. Derive day of week code from result of rule 2.
8. Constant.
9. Accumulated according to jobname (JNAME) and run unit (RUNIT).

Sample Reports

CA Datacom/DB Interface Reports

The CA Datacom/DB Interface reports are produced from the execution of the Interface from CA JARS to CA Datacom/DB. Two reports are produced:

- Control Report
- Termination Report

Samples of these reports are shown next. These reports were obtained by executing a modified version of member DCINTR in CAJRJCL.

```
CA JARS r12              C A  -  J A R S  /  D A T A C O M  C O N T R O L   R E P O R T           CAIDCR00  PAGE    1
Resource Accounting SP0                                                                                       16 JAN 1998 08


                                                             SYSTEM CONTROL CARDS

                          1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
                          Datacom DATA BASE 005 TBLNAM A04 SNAP 25 CPUID D ACCT JSDCACCT
                          1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80

CAJR922I 1 CONTROL CARD(S) READ.

CA JARS r12              C A  -  J A R S  /  D A T A C O M  C O N T R O L   R E P O R T           CAIDCR00  PAGE    2
Resource Accounting SP0                                                                                       16 JAN 1998 08

CAJR920I 182 TOTAL RECORDS READ, 182 TOTAL RECORDS USED, 0 TOTAL RECORDS UNUSED.
_____________________________________________________________________________________________________________________________________
CAJR924I 13 CA JARS HISTORY RECORD(S) WRITTEN.

CAJR904I PROCESSING COMPLETE, RETURN CODE = 0.
CA JARS r12                            T E R M I N A T I O N   R E P O R T                    CAIJFR99   PAGE    1
Resource Accounting SP0                                                                                       16 JAN 1998 08
** PRODUCT RETURN CODE -- 0000
** MESSAGES -- ** NO MESSAGES PRODUCED **
** FILE USAGE --
   NAME- CAIJFPR                                                RECORD COUNTS-
                  ACCESS - SAM                                            0 -INPUT
                  BLKSIZE- 00133                                         27 -OUTPUT
                  LRECL  - 00133                                          0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED ANS-PR-CTL
                  USAGE  - OUTPUT MOVE
                  SYS    - LST
                  TAP.OPT- NONE
   NAME- CAIJFIN                                                RECORD COUNTS-
                  ACCESS - SAM                                            1 -INPUT
                  BLKSIZE- 00080                                          0 -OUTPUT
                  LRECL  - 00080                                          0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED BLOCKED
                  USAGE  - INPUT MOVE
                  SYS    - 000
                  TAP.OPT- NONE
   NAME- CAIDCS6                                                RECORD COUNTS-
                  ACCESS - SAM                                            0 -INPUT
                  BLKSIZE- 06233                                         13 -OUTPUT
                  LRECL  - 00612                                          0 -UPDATED
                  CISIZE - 00000
                  RECFORM- VARIABLE BLOCKED
                  USAGE  - OUTPUT MOVE
                  SYS    - 006
                  TAP.OPT- STANDARD-LABEL REW-UNLOAD
** START TIME -- 08.58.06 END TIME -- 08.58.14 DURATION -- 00.00.08
** END OF JOB --
   HIGHEST RETURN CODE -- 0
```

CA JARS Reports

Two sample reports are provided with the CA Datacom/DB Interface.

1. Utilization Report
2. Job Charge Detail Report

Samples of each report and the system and report control statements required to generate them are shown next.

CA Datacom/DB Utilization Report

The sample Utilization Report, starting on the next page, was obtained by executing a modified version of member DCUTLR in CAJRJCL. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 SELECT      1                                    0
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 SELECT      1                                    0
0HEADER     D A T A C O M   U T I L I Z A T I O N
0SORT    01608A2112605A2107716A21               1
0DISPLAY DC002108114156140165166106112113
0DESCRIPT2****0851
0DESCRIPT1****0181
0EDIT    06 L12 L13 HF4 D
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
```

CA Datacom/DB Utilization (1 of 2):

```
                                 D A T A C O M    U T I L I Z A T I O N
BEGIN DATE - 12/27/94                                                                                RUN DATE - 01/16/95
END DATE   - 12/31/94                                                                                           PAGE    1
                                   RUN      USE      TOTAL    ELAPSED        CPU  START       START     STOP
DESCRIPTION         USER INFO      UNIT    COUNT  I/O COUNT      TIME       TIME  DATE        TIME      TIME

DBTEST01
       00591

                    DBACCOUNT        00591      1         30   00:06:21   00:01:43 94/12/27 20:31:58 20:32:04
                                         1      1         30   00:06:21   00:01:43 94/12/27 20:31:58 20:32:04
       00591                             1      1         30   00:06:21   00:01:43 94/12/27 20:31:58 20:32:04

       00593


                    DBACCOUNT        00593      1          0   00:00:02   00:00:02 94/12/27 20:25:22 20:25:22
                                         1      1          0   00:00:02   00:00:02 88/12/27 20:25:22 20:25:22
       00593                             1      1          0   00:00:02   00:00:02 88/12/27 20:25:22 20:25:22

       00595


                    DBACCOUNT        00595      2         27   00:00:56   00:00:46 94/12/27 21:21:09 21:21:09
                                         2      2         27   00:00:56   00:00:46 94/12/27 21:21:09 21:21:09
       00595                             2      2         27   00:00:56   00:00:46 94/12/27 21:21:09 21:21:09

       00652


                    DBACCOUNT        00652      1        520   00:19:14   00:13:49 94/12/27 22:10:24 22:10:42
                                         1      1        520   00:19:14   00:13:49 94/12/27 22:10:24 22:10:42
       00652                             1      1        520   00:19:14   00:13:49 94/12/27 22:10:24 22:10:42

       00678


                    DBACCOUNT       00678       1         22   00:00:33   00:00:28 94/01/10 20:38:45 20:38:45
```

CA Datacom/DB Utilization (2 of 2):

```
                                     D A T A C O M   U T I L I Z A T I O N
BEGIN DATE - 12/27/94                                                                      RUN DATE - 01/16/95
END DATE   - 12/31/94                                                                                 PAGE   2
                                        RUN      USE      TOTAL    ELAPSED        CPU  START       START     STOP
DESCRIPTION          USER INFO          UNIT    COUNT  I/O COUNT      TIME        TIME  DATE        TIME      TIME

                                           1        1         22   00:00:33   00:00:28 94/12/27 20:38:45 20:38:45
       00678                               1        1         22   00:00:33   00:00:28 94/12/27 20:38:45 20:38:45

       00679


                     DBACCOUNT           00679      1         22   00:00:17   00:00:14 94/12/27 20:48:45 20:48:45
                                           1        1         22   00:00:17   00:00:14 94/12/27 20:48:45 20:48:45
       00679                               1        1         22   00:00:17   00:00:14 94/12/27 20:48:45 20:48:45

       00681


                     DBACCOUNT           00681      1         22   00:09:34   00:06:23 94/12/27 15:55:03 15:55:09
                                           1        1         22   00:09:34   00:06:23 94/12/27 15:55:03 15:55:09
       00681                               1        1         22   00:09:34   00:06:23 94/12/27 15:55:03 15:55:09

       00682


                     DBACCOUNT           00682      1         22   00:42:09   00:37:33 94/12/27 16:07:08 16:07:50
                                           1        1         22   00:42:09   00:37:33 94/12/27 16:07:08 16:07:50
       00682                               1        1         22   00:42:09   00:37:33 94/12/27 16:07:08 16:07:50

       00683


                     DBACCOUNT           00683      1         22   00:00:44   00:00:42 94/12/27 18:32:32 18:32:32
                                           1        1         22   00:00:44   00:00:42 94/12/27 18:32:32 18:32:32
       00683                               1        1         22   00:00:44   00:00:42 94/12/27 18:32:32 18:32:32

       00687
                                                ®
                                                ®
                                                ®


                     DBACCOUNT           00688      2  2,001,473   15:03:49   14:07:06 94/12/27 21:51:35 22:06:35
                                           3        3  2,007,185   27:27:42   20:57:52 94/12/27 20:25:22 22:06:35
       00688                               3        3  2,007,185   27:27:42   20:57:52 94/12/27 20:25:22 22:06:35
DBTEST01                                  14       14  2,009,396   29:24:29   22:27:42 94/12/27 15:55:03 22:10:42

CICSPREL
       00594


                     CICSACCOUNT         00594    168      1,870   00:30:53   00:14:34 94/12/27 21:11:03 21:11:33
                                         168      168      1,870   00:30:53   00:14:34 94/12/27 21:11:03 21:11:33
       00594                             168      168      1,870   00:30:53   00:14:34 94/12/27 21:11:03 21:11:33
CICSPREL                                 168      168      1,870   00:30:53   00:14:34 94/12/27 21:11:03 21:11:33
                                         182      182  2,011,266   29:55:21   22:42:16 94/12/27 15:55:03 22:10:42
```

CA Datacom/DB Job Charge Detail Report

The sample Job Charge Detail Report, starting on the next page, was obtained by executing a modified version of member DCDETR in CAJRJCL. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 SELECT       1                                    0
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 SELECT      1                                    0
0HEADER     D A T A C O M   J O B   C H A R G E   D E T A I L
0SORT    01608A2112605A2107716A21               1
0DISPLAY DC0021081561661441401451461421 14
0RATE     1000          100      001001001001001001
0DESCRIPT2****0851
0DESCRIPT1****0181
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
```

```
                                   D A T A C O M   J O B   C H A R G E   D E T A I L
BEGIN DATE - 12/27/94                                                                                RUN DATE - 01/16/95
END DATE   - 12/31/94                                                                                            PAGE   1
                                          USE        CPU     PROCESS      TOTAL         I/O        TOTAL  PERCENT   RUN
DESCRIPTION          USER INFO          COUNT       TIME      CHARGE  I/O COUNT      CHARGE       CHARGE    TOTAL   UNIT

CICSPREL
       00594

                      CICSACCOUNT         168   00:14:34     $242.75      1,870        $.02      $242.77    1.068   00594
                                          168   00:14:34     $242.75      1,870        $.02      $242.77    1.068     168
       00594                              168   00:14:34     $242.75      1,870        $.02      $242.77    1.068     168
CICSPREL                                  168   00:14:34     $242.75      1,870        $.02      $242.77    1.068     168

DBTEST01
       00591


                      DBACCOUNT             1   00:01:43      $28.58         30        $.00       $28.58     .126   00591
                                            1   00:01:43      $28.58         30        $.00       $28.58     .126       1
       00591                                1   00:01:43      $28.58         30        $.00       $28.58     .126       1

       00593


                      DBACCOUNT             1   00:00:02        $.58          0        $.00         $.58     .003   00593
                                            1   00:00:02        $.58          0        $.00         $.58     .003       1
       00593                                1   00:00:02        $.58          0        $.00         $.58     .003       1

       00595


                      DBACCOUNT             2   00:00:46      $12.84         27        $.00       $12.84     .057   00595
                                            2   00:00:46      $12.84         27        $.00       $12.84     .057       2
       00595                                2   00:00:46      $12.84         27        $.00       $12.84     .057       2

       00652
```

```
                                 D A T A C O M   J O B   C H A R G E   D E T A I L
BEGIN DATE - 12/27/94                                                                                      RUN DATE - 01/16/95
END DATE   - 12/31/94                                                                                                PAGE   2
                                       USE        CPU      PROCESS      TOTAL         I/O         TOTAL  PERCENT   RUN
DESCRIPTION          USER INFO       COUNT       TIME      CHARGE  I/O COUNT      CHARGE        CHARGE    TOTAL   UNIT



                      DBACCOUNT          1   00:13:49     $230.40        520         $.01       $230.41    1.014   00652
                                         1   00:13:49     $230.40        520         $.01       $230.41    1.014       1
       00652                             1   00:13:49     $230.40        520         $.01       $230.41    1.014       1

       00678


                      DBACCOUNT          1   00:00:28       $7.64         22         $.00         $7.64     .034   00678
                                         1   00:00:28       $7.64         22         $.00         $7.64     .034       1
       00678                             1   00:00:28       $7.64         22         $.00         $7.64     .034       1

       00679


                      DBACCOUNT          1   00:00:14       $4.02        22         $.00         $4.02     .018   00679
                                         1   00:00:14       $4.02         22         $.00         $4.02     .018       1
       00679                             1   00:00:14       $4.02         22         $.00         $4.02     .018       1

       00681


                      DBACCOUNT          1   00:06:23     $106.49         22         $.00       $106.49     .469   00681
                                         1   00:06:23     $106.49         22         $.00       $106.49     .469       1
       00681                             1   00:06:23     $106.49         22         $.00       $106.49     .469       1

       00682


                      DBACCOUNT          1   00:37:33     $625.87         22         $.00       $625.87    2.754   00682
                                         1   00:37:33     $625.87         22         $.00       $625.87    2.754       1
       00682                             1   00:37:33     $625.87         22         $.00       $625.87    2.754       1

       00683


                      DBACCOUNT          1   00:00:42      $11.57         22         $.00        $11.57     .051   00683
                                         1   00:00:42      $11.57         22         $.00        $11.57     .051       1
       00683                             1   00:00:42      $11.57         22         $.00        $11.57     .051       1

       00687


                      DBACCOUNT          1   00:28:09     $469.27      1,524         $.02       $469.29    2.065   00687
                                         1   00:28:09     $469.27      1,524         $.02       $469.29    2.065       1
       00687                             1   00:28:09     $469.27      1,524         $.02       $469.29    2.065       1

       00688


                      DBACCOUNT          1   06:50:45   $6,845.95      5,712         $.06     $6,846.01   30.126   00688
                      DBACCOUNT          2   14:07:06  $14,118.44  2,001,473       $20.01    $14,138.45   62.217   00688
                                         3   20:57:52  $20,964.39  2,007,185       $20.07    $20,984.46   92.343       3
       00688                             3   20:57:52  $20,964.39  2,007,185       $20.07    $20,984.46   92.343       3
DBTEST01                                14   22:27:42  $22,461.65  2,009,396       $20.10    $22,481.75   98.934      14
                                       182   22:42:16  $22,704.40  2,011,266       $20.12    $22,724.52  100.002     182
```

EXTDATA Reports

There are sample CA Earl and CA Easytrieve reports that will process the Datacom Interface EXTDATA records.

Note: The EXTDATA record layout is described in the chapter "EXTDATA Reporting" in the *User Guide.*

```
OPTION LIST OFF
NOTE ******************************************************************
NOTE *  REPORT ID:      ERXTD001                                      *
NOTE *  REPORT NAME:    DATACOM PROCESS REPORT                        *
NOTE *                                                                *
NOTE *  DESCRIPTION:    THIS WILL REPORT ON THE TOTAL NUMBER OF IOS   *
NOTE *                  AMOUNT OF CPU TIME CONSUMED BY EACH INDIVIDUAL*
NOTE *                  RUN UNIT ACCESSING DATACOM, SORTED BY JOB NAME*
NOTE *                  AND ACCOUNTING INFORMATION.                   *
NOTE *                                                                *
NOTE *  RECORD TYPES:   MRXTHDR,                                      *
NOTE *                  MRXTSIED                                      *
NOTE *                                                                *
NOTE *  EXTDATA RECORD: SIED                                          *
NOTE *                                                                *
NOTE *  MACROS:                                                       *
NOTE ******************************************************************
OPTION PRINTER = 132
OPTION PAGE = 60
OPTION PRECISION = ALL
OPTION CPAGE = 60
HISTIN:  FILE JARS RECORD=3697
  DEF INAREA                     1-3697  X
  COPY MRXTHDR
  COPY MRXTSIED
DEF SESSDATE =RECDATE 1-6 N 'SESSION' 'DATE' PIC '99/99/99'
DEF SESSTIME =RECTIME 1-6 N 'SESSION' 'TIME' PIC '99:99:99'
NOTE ******************************************************************
NOTE * SELECTING FROM HISTORY FILE EXTDATA, SPECIFICALLY SIED         *
NOTE ******************************************************************
!
IF     PROCID NOT = ':' OR
       EXTTYPE NOT = 'SIED'
       THEN GOTO START
ENDIF
!
NOTE ******************************************************************
NOTE *                REPORT PROCESSING SECTION                       *
NOTE ******************************************************************
!
REPORT 'DATACOM ACTIVITY SUMMARY'
```

```
TITLE ' '
TITLE @1 'REPORT ID: ERXTD001'     @54 'SYSTEM ID:'  SID
TITLE @1 'SOURCE   : DATACOM ACCT' @54 ' APPL JOB:'  EXTSIED_CALLER_JOB
TITLE                              @54 '  USER ID:'  EXTSIED_USER_INFO
TITLE                              @54 '  ACCOUNT:'  EXTSIED_ACCOUNTING
TITLE ' '
!
CONTROL    (EXTSIED_CALLER_JOB) (EXTSIED_USER_INFO)
           (EXTSIED_ACCOUNTING) SKIP
            EXTSIED_RUN_UNIT
!
PRINT
      @1 ' '
         EXTSIED_RUN_UNIT
         SESSDATE
         SESSTIME
         EXTSIED_ELAPSED_TIME
         EXTSIED_RUNNING_TIME
         EXTSIED_TOTAL_IOS
END

LIST OFF
*****************************************************************
*  REPORT ID:      EZXTD001                                     *
*  REPORT NAME:    DATACOM ACTIVITY SUMMARY                     *
*  DESCRIPTION:    THIS SUMMARY REPORT WILL SHOW RESOURCE       *
*                  CONSUMPTION WITHIN DATACOM SUMMARIZED ON     *
*                  JOBNAME, RUN UNIT AND OPERATOR ID.           *
*                                                               *
*  RECORD TYPES:   MZXTHDR,                                     *
*                  MZXTSIED                                     *
*                                                               *
*  EXTDATA RECORD: SIED                                         *
*                                                               *
*****************************************************************
PARM ABEXIT (SNAP) DEBUG (FLDCHK STATE)
FILE EXTDATA
%MZXTHDR
%MZXTSIED
*
JOB INPUT EXTDATA
IF     PROCID  = ':' AND EXTTYPE = 'SIED'
       GOTO PROCESS_DATA
       ELSE
       GOTO JOB
END-IF
PROCESS_DATA
*
PRINT REPORT1
*
```

```
REPORT REPORT1 SUMMARY SPACE 0 PAGESIZE (60 60) LINESIZE 132 NOADJUST +
       SUMCTL DTLCOPY
*
SEQUENCE EXTSIED_CALLER_JOB EXTSIED_USER_INFO EXTSIED_ACCOUNTING      +
         EXTSIED_RUN_UNIT
*
CONTROL  EXTSIED_CALLER_JOB EXTSIED_USER_INFO EXTSIED_ACCOUNTING      +
         NEWPAGE EXTSIED_RUN_UNIT
*
TITLE 01 COL 51 'DATACOM ACTIVITY SUMMARY'
TITLE 02 ' '
TITLE 03 COL 1 'REPORT ID: EZXTD001'    COL 54 'SYSTEM ID      ' SID
TITLE 04 COL 1 'SOURCE   : DATACOM'     COL 54 'APPL JOB       '      +
                                        EXTSIED_CALLER_JOB
TITLE 05                                COL 54 'USER ID        '      +
                                        EXTSIED_USER_INFO
TITLE 06                                COL 54 'ACCOUNT        '      +
                                        EXTSIED_ACCOUNTING
LINE   EXTSIED_RUN_UNIT     '   ' +
       RECDATE              '   ' +
       RECTIME              '   ' +
       EXTSIED_ELAPSED_TIME '   ' +
       EXTSIED_RUNNING_TIME '   ' +
       EXTSIED_TOTAL_IOS
```

The sample output will look like this:

```
121/01/04                                               DATACOM ACTIVITY SUMMARY

 REPORT ID: ERXTD001                                   SYSTEM ID:       XE96
 SOURCE   : DATACOM ACCT                                APPL JOB:       CHARLIEB
                                                         USER ID:       DATSTART
                                                         ACCOUNT:       OTHERS

 --------------------------------------------------------------------------------------------------------------------------------
        RUN            SESSION       SESSION            ELAPSED            RUNNING              TOTAL
        UNIT              DATE          TIME          TIME (MIN)         TIME (MIN)               IOS
 --------------------------------------------------------------------------------------------------------------------------------
        00025103      03/12/05      09:49:42            0.25160            0.12551               735
        00025104      03/12/05      09:50:05            0.15488            0.05872              1658
        00025105      03/12/05      09:50:15            0.06874            0.02411               778
        00025106      03/12/05      09:50:20            0.06346            0.01411              1256
        00025107      03/12/05      09:50:26            0.07104            0.01463               903
```

Reporting Considerations

This section identifies the Report Writer areas that are affected by the introduction of CA Datacom/DB data. Specifically, the Basic Accounting Table and the Output Data Elements Table are replaced when producing reports with CA Datacom/DB data.

CA Datacom/DB Data Elements

The following is a list of CA Datacom/DB data elements:

```
Job Name
User Information Block
Priority
Run Unit
Operator ID
Data EXCPs
Index EXCPs
Start I/O
Data Logical I/O
Index Logical I/O
Logical Start I/O
Elapsed Time
CPU Time
Wait Time
Command Count
Minimum Start Date
Minimum Start Time
Maximum End Time
Day of Week Code
User Account Code
```

Basic Accounting Table

The following table replaces the Basic Accounting Table for designing CA Datacom/DB reports:

Note: The final column in this table provides the corresponding Output Data Element ID for the Basic Accounting Table.

CA Datacom/DB Basic Accounting Table:

Field Name	Field Position	Field Length	F*	Notes	Output DE ID
CPU Identification	1	1	a		57
Reserved	2-3	2	-		
Min Start Date	4-9	6	a	YYMMDD	60
Min Start Time	10-15	6	a	HHMMSS	61
Job Name	16-23	8	a		04
Reserved	24-25	2	-		
Command Count	26-27	2	b		56

Field Name	Field Position	Field Length	F*	Notes	Output DE ID
Processing ID	28	1	a	'C'	03
Reserved	29-36	8	a		
Min Start Time	37-42	6	a	HHMMSS	12
Min Start Date	43-48	6	a	YYMMDD	06
Job Class	49-50	2	a		07
Max End Time	51-56	6	a	HHMMSS	13
Concatenation of Job Name, Run Unit, Operator ID	57-76	20	a		58
User Account Code	77-92	16	a	blank unless JOBNAME and OPERID match entry in ACCT table	08
Reserved	93-98	6	-		
Record ID	99-106	8		'Datacom'	11
Program Name	107-114	8	a		05
Reserved	115-125	11	-		
Job Number	126-130	5	a		14
Priority Level	131-132	2	a		15
Reserved	133-170	38	-		
Elapsed Time CPU Time Reserved Wait Time	171-176 177-182 183-188 189-194	6 6 6 6	p p - p	In minutes, to 5 decimal places	25,65 26,66 28,68
Reserved	195-212	18	-		
Data EXCPs	213-219	7	p		33
Index EXCPs	220-226	7	p		34
Data Logical I/O	227-233	7	p		35
Index Logical I/O	234-240	7	p		37
Other EXCPs	241-247	7	p		38
Other Logical I/O	248-254	7	p		39
Total I/O Count	255-261	7	p		40
Reserved	262-295	34	-		

Field Name	Field Position	Field Length	F*	Notes	Output DE ID
Group Code #1 Group Code #2 Group Code #3	296 297 298	1 1 1	a a a	Blank unless filled by grouping feature	84 85 86
Reserved	299-364	66	-		
Posted ECBS	365-368	4	p		A5
Descriptors Updated	369-372	4	p		A6
Reserved	373-417	45	-		
CPU Index	418-419	2	p		D0
Reserved	420-436	16	-		
Day of Week Code	437	1	a		D5,D6
Group Code #4 Group Code #5 Group Code #6	438 439 440	1 1 1	a a a	Blank unless filled by grouping feature	D7 D8 D9
Reserved	441-550	108	-		
Processor Time	551-556	6	p	999999V99999C; hours	29,69
Processor Charge	557-562	6	p	999999999V99C; dollars	44
I/O Time	563-568	6	p	999999V99999C; hours	30,70
I/O Charge	569-574	6	p	999999999V99C;	45
Reserved	575-584	10			
Total Charge	585-590	6	p	999999999V99C	46
Reserved	591-608	18			

F* Format Indicator a=alphanumeric b=binary p=packed decimal

Contents of Target Libraries

CAJRSAMP Macros:	CAIDC01	DCURT1	DCURT2
CAJRSAMP Sample User Tables:	DCAACT		
CAJREARL CA EARL Source:	MRXTSIED		
CAJREZTR CA Easytrieve Source:	MZXTSIED		

CAJROPTN CA Datacom/DB Definitions:	JARSDC1				
CAJRJCL Sample JCL:	DCINTR	DCUTLR	DCDETR	ASMURT1	ASMURT2
CAJRLOAD Load Modules:	JSIRTTDC	JSDCPMSG	JSDC0000	JSDC1000	DC0100

Chapter 3: The DB2 Interface

The DB2 Interface provides a mechanism for:

- accounting for DB2 system usage
- adding DB2 charges to your CA JARS reports

DB2 accounting trace produces that class 1 accounting data that is used to assess and charge DB2 costs. The SMF type 101 records record this data. DB2 does not produce accounting data by default. To specify which accounting data DB2 trace can produce, see the *IBM DB2 Installation Guide* or *Updating DB2 Install and Migration Parameters* as described in *DB2 System Planning and Administration Guide*. In either case, specify the following parameters:

- YES for TRACE AUTO START. This action assures that the accounting trace is automatically invoked when DB2 is started.
- YES for SMF accounting.

Once these parameters are set, DB2 trace begins collecting accounting data when a thread connects to DB2. DB2 trace writes a completed record when the thread terminates or when the authorization identifier changes.

Compressed SMF Type 101 records that are decompressed and the DB2 Extract Program (JSZS0000) processes these records. This program is an additional optional feature of the report writer. To activate this program, code a Y (yes) in position 37 of the OPTION statement. In order to avoid multiple passes on the SMF data, activate the exit as part of the routine report program SMF processing procedure. The exit produces two output files; one required and one optional. The required file, ddname CAIJDB2X, contains the DB2 accounting extract for subsequent processing by the Wizard Report Writer. All DB2 accounting data elements from the SMF record are included in the extract record. Therefore, you can use it for more than just chargeback accounting. For instance, you can develop your own CA JARS Wizard programs to monitor:

- definitional SQL statements usage (CREATE, DROP, and ALTER) by application programs
- the use of the 32-KB buffer pool
- DB2 lock contention

The RECFM is FB, the LRECL is 372, and the default BLKSIZE is 2976. BLKSIZE can be overridden on the DD statement to any acceptable BLKSIZE desired.

The optional file, ddname CAIJDB2P, contains a formatted dump of each DB2 accounting record for problem determination purposes. If not used, remove the DD statement; not dummied. The RECFM is VBA, LRECL is 137, and the default BLKSIZE is 1100, but BLKSIZE can be overridden.

The interface uses the Wizard Report Writer to read the DB2 extract file. A CA JARS Wizard glossary, CAWGJRD2, is provided for this purpose. Two sample reports, created using CA JARS Wizard, are also provided with the interface. The report samples shown in this chapter are intended to illustrate the use of CA JARS Wizard **not** how to charge for DB2 usage.

Important! Before CICS Transaction Server (CTS) Release 2.2, double billing for CPU Usage occurs if you use SMF record type 30 and the DB2 Interface. CPU time utilization for a database access is included in the SMF record type 30.

This section contains the following topics:

Distributed Sample Source Code

The first report, JARSDB21, shows how CA JARS debit records can be created. These debit records are read in a run that reports on charges by account. DB2 usage charges are added to the other charges that are calculated on an account basis.

The second report, JARSDB22, is a sample report showing DB2 data usage by authorization ID. Each report is described on the following pages. A description of the CAWGJRD2 glossary and the CA JARS Wizard data element names to use in the CA JARS Wizard programs is contained in the *CA JARS Wizard Reference Guide.*

The source code for both of these CA JARS Wizard programs is distributed in the **AAJ1OPTN** distribution library and is copied to **CAJROPTN** at APPLY time by SMP. You are encouraged to use these as samples and develop your own CA JARS Wizard applications against DB2 data.

Note: If you desire to modify these samples, it is recommended that you copy them to new names outside of CA JARS SMP's control.

JARSDB21: Debit Record Creation

In JARSDB21, CA JARS Wizard is used to:

- get accounting information for each DB2 user using a DB2 user ID and a CA JARS Wizard facility called file matching. This involves having CA JARS Wizard search a second file to find the accounting information associated with each user ID. Complete information on file matching can be found in the *Wizard Reference Guide.*

- calculate the charge for the user. In this sample the charge is based on CPU time and the number of read requests. Because CA JARS Wizard has a flexible language for computing new fields, and since all the information about the user's session with DB2 is carried in the DB2 account record, the charge can be based on anything in the record. For instance, a surplus could be charged for using DB2 during peak hours.
- sum the charges for the accounts and print a report that shows the charge by account.
- write a CA JARS debit record for each account. This debit record contains the account information and the charge that was calculated. All debit records are read in a run that reports on charges by account. The charge for the use of DB2 is added to the other charges that are calculated on an account basis.

JARSDB21 executes on the assumption that you have a secondary file containing one record for each unique DB2 user ID at your site. Each record in this secondary file also contains the necessary debit record accounting information. Report JARSDB21 assumes that the userid is in positions 1 to 8 and the accounting information is in positions 10 to 25, as shown below:

```
         1         2    2
1........0.........0....5
userid   accounting info.
```

If you do not have such a file, you must set one up or alter the JARSDB21 control statements accordingly.

A sample of this file is located CAJROPTN member JARSDBTB.

To execute JARSDB21, set up the necessary JCL for the run. See the *CA JARS Wizard Reference Guide* for sample JCL. Be sure to include DD statements for the following ddnames:

- CAIJWI (your DB2 input file)
- CAIJWI2 (the secondary file containing account information)
- CAIJWOP (the output file for the debit records)

The following sample report is produced with the debit record output file when JARSDB21 is run.

```
CA                                                         PROGRAM LISTING                     CA JARS Wizard PAGE 1
 CA JARS Wizard 9710JW230                                                                                 23 MAR 1994 14.41.50
                                                         TOTAL CHARGES BY ACCOUNT

                                                                   CPU TIME            READ     DB2 ACCOUNT
                                 ACCOUNT           TOTAL CHARGE     SS.SSS          REQUEST         RECORDS
                            ----------------     --------------    --------     -------------     -----------

                            FINANCE                      $24.12     110.620              227               4
                            MARKETING                    $44.81      97.760            2,111              58
                            NETWORK                      $34.51      93.080            1,346               4
                            OPERATIONS                    $7.43      14.470              378               8
                            R & D                         $9.08      17.190              444             163
                            SALES                        $13.21      42.560              408              15
                                        .
                                        .
                                        .
                                                         TOTAL CHARGES BY ACCOUNT                     23 MAR 1994 PAGE    2

                                                                   CPU TIME            READ     DB2 ACCOUNT
                                 ACCOUNT           TOTAL CHARGE     SS.SSS          REQUEST         RECORDS
                            ----------------     --------------    --------     -------------     -----------

     GRAND TOTAL                                        $133.16     375.680            4,914             252
```

JARSDB21 Control Statements

```
PARAMETER XREF NOPC
INPUT CAWGJRD2
*
DEFINE OFILL1(1)(C) = ' '
DEFINE ODEBIT(8)(C) = 'DEBIT   '
DEFINE OCPUID(1)(C) = ' '
DEFINE OUSERID(8)(C) = ' '
DEFINE ODATE(6)(C) = ' '
DEFINE OJOB(8)(C) = 'DB2-PROC'
DEFINE OTIME(6)(C) = ' '
DEFINE OPROGRAMMER(20)(C) = ' '
DEFINE ODEBITAMT(6)(P)(.2) = 0
*
DEFINE IOREQT(6)(P) = 0
*
INPUT FILE KEY = 2CC1-8 MATCH = USER/ID TABLE=2CC10-25 LIST
COMPUTE(P) IF MATCHED THEN OACCT(C)(16) EQ 2CC10-25 ELSE
                           OACCT EQ USER/ID
*
COMPUTE OUSERID EQ USER/ID
COMPUTE IOREQT = (READ/SYNC/BP0 + READ/PREF/BP0 +
                  READ/SYNC/BP1 + READ/PREF/BP1 +
                  READ/SYNC/BP2 + READ/PREF/BP2 +
                  READ/SYNC/BP32 + READ/PREF/BP32)
*
COMPUTE ODEBITAMT = (CPU/TIME * .19283) + (IOREQT * .0123)
ODEBITC (6)(C)(.2) = ODEBITAMT
*
SORT OACCT
BREAK OACCT
HEADING1C TOTAL DB2 CHARGES BY ACCOUNT
LIST(SUM) OACCT(DL) 'ACCOUNT',
          ODEBITAMT($) 'TOTAL CHARGE',
          CPU/TIME 'CPU TIME',
          IOREQT 'READ/REQUEST',
          COUNT 'DB2 ACCOUNT/RECORDS'
*
OUTPUT(SUM) FILE,RECFM = FB,R = 80,B = 800,
   ITEM = OFILL1,
   ODEBIT,
   OCPUID,
   OUSERID,
   OACCT,
   ODATE,
   OJOB,
   OTIME,
   OPROGRAMMER,
```

```
ODEBITC
```

JARSDB21 Execution Description

The control statements used in JARSDB21 are described below. Complete descriptions of all CA JARS Wizard control statements can be found in the *CA JARS Wizard Reference Guide*.

PARAMETER

The PARAMETER control statement specifies options for a CA JARS Wizard run.

XREF

Creates a cross-reference of the data fields used in the run and the statements they are found in. This cross-reference listing is printed in addition to the control statements and the report for the run.

NOPC

Suppresses the CA JARS Wizard error handling routine.

INPUT

INPUT statements are used to identify the CA JARS Wizard glossary and/or the input files for the run. In JARSDB21 two INPUT statements are given:

1. The first INPUT statement lists the CAWGJRD2 glossary as the glossary for the primary input file for the run.

2. The second INPUT statement describes the secondary input file. Secondary files are only used when file matching is to be performed. KEY = 2CC1-8 defines the matching key field for the *secondary* file. Here, the first eight positions of each record are the matching key. MATCH = USER/ID designates the user ID field of the *primary* input file as its matching key field.

   TABLE indicates that the secondary input file is a table file to be read completely at the start of the run. Therefore, the entire file is available for searching during the run. The field in positions 10 through 25 of the secondary file contains the account information.

   The notation 2CC10-25 serves two purposes. It:

   - identifies the location of a data field in the secondary file.
   - serves as a name for the field.

DEFINE

Ten DEFINE statements are given in JARSDB21. Each defines a field for the run. The first nine DEFINE statements define fields for the debit record. All of the defined fields are initialized each time a new record is processed.

1. OFILL1: One-byte reserved field, initialized as a blank.
2. ODEBIT: Eight-byte field, initialized as DEBIT. This field identifies the statement as a DEBIT statement.
3. OCPUID: One-byte field, initialized as a blank, and used to identify the CPU.
4. OUSERID: Eight-byte field, initialized as blanks, and used for user identification.
5. ODATE: Six-byte field, initialized as blanks, and used for the date (YYMMDD).
6. OJOB: Eight-byte field, initialized as blanks, and used for the job name.
7. OTIME: Six-byte field, initialized as blanks, and used for the time (HHMMSS).
8. OPROGRAMMER: 20-byte field, initialized as blanks, and identifying the programmer.
9. ODEBITAMT: Six-byte field, initialized as zero, and used for the debit amount.
10. IOREQT: Six-byte field used to hold the sum of the READ/SYNC and READ/PREF counts for all buffer pools.

COMPUTE

Four COMPUTE statements are executed in JARSDB21.

The first COMPUTE statement evaluates the file matching between the primary input file and the secondary file. It also defines a new field OACCT (16 bytes) and assigns a value to it based on the results of file matching. If a match occurs on the user ID of a primary input file record and a secondary input file record, OACCT is assigned the value of the account information in positions 10 to 25 of the secondary file. Otherwise, OACCT is assigned a value of UNKNOWN.

Notice the (P) suffix code appended to the first COMPUTE statement. This code indicates that the COMPUTE should take place before the primary input file records are sorted. This is necessary because the SORT occurs on the OACCT field.

The remaining three COMPUTE statements simply assign values to fields: OUSERID, IOREQT, and ODEBITAMT. OUSERID is assigned the value of the user ID in the primary input record. IOREQT and ODEBITAMT are calculated from other fields in the primary input record.

SORT

The SORT statement identifies the sequence in which the input records should be sorted prior to processing. Here the sort is performed on OACCT (the account information). Note that the OACCT field is created and assigned a value in the COMPUTE(P) statement before the SORT.

BREAK

BREAK statements define logical groups of records. Here data is split into groups by OACCT. Records with the same account information are grouped together.

A SORT statement must be included in a CA JARS Wizard run when a BREAK statement is used. The fields specified in the BREAK statement must be included in the SORT statement and must be specified in the same order as the SORT statement.

HEADING

HEADING specifies a title for the report. Here the title for the report (created in addition to the output file) is: TOTAL DB2 CHARGES BY ACCOUNT.

LIST(SUM)

A summary listing is requested along with the output file. Each line of the summary listing lists debit information for a different account. The LIST(SUM) statement identifies the data fields to be summarized and printed. This data includes the:

- account identifier (information)
- calculated total charge for the account
- total CPU time used by the account
- total number of read requests used by the account
- number of DB2 accounting records for the account

OUTPUT(SUM)

One summary debit record is produced for each unique account. All records are written to the file identified by ddname CAIJWOP. The OUTPUT statement lists the fields to be summarized and included in each debit record.

JARSDB22: Sample Report

JARSDB22 is a sample report showing how you can use the CAWGJRD2 glossary and your DB2 input data to create CA JARS reports. A sample of the output from JARSDB22 is shown below

```
                                             DB2 USAGE BY USER (AUTHORIZATION) ID                 23 MAR 1994 PAGE    1

                          CONNECT                      CPU        SRB
         CONNECT              TOD        USER         TIME       TIME         BP0          BP1          BP2          BP32
            DATE         HH.MM.SS        ID         SS.SSS     SS.SSS        READ         READ         READ          READ
       -----------       --------     --------     -------    -------   ---------    ---------    ---------     ---------

       09 MAR 1994       11.57.43     JAKSU01         .320       .040           0            0            0             0
       09 MAR 1994       12.13.32     JAKSU01         .540       .040           0            0            0             0
       09 MAR 1994       12.21.12     JAKSU01         .300       .040           0            0            0             0
       09 MAR 1994       12.21.51     JAKSU01         .320       .030           0            0            0             0
       09 MAR 1994       12.22.55     JAKSU01         .320       .040           5            0            0             0
       10 MAR 1994       08.20.27     JAKSU01         .330       .030           1            0            0             0
       10 MAR 1994       08.59.03     JAKSU01         .310       .030           0            0            0             0
       10 MAR 1994       08.59.32     JAKSU01         .060       .010           0            0            0             0
       10 MAR 1994       09.19.22     JAKSU01         .060                      0            0            0             0
                                                   -------    -------   ---------    ---------    ---------     ---------

USER ID TOTAL                         JAKSU01        2.560       .260           6            0            0             0

       01 FEB 1994       10.55.48     KOLFI01         .870       .040           0            0            0             0
       01 FEB 1994       10.56.03     KOLFI01         .880       .020           0            0            0             0
                 .
                 .
                 .
                                            DB2 USAGE BY USER (AUTHORIZATION) ID                 23 MAR 1994 PAGE    2

                          CONNECT                      CPU        SRB
         CONNECT              TOD        USER         TIME       TIME         BP0          BP1          BP2          BP32
            DATE         HH.MM.SS        ID         SS.SSS     SS.SSS        READ         READ         READ          READ
       -----------       --------     --------     -------    -------   ---------    ---------    ---------     ---------
      *CONTINUED*
       10 MAR 1994       10.37.26     KOLFI01         .120                      0            0            0             0
       10 MAR 1994       10.37.35     KOLFI01        7.210       .090         120            0            0             0
       10 MAR 1994       10.41.59     KOLFI01        5.910       .100         135            0            0             0
                                                   -------    -------   ---------    ---------    ---------     ---------

USER ID TOTAL                         KOLFI01       97.760      1.680       2,111            0            0             0

       01 FEB 1994       10.47.12     MCFRED          .010                      0            0            0             0
                  .
                  .
                  .
       10 MAR 1994       09.10.25     MCFRED          .100                      3            0            0             0
       10 MAR 1994       09.10.35     MCFRED          .100                      3            0            0             0
       10 MAR 1994       09.10.46     MCFRED          .100                      3            0            0             0
       10 MAR 1994       10.39.44     MCFRED          .100                      3            0            0             0
       10 MAR 1994       10.39.50     MCFRED          .100                      3            0            0             0
       10 MAR 1994       10.39.54     MCFRED          .100                      3            0            0             0
                                                   -------    -------   ---------    ---------    ---------     ---------

USER ID TOTAL                         MCFRED        14.590       .020         436            0            0             0

                                                   -------    -------   ---------    ---------    ---------     ---------

  GRAND TOTAL                                      375.680      9.290       4,914            0            0             0
```

JARSDB22 Control Statements

```
PARAMETER XREF NOPC
INPUT CAWGJRD2
*
SORT USER/ID, CONNECT/DATE, CONNECT/TOD
BREAK USER/ID
HEADING1C DB2 USAGE BY USER (AUTHORIZATION) ID
COMPUTE BP0/READ(6)(P) = READ/SYNC/BP0 + READ/PREF/BP0
COMPUTE BP1/READ(6)(P) = READ/SYNC/BP1 + READ/PREF/BP1
COMPUTE BP2/READ(6)(P) = READ/SYNC/BP2 + READ/PREF/BP2
COMPUTE BP32/READ(6)(P) = READ/SYNC/BP32 + READ/PREF/BP32
LIST  CONNECT/DATE, CONNECT/TOD, USER/ID, CPU/TIME, SRB/TIME,
          BP0/READ, BP1/READ, BP2/READ, BP32/READ
*
```

JARSDB22 Execution Description

The control statements used in JARSDB22 are described below. All CA JARS Wizard control statements are fully documented in your *CA JARS Wizard Reference Guide*.

PARAMETER

The PARAMETER control statement specifies options for a CA JARS Wizard run.

XREF

creates a cross-reference of the data fields used in the run and the statements they are found in. This cross-reference listing is printed in addition to the control statements and the report for the run.

NOPC

suppresses the CA JARS Wizard error handling routine.

INPUT

This INPUT statement lists the CAWGJRD2 glossary as the glossary for the primary input file for the run.

COMPUTE

The four COMPUTE statements in JARSDB22 simply assign values to Buffer Pool Read fields for BP0 through BP32.

SORT

The SORT statement identifies the sequence in which the input records should be sorted prior to processing. Here the sort is performed on USER ID, DATE, and TIME of DAY.

BREAK

BREAK statements define logical groups of records. Here data is split into groups by user ID. Records with the same USER ID are grouped together.

HEADING

HEADING specifies a title for the report. Here the title for the report (created in addition to the output file) is: DB2 SUMMARY BY USER.

LIST

The LIST statement identifies the data element to be printed. This includes:

- connect date
- connect time of day
- user ID
- CPU seconds consumed (both TCB and SRB)
- number of read requests by buffer pool ID

Chapter 4: The IMS Interface

The IMS Interface provides data processing managers with a tool to make an effective analysis of IMS activity. The data provided yields a thorough picture of IMS system cost and performance.

Using the IMS Interface you can measure IMS user productivity, monitor the IMS environment, evaluate software efficiency, and provide equitable customer billing and cost distribution.

The interface automatically gathers the information about application resource usage. This information is made available in accounting records on the IMS system log.

Accounting records are reformatted by the interface, producing a summary file, which includes all relevant data in the IMS log record.

The IMS Interface can also be used to generate EXTDATA records that can be processed with the CA EARL and CA Easytrieve report writers. For general information on EXTDATA, see the chapter "EXTDATA Reporting" in the *User Guide.* Detailed information on how to create EXTDATA is provided later in this chapter.

The interface processes the following IMS log records:

- Type 01: Message logged
- Type 03: Message logged
- Type 07: Accounting
- Type 31: Message Get-Unique
- Type 35: Message Enqueue or Re-enqueue

The IMS interface supports IMS releases 1.3 and higher.

This section contains the following topics:

21st Century Support

21st Century support for the IMS Interface is provided through maintenance and requires IMS 5.1 or higher. IMS Release 6.1 is IBM's release of IMS that provides century support in the IMS Log File's date fields in Julian YYYYDDD form.

The interface has been modified to support the new IMS date format (IMS 6.1 and above), while input parameters and the output history file retain their existing date formats. Internally, the interface processes and sorts based on the full century date, so date selection and sort sequencing will be correct. The overall design of 21st century support in the Report Writer is to treat years with values of 00 through 59 as being in the 21st century; for example, 2000-2059. Years with values of 60 through 99 are treated as being in the 20th century; for example, 1960-1999. The following text discusses in detail each of the areas of date processing affected by 21st century support.

For purposes of sorting, comparisons and calculations involving dates, the two-digit year is logically expanded to include the century. This ensures proper sort sequencing, correct comparisons and results from calculations involving dates.

However, externally the two-digit year is maintained. This includes all external files with the exception of EXTDATA files, reports, and input parameters. This implementation eliminates the need to change parameters or file layouts. In addition, the Wizard Report Writer has been modified in the same fashion to properly process two-digit years in date fields.

The following text discusses in detail each of the areas of date processing affected by 21st century support.

Sorting on Date Fields

When a date field is specified on the Sort Control Statement, CA JARS takes the century into account and makes an adjustment in setting up the Sort field. If the year is 59 or less, it is treated as being in the 21st century. If the year is 60 or higher, it is treated as being in the 20th century. Thus, when performing a sort in ascending sequence, this product sorts a YY/MM/DD field containing "99/12/31" (December 31, 1999) ahead of a field containing "00/01/01" (January 1, 2000).

Selection, Rejection, and Compares Involving Date Fields

When performing selection or rejection based on a date field via the CRITERIA statement, CA JARS takes the century into account. If the year portion of the date contains a value of 59 or less, it is treated as being in the 21st century. If the year is 60 or more, it is treated as being in the 20th century.

Thus, for selection, rejection, or comparison purposes, a date field containing "00/01/01" (January 1, 2000) compares high against a constant of "99/12/31" (December 31, 1999).

Grouping

When grouping on date fields, if the dates in the data span the millenium, it is necessary to modify the GROUP/GROUPC Control Statements. For the Group Control Statement, add another group definition referencing the original (Date) Group field. For the original GROUPC Control Statement, make the ending range the last day of the 20th century. Add a second GROUPC Control Statement for the beginning and ending date ranges to be selected in the 21st century. An example follows.

Before Year 2000 Support

```
ASORT    04306A2 03706A  01608A
AGROUP   0436                     -----> DATE FIELD
AGROUPC  1991201 991231  A        -----> 12/01/99 - 12/31/99
```

After Year 2000 Support

```
ASORT    04306A2 03706A  01608A
AGROUP   0436  0436               -----> DATE FIELDS
AGROUPC  1991201 991231  A        -----> 12/01/99 - 12/31/99
AGROUPC  2000101 000131  B        -----> 01/01/00 - 01/31/00
```

Calculations Involving Date Fields

CA JARS takes the century into account when deriving various fields such as Elapsed Time and Turnaround Time that involve dates in the calculation. This ensures that correct values will be obtained for jobs, steps and transactions spanning the turn of the century.

Likewise, this product takes century into account in resolving the weekday and day of week keywords. Again, if the year is 59 or less, it is in the 21st century. If the year is 60 or higher, it is in the 20th century. So a YY/MM/DD date containing "97/01/01" generates a weekday value of Wednesday, while a date containing "00/01/01" generates a weekday value of Saturday, which is the correct day for January 1, 2000.

Interface Components

The interface executes as a batch program and is distributed to users in object form on a system distribution tape. The interface program reads the IMS log, and employs a User Accounting Table to identify various transactions with users. Selected records are reformatted for input to the CA JARS Report Writer.

Input to the interface program is the IMS log file. Output is a level-5 summary (history) file. Optionally, you can also request an EXTDATA output file.

The following table shows the Target library location of supplied sample source and JCL members:

```
JSIUA       CAJRMAC User Accounting Macro
JSIRTTMSCAJRSAMPIMS Interface Title Table
IMSJARS CAJRJCL Sample Working Set Report JCL
IMSTRAN CAJRJCL Sample IMS Interface Translate JCL
IMSUA       CAJRJCL Sample IMS Interface User Accounting JCL
```

User Accounting Table

The IMS Interface translates IMS log data into the format required for the Report Writer. One part of the operation of the interface is to add user-defined cost center identification to each translated record. This is accomplished using a User Accounting Table.

The User Accounting Table is a valuable part of the interface program. It causes specified transaction identifiers to be associated with given user identification text that is added to the translated record. You can create a unique User Accounting Table tailored to the accounting standards and needs of your installation.

The User Accounting Table can be created during IMS translation by specifying the two-character link-edited accounting table suffix on the TRANSLATE control statement.

User Accounting Table Macro

To build a User Accounting Table, you must assemble a set of JSIUA macro statements that generate Assembler Language instructions. This table is then used by interface program JSIIMT00 to reformat the IMS records for the Report Writer. The JSIUA macro is included on the system distribution tape and can be found in CAJRMAC.

Working Set Reports

A standard set of selected working set reports on IMS activity can be produced by the Report Writer. The required control statements are included on the system distribution tape and can be found in CAJRJCL member IMSJARS.

COMPRESS Options

As the IMS data contains a large number of accounting records (IMS type 7 records only), the IMS Interface Interface provides a facility through which you can reduce the number of records. This is achieved by compressing the IMS account type to a smaller amount of data.

Output data can be compressed further by using the INTERVAL parameter of the COMPRESS command. The time INTERVAL specified causes all data from like transaction IDs to be combined into one record without any loss of data detail.

The User Accounting Table

The IMS Interface translates IMS data into Report Writer format and can assign a cost center identification to each record. This cost center identification is accomplished using a User Accounting Table. The IMS Interface scans the User Accounting Table for an entry whose transaction ID matches the data element value in the IMS log record.

The IMS Interface examines the transaction ID in each User Accounting Table entry, in order, from the beginning to the end of the table. The user accounting information from the first table entry found to match the record is inserted into the output record. If no match is found, the output user accounting information field contains blanks.

A blank (nonspecified) value for the transaction ID in a table entry is ignored for comparison, and therefore treated as a matching identifier. An asterisk (*) in any position of a table entry is treated as matching the corresponding position in the record identifier(s).

Example

Suppose an IMS log record has the following value for its transaction ID:

```
Transaction

ABCDEFGH
```

All of the following identifiers for User Accounting Table entries would match the basic record:

```
Transaction

ABCDEFGH
ABCDEFG*
ABCDEF**
ABC*****
***D****
(and so on)
```

Note: The user accounting information from the first User Accounting Table entry found to match the input record is used.

The User Accounting Table is built by assembling a set of JSIUA macro instructions. JSIUA macro instructions are written in Assembler Language. Follow the rules for coding Assembler Language macro statements when using the JSIUA macro. Object code is generated as the statements are processed.

If serious errors in the macro specification are detected, a message is issued and assembly continues even though the assembled module may not produce the intended results.

Creating a User Accounting Table

The interface program translates IMS log data into the format for the Report Writer. One part of the operation of the interface is to add user-defined cost center identification to each translated record.

The interface accomplishes this cost center identification using the User Accounting Table. Assemble the User Accounting Table with the following JCL, found in CAJRJCL member IMSUA.

```
//IMSUA    JOB (ACCTINFO),'PROGRAMMER INFO',
//             MSGCLASS=X,CLASS=A
//*
//*********************************************************************
//* PURPOSE:  TO ASSEMBLE AND LINK THE USER ACCOUNTING TABLE FOR
//* PURPOSE:    THE CA JARS IMS INTERFACE.
//*********************************************************************
//IMSUA    EXEC ASMA90
//*
//ASM.SYSLIB DD DISP=SHR,DSN=CAI.CAJRMAC      CA JARS INSTALL MACLIB
//           DD DISP=SHR,DSN=SYS1.MACLIB
//ASM.SYSIN  DD *
         JSIUA TYPE=INITIAL
         .
         .
         .
         Code JSIUA statements for your configuration.
         See 'User Accounting Table (Optional)'
         .
         .
         .
         JSIUA TYPE=FINAL
         END
/*
//*  THE LAST 2 BYTES OF LOAD MODULE NAME ARE SUFFIX.
//*    THIS WILL BE SPECIFIED ON THE TRANSLATE CONTROL STATEMENT WHEN
//*    YOU RUN THE CA JARS IMS INTERFACE PROGRAM, JSIIMT00.
//*
//LKED.SYSLMOD DD DISP=SHR,DSN=CAI.your.loadlib(JSIIMUxx)       <<< DSN
//
```

Note: The xx in the SYSLMOD data set member name is the load module suffix.

Initializing the User Accounting Table

The User Accounting Table is built by specifying a set of coded JSIUA macro statements. The JSIUA TYPE=INITIAL macro must be coded first, followed by JSIUA TYPE=ENTRY macros, and terminated by a JSIUA TYPE=FINAL macro.

The following can be coded on the JSIUA macro statement:

```
JSIUA TYPE=INITIAL
```

TYPE=INITIAL

specifies that this statement begins the User Accounting Table assembly.

Defining a User Accounting Table Cost Center Entry

Use the JSIUA TYPE=ENTRY statement to define a User Accounting Table cost center entry within the User Accounting Table.

There can be any number of JSIUA TYPE=ENTRY statements coded for the User Accounting Table assembly, including none (dummy table). If there is more than one TYPE=ENTRY statement in the assembly, the corresponding User Accounting Table entries are generated in the order that the assembler encounters the statements.

The following parameters can be specified for JSIUA TYPE=ENTRY:

```
JSIUA  [TYPE=ENTRY,]
        ITRANS=cccccccc,
        USER='cccccccccccccccc'
```

TYPE=ENTRY

specifies that an entry is being defined in the User Accounting Table. This parameter and the first comma normally following it may be omitted.

ITRANS=cccccccc

specifies the 1-8 character transaction identifier of transactions whose execution is to be attributed to the cost center defined in this table entry.

USER='cccccccccccccccc'

specifies the 1-16 character cost center identification that will be placed in the user accounting information field of the interface's output records.

Terminating a User Accounting Table

The assembly of the IMS Interface Interface User Accounting Table is terminated when the assembler encounters the JSIUA TYPE=FINAL macro statement. This statement must be the last assembler statement in the assembler input before the END card for this User Accounting Table assembly.

The TYPE=FINAL statement causes assembler statements necessary for proper table length calculations to be generated. It can also add one last entry to the User Accounting Table. This last entry has a blank identifier field, and therefore, matches all otherwise unmatched input records.

The following parameters can be specified for JSIUA TYPE=FINAL:

```
JSIUA TYPE=FINAL
      [,USER='cccccccccccccccc']
```

TYPE=FINAL

specifies that this statement terminates the User Accounting Table.

USER='cccccccccccccccc'

specifies the 1-16 character cost center identification associates with blank identifiers, generated as the last entry in the table.

Interface Operation

The IMS Interface translates IMS log data from its data collection format to the input format required for the Report Writer. The interface uses the IMS log data set as input.

Output from the interface typically occupies a small fraction of the tape that the input IMS data occupies.

The interface has the ability to *compress* the IMS log tape. It only translates IMS accounting records. Using the *compress* function causes only these records to be copied to an output data set.

The following JCL executes the interface.

```
//IMSIVP   JOB (ACCTINFO),'PROGRAMMER INFO',
//             MSGCLASS=X,CLASS=A
//*********************************************************************
//STEP1    EXEC PGM=JSIIMT00,REGION=4M
//*
//STEPLIB   DD DISP=SHR,DSN=CAI.CAJRLOAD
//SYSUDUMP  DD SYSOUT=*
//CAIJRSO   DD SYSOUT=*
//CAIJRII   DD DISP=SHR,DSN=IMS.LOG.DATA      <- IMS LOG DATA INPUT
//CAIJRIO   DD DSN=JARS.HISTORY.FROM.IMS,     <- HISTORY FILE OUT
//             DISP=(NEW,PASS,DELETE),
//             UNIT=SYSDA,
//             SPACE=(CYL,(30,5),RLSE)
//CAIJRCM   DD DUMMY                          <- COMPRESSED FILE OUT
//*
//* UNCOMMENT CAIJSACT TO PRODUCE EXTDATA
//*CAIJSACT  DD DSN=JARS.EXTDATA.FILE,        <- EXTDATA OUT
//*             DISP=(NEW,CATLG,CATLG),
//*             UNIT=SYSDA,
//*             SPACE=(CYL,(30,5),RLSE)
//*             DCB=(RECFM=VB,LRECL=8188,BLKSIZE=8192)
//CAIJRPR   DD SYSOUT=*                       <- GRAPHS, CONTROL OUT
//CAIJRCD   DD *
         .                                                      00007000
         .                                                      00007000
         .                                                      00007000
         Code COMPRESS, DEFAULT, FFGRAPH, KEYWORD and TRANSLATE 00010000
         commands for your configuration.  Refer to the examples
         later in this chapter.
         Note that to create EXTDATA, you must have a valid
         TRANSLATE command and uncomment the CAIJSACT DDNAME.
         .                                                      00013000
         .                                                      00013000
         .                                                      00013000
/*
```

The interface executes COMPRESS, DEFAULT, FFGRAPH, KEYWORD, and TRANSLATE commands in the order that they are encountered. Execution of each command is indicated by printed output from the interface.

Execution of a COMPRESS command is recorded with a one-page report, giving the number of input records examined and the number of IMS log accounting records written to the compressed file. Execution of the FFGRAPH command causes the requested graphs to be printed. Execution of the TRANSLATE command causes a Translate Control Report to be printed.

The Control Report

The IMS Interface prints a Control Report upon successful execution of a TRANSLATE command. The NORMAL END OF PROCESSING message immediately follows this report.

The Control Report shows total counts of all records processed by the interface. The following statistics are shown:

IMS RECORDS READ

Number of valid type 07 accounting records.

RECORDS REJECTED

Number of type 07 accounting records rejected, primarily because of invalid date/time fields.

JARS JOB RECORDS WRITTEN

Number of translated records created from the input data.

EXTDATA RECORDS WRITTEN

Number of EXTDATA records written to the CAIJSACT DD.

The interface requires several interrelated files to execute. The following list describes these data sets and their functions:

DDName	Description
STEPLIB	Describes the load library that was loaded from the distribution tape.
SYSUDUMP	Describes a SYSOUT data set for dump output in the case of an abnormal termination.
CAIJRSO	The output file that contains SNAP OUTPUT IMS records.
CAIJRII	Describes the input file to be processed by the IMS Interface. The input log record includes: Type 01, 03, 07, 31, and/or 35.
CAIJRIO	Describes a data set for the translated output file.
CAIJRCM	Describes a data set for the compressed output file.
CAIJRPR	Describes the SYSOUT data set for generated display messages.
CAIJRCD	Describes the interface commands to be executed. Valid commands are COMPRESS, DEFAULT, FFGRAPH, KEYWORD and TRANSLATE.

Interface Commands

The IMS Interface provides several valuable graphic reports as optional printed output. These reports can be requested and customized to meet your needs using a flexible interface command language. Interface commands are entered through card image input to the interface. An output tape to be used as input to the Report Writer can also be produced using the TRANSLATE control command.

EXTDATA may also be produced by including a CAIJSACT DD and providing a TRANSLATE command.

Interface Command Format

The interface command language is a free-format command and parameter input language somewhat similar in structure to the IBM assembler macro statement coding format. To code a Interface command use the following fields:

Position	Field Name	Notes
1	Label	1 to 8 character label.
2-18	Command	The command must start and end between positions 2 and 18.
10-71	Parameters	Parameters (if present) must start and end in these positions.
72	Blank	Not used
73-80	Blank	Used for card sequence numbers as needed.

Commands include: COMPRESS, DEFAULT, FFGRAPH, KEYWORD and TRANSLATE.

Comments can be given with an asterisk (*) in position one. Labels must begin in position one and can be specified alone. Continuation is indicated by a comma as the last character in the parameters field followed by a space as a delimiter. Continuations resume after position ten of the next line. If only the command is entered, defaults are used for the operands. The commands are read by the interface through ddname CAIJRCD.

When using the interface command language, the following rules must be followed:

1. The first four characters of a parameter can be used to identify the parameter.
2. If more than one value is entered for a parameter, use parentheses to enclose the values and commas to separate the values. A value list can continue to the next line.
3. When entering text use single quotes to enclose the string if blanks are embedded in the text. **Text cannot be continued on the next card**.

COMPRESS Command

The IMS Interface requires an abbreviated log tape to:

- generate graphs with the FFGRAPH command
- create a data set for the Report Writer using the TRANSLATE command

Use the COMPRESS command to create this abbreviated version of the IMS log tape.

The abbreviated log tape contains only type 07 records. It considerably reduces the volume of useful data that may be retained for extended analysis. It also reduces interface run time for subsequent passes of the data.

If the COMPRESS command is encountered with the first set of TRANSLATE and FFGRAPH commands, subsequent sets of TRANSLATE and FFGRAPH commands use the compressed file as input instead of the raw IMS log data set. Therefore, it is efficient to include a COMPRESS command in the first command set of a multiple command set run, even if the compressed file is not to be retained.

The compressed file is written to the data set specified by the CAIJRCM ddname. If no COMPRESS command is given to the interface, the ddname CAIJRCM is not referenced. If a COMPRESS command is executed, subsequent command sets in the same interface execution use the compressed file as input, through the CAIJRCM ddname, and the CAIJRII ddname is not read from again.

The INTERVAL Parameter

The INTERVAL= parameter of the COMPRESS command can further reduce the amount of data output by the interface. Specification of a time interval value (in minutes) causes the data for all like transaction IDs (occurring over the specified interval) to be accumulated in one output record.

The format for the COMPRESS command is:

```
2  (command position)
COMPRESS INTERVAL=0
                  nn
```

nn

This is the compress time interval desired in minutes. Specification of 0 (the default) causes one record to be output for each IMS type 07 accounting record.

Example

```
2  (command position)
COMPRESS INTERVAL=15
```

This command causes an abbreviated version of the input log tape to be generated. Data with like transaction IDs occurring in 15 minute intervals is compressed into one interval output record.

Only one COMPRESS command is processed per interface execution.

DEFAULT Command

The IMS Interface can process several different releases of IMS log data. Code the DEFAULT command as the first command in CAIJRCD, indicating the release of IMS log data to be processed.

```
Command              Operands

[LABEL] DEFAULT

                    [,RELEASE={ 7.1.0 } ]
                    [         { 8.1.0 } ]
                    [         { 9.1.0 } ]
                    [         {10.1.0 } ]
                    [         {   .   } ]
                    [         {   .   } ]
                    [         {   .   } ]
```

RELEASE=

specifies the IMS release of the log data which is input this run. The default release is 3.1.0.

```
DEFAULT RELEASE=3.1.0
```

FFGRAPH Command

The FFGRAPH command controls the generation of Resource Utilization Graphs (RUGs). These graphs show how IMS resources are being used. The graphs can show peak use by day, week, and even month. This capability gives the manager a picture of how the IMS resources are being used (such as DL/1 database access counts or CPU time).

Types of Resource Utilization Graphs

The Resource Utilization Graph set consists of several different graphs, including the DAILY, COMPOSITE, SUMMARY, CALENDAR, and Named Resource reports.

The DAILY report shows resources requested by time intervals for a 24-hour period. With this graph you can see your peak periods within the day and how they relate to other resources.

The COMPOSITE report graphs the average of a resource by time interval, averaged over a period of days. With this graph, you are shown on an average how IMS resources are used over a daily period.

The SUMMARY report displays the maximum or average periods for a day against the maximum or averages from other days. This gives you a summary of how the resource is saturated over a number of days.

The CALENDAR report is used to relate resources used during a day against other days of the week or month.

Named Resource reports can be used to graph PSB name, transaction, job name, step name, region protection key and type, and Message Processing Region/Batch Processing Region activity by comparing their use against one another.

Resource Utilization Graph Command Language

Since Resource Utilization Graphs are also a part of the interface, the graphs are requested by using the FFGRAPH command. This command allows you to pick options such as the variables for each plot, which graphs to display, and transactions to be selected.

FFGRAPH Examples

The following are examples of the structure of the FFGRAPH command. The next section, FFGRAPH Format, describes the format of the command.

The simplest input is the command alone. This causes the RUG graphs to use the predefined defaults such as report selection and time interval.

```
2  (command position)
FFGRAPH
```

To select a specific transaction to graph across a span of days, the command would be entered as follows:

```
2         10
FFGRAPH   FROM=84319,TO=84320,TRANSID=LOGO,
          DAILY=OFF,COMPOSITE, SUMMARY,
          CALENDAR=BOTH
```

A CALENDAR graph is very versatile because it can display the selected fields in different orders. For example:

```
2        10
FFGRAPH  DAILY=OFF,SUMMARY=OFF,COMP=OFF,
         SYSPLOT=NONE,CALENDAR=(ALL,CBA,BOTH)
```

This command causes four separate CALENDAR reports to be printed. ALL displays all the fields on the calendar. CBA displays only those fields and in that order on the calendar. BOTH is used to create one calendar report for each variable selection, one with the maximum and one with the average values for the interval on the calendar.

To select graphs other than the defaults, specify override parameters on the commands, as in the following example:

```
2        10
FFGRAPH  NEWPLOT=CPU,
         NEWPLOT=(TRANSACT,MESSAGES),
         SYSPLOT=AGKLM,
         SUMMARY=OFF,
         CALENDAR=OFF,COMPOSITE=OFF

CPU      MAXVAL=29999
```

The last line sets the maximum to plot the graph of the keyword CPU.

A translated file can be generated and resource utilization graphs can be run at the same time:

```
2          10
FFGRAPHH   TO=84320
TRANSLATE  SUFFIX=XX
```

Multiple sets of Resource Utilization Graphs can be generated from one interface execution:

```
2        10
FFGRAPH  TO=84320
FFGRAPH  TO=84319,SUMMARY=OFF,
         CALENDAR=OFF,COMPOSITE=OFF
FFGRAPH  SUBSET=PSB-NAME
```

FFGRAPH Format

The following is the format of the FFGRAPH command.

```
Command          Operands
[LABEL] FFGRAPH
[                [ [ {ON  }    ]     ]   ]
                   [                [ [ {OFF },   ]     ]   ]
                   [                [ [ {MAX }    ]     ]   ]
                   [,CALENDAR  =(   [ [ {AVG } ,  ]     ] ) ]
                   [                [ [ {BOTH}    ]     ]   ]
                   [                [                   ]   ]
                   [                [ [ {ALL      }  ]  ]   ]
                   [                [ [ {A,B,C, ,H} ,]  ]   ]
                   [                [                   ]   ]
                   [                [ [NOLEGEND , ]     ]   ]
                   [                [                   ]   ]
                   [                [ [BAR=I,     ]     ]   ]

                   [,COLLAPSE =  ON  ]

                   [,COMPOSITE = {ON } ]
                   [             {OFF} ]

                   [,DAILY = {ON }      ]
                   [         {OFF}      ]

                   [,EXPAND = {ON }      ]
                   [          {OFF}      ]

                   [,FOOTER = {ON }      ]
                   [          {OFF}      ]

                   [,FROM = {YYDDD       }  ]
                   [        {(YYDDD,HHMM)}  ]

                   [,HEADER = '____ up to 60 char ____' ]

                   [,NEWPLOT = {KEY1       } ]
                   [           {(KEY1,KEY2)} ]

                   [,REGION = {MPR}  ]
                   [          {BPR}  ]

                   [,SELECT = {NAME1                   }  ]
                   [          {(NAME1,NAME2,...,NAME25)}  ]

                   [         {30           }  ]
                   [,SPAN =  {10-90        }  ]
                   [         {1440 or TOTAL}  ]
```

```
[,START = {HHMM}  ]
[         {0000}  ]

[        [ {TIME                              } ] ]
[        [                                      ] ]
[        [ {index-name                        } ] ]
[        [                                      ] ]
[        [ {field-group-identifier            } ] ]
[        [                                      ] ]
[,SUBSET=[ {(index-name,BY,field-group-identifier)} ] ]
[        [                                      ] ]
[        [ [           A      ]                 ] ]
[        [ [           B      ]                 ] ]
[        [ [           C      ]                 ] ]
[        [ [           D      ]                 ] ]
[        [ [,SORT  =   E      ]                 ] ]
[        [ [           F      ]                 ] ]
[        [ [           G      ]                 ] ]
[        [ [           H      ]                 ] ]
[        [ [           NAME   ]                 ] ]
[        [                                      ] ]
[        [ [,SMOOTH ]                           ] ]

[           {ON  }  ]
[           {OFF }  ]
[,SUMMARY = {BOTH}  ]
[           {MAX }  ]
[           {AVG }  ]

[           {ALL          } ]
[           {NONE         } ]
[,SYSPLOT = {V            } ]
[           {(A,B,C,...,Z)} ]
[           {(ABCDEF)     } ]

[,TO = {YYDDD       } ]
[      {(YYDDD,HHMM)} ]

[,TRANSID = {AAAA                }    ]
[           {(AAAA,BBBB,....,HHHH)}    ]
```

CALENDAR=

is specified to request the CALENDAR report. MAX is a calendar of the maximums for any time interval of each day. The AVG is the average of all time intervals for each day. BOTH generates both AVG and MAX reports.

Data elements shown on the CALENDAR report can be specified by the report ID entered for a report. For example, if ALL is entered, all fields are displayed; if ABCG is entered, only these fields are displayed. NOLEGEND removes the legend at the bottom of each CALENDAR. BAR= is used to specify a character to replace the vertical I in the CALENDAR report. Up to 10 different CALENDAR reports can be requested with one run.

COLLAPSE=

is specified to collapse null lines out of a graph. If there is no data to display for three or more intervals, the message *NO DATA* is shown, instead of several intervals having zero values if (the default) ON is specified.

COMPOSITE=

is specified to request the COMPOSITE report.

DAILY=

is specified to request the DAILY report.

EXPAND=

causes a single-element graph to be printed using full-page width. Otherwise, a single-element graph uses only about half a page width.

FOOTER=

is used to request tic lines at the bottom of each page.

FROM=

FROM is used to find the report starting point in the file to begin the report. YYDDD is the Julian date to begin. HHMM is the hour and minute to start. If this parameter is omitted, the beginning of the file is the starting point.

Julian dates specified with a year value of 00 through 59 are treated as year 2000 through 2059, and are considered logically greater than year values of 60 through 99 (1960 through 1999).

HEADER=

is used to enter a new header on each page of the reports. The new header can be up to 60 characters and is automatically centered in the header line.

NEWPLOT=

is used to create user plots if they are not one of the predefined SYSPLOTs (see the SYSPLOT parameter). The keywords are used to select data elements (one or two) to be graphed. The following example creates two plots:

```
NEWPLOT=CPU
NEWPLOT=(TRANSACT,CPU)
```

The first plots the CPU time and the second plots transactions and CPU time.

REGION=

is used to select the records associated with a Message Processing Region (MPR) or Batch Message Processing Region (BPR). Only IMS log records for applications run in the associated region are considered for Resource Utilization Graph generation.

SELECT=

if SUBSET is used for a named facility (such as PSB-NAME), SELECT can be used to select up to 25 items for the report. Each item may be a facility name, or a facility name prefix preceded with a slash (/). For example, SELECTing on the name APPL1 causes only data associated with PSB-NAME APPL1 to be graphed. SELECTing /APPL accepts data associated with any PSB-NAME beginning with the letters APPL, such as APPL1, APPLB, or APPL1234.

SPAN=

SPAN is used to control the time interval used by a graph. The interval of time which represents one line on the DAILY and COMPOSITE graph can be from 10 to 90 minutes; the default is 30 minutes. A value of 1440 may be specified if no DAILY or COMPOSITE graph is requested. If 1440 is used, the SUMMARY and CALENDAR graphs represent a daily total of each field entered. The DAILY and COMPOSITE graphs are automatically turned off. TOTAL also sets the interval to 1440.

START=

is used to specify the time of day at which a processing day is to begin. The time is entered in HHMM, representing hours and minutes.

SUBSET=

is used to select Resource Utilization Graph index form, index item order, and reportable data element set. Specify an index name to choose a time interval format or a named facility format. Specify a field group identifier to choose the group of eight data elements available to be selected for graphing. Specify a sort subparameter to alter the order of index items graphed for a named facility graph set. SMOOTH is used to ignore index items beginning with an asterisk (*).

```
          {TIME}                {TIME      }
          {PSB-NAME}            {USAGE     }
          {TRANSACT}            {MSG-QUEUE }
          {JOBNAME }            {TEST-QUEUE}
SUBSET= ( {STEPNAME}    , BY ,  {CMD-QUEUE } ,...)
          {REGION  }            {UPDATE    }
          {MPR     }            {EXCL      }
          {BPR     }            {DLI       }
```

Examples:

SUBSET=PSB-NAME
SUBSET=MPR
SUBSET=USAGE
SUBSET=(REGION,BY,CMD-QUEUE)
SUBSET=(TRANSACT,BY,USAGE,SORT=A,SMOOTH)

The SUBSET parameter must be before the NEWPLOT parameter on the FFGRAPH command. The fields are defined in the sections SUBSET Index Identifiers and FFGRAPH Keyword Title and Label Defaults in this chapter.

SUMMARY=

is used to request the SUMMARY report. The option MAX is a summary report on the maximums from each day. AVG is the summary report on the averages of each day. BOTH is used to get MAX and AVG reports.

SYSPLOT=

is used to select graph reports from the stored set of report IDs. NONE turns off SYSPLOT, ALL selects all 25 reports A through Z. Each report can be selected by entering the report ID in a value list. Two formats of this parameter are valid:

SYSPLOT=(A,G,K,M,Y)

SYSPLOT=AGKMYFBCD

The SYSPLOT codes are shown in the section SYSPLOT Report Codes in this chapter.

TO=

is used to define the report ending point in the file. YYDDD is Julian date to stop. HHMM is the time to end. If this parameter is omitted, the end of file is used.

Julian dates specified with a year value of 00 through 59 are treated as year 2000 through 2059, and are considered logically greater than year values of 60 through 99 (1960 through 1999).

TRANSID=

is used to select transaction(s) from the input file, can be from one to eight characters each. If no IDs are entered, all transactions are used. There can be one to ten transaction IDs entered for selection from the input file.

Examples

Example 1

```
2        10


FFGRAPH
```

Display graphs from the input file using all default values for the parameters.

Example 2

```
FFGRAPH RECID=255,FROM=84318,
        TRANSID=(P001,P002,P003,P004,P005), DAILY,
        SYSPLOT=ALL
```

Display graphs using the transaction IDs selected as input from the 318th day of 1984 to end of file.

Example 3

```
FFGRAPH SUMMARY=BOTH,COLLAPSE,START=0700,
        NEWPLOT=(TRANSACT,CPU),
        NEWPLOT=(SCHEDULE,CPU),
        SYSPLOT=(A,G,H,M,P,Q,K),
        HEADER='NEW PLOT EXAMPLE',
        CALENDAR=(ALL,MAX,AGH,ABC),
        SPAN=60
```

Graph both the MAX and AVG versions of the SUMMARY report. The DAILY reports requested by default are plotted on a 60 minute time span beginning 0700 for 24 hours. The two NEWPLOTs are plotted with the SYSPLOTs requested. CALENDAR is displayed 3 times with different values. The graph is also collapsed.

SYSPLOT Report Codes

Use this table to select predefined graph formats by specifying the associated report code as a value for the SYSPLOT parameter. For the definition of the field codes listed below, refer to the SELECT statement diagram in the Report Writer section of this chapter.

Report Code	Fields	Plot
A	A	one up
B	B	one up
C	C	one up
D	D	one up
E	E	one up
F	F	one up
G	G	one up
H	H	one up
I	I	one up
J	J	one up
K	A + B	two up
L	C + D	two up
M	E + F	two up
N	G + H	two up
O	I + J	two up
P	A + C	two up
Q	A + D	two up
R	A + E	two up
S	A + F	two up
T	A + G	two up
U	A + H	two up

V	B + C	two up
W	B + D	two up
X	B + E	two up
Y	B + F	two up
Z	B + G	two up
2	B + H	two up
3	C + E	two up
4	C + F	two up
5	C + G	two up
6	C + H	two up
7	D + E	two up
8	D + F	two up
9	D + G	two up
0	D + H	two up
$	E + G	two up
*	E + H	two up
+	F + H	two up

SUBSET Index Identifiers

The following items are values that may be specified for the index-name value in the SUBSET= parameter. These items determine the format and contents of the resources plotted for DAILY, SUMMARY and COMPOSITE graphs, and the type of data considered for the CALENDAR graph. Specify:

Index Name Values:

Name	Description
TIME (default)	time graph by time intervals
PSB-NAME	8 character index of PSB-NAME
TRANSACT	8 character transaction index
JOBNAME	8 character JOBNAME

Name	Description
STEPNAME	8 character STEPNAME
REGION	MPR--key - key is the protection key BPR--key - of that message region
MPR	time graph of all message processing region
BPR	time graph of all batch processing region
DLI	time graph of DL/1 calls

FFGRAPH Keyword Title and Label Defaults

There are eight fields, designated Field A to Field H, that are available as reportable data elements for any Resource Utilization Graph execution. These fields can be selected in groups by specifying values for the FFGRAPH SUBSET= parameter. Valid values include:

Valid Values for the FFGRAPH SUBSET=parameter:

Value	Reportable Group
TIME (default)	Total system load, CPU, message and DL/I activity.
USAGE	System load, CPU, message and DL/I activity by region type.
MSG-QUEUE or TEST-QUEUE	System load and message/test queueing activity.
CMD-QUEUE	System load and CMD queueing activity.
UPDATE or EXCL	System load and Update/Exclusive control queueing activity
DL/I	DL/1 data call counts.

The following tables show which data elements can be graphed by selecting each field group. The order of fields is shown as A to H, corresponding to reportable field identifiers A to H as shown in the SYSPLOT Report Codes. Each reportable data element has an identifying keyword, default title, and label text.

Also shown are the origin of each field (from the data element names in the standard IBM IMS type X'07' log record dummy section) and the default maximum value against which the data element will be graphed.

Field Group Identifier: TIME:

Letter	Keyword	Fields	Title/Label	Maximum 100%
A	TRANSACT	DLRMCNT	Transaction Utilization Report NBR of Transactions	OBS
B	CPU	DLRTIME	Total CPU Utilization Report CPU Seconds	OBS
C	ELAPSED		Average ELAPSED Time	
D	SCHEDULE	Record Count	Total Number of Programs Scheduled NBR Scheduled	OBS
E	DLI-TOTAL	DLRCLCNT	Total DL/I Calls Issued Report Call Count	OBS
F	DLI-GETS	DLRGU + DLRGN + DLRGHU + DLRGHNP + DLRGHN + DLRGNP	DL/I Get Call Issued Report Call Count	DLI-TOTAL
G	DLI-ISRT	DLRISRT	Insert DL/I Calls Issued Report Call Count	DLI-TOTAL
H	DLI-DLET	DLRDLET	Delete DL/I Calls Issued Report Call Count	DLI-TOTAL
I	DLI-REPL	DLRREPL	Replace DL/I Calls Issued Report Call Count	DLI-TOTAL
J	TOTLELAP		Total Elapsed for Number of Transactions	

Field Group Identifier: USAGE:

Letter	Keyword	Fields	Title/Label	Maximum 100%
A	TRANSACT	DLRMCNT	Transaction Utilization Report Transaction Count	OBS
B	CPU	DLRTIME	Total CPU Utilization CPU Seconds	OBS
C	MPR-TRNS	DLRMCNT for DLRTYPE=01	Message Region TRANS. Count Report Transaction Count	TRANSACT
D	MPR-CPU	DLR TIME for X'01' for DLRTYPE=01	Message Region CPU Report CPU Seconds	CPU

Letter	Keyword	Fields	Title/Label	Maximum 100%
E	MPR-DLI	DLRCLCNT for X'01' for DLRTYPE=01	Message Region DL/I Call Count Report DL/I Call Count	OBS
F	BPR-TRNS	DLRMCNT for DLRTYPE=02	Batch Message Region TRANS. Count Report Transaction Count	TRANSACT
G	BPR-CPU	DLRTIME for X'02' for DLRTYPE=02	Batch Message Region CPU Report CPU Seconds	CPU
H	BPR-DLI	DLRCLCNT for X'02' for DLRTYPE=02	Batch Message Region DL/I Calls Report DL/I Calls Count	OBS

Field Group Identifier: MSG-QUEUE or TEST=QUEUE:

Letter	Keyword	Fields	Title/Label	Maximum 100%
A	TRANSACT	DLRMCNT	Transaction Utilization Report Transaction Count	OBS
B	MQ-GU	DLRGUMES	MSG Queue Get Unique Call Count Reports NBR of GU Calls	OBS
C	MQ-GN	DLRGNMES	MSG Queue Get Next Call Count Report NBR of GN Calls	OBS
D	MQ-ISRT	DLRISMES	MSG Queue Insert Call Count Report NBR of ISRT Calls	OBS
E	MQ-PURG	DLRPUMES	MSG Queue Purge Call Count Report NBR of PURG Calls	OBS
F	TQ-ENQUE	DLRTSTNQ	Test Enqueue Report Test Enqueues	OBS
G	TQ-WAITS	DLRTSTWT	Number of Waits on Test Enqueue Test Waits	OBS
H	TQ-DEQUE	DLRTSTDQ	Number of Test Dequeues Report Test Dequeues	OBS

Field Group Identifier: CMD-QUEUE:

Letter	Keyword	Fields	Title/Label	Maximum 100%
A	TRANSACT	DLRMCNT	Transaction Utilization Report Transaction Count	OBS
B	CPU	DLRTIME	Total CPU Utilization Report CPU Seconds	OBS
C	DLI	DLRCLCNT	Total DLI Call Report DLI Call Count	OBS
D	CQ-ENQUE	DLRQCONQ	Number of Queues for CMD Enqueues CMD Enqueues	OBS
E	CQ-WAITS	DLRQCOWT	Waits on Queue CMD and Enqueues CMD Waits	OBS
F	CQ-DEQUE	DLRGCODQ	Number of Queue CMD Dequeues CMD Dequeues	OBS
G	CMD	DLCMD	Number of CMD Calls Report CMD Calls	OBS
H	GCMD	DLRGCMD	Number of GCMD Calls Report GCMD Calls	OBS

Field Group Identifier: UPDATE or EXCL:

Letter	Keyword	Fields	Title/Label	Maximum 100%
A	TRANSACT	DLRMCNT	Transaction Utilization Report Transaction Count	OBS
B	CPU	DLRTIME	Total CPU Utilization Report CPU Seconds	OBS
C	UPD-ENQ	DLRSUPNQ	Update Enqueue Report Update Enqueues	OBS
D	UPD-WAIT	DLRSUPWT	Waits on Update and Enqueues Report NBR Update Waits	OBS
E	UPD-DEQU	DLRSUPDQ	UPDATE Dequeues Report NBR Update DEQ	OBS

Letter	Keyword	Fields	Title/Label	Maximum 100%
F	EXCL-ENQ	DLREXCNQ	Exclusive Enqueues Report NBR EXCL Waits	OBS
G	EXCL-WTS	DLREXCWT	Waits on Exclusive Enqueues NBR EXCL Waits	OBS
H	EXCL-DEQ	DLREXCDQ	Exclusive Dequeues Report NBR EXCL DEQ	OBS

KEYWORD Command

The KEYWORD command controls the description of each reportable data element. Use the KEYWORD command to change data element titles, labels, or units; to set maximum values for graph scale; and to select appropriate units.

The format for the KEYWORD command is as follows:

```
Keyword Command Format:
Command           Operands

[LABEL] keyword
                  [,CHAR  =  {*     }  ]
                  [          {(char)}  ]

                  [                {+.}       ]
                  [                {-.}       ]
                  [,COMPUTE= (KEY1, {/ } ,KEY2) ]
                  [                {* }       ]

                  [,LABEL     =  '- 30 char -']

                  [           {999999999 }  ]
                  [MAXval  =  {999999.999}  ]
                  [           {'keyword' }  ]
                  [           {TOTAL     }  ]

                  [         {V        }  ]
                  [         {V9       }  ]
                  [         {V99      }  ]
                  [         {V999     }  ]
                  [,SCALE=  {V9999    }  ]
                  [         {percent/%}  ]
                  [         {V9%      }  ]
                  [         {V99%     }  ]
                  [         {HHMMSS   }  ]

                  [,TITLE  =  '- 40 char -']

                  [,UNITS  = {ONES     }  ]
                  [          {THOUSANDS}  ]

                  [         {n  } ]
                  [,100PCT= {MAX} ]
```

where:

KEYWORD command names are by default:

TRANSACT DLI-GETS
CPU DLI-ISRT
SCHEDULE DLI-DLET
DLI-TOTAL DLI-REPL

These names may be reassigned by the SUBSET= parameter of the FFGRAPH command. Default keywords and their associated titles and descriptions are listed in the FFGRAPH Keyword Title And Label Defaults section of this chapter.

CHAR=

causes the data for this reportable element to be plotted on the graphs with a specific character.

COMPUTE=

constructs the new graphable keywords from the sum, difference, product, or quotient of the two other keywords.

LABEL=

the description of each keyword can be replaced with a character string of up to 30 characters.

MAXVAL=

used to set a maximum value against which to plot. The maximum value for the graph abscissa can be entered with up to 3 decimal points. Values can range from .001 to 9999999.999. Set MAXVAL to another keyword's maximum by entering the keyword for the other reportable element.

SCALE=

specifies the numeric precision in which the output is shown. Numeric values are shown on the report as: numbers with one, two, three, or four digits to the right of the decimal point; percentage values with zero, one, or two digits to the right of the decimal point; or in hour-minute-second format.

TITLE=

used to replace the title of each graph. The title can be up to 40 characters.

UNITS=

the output display of the value can be controlled by using this parameter. THOUSANDS displays the value with three decimal points. ONES displays as an integer.

100PCT=

specifies the format and content of the numbers to be printed over the tic marks on graphs. The default is 100PCT=MAX which label the tic marks as zero to the maximum value for the keyword. Specify 100PCT=n, where n is some value in the prescribed units, to label the tic marks as zero to that number.

For example, if DL/1 counts are graphed and the maximum observed DL/1 count per graphed item is 40, this may be 40 DL/1 counts per five-minute time interval.

- The default of 100PCT=MAX, and DL/1 counts are plotted on a scale labeled from zero to 40. An item having 20 DL/1 counts has asterisks across half of the graphable space.

- Specify 100PCT=50, and DL/1 counts are plotted on a scale labeled from zero to 50. An item having 20 DL/1 counts has asterisks across two-fifths of the graphable space.
- Specify 100PCT=100, and DL/1 counts are plotted on a scale labeled from zero to 100. An item having 20 DL/1 counts has asterisks across half of the graphable space.

KEYWORD Example

```
CPUR MAXVAL=25000,CHAR=*,
     TITLE='REAL CPU',
     LABEL='NUMBER OF SECONDS'
```

TRANSLATE Command

The TRANSLATE command controls the production of a translated output tape. It is also required if you wish to create EXTDATA. This translated output tape is used as input to the Report Writer. Use the TRANSLATE command to:

- request the production of the translated output tape
- identify the User Accounting Table, if any, that defines user accounting field contents in the translated records
- specify a CPU identifier to be associated with the translated IMS data

The following is the format of the TRANSLATE command:

```
Command              Operands

[LABEL] TRANSLATE

                     [SUFFIX  [= {AT} ] ]
                     [        [  {xx} ] ]

                     [,CPUID= {I} ]
                     [        {x} ]

                     [,USEPSB= {YES} ]
                     [         { NO} ]
```

SUFFIX=

specifies the two-character suffix of the User Accounting Table load module name. The suffix is appended to the first six letters of the name JSIIMU to identify the load module name of the User Accounting Table.

For example, specifying SUFFIX=01 causes the interface to load a User Accounting Table named JSIIMU01. Specifying SUFFIX=AT would cause loading of module JSIIMUAT.

This parameter is optional. If SUFFIX= is not specified, no User Accounting Table is loaded and the user accounting fields in all translated records contain blanks.

CPUID=

specifies the one-character CPU identifier that is put into the IMS Interface interface summary records. This CPU identification can be used for various grouping and chargeback rate application functions by the Report Writer.

USEPSB=

specifies that if a Transaction ID is blank to move an asterisk followed by the first seven characters of the PSB name into the transaction ID. If NO is specified, the transaction is rejected.

Note: No parameter or keyword is required to create EXTDATA. All that is required is a CAIJSACT DD statement and a valid TRANSLATE command.

Sample Resource Utilization Graphs Examples

Example 1: Daily Run -- 30-Minute Interval:

```
CA                                                    RESOURCE UTILIZATION GRAPHS                                        PAGE      1
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                          5 OCT 1998 11

 TIME OF MEASUREMENT IS FROM 94/08/15 AT 04.21.40                                                         DAILY    00.00.00 TO   00.00.00
                         TO   94/08/15 AT 14.01.20                                                        INCLUDES 94/08/15

                     C P U   U T I L I Z A T I O N

 TIME TRANSACT        CPU       0         10        20        30        40        50        60        70        80        90        100
 HHMM    COUNT    SECONDS    PCT +---------+--------+--------+--------+--------+--------+--------+--------+--------+--------+

 0000-0400  ***** NO DATA *****
 0400       11      2.432   0.1 *
 0430-0600  ***** NO DATA *****
 0600        3      0.217   0.0 *
 0630        0      0.000   0.0 *
 0700        0      0.000   0.0 *
 0730       49     21.641   1.5 **
 0800      116     67.499   4.9 *****
 0830      359     91.005   6.6 *******
 0900      741    101.251   7.3 ********
 0930      660    130.172   9.4 **********
 1000      563    239.093  17.3 ******************
 1030      696    128.625   9.3 **********
 1100      759    135.833   9.8 **********
 1130      708    136.392   9.9 **********
 1200     1000     81.310   5.9 ******
 1230      863    101.471   7.3 ********
 1300      347     42.569   3.0 ****
 1330      364     94.400   6.8 *******
 1400        3      0.865   0.0 *
 1430-2400  ***** NO DATA *****

 SUMMARY
  MAX OBSERVED    239.093  17.3 ******************
  AVG      452     85.923   6.2 *******

 TOTAL    7242   1374.775       +---------+--------+--------+--------+--------+--------+--------+--------+--------+--------+
                                0         10        20        30        40        50        60        70        80        90        100

 L E G E N D

 KEYWORD    MAXIMUM SCALE (100 PCT) PER   30 MINUTE INTERVAL       DESCRIPTION

 CPU             1374.775 SECONDS   (TOTAL OF CPU     )            CPU SECONDS
```

Commands

```
FFGRAPH SYSPLOT=B
CPU  100PCT=100
```

Description

CPU, a KEYWORD command, is used to plot the graph on a scale labeled zero to 100. The run date and time are displayed in the upper right corner of the report. The general header, Resource Utilization Graph, can be changed using the HEADER parameter in the FFGRAPH command.

The time of measurement shows the first and last date and time of the records being considered in this report. The graph type and the 24-hour period that is covered in this report both print under the run date. The title of the field being plotted can be changed with the TITLE parameter of the KEYWORD command.

This is a TIME graph, with 30 minute intervals, as shown in the leftmost column of the report. The second column is the count of transactions in each interval. The third column on this report is the cumulative value for CPU time found in each interval, because this is a CPU Utilization report. The next column, PCT, is the percentage of the maximum CPU time found for an interval (MAX OBSERVED) to the TOTAL of CPU (the 100% mark).

On a one-up graph, the tic marks of the graph expand across the page. The ***** NO DATA ***** line is displayed when more than 2 consecutive intervals contain no data, if the parameter COLLAPSE is ON.

The MAX OBSERVED FIELD shows the maximum CPU utilization found in the data. The average (AVG) across all intervals is also displayed. Totals are calculated for the fields displayed.

The legend describes the fields graphed above.

The maximum value used to scale the graph can be specified by using the MAXVAL parameter of the SET command (a KEYWORD command) or can be left to default to the highest value found in any interval (MAX OBSERVED). The interval being graphed can be set with the INTERVAL parameter.

Example 2: Composite Plot:

```
CA                                                     RESOURCE UTILIZATION GRAPHS                                   PAGE      2
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                       5 OCT 199
11.45.31

 TIME OF MEASUREMENT IS FROM 94/08/04 AT 04.38.11                                                      COMPOSITE 00.00.00 TO   00.00.00
                        TO   94/08/24 AT 11.26.10                                                       INCLUDES 94/08/04 THRU 94/08/24

                     C P U   U T I L I Z A T I O N

 TIME               CPU       0         10        20       30        40        50        60        70        80        90       100
 HHMM     DAYS    SECONDS    PCT +--------+--------+--------+--------+--------+--------+--------+--------+--------+--------+

 0000       0      0.000   0.0 *
 0030       0      0.000   0.0 *
 0100       1      2.782   0.0 *
 0130       1      0.016   0.0 *
 0200       0      0.000   0.0 *
 0230       0      0.000   0.0 *
 0300       1      2.524   0.0 *
 0330       4      2.484   0.0 *
 0400       5      1.524   0.0 *
 0430       9      1.458   0.0 *
 0500       9      0.898   0.0 *
 0530       6      0.448   0.0 *
 0600       6      0.222   0.0 *
 0630      13     29.528   0.5 *
 0700      14     26.242   0.4 *
 0730      15     66.976   1.2 **
 0800      15    183.724   3.4 ****
 0830      15    244.119   4.5 *****
 0900      16    201.841   3.7 ****
 0930      16    248.250   4.6 *****
 1000      15    302.943   5.6 ******
 1030      15    352.136   6.5 *******
 1100      16    342.636   6.3 *******
 1130      15    304.380   5.6 ******
 1200      15    244.939   4.5 *****
 1230      15    236.497   4.3 *****
 1300      15    235.008   4.3 *****
 1330      15    297.837   5.5 ******
 1400      15    328.126   6.0 *******
 1430      14    333.412   6.1 *******
 1500      15    325.304   6.0 *******
 1530      14    348.776   6.4 *******
 1600      14    280.719   5.2 ******
 1630      13    128.255   2.3 ***
 1700      13    115.935   2.1 ***
 1730      13    102.505   1.9 **
 1800      13     60.399   1.1 **
 1830      13     18.625   0.3 *
 1900      11      2.020   0.0 *
 1930       6      3.547   0.0 *
 2000       6      1.923   0.0 *
 2030       1      0.452   0.0 *
 2100       2      0.017   0.0 *
 2130       0      0.000   0.0 *
 2200       1      0.015   0.0 *
 2230-2400  ***** NO DATA *****
 SUMMARY
  MAX OBSERVED    352.136   6.5 *******
  AVG       10    134.486   2.4 ***
                                 +--------+--------+--------+--------+--------+--------+--------+--------+--------+--------+
                                 0         10        20       30        40        50        60        70        80        90       100
 L E G E N D
 KEYWORD    MAXIMUM SCALE (100 PCT) PER   30 MINUTE INTERVAL       DESCRIPTION
 CPU             5379.442 SECONDS   (TOTAL OF CPU     )            CPU SECONDS
```

Commands

```
FFGRAPH SYSPLOT=B,COMPOSITE=ON,DAILY=OFF
CPU  100PCT=100
```

Description

This is a COMPOSITE graph of the average activity across a number of days for each interval. Notice that the Time of Measurement shows which dates and times this report contains data for. The number of days displayed in the DAYS column indicates that data was found for the interval from that many days. The CPU SECONDS column is an average of all the days for that interval.

When more than two intervals have no data to report, all the consecutive intervals with *no data* is displayed as a single line if COLLAPSE is ON.

The legend is displayed at the end of every report.

Example 3: Average Summary Graph:

```
CA                                                    RESOURCE UTILIZATION GRAPHS                                        PAGE      3
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                       5 OCT 1998 11

 TIME OF MEASUREMENT IS FROM 94/08/04 AT 04.38.11                                                   SUMMARY (AVG) 00.00.00 TO   00.00.00
                       TO   94/08/24 AT 11.26.10                                                         INCLUDES 94/08/04 THRU 94/08/24

                     C P U   U T I L I Z A T I O N                              T O T A L   D L / I   C A L L S

      TRANSACT        CPU       0         25        50        75        100    DLI$TOTL       0         25        50        75      100
 DATE    COUNT    SECONDS    PCT +---------+---------+---------+---------+        CALLS    PCT +---------+---------+--------+-------+

 10/02    2195    253.631  39.5 ****************                                  32691  17.0 *******
 10/03    2134    215.011  33.5 **************                                    32630  17.0 *******
 10/04    2214    181.183  28.2 ************                                      34917  18.2 ********
 10/05    2202    211.854  33.0 **************                                    41892  21.9 *********
 10/08    3022    240.473  37.5 ****************                                  46291  24.2 **********
 10/09    2522    183.872  28.6 ************                                      36188  18.9 ********
 10/10    2228    163.430  25.4 ***********                                       42562  22.2 *********
 10/11    1973    161.193  25.1 ***********                                       32182  16.8 *******
 10/12    1900    146.353  22.8 **********                                        35886  18.7 ********
 10/13     452     85.923  13.4 ******                                            15295   7.9 ****
 10/15    1817    162.957  25.4 ***********                                       37041  19.3 ********
 10/16    1564    139.324  21.7 *********                                         34746  18.1 ********
 10/17    2079    209.346  32.6 **************                                    58082  30.3 *************
 10/18    1439    140.696  21.9 *********                                         37841  19.7 ********
 10/19    3461    278.042  43.3 ******************                                72223  37.7 ****************
 10/21      24      2.966   0.4 *                                                     5   0.0 *
 10/22    1883    177.531  27.6 ************                                      35406  18.5 ********

 SUMMARY
  MAX OBSERVED    278.042  43.3 ******************                                72223  37.7 ****************
  AVG     1947    173.752  27.0 ***********                                       36816  19.2 ********

                                 +---------+---------+---------+---------+              +---------+---------+--------+-------+
                                 0         25        50        75        100            0         25        50        75      100

 L E G E N D

 KEYWORD    MAXIMUM SCALE (100 PCT) PER   30 MINUTE INTERVAL       DESCRIPTION

 CPU             641.177 SECONDS   (MAXIMUM OBSERVED)            CPU SECONDS
 DLI$TOTL         191242 CALLS     (MAXIMUM OBSERVED)            TOTAL DLI CALLS
```

Commands

```
FFGRAPH SYSPLOT=X,SUMMARY=AVG,DAILY=OFF
CPU  100PCT=100
DLI$TOTL  100PCT=100
```

Description

This summary graph is a plot of the average interval values calculated for each day with the maximum being of the greatest average interval value.

Example 4: Total Summary Graph:

```
CA                                                    RESOURCE UTILIZATION GRAPHS                                       PAGE      4
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                      5 OCT 1998 11

 TIME OF MEASUREMENT IS FROM 94/08/04 AT 04.38.11                                           SUMMARY (TOTAL) 00.00.00 TO   00.00.00
                        TO   94/08/24 AT 11.26.10                                                  INCLUDES 94/08/04 THRU 94/08/24

                      C P U   U T I L I Z A T I O N

      TRANSACT        CPU       0         10        20        30        40        50        60        70        80       90      100
 DATE    COUNT    SECONDS    PCT +---------+---------+---------+---------+---------+---------+---------+---------+--------+-------+
010/02   63681   7355.320  91.2 ********************************************************************************************
 10/03   59752   6020.321  74.6 ***************************************************************************
 10/04   64206   5254.332  65.1 ******************************************************************
 10/05   59475   5720.061  70.9 ***********************************************************************
 10/08   54397   4328.520  53.6 ******************************************************
 10/09   73141   5332.308  66.1 *******************************************************************
 10/10   66862   4902.928  60.8 *************************************************************
 10/11   65113   5319.390  65.9 ******************************************************************
 10/12   58906   4536.964  56.2 *********************************************************
 10/13    7242   1374.775  17.0 ******************
 10/15   54519   4888.738  60.6 *************************************************************
 10/16   48502   4319.050  53.5 ******************************************************
 10/17   58234   5861.707  72.6 *************************************************************************
 10/18   46065   4502.300  55.8 ********************************************************
 10/19  100372   8063.218 100.0 **************************************************************************************************
 10/21      48      5.932   0.0 *
 10/22   16947   1597.783  19.8 ********************

 SUMMARY
  MAX OBSERVED   8063.218 100.0 **************************************************************************************************
  AVG    52791   4669.626  57.9 **********************************************************

                                +---------+---------+---------+---------+---------+---------+---------+--------+--------+--------+
                                0        10        20        30        40        50        60        70       80       90      100

 L E G E N D

 KEYWORD    MAXIMUM SCALE (100 PCT) PER 1440 MINUTE INTERVAL       DESCRIPTION

 CPU             8063.218 SECONDS   (MAXIMUM OBSERVED)             CPU SECONDS
```

Commands

```
FFGRAPH SYSPLOT=B,SUMMARY=ON,SPAN=1440
CPU  100PCT=100
```

Description

This summary is the totals of the field from each day plotted against one another. The total is plotted by setting the INTERVAL=1440. Total of the field for each day is displayed in CPU SECONDS. The time interval is 1440 (for 24-hour period).

Example 5: Daily PSB Usage:

```
CA                                                    RESOURCE UTILIZATION GRAPHS                                       PAGE      5
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                         5 OCT 1998 16

 TIME OF MEASUREMENT IS FROM 94/08/04 AT 05.14.25                                                 DAILY     00.00.00 TO   00.00.00
                        TO   94/08/04 AT 17.32.09                                                 INCLUDES 94/08/04

                     T O T A L   D L / I   C A L L S

                 DLI$TOTL       0      9989     19978     29967     39956     49945     59934     69923     79912    89901     99890
 PSB-NAME           CALLS   PCT +---------+---------+---------+---------+---------+---------+---------+---------+--------+--------+

 AZ00T00              150   0.1 *
 DFKE0000             146   0.1 *
 PV00T00                6   0.0 *
 RT00T00             1949   1.9 **
 SAPB1CM            12047  12.0 *************
 VI00T01             9371   9.3 **********
 VI00T02            10975  10.9 ***********
 VS00T00            25279  25.3 **************************
 WH00T00             4360   4.3 *****
 WH00T01              234   0.2 *
 WH00T02            33804  33.8 **********************************
 WH00T03            99890 100.0 ****************************************************************************************************
 WH00T04             3783   3.7 ****
 WH00T05             3553   3.5 ****
 WH00T06               30   0.0 *
 WH00T09              167   0.1 *
 WM00T00             3163   3.1 ****
 XT00T00             1156   1.1 **

 SUMMARY
  MAX OBSERVED      99890 100.0 ****************************************************************************************************
  AVG               11670  11.6 ************

 TOTAL             210063       +---------+---------+---------+---------+---------+---------+---------+---------+--------+--------+
                                0      9989     19978     29967     39956     49945     59934     69923     79912    89901     99890

 L E G E N D

 KEYWORD    MAXIMUM SCALE (100 PCT)                         DESCRIPTION

 DLI$TOTL           99890 CALLS     (MAXIMUM OBSERVED)            TOTAL DLI CALLS
```

Commands

```
FFGRAPH SUBSET=PSB-NAME,SYSPLOT=E
```

Description

This is a daily graph of the file activity for a day. The PSB names sort alphabetically, but can be sorted by other fields with use of SORT value of the SUBSET parameter. The total activity for that field for the day is displayed in the DLI$TOTL CALLS column.

The legend describes the field. No time interval is considered because this is a file graph, not a time-related graph.

Example 6: Maximum Calendar Graph:

```
CA                                                  RESOURCE UTILIZATION GRAPHS                                           PAGE      6
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                     5 OCT 1998 11

 TIME OF MEASUREMENT IS FROM 94/08/10 AT 09.03.45                                            CALENDAR (MAX) 00.00.00 TO   00.00.00
                        TO   94/08/15 AT 14.01.20                                                  INCLUDES 94/08/04 THRU 94/08/24

                                                           C A L E N D A R

                     MONDAY          TUESDAY        WEDNESDAY       THURSDAY         FRIDAY          SATURDAY        SUNDAY
            100 +---------------+---------------+---------------+---------------+---------------+--------------+--------------+ 100
                I               I               I               I               I               I              I              I
                I               I               I               I               I               I              I              I
                I               I               I               I               I               I              I              I
                I               I               I    A  D       I               I               I              I              I
                I               I    A  D       I    A  D       I               I               I              I              I
                I               I    A  D       I    A  D       I               I               I              I              I
                I    A  D       I    A  D       I    A  D       I               I               I              I              I
                I    A  D       I    A  D       I    A  D       I               I               I              I              I
             75 +    A  D       +    A  D       +    A  D       +    A  D       +               +              +              + 75
                I    AB D       I    A  D       I    A  D       I    A  D       I    A  D       I              I              I
                I    AB D       I    A  D       I    A  D       I    A  D       I    A  D       I              I              I
                I    AB D       I    A  D       I    AB D       I    AB DE      I    A  D       I              I              I
                I    AB D       I    A  D       I    AB DE      I    AB DEF     I    A  D       I              I              I
                I    AB D       I    A  D       I    AB DE      I    AB DEF     I    A  D       I              I              I
                I    AB D       I    AB D       I    AB DE      I    AB DEF     I    A  D       I              I              I
                I    AB D       I    AB D       I    AB DEF     I    AB DEF     I    AB D       I              I              I
                I    AB D       I    AB D       I    AB DEF     I    AB DEF     I    AB DE      I              I              I
 FIELDS      50 +    AB DE      +    AB D       +    AB DEF     +    AB DEF     +    AB DEF     +              +  **NO DATA** + 50
 A-TRANSACT     I    AB DE      I    AB D       I    AB DEF     I    AB DEF     I    AB DEF     I              I              I
 B-CPU          I    AB DEF     I    AB DE      I    AB DEF     I    AB DEF     I    AB DEF     I              I              I
 C-ELAPSED (J/A)I    AB DEF     I    AB DE      I    AB DEF     I    AB DEF     I    AB DEF     I              I              I
 D-SCHEDULE     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I              I              I
 E-DLI$TOTL     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
 F-DLI$GETS     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
 G-DLI$ISRT     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
 H-DLI$DLET     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
             25 +    AB DEF     +    AB DEF     +    AB DEF     +    AB DEF     +    AB DEF     +     B        +              + 25
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I     B        I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF    I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF    I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF    I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF    I              I
                I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF     I    AB DEF    I              I
              0 +---------------+---------------+---------------+---------------+---------------+--------------+--------------+ 0
                     94/08/10        94/08/11        94/08/12        94/08/13        94/08/14        94/08/15
 MAXIMUM SCALE (100 PCT) PER   30 MINUTE INTERVAL
 A       6628 OBS       5369            5811            5905            5058            4828            1000
 B    641.177 OBS    473.463         380.546         436.819         435.725         368.945         239.093
 C       0.00 OBS       0.00            0.00            0.00            0.00            0.00            0.00
 D       6628 OBS       5369            5811            5905            5058            4828            1000
 E     191242 OBS      96383           87703          124215          131763          101966           30994
 F     191242 SET      87805           78421          109879          124224           97411           30624
 G     191242 SET       5223            3885            2371            2312            2390               4
 H     191242 SET        380             447             218             239             251               4

 L E G E N D
 A-TRANSACT TRANSACTION COUNT                D-SCHEDULE NBR PROGRAMS                     G-DLI$ISRT TOTAL DLI CALLS
 B-CPU      CPU SECONDS                      E-DLI$TOTL TOTAL DLI CALLS                  H-DLI$DLET TOTAL DLI CALLS
 C-ELAPSED  AVERAGE ELAPSED                  F-DLI$GETS TOTAL DLI CALLS
```

Commands

```
FFGRAPH CALENDAR=MAX,DAILY=OFF
```

Description

Maximum calendar graphs take the maximum values of fields, and plots them in relation to each other for each day of a week. The date and time of first and last record used as input to find the maximum scale is displayed as Time of Measurement. A list of fields being plotted is displayed to the left of the graph. This list is controlled by the CALENDAR parameter. The maximum scale is set (SET) or observed (OBS) based on input control statements. The time interval is used to calculate the field values.

The legend displays the labels and values of each field graphed.

Example 7: Total Calendar Graph:

```
CA                                                  RESOURCE UTILIZATION GRAPH                                       PAGE      7
 CA JARS IMS INTERFACE 7.2  9811JR720                                                                   5 OCT 1998 11

 TIME OF MEASUREMENT IS FROM 94/08/10 AT 09.03.45                                         CALENDAR (TOTAL) 00.00.00 TO   00.00.00
                        TO   94/08/15 AT 14.01.20                                                 INCLUDES 94/08/04 THRU 94/08/24

                                                              C A L E N D A R

                    MONDAY         TUESDAY        WEDNESDAY      THURSDAY        FRIDAY         SATURDAY       SUNDAY
            100 +--------------+--------------+--------------+--------------+--------------+--------------+--------------+ 100
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
                I              I              I              I              I              I              I              I
             75 +              +              +              +              +              +              +              + 75
                I              I   A  D       I              I              I              I              I              I
                I              I   A  D       I              I              I              I              I              I
                I              I   A  D       I              I              I              I              I              I
                I              I   AB D       I   A  D       I   AB D       I              I              I              I
                I              I   AB D       I   A  D       I   AB D       I              I              I              I
                I              I   AB D       I   AB DE      I   AB D       I   A  D       I              I              I
                I              I   AB D       I   AB DEF     I   AB D       I   AB D       I              I              I
                I   AB D       I   AB D       I   AB DEF     I   AB D       I   AB DE      I              I              I
 FIELDS      50 +   AB D       +   AB DE      +   AB DEF     +   AB DE      +   AB DE      +              + **NO DATA**  + 50
 A-TRANSACT     I   AB D       I   AB DE      I   AB DEF     I   AB DE      I   AB DEF     I              I              I
 B-CPU          I   AB D       I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
 C-ELAPSED (J/A)I   AB D       I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
 D-SCHEDULE     I   AB DE      I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
 E-DLI$TOTL     I   AB DE      I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
 F-DLI$GETS     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
 G-DLI$ISRT     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
 H-DLI$DLET     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
             25 +   AB DEF     +   AB DEF     +   AB DEF     +   AB DEF     +   AB DEF     +              +              + 25
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I    B         I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I    B         I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I    B  EF     I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I    B  EF     I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I
                I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I   AB DEF     I              I
              0 +--------------+--------------+--------------+--------------+--------------+--------------+--------------+ 0
                    94/08/10       94/08/11       94/08/12       94/08/13       94/08/14       94/08/15
 MAXIMUM SCALE (100 PCT) PER 1440 MINUTE INTERVAL
 A     100372 OBS      54397          73141          66862          65113          58906           7242
 B   8063.218 OBS   4328.520       5332.308       4902.928       5319.390       4536.964       1374.775
 C       0.00 OBS       0.00           0.00           0.00           0.00           0.00           0.00
 D     100372 OBS      54397          73141          66862          65113          58906           7242
 E    2094488 OBS     833248        1049478        1276889        1062018        1112496         244722
 F    2094488 SET     740489         946731        1185676         977124        1042580         240462
 G    2094488 SET      32002          34155          27635          24260          22169             25
 H    2094488 SET       2653           3317           2368           2398           2348             23

 L E G E N D
 A-TRANSACT TRANSACTION COUNT               D-SCHEDULE NBR PROGRAMS                    G-DLI$ISRT TOTAL DLI CALLS
 B-CPU      CPU SECONDS                     E-DLI$TOTL TOTAL DLI CALLS                 H-DLI$DLET TOTAL DLI CALLS
 C-ELAPSED  AVERAGE ELAPSED                 F-DLI$GETS TOTAL DLI CALLS
```

Commands

```
FFGRAPH CALENDAR=ON,SPAN=1440
```

Description

This graph is a plot of the total values against one another. The interval is set to 1440 so the fields are cumulative daily totals. The values below the maximum scale are totals for the days. The maximum is now the largest total of the period considered.

The Wizard Report Writer

Output

The output report formats vary from user to user depending on the report control statements used. Additional output in the form of a historical database on magnetic tape is discussed in the *CA JARS User Guide*

The Wizard Report Writer error messages and other diagnostics are in the *CA JARS Message Guide*.

All user-defined reports formatted by the Wizard Report Writer are in three parts:

1. Header information
2. Detail information
3. Summary information

```
A --> CA                 - DAILY IMS COST REVIEW
E --> OPERATING COST     $1,000
           BEGIN DATE - 09/22/94 <--C                                                    F --> RUN DATE - 09/
           END DATE   - 09/22/94 <--D                                                               G --> PAG
JOB      PSB         TX STOP   TX STOP   PERCENT       TOTAL   DISTRIBUTED
           DESCRIPTION <--B       CONTROL   NAME     NAME           DATE      TIME     TOTAL      CHARGE        CHARGE
CA                  <-H 85
           I -> PRODUCTION WORK   8502
             J --> T SMITH       8502614B
MSGREG1  PSBPERS    94/09/22  01.09.37     4.633      $22.15          $47
                                             MSGREG1  PSBPERS    94/09/22  01.19.27     4.633      $22.15           $47
                                             MSGREG1  PSBPERS    94/09/22  01.28.02     4.037      $19.30           $40
                                             MSGREG1  PSBACCT    94/09/22  01.34.12     8.093      $38.69           $81
T SMITH        8502614B                                        21.396     $102.29          $215
H JONES        8502633B
MSGREG2  PSBACCT    94/09/22  02.54.49    34.669     $170.89          $347
                                             MSGREG2  PSBPAYR    94/09/22  02.54.49    11.539      $55.17          $115
                                             MSGREG1  PSBACCT    94/09/22  02.56.07    10.985      $52.52          $110
                                             MSGREG1  PSBACCT    94/09/22  02.57.20    12.182      $58.24          $122
H JONES        8502633B                                        34.706     $165.93          $347
                 PRODUCTION WORK   8502                                             56.101     $268.52          $561
PROGRAMMER TEST   8524
                    L BROWN        8524999
K --> RBXTEST  PSBTEST1   94/09/22  18.25.55    12.464      $59.59          $125
                                             RBXTEST  PSBTEST1   94/09/22  18.25.55     4.005      $19.15           $40
                                             RBXTEST  PSBTEST7   94/09/22  18.26.19     3.683      $17.61           $37
                                             RBXTEST  PSBTEST3   94/09/22  18.26.44     4.775      $22.83           $48
                                             RBXTEST  PSBTEST1   94/09/22  18.30.56    31.369     $149.97          $313
                                             RBXTEST  PSBTEST3   94/09/22  18.30.56    10.435      $49.89          $104
                                             RBXTEST  PSBTEST1   94/09/22  18.32.02    20.933     $100.08          $209
L BROWN        8524999                                         44.455     $209.56  <-M->   $438
PROGRAMMER TEST   8524                                            44.455     $209.56  <-N->   $438
CA                     85                                             100.556     $478.08  <-P-> $1,000
100.556     $478.08  <-R-> $1,000
```

Note: This report is described in detail on the next two pages.

Header Information

The report header is eight lines of information in a standard format for all reports. Item A is introduced using the HEADER statement. See the HEADER Statement section in this chapter. Items C, D, E, and F are introduced using the SELECT Statement.

The left-hand items, C and D, start in the first print position. The righthand items, E, F, and G, adjust automatically to the computed print line length. The line length is based on the field length of the selected data elements and the number of blanks preceding each element as requested by you using the DISPLAY statement. See the DISPLAY Statement section in this chapter. Item B is determined by the DISPLAY statement; individual titles can be modified via the TITLE statement. See the TITLE Statement section in this chapter.

Header Line 1

The top-of-page header line displays the report title for a given report as indicated by A. The starting print position for the report title is defined by you on the HEADER statement.

Header Line 2

The operating cost is retrieved from the PARMS statement. If this value is not present or not relevant to a given report, item E is omitted.

Header Line 3

The third line displays the report begin date and run date, items C and F, respectively.

Header Line 4

The fourth line displays the report end date and the report page number, items D and G, respectively. The page number is a four-digit, zero-suppressed value.

Header Lines 5 and 6

These lines are intentionally blank on every report.

Header Lines 7 and 8

These lines display the titles of the selected output data elements at the print positions defined by you on the DISPLAY statement. The titles do not exceed the individual field lengths as indicated in the IMS Interface Output Data Elements Table later in this chapter.

Detail Information

The detail line information may be optionally displayed for each record at the transaction level, item K.

You may elect to display the selected output data elements for each transaction on a given report. The transaction information is a summary of pertinent data for all the programs within that transaction.

Summary Information

The summary line information is displayed for each change of data in a user-defined sort control field at any of the five sort levels. You may elect to display the selected output data elements at each of the five levels.

The forms are positioned to the top of the next page after printing the major summary line. This page eject occurs when the summary line option on the SORT statement is an E. By specifying a P, you can request a page eject after printing the major summary line with the page number reset to one.

Associated with each summarization level are description and control fields. You may elect to display these fields and associate personalized descriptive header information with the summary lines. This is accomplished through the use of DESCRIPT statements. See the DESCRIPT Statement section in this chapter.

In addition, the control field and summarization description can be displayed as headers to signal the beginning of a new summarization level as illustrated by items H, I and J. No other information appears on this line. Note that the descriptions have been staggered to present a more meaningful relationship between the different summarization levels. This is accomplished by appropriately spacing the summarization description in the field when preparing the DESCRIPT statements.

An additional final summary line, item R, is automatically displayed at the end of each report. All requested information that may logically be accumulated is presented as a final total on this line.

Executing the Wizard Report Writer

The Wizard Report Writer is executed as a standard batch job using basic IBM 370 facilities.

Data Set Use

The Wizard Report Writer requires several interrelated files to execute. The following list describes these data sets and their functions.

DDName File Name	Description Of Use	Predefined DCB Attributes
CAIJSHST	Used to input IMS data produced by the Translate Utility.	RECFM, LRECL, and BLKSIZE set automatically

DDName File Name	Description Of Use	Predefined DCB Attributes
anyname	Output data set for summary file generated using the Summarization Feature.	RECFM, LRECL, and BLKSIZE set automatically
CAIJSACT	Optional output DD for EXTDATA (only). Data will be written if the DD exists in your JCL and there is a valid TRANSLATE command.	RECFM, LRECL, and BLKSIZE set automatically
SORTWKnn	Temporary data sets used as sort work area in sort phases.	RECFM, LRECL, and BLKSIZE set automatically
CAIJSCT1	Temporary data set to hold edited report control statements.	RECFM, LRECL, and BLKSIZE set automatically
CAIJSCT2	Same as CAIJSCT1	RECFM, LRECL, and BLKSIZE set automatically
CAIJSCIN	Used to input report control statements	RECFM=F, LRECL=80
CAIJSPRT	SYSOUT data set for output reports.	RECFM=F, LRECL=133

In addition to these data sets, the following files are required:

```
//STEPLIB   DD DSN=____,DISP=SHR,UNIT=____,VOL=SER=_____
//SORTLIB   DD DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT    DD SYSOUT=____
//SNAPDUMP  DD SYSOUT=____
```

The STEPLIB statement points to the DASD volume on which a partitioned data set (user library) resides that includes the Wizard Report Writer as a member. If the library has been cataloged on the system, then the unit parameter and volume identification are not necessary.

The SORTLIB statement is required during the sorting operations activated by the Wizard Report Writer. This data set contains modules which are essential to the execution of the program.

The SYSOUT statement provides an output data set for the messages displayed on the printer by the IBM or vendor-supplied sort/merge program. You should be aware that this ddname may vary from one installation to another depending on the options specified at the time the sort/merge program was installed. Typical substitute ddnames employed by users are SORTMSG, SYSPRINT, and so forth.

Concatenating Input Files

Multiple input files are controlled by JCL. For example, several IMS Interface data tapes can be processed by specifying OPTCODE=B and listing the volume serial numbers of the input tapes. The Wizard Report Writer has been programmed to automatically accept and process input files under the same file name (CAIJSHST) with unlike attributes. This feature allows users to concatenate input files residing on different device types and having different DCB attributes.

Sample JCL

The following JCL illustrates a typical run deck setup to execute the Wizard Report Writer. Installation-dependent parameters are given in lowercase.

```
//IMSIVP   JOB (ACCTINFO),'PROGRAMMER INFO',
//             MSGCLASS=X,CLASS=A
//*                                                                   *
//JARS     EXEC PGM=JSIMAIN,REGION=4M
//*
//STEPLIB   DD DISP=SHR,DSN=CAI.CAJRLOAD
//SYSLIB    DD SYSOUT=*
//CAIJSPRT  DD SYSOUT=*
//SORTMSG   DD SYSOUT=*
//SYSOUT    DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//CAIJSNAP  DD SYSOUT=*
//SORTWK01  DD UNIT=SYSDA,SPACE=(CYL,(5))
//SORTWK02  DD UNIT=SYSDA,SPACE=(CYL,(5))
//SORTWK03  DD UNIT=SYSDA,SPACE=(CYL,(5))
//SORTWK04  DD UNIT=SYSDA,SPACE=(CYL,(5))
//SORTWK05  DD UNIT=SYSDA,SPACE=(CYL,(5))
//SORTWK06  DD UNIT=SYSDA,SPACE=(CYL,(5))
//CAIJSCT2  DD UNIT=SYSDA,SPACE=(TRK,(10,1))
//CAIJSCT1  DD UNIT=SYSDA,SPACE=(TRK,(10,1))
//CAIJSACT  DD UNIT=SYSDA,
//             SPACE=(CYL,(10,5))
//CAIJSHST  DD DISP=SHR,DSN=JARS.HISTORY.FROM.IMS
//CAIJSCIN  DD *
         .
         .
         .
         Wizard Report Writer Control Statements
         .
         .
         .
//*********************************************************************
```

Control Statements

Formatting customized reports begins with the preparation of control statements. Each statement is identified by an eight-character alphanumeric *statement type.* The Wizard Report Writer checks each statement for syntax and other discrepancies which would cause problems in execution. All errors are flagged, and messages are printed identifying the problem areas.

The following control statements control the general aspects of the Wizard Report Writer execution:

- SELECT (required)
- CRITERIA (optional)
- PARMS (optional)

Up to 15 reports can be produced in a single execution of the Wizard Report Writer. Each report is defined by a combination of the following control statements:

- HEADER (required)
- SORT (required)
- DISPLAY (required)
- GROUP (optional, for grouping feature)
- GROUPC
- RATE
- CREDIT (optional, for chargeback and budget control)
- DEBIT
- BUDGET
- TITLE
- DESCRIPT
- EXITS (see the *CA JARS User Guide)*

A unique *set code* identifies the report control statements for each report. This code is the first character in each statement; all the statements in the set contain the same set code. The Wizard Report Writer automatically orders and edits the report control statements prior to their use.

Note: The following sections describe the preparation of the Wizard Report Writer control statements. For each statement, there is a general description. Be sure to refer to both the general and the specific description when necessary.

The transaction data processed by the Wizard Report Writer originates in the IMS system log data set. This log data set is processed by the IMS Interface. Using the TRANSLATE command, the interface can translate log data to input format for the Wizard Report Writer. It also uses a user-defined accounting table to assign cost center identification to the reformatted interface records.

These reformatted interface records are output by the interface into a file called the IMS Interface summary file.

BUDGET Statement

The BUDGET statement, identified by the statement type BUDGET, is optional. It provides a mechanism by which you may introduce budget figures to the Wizard Report Writer and compare them to actual costs for a given period of time. Budget figures may be associated with a specific transaction or with any summarization level (such as account, department, project).

Each BUDGET statement introduced to the Wizard Report Writer is formatted into an accounting record to be sorted and reported on as any other input. All BUDGET statement fields are formatted to corresponding fields according to the Basic Accounting Table. For processing purposes, the record is treated as a transaction.

The date and time fields are processed the same way as those on the CREDIT and DEBIT statements.

The budget amount field, in whole dollars, is carried through by the Wizard Report Writer and made available for display via the Output Data Elements Table. The difference between the budget amount and the total charge can be displayed at any level, as can the over-under budget figure. The percent budget spent can show what percentage of the budget amount has been spent at any display level.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Statement Type	BUDGET
10	1	CPU Identification	
19-34	16	User Information	
35-40	6	Date	YYMMDD
41-48	8	Job Name	
49-54	6	Time	HHMMSS
75-80	6	Budget Amount	999999V; dollars

CREDIT Statement

This statement, identified by the statement type CREDIT, is optional. It is used to supplement the accounting algorithms defined on the RATE statements. Credits may be introduced to the Wizard Report Writer to be applied to a specific transaction or summarization level (account, department, project, etc.). Some typical uses for the CREDIT statement are to:

- negate transaction abend costs
- adjust prior months billing
- provide volume processing discounts

Each CREDIT statement introduced to the Wizard Report Writer is formatted into an accounting record to be sorted and reported on as any other input. All CREDIT statement fields are formatted to corresponding fields according to the Basic Accounting Table. For processing purposes, the record is treated as a transaction.

The following fields, if not present on the CREDIT statement, are filled with blanks in the formatted record:

- CPU identification
- user information
- transaction ID

The following fields, or any portion thereof, not present on the CREDIT statement are filled with high values (hex 'FF') in the formatted record:

- date
- time

For sorting purposes, it should be noted that the date field is moved to the transaction stop date and date record written fields. Also, the time field is moved to the transaction stop time and time record written fields in the formatted record as defined in the Basic Accounting Table. High values in any of these fields do not print when selected for display, and, therefore, can be used to cause credits to appear last in any group of records.

The credit amount field, in dollars and cents, is carried through by the Wizard Report Writer and made available for display in the Output Data Elements Table. The credit amount also affects (reduces) the total charge, distributed charge, and percent totals at any level of display.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	

Statement Position	Field Length	Field Name	Notes
2-9	8	Statement Type	CREDIT
10	1	CPU Identification	
19-34	16	User information	
35-40	6	Date	YYMDD
41-48	8	Job Name	
49-54	6	Time	HHMMSS
75-80	6	Credit Amount	9999V99; dollars

CRITERIA Statement

This statement, identified by the statement type CRITERIA, is optional. It provides a mechanism for selecting or rejecting input by date for processing by the Wizard Report Writer. You can establish a selection/rejection date range as follows:

```
DATE i ffffffff ssssssss
```

DATE

is the required keyword.

i

is the select (I =) or reject (I = 1) indicator.

ffffffff

is the first date, the range beginning.

ssssssss

is the second date. If the second date is omitted, it defaults to the first date, in effect selecting or rejecting a single date.

If the CRITERIA statement is omitted, all input is processed. An extension to the record selection/rejection capability at the report level is available through the use of the grouping feature. This function is controlled by the GROUP and GROUPC statements which are discussed in detail later in this chapter.

Statement Position	Field Length	Field Name	Notes
1	1	Reserved	Must be blank
2-9	8	Statement Type	CRITERIA

Statement Position	Field Length	Field Name	Notes
10-13	4	Keyword	DATE
14	1	Select/Reject Indicator	1 = reject = select
15-22	8	First Date	Range beginning date*
23-30	8	Second Date	Range ending date* (optional if same as range beginning date)
* Dates must be entered in the format MM/DD/YY			

Dates specified with a year value of 00 through 59 are treated as year 2000 through 2059, and are considered logically greater than year values of 60 through 99 (1960 through 1999).

DEBIT Statement

The DEBIT statement, identified by the statement type DEBIT, is optional. It is used in a similar manner as the CREDIT statement to supplement the accounting algorithms defined on the RATE statements. Debits may be introduced to the Wizard Report Writer to be applied to a specific transaction or summarization level (such as account, department, project). Some typical uses for the DEBIT statement are to:

- charge for dedicated online devices
- introduce disk space rental costs
- bill specific accounts for other EDP functions used

The DEBIT statement format and processing is identical to that of the CREDIT statement described earlier. The only difference is in the use of the amount field, which has the effect of increasing the charges.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Statement Type	DEBIT
10	1	CPU Identification	
19-34	16	User Information	
35-40	6	Date	YYMMDD
41-48	8	Job Name	
49-54	6	Time	HHMMSS

Statement Position	Field Length	Field Name	Notes
75-80	6	Debit Amount	9999V99; dollars

DESCRIPT Statement

The DESCRIPT statement, identified by the statement type DESCRIPT, is optional. When the data element description field is selected, it can provide a description of the control field break at the header and summary line. See the data element ID 02 in the IMS Interface Output Data Elements Table later in this chapter.

The summarization level defines which sort control break the DESCRIPT statement refers to. For example, you can select the two positions of the date field corresponding to the month as the major sort control field. The Wizard Report Writer then summarizes the accounting data and prints a summary line for all processing in each month and a final summary line for all months combined. To clarify the report, you can define a summarization description for each control break or summary line. In this example, you might prepare the following set of DESCRIPT statements:

```
ADESCRIPT101      JANUARY
ADESCRIPT102      FEBRUARY
ADESCRIPT103      MARCH
             .
             .
             .
ADESCRIPT1        UNIDENTIFIED DATE
```

For a description of the user sort control fields, see the SORT Statement section later in this chapter. Sort control fields can be a maximum of eight characters in length. Unused characters are padded with trailing blanks. The description control field must be the same as the eight-character sort control field. The description control field and a sort control field must match character for character to associate the correct description with the corresponding sort control break.

You may need the same DESCRIPT statements for different report formats -- the only variation being the summarization level. In one report you might use the date as the level one sort control field, as in this example, and in another report use the date as a level 2 or 3 sort control field. The only difference in the two sets of DESCRIPT statements would be the set code and the summarization level indicator.

You can, however, leave the set code blank and define the summarization level as 0 which makes the summarization description available to all reports and to any control break -- not just the level one break as in the example.

Use this *any level* summarization level with caution. Suppose a report were sorted by:

level 1=department number

level 2=group number

level 3=employee number

In such cases, you must specify summarization level to make sure that the right description appears at the right level.

Note: If fewer than five sort levels are used in a report, you may identify them as:

1, 2, and 3;

2, 3, and 4; or even

1, 4, and 5.

Level numbers indicate relative positions; the precise number selected is only important because the level number on the DESCRIPT statement must match that defined on the SORT statement.

Variable Description Feature

You may find that at a particular sort level, there are a number of fields whose descriptions are almost the same except for a small amount of variable information. For example, at level one a report might sort through the first three positions of the user information field which could identify an account number and so on for 20 or 25 account numbers. In this case, rather than code a separate DESCRIPT statement for each control break or summary line, you may prepare a single DESCRIPT statement and, by using the variable description feature, transfer the account number automatically from the sort control field into the description field, along with a constant, if desired. See the SORT Statement section later in this chapter.

To invoke this feature, replace the first four characters of the description control field with four asterisks. These indicate that the next four positions determine what is transferred from the sort control field. The four asterisks are followed by:

- two characters indicating where the transferred data is placed in the description field
- one character indicating how many characters of data to transfer
- one character indicating from which position in the sort control field the transfer of the data is to begin
- the description field, either blank, or with a constant to be used in conjunction with the transferred data

The following example illustrates a typical use of the variable description feature.

```
Summarization Level Invokes
Variable Description Feature
    |
    ▼
ADESCRIPT1  |**** 0931|  |ACCOUNT XXX|
                ▲
                |
        This will appear on every summary
        line at this sort control level.
```

This statement defines the format for Report A. The summarization level is 1, followed by the four asterisks that invoke the variable description feature. The variable information (the three position account number, in this case) located in the first position of the sort control field, is transferred to the ninth position of the description field (overlaying the XXX appearing in the example).

Note that DESCRIPT statements using the variable description feature and those that contain blank description control fields share one characteristic: they terminate the DESCRIPT statement searching logic, and are used regardless of the current contents of the sort control field. DESCRIPT statements with blank description control fields are intended to be used for catchall or miscellaneous descriptions and should follow all DESCRIPT statements with nonblank description control fields.

Statement Position	**Field Length**	**Field Name**	**Notes**
1	1	Set Code	Optional
2-9	8	Statement Type	DESCRIPT
10	1	Summarization Level	0 = any level 1 = 1st sort level (most general level) 2 = 2nd sort level 3 = 3rd sort level 4 = 4th sort level 5 = 5th sort level (most detailed level)

Statement Position	Field Length	Field Name	Notes
11-18	8	Description Control Field	Matches Sort Control Field unless variable description feature is used. In that case: Statement Len Notes Position 11-14 4 **** asterisks 15-16 2 TO location in DESCRIPT field, relative to 1 17 1 Number of characters to be moved 18 1 FROM location in control field, relative to 1 (Refer to Variable Description Feature)
19-38	20	Description Field	Refer to DE ID 02 in the Output Data Elements Table
39-80	42	Reserved	Not used

DISPLAY Statement

The DISPLAY statement is required. Use it to select the desired data elements for display.

Positions 10-11 on the DISPLAY statement are reserved for the suffix of the desired Title Table module. CA JARS and each interface comes with a preassembled Title Table module, containing the TITLE control statements that explicitly define the data elements for that particular interface or product. The module name is JSIRTTxx, where xx is the suffix as shown below:

```
01 = CA JARS
02 = CA JARS/CICS Interface
03 = CA JARS/APPC
MA = CA JARS Roscoe Interface
QA = CA JARS Adabas Interface
VO = CA JARS VM Interface
MS = CA JARS IMS Interface
IS = CA JARS IDMS Interface (optional)
JV = CA JARS VAX Interface  (optional)
DC = CA JARS Datacom DB
```

The Output Data Element Selection Table allows you to select as many as 23 data elements from a pool of available elements to display in a given report. The table entries are in the format *lnn* where:

l

is a one-digit number of leading spaces.

nn

is a two-character code identifying the data element selected for display. This identification corresponds to the data element ID in the Output Data Elements Table. Refer to the IMS Interface Output Data Elements Table given in this chapter.

Each DISPLAY statement must have a set code.

The following example illustrates a typical DISPLAY statement:

```
ADISPLAY MS002101504105107506112129142146147
```

This DISPLAY statement defines the format for Report A as indicated by the set code in statement position 1. The data elements selected, in order, are: description field, control field, job name, PSB name, transaction type, transaction stop date, transaction stop time, processor time, percent of total charge, total charge, and distributed charge.

Each of the selected fields were preceded by the following number of spaces, respectively: 0,1,5,1,1,5,1,1,1,1,1. The total print line cannot exceed 132 print positions. By using the indicated output length in the Output Data Elements Table and the number of blanks preceding each selected data element, you can compute the total requested print line length.

Note: Figures are normally displayed with commas marking the thousands, millions and billions places. If a number does not fit the space available, the commas are dropped. Right-hand decimal places are the next characters dropped, two at a time. If the number is so large that even the rounded integer doesn't fit, the number is rounded further, the rightmost places dropped and the remaining numbers are followed by an asterisk and a number indicating the number of places dropped. Thus, 386,957 (or 387,000) becomes 387*3. Sign values are always retained.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	Must be supplied
2	8	Statement Type	DISPLAY
10-11	2	Title Table Override	Override Title Table. Use MS for IMS titles

Statement Position	Field Length	Field Name	Notes
12-80	3 . . .	Output Data Element Selection Table	1 to 23 occurrences of lnn where: 1 = Number of leading spaces (0-9) nn = Output Data Element ID (01-B7). Refer to the Output Data Elements Table
	repeated 22 times		

GROUP Statement

This statement, identified by the statement type GROUP, is optional. The GROUP statement in conjunction with GROUPC statements identifies or qualifies accounting records based on values in defined positions of the record. Once an accounting record has been qualified, you may:

- select or reject the record for further processing
- assign the record a unique group code that can subsequently be used as a sort control field
- assign the record a unique CPU identification code so that a specific billing algorithm can be applied

The grouping feature can typically be used to:

- expand the criteria base for record selection/rejection
- summarize records that do not have common characteristics
- apply different billing algorithms to selected accounts
- report on an charge users according to shift differentials

There are six different levels of tests that can be defined on the GROUP statement in the format *ppplfi,*

ppp

is a three-digit number defining the starting position (character) in the Basic Accounting Table used to set up a qualifier for the grouping feature.

l

is a one-digit number defining the number of characters (beginning with and including the starting position) in the Basic Accounting Table used to construct the length of the qualifier for the grouping feature.

f

is a one-character code specifying the data format of the field in the Basic Accounting Table being used as the qualifier for the grouping feature. A blank format indicator is used for EBCDIC, a P for packed decimal, and an X for binary or the hexadecimal portion of a packed decimal field.

i

is a one-character code specifying whether qualified records should be selected or rejected.

An S causes all identified record groups to be selected for further processing and all unidentified record groups to be automatically rejected. An R causes the reverse effect to allow you to reject identified record groups.

If the indicator is left blank, no record rejection occurs and all record groups are selected for further processing. This is particularly useful when all records are to be grouped for display purposes without dropping any information, as in computer time shift reporting.

The process of identifying records starts with the group one definition. If the record is qualified and selected, the process continues to the group two definition and so on to the group six definition in a similar manner. If a record is selected based on all definitions, then the record is considered selected for further processing. If a record is rejected based on any single definition, then the record is considered rejected from further processing.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2-9	8	Statement Type	GROUP
10-15	6	Group 1 Definition	ppplfi format - where: ppp Beginning portion of Selected Field* (maximum of 8) l: Length of selected field (maximum of 8) f: Format of selected field : character P: packed decimal X: hexadecimal (binary) i: Selection Indicator : select all records S: select qualified records R: reject qualified records
16-21	6	Group 2 Definition	
22-27	6	Group 3 Definition	
28-33	6	Group 4 Definition	
34-39	6	Group 5 Definition	
40-45	6	Group 6 Definition	

Statement Position	Field Length	Field Name	Notes
46-80	35	Reserved	Not used
The selected field length may not be greater than 4 if either P or X is used as format indicator.			

GROUPC Statement

This statement, identified by the statement type GROUPC, is optional. The GROUPC statement must be used in conjunction with the GROUP statement for a given report. Whereas the GROUP statement defines which fields in the accounting record are to be used in the grouping feature, the GROUPC statement supplies the range of values to be used in a compare instruction to qualify the record. Multiple GROUPC statements may be required for a given report in order to provide many value ranges to qualify each accounting record.

The definition indicator on the GROUPC statement specifies which definition of the GROUP statement is applicable. Therefore, the definition indicator can only be a number from 1 to 6 relating to the proper definition number on the GROUP statement.

The lower and upper limiting criteria fields on the GROUPC statement provide the actual range of values that are compared against the corresponding value in the accounting record to qualify the record. The range values must be left-justified with trailing blanks when needed. If the upper limiting criteria is the same as the lower limiting criteria, it may be omitted.

The group code on the GROUPC statement is a one-character code that is placed in any accounting record that is selected according to the value ranges. The group code can subsequently be used as a sort control field via the SORT statement to provide totals for the different groups of accounting records selected by the grouping feature.

Note that positions 296 through 298 and positions 438 through 440 in the Basic Accounting Table correspond to the group codes for the six definitions as defined by the definition indicator on the GROUPC statement.

The CPU identification code on the GROUPC statement allows you to dynamically change the CPU identification of any accounting record for further processing. In this way, qualified records can be assigned different CPU identification codes corresponding to multiple RATE statements for a given report. Identified record groups may then use a different accounting algorithm than other accounting records.

A blank CPU identification code on the GROUPC statement indicates that no change in the record CPU identification is desired. Refer to the GROUPC statement layout given next.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2-9	8	Statement Type	GROUPC
10	1	Definition Indicator	1 to 6 relates to a group definition on the GROUP statement
11-18	8	Lower Limiting Criteria *	
19-26	8	Upper Limiting Criteria *	Optional if same as lower limit
27	1	Group Code	Any character - to be placed in appropriate Group Code field in accounting record
28	1	CPU Identification	Blank = no change in CPU ID Any character = replace CPU ID in accounting record with this character
29-80	52	Reserved	Not used

* Each criteria field is converted to packed-decimal or hexadecimal (binary) or left as in depending on the contents of the appropriate format indicator in the GROUP statement.

Refer to the table below to determine the number of characters to code in the criteria fields (always left justified) for format indicators P and X:

GROUP Statement Field Length	No. of Chars. for: P	X
1	1	2
2	3	4
3	5	6
4	7	8

HEADER Statement

The HEADER statement, identified by the statement type HEADER, is required for each report. The title position field specifies the starting print position of the report title on the first header line for a given report. If omitted, the default is the first print position. The report title field contains a 68-character alphanumeric report title for the report format associated with the set code in statement position 1. Each HEADER statement generates a separate title line. There may be up to three HEADER statements per report.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Statement Type	HEADER
10-12	3	Title Position	Must be blank or numeric. Defaults to first print position
13-80	68	Report Title	Alphanumeric title for the report

PARMS Statement

The PARMS statement, identified by the statement type PARMS, is optional. It provides optional execution parameters to the Wizard Report Writer.

The three date fields on the PARMS statement are used as the header dates for all reports produced in a given execution. The date fields are alphanumeric and are not edited by the Wizard Report Writer. The date fields have no relationship to the selection or rejection of input records. This function is controlled by the CRITERIA statement discussed in detail earlier in this chapter.

If omitted, the report begin date defaults to the lower limit date criteria as defined on the CRITERIA statement (if present). In the same manner, the report end date assumes the upper limit date criteria value on the CRITERIA statement. In the absence of a CRITERIA statement, the begin and end dates are filled by the earliest and latest input record dates encountered, respectively.

The report run date is filled with the current system date, if omitted. Nonblank date fields on the PARMS statement override the defaults and are moved to their respective positions in the heading information for each report generated in a given run.

The operating cost field may be used to introduce the total IMS cost for an installation for a given period of time. This value is then used in computing the distributed charge output data element amount available for display by the user.

Maximum line count is used to adjust the maximum number of lines to be printed per page of output. A two-digit numeric value overrides the default value of 60 lines per page.

The control statement print flag suppresses the printing of all control statements so that production reports which may use many user-supplied statements do not have to list the control statements.

The dollar sign print flag field provides you with the option of producing financial reports with or without the dollar sign ($) appearing in charge-related output data elements. This is particularly useful for installations using a print chain with a limited number of dollar sign characters. The print rate can be increased considerably by avoiding the printing of many special characters. The default is to force the use of dollar signs where appropriate.

Sort core size may be used to define to the Wizard Report Writer the amount of main storage to be used by the sorting operation. A three-digit numeric value represents the amount of storage in 1K byte increments which overrides the storage option default value.

The sort message indicator causes the sort/merge program to display all of its messages in accordance with the installation's defaults. The default for this parameter is CRITICAL. As a substitute for the record counts, the Wizard Report Writer prints a concise message stating the number of records sorted for each invocation of the sort/merge program.

Statement Position	Field Length	Field Name	Notes
1	1	Reserved	Must be blank
2-9	8	Statement Type	PARMS
10	1	Date Format Indicator	Must be blank
11-18	8	Report Begin Date	Defaults to dates on CRITERIA statement
19-26	8	Report End Date	Defaults to dates on CRITERIA statement
27-34	8	Report Run Date	Defaults to current date in system
35-42	8	Operating Cost	Must be blank or numeric. 99999999V (dollars)
59-60	2	Maximum Line Count	Maximum lines per output report page. Default is 60
61	1	Control Statement Print Flag	blank = print statements 1 = suppress printing

Statement Position	Field Length	Field Name	Notes
62	1	Dollar Sign Print Flag	blank = print dollar signs 1 = suppress dollar signs
64-66	3	Sort Core Size	Core size for sort in K bytes. Default is maximum available
68	1	Sort Message Indicator	blank = print CRITICAL messages only 1 = print ALL messages

RATE Statement

The RATE statement, identified by the statement type RATE, is optional. It provides a mechanism by which you may introduce an accounting algorithm to the Wizard Report Writer for computer billing or cost distribution purposes.

The RATE statement weights computer resources when calculating the dollar charges or relative utilization percentages for a given report. It may be omitted when no data elements involving charges or percentages are selected for any report.

The CPU identification code associates each RATE statement with the appropriate data. Multiple RATE statements may be required for a report so that data collected from different systems (or assigned CPU IDs by the grouping feature) may be processed simultaneously, each using a different accounting algorithm. The CPU identification on the RATE statement must match the corresponding CPU identification in the records for the algorithm to apply. If an accounting record that contains a CPU identification other than one found on any RATE statement for a report is encountered, then the accounting algorithm parameters default to the values on the first RATE statement defined for that report.

The basic processor rate field is the dollar amount per minute of processor time.

The CPU time factor field on the RATE statement enables you to weight the recorded time in calculating the processor time in minutes as follows:

```
Processor Time = Application CPU Time x Application CPU
                 Time Factor
```

The CPU time factor field is a percentage, (that is, 080 = 80%). Therefore, it is possible to calculate the processor time using the straight or unweighted CPU time by setting the CPU time factor to 100 (100%).

The processor time and processor rate as you define them are used to calculate the processor charge for each program as follows:

```
Processor Charge = Processor Time x Processor Rate.
```

The file I/O rates on the RATE statement enable you to charge for database accesses, and for message queue get and insert operations. The file I/O charge for each transaction is calculated as follows:

```
File I/O Charge = (Message Queue Gets x
                    Message Queue Get Rate      +
                  Message Queue Inserts x
                    Message Queue Insert Rate   +
                  Total DL/I I/O Count x
                    DL/I Rate)                  / 1000.
```

The processor charge for a transaction combined with the file I/O charge forms the transaction charge:

```
Transaction Charge = Processor Charge + File I/O Charges
```

The minimum transaction charge on the RATE statement is applied if it is greater than the computed transaction charge described above.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Statement Type	RATE
10	1	CPU Identification	
11-14	4	Basic Processor Rate	Must be blank or numeric. 9999 (dollars per min.)
25-27	3	CPU Time Factor	Must be blank or numeric. 999 (percentage)
52-54	3	Message Queue Get Rate	
58-60	3	DL/1 Rate	9V99 (dollars per 1000 count)
61-63	3	Message Queue Insert Rate	
70-73	4	Minimum Transaction Charge	Must be blank or numeric. 99V99 (dollars)
74-79	6	Reserved	Must be blank

SELECT Statement

The SELECT statement, identified by the statement type SELECT, is required. It indicates which reports are to be produced by the Wizard Report Writer.

The set code table allows you to select as many as 15 reports to be produced in a single Wizard Report Writer execution. Each set code table entry is a one-character code indicating the report selected for output, followed by a blank.

You must specify a 1 (one) in position 15 of the SELECT statement to process IMS Interface data.

Statement Position	Field Length	Field Name	Notes
1	1	Reserved	Must be blank
2-9	8	Statement Type	SELECT
15	1	IMS Interface Input Indicator	1
51-80	2 . . repeated 14 times	Set Code Table	sblank where s = set code for each selected report

SORT Statement

The SORT statement, identified by the statement type SORT, is required. It allows the input accounting data to be sorted on up to five different fields. Each field, or *sort level,* is defined by the format *pppllosd*

ppp

is a three-digit number specifying the sort field's starting position. Refer to the IMS Interface Basic Accounting Table given later in this chapter.

ll

is a two-digit number between 01 and 08 defining the length of the sort field in the Basic Accounting Table.

o

indicates the sort order:

A = ascending
D = descending

The default is A (ascending).

s

is the summary print option that tells the Wizard Report Writer whether or not you want a summary line printed for this level and is defined as follows:

N or

no summary line is printed at this level.

1, 2, or 3

single, double, or triple spacing before printing the summary line.

E

eject to a new page after printing the summary.

P

eject to a new page and reset page number to 1 after printing.

(If either E or P is specified for the first (major) summary level, grand totals print on a page by themselves.)

d

specifies whether a descriptive header appears at this level.

The creation of any user sort control field may be omitted. If no sort control field is specified, the accounting data is arranged in the following default order:

- Transaction End Date
- Transaction End Time

The maximum length of each user-defined sort control field is eight (8) characters. Sort field definitions of less than eight characters are padded with trailing blanks. In addition to a summary line at each of the five levels, the Wizard Report Writer automatically produces a final totals line at the conclusion of a report.

Print record flag fields allow you to specify which type of detail record will be printed: transaction or program. A 1 indicates print. A blank specifies that this type record should not be printed.

The required records indicator field specifies the type of records needed for a given report when no detail records are to be printed. For example, if you want a report to determine the degree of utilization of the various compilers at the summary level, sort on the program name of each program record. The presence of transaction records is detrimental as well as unnecessary to this report. In this example, to prevent the use of transaction records, and to specify that only program records are to be sorted for this report, an S is coded in the required records indicator field.

Each SORT statement must have a set code.

The following example illustrates a typical SORT statement:

```
     First      Second
   Sort Level   Sort Level
      |          |
      ▼          ▼
      ┌─────────────────────┐
ASORT | 04902AE1 | 02903A21 |
      └─────────────────────┘
```

Report A is sorted on two levels. The more general level is transaction type (begins at position 49 in the Basic Accounting Table), a two-character field, sorted in ascending order. Eject to new page after printing summary lines, and include descriptive headers.

The second sort level is transaction ID (positions 29 through 31 in the Basic Accounting Table), a three-digit field sorted in ascending order. Skip two lines before printing summary lines, and include descriptive headers.

The print ddname suffix field tells the Wizard Report Writer to use different print file DD statements for each report. When this position is nonblank, the character is appended to CAIJS and used as the ddname for the print file for this report. For example, CAIJS1 when the suffix character is a 1.

History Files

The history file ddname field specifies that you want to build an output file with the report. There are two kinds of history files:

- Detail level history file
- Summary level history file

The detail level history file is an archive or data base of all job accounting information (not just the information output on the report being created). It is created either at the transaction or transaction/program level and serves much the same purpose as the raw data, except that a detail level history file is already formatted and merged with data collected by other systems, and all calculations are already performed. A lot of time and resources are saved when the detail level history file rather than the raw data is used as input in subsequent executions.

The summary level history file creates an output file of summary line information. It is useful for creating subsequent, periodic, or year-to-date reports with little effort. The summary level history file can be created at any sort level from 1 to 5. Note that a level 3 summary file, for example, also contains information that may be summarized mathematically for sort levels 1 and 2.

The history level flag field set in the SORT statement defines the kind of history file you want created and at which level. A level 1-5 flag refers to the corresponding sort control level for a summary level history file. A level 6 or 7 flag indicates that detail level history data is to be created at the transaction (6) or the transaction/program (7) level.

SORT Statement Layout

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2	8	Statement Type	SORT
10-17 18-25 26-33 34-41 42-49	8 8 8 8 8	1st Sort Level 2nd Sort Level 3rd Sort Level 4th Sort Level 5th Sort Level	pppllosd must be blank or numeric where **pppllosd:** ppp: Position of sort field from Basic Accounting Table ll: Length of sort field (max 8) o: Order of sort field A = ascending (default) D = descending s: Summary Line Print Option: see table below d: Description Header Flag: = suppress printing 1= print Description Headers for this level
50 51	1 1	Transaction Flag Program Flag	= suppress printing 1= print records
52-53	2	Reserved	
54	1	Required Records Indicator	J: Transaction records only S: Program records only
55-62	8	History File DDName	= No history file xxxxxxxx = History file ddname
63	1	History Level Flag	1-5 = Summary level history file 6 = Transaction level hist file 7 = Transaction/Program hist file
64	1	Print DDName Suffix	If nonblank, append to ddname of 'PRINT' and use that ddname for the report output
65-80	16	Reserved	Not used

Statement Position	Field Length	Field Name	Notes
Summary Line Print Option Table N or - No summary print for this level 1, 2, or 3- Single, double, or triple space before printing summary E* - Eject to new page after printing summary P* - Eject to new page and reset pg. no. after printing summary * If either E or P is specified for the first level summary line, then grand totals print on a page by themselves.			

TITLE Statement

This statement, identified by the statement type TITLE, is optional. It provides a mechanism by which you may override the predefined default titles of output data elements available for display. Each TITLE statement overrides one specific element title. Multiple statements may be used as required.

The data element ID field specifies which entry in the Output Data Elements Table is to have its title changed.

The top line title field is a twenty (20) character field available to you to override the top line of data element titles. The bottom line title field is used to override the bottom line of titles. User-defined titles may not exceed the output length of the corresponding data element as defined in the table.

TITLE statements with a set code in statement position 1 apply to that report only. TITLE statements can be made to override the standard titles for all reports that use the affected data elements by leaving statement position one blank.

Statement Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	TITLE
10-11	2	Data Element ID	
12-31	20	Top Line Title	
32-51	20	Bottom Line Title	

Data Element Directory

The IMS Interface translated data is in a format that the Wizard Report Writer recognizes as a level-7 summary record. The IMS Interface summary record exists only to enable the Wizard Report Writer to generate IMS Interface reports by using the same powerful reporting capabilities as the Job Accounting Report System batch reporting.

There are three main reporting functions:

- data accumulation
- sorting
- displaying data elements

Because each of these functions treats IMS data in a manner related to the function (such as displaying data elements deals with an external data element format), the IMS Interface summary record is shown in three ways in this directory: the physical summary record format, a Basic Accounting Table, and an Output Data Elements Table.

Summary Record Format

This is the format of IMS Interface data as input to the Wizard Report Writer.

You may change IMS Interface data within the summary record using exits to the Wizard Report Writer. You may also add data elements to the summary record for special application-related reporting.

If you change or add data within the summary record, the format of the record must be maintained exactly as specified in this table. The Wizard Report Writer operates on all data elements, and does not treat records that have improper data (such as EBCDIC data in a packed decimal field), or may give unexpected results (such as unnoted truncations of printed data).

The following table shows the format of the summary record. The final column provides the corresponding Output Data Element ID for the Summary Record.

IMS Interface Summary Record Format:

Field Name	Len	Displ	Mode	Notes	Output DE ID
CPU Identification	1	0	EBCDIC		57
Reserved	2	1			
Date Record Written	6	3	EBCDIC	YYMMDD	60
Time Record Written	6	9	EBCDIC	HHMMSS	61

Field Name	Len	Displ	Mode	Notes	Output DE ID
Job Name	8	15	EBCDIC		04
Reserved	2	23			
Transaction Count	2	25	Binary		56
Processing ID	1	27	EBCDIC	C	03
Transaction ID	8	28	EBCDIC		10
Trans Stop Time	6	36	EBCDIC	HHMMSS	12
Trans Stop Date	6	42	EBCDIC	YYMMDD	06
Trans Type	2	48	EBCDIC	Message Region/Batch Message Region Transaction Indicator	07
Reserved	6	50			
User ID	8	56	EBCDIC		58
Reserved	12	64			
User Information	16	76	EBCDIC		08
Abend Code	4	92	EBCDIC		09
Reserved	2	96			
Step Name	8	98	EBCDIC		11
PSB Name	8	106	EBCDIC		05
Reserved	18	114			
Total Message Gets	6	132	Packed		18
Reserved	6	138			
Total DL/I Operations	6	144	Packed		19
Total Message Inserts	6	150	Packed		20
Reserved	14	156			
Elapsed Time	6	170	Packed	xxxxxvxxxxxc minutes	25 65 90
Application CPU Time	6	176	Packed	xxxxxvxxxxxc minutes	26 66 91
Reserved	37	182	Packed		

Field Name	Len	Displ	Mode	Notes	Output DE ID
Terminal Messages	7	219	Packed		34
Reserved	7	226			
GU/GHU DLI Counts	7	233	Packed		37
GN/GHN DLI Counts	7	240	Packed		38
GNP/GHNP DLI Counts	7	247	Packed		39
Total DLI Gets	7	254			40
Reserved	34	261			
Group Code #1 Group Code #2 Group Code #3	1 1 1	295 296 297	EBCDIC	Blank unless filled by grouping feature	84 85 86
Reserved	2	298			
Logical terminal ID	8	300	EBCDIC		58
Reserved	12	308			
ISRT DLI Count	7	320	Packed		A1
DLET DLI Count	7	327	Packed		A2
REPL DLI Count	7	334	Packed		A3
Reserved	87	341			
Priority	3	428	EBCDIC		B6
Storage Protect Key	3	431	EBCDIC		B7
Reserved	3	434			
Time fields are recorded in 100000ths of a minute.					

CA JARS IMS Basic Accounting Table

IMS Interface summary record data is used by the Wizard Report Writer for several report control functions other than the actual display of data. Such functions as multilevel sort control, data grouping, and record selection/rejection are driven from the summary record data as presented in the Basic Accounting Table (BAT).

The following table shows the Basic Accounting Table format and pertinent accounting characteristics of IMS Interface summary record data. The final column provides the corresponding Output Data Element ID for the IMS Basic Accounting Table.

IMS Interface Basic Account Table:

BAT Field Position	BAT Field Length	Format Indicator	Field Name	Notes	Output DE ID
1	1	a	CPU Identification		57
2-3	2	-	Reserved	Nonblank characters	
4-9	6	a	Date Record Written	YYMMDD	60
10-15	6	a	Time Record Written	HHMMSS	61
16-23	8	a	Job Name		04
26-27	2	x	Transaction Count	Will be program use count in program records for basic mode collection	56
28	1	a	Processing ID	C	03
29-36	8	a	Transaction ID		10
37-42	6	a	Trans Stop Time	HHMMSS	12
43-48	6	a	Trans Stop Date	YYMMDD	06
49-50	2	a	Trans Type	Message/Batch Message Region Transaction Indicator	07
51-56	6	-	Reserved		
57-76	20	a	USERID	USERID present only if user has signed on to IMS through RACF, CA TOP SECRET or other security system	58
77-92	16	a	User Information		08

BAT Field Position	BAT Field Length	Format Indicator	Field Name	Notes	Output DE ID
93-96	4	a	Abend Code		09
97-98	2	-	Reserved		
99-106	8	a	Step Name		11
107-114	8	a	PSB Name		05
115-132	18	-	Reserved		
133-138	6	p	Total Message Gets		18
139-144	6	-	Reserved		
145-150	6	p	Total DL/I IO counts		19
151-156	6	p	Total Message Inserts		20
157-170	14	-	Reserved		
171-176	6	p	Elapsed Time	xxxxxxxvxxxxxc minutes	25, 65, 90
177-182	6	p	Application CPU Time	xxxxxxxvxxxxxc minutes	26 66, 91
183-219	37	-	Reserved		
220-226	7	p	Terminal Messages		34
227-233	7	-	Reserved		
234-240	7	p	GU/GHU DLI Counts		37
241-247	7	p	GN/GHN DLI Counts		38
248-254	7	p	GNP/GHNP DLI Counts		39
255-261	7	p	Total DLI Gets		40
262-295	34	-	Reserved		
296 297 298	1 1 1	a a a	Group Code #1 Group Code #2 Group Code #3	Blank unless filled by grouping feature	84 85 86

BAT Field Position	BAT Field Length	Format Indicator	Field Name	Notes	Output DE ID
299-300	2	-	Reserved		
301-308	8	a	Input logical terminal ID	IMS 1.3 and above, MPPs only. Blank or BMPs.	A0
309-320	12	-	Reserved		
321-327	7	p	ISRT DLI Count		A1
328-334	7	p	DLET DLI Count		A2
335-341	7	p	REPL DLI Count		A3
342-428	87	-	Reserved		
429-431	3	a	Priority		B6
432-434	3	a	Storage Protect Key		B7
435-437	3	-	Reserved		
* Format Indicator: a=alphanumeric, P=packed decimal, X=hexadecimal binary					

CA JARS IMS Output Data Elements Table

IMS Interface summary record data elements are converted into printable EBCDIC formats for report printing. The Output Data Elements Table (ODE) contains all the print images of the IMS Interface data elements. You can examine or modify data elements within this table before the printing of every line by use of a Wizard Report Writer type 3 exit. See the *CA JARS User Guide.*

This table also contains several printable data elements that do not represent direct conversions of data elements within the IMS Interface summary record. These calculated data elements are also available for examination or modification by user exit logic.

The following Output Data Elements Table shows individual data element formats and edit pictures, and the displacements of printable data elements within the Wizard Report Writer table. The final column provides the corresponding Output Data Element ID for the IMS Output Data Elements Table.

Interface Output Data Elements Table:

Output Length	Table Displ	Data Element Name	**STD	Notes	Output DE ID
8	0	Control Field	S	Based on SORT statement	01
20	8	Description Field	S	Based on DESCRIPT statement	02
1	28	Processing ID	T D	C	03
8	29	Job Name	T D		04
8	37	PSB Name	D		05
8	45	TX Stop Date	T D	YY/MM/DD	06
2	53	TX Type	T D	Message/Batch	07
16	55	User Information Field	T D	From User Accounting Table	08
4	71	Abend Code	T D		09
8	75	Transaction ID	T D		10
8	83	Step Name	D		11
8	91	TX Stop Time	T D	HH.MM.SS Initiation Time	12
9	123	Total Message Gets	S T	99999,999	18
10	132	Total DI/I IO counts	S T	999999,999	19
9	142	Total Message Inserts	S T	99999,999	20
10	172	Elapsed Time	S T D	9999.99999	25
10	182	Application CPU TIME	STD	9999.99999 minutes	26
10	212	Processor Time	S T D	9999.99999 minutes	29

Output Length	Table Displ	Data Element Name	**STD	Notes	Output DE ID
10	232	Total Time	S T D		31
10	254	Terminal Messages	S T D		34
10	284	GU/GHU DLI Counts	S T D		37
10	294	GN/GHN DLI Counts	S T D	999999,999	38
10	304	GNP/GHNP DLI Counts	S T D		39
10	314	Total DLI Gets	S T D		40
8	332	Percent of Total Charge*	S T D	999.999S	42
9	340	Reserved			43
11	349	Processor Charge*	S T D	$999,999.99	44
13	371	Total Charge*	S T D	$9999,999.99S	46
10	384	Distributed Charge*	S T D	$9,999,999	47
11	403	File I/O Charge	S T	$999,999.99	54
6	424	Transaction Count	S T D	999999	56
1	430	CPU Identification	T D		57
20	431	USERID	T D		58
8	453	Date Record Written	T D	YY/MM/DD	60
8	461	Time Record Written	T D	HH.MM.SS	61
10	493	Elapsed Time	S T D	MMMM.SS.60	65
10	503	Application CPU Time	S T D		66
10	533	Processor Time*	S T D	MMMM.SS.60	69
10	553	Total Time*	S T D		71

Output Length	Table Displ	Data Element Name	**STD	Notes	Output DE ID
12	606	Credit Amount	S T D	$9999,999.99 based on CREDIT statements	79
12	618	Debit Amount	S T D	$9999,999.99 based on DEBIT statements	80
10	630	Budget Amount	S T D	$9,999,999	81
13	640	Over-Under Budget	S	$9999,999.99 based on BUDGET statements	82
6	653	Percent Budget Spent	S	9999.9	83
1 1 1	659 660 661	Group Code #1 Group Code #2 Group Code #3	T D T D T D	Blank unless filled by grouping feature	84 85 86
8	684	Elapsed Time-Avg	S T D	HH.MM.SS	90
8	692	Appl. CPU-Time Avg	S T D		91
10	714	Blank Spaces	S T D	May be used to adjust print line	99
8	724	Logical Terminal ID	T D		A0
10	732	ISRT DLI Counts	S T D	999999,999	A1
6	742	DLET DLI Counts	S T D		A2
7	752	REPL DLI Counts	S T D		A3
3	865	Priority	T D		B6
3	868	Storage Protect Key	T D		B7

**STD = Summary, Transaction, and Detail levels, respectively.

* Data element not available unless RATE parameters specified for report.

Chapter 5: The Network Accounting Interface

The Network Accounting Interface provides a mechanism for:

- Accounting for network system usage
- Adding network charges to your reports

The data used to assess and charge network cost is obtained from either CA Mazdamon or IBM NETVIEW. This guide describes how to manipulate IBM NETVIEW and CA Mazdamon data through CA JARS and CA JARS Wizard.

Note: The Network Accounting Interface uses the Wizard Report Writer to read the IBM NETVIEW and CA Mazdamon session file extract records. Two CA JARS Wizard glossaries, JR71CBF and JR71CB2, are provided for this purpose. Two sample reports, created using CA JARS Wizard, are also provided with the interface.

This section contains the following topics:

Daily Processing for CA Mazdamon

The CA Mazdamon daily run can be set to produce an output file called the *session file.* CA Mazdamon users must activate the CA JARS switch in the CA Mazdamon Daily2 routine in order to receive the session file output. This file is optional output for the CA Mazdamon daily summary data base. There is one record per user session that shows the network activity for that user in terms of messages and characters transmitted. On a daily basis, these session records are written to a new generation of this data set and accumulated until the end of the billing period.

Daily Processing for IBM NETVIEW

The data used to assess and charge IBM NETVIEW cost is obtained from the session monitor records written to the SMF log file as type 39 records. To record data that the session monitor collects, see the *IBM NETVIEW Installation and Administration Guide.*

Once the SMF type 39 records are written to the SMF log file, CA JARS can be coded to extract these records and create a new generation of the session file during a single pass of the SMF data. The session file produced by IBM NETVIEW has the same format as the file produced by CA Mazdamon Daily2 run.

The SMF type 39 log records are processed by the CA JARS NETVIEW extract program (JSZT0000). An optional feature of the report writer is activated either by coding a **Y** (yes) in position 41 of the OPTION statement. or by coding a **Y** (yes) in positions 10 and 46 of the EXTDATA statement. The exit produces one required file, ddname CAIJMSFX. This file contains the IBM NETVIEW accounting extract for subsequent processing by the Wizard Report Writer. All IBM NETVIEW accounting data elements from the SMF record are included in the extract record. Therefore, you can use it for more than just chargeback accounting.

The CAIJMSFX file has the following characteristics:

```
RECFM=FB
LRECL=200
BLKSIZE=4000 (default)
```

However, the DD statement can be changed to any acceptable BLKSIZE desired.

In addition, EXTDATA records that can be processed by CA EARL and CA Easytrieve can also be generated. To do this you must include an EXTDATA card in the CA JARS control statements, and have columns 10 and 46 set to Y. This will generate NETVIEW EXTDATA records and write them to the CA JARS Accounting file (CAIJSACT).

For EXTDATA production, it is not required that the IBM NETVIEW extract option be set on the OPTION statement (column 41 set to Y).

Operating Instructions

Two reports are generated by the interface:

JSINET1:

shows how debit records can be created. These debit records are read in a product run that reports on charges by account. Network usage charges are added to the other charges that are calculated on an account basis.

JSINET2:

shows network usage by terminal ID.

JSINET3

provides sample control statements for processing of IBM NETVIEW data into CA JARS.

Each report and the CA JARS Wizard glossary for the interface are described on the following pages.

The source code for both of these CA JARS Wizard programs is distributed in the AAJ1OPTN distribution library and is copied to CAJROPTN at APPLY time by SMP. You are encouraged to use these as samples and develop your own CA JARS Wizard applications against either CA Mazdamon or IBM NETVIEW data. However, you should avoid modifying the distributed source other than via official maintenance.

JSINET1: Debit Record Creation

In JSINET1, CA JARS Wizard is used to:

- Get accounting information for each network user using their terminal ID and a CA JARS Wizard facility called file matching. This involves CA JARS Wizard searching a second file to find the accounting information associated with each terminal ID. Complete information on file matching can be found in the *Wizard Reference Guide*.
- Calculate the charge for the user. In this sample the charge is based on number of characters and number of messages transmitted to and from the terminal. Because CA JARS Wizard has a flexible language for computing new fields, the charge can be based on anything in the record. for instance, a surplus could be charged for network usage during peak hours.
- Sum the charges for the accounts and print a report that shows the charge by account.
- Write a debit record for each account. This debit record contains the account information and the calculated charge. All debit records are read in a product run that reports on charges by account. The charge for using the network is added to the other charges that is calculated on an account basis.

JSINET1 executes on the assumption that you have a secondary file containing one record for each unique terminal ID at your site. Each record in this secondary file also contains the necessary debit record accounting information. Report JSINET1 assumes that the Terminal ID is in positions 1 to 8 and the accounting information is in positions 10 to 25, as follows:

```
         1         2    2
1........0.........0....5
terminal accounting info.
ID
```

If you do not have such a file, you must set one up or alter the JSINET1 control statements accordingly.

A sample of this file is located in CAJROPTN member JSINET1.

To execute JSINET1, set up the necessary JCL for the run. Be sure to include DD statements for the following ddnames:

- CAIJWI (your session file)
- CAIJWI2 (the secondary file containing account information)
- CAIJWOP (the output file for the debit records)

The sample report produced with the debit record output file when JSINET1 is shown on the next page.

Sample Report - JSINET1

JSINET1 Report - charges by account number.:

```
CA                                                        PROGRAM LISTING
CA JARS Wizard 9710JW230
                                                   TOTAL NETWORK CHARGES BY ACCOUNT                            28 OCT 1998 PAGE   1

                                                            CHARACTERS          MESSAGES     TERMINAL     APPLICATION
                    ACCOUNT            TOTAL CHARGE        TRANSMITTED       TRANSMITTED     ID           ID
               ----------------     --------------     --------------     --------------     --------     -----------

               ACCOUNTING               $39,707.04         721,759.00              82.00
               DEVELOPMENT             $177,008.20       3,215,321.00           1,319.00
               SALES                    $12,076.13         219,429.00              60.00
                     .                       .                  .                   .           .             .
                     .                       .                  .                   .           .             .
                     .                       .                  .                   .           .             .
                                                   TOTAL NETWORK CHARGES BY ACCOUNT                           28 OCT 1998 PAGE   13

                                                            CHARACTERS          MESSAGES     TERMINAL     APPLICATION
                    ACCOUNT            TOTAL CHARGE        TRANSMITTED       TRANSMITTED     ID           ID
               ----------------     --------------     --------------     --------------     --------     -----------

  GRAND TOTAL                       $11,375,991.62     206,699,314.00          59,992.00
CA                                                         EXECUTION STATISTICS
CA JARS Wizard 9710JW230

 CAJW200I     1067 SORTED INPUT           9:20:55 START
 CAJW202I      557 OUTPUT RECORDS         9:20:59 END
 CAJW205I     1067 PRE-SORT RECORDS           :04 DURATION
 CAJW206I     1067 SELECTED RECORDS
 CAJW211I       21 MATCHED RECORDS
 CAJW212I     4268 COMPUTATIONS
 CAJW213I       16 FILE 2 RCDS READ
 CAJW214I       21 FILE 2 MATCHED
 CAJW215I     1046 FILE 2 MISSING
 CAJW216I      557 LEVEL 1 BREAKS
 CAJW217I       98 SORT RCD LENGTH
 CAJW219I    88960 ADDTL CORE USED
                             FORMAT OF NEW RECORD
                   POSITION BYTES FORMAT       DESCR
               001   1         1  CHAR         OFILL1
               002   2-  9     8  CHAR         ODEBIT
               003  10         1  CHAR         OCPUID
               004  11- 18     8  CHAR         OTERMINALID
               005  19- 34    16  CHAR         OACCT
               006  35- 40     6  CHAR         ODATE
               007  41- 48     8  CHAR         OJOB
               008  49- 54     6  CHAR         OTIME
               009  55- 74    20  CHAR         OPROGRAMMER
               010  75- 80     6  PACKED .2    ODEBITAMT
```

JSINET1 Control Statements:

```
PARAMETER XREF NOPC
*
DEFINE OFILL1(1)(C) = ' '
DEFINE ODEBIT(8)(C) = 'DEBIT   '
DEFINE OCPUID(1)(C) = ' '
DEFINE OTERMINALID(8)(C) = ' '
DEFINE ODATE(6)(C) = ' '
DEFINE OJOB(8)(C) = 'NETWORK '
DEFINE OTIME(6)(C) = ' '
DEFINE OPROGRAMMER(20)(C) = ' '
DEFINE ODEBITAMT(6)(P)(.2) = 0
*
DEFINE NETMESSAGES(6)(P)(.2) = 0
DEFINE NETCHARACTERS(6)(P)(.2) = 0
*
INPUT JR70CBF
SELECT REC/TYPE EQ '8'
*
INPUT FILE KEY = 2CC1-8 MATCH = TERMINAL/ID TABLE=2CC10-25 LIST
COMPUTE(P) IF MATCHED THEN OACCT(C)(16) EQ 2CC10-25 ELSE
                           OACCT(C)(16) EQ TERMINAL/ID
*
COMPUTE NETMESSAGES = 8.MESS/TRANS/IN + 8.MESS/TRANS/OUT
COMPUTE NETCHARACTERS = 8.CHAR/TRANS/IN + 8.CHAR/TRANS/OUT
*
COMPUTE ODEBITAMT = (NETMESSAGES * .1255) + (NETCHARACTERS * .055)
COMPUTE ODEBITC(6)(N)(.2)=ODEBITAMT
*
SORT OACCT
BREAK OACCT
HEADING1C TOTAL NETWORK CHARGES BY ACCOUNT
LIST(SUM) OACCT(DL) 'ACCOUNT',
          ODEBITAMT($) 'TOTAL CHARGE',
          NETCHARACTERS 'CHARACTERS/TRANSMITTED',
          NETMESSAGES 'MESSAGES/TRANSMITTED',
          TERMINAL/ID,A.APPLICATION/ID
*
OUTPUT FILE,RECFM = FB,R = 80,B = 800,
   ITEM = OFILL1,
   ODEBIT,
   OCPUID,
   OTERMINALID,
   OACCT,
   ODATE,
   OJOB,
   OTIME,
   OPROGRAMMER,
   ODEBITC
```

JSINET1 Execution Description

The control statements used in JSINET1 are described below. Complete descriptions of all CA JARS Wizard control statements can be found in your *CA JARS Wizard Reference Guide*.

PARAMETER

The PARAMETER control statement specifies options for a CA JARS Wizard run.

XREF

creates a cross-reference of the data fields used in the run and the statements they are found in. This cross-reference listing is printed in addition to the control statements and the report for the run.

NOPC

suppresses the CA JARS Wizard error handling routine.

INPUT

INPUT statements are used to identify the CA JARS Wizard glossary and/or the input files for the run. In JSINET1 two INPUT statements are given:

- The first INPUT statement lists the JR70CBF glossary as the glossary for the primary input file for the run.
- The second INPUT statement describes the secondary input file. Secondary files are only used when file matching is to be performed.

KEY = 2CC1-8

defines the matching key field for the secondary file. Here, the first eight positions for each record are the matching key.

MATCH =

TERMINAL/ID

designates the terminal ID field of the primary input file as its matching key field.

TABLE

indicates that the secondary input file is a table file to be read completely at the start of the run. Therefore, the entire file is available for searching during the run. The field in positions 10 through 25 of the secondary file contains the account information.

The notation 2CC10-25 serves two purposes:

- Identifies the location of a data field in the secondary file
- Serves as a name for the field

SELECT

The SELECT statement identifies the record type of the Network Accounting Billing Records.

DEFINE

Eleven DEFINE statements are given in JSINET1. Each defines a field for the run. All of the defined fields are initialized each time a new record is processed. The first nine DEFINE statements define fields for the debit record. There are:

1. OFILL1:

One-byte filler field, initialized as a blank.

2. ODEBIT:

Eight-byte field, initialized as DEBIT. This field identifies the CA JARS record as a DEBIT record.

3. OCPUID:

One-byte field, initialized as a blank, and used to identify the CPU.

4. TERMINALID:

Eight-byte field, initialized as blanks, and used for terminal identification.

5. ODATE:

Six-byte field, initialized as blanks, and used for the date (YYMMDD).

6. OJOB:

Eight-byte field, initialized as blanks, and used for the job name.

7. OTIME:

Six-byte field, initialized as blanks, and used for the time (HHMMSS).

8. OPROGRAMMER:

20-byte field, initialized as blanks, and identifying the programmer.

9. ODEBITAMT:

Six-byte field, initialized to zero, and used for the debit amount.

10. NETMESSAGE:

Six-byte field, used to hold the sum of the network messages transmitted.

11. NETCHARACTERS:

Six-byte field, used to hold the sum of the network characters transmitted.

COMPUTE

Four COMPUTE statements are executed in JSINET1.

The first COMPUTE statement evaluates the file matching between the primary input file and the secondary file. It also defines a new field OACCT(16 bytes) and assigns a value to it based on the results of file matching. If a match occurs on the terminal/ID of a primary input file record and a secondary input file record, OACCT is assigned the value of the account information in positions 10 to 25 of the secondary file. Otherwise, OACCT is assigned a value of the terminal/ID.

Notice the (P) suffix code appended to the first COMPUTE statement. This code indicates that the COMPUTE should take place before the primary input file records are sorted. This is necessary because the SORT occurs on the OACCT field.

The remaining three COMPUTE statements simply assign values to fields: NETMESSAGES, NETCHARACTERS, and OTERMINALID. OTERMINALID is assigned the value of TERMINAL/ID in the primary input record. NETMESSAGES and NETCHARACTERS are calculated from other fields in the primary input record.

SORT

The SORT statement identifies the sequence in which the input records should be sorted prior to processing. Here the SORT is performed on OACCT (the account information). Note that the OACCT field is created and assigned a value in the COMPUTE(P) statement before the SORT.

BREAK

BREAK statements define logical groups of records. Here data is split into groups by OACCT. Records with the same account information are grouped together.

A SORT statement must be included in a CA JARS Wizard run when a BREAK statement is used. The fields specified in the BREAK statement must be included in the SORT statement and must be specified in the same order as the SORT statement.

HEADING

HEADING specifies a title for the report. Here the title for the report (created in addition to the output file) is TOTAL NETWORK CHARGES BY ACCOUNT.

LIST(SUM)

A summary listing is requested along with the output file. Each line of the summary listing list debit information for a different account. The LIST(SUM) statement identifies the data fields to be summarized and printed. This data includes the:

- Account identifier (information)
- Calculated total charge
- Calculated total characters
- Total messages sent

OUTPUT

One debit record is produced for each unique account. All records are written to the file identified by ddname CAIJWOP. The OUTPUT statement lists the fields to be included in each debit record.

Sample Report - JSINET2

JSINET2 is a sample report showing how you can use the JR70CBF glossary and your CA Mazdamon or IBM NETVIEW session file data to create CA JARS reports. A sample of the output from JSINET2 is shown below:

JSINET2 Report:

```
CA                                                      PROGRAM LISTING
CA JARS Wizard 9710JW230

                                                   NETWORK USAGE BY TERMINAL/ID                              27 OCT 1998 PAGE    1

                    SES            SES                       CHAR        CHAR        MESS        MESS
                  START          START      TERMINAL        TRANS       TRANS       TRANS       TRANS      APPLICATION
                   DATE           TIME      ID                 IN         OUT          IN         OUT      ID
               -----------      HH:MM:SS    --------      -------     -------     -------     -------      -----------

               23 OCT 1994      08:00:00    ACXCW0A0            8         806           2           6
               23 OCT 1994      16:30:00    ACXCW0A0       15,389     829,323           1           2         A2K
               -----------                                -------     -------     -------     -------
TERMINAL ID TOTAL                           ACXCW0A0       15,397     830,129           3           8

               23 OCT 1994      10:00:00    ACXDW0A0        4,322      24,612          10          19
               23 OCT 1994      16:00:00    ACXDW0A0        1,899      56,496           2           4         A2K
               -----------                                -------     -------     -------     -------
TERMINAL ID TOTAL                           ACXDW0A0        6,221      81,108          12          23

                    .              .             .              .         .               .           .          .
                    .              .             .              .         .               .           .          .
                    .              .             .              .         .               .           .          .
                    .              .             .              .         .               .           .          .
               23 OCT 1994      15:40:00    XFF0W0A0           33         427           4           5         MVS15
               23 OCT 1994      15:40:00    XFF0W0A0       11,361     693,439           2           1         TSO
               -----------                                -------     -------     -------     -------
TERMINAL ID TOTAL                           XFF0W0A0       11,394     693,866           6           6

               23 OCT 1994      16:10:00    XFNCW0A0       58,764     386,368           2           2
               -----------                                -------     -------     -------     -------
TERMINAL ID TOTAL                           XFNCW0A0       58,764     386,368           2           2

               23 OCT 1994      12:40:00    XF38W0A0          368     122,506           2           2
               -----------                                -------     -------     -------     -------
TERMINAL ID TOTAL                           XF38W0A0          368     122,506           2           2

               23 OCT 1994      16:10:00    XX01W0A0           31          93           1           2         MVS15
               -----------                                -------     -------     -------     -------
TERMINAL ID TOTAL                           XX01W0A0           31          93           1           2

  GRAND TOTAL                                          15,484,328 191,214,986      28,723      31,269
CA                                                   EXECUTION STATISTICS
CA JARS Wizard 9710JW230

 CAJW200I     1067 SORTED INPUT          14:50:28 START
 CAJW203I     1067 LINES PRINTED         14:50:57 END
 CAJW205I     1067 PRE-SORT RECORDS           :29 DURATION
 CAJW206I     1067 SELECTED RECORDS
 CAJW216I      563 LEVEL 1 BREAKS
 CAJW217I       71 SORT RCD LENGTH
 CAJW219I    80784 ADDTL CORE USED
```

```
JSINET2 Control Statements:
PARAMETER XREF NOPC




INPUT JR70CBF
SELECT REC/TYPE EQ '8'
SORT TERMINAL/ID,SES/START/DATE,SES/START/TIME
BREAK TERMINAL/ID
*
HEADING1C NETWORK USAGE BY TERMINAL/ID
LIST SES/START/DATE,SES/START/TIME(HS),TERMINAL/ID,
          8.CHAR/TRANS/IN,8.CHAR/TRANS/OUT,
          8.MESS/TRANS/IN,8.MESS/TRANS/OUT,
          8.APPLICATION/ID
```

JSINET2 Execution Description

The control statements used in JSINET2 are described below. All CA JARS Wizard control statements are fully documented in your *CA JARS Wizard Reference Guide*.

PARAMETER

The PARAMETER control statement specifies options for a CA JARS Wizard run. XREF creates a cross-reference of the data fields used in the run and the statements they are found in. This cross-reference listing is printed in addition to the control statements and the report for the run. NOPC suppresses the CA JARS Wizard error handling routine.

INPUT

This input statement list the JR70CBF glossary as the glossary for the primary input file for the run.

SELECT

The SELECT statement identifies the record type of the Network Accounting Billing Records.

SORT

The SORT statement identifies the sequence in which the input records should be sorted prior to processing. Here the sort is performed on TERMINAL/ID, SES/START/DATE, and SES/START/TIME.

BREAK

BREAK statements define logical groups of records. Here data is split into groups by user ID. Records with the same TERMINAL/ID are grouped together.

HEADING

HEADING specifies a title for the report. Here the title for the report (created in addition to the output file) is: NETWORK USAGE BY TERMINAL ID.

LIST

The LIST statement identifies the data element to be printed. This includes:

- Session start date
- Session start time
- Terminal ID
- Number of characters transmitted in
- Number of characters transmitted out
- Number of messages transmitted in
- Number of messages transmitted out
- Application ID

CA Mazdamon and IBM NETVIEW Data Elements

Name	Pos	Len	Format	Description
RCD DESCRIPTOR	1	4	B	Record length from RDW
SMF/ID	5	4	C	SMF ID
SES/START/DATE	9	3	P	Session start date yyddd
SES/START/TIME	12	8	P	Session start time
GREG/DATE	23	6	C	Start date yymmdd
TERMINAL/ID	29	8	C	Terminal ID (session ID)
START/DATE	37	3	P	Start Date yyddd
START/TIME	40	8	P	Start time
STOP/DATE	48	3	P	Stop date yyddd
STOP/TIME	51	8	P	Stop Time

Name	Pos	Len	Format	Description
CONNECT/TIME	59	8	P	Session Connect Time
REC/TYPE	83	1	C	JR70CBF Record Type ('8')
SUB/REC/TYPE	84	1	C	Record Subtype M=CA Mazdamon N=IBM NETVIEW
NET/START/TIME	88	8	P	Start Time
8.APPLICATION/ID	118	8	C	Application ID
8.CHAR/TRANS/IN	128	4	B	Number of Char Transmitted In
8.CHAR/TRANS/OUT	132	4	B	Number of Char Transmitted Out
8.RE TRANS/IN	136	4	B	Number of Char Retransmitted In
8.RE TRANS/OUT	140	4	B	Number of Char Retransmitted Out
8.MESS/TRANS/IN	144	4	B	Number of Messages Transmitted In
8.MESS/TRANS/OUT	148	4	B	Number of Messages Transmitted Out
8.NETWORK/ACCT	152	48	C	Account Number of Network User

EXTDATA Reports

There are sample CA Earl and CA Easytrieve reports that will process the NETVIEW Interface EXTDATA records.

Note: The EXTDATA record layout is described in the chapter "EXTDATA Reporting" in the *User Guide.*

```
OPTION LIST OFF
NOTE *******************************************************************
NOTE *  REPORT ID:      ERXTN001                                       *
NOTE *  REPORT NAME:    NETVIEW SESSION DETAIL REPORT                  *
NOTE *                                                                 *
NOTE *  DESCRIPTION:    THIS REPORT ITEMIZES ALL NETVIEW SESSIONS THAT*
NOTE *                  APPEAR IN A CA JARS ACCOUNTING FILE.*
NOTE *                  THE DATA ITEMS REPORTED ON IN THE REPORT ARE  *
NOTE *                  START AND END TIME, THE LINE USE TIME, THE    *
NOTE *                  TERMINAL AND APPLICATION ID, AS WELL AS THE   *
NOTE *                  BYTES TRANSMITTED EITHER WAY.                  *
NOTE *                                                                 *
NOTE *  RECORD TYPES:   MRXTHDR,                                       *
NOTE *                  MRXTSIEN                                       *
NOTE *                                                                 *
NOTE *  EXTDATA RECORD: SIEN                                           *
NOTE *                                                                 *
NOTE *  MACROS:                                                        *
NOTE *******************************************************************
OPTION PRINTER = 132
OPTION PAGE = 60
OPTION PRECISION = ALL
OPTION CPAGE = 60
HISTIN:  FILE JARS RECORD=3697
  DEF INAREA                  1-3697  X
  COPY MRXTHDR
  COPY MRXTSIEN
  COPY JARRAY
  COPY DEFDATE1
DEF SDATE (X 8) = NONE   'START' 'DATE'
DEF EDATE (X 8) = NONE   'END' 'DATE'
NOTE *******************************************************************
NOTE * SELECTING FROM HISTORY FILE EXTDATA, SPECIFICALLY SIEN          *
NOTE *******************************************************************
!
IF     PROCID NOT = ':' OR
       EXTTYPE NOT = 'SIEN'
       THEN GOTO START
ENDIF
!
 SET CAI_DATE = EXTSIEN_START_JDATE
```

```
 PERFORM DATE_CONVERSION
 SET SDATE = CAI_OUTDATE
 SET CAI_DATE = EXTSIEN_END_JDATE
 PERFORM DATE_CONVERSION
 SET EDATE = CAI_OUTDATE
!
DATE_CONVERSION: PROC
NOTE *****************************************************************
NOTE *   THIS PROCEDURE CONVERTS A JULIAN DATE TO A GREGORIAN DATE.   *
NOTE *****************************************************************
 SET CAI_OUTDATE = '         '
 GOTO CAI_NODATE (CAI_DAYS = 0)
 SET CAI_R1 = 1
 SET CAI_NDAYS = CAI_DAYS
 SET CAI_DTAB (/2/) = 28
 SET C_YEAR (3.0) = (CAI_YEAR / 4)
 SET C_YEAR  = C_YEAR * 4
 IF C_YEAR = CAI_YEAR THEN
     SET CAI_DTAB (/2/) = 29
 ENDIF
 SET CAI_OUTDATE = '00/00/00'

 CAI_DATE_LOOP:
         IF CAI_NDAYS < 0 THEN GOTO CAI_LOOP_END
         ENDIF
         IF CAI_NDAYS = 0 THEN GOTO CAI_LOOP_END
         ENDIF
         IF CAI_R1 > 12 THEN GOTO CAI_LOOP_END
         ENDIF
         SET CAI_NDAYS = (CAI_NDAYS - CAI_DTAB(/CAI_R1/))
         SET CAI_MNTH = CAI_R1
         SET CAI_R1 = CAI_R1 + 1
         GOTO CAI_DATE_LOOP
  CAI_LOOP_END:
  SET CAI_OUTDD = (CAI_NDAYS + CAI_DTAB(/CAI_MNTH/))
  SET CAI_OUTMM = CAI_MNTH
  SET CAI_OUTYY = CAI_YEAR
  CAI_NODATE:
ENDPROC
!
NOTE *****************************************************************
NOTE *                REPORT PROCESSING SECTION                       *
NOTE *****************************************************************
!
REPORT 'NETVIEW SESSION DETAIL'
TITLE ' '
TITLE @1 'REPORT ID: ERXTN001'     @54 'SYSTEM ID:' SID
TITLE @1 'SOURCE   : SMF 39'       @54 '  ACCOUNT:' EXTSIEN_ACCOUNTING
TITLE ' '
!
```

```
CONTROL    (SID) (EXTSIEN_ACCOUNTING) SKIP
           EXTSIEN_START_JDATE EXTSIEN_START_TIME
!
PRINT
      @1 ' '
         SDATE
         EXTSIEN_START_TIME
         EDATE
         EXTSIEN_END_TIME
         EXTSIEN_LINEUSE_TIME
         EXTSIEN_TERM_ID
         EXTSIEN_APPL_CODE
         EXTSIEN_BYTES_IN
         EXTSIEN_BYTES_OUT
END

LIST OFF
*****************************************************************
*  REPORT ID:      EZXTN001                                     *
*  REPORT NAME:    NETVIEW DETAIL REPORT                        *
*  DESCRIPTION:    THIS REPORT ITEMIZES ALL NETVIEW SESSIONS THAT*
*                  APPEAR IN A CA JARS ACCOUNTING FILE.*
*                  THE DATA ITEMS REPORTED ON IN THE REPORT ARE  *
*                  START AND END TIME, THE LINE USE TIME, THE    *
*                  TERMINAL AND APPLICATION ID, AS WELL AS THE   *
*                  BYTES TRANSMITTED EITHER WAY.                 *
*                                                               *
*  RECORD TYPES:   MZXTHDR,                                     *
*                  MZXTSIEN                                     *
*                                                               *
*  EXTDATA RECORD: SIEN                                         *
*                                                               *
*****************************************************************
PARM ABEXIT (SNAP) DEBUG (FLDCHK STATE)
FILE EXTDATA
%MZXTHDR
%MZXTSIEN
*
DEFINE SDATE W 6 N   VALUE 0 HEADING('START' 'DATE') MASK '99/99/99'
DEFINE EDATE W 6 N   VALUE 0 HEADING('END' 'DATE') MASK '99/99/99'
*
JOB INPUT EXTDATA
IF     (PROCID  NE ':') OR (EXTTYPE NE 'SIEN')
       GOTO JOB
END-IF
*
 %JULCONVT EXTSIEN_START_JDATE SDATE
 %JULCONVT EXTSIEN_END_JDATE EDATE
*
PRINT REPORT1
```

```
*
REPORT REPORT1 SUMMARY SPACE 0 PAGESIZE (60 60) LINESIZE 132 NOADJUST +
       SUMCTL DTLCOPY
*
SEQUENCE SID EXTSIEN_ACCOUNTING EXTSIEN_START_JDATE                    +
         EXTSIEN_START_TIME
*
CONTROL  EXTSIEN_ACCOUNTING NEWPAGE                                    +
         EXTSIEN_START_JDATE EXTSIEN_START_TIME
*
TITLE 01 COL 51 'NETVIEW SESSION DETAIL'
TITLE 02 ' '
TITLE 03 COL 1 'REPORT ID: EZXTN001'    COL 54 'SYSTEM ID      ' SID
TITLE 04 COL 1 'SOURCE   : NETVIEW'     COL 54 'ACCOUNT        '      +
                                        EXTSIEN_ACCOUNTING
LINE   SDATE                ' ' +
       EXTSIEN_START_TIME   ' ' +
       EDATE                ' ' +
       EXTSIEN_END_TIME     ' ' +
       EXTSIEN_LINEUSE_TIME ' ' +
       EXTSIEN_TERM_ID      ' ' +
       EXTSIEN_APPL_CODE    ' ' +
       EXTSIEN_BYTES_IN     ' ' +
       EXTSIEN_BYTES_OUT
```

The sample output looks like this:

```
121/01/04                                           NETVIEW SESSION DETAIL

 REPORT ID: ERXTN001                              SYSTEM ID:      SCNN
 SOURCE   : SMF 39                                  ACCOUNT:

 -----------------------------------------------------------------------------------------------------------------------------
     START                START   END                  END          LINE USAGE   TERMINAL    APPLICATION           BYTES       BYTE
     DATE                  TIME   DATE                 TIME               TIME   ID          CODE                     IN         OU
 -----------------------------------------------------------------------------------------------------------------------------
     91/04/01    18:44:50.8900   91/04/01    23:55:01.0200          18610.1200   ________    HOST59                   0          0
     91/04/01    18:51:27.2500   91/04/01    23:55:03.1200          18215.8600   ________    HOST59                   3         41
     91/04/01    18:54:02.4400   91/04/01    23:55:06.2600          18063.8100   ________    HOST59                   3         41
     91/04/01    18:54:02.4400   91/04/01    23:55:06.2600          18063.8100   ________    HOST59                   3         41
     91/04/01    18:54:04.5400   91/04/01    23:55:07.3100          18062.7700   ________    HOST59                 532         59
     91/04/01    18:54:10.8300   91/04/01    23:55:09.4100          18058.5700   ________    HOST59                  83         44
     91/04/01    18:54:13.9800   91/04/01    23:55:12.5500          18058.5700   ________    HOST59                   0          0
     91/04/01    18:54:13.9800   91/04/01    23:55:12.5500          18058.5700   ________    HOST59                   3         41
     91/04/01    18:54:17.1200   91/04/01    23:55:13.6000          18056.4700   ________    HOST59                   0          0
     91/04/01    18:54:18.1700   91/04/01    23:55:15.7000          18057.5200   ________    HOST59                   3         41
     91/04/01    18:54:19.2200   91/04/01    23:55:16.7500          18057.5200   ________    HOST59                 532         59
     91/04/01    18:54:22.3700   91/04/01    23:55:18.8500          18056.4700   ________    HOST59                1268         74
     91/04/01    18:54:25.5100   91/04/01    23:55:20.9400          18055.4300   ________    HOST59                   3         41
     91/04/01    18:54:26.5600   91/04/01    23:55:23.0400          18056.4700   ________    HOST59                 292         50
     91/04/01    18:54:29.7100   91/04/01    23:55:26.1900          18056.4700   ________    HOST59                   0          0
     91/04/01    18:54:29.7100   91/04/01    23:55:26.1900          18056.4700   ________    HOST59                   0          0
     91/04/01    18:54:32.8500   91/04/01    23:55:28.2800          18055.4300   ________    HOST59                  83         44
     91/04/01    18:54:32.8500   91/04/01    23:55:29.3300          18056.4700   ________    HOST59                   3         41
     91/04/01    18:54:36.0000   91/04/01    23:55:31.4300          18055.4300   ________    HOST59                   3         41
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:39.1400   91/04/01    23:55:34.5700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:34.5700          18054.3800   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:34.5700          18054.3800   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:35.6200          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:34.5700          18054.3800   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:34.5700          18054.3800   ________    HOST59                   0          0
     91/04/01    18:54:40.1900   91/04/01    23:55:34.5700          18054.3800   ________    HOST59                   0          0
     91/04/01    18:54:41.2400   91/04/01    23:55:35.6200          18054.3800   ________    HOST59                   0          0
     91/04/01    18:54:41.2400   91/04/01    23:55:36.6700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:41.2400   91/04/01    23:55:36.6700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:41.2400   91/04/01    23:55:36.6700          18055.4300   ________    HOST59                   0          0
     91/04/01    18:54:41.2400   91/04/01    23:55:36.6700          18055.4300   ________    HOST59                   0          0
```

Chapter 6: The CA Roscoe Interface

The Interface to Roscoe is distributed as part of the CA JARS (Job Accounting Report System) family of programs. It provides users of the Roscoe software package with the reporting and chargeback capabilities of CA JARS. With this interface, you can use the Report Writer to report on Roscoe data.

This section contains the following topics:

Functional Description

The Interface to CA Roscoe translates CA Roscoe sign-off records to CA JARS level-7 history records. The interface is made up of two programs:

- MA0000 - Product Executive
- MA1000 - Record Processor

The input to the interface is a Roscoe journal file or an SMF file with Roscoe user records from which sign-off records are selected. An input control statement is read by the Roscoe Interface program to determine what type of data is being input. The output is a CA JARS level-7 history file for subsequent input to the Report Writer. The Report Writer processes Roscoe summary records in a way similar to that for TSO sessions.

This interface can also be used to generate EXTDATA records. EXTDATA records can be used for reporting with CA EARL and CA Easytrieve. The layout and format of the EXTDATA records are described in the chapter "EXTDATA Reporting" in the *User Guide.*

In addition, the EXTDATA records can be used in conjunction with CA PMA Chargeback to create billing and chargeback systems for Roscoe resource utilization.

Roscoe Journal File

Roscoe Sign-off Record Layout Pre Roscoe Release 5.5

SMF Header Portion:

Field Name	Field Position	Field Length	FMT	Description
SMFFLG	1	1	b	SMF header flag byte
SMFRTY	2	1	b	SMF record type
SMFTME	3-6	4	b	SMF write time
SMFDTE	7-10	4	b	SMF write date
SMFSID	11-14	4	a	SMF system ID
ROSJOB	15-22	8	a	Name of Roscoe job
ROSITIME	23-26	4	p	Time of Roscoe start
ROSIDATE	27-30	4	p	Date of Roscoe start

Roscoe Sign-off Record Layout (page 1 of 2)

Roscoe Log Portion:

Field Name	Field Position	Field Length	FMT	Description
SIDB	1-2	2	b	User Session ID
SVTAMID	3-10	8	a	VTAM Terminal Name
SAMETH	11-12	2	b	Access method
FILLER1	13-20	8	-	Filler
SKEY	21-42	22	a	User Sign-on Key
SJOBNM	21-28	8	a	Job Name
	29-42	14	-	Filler
STERMTYP	43-44	2	b	Terminal Type
FILLER3	45-48	4	-	Filler
STERMNUM	49-52	4	b	User Terminal ID
SONTIME	53-56	4	b	Sign-on Time

Field Name	Field Position	Field Length	FMT	Description
SUSER	57-60	4	b	User Command Count
SESTUCPU	61-64	4	b	CPU Time (Timer Units)
STERMACC	65-68	4	b	Terminal Accesses
SDISKACC	69-72	4	b	Disk Accesses
SJOBS	73-74	2	b	Jobs Submitted
SRECTYPE	75	1	a	Record Type (=C'1')
FILLER4	76	1	-	Filler
SOFFTIME	77-80	4	b	Sign-off Time
SDATE	81-86	6	a	Date (MMDDYY)
FILLER5	87	1	-	Filler
SUCB	88-90	3	a	UCB Number of Terminal
SROSID	91-94	4	b	Roscoe Session ID
FILLER6	95-100	6	-	Filler

Roscoe Sign-off Record Layout (page 2 of 2)

Roscoe Record Layout for Roscoe 5.5 and Above

Roscoe Common Portion:

Field Name	Field Position	Field Length	FMT	Description
	1-14	14	b	SMF Header
SRJOBNM	15-22	8	a	Roscoe Job Name
SRRITME	23-26	4	b	Roscoe INIT Time (HHMMSSTH)
SRRIDTE	27-30	4	p	Roscoe INIT Date (00YYDDDF)
SRUSKEY	31-52	22	a	User Sign-on Key
SRUFKEY	53-74	22	a	User Formal Key
SRUAF	75-94	20	a	User Accounting Field
SRUSONT	95-98	4	b	User Sign-on Time
SRUSOND	99-102	4	p	User Sign-on Date (00YYDDDF)

Field Name	Field Position	Field Length	FMT	Description
SRTYPE	103-103	1	a	Record Type x'10' Sign-on Record x'20' Sign-off Record x'30' RTM Record x'34' Roscoe Statistics Record x'50' LIB STATS Record x'60' Monitor Record x'70' Data Set Facility x'90' VPE Record x'F0' AWS Record x'F4' Shutdown Record
SRMONNM	104-106	3	a	Monitor Name
SRMONTYP	107-107	1	b	Monitor Type
SRFLAG	108-108	1	b	Flag
SRRESV1	109-112	4	b	Reserved
SRRESV2	113-116	4	b	Reserved
SRRESV3	117-120	4	b	Reserved

Roscoe Record Layout (page 1 of 3)

Sign-On Record:

Field Name	Field Position	Field Length	FMT	Description
S10AMETH	121-121	1	b	Access Method
S10VTAM	122-129	8	c	Terminal Name
S10UNVPW	130-130	1	c	UNIVERSE Password

Roscoe Record Layout (page 2 of 3)

Sign-Off Record:

Field Name	Field Position	Field Length	FMT	Description
S20CPU	121-124	4	b	CPU Used (Timer Units)

Field Name	Field Position	Field Length	FMT	Description
S20TRMIO	125-128	4	b	Terminal I/O
S20DACC	129-132	4	b	Disk Access
S20SOFFT	133-136	4	b	Sign-off Time
S20LIBMC	137-140	4	b	Library Member Count
S20LIBRC	141-144	4	b	Library Record Count
S20LIBBC	145-148	4	b	Library Block Count
S20JOB	149-150	2	b	# of Jobs Submitted
S20FLAG	151-151	1	b	Flag

Roscoe Record Layout (page 3 of 3)

Roscoe Data Element Assignments

Data Element Assignments For Roscoe Data:

Field Name	Basic Accounting Record	Length	FMT	Roscoe Source Name	Comments
2-3	File ID	2	E		Set to "c'7',x'4c'"
4-9 DE 60	Reader Start Date SIGNON DATE	6	E	SDATE SRUSOND	Convert from MMDDYY to YYMMDD Convert from YYDDD to YYMMDD
10-15 DE 61	Reader Start Time SIGNON TIME	6	E	SONTIME SRUSONT	Convert from T100 to HHMMSS
16-23 DE 04	Job Name	6	E	SKEY (SJOBNM) SRUSKEY	1st 8 chars. of User Sign-on Key
24-25	Job/Step Ind.	2	E		Set to "11"
28 DE 03	Processing ID	1	E		Set to "T" - TSO
29-36 DE 10	User Identification RECORD ID	8	E		Set to "*Roscoe*"

Field Name	Basic Accounting Record	Length	FMT	Roscoe Source Name	Comments
37-42 DE 12	Start Time	6	E	SONTIME SRUSONT ROSITIME SRRITIME	Convert from T100 to HHMMSS Roscoe Start Time (SMF ONLY)
43-48 DE 06	Run Date	6	E	SDATE SRUSOND ROSIDATE SRRIDTE	Convert from MMDDYY to YYMMDD Roscoe Start Date (SMF ONLY)
49-50 DE 07	Job Class	2	E		Set to "V"
51-56 DE 13	Stop Time SIGNOFF TIME	6	E	SOFFTIME S20OFFT	Convert from T100 to HHMMSS
57-78 DE 58	Programmer Name USER SIGNON KEY	22	E	SKEY SRUSKEY	User Sign-on Key
99-106 DE 11	Step Name TERMINAL NAME	8	E	SVTAMID S10VTAM	VTAM Terminal Name
107-114 DE 05	Program/Phase Name Roscoe JOB NAME	8	E	ROSJOB SRJOBNM	Roscoe Job Name (SMF ONLY)
126-130 DE 14	Job Number SESSION ID	5	E	SIDB	User Session ID (1)
171-176 DE 25	Elapsed Time	6	P	SONTIME- SOFFTIME SRUSONT- SROSOFFT	Elapsed Time (Hours) DEC 5
177-182 DE 26	CPU Time	6	P	SESTUCPU SCPU20	CPU Time in Hundredths of a Second
241-247 DE 38	Disk I/O Count DISK ACCESSES	7	P	SDISKACC S20DACC	Disk Accesses
248-254 DE 39	Other I/O Count TERMINAL ACCESSES	7	P	STERMACC S20TRMIO	Terminal Accesses
255-261 DE 40	Total I/O Count TOTAL ACCESSES	7	P	SDISKACC + STERMACC S20TRMIO + S20DACC	Total of Disk and Terminal Accesses

Field Name	Basic Accounting Record	Length	FMT	Roscoe Source Name	Comments
262-265 DE 78	I/O Index	4	P		(Total EXCP's * 10 Million)/(CPU Time * 3600)
301-308 DE A0	Input Device Name TERMINAL ID	8	E	STERMNUM	User Terminal ID (1)
365-368 DE A5	TPUTs JOBS SUBMITTED	4	P	SJOBS S20JOB	Jobs Submitted
373-378 DE A7	Active Time	6	P		Elapsed Time in Hours DEC 5
379-384 DE B0	Connect Time	6	P		Elapsed Time in Hours DEC 5
391-396 DE C1	Resident Time	6	p		Elapsed Time in Hours DEC 5
403-408 DE C7	CPU Time (TCB)	6	P	SESTUCPU S20CPU	See CPU time
429-431 DE B6	Input Route Code TERMINAL NUMBER	3	E	SUCB	UCB # of Terminal (1)
432-434 DE B7	Print Route Code TERMINAL TYPE	3	E	STERMTYPE	Terminal Type (1)
437 DE D5	Day-of-week Indicator	1	E	SDATE SRUSOND	Day-of-Week Calculation
446-453 DE E4	Output Device Name Roscoe ID	8	E	SROSID SRJOBNM	Roscoe Session ID
487-502 DE F2	ACCOMF Field2 USER FORMAL KEY	16	e	SRUFKEY	User Formal Key (5)
503-518 DE F3	Account Field3 USER ACCOUNT FIELD	16	e	SRUAF	User Account Key (5)
535-539 DE F5	User Count Field	5	p	SUSER	User Count field (1) divided by 2
545-550	Reserved	6	E	Set to "YNNNNN"	
(1) NOT available for Roscoe 5.5 or above.					
(5) Only available for Roscoe 5.5 or above.					

Operating Instructions

The region size suggested to execute the interface is approximately 4096K. The interface to Roscoe reads a required input control statement to determine the type of input. The control statement is read in through CAIJRIN in the following format:

Control Statement Layout - Roscoe Release 5.4 and earlier:

Field Name	Field Position	Field Length	FMT	Description
Statement Type	1-5	5	a	'Input'
	6-9	5	a	Filler
Input Type	10-12	3	a	'LOG' - Roscoe Journal File 'SMF' - SMF input
SMF Type	13-15	3	/n	blank - If input type = LOG (Roscoe Journal File) 'nnn' - If input type = SMF, with 'nnn' the user record type for Roscoe records

Control Statement Layout - Roscoe Release 5.5 and later:

Field Name	Field Position	Field Length	FMT	Description
Statement Type	1-5	5	a	'Input'
	6-9	4	-	Filler
Input Type	10-12	3	a	'5.5'
SMF Type	13-15	3	/n	blank - For Roscoe Journal File 'nnn' - For SMF input, with 'nnn' the user record type for Roscoe records.

The interface requires several interrelated files to execute. The following list describes these data sets and their functions:

CAIJFPR

The CAIJFPR statement describes the SYSOUT data set for generated display messages.

CAIJFSN

The CAIJFSN statement describes a SYSOUT data set for generated SNAP dumps. The SNAP limit is 100, however, you can change this 2 byte binary limit count at offset 000032, to any number between 0001 and 7FFF. The number of records SNAPed is one less than the number specified. If you want no records SNAPed, set ZAP offset 000032=0001.

CAIJRHST

The CAIJRHST statement describes the output file written by the Roscoe Interface. This is the file that is later input to the Report Writer. This file must have the following attributes:

RECFM=VB
LRECL=612
BLKSIZE=6233

CAIJRIN

The CAIJRIN statement describes the data set that contains the Roscoe control statement.

CAIJRROS

The CAIJRROS statement describes the input file to be processed by the Roscoe Interface, either a Roscoe Journal File or an SMF file.

CAIJSACT

This optional DD statement indicates to the interdace that EXTDATA records are to be written as well. The file must have these attributes:

RECFM=VB
LRECL=8188
BLKSIZE=8192 or higher

SORTMSG

The SORT message output.

SORTWKnn

Temporary data set used as sort work areas.

STEPLIB

The STEPLIB statement describes the load library that was loaded from the distribution tape.

SYSUDUMP

The SYSUDUMP statement describes a SYSOUT data set for dump output in the case of an abnormal termination.

The following JCL illustrates a run deck for executing the interface to Roscoe Interface.

Sample JCL for Interface to Roscoe

```
//ROSRUN   JOB ,'RUN Roscoe INTERFACE',CLASS=A,MSGCLASS=M
//*
//* DOC:   THIS JOB EXECUTES THE Roscoe INTERFACE PROGRAM.
//*
//*        YOU MUST CHANGE THE VOLUME AND UNIT DESIGNATORS IN THIS
//*        JCL TO DESCRIBE THE ACTUAL VOLUMES ON WHICH YOUR DATA
//*        SETS RESIDE. YOU MUST ALSO CHANGE THE RESPECTIVE
//*        DATA SET NAMES.
//*
//*        THIS JCL REFERS TO DATA SET NAME CA.JARS.PRODLIB ON
//*        THE STEPLIB DD. THIS NAME MUST MATCH THE ONE WITH WHICH
//*        YOU LOADED THE LOAD LIBRARY FROM THE DISTRIBUTION TAPE.
//*
//*        CAIJFPR   DD   Roscoe OUTPUT
//*        CAIJFSN   DD   SNAPED RECORDS
//*        CAIJRIN   DD   CONTROL CARD INPUT
//*                       (INPUT CONTROL CARD REQUIRED)
//*        CAIJRROS  DD   Roscoe OR SMF INPUT DATA
//*        CAIJRHST  DD   JARS HISTORY FILE
//*        SORTWKnn  DD   TEMP SORT WORK AREA
//*
//JSSS01   EXEC PGM=JSI,PARM='XXXX0080,JSMA0000'
//STEPLIB  DD   DSN=CAI.CAJRLOAD,DISP=SHR
//*
//CAIJFPR  DD   SYSOUT=*
//CAIJFSN  DD   SYSOUT=*
//SORTWK01 DD   UNIT=SYSDA, SPACE=(CYL,(3))
//SORTWK02 DD   UNIT=SYSDA, SPACE=(CYL,(3))
//SORTWK03 DD   UNIT=SYSDN, SPACE=(CYL,(3))
//SORTMSG  DD   SYSOUT=*
//*
//CAIJRIN  DD   *
INPUT    SMF248
 OR
INPUT    LOG
 OR
INPUT    5.5248
 OR
INPUT    5.5
/*
//CAIJRROS DD   DSN=SMF.DAILY,DISP=SHR,UNIT=3350,
//         DCB=(RECFM=VBS,LRECL=32759,BLKSIZE=4096)
//CAIJRHST DD   DSN=JARS.Roscoe.HISTORY,DISP=(NEW,CATLG,DELETE),
//         UNIT=3350,VOL=SER=WORK01,SPACE=(TRK,(5,5)),
//         DCB=(RECFM=VB,LRECL=612,BLKSIZE=6233),SPACE=(TRK,(5,5))
//CAIJSACT  DD DSN=CAI.ROSCOE.EXTDATA,
//          DISP=(NEW,CATLG,DELETE),
//          UNIT=uuuu,
```

```
//          SPACE=(CYL,(pp,ss),RLSE),
//          DCB=(RECFM=VB,LRECL=8188,BLKSIZE=bbbb),
//          VOL=SER=vvvvvv
//*
//
```

The following JCL illustrates a run deck for producing a Roscoe Session Analysis Report using the Report Writer. This JCL is included as member ROSJARS1 in CAJRJCL.

Sample JCL for Interface to Roscoe Session Analysis Report

```
//JARS1 JOB (CAI,GXB),CMSGXB,CLASS=A,MSGCLASS=M
//*
//* DOC:   THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO
//*              PRODUCE A Roscoe SESSION ANALYSIS REPORT, USING
//*              A Roscoe HISTORY FILE AS INPUT.
//*
//*
//JARS      EXEC PGM=JSIMAIN
//STEPLIB   DD DSN=CAI.CAJRLOAD,DISP=SHR
//*
//CAIJSPRT  DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//CAIJSNAP  DD SYSOUT=*
//SORTWK01  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK02  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK03  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK04  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK05  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK06  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//CAIJSCT2  DD UNIT=SYSDA,DISP=(,DELETE,DELETE),
//             SPACE=(TRK,(10,1))
//CAIJSCT1  DD UNIT=SYSDA,DISP=(,DELETE,DELETE),
//             SPACE=(TRK,(10,1))
//CAIJSACT  DD UNIT=SYSDA,DISP=(,DELETE,DELETE),
//             SPACE=(CYL,(10,5))
//*
//CAIJRHST  DD  DSN=JARS.Roscoe.HISTORY,DISP=(OLD,KEEP),
//          UNIT=3350,VOL=SER=WORK01
//*
//*
//CAIJSCIN  DD *
 CONFIG  OTHE01F
 SELECT      1                                    B
BHEADER     R O S C O E   S E S S I O N   A N A L Y S I S
BSORT    05722A2                                 1
BDISPLAY MA0582603613132B02261391382A53113B6
/*
```

The following JCL illustrates a run deck for producing a Roscoe User Charge Summary Report using the Report Writer. This JCL is included as member ROSJARS2 in CAJRJCL.

Sample JCL For Roscoe User Charge Summary Report

```
//JARS2 JOB (CAI,GXB),CMSGXB,CLASS=A,MSGCLASS=M
//*
//* DOC:   THIS JOB EXECUTES THE CA JARS REPORT PROGRAM TO
//*              PRODUCE A Roscoe SESSION ANALYSIS REPORT, USING
//*              A Roscoe HISTORY FILE AS INPUT.
//JARS      EXEC PGM=JSIMAIN
//STEPLIB   DD DSN=CAI.CAJRLOAD,DISP=SHR
//*
//CAIJSPRT  DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//CAIJSNAP  DD SYSOUT=*
//SORTWK01  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK02  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK03  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK04  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK05  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//SORTWK06  DD UNIT=SYSDA,
//             SPACE=(CYL,(5))
//CAIJSCT2  DD UNIT=SYSDA,DISP=(,DELETE,DELETE),
//             SPACE=(TRK,(10,1))
//CAIJSCT1  DD UNIT=SYSDA,DISP=(,DELETE,DELETE),
//             SPACE=(TRK,(10,1))
//CAIJSACT  DD UNIT=SYSDA,DISP=(,DELETE,DELETE),
//             SPACE=(CYL,(10,5))
//*
//CAIJSHST  DD  DSN=JARS.Roscoe.HISTORY,DISP=(OLD,KEEP),
//          UNIT=3350,VOL=SER=WORK01
//*
//CAIJSCIN  DD *
 CONFIG  OTHE01F
 SELECT      1                                  A
AHEADER     R O S C O E   U S E R   C H A R G E   S U M M A R Y
ASORT    05703A3105720A  00412A                1
ADISPLAY MA0022581602612B3244245246
ATSORATE  1000500    1000   100           100100                        0100
ADESCRIPT1ROS     PRODUCT DEVELEPMENT
ADESCRIPT1110     SYSTEMS
ADESCRIPT1210     ACCOUNTING
ADESCRIPT1219     PRODUCTION CONTROL
ADESCRIPT1221     ADVERTISING
```

```
ADESCRIPT1222     SALES - EAST
ADESCRIPT1223     SALES - CENTRAL
ADESCRIPT1227     SALES - WEST
ADESCRIPT1231     FINANCE
/*
```

Sample Reports

Roscoe Interface Reports

The Roscoe Interface reports are produced from the execution of the Interface to Roscoe. Two reports are produced:

- Roscoe Interface Listing
- Termination Report

Samples of these reports are shown on the following page. These reports were obtained by executing member ROSRUN in the CA JARS source library.

Roscoe Interface Listing:

```
CA JARS r12                  R O S C O E   I N T E R F A C E   L I S T I N G                            PAGE    1
Resource Accounting SP0                                                                                     17 AUG 1998 15

CAJR010I LOG INPUT FILE PROCESSED.

015D38  0000  00000000 00000000 00000000 00000000  00000000 40404040 40404040 40404040   *....................            *
015D58  0020  40404040 40404040 40400000 00000000  00000000 00000000 F0F5F2F8 F8F40000   *          ..............052884..*
015D78  0040  00000000 00000000 00000000 0082CE53  F0F5F2F8 F8F40000 000000AF 4FF90000   *................052884......|9..*
015D98  0060  00000000                                                                   *....*
CAJR005W RECORD SNAPPED. REASON CODE C .
-----------------------------------------------------------------------------------------------------------------------------------

CAJR011I 149 Roscoe TYPE 1 RECORDS READ.
CAJR011I 2746 Roscoe TYPE 8 RECORDS READ.
CAJR011I 1 Roscoe TYPE 9 RECORDS READ.
CAJR012I 1 UNKNOWN RECORDS READ.
CAJR014I 2897 TOTAL RECORDS READ.
CAJR015I 0 DUPLICATE Roscoe RECORDS REJECTED.
CAJR016I 0 RECORDS REJECTED FOR INVALID DATA.
CAJR017I 149 JARS V4 HISTORY RECORDS WRITTEN.
```

Termination Report:

```
CA JARS r12                      T E R M I N A T I O N   R E P O R T                      CAIJFR99   PAGE    2
Resource Accounting SP0                                                                                 17 AUG 1998 15
** PRODUCT RETURN CODE -- 0004

** MESSAGES -- ** NO MESSAGES PRODUCED **

** FILE USAGE --

   NAME- CAIJFPR                                                RECORD COUNTS-
                  ACCESS - SAM                                             0 -INPUT
                  BLKSIZE- 00133                                          25 -OUTPUT
                  LRECL  - 00133                                           0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED ANS-PR-CTL
                  USAGE  - OUTPUT MOVE
                  SYS    - LST
                  TAP.OPT- NONE

   NAME- CAIJRIN                                                RECORD COUNTS-
                  ACCESS - SAM                                             1 -INPUT
                  BLKSIZE- 00080                                           0 -OUTPUT
                  LRECL  - 00080                                           0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED BLOCKED
                  USAGE  - INPUT MOVE
                  SYS    - 000
                  TAP.OPT- STANDARD-LABEL REWIND

   NAME- CAIJRROS                                               RECORD COUNTS-
                  ACCESS - SAM                                         2,897 -INPUT
                  BLKSIZE- 01000                                           0 -OUTPUT
                  LRECL  - 00100                                           0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED BLOCKED
                  USAGE  - INPUT MOVE
                  SYS    - 000
                  TAP.OPT- STANDARD-LABEL REWIND

   NAME- CAIJRHST                                               RECORD COUNTS-
                  ACCESS - SAM                                             0 -INPUT
                  BLKSIZE- 06124                                         149 -OUTPUT
                  LRECL  - 00612                                           0 -UPDATED
                  CISIZE - 00000
                  RECFORM- VARIABLE BLOCKED
                  USAGE  - OUTPUT MOVE
                  SYS    - 000
                  TAP.OPT- STANDARD-LABEL REWIND

** START TIME -- 15.29.56 END TIME -- 15.30.00 DURATION -- 00.00.04

** END OF JOB --
   HIGHEST RETURN CODE -- 4
```

CA JARS Reports

Two sample reports are provided with the interface to Roscoe.

1. Roscoe Session Analysis Report
2. Roscoe User Charge Summary Report

Samples of each report and the system and report control statements required to generate them are shown next.

Roscoe Session Analysis Report

The sample Roscoe Session Analysis report shown on the following pages was obtained by executing member ROSJARS1 in CAJRJCL. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT       1                                   B
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
 CONFIG  OTHE01F
 SELECT       1                                   B
BHEADER     R O S C O E   S E S S I O N   A N A L Y S I S
BSORT    05722A2                                 1
BDISPLAY MA0582603613132B02261391382A53113B6
1...5...10...15...20...25...30...35...40...45...50...55...60...65  .80
```

Here is the sample report (5 pages).

Roscoe Session Analysis Report (page 1 of 5):

R O S C O E   S E S S I O N   A N A L Y S I S

BEGIN DATE - 07/28/94 RUN DATE - 08/17/94

END DATE - 07/28/94 PAGE 1

USER SIGNON KEY	SIGNON DATE	SIGNON TIME	SIGNOFF TIME	CONNECT TIME	CPU TIME	TERMINAL ACCESSES	DISK ACCESSES	JOBS SUBMITTED	TERMINAL NAME	TRM NUM
ROS.RM.PUBLIC	94/07/28	07:54:12	07:55:42	.02496	.00038	28	149	1	D72L483	VTA
ROS.RM.PUBLIC	94/07/28	10:32:21	10:32:35	.00379	.00018	10	32	0	D72L483	VTA
ROS.RM.PUBLIC	94/07/28	10:43:21	10:44:04	.01198	.00020	18	37	0	D72L483	VTA
ROS.RM.PUBLIC	94/07/28	11:39:45	11:41:43	.03275	.00049	62	126	1	D72L483	VTA
ROS.RM.PUBLIC	94/07/28	15:47:53	15:49:12	.02183	.00054	44	238	1	D72L481	VTA
ROS.RM.PUBLIC	94/07/28	15:49:45	15:50:04	.00526	.00024	26	42	0	D72L481	VTA
				.10057	.00203	188	624	3		
11012JVDBROEK	94/07/28	16:42:10	16:47:09	.08326	.00050	26	149	1	D72L483	VTA
				.08326	.00050	26	149	1		
21021JVSTEEN	94/07/28	09:16:08	09:16:13	.00133	.00014	4	30	0	D72L491	VTA
21021JVSTEEN	94/07/28	09:16:17	09:24:44	.14096	.00083	116	235	0	D72L491	VTA
21021JVSTEEN	94/07/28	09:33:22	10:19:49	.77415	.00477	550	919	7	D72L491	VTA
21021JVSTEEN	94/07/28	10:20:22	10:29:33	.15279	.00101	126	145	0	D72L491	VTA
21021JVSTEEN	94/07/28	12:31:21	12:39:07	.12933	.00034	32	99	0	D72L461	VTA
21021JVSTEEN	94/07/28	12:42:02	12:56:16	.23721	.00181	128	600	0	D72L461	VTA
21021JVSTEEN	94/07/28	12:56:28	12:57:57	.02488	.00056	38	186	0	D72L461	VTA
21021JVSTEEN	94/07/28	13:26:45	13:30:09	.05661	.00021	24	41	0	D72L461	VTA
21021JVSTEEN	94/07/28	13:35:43	13:49:07	.22341	.00043	48	135	0	D72L461	VTA
21021JVSTEEN	94/07/28	13:49:12	14:02:50	.22744	.00060	64	148	0	D72L461	VTA
21021JVSTEEN	94/07/28	16:22:59	16:24:35	.02670	.00030	18	90	0	D72L466	VTA
21021JVSTEEN	94/07/28	17:32:48	17:38:20	.09207	.00061	74	121	1	D72L461	VTA
21021JVSTEEN	94/07/28	17:57:32	17:58:32	.01690	.00030	20	76	1	D72L461	VTA
				2.10378	.01191	1,242	2,825	9		
21022LVSTEEN	94/07/28	09:51:22	09:57:45	.10648	.00045	86	67	0	D72L480	VTA
21022LVSTEEN	94/07/28	13:19:20	13:26:12	.11449	.00028	48	41	0	D72L461	VTA
21022LVSTEEN	94/07/28	13:32:13	13:35:39	.05723	.00015	6	32	0	D72L461	VTA
				.27820	.00088	140	140	0		
21026EBERENS	94/07/28	11:55:59	12:04:01	.13383	.00031	32	64	0	D72L481	VTA
21026EBERENS	94/07/28	12:30:01	12:35:13	.08656	.00097	154	235	1	D72L481	VTA
21026EBERENS	94/07/28	12:44:59	12:49:01	.06729	.00021	12	39	0	D72L481	VTA
21026EBERENS	94/07/28	17:19:06	17:43:15	.40275	.00071	92	193	2	D72L483	VTA
				.69043	.00220	290	531	3		
21027JRUTTEN	94/07/28	09:16:35	11:36:23	2.32997	.01202	938	6,943	0	D72L461	VTA
21027JRUTTEN	94/07/28	11:36:28	11:36:42	.00378	.00016	8	32	0	D72L461	VTA
21027JRUTTEN	94/07/28	11:36:49	12:31:14	.90688	.00608	312	3,292	1	D72L461	VTA
21027JRUTTEN	94/07/28	12:39:14	12:41:54	.04443	.00072	40	174	0	D72L461	VTA
21027JRUTTEN	94/07/28	12:58:03	12:59:56	.03137	.00054	30	167	1	D72L461	VTA
21027JRUTTEN	94/07/28	16:33:21	16:51:30	.30241	.00658	532	2,872	3	D72L461	VTA
21027JRUTTEN	94/07/28	16:55:51	16:59:06	.05427	.00024	12	39	0	D72L461	VTA
21027JRUTTEN	94/07/28	17:06:38	17:32:42	.43438	.00134	74	478	0	D72L461	VTA
				4.10749	.02768	1,946	13,997	5		

Roscoe Session Analysis Report (page 2 of 5):

```
                                       R O S C O E   S E S S I O N   A N A L Y S I S
BEGIN DATE - 07/28/94                                                                                   RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                              PAGE   2
                        SIGNON     SIGNON    SIGNOFF     CONNECT        CPU   TERMINAL       DISK       JOBS   TERMINAL    TRM
USER SIGNON KEY           DATE       TIME       TIME        TIME       TIME   ACCESSES   ACCESSES  SUBMITTED   NAME        NUM

21031JPIJNENBORG      94/07/28   10:47:31   13:16:52     2.48895     .00917      1,036      4,650         11   D72L491     VTA
21031JPIJNENBORG      94/07/28   13:43:16   13:43:31      .00423     .00015          6         32          0   D72L491     VTA
                                                         2.49318     .00932      1,042      4,682         11

21910ROSPROC          94/07/28   07:55:47   08:01:29      .09503     .00086         94        380          1   D72L483     VTA
                                                          .09503     .00086         94        380          1

22112HABBINK          94/07/28   10:12:20   10:37:21      .41693     .00457        396      1,886          5   D72L460     VTA
22112HABBINK          94/07/28   10:51:12   10:51:16      .00098     .00006          4         20          0   D72L460     VTA
22112HABBINK          94/07/28   10:51:24   11:35:53      .74147     .00039         68         56          0   D72L460     VTA
22112HABBINK          94/07/28   13:16:49   14:34:28     1.29422     .00543        340      1,890          2   D72L460     VTA
22112HABBINK          94/07/28   14:47:03   16:51:51     2.08000     .00359        718        581          4   D72L460     VTA
                                                         4.53360     .01404      1,526      4,433         11

22123FVLOON           94/07/28   09:01:40   09:02:12      .00884     .00020         24         33          0   D72L465     VTA
22123FVLOON           94/07/28   09:10:58   09:32:02      .35115     .00064        118        184          0   D72L465     VTA
22123FVLOON           94/07/28   12:38:07   12:42:05      .06606     .00094        174        442          0   D72L465     VTA
                                                          .42605     .00178        316        659          0

22124HCOUWENBERG      94/07/28   14:36:16   14:41:15      .08288     .00073         94        223          0   D72L465     VTA
22124HCOUWENBERG      94/07/28   15:52:24   15:52:43      .00541     .00018         16         41          0   D72L465     VTA
                                                          .08829     .00091        110        264          0

22125RVKAPPEL         94/07/28   15:11:35   15:12:54      .02185     .00031         14         50          0   D72L465     VTA
                                                          .02185     .00031         14         50          0

22129ALGEMEENSP400    94/07/28   16:31:23   16:32:13      .01383     .00033         54         58          0   D72L465     VTA
                                                          .01383     .00033         54         58          0

22201HKUYPERS         94/07/28   12:04:23   12:09:57      .09276     .00162        120        294          0   D72L494     VTA
22201HKUYPERS         94/07/28   13:13:34   13:18:45      .08647     .00111         80        350          0   D72L467     VTA
                                                          .17923     .00273        200        644          0

22212MVDUUREN         94/07/28   08:59:38   09:03:60      .07271     .00216        114        734          1   D72L466     VTA
22212MVDUUREN         94/07/28   10:52:02   11:32:03      .66690     .00611        528      1,700          2   D72L466     VTA
22212MVDUUREN         94/07/28   13:35:31   13:35:35      .00114     .00015          4         29          0   D72L466     VTA
22212MVDUUREN         94/07/28   13:35:38   14:20:43      .75163     .01998      1,268      7,957          3   D72L466     VTA
22212MVDUUREN         94/07/28   14:27:05   14:27:43      .01064     .00036         26        100          0   D72L494     VTA
22212MVDUUREN         94/07/28   16:24:54   16:25:47      .01462     .00033         14         90          0   D72L466     VTA
22212MVDUUREN         94/07/28   16:26:54   16:27:23      .00804     .00031         18         55          0   D72L466     VTA
22212MVDUUREN         94/07/28   16:28:42   16:30:05      .02315     .00029         18         66          0   D72L466     VTA
22212MVDUUREN         94/07/28   16:30:58   16:31:02      .00108     .00014          4         29          0   D72L466     VTA
22212MVDUUREN         94/07/28   16:31:05   17:10:10      .65147     .01957        628     10,111          3   D72L466     VTA
```

Roscoe Session Analysis Report (page 3 of 5):

R O S C O E   S E S S I O N   A N A L Y S I S

BEGIN DATE - 07/28/94 RUN DATE - 08/17/94

END DATE - 07/28/94 PAGE 3

USER SIGNON KEY	SIGNON DATE	SIGNON TIME	SIGNOFF TIME	CONNECT TIME	CPU TIME	TERMINAL ACCESSES	DISK ACCESSES	JOBS SUBMITTED	TERMINAL NAME	TRM NUM
				2.20138	.04940	2,622	20,871	9		
22213WSMEEKENS	94/07/28	10:10:27	10:31:05	.34387	.00269	194	1,320	0	D72L466	VTA
22213WSMEEKENS	94/07/28	10:42:27	10:42:31	.00124	.00014	4	29	0	D72L466	VTA
22213WSMEEKENS	94/07/28	10:42:35	10:51:25	.14739	.00350	198	1,506	3	D72L466	VTA
22213WSMEEKENS	94/07/28	11:22:37	11:24:31	.03147	.00063	150	41	0	D72L494	VTA
				.52397	.00696	546	2,896	3		
22223EVLOON	94/07/28	08:12:59	08:13:50	.01398	.00091	16	308	0	D72L464	VTA
22223EVLOON	94/07/28	08:24:42	08:33:51	.15258	.00246	274	751	2	D72L464	VTA
22223EVLOON	94/07/28	08:40:08	10:17:40	1.62564	.01515	1,852	3,505	19	D72L464	VTA
22223EVLOON	94/07/28	10:23:20	10:33:45	.17352	.00192	302	460	2	D72L464	VTA
22223EVLOON	94/07/28	10:38:13	10:48:20	.16856	.00056	118	47	0	D72L464	VTA
22223EVLOON	94/07/28	10:49:06	11:01:15	.20238	.00098	122	286	1	D72L464	VTA
22223EVLOON	94/07/28	11:05:29	11:20:03	.24272	.00111	140	358	1	D72L464	VTA
22223EVLOON	94/07/28	11:32:49	12:22:54	.83482	.01481	922	7,807	3	D72L464	VTA
22223EVLOON	94/07/28	13:07:27	13:57:34	.83516	.02815	1,844	16,203	6	D72L464	VTA
				4.24936	.06605	5,590	29,725	34		
22224AVVALKENBURG	94/07/28	14:30:27	14:58:02	.45957	.00197	468	810	0	D72L466	VTA
				.45957	.00197	468	810	0		
22312RJANSEN	94/07/28	08:48:25	09:22:17	.56445	.00176	164	827	1	D72L463	VTA
22312RJANSEN	94/07/28	09:23:38	10:17:13	.89301	.00147	224	409	2	D72L463	VTA
22312RJANSEN	94/07/28	10:28:55	10:29:19	.00688	.00019	14	35	0	D72L463	VTA
22312RJANSEN	94/07/28	10:37:47	10:49:49	.20056	.00126	128	499	2	D72L463	VTA
22312RJANSEN	94/07/28	11:41:37	11:49:21	.12881	.00163	42	696	0	D72L463	VTA
22312RJANSEN	94/07/28	12:50:05	12:57:11	.11848	.00096	126	392	1	D72L463	VTA
22312RJANSEN	94/07/28	13:01:03	13:31:60	.51559	.00373	420	1,209	4	D72L463	VTA
22312RJANSEN	94/07/28	13:37:33	15:26:59	1.82403	.00914	386	4,251	7	D72L462	VTA
				4.25181	.02014	1,504	8,318	17		
22321PBRENDERS	94/07/28	08:59:05	09:19:54	.34691	.01378	276	8,493	3	D72L462	VTA
22321PBRENDERS	94/07/28	09:21:30	09:59:40	.63622	.00223	380	391	4	D72L462	VTA
22321PBRENDERS	94/07/28	10:28:41	10:56:56	.47086	.00530	324	463	3	D72L462	VTA
22321PBRENDERS	94/07/28	11:11:52	11:45:32	.56107	.00294	248	264	1	D72L481	VTA
22321PBRENDERS	94/07/28	11:54:14	12:10:37	.27319	.00099	142	188	2	D72L462	VTA
22321PBRENDERS	94/07/28	13:23:59	13:31:01	.11737	.00101	146	323	1	D72L462	VTA
22321PBRENDERS	94/07/28	13:52:13	14:19:34	.45563	.01032	506	5,511	4	D72L494	VTA
22321PBRENDERS	94/07/28	15:16:42	15:17:11	.00803	.00018	12	41	0	D03340C4	VTA
				2.86928	.03675	2,034	15,674	18		
22322KHAVENAAR	94/07/28	13:32:03	13:32:06	.00106	.00014	4	29	0	D72L463	VTA
22322KHAVENAAR	94/07/28	13:32:11	17:58:49	4.44378	.01841	3,906	4,754	15	D72L463	VTA
22322KHAVENAAR	94/07/28	19:40:38	21:27:26	1.78002	.00881	1,486	2,434	7	D72L463	VTA
				6.22486	.02736	5,396	7,217	22		

Roscoe Session Analysis Report (page 4 of 5):

R O S C O E   S E S S I O N   A N A L Y S I S

BEGIN DATE - 07/28/94 RUN DATE - 08/17/94

END DATE - 07/28/94 PAGE 4

USER SIGNON KEY	SIGNON DATE	SIGNON TIME	SIGNOFF TIME	CONNECT TIME	CPU TIME	TERMINAL ACCESSES	DISK ACCESSES	JOBS SUBMITTED	TERMINAL NAME	TRM NUM
22323JKOLSTEREN	94/07/28	13:03:44	13:08:15	.07524	.00163	78	738	0	D72L462	VTA
				.07524	.00163	78	738	0		
22324HHERMANS	94/07/28	08:35:15	08:42:42	.12406	.00383	394	1,293	2	D72L462	VTA
22324HHERMANS	94/07/28	09:20:35	09:46:58	.43990	.00536	590	2,609	2	D72L462	VTA
				.56396	.00919	984	3,902	4		
22721PVERHOEVEN	94/07/28	08:11:26	12:24:26	4.21660	.07251	5,396	42,802	15	D72L467	VTA
22721PVERHOEVEN	94/07/28	13:21:29	14:52:39	1.51956	.02614	1,870	14,908	9	D72L467	VTA
22721PVERHOEVEN	94/07/28	14:52:44	14:53:06	.00621	.00024	20	45	0	D72L467	VTA
22721PVERHOEVEN	94/07/28	14:57:32	15:14:15	.27844	.00649	368	4,172	1	D72L467	VTA
22721PVERHOEVEN	94/07/28	15:36:36	15:46:09	.15923	.00340	286	1,208	2	D72L467	VTA
				6.18004	.10878	7,940	63,135	27		
22724RDJONGH	94/07/28	09:54:03	10:15:02	.34959	.00336	268	1,830	4	D72L465	VTA
22724RDJONGH	94/07/28	12:13:45	12:18:12	.07396	.00104	192	152	1	D72L465	VTA
22724RDJONGH	94/07/28	12:25:45	12:27:23	.02721	.00033	46	53	0	D72L465	VTA
				.45076	.00473	506	2,035	5		
23101WVGILS	94/07/28	09:06:37	10:14:54	1.13818	.00520	156	1,791	0	D72L484	VTA
23101WVGILS	94/07/28	10:28:40	11:12:06	.72400	.00347	180	1,192	1	D72L484	VTA
23101WVGILS	94/07/28	11:33:01	12:08:45	.59554	.00403	388	1,661	2	D72L484	VTA
23101WVGILS	94/07/28	12:59:58	13:11:25	.19074	.00049	72	184	0	D72L484	VTA
23101WVGILS	94/07/28	13:14:07	14:10:41	.94287	.00488	604	1,964	3	D72L484	VTA
23101WVGILS	94/07/28	14:22:57	18:40:41	4.29555	.02646	2,688	10,375	16	D72L484	VTA
23101WVGILS	94/07/28	18:43:31	19:09:28	.43256	.00503	834	990	10	D72L484	VTA
23101WVGILS	94/07/28	19:09:40	19:13:28	.06323	.00121	274	85	1	D72L484	VTA
23101WVGILS	94/07/28	19:16:24	20:53:16	1.61457	.01265	2,232	2,094	27	D72L484	VTA
23101WVGILS	94/07/28	20:53:26	20:55:02	.02691	.00039	46	94	0	D72L484	VTA
23101WVGILS	94/07/28	20:55:09	20:55:23	.00402	.00019	10	37	0	D72L484	VTA
23101WVGILS	94/07/28	20:57:27	23:44:35	2.78533	.00974	890	2,638	12	D72L484	VTA
				12.81350	.07374	8,374	23,105	72		
23102RRUEDISUELI	94/07/28	08:44:16	09:12:05	.46351	.00033	28	65	0	D72L492	VTA
23102RRUEDISUELI	94/07/28	11:32:36	11:33:58	.02277	.00048	42	104	1	D72L482	VTA
23102RRUEDISUELI	94/07/28	15:47:55	16:35:00	.78466	.00459	268	1,596	4	D72L492	VTA
				1.27094	.00540	338	1,765	5		
23103TSPIJKERS	94/07/28	13:16:21	14:14:12	.96406	.00375	484	1,430	0	D72L482	VTA
23103TSPIJKERS	94/07/28	14:15:08	15:06:23	.85408	.00435	408	1,364	0	D72L482	VTA
23103TSPIJKERS	94/07/28	15:14:57	15:15:13	.00429	.00018	10	37	0	D72L482	VTA
23103TSPIJKERS	94/07/28	15:16:25	16:18:16	1.03086	.00809	282	2,899	0	D72L482	VTA
23103TSPIJKERS	94/07/28	16:19:14	16:21:00	.02960	.00183	42	564	0	D72L482	VTA
				2.88289	.01820	1,226	6,294	0		

Roscoe Session Analysis Report (page 5 of 5):

```
                                       R O S C O E   S E S S I O N   A N A L Y S I S
BEGIN DATE - 07/28/94                                                                                        RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                                   PAGE   5
                        SIGNON     SIGNON     SIGNOFF      CONNECT          CPU   TERMINAL       DISK       JOBS   TERMINAL    TRM
USER SIGNON KEY           DATE       TIME        TIME         TIME         TIME   ACCESSES   ACCESSES  SUBMITTED   NAME        NUM

23105PDJONGH          94/07/28   13:18:51    13:19:26       .00956       .00050         30        133          1   D72L467     VTA
                                                            .00956       .00050         30        133          1

23109ALGEMEEN100      94/07/28   21:44:40    23:37:39      1.88292       .01259        916      3,736         34   D72L480     VTA
23109ALGEMEEN100      94/07/28   23:46:55    23:47:16       .00588       .00029         20         62          0   D72L480     VTA
                                                           1.88880       .01288        936      3,798         34

23111THMOLTHOF        94/07/28   11:23:23    11:25:47       .04006       .00059         42        209          1   D72L482     VTA
23111THMOLTHOF        94/07/28   11:36:58    11:37:33       .00975       .00024         12         39          0   D72L482     VTA
23111THMOLTHOF        94/07/28   11:37:46    11:47:14       .15771       .00069         60        171          1   D72L482     VTA
23111THMOLTHOF        94/07/28   13:08:02    13:08:58       .01556       .00029         38         41          0   D72L487     VTA
23111THMOLTHOF        94/07/28   14:45:52    18:07:31      3.36102       .00502        500      1,704          2   D72L487     VTA
                                                           3.58410       .00683        652      2,164          4

23114ABRENDERS        94/07/28   13:03:07    13:04:29       .02266       .00048         44         92          0   D72L482     VTA
                                                            .02266       .00048         44         92          0

23121PLANNING         94/07/28   08:38:48    11:50:53      3.20145       .00605         70      3,570          2   D72L490     VTA
                                                           3.20145       .00605         70      3,570          2

23131TAPEPOOL         94/07/28   08:11:30    08:11:57       .00729       .00137         14        956          0   D72L485     VTA
23131TAPEPOOL         94/07/28   08:12:04    08:12:18       .00380       .00024         12        113          0   D72L485     VTA
23131TAPEPOOL         94/07/28   08:12:41    08:13:05       .00668       .00015          8         46          1   D72L485     VTA
23131TAPEPOOL         94/07/28   10:45:05    10:46:03       .01609       .00028         10        142          0   D72L485     VTA
23131TAPEPOOL         94/07/28   10:47:29    10:48:25       .01567       .00049         12        202          0   D72L485     VTA
23131TAPEPOOL         94/07/28   14:14:18    14:15:05       .01320       .00037         12        220          0   D72L482     VTA
23131TAPEPOOL         94/07/28   15:15:23    15:16:15       .01444       .00037         12        223          0   D72L482     VTA
23131TAPEPOOL         94/07/28   15:46:24    15:47:51       .02410       .00018         30         60          0   D72L492     VTA
23131TAPEPOOL         94/07/28   16:18:25    16:19:10       .01242       .00032         14        158          0   D72L482     VTA
23131TAPEPOOL         94/07/28   18:06:19    18:07:00       .01149       .00026         10        142          0   D72L482     VTA
23131TAPEPOOL         94/07/28   18:41:59    18:43:11       .02003       .00029         10        158          0   D72L482     VTA
                                                            .14521       .00432        144      2,420          1

23149ALGEMEEN500      94/07/28   10:38:24    18:27:01      7.81028       .00189        266        538          0   D72L480     VTA
23149ALGEMEEN500      94/07/28   19:25:36    20:28:07      1.04194       .00057         54        144          0   D72L480     VTA
                                                           8.85222       .00246        320        682          0
                                                          77.93635       .53930     46,990    228,780        302
CAJS003I NORMAL END OF PROCESSING
```

Roscoe User Charge Summary Report

The sample Roscoe Session Analysis report shown on the following pages was obtained by executing member ROSJARS2 in CAJRJCL. The following system control statements were used.

System Control Statements

```
1...5...10...15...20...25...30...35...40...45...50...55...60...65   .80
 CONFIG  OTHE01F
 SELECT       1                                    A
```

These Report Writer control statements were used to produce the report.

Report Control Statements

```
  1...5...10...15...20...25...30...35...40...45...50...55...60...65  .75...80
   CONFIG  OTHE01F
   SELECT      1                                   A
  AHEADER     R O S C O E   U S E R   C H A R G E   S U M M A R Y
  ASORT    05703A3105720A  00412A                 1
  ADISPLAY MA0022581602612B3244245246
  ATSORATE  1000500    1000   100            100100                   0100
  ADESCRIPT1ROS     PRODUCT DEVELEPMENT
  ADESCRIPT1110     SYSTEMS
  ADESCRIPT1210     ACCOUNTING
  ADESCRIPT1219     PRODUCTION CONTROL
  ADESCRIPT1221     ADVERTISING
  ADESCRIPT1222     SALES - EAST
  ADESCRIPT1223     SALES - CENTRAL
  ADESCRIPT1227     SALES - WEST
  ADESCRIPT1231     FINANCE
  1...5...10...15...20...25...30...35...40...45...50...55...60...65  .75...80
```

Here is the sample report (5 pages).

Roscoe User Charge Summary Report (1 of 5):

```
                            R O S C O E   U S E R   C H A R G E   S U M M A R Y
BEGIN DATE - 07/28/94                                                                          RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                     PAGE   1

                                              SIGNON    SIGNON       CONNECT      PROCESS        I/O         TOTAL
DESCRIPTION           USER SIGNON KEY           DATE      TIME        CHARGE       CHARGE       CHARGE       CHARGE

PRODUCT DEVELEPMENT
                      ROS.RM.PUBLIC         94/07/28  07:54:12          $.25         $.38         $.42        $1.05
                      ROS.RM.PUBLIC         94/07/28  10:32:21          $.04         $.18         $.28        $1.00M
                      ROS.RM.PUBLIC         94/07/28  10:43:21          $.12         $.20         $.28        $1.00M
                      ROS.RM.PUBLIC         94/07/28  11:39:45          $.33         $.49         $.42        $1.24
                      ROS.RM.PUBLIC         94/07/28  15:47:53          $.22         $.54         $.56        $1.32
                      ROS.RM.PUBLIC         94/07/28  15:49:45          $.05         $.24         $.28        $1.00M

PRODUCT DEVELEPMENT                                                    $1.01        $2.03        $2.24        $6.61

SYSTEMS

                      11012JVDBROEK         94/07/28  16:42:10          $.83         $.50         $.42        $1.75

SYSTEMS                                                                 $.83         $.50         $.42        $1.75

ACCOUNTING

                      21021JVSTEEN          94/07/28  09:16:08          $.01         $.14         $.28        $1.00M
                      21021JVSTEEN          94/07/28  09:16:17         $1.41         $.83         $.70        $2.94
                      21021JVSTEEN          94/07/28  09:33:22         $7.74        $4.77        $2.22       $14.73
                      21021JVSTEEN          94/07/28  10:20:22         $1.53        $1.01         $.56        $3.10
                      21021JVSTEEN          94/07/28  12:31:21         $1.29         $.34         $.28        $1.91
                      21021JVSTEEN          94/07/28  12:42:02         $2.37        $1.81        $1.11        $5.29
                      21021JVSTEEN          94/07/28  12:56:28          $.25         $.56         $.42        $1.23
                      21021JVSTEEN          94/07/28  13:26:45          $.57         $.21         $.28        $1.06
                      21021JVSTEEN          94/07/28  13:35:43         $2.23         $.43         $.42        $3.08
                      21021JVSTEEN          94/07/28  13:49:12         $2.27         $.60         $.42        $3.29
                      21021JVSTEEN          94/07/28  16:22:59          $.27         $.30         $.28        $1.00M
                      21021JVSTEEN          94/07/28  17:32:48          $.92         $.61         $.42        $1.95
                      21021JVSTEEN          94/07/28  17:57:32          $.17         $.30         $.28        $1.00M
                      21022LVSTEEN          94/07/28  09:51:22         $1.06         $.45         $.28        $1.79
                      21022LVSTEEN          94/07/28  13:19:20         $1.14         $.28         $.28        $1.70
                      21022LVSTEEN          94/07/28  13:32:13          $.57         $.15         $.28        $1.00
                      21026EBERENS          94/07/28  11:55:59         $1.34         $.31         $.28        $1.93
                      21026EBERENS          94/07/28  12:30:01          $.87         $.97         $.70        $2.54
                      21026EBERENS          94/07/28  12:44:59          $.67         $.21         $.28        $1.16
                      21026EBERENS          94/07/28  17:19:06         $4.03         $.71         $.42        $5.16
                      21027JRUTTEN          94/07/28  09:16:35        $23.30       $12.02       $11.11       $46.43
                      21027JRUTTEN          94/07/28  11:36:28          $.04         $.16         $.28        $1.00M
                      21027JRUTTEN          94/07/28  11:36:49         $9.07        $6.08        $5.14       $20.29
                      21027JRUTTEN          94/07/28  12:39:14          $.44         $.72         $.42        $1.58
                      21027JRUTTEN          94/07/28  12:58:03          $.31         $.54         $.42        $1.27
                      21027JRUTTEN          94/07/28  16:33:21         $3.02        $6.58        $4.86       $14.46
                      21027JRUTTEN          94/07/28  16:55:51          $.54         $.24         $.28        $1.06
                      21027JRUTTEN          94/07/28  17:06:38         $4.34        $1.34         $.84        $6.52
                      21031JPIJNENBORG      94/07/28  10:47:31        $24.89        $9.17        $8.06       $42.12
```

Roscoe User Charge Summary Report (2 of 5):

```
                         R O S C O E   U S E R   C H A R G E   S U M M A R Y
BEGIN DATE - 07/28/94                                                                             RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                        PAGE   2

                                         SIGNON    SIGNON      CONNECT      PROCESS         I/O         TOTAL
DESCRIPTION          USER SIGNON KEY       DATE      TIME       CHARGE       CHARGE      CHARGE        CHARGE

                     21031JPIJNENBORG     94/07/28  13:43:16         $.04         $.15        $.28         $1.00M

ACCOUNTING                                                     $96.70       $51.99      $41.88       $192.59

PRODUCTION CONTROL

                     21910ROSPROC         94/07/28  07:55:47         $.95         $.86        $.70          $2.51

PRODUCTION CONTROL                                               $.95         $.86        $.70          $2.51

ADVERTISING

                     22112HABBINK         94/07/28  10:12:20        $4.17        $4.57       $3.20         $11.94
                     22112HABBINK         94/07/28  10:51:12         $.01         $.06        $.28         $1.00M
                     22112HABBINK         94/07/28  10:51:24        $7.41         $.39        $.28          $8.08
                     22112HABBINK         94/07/28  13:16:49       $12.94        $5.43       $3.20         $21.57
                     22112HABBINK         94/07/28  14:47:03       $20.80        $3.59       $1.95         $26.34
                     22123FVLOON          94/07/28  09:01:40         $.09         $.20        $.28         $1.00M
                     22123FVLOON          94/07/28  09:10:58        $3.51         $.64        $.56          $4.71
                     22123FVLOON          94/07/28  12:38:07         $.66         $.94        $.97          $2.57
                     22124HCOUWENBERG     94/07/28  14:36:16         $.83         $.73        $.56          $2.12
                     22124HCOUWENBERG     94/07/28  15:52:24         $.05         $.18        $.28         $1.00M
                     22125RVKAPPEL        94/07/28  15:11:35         $.22         $.31        $.28         $1.00M
                     22129ALGEMEENSP400   94/07/28  16:31:23         $.14         $.33        $.28         $1.00M

ADVERTISING                                                    $50.83       $17.37      $12.12        $82.33

SALES - EAST

                     22201HKUYPERS        94/07/28  12:04:23         $.93        $1.62        $.70          $3.25
                     22201HKUYPERS        94/07/28  13:13:34         $.86        $1.11        $.70          $2.67
                     22212MVDUUREN        94/07/28  08:59:38         $.73        $2.16       $1.39          $4.28
                     22212MVDUUREN        94/07/28  10:52:02        $6.67        $6.11       $3.20         $15.98
                     22212MVDUUREN        94/07/28  13:35:31         $.01         $.15        $.28         $1.00M
                     22212MVDUUREN        94/07/28  13:35:38        $7.52       $19.98      $12.92         $40.42
                     22212MVDUUREN        94/07/28  14:27:05         $.11         $.36        $.28         $1.00M
                     22212MVDUUREN        94/07/28  16:24:54         $.15         $.33        $.28         $1.00M
                     22212MVDUUREN        94/07/28  16:26:54         $.08         $.31        $.28         $1.00M
                     22212MVDUUREN        94/07/28  16:28:42         $.23         $.29        $.28         $1.00M
                     22212MVDUUREN        94/07/28  16:30:58         $.01         $.14        $.28         $1.00M
                     22212MVDUUREN        94/07/28  16:31:05        $6.51       $19.57      $15.14         $41.22
                     22213WSMEEKENS       94/07/28  10:10:27        $3.44        $2.69       $2.22          $8.35
                     22213WSMEEKENS       94/07/28  10:42:27         $.01         $.14        $.28         $1.00M
                     22213WSMEEKENS       94/07/28  10:42:35        $1.47        $3.50       $2.50          $7.47
                     22213WSMEEKENS       94/07/28  11:22:37         $.31         $.63        $.42          $1.36
                     22223EVLOON          94/07/28  08:12:59         $.14         $.91        $.70          $1.75
```

Roscoe User Charge Summary Report (3 of 5):

```
                               R O S C O E   U S E R   C H A R G E   S U M M A R Y
BEGIN DATE - 07/28/94                                                                       RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                  PAGE   3
                                              SIGNON    SIGNON     CONNECT      PROCESS        I/O        TOTAL
DESCRIPTION          USER SIGNON KEY            DATE      TIME      CHARGE       CHARGE       CHARGE      CHARGE

                     22223EVLOON          94/07/28  08:24:42       $1.53        $2.46        $1.53        $5.52
                     22223EVLOON          94/07/28  08:40:08      $16.26       $15.15        $7.64       $39.05
                     22223EVLOON          94/07/28  10:23:20       $1.74        $1.92        $1.25        $4.91
                     22223EVLOON          94/07/28  10:38:13       $1.69         $.56         $.42        $2.67
                     22223EVLOON          94/07/28  10:49:06       $2.02         $.98         $.70        $3.70
                     22223EVLOON          94/07/28  11:05:29       $2.43        $1.11         $.84        $4.38
                     22223EVLOON          94/07/28  11:32:49       $8.35       $14.81       $12.36       $35.52
                     22223EVLOON          94/07/28  13:07:27       $8.35       $28.15       $25.28       $61.78
                     22224AVVALKENBURG    94/07/28  14:30:27       $4.60        $1.97        $1.95        $8.52

SALES - EAST                                                      $76.15      $127.11       $93.82      $299.80

SALES - CENTRAL

                     22312RJANSEN         94/07/28  08:48:25       $5.64        $1.76        $1.53        $8.93
                     22312RJANSEN         94/07/28  09:23:38       $8.93        $1.47        $1.11       $11.51
                     22312RJANSEN         94/07/28  10:28:55        $.07         $.19         $.28        $1.00M
                     22312RJANSEN         94/07/28  10:37:47       $2.01        $1.26         $.97        $4.24
                     22312RJANSEN         94/07/28  11:41:37       $1.29        $1.63        $1.11        $4.03
                     22312RJANSEN         94/07/28  12:50:05       $1.18         $.96         $.84        $2.98
                     22312RJANSEN         94/07/28  13:01:03       $5.16        $3.73        $2.50       $11.39
                     22312RJANSEN         94/07/28  13:37:33      $18.24        $9.14        $6.53       $33.91
                     22321PBRENDERS       94/07/28  08:59:05       $3.47       $13.78       $12.22       $29.47
                     22321PBRENDERS       94/07/28  09:21:30       $6.36        $2.23        $1.11        $9.70
                     22321PBRENDERS       94/07/28  10:28:41       $4.71        $5.30        $1.25       $11.26
                     22321PBRENDERS       94/07/28  11:11:52       $5.61        $2.94         $.84        $9.39
                     22321PBRENDERS       94/07/28  11:54:14       $2.73         $.99         $.56        $4.28
                     22321PBRENDERS       94/07/28  13:23:59       $1.17        $1.01         $.84        $3.02
                     22321PBRENDERS       94/07/28  13:52:13       $4.56       $10.32        $8.61       $23.49
                     22321PBRENDERS       94/07/28  15:16:42        $.08         $.18         $.28        $1.00M
                     22322KHAVENAAR       94/07/28  13:32:03        $.01         $.14         $.28        $1.00M
                     22322KHAVENAAR       94/07/28  13:32:11      $44.44       $18.41       $12.22       $75.07
                     22322KHAVENAAR       94/07/28  19:40:38      $17.80        $8.81        $5.56       $32.17
                     22323JKOLSTEREN      94/07/28  13:03:44        $.75        $1.63        $1.25        $3.63
                     22324HHERMANS        94/07/28  08:35:15       $1.24        $3.83        $2.36        $7.43
                     22324HHERMANS        94/07/28  09:20:35       $4.40        $5.36        $4.59       $14.35

SALES - CENTRAL                                                  $139.85       $95.07       $66.84      $303.25

SALES - WEST

                     22721PVERHOEVEN      94/07/28  08:11:26      $42.17       $72.51       $67.09      $181.77
                     22721PVERHOEVEN      94/07/28  13:21:29      $15.20       $26.14       $23.47       $64.81
                     22721PVERHOEVEN      94/07/28  14:52:44        $.06         $.24         $.28        $1.00M
                     22721PVERHOEVEN      94/07/28  14:57:32       $2.78        $6.49        $6.39       $15.66
                     22721PVERHOEVEN      94/07/28  15:36:36       $1.59        $3.40        $2.22        $7.21
                     22724RDJONGH         94/07/28  09:54:03       $3.50        $3.36        $3.06        $9.92
                     22724RDJONGH         94/07/28  12:13:45        $.74        $1.04         $.56        $2.34
```

Roscoe User Charge Summary Report (4 of 5):

```
                              R O S C O E   U S E R   C H A R G E   S U M M A R Y
BEGIN DATE - 07/28/94                                                                           RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                      PAGE   4
                                             SIGNON    SIGNON       CONNECT      PROCESS          I/O        TOTAL
DESCRIPTION          USER SIGNON KEY           DATE      TIME        CHARGE       CHARGE       CHARGE       CHARGE


                     22724RDJONGH          94/07/28  12:25:45          $.27         $.33         $.28       $1.00M

SALES - WEST                                                         $66.31      $113.51      $103.35      $283.71

FINANCE

                     23101WVGILS           94/07/28  09:06:37        $11.38        $5.20        $2.78       $19.36
                     23101WVGILS           94/07/28  10:28:40         $7.24        $3.47        $1.95       $12.66
                     23101WVGILS           94/07/28  11:33:01         $5.96        $4.03        $2.92       $12.91
                     23101WVGILS           94/07/28  12:59:58         $1.91         $.49         $.42        $2.82
                     23101WVGILS           94/07/28  13:14:07         $9.43        $4.88        $3.75       $18.06
                     23101WVGILS           94/07/28  14:22:57        $42.96       $26.46       $18.20       $87.62
                     23101WVGILS           94/07/28  18:43:31         $4.33        $5.03        $2.64       $12.00
                     23101WVGILS           94/07/28  19:09:40          $.63        $1.21         $.56        $2.40
                     23101WVGILS           94/07/28  19:16:24        $16.15       $12.65        $6.11       $34.91
                     23101WVGILS           94/07/28  20:53:26          $.27         $.39         $.28       $1.00M
                     23101WVGILS           94/07/28  20:55:09          $.04         $.19         $.28       $1.00M
                     23101WVGILS           94/07/28  20:57:27        $27.85        $9.74        $5.00       $42.59
                     23102RRUEDISUELI      94/07/28  08:44:16         $4.64         $.33         $.28        $5.25
                     23102RRUEDISUELI      94/07/28  11:32:36          $.23         $.48         $.42        $1.13
                     23102RRUEDISUELI      94/07/28  15:47:55         $7.85        $4.59        $2.64       $15.08
                     23103TSPIJKERS        94/07/28  13:16:21         $9.64        $3.75        $2.78       $16.17
                     23103TSPIJKERS        94/07/28  14:15:08         $8.54        $4.35        $2.64       $15.53
                     23103TSPIJKERS        94/07/28  15:14:57          $.04         $.18         $.28       $1.00M
                     23103TSPIJKERS        94/07/28  15:16:25        $10.31        $8.09        $4.45       $22.85
                     23103TSPIJKERS        94/07/28  16:19:14          $.30        $1.83         $.97        $3.10
                     23105PDJONGH          94/07/28  13:18:51          $.10         $.50         $.42        $1.02
                     23109ALGEMEEN100      94/07/28  21:44:40        $18.83       $12.59        $6.67       $38.09
                     23109ALGEMEEN100      94/07/28  23:46:55          $.06         $.29         $.28       $1.00M
                     23111THMOLTHOF        94/07/28  11:23:23          $.40         $.59         $.56        $1.55
                     23111THMOLTHOF        94/07/28  11:36:58          $.10         $.24         $.28       $1.00M
                     23111THMOLTHOF        94/07/28  11:37:46         $1.58         $.69         $.42        $2.69
                     23111THMOLTHOF        94/07/28  13:08:02          $.16         $.29         $.28       $1.00M
                     23111THMOLTHOF        94/07/28  14:45:52        $33.61        $5.02        $3.20       $41.83
                     23114ABRENDERS        94/07/28  13:03:07          $.23         $.48         $.28       $1.00M
                     23121PLANNING         94/07/28  08:38:48        $32.01        $6.05        $5.14       $43.20
                     23131TAPEPOOL         94/07/28  08:11:30          $.07        $1.37        $1.53        $2.97
                     23131TAPEPOOL         94/07/28  08:12:04          $.04         $.24         $.42       $1.00M
                     23131TAPEPOOL         94/07/28  08:12:41          $.07         $.15         $.28       $1.00M
                     23131TAPEPOOL         94/07/28  10:45:05          $.16         $.28         $.42       $1.00M
                     23131TAPEPOOL         94/07/28  10:47:29          $.16         $.49         $.56        $1.21
                     23131TAPEPOOL         94/07/28  14:14:18          $.13         $.37         $.56        $1.06
                     23131TAPEPOOL         94/07/28  15:15:23          $.14         $.37         $.56        $1.07
                     23131TAPEPOOL         94/07/28  15:46:24          $.24         $.18         $.28       $1.00M
                     23131TAPEPOOL         94/07/28  16:18:25          $.12         $.32         $.42       $1.00M
                     23131TAPEPOOL         94/07/28  18:06:19          $.11         $.26         $.42       $1.00M
                     23131TAPEPOOL         94/07/28  18:41:59          $.20         $.29         $.42       $1.00M
                     23149ALGEMEEN500      94/07/28  10:38:24        $78.10        $1.89        $1.25       $81.24
                     23149ALGEMEEN500      94/07/28  19:25:36        $10.42         $.57         $.42       $11.41
```

Roscoe User Charge Summary Report (5 of 5):

```
                                R O S C O E   U S E R   C H A R G E   S U M M A R Y
BEGIN DATE - 07/28/94                                                                        RUN DATE - 08/17/94
END DATE   - 07/28/94                                                                                   PAGE   5
                                             SIGNON    SIGNON      CONNECT      PROCESS         I/O        TOTAL
DESCRIPTION           USER SIGNON KEY          DATE      TIME       CHARGE       CHARGE      CHARGE       CHARGE

FINANCE                                                            $346.74      $130.86      $84.42      $565.78
                                                                   $779.37      $539.30     $405.79    $1,738.33

CAJS003I NORMAL END OF PROCESSING
```

EXTDATA Reports

There are sample CA Earl and CA Easytrieve reports that will process the Roscoe Interface EXTDATA records.

Note: The EXTDATA record layout is described in the chapter "EXTDATA Reporting" in the *User Guide.*

```
OPTION LIST OFF
NOTE ******************************************************************
NOTE *  REPORT ID:      ERXTR001                                       *
NOTE *  REPORT NAME:    ROSCOE SESSION ANALYSIS                        *
NOTE *                                                                 *
NOTE *  DESCRIPTION:    THIS SUMMARY REPORT WILL COLLATE ROSCOE        *
NOTE *                  SESSION PROCESSING BY USER KEY.  PLEASE NOTE   *
NOTE *                  THAT THE ROSCOE JOB NAME WILL NOT BE AVAILABLE*
NOTE *                  UNLESS THE INPUT SOURCE DATA TO THE EXTDATA    *
NOTE *                  GENERATOR (THE ROSCOE INTERFACE) WAS ROSCOE    *
NOTE *                  SMF DATA.                                      *
NOTE *                                                                 *
NOTE *                  FOR EACH SESSION, THE ELAPSED TIME, CPU TIME, *
NOTE *                  TOTAL I/O COUNT, AND JOBS SUBMITTED COUNT WILL*
NOTE *                  BE DISPLAYED.                                  *
NOTE *  RECORD TYPES:   MRXTHDR,                                       *
NOTE *                  MRXTSIER                                       *
NOTE *  EXTDATA RECORD: SIER                                           *
NOTE *  MACROS:                                                        *
NOTE ******************************************************************
OPTION PRINTER = 132
OPTION PAGE = 60
OPTION PRECISION = ALL
OPTION CPAGE = 60
HISTIN:  FILE JARS RECORD=3697
  DEF INAREA                    1-3697  X
  COPY MRXTHDR
  COPY MRXTSIER
NOTE ******************************************************************
NOTE * SELECTING FROM HISTORY FILE EXTDATA, SPECIFICALLY SIER         *
NOTE ******************************************************************
!
IF     PROCID NOT = ':' OR
       EXTTYPE NOT = 'SIER'
       THEN GOTO START
ENDIF
!
NOTE ******************************************************************
NOTE *                REPORT PROCESSING SECTION                        *
NOTE ******************************************************************
!
```

```
REPORT 'ROSCOE SESSION ANALYSIS'
TITLE ' '
TITLE @1 'REPORT ID: ERXTR001'    @54 'SYSTEM ID:'  SID
TITLE @1 'SOURCE   : ROSCOE'      @54 '   ROSCOE:'  EXTSIER_ROS_JOBNAME
TITLE                             @54 ' USER KEY:'  EXTSIER_KEY_FULL
TITLE                             @54 '  ACCOUNT:'  EXTSIER_ACCOUNT
TITLE ' '
!
CONTROL    (EXTSIER_ROS_JOBNAME)  (EXTSIER_KEY_FULL)
           (EXTSIER_ACCOUNT) SKIP EXTSIER_SON_DATE
           EXTSIER_SON_TIME
!
PRINT
      @1 ' '
         EXTSIER_SON_DATE
         EXTSIER_SON_TIME
         EXTSIER_ELAP_TIME
         EXTSIER_TOT_IOS
         EXTSIER_CPU_TIME
         EXTSIER_JOBS_SUB
END

LIST OFF
******************************************************************
*  REPORT ID:      EZXTR001                                      *
*  REPORT NAME:    ROSCOE SESSION ACTIVITY SUMMARY               *
*  DESCRIPTION:    THIS SUMMARY REPORT WILL COLLATE ROSCOE       *
*                  SESSION PROCESSING BY USER KEY.  PLEASE NOTE  *
*                  THAT THE ROSCOE JOB NAME WILL NOT BE AVAILABLE*
*                  UNLESS THE INPUT SOURCE DATA TO THE EXTDATA   *
*                  GENERATOR (THE ROSCOE INTERFACE) WAS ROSCOE   *
*                  SMF DATA.                                     *
*                                                                *
*                  FOR EACH SESSION, THE ELAPSED TIME, CPU TIME, *
*                  TOTAL I/O COUNT, AND JOBS SUBMITTED COUNT WILL*
*                  BE DISPLAYED.                                 *
*                                                                *
*  RECORD TYPES:   MZXTHDR,                                      *
*                  MZXTSIER                                      *
*                                                                *
*  EXTDATA RECORD: SIER                                          *
*                                                                *
******************************************************************
PARM ABEXIT (SNAP) DEBUG (FLDCHK STATE)
FILE EXTDATA
%MZXTHDR
%MZXTSIER
*
JOB INPUT EXTDATA
IF     PROCID  = ':' AND EXTTYPE = 'SIER'
```

```
       GOTO PROCESS_DATA
       ELSE
       GOTO JOB
END-IF
PROCESS_DATA
*
PRINT REPORT1
*
REPORT REPORT1 SPACE 0 PAGESIZE (60 60) LINESIZE 132 NOADJUST
*
SEQUENCE EXTSIER_ROS_JOBNAME EXTSIER_KEY_FULL EXTSIER_ACCOUNT         +
         EXTSIER_SON_DATE EXTSIER_SON_TIME
*
CONTROL  EXTSIER_ROS_JOBNAME EXTSIER_KEY_FULL EXTSIER_ACCOUNT NEWPAGE
*
TITLE 01 COL 48 'ROSCOE SESSION ACTIVITY SUMMARY'
TITLE 02 ' '
TITLE 03 COL 1 'REPORT ID: EZXTR001'    COL 54 'SYSTEM ID      ' SID
TITLE 04 COL 1 'SOURCE   : ROSCOE'      COL 54 'ROSCOE         '      +
                                        EXTSIER_ROS_JOBNAME
TITLE 05                                COL 54 'USER KEY       '      +
                                        EXTSIER_KEY_FULL
TITLE 06                                COL 54 'ACCOUNT        '      +
                                        EXTSIER_ACCOUNT
LINE   EXTSIER_SON_DATE    '   ' +
       EXTSIER_SON_TIME    '   ' +
       EXTSIER_ELAP_TIME   '   ' +
       EXTSIER_TOT_IOS     '   ' +
       EXTSIER_CPU_TIME    '   ' +
       EXTSIER_JOBS_SUB
```

The sample output will look like this:

```
121/01/04                                          ROSCOE SESSION ANALYSIS

 REPORT ID: ERXTR001                               SYSTEM ID:      XAE1
 SOURCE    : ROSCOE                                   ROSCOE:      ROSCOE60
                                                    USER KEY:      CHIWA01
                                                     ACCOUNT:      _______________

 ------------------------------------------------------------------------------------------------------------------------------
        SIGN ON       SIGN ON          ELAPSED              TOTAL          CPU TIME          JOBS
           DATE          TIME         TIME (HR)               IOS        (TM UNITS)      SUBMITTED
 ------------------------------------------------------------------------------------------------------------------------------
       02/11/18      12:07:53          2.07662               5768                22              0
       02/11/18      15:43:43          4.11261                428                 3              1
121/01/04                                          ROSCOE SESSION ANALYSIS

 REPORT ID: ERXTR001                               SYSTEM ID:      XAE1
 SOURCE    : ROSCOE                                   ROSCOE:      ROSCOE60
                                                    USER KEY:      COLDE05
                                                     ACCOUNT:      _______________

 ------------------------------------------------------------------------------------------------------------------------------
        SIGN ON       SIGN ON          ELAPSED              TOTAL          CPU TIME          JOBS
           DATE          TIME         TIME (HR)               IOS        (TM UNITS)      SUBMITTED
 ------------------------------------------------------------------------------------------------------------------------------
       02/11/18      13:30:33          0.02614                309                 4              7
       02/11/18      13:32:11          3.53465               2938               250              5
```

Reporting Considerations

This section identifies those areas of the Report Writer operation that are affected by the introduction of Roscoe data. Specifically, the Basic Accounting Table, the Output Data Elements Table, and the TSORATE statement are replaced when producing reports with the CA JARS Interface to Roscoe data.

Roscoe Basic Accounting Table

The following table replaces the batch Basic Accounting Table for designing Roscoe reports:

Interface to Roscoe Basic Accounting Table:

Field Name	Field Position	Field Length	FMT	Notes	DE ID
CPU Identification	1	1	a	57	
Reserved	2-3	2	-		
Signon Date	4-9	6	a	YYMMDD	60
Signon Time	10-15	6	a	HHMMSS	61
Job Name	16-23	8	a	user sign-on key (1-8)	04

Field Name	Field Position	Field Length	FMT	Notes	DE ID
Reserved	24-27	4	-		
Processing ID	23	1	a	"t"	03
Record ID	29-36	8	a	"*Roscoe*"	10
Start Time	37-42	6	a	HHMMSS Sign-on Time or SMF Roscoe Start Time	12
Run Date	43-48	6	a	YYMMDD Sign-on Date or SMF Roscoe Start Date	06
Job Class	49-50	2	a	"v "	07
Signoff Time	51-56	6	a	HHMMSS	13
User Signon Key	57-76	20	a	User Sign-on Key	58
Reserved	77-98	22	-		
Terminal VTAM ID	99-106	8	a	VTAM Terminal Name	11
Roscoe Job Name	107-114	8	a	Smf Roscoe job name	05
Reserved	115-125	10	-		
User Session ID	126-130	5	a	User session ID	14
Reserved	131-170	40	-		
Elapsed Time	171-176	6	p	In hours, to 5 decimal places	25, 65, 90
Total CPU Time	177-182	6	p	In hours, to 5 decimal places	26, 66, 91
Reserved	183-240	58			
Disk Access	241-247	7	p	38	
Terminal Access	248-254	7	p	39	
Total Accesses	255-261	7	p	40	
I/O Index	262-265	4	p	78	
Reserved	266-295	30			
Group Code #1 Group Code #2 Group Code #3	296 297 298	1 1 1	a a a	Blank unless filled by Grouping feature	84 85 86
Reserved	299-300	2			

Field Name	Field Position	Field Length	FMT	Notes	DE ID
User Terminal ID	300-308	8			A0
Reserved	309-364	56	-		
Jobs Submitted	365-368	4	p		A5
Reserved	369-372		P		
Active Time	373-378	6	p	In hours, to 5 decimal places	A7, A8, A9
Connect Time	379-384	6	p	In hours, to 5 decimal places	B0, B1, B2
Reserved	385-390	6	-		
Resident Time	391-396	6	p	In hours, to 5 decimal places	B0, B1, B2
Reserved	397-402	6	-		
TCB CPU Time	403-408	6	p	In hours, to 5 decimal places.	C7, C8, C9
Reserved	409-428	19	-		
Terminal UCB Number	429-431	3	a		B6
Terminal Type	432-434	3	a		B7
Reserved	435-436	2	-		
Day of Week Code	437	1	a		D5, D6
Group Code #4 Group Code #5 Group Code #6	438 439 440	1 1 1	a a a	Blank unless filled by grouping feature.	D7 D8 D9
Reserved	441-445	5	-		
Roscoe Session ID	446-453	8	a		E4
Reserved	454-502	81	-		
User Account Field	503-518	16	E		F3
User Count Field	535-539	5	p		F5

Field Name	Field Position	Field Length	FMT	Notes	DE ID
Reserved	540-550	11	-		
Processor Time	551-556	6	p	999999V99999C hours	29,69
Processor Charge	557-562	6	p	999999999V99C dollars	44
I/O Time	563-568	6	p	999999V99999C hours	30,70
I/O Charge	569-574	6	p	999999999V99C dollars	45
Reserved	575-584	10	-		
Total Charge	585-590	6	p	999999999V99C dollars	46
Reserved	591-597	7	-		
Connect Charge	598-602	5	p	9999999V99C dollars	B3
Reserved	603-608	6	-		

Format Indicator: a=alphameric; p=packed decimal.

Chapter 7: The Tape Volume Accounting Interface

The Tape Volume Accounting Interface (TVA) is distributed as part of the CA JARS family of products. It provides a mechanism for users of CA tape management software packages (CA 1 and CA DYNAM/TLMS) to:

- Account for tape volume usage
- Add charges for tape volume usage to your CA JARS reports

This section contains the following topics:

Functional Description

The TVA Interface extracts information from the tape management system master file and creates billing records. The input to the interface is either the TMC (for CA 1) or VMF (for CA DYNAM/TLMS) master file, or both. A control statement is read by the interface to determine the billing period and type of master file(s) being input. The output is a billing file for subsequent processing by CA JARS Wizard.

The TVA Interface executes on the assumption that your tape management system master file contains an account number. For CA 1, the account number is taken from the TMC TMUSER field. For CA DYNAM/TLMS, the account number is taken from the VMF BAJOBACC field.

Note: It is your responsibility to ensure that a valid account number is contained in the appropriate field for your tape management system.

The TVA job streams test for blank account numbers. If found, the account *MISC.ACCOUNT* is utilized. This account can be changed to meet your requirements by modification of the CA JARS Wizard COMPUTE statement. Refer to the JR70TVA1 and JR70TVA2 CA JARS Wizard control statements in CAJROPTN for details.

This interface can also be used to generate EXTDATA records. EXTDATA records can be used for reporting with CA EARL and CA Easytrieve. The layout and format of the EXTDATA records are described in the chapter "EXTDATA Reporting" in the *User Guide.*

In addition, the EXTDATA records can be used in conjunction with CA PMA Chargeback to create billing and chargeback systems for tape resource utilization.

21st Century Support

Due to architectural limitations, the date normalization routines will not process dates beyond 2027 properly. Therefore, dates may only be between January 1, 1960 and December 31, 2027 for normalization logic. Tape catalog dates beyond 2027 are treated as the last day of 2027 for purposes of determining slot times.

CA DYNAM/TLMS does not keep the actual EXPDT values in its catalog, depending on the TLMS options in effect. However, TLMS always maintains the scratched date. If this date is zero, then the tape is active, otherwise, by definition, the field contains the date the tape was scratched. In order to calculate the slot time, CA use these field contents as follows:

- If it is non-zero, CA uses its contents directly.
- If it is zero, CA uses the value from the end date (control card).

Control card date format is MM/DD/YY. Anytime 'YY' is less than 60, it will be treated as if it were 20YY. For example, in the 21st century.

Operating Instructions

The TVA Interface should be run as the last step of the CA 1 TMSCLEAN, or CA DYNAM/TLMS Tape Retention System execution. The region size suggested to execute the interface is approximately 150K. The TVA Interface reads a required input control statement to determine the billing period and the type of input. The control statement is read through CAIJFIN in the following format.

TVA Control Statement Layout

Position	Field Length	Fmt	Field Name	Notes
1-8	8	a	Start Date	Start date of billing period (see note below)
9	1		Reserved	
10-17	8	a	End Date	End date of billing period (see note below)
18	1		Reserved	
19-22	4	a	Tape System Flag 1	CA 1: CA 1 TMC input TLMS: CA DYNAM/TLMS VMF input Default is CA 1

Position	Field Length	Fmt	Field Name	Notes
23	1		Reserved	
24-27	4	a	Tape System Flag 2	CA 1: CA 1 TMC input TLMS: CA DYNAM/TLMS VMF input Default is CA 1

Note: The Start Date and End Date field names are used to filter data from the input for a user defined billing period. If left blank the field name defaults to the current system date.

TVA File Names

The interface requires several files to execute. The following table provides a list of these files, their data set names, and a description of each.

DDName	Description
STEPLIB	This statement describes the load library loaded from the distribution tape.
CAIJFPR	This statement describes the SYSOUT data set for generated display messages and reports.
CAIJFSN	This statement describes the SYSOUT data set for generated SNAP dumps.
CAIJFIN	This statement describes the data set that contains the TVA control statement.
CAIJSACT	This optional DD statement indicates to the interfact that EXTDATA records are to be written as well. This file must have these attributes: RECFM=VB LRECL=8188 BLKSIZE=8192 or more
CAIVMFI	This optional statement describes the input file (CA DYNAM/TLMS VMF) to be processed. It is required if *TLMS* is specified in the TVA control statement.
CAITMCI	This optional statement describes the input file (CA 1 TMC) to be processed. It is required if *CA 1* or the default is specified in the TVA control statement.

DDName	Description
CAITVAS6	This statement describes the output file written by TVA. This is the file that is processed later by CA JARS Wizard to create debit statements and reports. Since TVA is run as the last step in your daily tape system clean job, it is suggested that this file be defined as a GDG. This file must have the following attributes: RECFM=FB LRECL=270 BLKSIZE=6750

TVA Sample JCL

The following is a sample run deck for executing the TVA Interface.

```
//TVARUN   JOB ,'RUN TVA INTERFACE',CLASS=A,MSGCLASS=M
//*
//* DOC:   THIS JOB EXECUTES THE CA JARS/TVA INTERFACE PROGRAM
//*        THIS JCL REFERS TO DATA SET NAME CAI.CAJRLOAD ON THE
//*        STEPLIB DD. THIS NAME MUST MATCH THE ONE WITH WHICH
//*        YOU LOADED THE LOAD LIBRARY FROM THE DISTRIBUTION TAPE.
//*
//*        CAIJFPR   DD   TVA MESSAGE AND REPORT OUTPUT
//*        CAIJFSN   DD   SNAP DUMP
//*        CAIJRIN   DD   CONTROL CARD INPUT (INPUT CONTROL CARD REQUIRED
//*        CAIVMFI   DD   CA DYNAM/TLMS INPUT MASTER FILE
//*                       (OPTIONAL DEPENDING ON CONTROL CARD)
//*        CAITMCI   DD   CA 1 INPUT MASTER FILE
//*                       (OPTIONAL DEPENDING ON CONTROL CARD)
//*        CAITVAS6  DD   TVA OUTPUT BILLING FILE
//*
//TVA01   EXEC PGM=JSTA0020,REGION=150K
//*
//STEPLIB  DD  DSN=CAI.CAJRLOAD,DISP=SHR
//*
//CAIJFPR  DD  SYSOUT=*
//CAIJFSN  DD  SYSOUT=*
//SYSPRINT DD  SYSOUT=*
//CAIJFIN  DD   *
MM/DD/YY MM/DD/YY CA 1       (ONLY CA 1 MASTER FILE IS PROCESSED)
 OR
MM/DD/YY MM/DD/YY CA 1 CA 1  (ONLY CA 1 MASTER FILE IS PROCESSED)
 OR
MM/DD/YY MM/DD/YY TLMS       (ONLY TLMS MASTER FILE IS PROCESSED)
 OR
MM/DD/YY MM/DD/YY TLMS TLMS  (ONLY TLMS MASTER FILE IS PROCESSED)
 OR
MM/DD/YY MM/DD/YY CA 1 TLMS  (BOTH MASTER FILES ARE PROCESSED)
 OR
MM/DD/YY MM/DD/YY TLMS CA 1  (BOTH MASTER FILES ARE PROCESSED)
 OR
MM/DD/YY MM/DD/YY      TLMS  (BOTH MASTER FILES ARE PROCESSED)
 OR
MM/DD/YY MM/DD/YY      CA 1  (ONLY CA 1 MASTER FILE IS PROCESSED)
 OR
MM/DD/YY MM/DD/YY            (ONLY CA 1 MASTER FILE IS PROCESSED)
/*
//CAIVMFI  DD   DSN=TLMS.VMF.MASTER.FILE,DISP=SHR
//CAITMCI  DD   DSN=CA 1.TMC.MASTER.FILE,DISP=SHR
//CAITVAS6 DD   DSN=TVA.BILLING.FILE,DISP=(,CATLG,DELETE),
```

```
//         DCB=(RECFM=FB,LRECL=270,BLKSIZE=6750),
//         SPACE=(CYL(5,5)),
//         UNIT=SYSDA,VOL=SER=WORK01
//CAIJSACT  DD DSN=CAI.TVA.EXTDATA,
//          DISP=(NEW,CATLG,DELETE),
//          UNIT=uuuu,
//          SPACE=(CYL,(pp,ss),RLSE),
//          DCB=(RECFM=VB,LRECL=8188,BLKSIZE=bbbb),
//          VOL=SER=vvvvvv
/*
//
```

Sample Reports

The interface uses the CA JARS Wizard Report Writer to read the TVA billing file. A record description for the TVA billing file is provided in the CA JARS Wizard combined billing glossary, JR70CBF. Two sample reports, created using CA JARS Wizard, are also provided with the interface. The report samples shown in this chapter are intended to illustrate the use of CA JARS Wizard **not** how to charge for tape volume usage.

Sample reports are also provided for EXTDATA using CA EARL and CA Easytrieve. Again these sample are provided to illustrate the use of EXTDATA in reporting, and **not** to illustrate the use of the generated EXTDATA for chargeback.

Distributed Sample Source Code

The first report, JR70TVA1, shows how CA JARS debit records can be created. The debit records are read in a product run that reports on charges by account. Tape volume usage charges are added to the other charges that are calculated on an account basis.

The second report, JR70TVA2, is a sample report showing tape volume usage by account number. Each report is described on the following pages. A description of the JR70CBF glossary is contained in the *CA JARS Wizard Reference Guide*. A complete description of the function of the JR70CBF glossary is provided in "Appendix B" of the *Systems Programmer Guide*. A description of the CA JARS Wizard data element names to use in CA JARS Wizard programs to process the TVA billing records is contained later in this chapter. TVA Data Elements (see page 257)

The source code for both of these CA JARS Wizard programs is distributed in the **AAJ1OPTN** distribution library and is copied to CAJROPTN at APPLY time by SMP. You are encouraged to use these programs as samples to help you develop your own CA JARS Wizard programs to process the TVA billing data.

JR70TVA1: Debit Record Creation

In JR70TVA1, CA JARS Wizard is used to:

- Calculate the charge for the user. In this sample the charge is based on the elapsed time of use of a tape volume. Because CA JARS Wizard has a flexible language for computing new fields, and since information about the tape volume is carried in the TVA billing record, the charge can be based on anything in the record. For example, a surcharge could be charged for 1600 BPI density tape volumes.
- Sum the charges for the account and print a report showing the charge by account.
- Write a debit record for each account. The debit record contains the account information and the charge that was calculated. All debit records are in a CA JARS run that reports on charges by account. The charge for tape volume usage is added to the other charges that are calculated on an account basis.

JR70TVA1 executes on the assumption that your tape management system master file contains an account number. For CA 1, the account number is taken from the TMC TMUSER field. For CA DYNAM/TLMS, the account number is taken from the VMF BAJOBACC field.

Note: It is your responsibility to ensure that a valid account number is contained in the appropriate field for your tape management system.

JR70TVA1 does test for a blank account number. If found, JR70TVA1 uses the account *MISC.ACCOUNT* for the account number. You can alter this accordingly.

Be sure to include DD statements for the following ddnames:

- CAIJWI (your TVA billing file)
- CAIJOP (the report file for the debit record)

The sample report produced with the debit record output file with JR70TVA1 is shown next.

```
                              TOTAL TAPE SYSTEM CHARGES BY ACCOUNT                        18 OCT 1998 PAGE    1

                                                     TVA BILLING
                              ACCOUNT NUMBER   TOTAL CHARGE    RECORDS   DAYS OF USAGE
                             ----------------  -------------  -----------  -------------

                                   AMOCO           $145.00          1             29
                              CAP1.FIMS.FEDX       $145.00          1             29
                              TERRY DENNIS         $145.00          1             29
                             BETTYE SPARKS         $435.00          3             87
                             BEV HALWA             $145.00          1             29
                             BF-MEMBERS 6/79       $145.00          1             29
                             BILL VALLIERE       $1,015.00          7            203
                             BKUP DS 080679        $580.00          4            116
                             BKUP HAW MOVE         $145.00          1             29
                             BKUP MIMS 1.3         $145.00          1             29
                             BKUP OF OPT.REL       $145.00          1             29
                             BKUP OF TLMSII        $145.00          1             29
                             BKUP REL-1.2          $145.00          1             29
                             BKUP SL,RL,CL,R       $145.00          1             29
                             BKUP 79-REL 2.0       $145.00          1             29
                             BKUP-071578-1.0       $145.00          1             29
                                    .
                                    .
                                    .

                                                     TVA BILLING
                              ACCOUNT NUMBER   TOTAL CHARGE    RECORDS   DAYS OF USAGE
                             ----------------  -------------  -----------  -------------

GRAND TOTAL                                  $1,581,175.00     11,977        316,235
```

JR70TVA1 Control Statements

```
PARAMETER XREF
CALL WIZSETT
INPUT JR70CBF
DEFINE OFILL1(1)(C) = ' '
DEFINE ODEBIT(8)(C) = 'DEBIT   '
DEFINE OCPUID(1)(C) = ' '
DEFINE OUSERID(8)(C) = ' '
DEFINE ODATE(6)(C) = 'yymmdd'
DEFINE OJOB(8)(C) = 'TVA-PROC'
DEFINE OTIME(6)(C) = 'hhmmss'
DEFINE OPROGRAMMER(20)(C) = ' '
DEFINE ODEBITAMT(6)(P)(.2) = 0
DEFINE ORENTDAYS(6)(P) = 0
DEFINE USEDAYS(6)(P) = 0
COMPUTE MOVE TODAY TO ODATE(6)(YYMMDD)
COMPUTE WKTIM(6)(P) = TOD
COMPUTE WKHRS(6)(N)(.4) = WKTIM / 3600
COMPUTE WKHR2(2)(C) = WKHRS
COMPUTE WKMIN(6)(N)(.4) = (WKTIM / 60) - (WKHR2 * 60)
COMPUTE WKMI2(2)(C) = WKMIN
COMPUTE WKSEC(2)(N) = WKTIM - ((WKHR2 * 3600) + (WKMI2 * 60))
COMPUTE OTIME(1,2) = WKHRS
COMPUTE OTIME(3,2) = WKMIN
COMPUTE OTIME(5,2) = WKSEC
SELECT REC/TYPE EQ 'T' AND SUB/REC/TYPE EQ 'M'
COMPUTE(P) IF T.ACCOUNT/NUMBER EQ BLANK THEN
              OACCT(C)(16) EQ 'MISC. ACCOUNT   ' ELSE
              OACCT EQ T.ACCOUNT/NUMBER
COMPUTE RENTDAYS = (RENTDAYS + VOL/RENT/TIME)
COMPUTE USEDAYS = (RENTDAYS / 86400)
COMPUTE ODEBITAMT = (USEDAYS * 0.1250)
SORT OACCT, T.VOLUME/SERIAL
BREAK OACCT
HEADING1C TOTAL TAPE SYSTEM CHARGES BY ACCOUNT
LIST (SUM) OACCT 'ACCOUNT NUMBER', ODEBITAMT($) 'TOTAL CHARGE',
     COUNT 'TVA BILLING/RECORDS', USEDAYS 'DAYS OF USAGE'
OUTPUT (SUM) FILE,RECFM=FB,R=80,B=800,
   ITEM = OFILL1,ODEBIT,OCPUID,OUSERID,OACCT,ODATE,OJOB,OTIME,
   OPROGRAMMER,ODEBITAMT
```

JR70TVA1 Execution Description

The control statements used in JR70TVA1 are described below. Complete descriptions of all CA JARS Wizard control statements can be found in the *CA JARS Wizard Reference Guide*.

PARAMETER

This control statement specifies options for a CA JARS Wizard run. XREF creates a cross reference of the data fields used in the run and the statements they are found in. This cross reference listing is printed in addition to the control statements and the report for the run.

INPUT

The INPUT statement identifies the CA JARS Wizard glossary or the input files for the run. In JR70TVA1, the INPUT statement lists the JR70CBF glossary as the glossary for the primary input file for the run.

DEFINE

11 DEFINE statements are given in JR70TVA1. Each define a field for the run.

The first nine DEFINE statements define fields for the debit record:

1. OFILL1:

One byte field. Initialized as a blank.

2. ODEBIT:

Eight byte field. Initialized as DEBIT. This field identifies the statement as a DEBIT statement.

3. OCPUID:

One byte field. Initialized as a blank: used to identify the CPU.

4. OUSERID:

Eight byte field. Initialized as blanks: used for user identification.

5. ODATE:

Six byte field. Initialized as blanks: used for the date (YYMMDD).

6. OJOB:

Eight byte field. Initialized as blanks: used for the job name.

7. OTIME:

Six byte field. Initialized as blanks: used for the time (HHMMSS).

8. PROGRAMMER:

Twenty byte field. Initialized as blanks: used to identify the programmer.

9. ODEBITAMT:

Six byte field. Initialized as zero: used for the debit amount.

The remaining DEFINE statements are

10. RENTDAYS:

Six byte field. Used to hold the number of seconds of tape volume usage.

11. USEDAY:

Six byte field. Used to hold the number of days of tape volume usage.

SELECT

SELECT statements indicate which records in the primary input file are to be processed. JR70TVA1 uses the JR70CBF glossary for combined billing. In JR70TVA1, the SELECT statement identifies the record type to be processed (T) and the subrecord type to be processed (M). This identifies the JR70CBF record type and subrecord type for the TVA billing records.

COMPUTE

Four COMPUTE statements are executed in JR70TVA1:

The first COMPUTE statement evaluates the value of the account number contained in the billing record. It also defines a new field, OACCT (16 bytes), and assigns a value to it based on the results of the evaluation. If the account number is blank, OACCT is assigned the value of *MISC.ACCOUNT.* Otherwise, OACCT is assigned the value of the account number.

Notice the (P) suffix code appended to the first compute statement. This suffix indicates that the COMPUTE should take place before the primary input file is sorted. This is needed since the SORT occurs on OACCT field.

The remaining three COMPUTE statements assign values to the fields: RENTDAYS, USEDAYS, and ODEBITAMT. RENTDAYS is assigned the value of the total number of seconds of tape volume usage for an account. USEDAYS is assigned the value of the total number of days of tape volume usage for an account; it is computed using RENTDAYS divided by the number of seconds in a day (86400). ODEBITAMT is assigned the charge for tape volume usage.

SORT

This statement identifies the sequence in which the input records should be sorted prior to processing. Here the sort is performed on OACCT (the account number) and T.VOLUME/SERIAL (the tape's volume serial number).

BREAK

This statement is used to define logical group of records. Here data is split into groups by OACCT. Records with the same account number is grouped together.

HEADING

HEADING specifies a title for the report. The title for this report is TOTAL TAPE SYSTEM CHARGES BY ACCOUNT.

LIST(SUM)

A summary listing is requested with the output file. Each line of the summary listing lists the debit information for a different account. The LIST(SUM) statement identifies the date fields to be summarized and printed. This data includes the:

- Account number
- Calculated total charge for the account
- Number of TVA billing records for the account
- Number of days of tape volume usage for the account

OUTPUT

One debit record is produced for each unique account. All records are written to the file identified by ddname CAIJWOP. The OUTPUT statement lists the fields to be included in each debit record.

JR70TVA2 Report Sample

The following report shows tape volume usage by account number.

```
1                                     TAPE VOLUME USAGE BY ACCOUNT                          02 NOV 1994 PAGE  161

                                                                                 DAYS
                                ACCOUNT         VOLUME     CREATION     EXPIRATION       OF VOLUME
                                NUMBER          SERIAL         DATE           DATE           USAGE
                           ----------------     ------     --------     ----------     -------------
                          *CONTINUED*
                           111111-11            009722      0092272        0000000              31
                           111111-11            009800      0092263        0000000              31
                           111111-11            009814      0092236        0000000              31
                           111111-11            009849      0092265        0000000              31
                           111111-11            009862      0092267        0000000              31
                           111111-11            009961      0092263        0000000              31
                           111111-11            009975      0092272        0000000              31
                           111111-11            010179      0092266        0000000              31
                           111111-11            010185      0092242        0000000              31
                           111111-11            010213      0092271        0000000              31
                           111111-11            010216      0092271        0000000              31
                           111111-11            010243      0092264        0000000              31
                           111111-11            010246      0092271        0000000              31
                           111111-11            010262      0092271        0000000              31
                           111111-11            010268      0092271        0000000              31
                           111111-11            010355      0092267        0000000              31
                           111111-11            010424      0092212        0000000              31
                           111111-11            010433      0092264        0000000              31
                           111111-11            010458      0092271        0000000              31
                           111111-11            010459      0092271        0000000              31
                           111111-11            010472      0092256        0000000              31
                           111111-11            010518      0092228        0000000              31
                           111111-11            010636      0092271        0000000              31
                           111111-11            010645      0092236        0000000              31
                           111111-11            010651      0092264        0000000              31
                           111111-11            010670      0092271        0000000              31
                           111111-11            010677      0092266        0000000              31
                           111111-11            011436      0092242        0000000              31
                           111111-11            011439      0092228        0000000              31
                           111111-11            011446      0092236        0000000              31
                           111111-11            011447      0092228        0000000              31
                           111111-11            011471      0092257        0000000              31
                           111111-11            011477      0092236        0000000              31
                           111111-11            011517      0092268        0000000              31
                           111111-11            011537      0092228        0000000              31
                           111111-11            011569      0092265        0000000              31
                           111111-11            011572      0092267        0000000              31
                           111111-11            011596      0092264        0000000              31
                           111111-11            011603      0092272        0000000              31
                           111111-11            011641      0092272        0000000              31
                           111111-11            011650      0092272        0000000              31
                           111111-11            011662      0092265        0000000              31
                           111111-11            011701      0092263        0000000              31
                           111111-11            011714      0092256        0000000              31
                           111111-11            011740      0092265        0000000              31
                           111111-11            011753      0092256        0000000              31
                           111111-11            011802      0092272        0000000              31
                           111111-11            011825      0092264        0000000              31
                           111111-11            011830      0092263        0000000              31
                           111111-11            011854      0092272        0000000              31
                           111111-11            011861      0092228        0000000              31
                           111111-11            011869      0092272        0000000              31
                           111111-11            011913      0092272        0000000              31
                           111111-11            011916      0092272        0000000              31
                           111111-11            011959      0092261        0000000              31
                           111111-11            011974      0092272        0000000              31
                           111111-11            011984      0092261        0000000              31
                                                                                   -------------
 0ACCT TOTAL               111111-11                                                       9,052

   GRAND TOTAL                                                                           244,125
```

JR70TVA2 Control Statements

```
PARAMETER XREF
INPUT JR70CBF
DEFINE RENTDAYS(6)(P) = 0
DEFINE CRTDT(4)(P) = 0
DEFINE SCRTDT(4)(P) = 0
SELECT REC/TYPE EQ 'T' AND SUB/REC/TYPE EQ 'M'
COMPUTE(P) IF T.ACCOUNT/NUMBER EQ BLANK THEN
              OACCT(C)(16) EQ 'MISC. ACCOUNT   ' ELSE
              OACCT EQ T.ACCOUNT/NUMBER
COMPUTE CRTDT EQ T.CREATE/DATE
COMPUTE SCRTDT EQ T.SCRATCH/DATE
COMPUTE RENTDAYS = (VOL/RENT/TIME / 86400)
SORT OACCT, T.VOLUME/SERIAL
BREAK OACCT
HEADING1C TAPE VOLUME USAGE BY ACCOUNT
LIST OACCT 'ACCOUNT/NUMBER',
     T.VOLUME/SERIAL,
     CRTDT(NV) 'CREATION/DATE',
     SCRTDT(NV) 'EXPIRATION/DATE',
     RENTDAYS 'DAYS/OF VOLUME/USAGE'
```

JR70TVA2 Execution Description

The control statements used in JR70TVA2 are described below. Complete descriptions of all CA JARS Wizard control statements can be found in the *CA JARS Wizard Reference Guide*.

PARAMETER

This control statement specifies options for a CA JARS Wizard run. XREF creates a cross reference of the data fields used in the run and the statements they are found in. This cross reference listing is printed in addition to the control statements and the report for the run.

INPUT

The INPUT statement lists the JR70CBF glossary as as the glossary for the primary input file for the run.

DEFINE

The three DEFINE statements define the following fields:

RENTDAYS:

Six byte field. Used to hold the number of days of tape volume usage.

CRTDT:

Three byte field. Used to hold the creation date (YYDDD) of the tape volume.

SCRDT:

Three byte field. Used to hold the expiration date (YYDDD) for the tape volume.

SELECT

The SELECT statement identifies the record type and subrecord type for the TVA billing record.

COMPUTE

The first COMPUTE statement evaluates the value of the account number contained in the billing record. It also defines a new field, OACCT (16 bytes), and assigns a value to it based on the results of the evaluation. If the account number is blank, OACCT is assigned the value of *MISC.ACCOUNT.* Otherwise, OACCT is assigned the value of the account number.

Notice the (P) suffix code appended to the first compute statement. This suffix indicates that the COMPUTE should take place before the primary input file is sorted. This is needed since the SORT occurs on OACCT field.

The remaining COMPUTE statements assign values to the fields: CRTDT, SCRTDT, and RENTDAYS.

SORT

This statement identifies the sequence in which the input records should be sorted prior to processing. Here the sort is performed on OACCT (the account number) and T.VOLUME/SERIAL (the tape's volume serial number).

BREAK

BREAK statements define logical groups of records. Here data is split into groups by account number. Records with the same account number is grouped together.

HEADING

HEADING specifies a title for the report. Here the title for the report is TAPE VOLUME USAGE BY ACCOUNT.

LIST

The LIST statement identifies the data elements to be printed. This includes:

- Account number
- Creation date (YYDDD)
- Expiration date (YYDDD)
- Days of volume usage

EXTDATA Reports

There are sample CA Earl and CA Easytrieve reports that will process the ADABAS Interface EXTDATA records.

Note: The EXTDATA record layout is described in the chapter "EXTDATA Reporting" in the *User Guide.*

```
OPTION LIST OFF
NOTE *****************************************************************
NOTE *  REPORT ID:      ERXTT001                                     *
NOTE *  REPORT NAME:    TAPE VOLUME ACCOUNTING INTERVAL REPORT       *
NOTE *                                                               *
NOTE *  DESCRIPTION:    THIS REPORT WILL LIST ALL OF THE TAPES       *
NOTE *                  IN A TAPE LIBRARY BASED UPON THE ACCOUNTING  *
NOTE *                  INFORMATION.  INFORMATION REPORTED: THE FIRST *
NOTE *                  DATASET NAME ON THE TAPE, THE CREATION DATE  *
NOTE *                  AND TIME, THE SCRATCH DATE, AND THE LOCATION. *
NOTE *                                                               *
NOTE *  RECORD TYPES:   MRXTHDR,                                     *
NOTE *                  MRXTSIET                                     *
NOTE *                                                               *
NOTE *  EXTDATA RECORD: SIET                                         *
NOTE *                                                               *
NOTE *  MACROS:                                                      *
NOTE *****************************************************************
OPTION PRINTER = 132
OPTION PAGE = 60
OPTION PRECISION = ALL
OPTION CPAGE = 60
HISTIN:  FILE JARS RECORD=3697
  DEF INAREA                  1-3697  X
  COPY MRXTHDR
  COPY MRXTSIET
NOTE *****************************************************************
NOTE * SELECTING FROM HISTORY FILE EXTDATA, SPECIFICALLY SIET        *
NOTE *****************************************************************
!
IF     PROCID NOT = ':' OR
       EXTTYPE NOT = 'SIET'
       THEN GOTO START
ENDIF
!
NOTE *****************************************************************
NOTE *                REPORT PROCESSING SECTION                      *
NOTE *****************************************************************
!
REPORT 'TAPE INVENTORY SNAPSHOT'
TITLE ' '
```

```
TITLE @1 'REPORT ID: ERXTT001'     @54 'SYSTEM ID:' SID
TITLE @1 'SOURCE   : TAPE CATALOG' @54 '  ACCOUNT:' EXTSIET_ACCOUNTING
TITLE ' '
!
CONTROL    (EXTSIET_ACCOUNTING) SKIP
           EXTSIET_VOLSER
!
PRINT
      @1 ' '
         EXTSIET_VOLSER
         EXTSIET_DSN
         EXTSIET_CRE_DATE
         EXTSIET_CRE_TIME
         EXTSIET_SCR_DATE
         EXTSIET_VOL_LOC
END

LIST OFF
*****************************************************************
*  REPORT ID:      EZXTT001                                      *
*  REPORT NAME:    TAPE VOLUME ACTIVITY                          *
*  DESCRIPTION:    THIS REPORT WILL LIST ALL OF THE TAPES        *
*                  IN A TAPE LIBRARY BASED UPON THE ACCOUNTING   *
*                  INFORMATION.  INFORMATION REPORTED: THE FIRST *
*                  DATASET NAME ON THE TAPE, THE CREATION DATE   *
*                  AND TIME, THE SCRATCH DATE, AND THE LOCATION. *
*                                                                *
*  RECORD TYPES:   MZXTHDR,                                      *
*                  MZXTSIET                                      *
*                                                                *
*  EXTDATA RECORD: SIET                                          *
*                                                                *
*****************************************************************
PARM ABEXIT (SNAP) DEBUG (FLDCHK STATE)
FILE EXTDATA
%MZXTHDR
%MZXTSIET
*
JOB INPUT EXTDATA
IF     PROCID  = ':' AND EXTTYPE = 'SIET'
       GOTO PROCESS_DATA
       ELSE
       GOTO JOB
END-IF
PROCESS_DATA
*
PRINT REPORT1
*
REPORT REPORT1 SPACE 0 PAGESIZE (60 60) LINESIZE 132 NOADJUST
*
```

```
SEQUENCE EXTSIET_ACCOUNTING EXTSIET_VOLSER
*
CONTROL  EXTSIET_ACCOUNTING NEWPAGE EXTSIET_VOLSER NOPRINT
*
TITLE 01 COL 52 'TAPE INVENTORY LISTING'
TITLE 02 ' '
TITLE 03 COL 1 'REPORT ID: EZXTT001'    COL 54 'SYSTEM ID      ' SID
TITLE 04 COL 1 'SOURCE   : TAPE CATALOG' COL 54 'ACCOUNT        '     +
                                        EXTSIET_ACCOUNTING
LINE   EXTSIET_VOLSER      '   ' +
       EXTSIET_DSN         '   ' +
       EXTSIET_CRE_DATE    '   ' +
       EXTSIET_CRE_TIME    '   ' +
       EXTSIET_SCR_DATE    '   ' +
       EXTSIET_VOL_LOC
```

The sample output will look like this:

```
108/01/04                                          TAPE INVENTORY SNAPSHOT

 REPORT ID: ERXTT001                              SYSTEM ID:      XE44
 SOURCE   : TAPE CATALOG                            ACCOUNT:

 -------------------------------------------------------------------------------------------------------------------------------
        VOLUME      FIRST DSN                                           CREATION       CREATION       SCRATCH       VOLUME
        SERIAL      ON VOLUME                                               DATE           TIME          DATE       LOCATION
 -------------------------------------------------------------------------------------------------------------------------------
        100572      CAI.DASD.DNGAL.TESTTAPE.D042187                       87.111       13:24:34        00.000       DC
        100674      CAI.DASD.DNSAW.ARC.A120986                            86.343       13:01:54        00.000       DC
        100689      BFCS.EPNE433.FILE1                                    89.104       12:01:51        00.000       DC
        100721      CAI.DASD.BACKUP.D091786                               86.260       11:56:15        00.000       DC
        100726      CAI.DASD.DNSAW.ARC.A120986                            86.343       13:34:02        00.000       DC
        100743      BFCS.EPNE433.FILE1                                    89.104       12:05:04        00.000       DC
        100756      CAI.DASD.DNSAW.ARC.A120986                            86.343       13:16:44        00.000       DC
        100792      MIKES.MNT8702.CICSV170.BACKUP                         87.329       17:26:55        00.000       DC
        100795      CAI.INSTALL                                           88.301       11:54:00        00.000       DC
        100798      MIKES.MNT8702.CICSV370.BACKUP                         87.329       17:17:06        00.000       DC
        100800      MIKES.MNT8702.CICSV161.BACKUP                         87.329       17:18:00        00.000       DC
        100812      MIKES.MNT8702.CICSV                                   87.329       16:45:55        00.000       DC
        100814      MIKES.MNT8702.CICSV                                   87.329       16:41:37        00.000       DC
        100815      DAWYA01.TEST                                          87.302       14:29:45        00.000       DC
        100819      MIKES.MNT8702.CICSV                                   87.329       16:35:01        00.000       DC
        100822      SHACH02.BK72.SOURCE                                   87.329       16:20:37        00.000       DC
        100830      CAIPRFBU.JARS.V51BETA.PROFILE                         88.047       17:49:09        00.000       DC
        100836      CAI.SYSQA.QA.DSS.SCHD8811.BACKUP                      88.344       16:35:22        00.000       DC
        100922      CAI.DASD.DNSAW.ARC.A060587                            87.156       18:17:15        00.000       DC
        100949      MVSSYS.ARCHLOG1.B0000090                              91.046       14:33:36        00.000       DC
        100953      CAI.OPERA.SYSPRINT.D051187                            87.131       18:47:00        00.000       DC
        100978      CAI.TLMS.R53.BKUP.BETA.LISTINGS                       87.137       11:38:52        00.000       DC
        101016      TRANBACK.TRAN.BASE.CNTLA2I2                           88.158       17:32:06        00.000       DC
        101034      MVSSYS.ARCHLOG2.B0000334                              91.315       13:31:11        00.000       DC
        101044      CAI.SYSQA.QA.DSS.SCHD8811.BACKUP                      88.344       16:28:48        00.000       DC
        101054      CAI.IMP.SYSPRINT.D021178                              87.042       14:40:50        00.000       DC
        101130      DEMO.CA7.R29.LOGTAPE.G0001V00                         89.151       17:01:44        00.000       DC
        101133      DEMO.CA7.R29.LOGARCH.G0001V00                         89.151       17:03:25        00.000       DC
        101164      SYS.SMFDATA.MS031287.T1608P1                          87.071       16:11:42        00.000       DC
        101187      SYS.SMFDATA.MS031287.T1608A1                          87.071       16:11:45        00.000       DC
        101195      BLURI01.QAUNI.PROFILE                                 88.315       15:28:21        00.000       DC
        101251      CAI.TLMS.R52.CAIHELP                                  87.152       19:43:06        00.000       DC
        101279      CAI.TLMS.R5310.G8805.LISTINGS                         88.162       11:32:16        00.000       DC
        101295      CAI.TLMS.R5310.G8805.LISTINGS                         88.162       11:28:17        00.000       DC
        101396      CAI.TLMS.R5310.G8805.LISTINGS                         88.162       11:45:51        00.000       DC
        101399      APDAD.MV71.LD                                         88.363       16:13:08        00.000       DC
        101402      CAI.TLMS.R5310.G8805.LISTINGS                         88.162       11:54:18        00.000       DC
        101411      ASM2.ARCH.MASTER.TAPE                                 88.211       17:12:46        00.000       DC
        101416      CAI.TLMS.R53.BKUP.BETA.LISTINGS                       87.137       11:40:08        00.000       DC
        101457      CAI.DASD.BACKUP.D122286                               86.356       11:41:13        00.000       DC
        101520      MVSSYS.ARCHLOG2.B0000169                              91.136       23:57:22        00.000       DC
        101528      APDAD.DEMOJCL                                         88.357       10:32:53        00.000       DC
        101534      MVSSYS.ARCHLOG1.B0000166                              91.136       23:17:14        00.000       DC
        101572      MVSSYS.ARCHLOG2.B0000389                              91.354       17:23:51        00.000       DC
        101587      MARKN.BK300601.V1                                     87.310       08:28:56        00.000       DC
        101595      WILMI01.BACK8701.DISTLOAD                             87.070       20:02:19        00.000       DC
        101657      CAI.TLMS.R5310.BKUP.BETA.LISTINGS                     87.288       20:23:43        00.000       DC
        101659      CAI.TLMS.R5310.BKUP.BETA.LISTINGS                     87.288       20:26:27        00.000       DC
        101719      CAI.TLMS.R53.BKUP.BETA.LISTINGS                       87.137       12:01:47        00.000       DC
        101722      CAI.DASD.DNGAL.TESTTAPE.D041587                       87.105       14:31:20        00.000       DC
```

TVA Data Elements

Name	Pos	Len	Format	Descriptions
RDW	001	004	B	Record descriptor word
REC/TYPE	083	001	C	Record Type Code, Character 'T'
SUB/REC/TYPE	084	001	C	Record Sub-Type Code, Character 'M'
VOL/RENT/TIME	104	004	B	Tape volume rental time in seconds
T.SLOT/NUMBER	118	004	C	Tape slot/cabinet number
T.CREATE/TIME	122	004	P	Tape creation time
T.CREATE/DATE	126	004	P	Tape creation date
T.SCRATCH/DATE	130	004	P	Volume scratch date
T.VOLUME/SERIAL	134	006	C	Volume serial number of tape
T.TECH/CODE	140	001	H	Recording technique code
T.RECORDING/TECH	141	025	C	Recording technique
T.DENSITY/CODE	166	001	H	Tape density code
T.DENSITY	167	004	C	Tape density
T.LABEL/CODE	171	001	H	Tape label type code
T.LABEL/TYPE	172	004	C	Tape label type
T.VOL/LOCATION	176	004	C	Tape volume location
T.VOL/MOVE/DATE	180	004	P	Tape volume moved date
T.SYSTEM/FROM	184	001	C	Tape system data is from 1=ca-1, 2=tlms
T.DSN	185	044	C	Data set name of 1st data set on volume
T.ACCOUNT/NUMBER	229	041	C	Account number
T.VOL/RECREATE	270	001	C	Volume recreate flag; 1=volume recreate

Chapter 8: The VM Interface

The VM Interface lets you report on VM accounting data and charge users for resources consumed. The EXTDATA option lets you report on messages transmitted between virtual machines. The full reporting and charging capabilities of the Report Writer can be applied to VM data.

The VM Interface translates VM accounting records into summary file format for input to CA JARS. As the records are translated, the data can be tailored to your specifications. You have options to:

- set the CPU Identification Code and User Information fields based on the VM userid and account number
- restrict records to specific userids and/or a specific date range
- produce the OS or VSE version of summary file records, or produce a VSE glossary format record for use in period processing

The VM Interface is valuable for all VM users because:

- the activity of each virtual machine can be monitored
- VM accounting data may be used in conjunction with guest SCP accounting data for consolidated utilization and billing reports
- special charging algorithms and rates can be constructed for VM users, and different groups of users can be charged different rates
  - the same data center accounting standards can be applied to both the CMS and batch work loads
  - you can produce performance reports to display the resource consumption of selected virtual machines

The VM Interface gives quick, accurate answers to questions such as:

- How much CPU time is spent servicing virtual machines?
- Who is using CMS?
- What virtual machines are contributing to system degradation at peak periods of the day?

The Report Writer grouping feature is particularly useful for separating the analysis of usage by virtual machine or CMS user, and for combining VM data for analysis or billing.

Additional CA JARS sample reports are included with the VM Interface. EXTDATA can be generated that will allow you to report on chargeback and resource utilization. The EXTDATA option also reports on bandwidth consumed between virtual machines by TCP/IP, CTCAs, or APPC.

Note: If chargeback is needed for intermachine communication, the EXTDATA option must be used. The z/VM format accounting records that contain information on zIIP, zAAP, and IFL processor use are supported as EXTDATA records.

This section contains the following topics:

VM Interface Components

The VM Interface has three main components:

- translate (summarizes raw VM data for reporting)
- reporting and chargeback
- EXTDATA reporting

The VM Interface's translate component executes from the CAI common load library, CAJRLOAD, as a z/OS batch job. It reads the input accounting data from an unblocked sequential file of VM account records. The output is a file in summary file format for later input to the CA JARS z/OS Report Writer, and to an EXTDATA file for input to CA Chargeback, and for on-demand reporting.

By creating a User Accounting Table you can select or reject data for specific users, and place standard accounting information into the output records. You can also submit a CRITERIA control statement to select or reject data for specific dates.

Selected records are then reformatted to tape or disk for later input to the Report Writer.

User Accounting Table

The User Accounting Table is an optional feature of the CA JARS VM Interface, used to select records for processing and/or add accounting information for selected userids. A dummy table is included on the distribution tape that allows all VM accounting records to be processed. You can create a unique User Accounting Table tailored to meet the accounting standards and needs of the data center.

User Accounting Table Macro

The User Accounting Table is built by assembling a set of CAIJV01 macro statements. The CAIJV01 macro is included in CAJRMAC on your distribution tape.

Sample Reports

Sample reported are provided in CA JARS report writer format, CA EARL report writer format, and CA Easytrieve report writer format.

The CA JARS report writer uses CA JARS account files containing history data. For usage information, see the *User Guide.*

The CA EARL and CA Easytrieve report writers uses CA JARS account files containing EXTDATA. For usage information, see the *Reports Guide.*

VM Interface Materials

The material that follows in this chapter describes the VM Interface data translation and reporting component provided with CA JARS. The reporting/billing phase of the VM Interface is the reporting/billing component of CA JARS that executes in the z/OS environment. Instructions for execution of the reporting component are included later in this chapter. If you need additional assistance with your reporting requirements, use the VM Basic Accounting Table and VM Output Data Elements Table from this chapter together with your *CA JARS User Guide* to define your reporting requirements.

Creating and Using the Accounting Table

The User Accounting Table gives you the ability to select, reject, or modify VM accounting data. You define the table to select the records you want to process. When a record is selected, you can use the table to assign a specific CPU ID and/or accounting information to the record.

The translate component scans the User Accounting Table for an entry whose virtual machine ID and account number match the VM accounting record. The table is searched sequentially. The CPU ID and User Accounting Information fields from the first entry that matches the account record are inserted into the output history record. If no match is found, the output CPU ID field contains blanks and the output User Accounting Information field contains the virtual machine account number as set by CP from the information in the user directory.

Each table entry is scanned for comparison, character by character. An asterisk (*) can be used to represent *any* character in a character string for searching purposes; however, it can appear only once within a given VM ID or VM account number. You can place the asterisk in any position in either the VM ID or Account Number. This *wild card* technique lets you reduce the number of entries in your table based on identical character strings found in VM IDs and Account Numbers. The following table shows how you can use wild cards in the matching process.

Position	**VM ID**	**VM Account #**	**Result**
Prefix	*DEV01*	*	Gives you a match for any account number providing the last five characters of the VM ID are DEV01.
Suffix	SYS*	117*	A match occurs for an account number whose first three characters are 117 providing the first three characters of the VM ID are SYS.
Middle	APL*01	*	A match occurs against any account number and if the first three characters of the VM ID are APL and the last two 01.

If a table entry is specified using the DELETE option, any account record that matches a table entry is rejected from further processing. Conversely, the KEEP option allows processing of the record to continue; this includes placing any CPU ID and User Account Information into the output history record. You build a User Accounting Table by assembling a set of CAIJV01 macro instructions. A dummy User Accounting Table is included as CAJRSAMP(CAIJV01A). This source program will create the distributed default User Accounting table found in CAJRLOAD(CAIJV01). If used, it allows all records to be processed and assigns a blank CPU ID. CAIJV01 macro instructions are input to the macro assembler, and must follow the rules for coding macro statements. Two more complex sample User Accounting Tables are included in CAJRSAMP members CAIJV11A and CAIJV14A to illustrate the format required.

You first create a User Accounting Table as an ordinary z/OS file, using ISPF or the editor of your choice. When you have entered the necessary statements, you assemble the file, then link edit it into a load library. These steps are described in the Creating a User Accounting Table section of this chapter. Sample assembly and link-edit JCL are found in CAJRJCL(CAIJVMAT).

Initiating the User Accounting Table

You build the VM Interface User Accounting Table by creating a file of coded CAIJV01 macro statements. The CAIJV01 TYPE=INITIAL statement must be coded first, followed by CAIJV01 TYPE=ENTRY statements, and terminated by a CAIJV01 TYPE=FINAL statement.

Object code is generated from the processed statements. If errors are detected in the macro specifications, messages are issued. The assembly is complete, but you may not get the results you wanted.

Your first CAIJV01 macro statement must be:

CAIJV01 TYPE=INITIAL

where:

TYPE=INITIAL specifies that this statement initiates the User Accounting Table.

Defining the User Accounting Table Entry

Use the CAIJV01 TYPE=ENTRY statement to define an entry in the User Accounting Table.

There can be any number of CAIJV01 TYPE=ENTRY statements coded for the User Accounting Table assembly. If there is more than one TYPE=ENTRY statement in the assembly, the corresponding User Accounting Table entries are generated in the order in which they were coded.

The following parameters can be specified for the CAIJV01 TYPE=ENTRY:

```
CAIJV01    [VMID=xxxxxxxx]
           [,VMAC=xxxxxxxx]
           [,TYPE=ENTRY]
           [,DISP=Keep|Delete]
           [,CPUID=x]
           [,USER='xxxxxxxxxxxxxxxx']
```

VMID=xxxxxxxx

specifies the 1-8 character virtual machine identifier of the accounting records. A match causes the VM Interface to scan for the account number parameter. If that also matches, the CPU ID and cost center information are moved from the table to the output record if the record is not deleted by the DISP parameter.

VMAC=xxxxxxxx

specifies the 1-8 character account number. A match updates the CPU ID and cost center information in the output record depending on the DISP parameter.

TYPE=ENTRY

specifies that this statement defines an entry in the User Accounting Table. This parameter can be omitted.

DISP= Keep|Delete

specifies the 1-6 character disposition of the VM accounting record. If omitted, the default disposition is KEEP.

CPUID=x

specifies the 1-character identification that is placed in the CPU ID field of the output record.

USER='xxxxxxxxxxxxxxxx'

specifies the 1 to 16 character cost center identification that is placed in the Accounting Field of the output record.

Terminating the User Accounting Table

The assembly of the VM Interface User Accounting Table is terminated with the TYPE=FINAL statement, so this statement must be the last one in the input for the User Accounting Table assembly. It creates assembler statements necessary to generate proper table length calculations.

The following parameters can be specified for CAIJV01 TYPE=FINAL:

```
CAIJV01      TYPE=FINAL
```

TYPE=FINAL

specifies that this statement terminates the User Accounting Table.

User Accounting Table Entries Examples

Example 1 - Found in CAIJRSAMP(CAIJV01A)

You do not need to create a User Accounting Table to run the VM Interface. The following dummy table, distributed as the default for the VM Interface, allows all records to pass unaltered.

```
CAIJV01 TYPE=INITIAL
CAIJV01 TYPE=FINAL
```

Example 2 - Found in CAIJRSAMP(CAIJV11A)

This is an example of a generated table that deletes all VM accounting records with a virtual machine ID of *DOSVS.* All records with an identification of *OSVS1* will have the CPU ID and Accounting Fields modified.

```
CAIJV01 TYPE=INITIAL
CAIJV01 VMID=DOSVS,DISP=DELETE
CAIJV01 VMID=OSVS1,CPUID=X,USER='TEST SYSTEM'
CAIJV01 TYPE=FINAL
```

Example 3 - Found in CAIJRSAMP(CAIJV14A)

This generated table modifies the Accounting Field for all records with a virtual machine ID beginning with the two characters *OS,* and the first three characters *A14* in the account field:

```
CAIJV01 TYPE=INITIAL
CAIJV01 VMID=OS*,VMAC=A14*,USER='SYSTEMS TEST'
CAIJV01 TYPE=FINAL
```

Creating a User Accounting Table

Use the following steps to create a User Accounting Table that meets your data center's needs:

Access The Necessary Files

You must have read access to CAJRMAC and write access to a load library that you must subsequently add to the CA JARS JCL. You can use CAJRLOAD. If you use CAJRLOAD instead of a site-defined library, do not replace the default member CAIJV01. (The preferred method of CA maintenance is complete product replacement, so a user table named CAJRLOAD(CAIJV01) will be erased by regular maintenance.)

Update The User Accounting Table

EDIT the CAIJVnn ASSEMBLE file. Between the CAIJV01 TYPE=INITIAL and the CAIJV01 TYPE=FINAL statements, add whatever CAIJV01 statements you need to select/reject records or set CPU ID or accounting information.

Assemble Table/Place in Appropriate Load Library

The sample JCL on the next page, which can be found in CAJRJCL(CAIJVMAT), assembles the new table and places it in the load library of your choice. A user-selected name can be assigned by coding CSNAME=tablename on the CAIJV01 TYPE=INITIAL macro statement. If any of these commands gives a nonzero return code, do not proceed to the next step. Review what you have done in Steps 1 and 2 and resolve the error messages before proceeding.

Save The Updated Table

Save the User Table source macros in a repository that complies with your site's source control standard. The target library, shown here as DSN=&CAIPRFX..**EXITLIB**.LOAD should be chosen according to your data center standards. It must be concatenated to the //STEPLIB DD statement when you execute CA JARS.

```
//jobname JOB (Accntinfo),' CAIJVMAT ',NOTIFY=&SYSUID.
//*    (CAIJVMAT)
//ASM   EXEC PGM=ASMA90,REGION=0M,
//      PARM=('NODECK,OBJ,XREF(SHORT),TERM,USING(MAP)')
//SYSLIB  DD DISP=SHR,DSN=&CAIPRFX..CAJRMAC
//      DD DISP=SHR,DSN=SYS1.MACLIB
//SYSUT1  DD UNIT=SYSDA,SPACE=(TRK,(15,15))
//SYSUT2  DD UNIT=SYSDA,SPACE=(TRK,(15,15))
//SYSUT3  DD UNIT=SYSDA,SPACE=(TRK,(15,15))
//SYSTERM DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSLIN  DD DSN=&.&SYSLIN.,DISP=(NEW,PASS),UNIT=SYSDA,
//        SPACE=(CYL,(1,1))
//SYSIN  DD *
     CAIJV01 TYPE=INITIAL,CSNAME=CAIJV99
     CAIJV01 VMID=DOSVS,DISP=DELETE
     CAIJV01 VMID=CFT2ND*,VMAC=*,USER='SYSTEMS TEST'
     CAIJV01 TYPE=FINAL
/*
//LINK   EXEC PGM=IEWL,PARM='LET,LIST,NCAL,XREF,MAP,REUS',
//      COND=(0,NE)
//SYSUT1  DD DSN=&.&SYSUT1.,UNIT=SYSDA,SPACE=(1024,(100,10))
//SYSPRINT DD SYSOUT=*
//SYSLMOD DD DISP=SHR,DSN=&CAIPRFX..EXITLIB.LOAD <<= Modify
//SYSLIN  DD DSN=&.&SYSLIN.,DISP=(SHR,PASS)
//      DD *
 NAME  CAIJV99(R)
/*
```

The Translate Component

Translate Component Control Statements

VMPARM Statement

The VMPARM statement gives you runtime control of several variables in the VM Interface's translate component. Keywords and their values can be specified in any order. The statement identifier, VMPARM, must begin in position 2. This statement must be placed in the file defined by the //CAIJFIN DD of the CA JARS execution JCL. This statement is required.

```
Command    Operands

VMPARM     RECx -SNAP nnnn- -CNCT nnnn- -FBLK nnnn- -WORK nnnn-
```

x (in RECx)

(required) specifies the desired format of the output account record. O causes an OS formatted account record to be created. D causes a VSE formatted account record to be created. G causes creation of a VSE glossary record compatible with CA JARS RA for z/VSE period processing.

SNAP nnnn

specifies the count of rejected or invalid records to be SNAP dumped. If omitted, the VM Interface will SNAP the first 10 records encountered. To suppress this option, specify: **SNAP 0.**

CNCT nnnn

specifies the maximum number of days considered valid for the *connect time* in a single type 01 VM accounting record. If a record is encountered with a larger connect time, it is snapped and ignored. If omitted, the CNCT value defaults to 7 days.

FBLK nnnn

specifies the number of FBA blocks to be considered as one cylinder. This number is only used if your data center allocates temporary disk on FBA devices. If you do not specify an FBLK value, the VM Interface uses 1000.

WORK nnnn

For VSE users, this keyword specifies the number of SORTWKn files specified in your execution JCL.

UACTNAME Statement

When processing the translate component with a user accounting table, an additional control statement (UACTNAME) is required to name the generated user accounting table. The statement identifier, UACTNAME, must begin in position 2 and a space must precede the operand. This information is provided via the CAIJFIN DD statement. The format of this statement is as follows:

```
Statement Identifier    Operand
UACTNAME                name
```

UACTNAME

is the name of the command. It must be present, and spelled exactly as shown.

name

is the name given the User Accounting Table when it was placed in DSN=&CAIPRFX..EXITLIB.LOAD

Reporting Component

The VM Interface translate component creates summary file records in the same format as those produced by CA JARS z/OS to facilitate combined billing applications. VM account records, however, do not contain exactly the same information as accounting records produced by z/OS systems. Some fields in the VM Interface output record, therefore, do not have the same meaning as the corresponding fields in a record produced by CA JARS z/OS.

This guide contains a complete description of the records produced by the VM Interface. If you do not already use CA JARS for z/OS accounting, you can rely on this guide to interpret the data produced by the VM Interface. If you have some familiarity with CA JARS z/OS, note the following differences.

To interpret VM data, you must:

- Use the VM Basic Accounting Table in this guide instead of the Basic Accounting Table in the *User Guide.*
- Use the VM Output Data Elements Table in this guide instead of the Output Data Elements Table in the *User Guide.*

To apply billing rates to VM data in a CA JARS run, you must:

- For CA JARS RA for z/OS, use the VMRATE statement described in this guide.
- For CA JARS RA for z/VSE, use the CPURATE statement described in this guide.

VM Accounting Record

VM gathers information on virtual machine resource usage and certain other statistics. The information is placed in VM account records distinguished by type codes of 01 to 07. The VM Interface uses the information on resource usage recorded in type 01, 02 and 03 VM accounting records. Types 04, 05, 06 and 07 records do not participate at all in VM Interface processing.

VM permits the generation of user accounting records when a batch machine performs work on another user's behalf. Certain users are also permitted to create type C0 records, which are free-form. The VM Interface provides a count of all record types encountered in the input data. Types C1 to C3 (corresponding to types 01 to 03) are produced when a batch machine performs work on behalf of another user and batch accounting is enabled.

You may elect, through the *Record Indicators* fields in the CRITERIA statement, to treat any of the C1, C2 and C3 record types like their 01, 02 and 03 counterparts. If you do so, the VM Interface creates records based on this data, tying the resources used to the user who submitted the batch job. Such records are flagged with a *batch indicator,* though, so it is still possible to distinguish between work done in a user's own machine and work done for that user in a batch machine.

The VM Interface may detect from the presence of type 02 and/or 03 records that a user was logged on during a certain interval, although there is no type 01 record for that interval. In this case, the VM Interface produces an output record for as much of the interval as can be deduced from the data available in the type 02/03 records.

The following is the information contained in the accounting records when a user ends a terminal session or when a device is removed from a virtual machine:

User ID	Number of Page Writes
Account Number	Non-spooled I/O Count
Logon Date/Time	Spooled Reader I/O Count
Connect Time	Spooled Printer I/O Count
Virtual CPU Time	Spooled Punch I/O Count
Total CPU Time	Cylinders/Blocks Temporary Disk Used
Number of Page Reads	Amount of Time Device Connected to User

User-Defined Reports

The output report formats vary from user to user, depending on the report control statements used. This section discusses features common to all user-defined reports. Refer to the report below for an example printout.

All user-defined reports formatted by the Report Writer contain three (3) parts:

- header information
- detail information
- summary information

```
                         A --> V M   T O T A L   C H A R G E   S U M M A R Y
                                       B Y   U S E R   AND   D A T E

 BEGIN DATE - 01/14/97  <--B                                                 C -->  RUN DATE - 02/01/94
 END DATE   - 01/22/97  <--D                                                             E -->  PAGE   2

           VM             CONNECT      PROCESS          I/O          U/R       SETUP         TOTAL    PERCENT
           USERID          CHARGE       CHARGE       CHARGE       CHARGE      CHARGE        CHARGE      TOTAL

F-->DATE 970115           $10.54       $31.29       $90.47      $148.91       $5.00       $286.21      3.380
F-->DATE 970121           $26.18       $12.72      $514.60         $.00     $5.00       $558.50     6.595

 USERID A42MAINT <-- G     $36.72       $44.01      $605.07      $148.91      $10.00       $844.71      9.975

     DATE 970118            $3.33         $.77         $.00         $.00        $.00         $4.10       .048
     DATE 970121          $110.51        $6.31      $206.79       $12.53        $.00       $336.14      3.969
     DATE 970122           $58.70         $.02      $117.45         $.00        $.00       $176.17      2.080

 USERID CMSGXB            $172.54        $7.10      $324.24       $12.53        $.00       $516.41      6.097

     DATE 970118            $3.33         $.00         $.00         $.00        $.00         $3.33       .039
     DATE 970121           $50.76       $44.78      $119.32        $4.86        $.00       $219.72      2.595
     DATE 970122           $41.92       $27.64      $131.89       $26.14        $.00       $227.59      2.686 <--H

 USERID CMSPLM             $96.01       $72.42      $251.21       $31.00        $.00       $450.64      5.320 <--I

                        $2,680.06      $880.22    $4,523.90      $318.82      $65.00     $8,468.00     99.958 <--J
```

This report is described in detail on the next two pages.

Report Header Lines

The report header consists of eight to ten lines of information in a standard format for all reports. Item A is introduced through the use of the HEADER statement. Items B, C, and D are introduced through the use of the PARMS statement. The items on the left, B and D, start in the first print position. The items on the right, C and E, adjust automatically to the computed print line length. The line length is based on the field length of the selected data elements and the number of blanks preceding each element.

Header Line Number	Description
1	The top-of-page header line displays the report title for a given report as indicated by A. The Title Column of starting position for the report title is defined by the user.
2	The third line displays the Report Begin Date and Run Date, items B and C, respectively.
3	The fourth line displays the Report End Date and the Report Page Number, items D and E, respectively. The page number is a four-digit, zero-suppressed value.
4 and 5	These lines are intentionally blank on every report.
6 and 7	These lines display the titles of the selected output data elements fields at the print positions defined by the user. The titles do not exceed the individual field lengths.

Detail Lines

The detail line information may be optionally displayed for each accounting record, item F.

For comparison to CA JARS reports on z/OS accounting data, each type 01 VM record is treated like a one step job.

Summary Lines

Summary line information is displayed for each change of data in a user sort control field at each of up to five summarization levels, items H and I, respectively.

The action taken after printing each summary line such as double-spacing, ejecting to a new page, and so forth, is specified in the Summary Print Option at each sort level.

Description and Control fields are associated with each summarization level. You can elect to display these fields and associated personalized descriptive header information with the summary lines. This is accomplished by using DESCRIPT statements.

In addition, the Control field and Summarization Description can be displayed as headers to signal the beginning of a new summarization level as illustrated by item G. No other information appears on this line. Note that the descriptions have been staggered to present a more meaningful relationship between the different summarization levels. This is accomplished by appropriately spacing the Summarization Description in the field when preparing DESCRIPT statements.

An additional final summary line, item J, is automatically displayed at the end of each report. All information that can logically be accumulated is presented as a final total on this line. If page ejection has been specified for the highest (major) summarization level, this line will print on a separate page.

More information:

HEADER Statement (see page 295)
DESCRIPT Statement (see page 279)

Preparing Control Statements

Control statements are used to tell the Report Writer which reports you want generated, for what time period, and how you want them formatted. They are contained in a file of fixed-length 80-byte records. Each control statement is identified by an eight-character alphanumeric statement type and checked for syntax and discrepancies that might cause errors during the run. If there are errors in the data, the record is flagged and a message is printed indicating the problem area.

Control statements are divided into two groups:

- The first group consists of statements that govern the general aspects of the Report Writer run.
- The second group controls the formatting of individual reports.

The following statements in the first group are required:

- CONFIG statement
- SELECT statement

The following statements in the first group are optional:

- CRITERIA statement
- PARMS statement

The following statements are used to control the format of individual output reports. Since multiple reports can be requested for each run, this group can be composed of many sets of statements, with each set of statements used to define one particular report format. Each set can include a combination of any of the following statement types.

The following statements are required for basic reporting:

- HEADER
- DISPLAY
- SORT

The following statements are optional, grouped by usage.

```
Computer Billing      Other Format             Record Grouping
& Budget Control      Customization Features   Feature

BUDGET                DESCRIPT                 GROUP
CREDIT                EDIT                     GROUPC
DEBIT                 EXITS
FORMRATE              TITLE
VMRATE
```

Each report is identified by a *set code.* This code is used to tie together all control statements relating to a specific report. All the statements for a given set of reports must contain the same *set code.* The set code consists of any valid EBCDIC character placed in the first position of all statement types, with the exception of the CONFIG, SELECT, CRITERIA and PARMS control statements that never require set codes due to their global nature.

Control statements with blank set codes are referred to as *global* control statements. The following statement types can have a blank set code that allows them to be included in every report set, but those with an asterisk may be overridden by a corresponding statement type containing a nonblank set code.

```
  BUDGET
  CREDIT
  DEBIT
  DESCRIPT
* EXITS
  FORMRATE
* TITLE
  VMRATE
```

It is recommended that you include all sets of control statements when generating reports. Doing so assures that the Report Writer has access to all your user report formats, and relieves you of the necessity of combining the proper sets of control statements for the appropriate run. The SELECT statement is used to indicate which set(s) of statements are required to generate the desired report(s).

Control Statement Coding Conventions

All alphabetic characters entered on control statements are assumed to be uppercase by the editor. In general, all numeric fields are to be right justified and need not be padded with leading zeros, since the Report Writer performs this function as part of its numeric field editing routine. The input control statements are never sorted. Generally, the order of the statements is not important. However, in the case of certain statement types, order may have an effect on report results. Where such order is a consideration, it is noted in the detail description of the affected statement.

Caution Sequence numbers are unacceptable on control statements. The Report Writer interprets them as a function field.

CPU Identification Usage

Five report control statements allow you to specify a 1-byte field called *CPU Identification:* BUDGET, CREDIT, DEBIT, FORMRATE, and VMRATE. The CPU ID field is simply a 1-byte character field carried in every CA JARS record. When a nonblank character is placed in this field, it tells the Report Writer that the control statement applies only to those records having a matching CPU ID. However, a control statement with a blank CPU ID field applies to all records.

The CPU ID field is used primarily as a user controlled switch to separate different groups of data--it need not have anything to do with actual CPU Identification. There are two ways of setting this field:

- Your User Accounting Table may set the CPU ID based on the VM userid and VM Account Number in the raw VM data.
- The Report Writer Grouping feature, using the GROUP and GROUPC control statements, may set the CPU ID based on any test or series of tests expressible within the bounds of GROUP/GROUPC syntax.

Remember, the CPU ID field is provided as means for you to manipulate and separate data into convenient groups. A typical application is to separate data into groups according to the billing rates you plan to apply. You accomplish this by assigning different CPU IDs for each group on the VMRATE and FORMRATE statements. You can then charge different rates for each group based on their CPU ID.

Report Control Statements

BUDGET Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	BUDGET
10	1	CPU Identification	
11-18	8	VM Account number	
19-34	16	VM Account number or User Accounting Table information	
35-40	6	Date	YYMMDD
41-48	8	VM Userid	
49-54	6	Time	HHMMSS
55-74	20	Blanks	
75-80	6	Budget Amount	999999V; dollars

This statement, identified by the statement type BUDGET, is optional. The BUDGET statement provides a mechanism by which you can manually introduce budget figures to the Report Writer and compare them to actual costs for a given period of time. Budget figures may be associated with a specific job or with any summarization level (account, department, project, and so forth).

Each BUDGET statement introduced to the Report Writer is formatted into an accounting record to be sorted and reported on as any other input. All BUDGET statement fields are moved into the corresponding fields in the accounting record. For processing purposes, the record is treated as a one-step job similar to those generated by CREDIT and DEBIT statements.

The Budget Amount, in dollars, is carried by the Report Writer and made available for display as DE ID 81 in the VM Output Data Elements Table.

The difference between the Budget Amount and the Total Charge (DE ID 46) can be displayed at any level as the Over-Under Budget figure, DE ID 82. The Percent Budget Spent, DE ID 83 can reflect what percent of the Budget Amount has been spent at any display level.

The following example illustrates a typical BUDGET statement setup:

```
                                                    position 75 x
ABUDGET 6        AAA              8409                         125000
```

This BUDGET statement for Report A is to be applied against CPU Identification 6. The account number AAA, is assumed to be in the first three characters of the Accounting Fields information. The current September budget control report is to reflect a $125,000 budget for account AAA. Note that the Budget Amount field on the BUDGET statement is in dollars format with no cents.

CONFIG Statement

This statement, identified by the statement type CONFIG, is required. The CONFIG statement is used to define the computer installation's peripheral device configuration. It has meaning only when CA JARS reports on OS or VSE data. To satisfy the editing requirements, you should include a CONFIG statement of this form:

```
CONFIG  READ00C
```

CREDIT Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	CREDIT
10	1	CPU Identification	
11-18	8	VM Account number	
19-34	16	VM Account number or User Accounting Table information	
35-40	6	Date	YYMMDD
41-48	8	VM Userid	
49-54	6	Time	HHMMSS
55-74	20	Blanks	
75-80	6	Credit Amount	9999V99; dollars

This statement, identified by the statement type CREDIT, is optional. The CREDIT statement is used to supplement the accounting algorithm defined on the VMRATE and FORMRATE statements. Credits may be manually introduced to the Report Writer to be applied to a specific session or summarization level (account, department, project, and so forth). The CREDIT statement is typically used to:

- negate job rerun costs
- adjust prior months billing
- provide volume processing discounts.

Each CREDIT statement introduced to the Report Writer is formatted into an accounting record to be sorted and reported on as any other input. All CREDIT statement fields are moved into the corresponding fields in the accounting record.

For processing purposes, the record is treated as a one-step job.

The following fields, if not present on the CREDIT statement, are filled with blanks in the formatted record:

- CPU Identification
- VM Account number
- Account number/User Accounting Table information
- VM Userid.

The following fields (or any portion thereof) not present on the CREDIT statement are filled with *high values* (hex 'FF') in the formatted record:

- Date (YYMMDD)
- Time (HHMMSS)

For collating purposes, note that the Date field is moved to the Start Date fields. Also, the Time field is moved to the Start Time fields in the formatted record. The *high values* portion of these fields, if any, do not print when selected for display and, therefore, can be used to reduce keypunch strokes when preparing CREDIT statements or to cause credits to collate last in a certain group of records.

The Credit Amount, in dollars, is carried by the Report Writer and made available for display as DE ID 79 in the VM Output Data Elements Table.

The Credit Amount also affects the Total Charge, Distributed Charge, and Percent Totals at any level of display (DE ID 46, 47, 41 and 42, respectively). The following is an example of a typical CREDIT statement setup:

```
                                                       position  75 x
ACREDIT  6       AAA           8408                            150000
```

The CREDIT statement for Report A is to be applied against CPU Identification 6. The account number is AAA, assumed to be the first three characters of the Accounting Fields information. The Credit Amount of $1500.00 is to be applied against current September billing for August adjustments.

DEBIT Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	DEBIT
10	1	CPU Identification	
11-18	8	VM Account number	
19-34	16	VM Account number or User Accounting Table information	
35-40	6	Date	YYMMDD
41-48	8	VM Userid	
49-54	6	Time	HHMMSS
55-74	20	Blanks	
75-80	6	Debit Amount	9999V99; dollars

This statement, identified by the statement type DEBIT, is optional. The DEBIT statement is used like the CREDIT statement to supplement the accounting algorithm defined on the VMRATE and FORMRATE statements. Debits may be manually introduced to the Report Writer to be applied to a specific session or summarization level (account, department, project, and so forth). The DEBIT statement is typically used to:

- charge for dedicated online devices
- introduce tape and disk rental costs
- bill specific accounts for other EDP functions used.

The DEBIT statement format and processing is identical to that of the CREDIT statement; the only difference is in the use of the amount field.

The Debit Amount, in dollars, is carried through the Report Writer and made available for display as DE ID 80 in the VM Output Data Elements Table.

The Debit Amount also affects the Total Charge, Distributed Charge, and Percent Totals at any level of display (DE 46, 47, 41 and 42, respectively). The following are examples of typical DEBIT statement setups:

```
                                                    position 75 x
ADEBIT   6        AAA             9809  **DISK**                 6000
ADEBIT   6        AAA             9809  **TAPE**                 5000
ADEBIT   6        AAA             980915*BLOCK* 1330            22500
```

The first two DEBIT statements for Report A are to be applied against CPU Identification 6. The account number AAA, is assumed to be in the first three characters of the Accounting fields information. The current September billing is to include the Debit Amounts of $60.00 and $50.00, to be charged against account AAA for the rental of disks and tapes respectively.

The third DEBIT statement for Report A reflects a $225.00 charge against the same account for block time rental started at 13.30 on September 15, 1998. The debit can be associated with a particular VM userid by placing that userid in positions 41-48.

More information:

CREDIT Statement (see page 276)

DESCRIPT Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	DESCRIPT
10	1	Summarization Level	0 = any level 1 = 1st sort level (most general level) 2 = 2nd sort level 3 = 3rd sort level 4 = 4th sort level 5 = 5th sort level (most detailed level)

Position	Field Length	Field Name	Notes
11-18	8	Description Control Field	Matches Sort Control Field unless Variable Description feature is used. In that case: Position Length Notes 11-14 4 **** asterisks 15-16 2 'TO' location in DESCRIPT Field, relative to 1 17 1 number of characters to be moved 18 1 'FROM' location in Control Field, relative to 1 (Refer to Variable Description feature)
19-38	20	Description Field	Refer to DE ID 02 in the Output Data Elements Table
39-80	42	Reserved	Not used

This statement, identified by DESCRIPT, is optional. When selected, it provides a description of summary line information. Refer to DE ID 02 in the VM Output Data Elements Table.

The summarization level defines which sort control break the DESCRIPT statement refers to. For example, a user may select Product Name as the major sort control field. The Report Writer summarizes the accounting data and prints a summary line for all processing under each product and a final summary line for all products combined. To clarify the report, you can define a Summarization Description for each control break or summary line. In this example, the user might prepare the following set of DESCRIPT statements:

```
ADESCRIPT1DSM     SCRIPT JOBS
ADESCRIPT1PROFS   OFFICE MANAGEMENT
ADESCRIPT1JSIMAIN JARS REPORT RUNS
             .
             .
             .
ADESCRIPT1        UNIDENTIFIED CLASS
```

For a description of the user sort control fields, see page :spotref refid=vsort.. These sort control fields may be a maximum of eight characters in length. Unused characters are padded with trailing blanks. The Description Control Field must be the same as the 8-character sort control field. The description control field and a sort control field must match character for character to associate the correct description with the corresponding sort control break.

You may find that you require the same DESCRIPT statements for different report formats: the only variation is the summarization level. In one report the user might use product name as the level one sort control field, as in this example, and in another report use product name as a level 2 or 3 sort control field. The only difference in the two sets of DESCRIPT statements is the set code and the summarization level indicator.

You can however, leave the set code blank and define the summarization level as 0 this makes the summarization description available to all reports and to any control break, not just the level one break as in the example.

You must use the *any level* summarization level with caution. Certain reports, for example, one sorted by

```
level 1=department number
level 2=group number
level 3=employee number
```

In such cases, the user must specify summarization level to make sure that the right description appears at the right level.

Note: If fewer than five sort levels are used in a report, the user may identify them as:

```
1, 2, and 3;
2, 3, and 4; or even
1, 4, and 5.
```

Level numbers indicate relative positions; the precise number selected is only important because the level number on the DESCRIPT statement must match that defined on the SORT statement.

Variable Description Feature

You may find that at a particular sort level, there are a number of fields whose descriptions are almost the same except for a small amount of variable information. For example, at level 1 a report might sort through 20 or 25 Project IDs. In this case, rather than code a separate DESCRIPT statement for each control break or summary line, the user may prepare a single DESCRIPT statement and, by using the Variable Description feature, transfer the Project ID automatically from the sort control field into the description field. Refer to the SORT statement on :spotref refid=vsort..

You invoke this feature by replacing the first four characters of the Description Control Field with four asterisks. These indicate that the next four positions determine what is transferred from the Sort Control Field. The four asterisks are followed by:

2 characters indicating where the transferred data is placed in the Description field

1 character indicating how many characters of data to transfer

1 character indicating from which position in the Sort Control Field the transfer of the data is to begin.

The following example shows typical variable description usage:

```
     Summarization Level
     |
     |             Invokes
     |    Variable Description Feature
     |      |
     ▼      ▼
          ┌────┐       ┌────────────────┐
ADESCRIPT1│****│ 0981  │PROJECT XXXXXXXX│
          └────┘       └────────────────┘
                                ▲
                                |
               This will appear on every summary
               line at this sort control level.
```

This statement defines the format for Report A. The summarization level is 1, followed by the four asterisks that invoke the Variable Description feature. The variable information (Project ID, in this case) located in the positions 1-8 of the sort control field, is transferred to the positions 9-16 of the description field (overlaying the xs appearing in the example).

Note that DESCRIPT statements using the variable description feature and those that contain blank description control fields share one characteristic; they terminate the DESCRIPT statement searching logic, and are used regardless of the current contents of the sort control field. DESCRIPT statements with blank description control fields are intended to be used for *catchall* or *miscellaneous* descriptions and should follow all DESCRIPT statements with nonblank description control fields.

DISPLAY Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2	8	Statement Type	DISPLAY
10-11	2	Title Table Suffix	VO recommended for VM data

Position	Field Length	Field Name	Notes
12-80	3 . . . Up to 20 additional occurrences . .	Output Data Element Selection Table	1 to 23 occurrences of lnn where: l: = Number of leading spaces (0-9) nn:= Output Data Element ID (01-H3) Refer to VM Data Elements Table

This statement, identified by the statement type DISPLAY, is required. The DISPLAY statement lets you select the desired data elements for display and define the print line format.

The Output Data Element Selection Table allows you to select as many as 23 data elements from a pool of available elements to display in a given report. The table entries are in the format lnn where,

l

is a one-digit number of leading spaces.

nn

is a two-character code identifying the data element selected for display.

This identification corresponds to the DE ID in the Output Data Elements Table. See the VM Output Data Elements Table starting later in this chapter.

Each DISPLAY statement must have a set code.

The following example illustrates a typical DISPLAY statement:

```
ADISPLAY V000210150410651211312914214614 7
```

This DISPLAY statement defines the format for Report A as indicated by the set code in statement position 1. The data elements selected, in order, are:

- Description Field
- Control Field
- User ID
- Start Date
- Start Time
- Stop Time
- Processor Time

- Percent of Total Charge
- Total Charge
- Distributed Charge

Each of the selected fields were preceded by the following number of spaces, respectively: 0,1,5,1,5,1,1,1,1,1. The total print line cannot exceed 132 print positions. By using the indicated output length and the number of blanks preceding each selected data element, you can compute the total requested print line length.

Note: Figures are normally displayed with commas marking the thousands, millions and billions places. If a number does not fit the space available, the commas are dropped. Right-hand decimal places are the next characters dropped, two at a time. If the number is so large that even the rounded integer doesn't fit, the number is rounded further, the rightmost places dropped and the remaining numbers are followed by an asterisk and a number indicating the number of places dropped. Thus 386,957 (or 387,000) becomes 387*3. Sign values are always retained.

EDIT Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	EDIT
10-69	4 . . . Up to 14 additional occurrences . .	Option Specification	1 to 15 occurrences of nnes where: nn: = Output Data Element ID (See Output Data Element Table) e: = Data Element Edit Option Code s: = Summary Option Code
70-80	11	Reserved	Not used

This statement, identified by the statement type EDIT, is optional. The EDIT statement can be used to alter the way in which output data elements are edited for printing, and/or the logic applied at control breaks (summary lines).

Alternate edit and/or summary option codes may be specified for up to 15 output data elements. The available edit option codes and their interpretations are described in the following Data Element Edit Option Codes Table. The available summary option codes and their interpretations are described in the Summary Option Codes Table. The specification of an edit or summary option that is not applicable to a particular type of output data element is ignored, and the default options are used. One EDIT statement can be used *globally,* that is with a blank set code. This statement can be overridden for any individual report by an EDIT statement with a nonblank set code. The relative order of the statements in the input stream has no effect on this logic.

Only one edit and summary option can be in effect for an output data element even if it is specified more than once on either a DISPLAY or EDIT statement. If specified more than once on an EDIT statement, the last (rightmost) set of options apply. An exception to this is the use of the S (Sign) or E (Currency Symbol), which are *additive,* and may be specified *in addition to* a formatting type edit option.

The calculation of utilization rate and index data elements are handled as special cases by the Report Writer and the specification of alternate summary options for these types of output data elements is not recommended. If this is done, the summary option is applied to the calculated value contained in the Basic Account Record. For example, if a summary option of T is specified for the Output Data Element 78 (I/O Index), the result at each control break is the display of the total of all calculated I/O Index values from each Basic Account Record within that control break. It is unlikely that this particular number would be of much interest, but there may well be valid applications for the use of the minimum, maximum or average type summary options with these types of output data elements. Since the effect of several of the summary options is to significantly alter the interpretation of the displayed data elements, it is suggested that appropriate titles also be specified.

Data Element Edit Option Codes

Option Code	Description Code
0	Edit numbers as integers (that is, zero decimal positions)
1	Edit numbers with one decimal place
2	Edit numbers with two decimal places
3	Edit numbers with three decimal places
4	Edit numbers with four decimal places
5	Edit numbers with five decimal places
H	Edit time fields at HHHH.MM.SS or HHHHHHH.MM
D	Edit dates as DD/MM/YY
M	Edit dates as MM/DD/YY
Y	Edit dates as YY/MM/DD

Option Code	Description Code
C	Edit character data - normal default for most non-numeric data elements
S	Reserve low-order position for sign: =positive, - = negative*
E	Add currency symbol if space is available and not suppressed via PARMS statement*
	Do not change - allow default option to remain in effect
* May be used in combination with other option specifications for the same output data element.	

Summary Option Codes

Summary Option Code Table:

Option Code	Note	Description
T		TOTAL - Normal default for most numeric Output date
A		AVERAGE - Total divided by number of records
H	2	HIGHEST value encountered since last Control break
L	2	LOWEST value encountered since last Control break
D	2	DISPLAY edited value from last Account Record before a Control break
N	2	NO-OP - Do not display anything - default for character fields
B	3	BREAK-AVERAGE - Total divided by number of control field changes at next lower summary level
U	1	USER-AVERAGE - Total divided by accumulation of User-Count-Field
I	1	INDEX - Total divided by accumulation of CPU Time (in seconds)
E	1	ELAPSED-INDEX - Total divided by accumulation of Elapsed-Time (in minutes)
		Do not change - Allow default option to remain in effect

Option Code	Note	Description

Note:

- Operative at detail level, as well as each summary level.
- Only options allowable for non-numeric data-elements, thatinclude dates and times-of-day.
- Example: Sort Field 1 = Userid, Sort Field 2 = Run Date: Result at second summary level is daily total, at first summary level is average per day, at grand total is average per different userid. See references to Output Data Element F7: Control Break Count.

EXITS Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Card Type	EXITS
10-17	8	Exit Name #1	Before Calculation of Charges = no exit
18-25	8	Exit Name #2	After Calculation of Charges xxxxxxxx = member or alias name
26-33	8	Exit Name #3	Output Phase
34-80	39	Reserved	Not used

This statement, identified by the statement type EXITS, is optional. Its presence tells the Report Writer that you will use at least one exit at various phases during processing. Three exits allow you to edit, modify, and delete accounting information in the reporting phase. Details regarding these exits are discussed in the User Exit Routines section of this chapter.

The set code for the EXITS statement can be left blank; however, such a statement is overridden if the Report Writer encounters an EXITS statement with a nonblank set code.

If an Exit Name field on the EXITS statement is omitted, no exit is taken. A nonblank field sets up the exit and must be the one to eight-character load module name of the user-coded exit routine to be accessed. An exit program must be available to the Report Writer as a member of a z/OS or VSE executable library.

The Load Library containing the EXIT modules can be any z/OS PDS. If you choose to use &CAIPRFX..CAJRLOAD, be sure not to replace a member supplied by CA. If you prefer a user exit library, concatenate it to the //STEPLIB DD statement.

FORMRATE Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	FORMRATE
10	1	CPU Identification	
11	1	Reserved	Not used
12-15	4	Forms ID	Blanks
16-19	4	Setup Charge	99V99; dollars
20-23	4	Line/Card Rate	99V99; dollars per 1000
24-80	57	Reserved	Not used

This statement, identified by the statement type FORMRATE, is optional.

The number you enter in the Line/Card Rate field (positions 20-23) is your charge per 1000 lines sent to a virtual printer.

GROUP Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2-9	8	Statement Type	GROUP

Position	Field Length	Field Name	Notes
10-15 16-21 22-27 28-33 34-39 40-45	6 6 6 6 6 6	Group 1 Definition Group 2 Definition Group 3 Definition Group 4 Definition Group 5 Definition Group 6 Definition	where: ppplfi ppp: beginning portion of selected field* l: length of selected field (maximum of 8) f: format of selected field : character p: packed decimal X: hexadecimal (binary) i: Selection Indicator : select all records S: select qualified records R: reject qualified records
46-80	35	Reserved	Not used

Selected Field Length cannot be greater than 4 if either P or X is used as Format Indicator.

* Refer to the VM Basic Accounting Table

This statement, identified by the statement type GROUP, is optional. The GROUP statement in conjunction with GROUPC statements provides you with a mechanism to identify or qualify accounting records based on values in defined positions of the record. Once an accounting record has been qualified, the following functions can be employed at your option:

- select or reject the record for further processing
- assign the record a unique group code that can subsequently be used as a sort control field
- assign the record a unique CPU Identification code in order that a specific billing algorithm can be applied

The Grouping feature can be used to:

- expand *criteria base* for record selection/rejection
- summarize records that do not have common characteristics
- apply different billing algorithms to selected accounts
- report on and charge users according to shift differentials

Six different levels of tests can be defined on the GROUP statement in the format ppplfi, where:

ppp

is a three-digit number defining the starting position (character) in the Basic Accounting Table used to set up a qualifier for the grouping feature.

l

is a one-digit number defining the number of characters (beginning with and including the starting position) in the *Basic Accounting Table* used to construct the length of the qualifier for the grouping feature.

f

is a one-character code indicating the data format of the field in the Basic Accounting Table being used as the qualifier for the grouping feature.

A blank format indicator is used for EBCDIC, a P for packed decimal, and an X for binary or the hexadecimal portion of a packed decimal field.

i

is a one-character code indicating whether qualified records should be selected or rejected.

An S causes all identified record groups to be selected for further processing and all unidentified record groups to be automatically rejected. An R causes the reverse effect to allow the user to reject identified record groups.

If the indicator is left blank, no record rejection occurs and all record groups are selected for further processing. This is particularly useful when all records are to be grouped for display purposes without dropping any information, as in computer time shift reporting.

The process of identifying records starts with the Group One Definition. If the record is qualified and selected, the process continues to the Group Two Definition and so on to the Group Six Definition in a similar manner. If a record is selected based on all definitions, then the record is considered selected for further processing. If a record is rejected based on any single definition, then the record is considered rejected from further processing.

GROUPC Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2-9	8	Statement Type	GROUPC
10	1	Definition Indicator	1 to 6; relates to a Group Definition on the Group statement
11-18	8	Lower Limiting Criteria*	
19-26	8	Upper Limiting Criteria*	Optional if same as lower limit
27	1	Group Code	Any character; to be placed in appropriate Group Code field in accounting record
28	1	CPU Identification	any character = replace CPU ID in accounting record with this character
29-80	52	Reserved	Not used

Each Criteria Field is converted to packed-decimal or hexadecimal (binary) or left as is depending on the contents of the appropriate Format Indicator in the GROUP statement.

Refer to the table below to determine the number of characters to code in the Criteria fields (always left justified for Format Indicators P and X):

GROUP Statement	Number of Characters for:	
Field Length	P	X
1	1	2
2	3	4
3	5	6
4	7	8

This statement, identified by the statement type GROUPC, is optional. The GROUPC statement must be used in conjunction with the GROUP statement for a given report. Whereas the GROUP statement defines which fields in the accounting record are to be used in the grouping feature, the GROUPC statement supplies the range of values to be used in a compare instruction to qualify the record. Multiple GROUPC statements may be required for a given report in order to provide many value ranges to qualify each accounting record.

The Definition Indicator on the GROUPC statement indicates which definition of the GROUP statement is applicable. Therefore, the Definition Indicator may be 1 to 6, relating to the proper definition number on the GROUP statement.

The Lower and Upper Limiting Criteria on the GROUPC statement provide the actual range of values that are compared against the corresponding value in the accounting record to qualify the record.

The range values must be left justified with trailing blanks when needed. If the Upper Limiting Criteria is the same as the Lower Limiting Criteria, it can be omitted.

The Group Code on the GROUPC statement is a one-character code that is placed in any accounting record that is selected according to the value ranges. The Group Code can subsequently be used as a sort control field via the SORT statement to provide totals for the different groups of accounting records selected by the grouping feature.

Note that positions 296 through 298 and positions 438 through 440 in the Basic Accounting Table correspond to the Group Codes for the six definitions as defined by the Definition Indicator on the GROUPC statement.

The CPU Identification code on the GROUPC statement allows you to dynamically change the CPU Identification of any accounting record for further processing. In this way, qualified records can be assigned different CPU Identification codes corresponding to multiple VMRATE statements for a given report. Identified record groups may then use a different accounting algorithm than other accounting records.

A blank CPU Identification Code on the GROUPC statement indicates that no change in the record CPU Identification is desired.

The examples on the following page show some typical uses and combinations of the GROUP and GROUPC statements.

Grouping Feature Example 1

Request

Report utilization by shifts where:

shift A = 8 am - 4 pm

shift B = 4 pm - 12 pm

shift C = 12 pm - 8 am

1. Build GROUP and GROUPC statements as follows:

   points to hours position of Start Time field in VM Basic Accounting Table:

```
      select all records
             V
AGROUP   0102
AGROUPC  108      15      A    Shift A
AGROUPC  116      23      B    Shift B
AGROUPC  100      07      C    Shift C
```

2. Build SORT statement to sort on Group #1 Code field in accounting record.
3. DESCRIPT statements could then be used to associate Group Codes with literals as follows:

```
ADESCRIPT0A      FIRST SHIFT
ADESCRIPT0B      SECOND SHIFT
ADESCRIPT0C      THIRD SHIFT
```

Example 1 shows you how to use the grouping feature without employing the record selection/rejection option. All records have been selected and assigned a Group Code according to which range the Start Time corresponds. The appropriate Group Code (A, B, or C) is placed in the Group #1 Code field in each record and subsequently used as a sort control field to produce totals for the three shifts.

Grouping Feature Example 2

Request

A report of CMS batch work run between 8 a.m. and 12 noon on Mondays ONLY, during the first quarter of 1994.

1. Build CRITERIA statement to select 01/01/94 through 03/31/94.

2. Build GROUP and GROUPC statements as follows:

```
                points to Start Date
                in VM Basic Accounting Table
                |
                |     points to Start Time (HH)
                |     in VM Basic Accounting Table
                |     |
                |     |
                |     |      points to batch
                |     |     |run indicator
                ▼     ▼     ▼

BGROUP   0046 S0102 S2261 S

S in the line above is the selection indicator

BGROUPC  1870102          (1st Monday in quarter)
BGROUPC  1870109          (2nd Monday in quarter)
          .                          .
          .                          .
          .                          .
BGROUPC  1870327          (last Monday in quarter)

     8 a.m. through 12 noon
           ▼      ▼
BGROUPC  208      11

          batch job indicator
          ▼
BGROUPC  3B
```

Example 2 shows you how to use the grouping feature to selectively retrieve only those accounting records that qualify for selection. When you set the Selection/Rejection indicator on the GROUP statement to S, a record must pass all three criteria to be selected for further processing. Group #1 Definition requires the record to have a Start Date equal to that of an identified Monday in the first quarter.

If qualified, then Group #2 Definition requires the record to have a Start Time between 8 a.m. and 12 noon. If qualified, then Group #3 Definition requires the record to have the batch indicator set, showing that the work was performed in a CMS batch machine.

Any record failing one of the criteria is automatically rejected from further processing. The user could then define a SORT statement to sort on Start Date (major) and the hours position of Start Time (intermediate) to cause production statistics to come out hourly within date for each Monday in the first quarter.

Grouping Feature Example 3

Request

A computer billing report with special rates for each of 3 account numbers:

```
AAA
BBB        different rates for each
CCC
```

Build GROUP and GROUPC statements as follows:

points to Accounting Field information in Basic Accounting Table ▼

```
 CGROUP   0773   < select all records

     CGROUPC  1AAA            X < CPU ID for records
                                 with account #AAA

     CGROUPC  1BBB            Y < CPU ID for records
                                 with account #BBB

     CGROUPC  1CCC            Z < CPU ID for records
                                 with account #CCC
```

Example 3 shows you how to use the Grouping feature to dynamically change the CPU Identification code in specific accounting records based on their associated account number. This example assumes that the first three characters of the accounting fields information holds an account number.

The Selection/Rejection Indicator is blank, causing all records to be selected since no grouping is required for this report. The CPU Identification codes on all qualified records are changed as designated by the GROUPC statements. All unidentified record groups remain unchanged. You could then define separate accounting algorithms on different VMRATE statements to correspond to the newly created CPU Identification codes in addition to other algorithms normally used.

HEADER Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Required
2-9	8	Statement Type	HEADER
10-12	3	Title Column	999; must be blank or numeric. If blank, defaults to automatic centering.

Position	Field Length	Field Name	Notes
13-80	68	Report Title	

This statement, identified by the statement type HEADER, is required. The Title Column defines the starting print position (column) of the Report Title on the first header line for a given report.

If the Title Column field is left blank, the Report Title is automatically centered. The Report Title is a 68 character alphanumeric field available to the user as the title for the report associated with the set code in position 1. There may be up to three HEADER statements per report.

PARMS Statement

Position	Field Length	Field Name	Notes
1	1	Reserved	Not used
2-9	8	Statement Type	PARMS
10	1	Date Format Indicator	= MM/DD/YY indicates date 1 = DD/MM/YY option used
11-18 19-26	8 8	Report Begin Date Report End Date	Defaults to dates on CRITERIA statement
27-34	8	Report Run Date	Defaults to current date in system
35-42	8	Operating Cost	Must be blank or numeric; 99999999V (dollars)
43-50	8	Required blanks	
51-58	8	Account Exit Name	= no exit requested xxxxxxxx = member or alias name
59-60	2	Max Line Count	Maximum lines per output report page; default is 60
61	1	Control Card Print Flag	= print control statements 1 = suppress printing control statement
62	1	Dollar Sign Print	= print dollar signs 1 = suppress printing dollar signs

Position	Field Length	Field Name	Notes
63	1	Reserved	Not used
64-66	3	Sort Core Size	Core size for sort in K bytes; default is 64K; at least 128k is recommended when running under CMS
67	1	Reserved	Not used
68	1	Sort Message Indicator	= print CRITICAL messages only 1 = print ALL messages
69-80	12	Reserved	Not used

This statement, identified by the statement type PARMS, is optional. The PARMS statement provides a means to specify optional parameters to the Report Writer during execution.

The *date format* indicator defines the date format on all report control statements. The three date fields on the PARMS statement are used as the header dates for all reports generated in a given run. The date fields are alphanumeric and will not be edited by the Report Writer. They have no relationship to the selection or rejection of input accounting records. This function is controlled by the CRITERIA statement.

If omitted, the Report Begin Date defaults to the lower limit date criteria as defined on the CRITERIA statement (if present). Similarly, the Report End Date assumes the upper limit date criteria value on the CRITERIA statement. In the absence of a CRITERIA statement, the begin and end dates will be filled by the earliest and latest input record dates encountered. If omitted, the Report Run Date is filled with the current system date.

Nonblank date fields on the PARMS statement override the defaults and are moved to their respective positions in the heading information for each report generated in a given run.

The *operating cost* field may be used to introduce the total EDP cost for an installation for a given time period. This value is then used to compute the *distributed charge* amount available for display by the user. For example, if the total EDP cost for an installation is $60,000 for a given period of time, then all computer users for that period should theoretically account for this amount on a pro rata basis. If a certain customer or inhouse department used 10 percent of the total computer effort, then they should account for $6,000 toward the EDP budget. Note that this is the distributed charge based on resources used versus the EDP cost, not the total charge based on resources used versus a billing algorithm.

The *account exit name* is an eight-character field identifying an exit routine to be given control each time a record is about to be written to the account file. For details regarding exit routines, see the User Exit Routines section of this chapter.

The *max line count* field can be used to adjust the maximum number of lines to be printed per page of output. A two-digit numeric value overrides the default value of 60 lines per page.

The *control card print flag* can be used to suppress the printing of report level control statements. This feature is provided so that production runs that use many user-supplied statements do not have to list the control statements.

The *dollar sign print flag* provides you with the option of producing financial reports with or without the dollar sign ($) appearing in charge related output data elements. This is particularly useful for installations using a print chain with a limited number of dollar sign characters. The print rate can be increased considerably by avoiding the printing of special characters. The default is to force the use of dollar signs where appropriate.

The *sort core size* field can be used to define to the Report Writer the amount of main storage to be used by the sorting operation. A three-digit numeric value represents the amount of storage in 1K byte increments that overrides the default value of 64K.

The *sort message* indicator can be used to cause the sort/merge program to display messages to the printer via the parameter MSG=AP. The default for this parameter is MSG=CP, specifying that only critical messages are to be printed.

SELECT Statement

Position	Field Length	Field Name	Notes
1	1	Reserved	Not used
2-9	8	Statement Type	SELECT
Input Indicators:			
10-13	4	Required Blanks	
14	1	Account Input	= no input required
15	1	History Input	1 = input required
16	1	No Input Indicator	1 = process from an existing account file
17	1	Edit Only	1 = edit all control statements but do not process and input
18-50	33	Required blanks	
User-Defined Reports Selection Indicators:			

Position	Field Length	Field Name	Notes
51-80	2 . . . Up to 14 additional occurrences . .	Set Code Table	1 to 15 occurrences of S where: S = set code for each selected report = blank

This statement, identified by the statement type SELECT, is required. SELECT statement parameters let you define the source of input accounting data and select reports to be output by the Report Writer.

These input indicators tell the Report Writer whether or not to open the corresponding data sets to process input accounting data. The data produced by the VM Interface's translate component is level-7 history data, so *History input* would be the normal choice.

The *no-input* indicator specifies that no input files are to be processed, but that processing begins with an existing *working* account file. Use of this feature is intended for specific applications and is not meant as a substitute for *account input.* When used, the logic implied by a CRITERIA statement and the invocation of an account exit are bypassed. This capability is provided primarily to allow multiple executions of the Report Writer to produce more than 15 reports without having to recreate the working account file.

The *edit-only* indicator specifies that no input data is to be processed but that all requested sets of report control statements and any global control statements are to be edited for errors. The use of this feature is recommended when global control statements are present, since an error in one of these statements causes the rejection of all requested reports.

The Set Code Table lets you select as many as 15 report formats for generation in a single Report Writer run. Each Set Code Table entry is a one-character code indicating the report format selected for output, followed by a blank.

SORT Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Required

Position	Field Length	Field Name	Notes
2-9	8	Statement Type	SORT
10-17 18-25 26-33 34-41 42-49	8 8 8 8 8	1st Sort Level 2nd Sort Level 3rd Sort Level 4th Sort Level 5th Sort Level	pppllosd must be blank or numeric where: ppp: Position of sort field from VM Basic Accounting Table ll: Length of sort field (maximum is 8) o: Order of sort field A = ascending (default) D = descending s: Summary Line Print Option: see table below d: Description Header Flag: = suppress printing 1 = print Description Header for this level
50	1	Job Flag	1 required for VM processing
51-54	4		Required blanks
55-62	8	History File DDname	= No History File xxxxxxxx = History File DDname
63	1	History Level Flag	1-5 = Summary level history file with charges applied
64	1	Print DDname Suffix	If nonblank, append to DDname of CAIJSPRT and use that DDname for the report output
65-80	16	Reserved	Not used

Summary Line Print Option Table

or N - No summary print for this level
1, 2, or 3 - Single, double, or triple space before printing summary
E* - Eject to new page after printing summary
P* - Eject to new page and reset page number after printing summary

* If either E or P is specified for the first level summary line, then grand totals print on a page by themselves.

The SORT statement, identified by the statement Type SORT, is required. It allows the input accounting data to be sorted on up to five different fields. Each field or *sort level* is defined by the format pppllosd where:

ppp

is a three-digit number indicating the sort field's starting position. Refer to the VM Basic Accounting Table later in this chapter.

ll

is a two-digit number between 01 and 08 defining the length of the sort field in the VM Basic Accounting Table.

o

indicates the sort order:

A =

ascending (default)

D =

descending

s

is the summary print option that tells the Report Writer whether the user wants a summary line printed for this level and is defined as follows:

N or =

no summary line is printed at this level.

1, 2, or 3 =

single, double, or triple spacing before printing the summary line.

E =

eject to a new page after printing summary.

P =

eject to new page and reset page number to 1 after printing. (If either E or P is specified for the first [major] summary level, grand totals print on a page by themselves.)

d

indicates whether a Descriptive Header appears at this level.

The creation of any user sort control field may be omitted. If no sort control field is specified, the accounting data is arranged in the following default order:

- Start Date
- Start Time.

The maximum length of each user-defined sort control field is eight (8) characters. Sort field definitions of less than eight characters are padded with trailing blanks. In addition to a summary line at each of the five levels, the Report Writer automatically produces a final totals line at the conclusion of a report.

Each SORT statement must have a set code.

The following example illustrates a typical SORT statement:

```
           First Sort Level    Second Sort Level

1           10                  18

ASORT       30108AE1            01608A21
```

Report A is sorted on two levels. The more general level is project ID (begins at position 301 in the Basic Accounting Table), an 8-character field, sorted in ascending order. The E1 tells CA JARS to eject to a new page after printing summary lines, and include descriptive headers.

The second sort level is userid (position 16 in the Basic Accounting Table), an 8-character field sorted in ascending order. The 21 tells CA JARS to skip two lines before printing summary lines, and include descriptive headers.

The Print DDname Suffix can be used to tell the Report Writer to use different print file DD statements for each report. When this position is non-blank, the character is appended to CAIJSPRT and used as the DDname for the print file for this report. For example, CAIJSPRT is the DDname when the suffix character is a 1. When running under CMS, you identify a DDname with a FILEDEF command. For instance, you would modify the CAIJV050 EXEC to include the command:

```
FILEDEF CAIJSPRT DISK REPORT1 OUTPUT A1
```

The Historical Database

Using the summarization feature, the Report Writer is able to create and maintain a historical database of computer utilization statistics and cost accounting. (data elements in the summary record that pertain to computer billing are not filled with valid data unless rate parameters are present during the creation of the summary file. Rate parameters are input using the VMRATE and FORMRATE statements.) You can optionally elect to create a summary file using the history file ddname field on the SORT statement and by coding the appropriate output FILEDEF statement in the Run EXEC (the supplied CAIJV050 EXEC, for example).

You can further specify to what level of detail the summary file is created using the *summary flag* on the SORT statement. The summary flag, that you define, allows summarization at any of 7 levels. Levels 1-5 correspond to sort fields in your SORT statement. Levels 6 and 7 correspond to the OS concepts of job level and step level. The output of the VM Interface's translate component (input to the Report Writer generator) is a level-7 history file. There is no advantage to creating a level-6 file from VM data. If you apply rates to your data, to calculate changes, you may wish to create a level-7 output file, since the output records include the charge amounts. Level 1-5 output is perfectly logical for VM data. Such a file would represent your data summarized at the sort level you select. The following FILEDEF statement reflects a typical method of retaining this file:

```
FILEDEF HISTOUT DISK AUG94 BYDATE A4 ( RECFM VB LRECL 8188 BLKSIZE 8192
```

The summary file can be subsequently introduced to the Report Writer using the history input indicator.

History Files

The history file name indicates that the user wants to build an output file with the report. There are two kinds of history files:

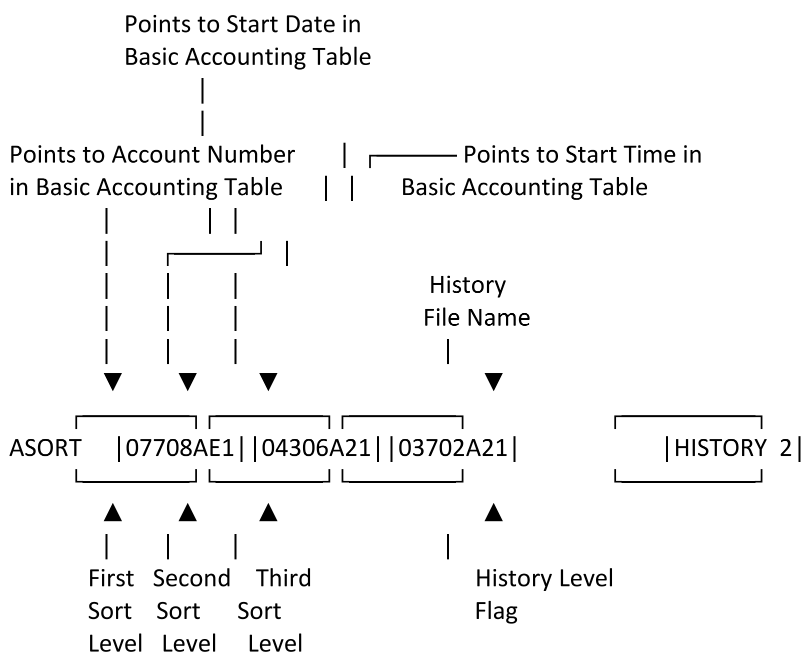
The first kind is the *detail level history file.* It is an archive or database of all accounting information (not just the information output on the report being created.) The output of the VM Interface's translate component is a detail level history file. It includes all the data in the raw VM accounting data, but no dollar charges (since rates are not supplied to the translate component). If you wish to preserve the charges you apply with VMRATE and/or FORMRATE statements, you may create a detail level history file as output from the report writer. This file may be used as input for future reports.

The second type of history file is a *summary level history file* that creates an output file of summary line information. It is useful for creating subsequent periodic or year-to-date reports with little effort. The summary level history file can be created at any sort level from 1 to 5. Note that a level-3 summary file, for example, also contains information that may be summarized mathematically for sort levels 1 and 2.

The *history level flag* defines the kind of history file to be created and at which level. A level 1-5 flag refers to the corresponding sort control level for a summary level history file. Requesting a level-7 (detail level) history file causes the report writer to produce an output history file that includes any charges you have applied. This output file is otherwise the same as the file produced by the translate program.

Summary Level History File Example

The following example illustrates how to create a summary level history file:



In this example, the user requested that history records be generated for each change in the second sort control field as indicated by the History Level Flag 2. Each time this sort control field (Start Date) changes, a record is written to the history file defined by the file name HISTORY. To use this SORT statement, you would include a FILEDEF command in the CAIJV050 EXEC that defines the name HISTORY, for instance:

```
FILEDEF HISTORY DISK REPAHIST DATA A4 ( RECFM VB LRECL 8188 BLKSIZE 8192
```

Report A is sorted on three levels. The most general level is *Account Number* (starting at position 77 in the Basic Accounting Table), sorted in ascending order on the first 8 positions. CA JARS ejects to a new page after printing summary lines, and includes a descriptive header.

The second sort level is *start date* (starting position 43), a 6-character field sorted in ascending order. CA JARS double spaces before printing summary lines and includes a descriptive header.

The third sort level is *start time* (starting position 37 in the Basic Accounting Table). It is 2 characters long (the hours portion), sorted in ascending order. CA JARS double spaces before printing summary lines and includes a descriptive header. Note that reports designed to use the history file as input does not provide information to any level of detail greater than that specified at the time the history file was created. The following examples explain this statement:

```
Summary Level History Flag Example #1

Sort Definitions:              Level 1:  account number
                               Level 2:  start date

History File Name:             HIST001

History Level Flag:            1
```

A history file (ddname HIST001) is generated during the formatting of this report. Each time the first level sort control field changes (each new account number), a record is output to HIST001, summarizing information for the previous account. Assuming there are 50 different account numbers to be reported on, there are 50 records generated and written to HIST001. Only those data elements that can be logically added up for totals contain values. The data element corresponding to the sort control field also has a value. In this case, each history record contains an account number in the appropriate field since it was used as the sort control field definition. The ddname HIST001 must be defined in a FILEDEF command before you run the Report Writer (see the CAIJV050 EXEC).

```
Summary Level History Flag Example #2

Same parameters as in Example #1 with the following exception:

History Level Flag:            2
```

This example shows the importance of choosing Sort Definitions and a corresponding history level flag wisely when creating a history file. In the previous example, each record generated contained an account number because the history level flag caused history records to be generated at the first level. However, in that example, since start date is not logically additive and is a subordinate sort definition to that specified by the history flag, no output records contain a start date. Obviously, this could be a problem in subsequent reporting if it becomes necessary to identify or report on start date.

In Summary Level History Flag Eample #2, the history flag is set so that a record is generated and written to HIST001 each time the second level sort control field changes (each new start date). Since start date is subordinate to account number, each record generated also contains the appropriate account number. More records are written to HIST001 (each start date within each account as opposed to each account), but the future flexibility is worth it. If HIST001 is input to the Report Writer, you can sort on account number and/or start date (or any other field that contains valid data) and still maintain integrity in the data by start date.

Note:

- A single run of the Report Writer can produce 15history files of either kind, one per report. Summary level historical information varies depending on the sort fields selected, and is different for each report.
- Data elements in the history record relative to computer billing is not filled with valid data unless rate parameters are present during creation of the history file. Rate parameters are input using the VMRATE and FORMRATE statements.

TITLE Statement

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	TITLE
10-11 12-31 32-51	2 20 20	Data Element ID Top Line Title Bottom Line Title	Refer to Output Data Elements Table
52-80	29	Reserved	Not used

This statement, identified by the statement type TITLE, is optional. The TITLE statement provides a mechanism by which the user can override predefined default titles of output data elements available for display. Each title has a Data Element Identification (DE ID) code associated with it. The DE ID determines which field in the table is to be changed.

The Top Line Title is a 20-character field available to the user to override the top line of data element titles. The Bottom Line Title field is used to override the bottom line of titles. The user-defined titles may not exceed the output length of the corresponding data element as defined in the table.

Each TITLE statement overrides one specific set of output data element titles. Multiple statements can be used as required. The following example illustrates a typical TITLE statement setup:

```
TITLE    08DEPT./PROJECT       IDENTIFICATION
```

This TITLE statement would override the existing 16 character title for data element 08, Accounting Information, as follows:

```
   Before                 After

ACCOUNT ACCOUNT       DEPT./PROJECT
FIELD1  FIELD2        IDENTIFICATION
```

If position 1 of the TITLE statement is blank, all reports are produced with the user-specified title. If position 1 contains a *report set code,* only the report corresponding to that set code uses the user-specified title.

VMRATE Statement

The VMRATE statement uses the TSORATE statement format to define the rate parameters for the billing algorithm. Therefore, TSO data cannot be processed concurrently with VM data unless the grouping feature is used to select and/or change CPU ID for at least one type of data.

Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Statement Type	VMRATE
10	1	CPU Identification	
11-14	4	Basic Processor Rate	9999; dollars per hour
15-17	3	Basic I/O Rate	9999; dollars per hour
18-21	4	Reserved	Not used
22-25	4	Connect Time Rate	99V99; dollars per hour
26-28 29-31	3 3	Virtual CPU Time Factor Total CPU Time Factor	999; percentage
32-34 35-37 38-40	3 3 3	Spooled Reader I/O Factor Spooled Printer I/O Factor Spooled Punch I/O Factor	9V99; dollars per 1000 I/O
41-43	3	Tape Connect Factor	99V9; dollars per tape connect hour
44-46	3	Temporary Disk Factor	99V9; dollars per temp-disk cylinder-hour
47-49	3	Non-spooled I/O Factor	9V99; dollars per 1000 I/O
50-61	17	Reserved	Not used

Position	Field Length	Field Name	Notes
62-64	3	Punch Rate Reader Rate	9V99; dollars per thousand
65-67	3	Reader Rate	
68-70	3	Tape Allocation Charge	9V99; dollars per tape drive
71-73	3	Disk Mount Charge	9V99; dollars per disk mount
74-77	4	Minimum Session Charge	99V99; dollars
78-80	3	Reserved	Not used

VM Tables

The VM Basic Accounting Table

The table on the following pages show the format of the records created by the VM Interface translate component. It can also be used to locate sort field starting positions and lengths for a SORT statement

One user's activity is represented by as many of these records as there were type 01 (or C1) VM account records for the user. In the normal operation of VM, type 01 records are only created at logoff, so one of these records would represent an entire day's activity. If type 01 records are created more frequently (as they are by the project, product, or interval accounting features of the CA JARS VM product) one of these records represents only a portion of the user's total work for the day.

Note: The CA JARS VM accounting product that generates the C1 activity records is no longer supported.

VM Basic Accounting Table:

Field Name	Field Position	Field Length	FMT*	Notes	DE ID
CPU Identification	1	1		Supplied from User Account Table	57
File Level	2	1		7 for VM data	
Record Version Indicator	3	1	p	X'4C'	
Start Date	4-9	6		YYMMDD	60

Field Name	Field Position	Field Length	FMT*	Notes	DE ID
Start Time	10-15	6		HHMMSS	61
User ID	16-23	8		04	
Step/Job Indicator	24-25	2		11	
Number of Steps	26-27	2	b	1	
Processing ID	28	1		Always T	03
Account Number	29-36	8			10
Start Time	37-42	6		HHMMSS	12
Start Date	43-48	6		YYMMDD	06
Reserved	49-50	2			
Stop Time	51-56	6		HHMMSS	13
Reserved	57-76	20			
Accounting Fields	77-92	16		Account number or User Accounting Table	08
Reserved	93-98	6			
Record ID	99-106	8		*VM/370*	11
Reserved	107-118	12			
Reserved	119-122	4			
Reserved	123-138	16			
Lines printed (std)	139-144	6	p	Total lines printed	E5
Reserved	145-170	26	-		
Elapsed Time	171-176	6	p	In hours, to 5 decimal places	25,65,90
Total CPU Time	177-182	6	p	In hours, to 5 decimal places	26,66,91
Reserved	183-212	30			
Spooled Reader I/O Count	213-219	7	p		33
Spooled Printer I/O Count	220-226	7	p		34
Spooled Punch I/O Count	227-233	7	p		35
Tape Connect Time	234-240	7	p		37
Disk cyl, blk hours	241-247	7	p	1 cyl for 1 hr = 10000	38
Non-spooled I/O Count	248-254	7	p		39
Total I/O Count	255-261	7	p		40

Field Name	Field Position	Field Length	FMT*	Notes	DE ID
I/O Index	262-265	4	p		78
Batch Indicator	266	1	a	B if record charges for batch work	72
VS Page Reads	267-273	7	p		73
VS Page Writes	274-280	7	p		74
Total VS Pages	281-287	7	p		75
CPU Paging Rate	288-291	4	p		77
Elapsed Paging Rate	292-295	4	p		76
Group Code #1 Group Code #2 Group Code #3	296 297 298	1 1 1	a a a	Blank unless filled by Grouping feature	84 85 86
Reserved	299-300	2			
Reserved	301-308	8			
Non-tape Dedicated	309-314	6	p	999999V99999C hours	88
Device Connect Time Reserved	309-354	46	-		
Number Tape Mounts	355-356	2	p		95
Number Disk Mounts	357-358	2	p		96
Number Other Devices	359-360	2	p	Counted when attached	98
Number Disk Mounts	361-362	2	p		96
Reserved	363-364	2	-		
Cards Punched	365-368	4	p		A5
Cards Read	369-372	4	p		A6
Virtual CPU Time	373-378 379-384	6 6	p p	In hours, to 5 decimal places	A7,A8,A9 B0,B1,B2
Reserved	385-396	12	-		
CP Overhead Time Virtual CPU Time	397-402 403-408	6 6	p p	In hours, to 5 decimal places	C4,C5,C6 C7,C8,C9
Reserved	409-417	9	-		
CPU Index	418-419	2	p		D0
Reserved	420-436	17	-		
Day of Week Ind.	437	1	a	Based on record start	D5,D6

Field Name	Field Position	Field Length	FMT*	Notes	DE ID
Group Code #4 Group Code #5 Group Code #6	438 439 440	1 1 1	a a a	Blank unless filled by grouping feature	D7 D8 D9
Forms-entries	441-442	2	p	# SYSOUT entries in this record (always 1)	E0
Reserved	443-445	3	-		
Reserved	446-453	8			
Lines Printed (total)	454-459	6	p		19
Reserved	460-474	15	-		
Number Tape Mounts	475-478	4	p		F0
Number Disk Mounts	479-482	4	p		F1
Reserved	483-486	4	-		
Reserved	487-502	16			
Reserved	503-550	48	-		
Processor Time	551-556	6	p	999999V99999C; hours	29,69
Processor Charge	557-562	6	p	999999999V99C; dollars	44
I/O Time	563-568	6	p	999999V99999C; hours	30,70
I/O Charge	569-574	6	p	999999999V99C; dollars	45
U/R Charge Setup Charge Total Charge	575-579 580-584 585-590	6 6 6	p p p	999999999V99C; dollars	54 55 46
Reserved	591	1	-		
Not used					
Adjusted Rate	592-597	6	p	999999999V99C; dollars	43
Connect Charge	598-602	5	p	9999999V99C; dollars	B3
Reserved	603-635	33	-		
Number Lines Printed	636-641	6	p	same data as DEs ...	19,E5
Reserved	642-658	17	-		

* Format Indicator a or blank=alphanumeric p=packed decimal b=binary

VM Output Data Elements Table (CMS)

This table describes the data elements available for display in reports. The column labeled DE ID gives the two-character code you should use in a DISPLAY statement to include the element in your report. The column labeled Tbl Dsp gives the displacement of the element in the table presented to Exit #3, an optional exit used to modify print line information. Exit #3 is discussed in the User Exit Routines section of this chapter.

VM Output Data Elements Table:

Data Element Table	DE ID	Len	Tbl Dsp	Notes
Control Fields				
Blank Spaces	99	10	714	Used to adjust print line
Control Field	01	8	0	Contents of SORT Control Field at each control break
Control Break Count	F7	6	1175	Number of changes in SORT Control Field in next lower SORT Level
Description Field	02	20	8	Based on DESCRIPTION statements
Group Code #1 Group Code #2 Group Code #3	84 85 86	1 1 1	659 660 661	Blank unless filled by Grouping feature
Identifying Fields				
Accounting Fields	08	16	55	VM Account Number unless filled from User Accounting Table
CPU Identification	57	1	430	Blank unless filled by the VM Interface from the User Accounting Table
Number of Sessions	B4	6	857	999999
Record ID	11	8	37	*VM/370*
VM Account Number	10	8	75	
VM User ID	04	8	29	
Batch Indicator	72	1	563	B if record charges for batch work
Event Date And Time Fields				
Record Start Date	06	8	45	YY/MM/DD
Record Start Time	12	8	91	HH.MM.SS
Record Start Date	60	8	453	YY/MM/DD

Data Element Table	DE ID	Len	Tbl Dsp	Notes
Record Start Time	61	8	461	HH.MM.SS
Record Stop Time	13	8	99	
Computer Resource Utilization Fields				
Total CPU Time	26	10	182	9999.99999; hours CP Overhead + Virtual CPU
Total CPU Time	66	10	503	HHHH.MM.SS
Total CPU Time	91	8	692	HH.MM.SS; averaged at summary levels
CP Overhead Time	C4	10	927	9999.99999; hours
CP Overhead Time	C5	10	937	HHHH.MM.SS
CP Overhead Time	C6	8	947	HH.MM.SS; averaged at summary levels
Virtual CPU Time	C7	10	955	9999.99999; hours
Virtual CPU Time	C8	10	965	HHHH.MM.SS
Virtual CPU Time	C9	8	975	HH.MM.SS; averaged at summary levels
VS Page Reads	73	10	564	
VS Page Writes	74	10	574	
Total VS Pages	75	10	584	Page Reads + Page Writes
I/O Device Utilization Fields				
Cards Read	A6	9	781	99999,999
Cards Punched	A5	9	772	99999,999
Lines Printed	E5	10	1045	99999,999
Spooled Reader I/O Count	33	10	244	
Spooled Printer I/O Count	34	10	254	9999,999
Spooled Punch I/O Count	35	10	264	
Tape Connect Time	37	10	284	1 tape for 1 hr = 10,000
Non-tape Dedicated	88	10	664	Hours to 5 decimal places

Data Element Table	DE ID	Len	Tbl Dsp	Notes
Device Connect Time # Tape Mounts	95	2	706	99999,999
Temp-Disk cyl,blk	38	10	294	1 cyl for 1 hr = 10,000 hours
# Disk Mounts	96	2	708	99
Non-spooled I/O Count	39	10	304	999999,999
# Other Devices Used	98	2	712	99
Total Virtual I/O Count	40	10	314	999999,999; Spooled U/R Non-Spooled
Interval Or Accumulated Time Fields				
Connect Time	B0	10	818	9999.99999; hours
Connect Time	B1	10	828	HHHH.MM.SS
Connect Time	B2	8	838	HH.MM.SS; averaged at summary levels
Elapsed Time	25	10	172	9999.99999; hours
Elapsed Time	65	10	493	HHHH.MM.SS
Elapsed Time	90	8	684	HH.MM.SS; averaged at summary levels
Code/Indicator Fields				
Processing ID	03	1	28	Always T for VM data
Day of Week Ind	D5	1	1014	1-7 = Monday-Sunday
Spelled Day of Week	D6	10	1015	
Calculated Utilization Rates Fields				
PU Paging Rate	77	4	598	9999 Total Pages/CPU seconds
Elapsed Paging Rate	76	4	594	9999 Total Pages/elapsed minutes
I/O Index	78	4	602	9999 Total EXCPs/CPU seconds
CPU Index	D0	3	983	999 (CP OVHD/(CP OVHD+VCPU))*100
Calculated Charge Data Fields (Based on VMRATE Parameters)				
I/O Time-In Hours	30	10	222	9999.99999; hours
I/O Time	70	10	543	
Processor Time-In Hours	29	10	212	9999.99999; hours

Data Element Table	DE ID	Len	Tbl Dsp	Notes
Processor Time	69	10	533	HHHH.MM.SS
Adjusted Rate	43	9	340	$9,999.99
Connect Charge	B3	11	846	
I/O Charge	45	11	360	$999,999.99
Processor Charge	44	11	349	
Total Charge	46	13	371	$9999,999.99S
% Total Charge	42	8	332	999.999S
Distributed Charge	47	10	384	$9,999,999
U/R Charge	54	11	403	$999,999.99
Setup Charge	55	10	414	$999,999.99
Credit Amount	79	12	606	$9999,999.99*
Debit Amount	80	12	618	$9999,999.99*
Budget Amount	81	10	630	$9,999,999*
Over/Under Budget	82	13	640	
$9999,999.99S*				
% Budget Spent	83	6	653	
9999.9*				
* Based on CREDIT, DEBIT, BUDGET statements				

Charging For VM Resources (CMS)

This section applies to you if you elect to produce history records formatted for CMS. If you choose to create records formatted for CA JARS RA for z/VSE, see Charging for VM Resources (VSE) later in this chapter.

The VMRATE statement supplies rates used by CA JARS to calculate dollar charges for use of resources. The rate parameters can be omitted when no data elements involving charges are selected for a given report. The set code on the VMRATE statement, as on all rate and budget control statements, is optional. A blank in position 1 indicates that the statement is used in all reports.

CPU Identification

The CPU Identification code associates each VMRATE statement with the appropriate VM data. When you run the VM Interface translate component, a CPU Identification Code is placed into its output records according to the User Accounting Table you supply. You can also set the CPU ID field with the grouping feature, using GROUP and GROUPC statements. When this product reads those records as input, the CPU Identification on the VMRATE statement must match the corresponding CPU Identification in the records for the rates to be applied.

If your User Accounting Table defined different CPU ID Codes for different classes of users, you will need multiple VMRATE statements to calculate charges for each separate class. If this product reads a record whose CPU ID does not match the CPU ID of any VMRATE statement for a given report, it applies the rates from the first VMRATE statement for the report.

Connect Charge

The Connect Charge is calculated as:

```
Connect Charge = Connect Time x Connect Time Rate
```

You supply the Connect Time Rate on a VMPARM statement. It is the dollar amount ($99V99) per hour of connect time. The Connect Time value is in the data, as hours to 5 decimal places.

Processor Charge

This is a charge for CPU time consumed. The basic formula is:

```
Processor Charge = Processor Time x Basic Processor Rate
```

Each of these factors (Processor Time and Basic Processor Rate) is explained below.

The first factor, Processor Time, is calculated from CPU times in a record and rates in a VMRATE statement.

```
Processor Time Algorithm:

Processor Time = Total CPU Time x Total CPU Time Factor
                               +
                 Virtual CPU Time x Virtual CPU Time Factor
```

The two CPU Time factors are percentages (that is, 100 = 100%). A common approach for these factors is to set one to 100 and omit the other (they default to 0). For instance, if you want to charge on Total CPU Time only, set the Total CPU Time Factor to 100 and omit the Virtual CPU Time Factor. To charge entirely on Virtual CPU time, set the Virtual CPU Time Factor to 100 and omit the other factor.

To charge using both factors (at 050 each, for instance) you calculate Processor Time as an average of Total and Virtual CPU Time. If your two factors do not add up to 100% you probably will not get useful results.

Assume a particular account record contains these values:

```
Total CPU Time            1.3 hours
Virtual CPU Time          1.1 hours
```

Assume you use a VMRATE statement with these factors:

```
Virtual CPU Time Factor   (blank)
Total CPU Time Factor     100
Basic Processor Rate      $500.00 per hour of Processor Time
```

The calculation goes as follows:

```
Basic Processor Rate =   $500.00 + (50 x $3.20) = $660.00 per hour
Processor Time=          (100% x 1.3) + (0% x 1.1) = 1.3 hours
Processor Charge =       $500.00 x 1.3 = $650.00
```

I/O Charge

CA JARS provides two methods to calculate an I/O charge. Differences between OS and VM accounting data make one of the two techniques inappropriate for VM data. Only the recommended method is described. The other method (as documented in the *CA JARS User Guide)* can still be used, but does **not** produce meaningful results. To assure that you use the recommended method, leave the Basic I/O Rate field (positions 15-17) blank in your VMRATE statements.

For VM data, the *I/O Charge* includes some true I/O components and some components that are related to device connect time. I/O Charge is calculated as follows:

```
I/O Charge = (  Reader I/O Count x Spooled Reader I/O Factor
                   +
                Printer I/O Count x Spooled Printer I/O Factor
                   +
                Punch I/O Count x Spooled Punch I/O Factor
                   +
                Non-spooled I/O Count x Non-spooled I/O Factor  ) / 1000
                   +
              ( Temporary Disk Use x Temporary Disk Factor
                   +
                Tape Connect Time x Tape Connect Factor        ) / 10000
```

Note the parentheses in the formula - the first four terms are all divided by 1000, the last two by 10,000. You supply all the factors in your VMRATE statement. The VM Interface places all the data elements into the history records.

You supply all factors as three digit numbers. The first four factors in the formula, the ones that apply to I/O counts, are interpreted as dollars and cents ($9V99). They are the dollar charge per 1000 I/O of the various types.

The last two factors, the Temporary Disk Factor and the Tape Connect Factor, are interpreted as dollars to one decimal place ($99V9). The Temporary Disk Factor is the rate you want to charge for one cylinder-hour of temporary disk use. The Tape Connect Factor is the rate you want to charge for one hour's use of one tape drive. You must select rates that are even multiples of $0.10 - if you enter a rate of 127 in the VMRATE statement, it is interpreted as $12.70 per hour.

Temporary Disk Use is stored in the record in units of 1 ten-thousandth of a cylinder hour. For example, one cylinder of temporary disk, held for one hour, produces the number 10,000 in the Temporary Disk Use field. Two cylinders held for 3 hours would produce 60,000 for Temporary Disk Use.

Tape Connect Time is stored in the record in units of 1 ten-thousandth of an hour. For example, one tape drive held for one hour produces the number 10,000 in the Tape Connect Time field. Two tape-drives held for three hours each would produce 60,000 for Tape Connect Time.

If temporary disk is allocated on an FBA device, the raw VM account records contain a count of FBA blocks rather than a number of cylinders. The VM Interface converts the FBA block count to an equivalent number of cylinders. It divides the block count by a number that represents the number of blocks in one cylinder. The default value for this number is 1000. You may supply a different number in the FBLK parameter of your VMPARM statement when you run the VM Interface.

Unit Record Charge

The Unit Record Charge gives you an alternate method of charging for unit record use (reader, punch and printer). The numbers found in *Reader I/O Count* and *Punch I/O Count* are also available as *Cards Read* and *Cards Punched.* The *Printer I/O Count* figure is also available as *Total Lines Printed* and *Standard Lines Printed.*

The Unit Record Rates (Reader Rate and Punch Rate) on the VMRATE statement permit you to charge for the use of unit record devices as follows:

```
U/R Charge = ( Cards Read x Reader Rate
                        +
               Cards Punched x Punch Rate ) / 1000
```

To include Lines Printed in the U/R Charge, you must supply a FORMRATE statement. If you include a Line/Card Rate in the FORMRATE statement, the U/R Charge is adjusted to:

```
U/R Charge = U/R Charge
                  +
             (Lines Printed x Line/Card Rate)/1000
```

Thus all three unit record types may be included in the U/R Charge. Be careful not to bill twice for the same activity. If you supply a Spooled Reader I/O Factor in a VMPARM statement, you include a charge for reader I/O into the total I/O Charge. If you also supply a Reader Rate in the VMPARM statement, you include a charge for the same reader I/O into the total U/R Charge. You should choose one or the other way to bill for each type of unit record activity.

The Tape and Disk Allocation Charge fields permit you to charge for tape mounts and disk mounts.

```
Setup Charge = # of Tape Mounts x Tape Mount Charge
                             +
               # of Disk Mounts x Disk Mount Charge
```

Total Charge

The Total Charge is defined as:

```
Total Charge = Connect Charge
                      +
               Processor Charge
                      +
               I/O Charge
                      +
               U/R Charge
                      +
               Setup Charge
```

If you supply a Minimum Session Charge on the VMRATE statement, and that charge is greater than the Total Charge computed above, the Minimum Session Charge is used as the Total Charge.

If you are using the Project, Product, or Interval Accounting features of the VM Interface, you should probably not supply a Minimum Session Charge. A *session* means the period of time covered by one raw type 01 VM account record. If no special data collection features are active, that is the entire user session from LOGON to LOGOFF. If the VM Interface is gathering extra information through project, product or interval accounting, there may be many type 01 records created for a single user in a day's work, some representing only a short time interval. A Minimum Session Charge could severely overcharge a user.

Charging for VM Resources (VSE)

This section applies to you if you elect to produce history records formatted for CA JARS RA for z/VSE. If you choose to create records formatted for CMS, see the section entitled Charging for VM Resources (CMS).

The CPURATE statement supplies rates used by this product to calculate dollar charges for resource usage. The rate parameters may be omitted when no data elements involving charges are selected for a given report. The set code on the CPURATE statement, as on all rate and budget control statements, is optional. A blank in position 1 indicates that the statement is used in all reports.

CPU Identification

The CPU Identification code associates each CPURATE statement with the appropriate VM data. When you run the VM Interface translate component, the VM Interface places a CPU Identification Code into its output records according to the User Accounting Table you supply. When CA JARS reads those records as input, the CPU Identification on the CPURATE statement must match the corresponding CPU Identification in the records for the rates to be applied.

If your User Accounting Table defined different CPU ID Codes for different classes of users, you need multiple CPURATE statements to calculate charges for each separate class. If this product reads a record whose CPU ID does not match the CPU ID of any CPURATE statement for a given report, it applies the rates from the first CPURATE statement for the report.

Processor Charge

This is a charge that combines Total CPU Time and Connect Time. The basic formula is:

```
Processor Charge = Processor Time x Basic Processor Rate
```

You supply the Basic Processor Rate in the CPURATE statement. The calculation of Processor Time is explained as follows:

Processor Time is calculated from times in a record and rates in a VMRATE statement.

```
Processor Time Algorithm (VSE):

Processor Time = ( Total CPU Time x Total CPU Time Factor
                              +
                   Connect Time x Connect Time Factor    ) /3600
```

The two factors are percentages (that is, 100 = 100%). One possible approach for these factors is to set one to 100 and omit the other (they default to 0). For instance, if you want to charge on Total CPU Time only, set the Total CPU Time Factor to 100 and omit the Connect Time Factor. To charge entirely on Connect time, set the Connect Time Factor to 100 and omit the other factor. If you use both factors (at 050 each, for instance) you calculate Processor Time as an average of Total CPU Time and Connect Time.

Often, people think in terms of two rates, a rate per hour they want to charge for Connect Time, and a rate per hour they want to charge for Total CPU Time. As you can see from the above formula, CA JARS does not calculate its charges in exactly that way. With a little arithmetic, though, you can convert your desired rates into factors that produces the total charge you want.

Suppose you want to charge C dollars per hour for Connect Time, and T dollars per hour for Total CPU Time. T of course is a larger rate than C. The simplest approach is to set:

```
Basic Processor Rate    =       T    (your rate for Total CPU Time)
Total CPU Time Factor   =       100
Connect Time Factor     =       C/T  (rounded to whole percent)
```

Let us carry through an example. You want to charge:

```
$300.00 per hour for Total CPU Time
 $60.00 per hour for Connect Time
```

A user has accumulated the following figures:

```
3600 seconds (1 hour) of Connect Time
 900 seconds (15 minutes) of Total CPU Time
```

The right answer, from the calculation you are used to, is:

```
Processor Charge = ($60 x 1 hour) + ($300 x .25 hours) = $135.00
```

Using the formulas suggested, you set:

```
Basic Processor Rate  = $300.00 (same as your desired CPU Time rate)
Total CPU Time Factor = 100
Connect Time Factor   = 60/300 = 020% (ratio of your two rates)
```

CA JARS calculates the Processor Charge as:

```
Processor Time   = ( (100% x 900 sec) + (20% x 3600 sec) ) /3600
                 = ( 900 sec + 720 sec ) /3600
                 = 0.45 hours
Processor Charge = $300.00 x 0.45 = $135.00
```

There could be some loss of precision if the ratio of your two desired rates does not come out evenly to a whole percent. You can improve the precision with one more adjustment. You can divide the Basic Processor Rate by any number you like, without changing the Processor Charge, if you multiply both the Total CPU Time Factor and the Connect Time Factor by that same number.

For instance, in the previous example, dividing the Basic Processor Rate by 5 gives $60.00 per hour. Multiplying both factors by 5 gives 500% and 100% for the Total CPU Time Factor and the Connect Time Factor. The calculation would then be:

```
Processor Time    = ( (500% x 900 sec) + (100% x 3600 sec) ) /3600
                  = ( 4500 sec + 3600 sec) /3600
                  = 2.25 hours
Processor Charge  = $60.00 x 2.25 = $135.00
```

If you can find an adjustment factor that makes the ratio of your two rates come out very close to a whole percent, and does not cause much rounding error when you divide it into your Basic Processor Rate, you can make the calculation almost perfectly match the calculation you are used to.

I/O Charge

CA JARS RA for z/VSE provides two methods to calculate an I/O charge. Differences between VSE and VM accounting data make one of the two techniques inappropriate for VM data. Only the recommended method is described. The other method can still be used, but does not produce meaningful results. To assure that you use the recommended method, leave the Basic I/O Rate field (positions 15-17) blank in your CPURATE statements.

For VM data, the *I/O Charge* includes one true I/O component and two components that are related to device connect time. I/O Charge is calculated as follows:

```
I/O Charge = ( Non-spooled I/O Count x Non-spooled I/O Factor
                  +
               Temporary Disk Use x Temporary Disk Factor
                  +
               Tape Connect Time x Tape Connect Factor        ) / 1000
```

Note the parentheses in the formula: all three terms are divided by 1000. You supply all the factors in your CPURATE statement. The VM Interface places all the data elements into the history records.

You supply all factors as four digit numbers, interpreted as dollars and cents ($99V99). The Non-spooled I/O Factor is the rate you want to charge per 1000 nonspooled SIOs. The Temporary Disk Factor is the rate you want to charge for one cylinder-hour of temporary disk use. The Tape Connect Factor is the rate you want to charge for one hour's use of one tape drive.

Temporary Disk Use is stored in the record in units of one/thousandth of a cylinder hour. For example, one cylinder of temporary disk, held for one hour, produces the number 1,000 in the Temporary Disk Use field. Two cylinders held for three hours would produce 6,000 for Temporary Disk Use.

Tape Connect Time is stored in the record in units of one/thousandth of an hour. For example, one tape drive held for one hour produces the number 1,000 in the Tape Connect Time field. Two tape drives held for three hours each would produce 6,000 for Tape Connect Time.

If temporary disk is allocated on an FBA device, the raw VM account records contain a count of FBA blocks rather than a number of cylinders. The VM Interface converts the FBA block count to an equivalent number of cylinders. It divides the block count by a number that represents the number of blocks in one cylinder. The default value for this number is 1000. You may supply a different number in the FBLK parameter of your VMPARM statement when you run the VM Interface.

Unit Record Charge

The Unit Record Charge gives you the ability to charge for unit record use (reader, punch and printer). The Reader Rate on the CPURATE statement defines the rate you wish to charge per 1000 cards read. The first calculation of U/R Charge is:

```
U/R Charge = (Cards Read x Reader Rate) / 1000
```

To include Lines Printed in the U/R Charge, you must supply a FORMRATE statement with a Forms ID of *PR*. If you include a Line/Card Rate in this FORMRATE statement, the U/R Charge is adjusted to:

```
U/R Charge = U/R Charge
                  +
             (Lines Printed x Line/Card Rate)/1000
```

To include statements Punched in the U/R Charge, you must supply a FORMRATE statement with a Forms ID of *PU*. If you include a Line/Card Rate in this FORMRATE statement, the U/R Charge is adjusted to:

```
U/R Charge = U/R Charge
                  +
             (Cards Punched x Line/Card Rate)/1000
```

By including both *PU* and *PR* FORMRATE statements, you can have both Lines Printed and Cards Punched included in the U/R Charge, along with Cards Read.

The Tape and Disk Allocation Charge fields permit you to charge for tape mounts and disk mounts.

```
Setup Charge = # of Tape Mounts x Tape Mount Charge
                             +
               # of Disk Mounts x Disk Mount Charge
```

Total Charge

The Total Charge is defined as:

```
Total Charge = Processor Charge
                      +
               I/O Charge
                      +
               U/R Charge
                      +
               Setup Charge
```

Each of the four Charges in the above formula can be adjusted by a percentage from a PRIORITY statement.

If you supply a Minimum Job Charge on the CPURATE statement, and that charge is greater than the Total Charge computed above, the Minimum Job Charge is used as the Total Charge.

If you are using the Project, Product, or Interval Accounting features of the VM Interface, you should probably not supply a Minimum Job Charge. A *job* means the period of time covered by one raw type 01 VM account record. If no special data collection features are active, that is the entire user session from LOGON to LOGOFF. If the VM Interface is gathering extra information through project, product or interval accounting, there may be many type 01 records created for a single user in a day's work, some representing only a short time interval. A Minimum Job Charge could severely overcharge a user.

If you elect to produce VSE-formatted records from the translation component of the VM Interface, you require a copy of the CA JARS RA for z/VSE product to report on them. There are a two differences in the use of control statements you must take into account.

- You must use the CPURATE statement instead of the VMRATE statement.
- The use of the FORMRATE statement is somewhat different. These differences are detailed in the following sections.

CPURATE Statement

This statement is input to CA JARS RA for z/VSE, if you choose to use that product as the reporting component for the VM Interface.

To bill for VM data under CA JARS RA for z/VSE, you use the CPURATE statement to define the rate parameters for the billing algorithm. VM data is treated as if it were POWER Data. Therefore, POWER data cannot be processed concurrently with VM data unless the grouping feature is used to select and/or charge CPU ID for at least one type of data.

Position	Field Length	Field Name	Notes
1	1	Set Code	
2-9	8	Statement Type	CPURATE
10	1	CPU Identification	CPU ID or blank
11-14	4	Basic Processor Rate	9999; dollars per hour
15-17	3	Basic I/O Rate	999; dollars per hour; blanks recommended
18-20 21-23	3 3	Connect Time Factor Total CPU Time Factor	999; percentage must be blank or numeric
 27-29 30-32 33-35 36-38 39-41	3 3 3 3 3 3	Spool Reader I/O Factor Spool Printer I/O Factor Spool Punch I/O Factor Tape I/O Factor Disk I/O Factor Other I/O Factor	999; SIO count per second; blanks recommended
42-45	4	Reader Rate	99V99; dollars per 1000 cards
46-49	4	Tape Rate	99V99; dollars per 1000
50-53	4	Temporary-Disk Rate	99V99; dollars per cyl-hour
54-57	4	Non-spooled I/O Rate	99V99; dollars per 1000 I/O
58-61	4	Tape Allocation Charge	99V99; dollars per tape drive
62-65	4	Disk Mount Charge	99V99; dollars per mount
66-69	4	Minimum Session Charge	99V99; dollars
70-80	11	Reserved	Not used

FORMRATE Statement

Place *PR* or *PU* in the Forms ID field. The number you enter in the Line/card Rate field is then your charge per 1000 lines sent to a virtual printer (*PR* Forms ID) or per 1000 virtual cards punched (*PU* Forms ID). You may submit two FORMRATE statements to a single run, one to charge for lines printed, the other to charge for cards punched.

Position	Field Length	Field Name	Notes
1	1	Set Code	Optional
2-9	8	Statement Type	FORMRATE
10	1	CPU Identification	
11	1	Reserved	Not used
12-15	4	Forms ID	*PR* or *PU*
16-19	4	Setup Charge	99V99; dollars
20-23	4	Line/Card Rate	99V99; dollars per 1000
24-80	57	Reserved	Not used

VM Accounting Versus Batch Accounting

The accounting data collected by VM is primarily oriented towards overall system operation. Data is collected for each virtual machine and represents total resource usage by each virtual machine. An individual virtual machine may be an OS machine, a VSE machine, or a CMS machine.

For CMS users, the VM data is the only accounting data. If you want to report on overall system use and performance, it may be appropriate to use the VM accounting data for all virtual machines. For billing purposes, though, you may instead consider using VM accounting data for CMS users, but still use SMF and/or POWER/VS accounting data for users of your guest batch systems.

The VM Interface puts VM data into the same record format used for SMF and POWER/VS data. Whenever possible, comparable data is in the same fields. This makes it easy to mix VM data and batch accounting data in a single report.

Some ideas for designing mixed-data reports:

- You can reject VM accounting data on the batch machines using the User Accounting Table.
- With the User Accounting Table, you can insert CPU IDs that differentiate billable and nonbillable usage.
- The grouping feature can select or reject data to keep only the data appropriate for each report.

User Exit Routines

In order to accommodate installation accounting and reporting requirements not supported by the standard features of the Report Writer, provision is made for user exit routines to augment or modify the actions normally taken. These user exit routines may be written in any language that supports the standard OS/VS program linkage conventions, but COBOL or the Assembler are probably the easiest to use with the least likelihood of problems. The Assembler must be used for input or account exits that intend to insert records. This section describes the parameters passed to exit routines at each of the following four phases in the Report Writer's processing logic:

- Creation of the working account file (account exit).
- Processing of the working account file prior to the application of billing algorithms (exit-1 exit).
- Processing of the working account file after the application of billing algorithms (exit-2 exit).
- Processing of user-defined reports prior to formatting a report print line (exit-3 exit).

Exit routines must be present on an accessed disk. A routine may be in the form of a TEXT file, a member in a GLOBALed TXTLIB, or a member in a GLOBALed LOADLIB. To use a LOADLIB member, you must also include the LOADLIB in the FILEDEF statement for $SYSLIB. You should modify the CAIJV050 EXEC to include the statement:

```
FILEDEF $SYSLIB DISK lib-name LOADLIB fm (CONCAT
```

It is not necessary to link edit an exit routine with the Report Writer. The exit routine should be compiled and linked independently of the Report Writer.

Exit routines are invoked according to standard linkage conventions, as follows:

Register	Description
13	Address of a register save area.
14	Return address.
15	Address of the exit routine's entry point.
1	Address of the parameter list.

Account Exit

The account exit, if activated, passes each account record just as it is about to be written to the account file. This exit may modify, delete, or insert records at this point. Note that extreme care must be exercised if records are being inserted since no further editing or validation operations are performed before the record is written to the account file.

The parameter list contains the following parameters:

Word	Description
1	Address of logical record currently being processed (following the Record Description Word (RDW)).
2	Address of a 1-character disposition indicator.
3	Address of a 1-character insertion indicator.

Each Account Record is made available to the user exit routine.

A value of EBCDIC blank (hex '40') in the disposition indicator on entry to the account exit indicates that a record is available to be processed. If the exit needs to modify or extract information from the record, it can do so at this time.

If the modifications include a change to the record length, the exit must move the record to its own work area, make the required modifications to the record in the work area, then store the address of the modified record back into the first word of the parameter list before returning control to the Report Writer.

If the exit needs to delete the record from further processing, it must set the disposition indicator to any nonblank value before returning control to the Report Writer. In order to insert records into the input stream, the exit must set the insertion indicator to any nonblank value, and store the address of the record to be inserted in the first word of the parameter list before returning control to the Report Writer. The record to be inserted must be preceded by a valid Record Descriptor Word (RDW) that contains the length of the record (including the four bytes for the RDW), but the address stored into the first word of the parameter list must point to the beginning of the record after the RDW.

When the user exit is next invoked, after the inserted record has been processed, it again receives a pointer to the original record, which it can now choose to process, or delete, or it can continue inserting records of its own.

High values (hex 'FF') in the disposition indicator on entry to the account exit indicates that end-of-file has been reached. No record is available for processing at this point, nor can any additional records be inserted. The account exit should take this opportunity to prepare totals, generate user-formatted reports, close its files, etc.

Exit #1

This exit provides you with control immediately following the grouping feature logic and prior to the application of the accounting algorithm for each accounting record being processed. This lets you to test or apply a unique algorithm to any record reaching this phase of processing.

Historical data is passed to the user exit routine prior to all old account records.

The parameter list for this exit is as follows:

Word	Description
1	Address of Set Code for report currently being generated
2	Address of accounting record currently being processed
3	Address of RATE statement information table
4	Address of PRIORITY statement information table
5	Address of working storage area
6	Address of disposition indicator to be set by user
7	Address of VMRATE statement information table
8	Address of FORMRATE statement information table.
9	Address of RJERATE statement information table.

All these tables are described on the following pages. For VM data, the RATE, PRIORITY, and RJERATE statement information tables contain binary zeros, since these three statement types are not used under CMS.

The RATE statement information table consists of a variable number of entries, with the last valid entry being followed by an entry containing low-values (x'00'). Each entry is basically in the same format as the RATE statement as shown on the following page.

RATE Statement:

Field Name	Field Length	Displacement
CPU Identification	1	0
Basic Processor Rate	4	1
Basic I/O Rate	3	5
Core Factor	4	8
Elapsed Time Factor	3	12

Field Name	Field Length	Displacement
Total CPU Time Factor	3	15
SRB CPU Time Factor	3	18
TCB CPU Time Factor	3	21
Reader I/O Factor	3	24
Printer I/O Factor	3	27
Punch I/O Factor	3	30
Tape I/O Factor	3	33
Disk I/O Factor	3	36
Other I/O Factor	3	39
Reader Rate	3	42
Printer Rate*	3	45
Special Print Rate*	3	48
Punch Rate*	3	51
Tape Allocation Charge	3	54
Disk Allocation Charge	3	57
Minimum Job Charge	4	60
Maximum Step Rate	4	64
Step Time Criteria	2	68
Core Indicator	1	70
* Not used for OS jobs (FORMRATE used instead)		

The VMRATE statement information table consists of a variable number of entries with the last entry being followed by an entry containing low-values (x'00'). Each entry is basically in the same format as the VMRATE statement as follows. All data is in EBCDIC format.

VMRATE Statement:

Field Name	Field Length	Displacement
CPU Identification	1	0
Basic Processor Rate	4	1
Basic I/O Rate	3	5

Field Name	Field Length	Displacement
Product Factor	4	8
Connect Time Rate	4	12
Virtual CPU Time Factor	3	16
Total CPU Time Factor	3	19
Reader I/O Factor	3	22
Printer I/O Factor	3	25
Punch I/O Factor	3	28
Tape Connect Factor	3	31
Temporary Disk Factor	3	34
Non-Spooled I/O Factor	3	37
Filler	12	40
Punch Rate	3	52
Reader Rate	3	55
Tape Allocation Charge	3	58
Disk Allocation Charge	3	61
Minimum Session Charge	4	64

The PRIORITY statement information table consists of a variable number of entries with the last entry being followed by an entry containing low-values (x'00'). Each entry is basically in the same format as the PRIORITY statement as follows:

PRIORITY Statement:

Field Name	Field Length	Displacement
CPU Identification	1	0
Processor Charge Flag	1	1
I/O Charge Flag	1	2
U/R Charge Flag	1	3
Setup Charge Flag	1	4
Priority Factors	30	5
Class/Partition Factors	35	35

The FORMRATE statement information table consists of a variable number of entries with the last entry being followed by an entry containing low-values (x'00'). Each entry is in a format similar to the FORMRATE statement with numeric fields converted to packed decimal as follows:

FORMRATE Statement:

Field Name	Field Length	Displacement	Format
CPU Identification	1	0	character
SYSOUT Class	1	1	character
Forms ID	4	2	character
Setup charge	3	6	packed (999v99)
Line rate	3	9	packed (999v99)
Page rate	3	12	packed (999v99)
Charge option	1	15	character

The RJERATE statement information table consists of a variable number of entries with the last entry being followed by an entry containing low-values (x'00'). Each entry is in a format similar to the RJERATE statement with numeric fields converted to packed decimal as follows:

RJERATE Statement:

Field Name	Field Length	Displacement	Format
CPU Identification	1	0	character
Line name	8	1	character
Time rate	4	9	packed (99999V99)
Record rate	3	13	packed (999V99)
Connect rate	4	16	packed (99999V99)
Transmission rate	3	20	packed (999V99)
Minimum session charge	3	23	packed (999V99)
Job name	8	26	character
User information	16	34	character

When the record being processed is a summary record from the historical database, the working storage area contains the time and charge values accumulated into that record when it was created.

Only the RATE, VMRATE, FORMRATE, RJERATE, and PRIORITY statements required to generate a given report are present in their respective tables during this execution phase. Table entries are in the same order as the statements were read by the Report Writer.

The working storage area referenced in the parameter list contains the following fields:

Field Name	Field Length	Displacement	Mode	Notes
Processor Time	6	0	Packed	999999V99999C; hours
Processor Charge	6	6	Packed	999999999V99C; dollars
I/O Time	6	12	Packed	999999V99999C; hours
I/O Charge	6	18	Packed	999999999V99C; dollars
U/R Charge	5	24	Packed	9999999V99C; dollars
Setup Charge	5	29	Packed	9999999V99C; dollars
Total Charge	6	34	Packed	999999999V99C; dollars
Charge Suffix	1	40	EBCDIC	See below
Adjusted Rate	6	41	Packed	999999999V99C; dollars
Connect Charge	5	47	Packed	9999999V99C; dollars
RJE Charge	5	52	Packed	9999999V99C; dollars

The Charge Suffix indicates that the Total Charge field contains one of the following values:

Charge Suffix	Meaning
-	Credit amount
+	Debit amount
*	Budget amount

Charge Suffix	Meaning
M	Minimum job charge
B	Block time charge
blank	Normal job charge

Each accounting record and all pertinent billing parameters are made available through the parameter list. You can modify information in the accounting record and calculate the various time and charge fields related to the record.

Upon entry to the user exit routine, the time and charge fields in working storage are initialized and available for calculations. When the record being processed is a summary record from the historical database, the working storage area contains the time and charge values accumulated into that record when it was created.

The one-byte EBCDIC disposition indicator, as referenced through the parameter list, is blank upon entry to the user exit routine. A hex 'FF' (high values) upon entry indicates that an end-of-file condition has occurred and no further record processing is to be performed.

You should take this opportunity to prepare totals, generate user-formatted reports, close any files you opened, etc. You can optionally set the one-byte EBCDIC disposition indicator to specify the following action to be taken upon each return to the Report Writer:

Disposition Indicator	Meaning
blank	Default - normal processing continues with calculating values in working storage area using standard accounting algorithm.
1	Skip standard accounting algorithm calculations - use values in working storage area as placed there by user exit routine.
2	Reject record from further processing - read next input accounting record.

Exit #2

This exit gives you control immediately following the completion of the standard accounting algorithm calculations and prior to the construction of user sort control fields, as specified by the SORT statement, for each accounting record being processed. This lets you perform tests to verify the time and charge calculations or make unique billing adjustments to any record reaching this phase of processing. The parameter list and record processing sequence for this exit is identical to that of Exit #1.

Each accounting record and all pertinent billing parameters are made available through the parameter list. You can modify information in the accounting record or any field in the working storage area made available through the parameter list. Upon entry to the user exit routine, the time and charge fields in working storage contain the results of the standard accounting algorithm calculations based on the appropriate RATE, TSORATE, FORMRATE, RJERATE, and PRIORITY statements.

The one-byte EBCDIC disposition indicator, as referenced through the parameter list, is blank upon entry to the user exit routine. A hex 'FF' (high values) upon entry indicates that an end-of-file condition has occurred and no further record processing is to be performed. You should take this opportunity to prepare totals, generate user-formatted reports, close any files you have opened, etc.

You can optionally set the one-byte disposition indicator to specify the necessary action to be taken upon return to the Report Writer. If you have set the disposition indicator to any nonblank character, then the record is automatically rejected from further processing.

Exit #3

This exit provides you with control during the output phase while generating the user-defined reports. This gives you the capability of modifying print line information or using summarized data for reporting purposes unique to their installation. The parameter list for this exit is as follows:

Word	Description
1	Address of Set Code for report currently being generated
2	Address of print line identification code
3	Address of record type indicators
4	Address of Output Data Elements Table

The print line identification code referenced in the parameter list defines the type of print line currently being developed by the Report Writer. This code is a one-byte binary number defining the type of information currently stored in the Output Data Elements Table:

Print Line ID	Meaning
X'01'	Top line of output data element titles available for display.
X'02'	Bottom line of output data element titles available for display.
X'03'	Output data elements available for display at detail level (that is, job and job step records).

Print Line ID	Meaning
X'04'	Output data elements available for display at final summarization level.
X'05'	Output data elements available for display at summarization level 1.
X'06'	Output data elements available for display at summarization level 2.
X'07'	Output data elements available for display at summarization level 3.
X'08'	Output data elements available for display at summarization level 4.
X'09'	Output data elements available for display at summarization level 5.
X'50'	Output data elements available for display as level 1 header information.
X'60'	Output data elements available for display as level 2 header information.
X'70'	Output data elements available for display as level 3 header information.
X'80'	Output data elements available for display as level 4 header information.
X'90'	Output data elements available for display as level 5 header information.
X'FF'	End-of-file condition has occurred and no further record processing is to be performed. Previous entry should have been with identification code X'04' for final totals.

If the print line identification code is equal to X'03', then the record type indicator defines which type of record is currently being processed to develop the detail print line. The record type indicator has no meaning when the print line identification code is a value other than X'03'. This indicator is a two-byte EBCDIC field containing one of the following values:

Record Type Indicator	Meaning
1	Output Data Elements Table contains job step level information.
1	Output Data Elements Table contains job level information.
11	Output Data Elements Table contains information for a one-step job. Data created by the VM Interface is always treated as a one-step job.

The Output Data Elements Table referenced in the parameter list contains the output data elements available for display. The Tbl Dsp column defines the displacement, relative to zero, into the table for each output data element. The Len column defines the field length, and the Notes column indicates the field format after editing but prior to printing. The information in this table is available to users for verification and modification purposes. By changing the table information, you can effectively control the information that is eventually selected for display based on the DISPLAY statement.

Additionally, this information could be referenced to develop special reports and user records formatted for output by the user exit routine.

Note that only those Output Data Elements specified on a DISPLAY or EDIT statement contains valid information in the Output Data Elements Table. If the logic of an exit requires access to a data element that is not displayed, an EDIT statement can be used to force the editing of the data element and make it available. It is not recommended that numeric operations be performed on numeric output data elements since their formats may change due to dynamic re-editing to avoid high order digit truncation.

Sample Reports

CMS Control Report

(page 1 of 2):

```
CA JARS r12              C A  -  J A R S  /  C M S   C O N T R O L   R E P O R T     CAIJVR00  PAGE  1
Resource Accounting SP0                                                                                  01 NOV yyyy 11.


                                                        SYSTEM CONTROL CARDS

                        1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
                         CRITERIA                                                         123
                         VMPARM RECO
                        1...5...10...15...20...25...30...35...40...45...50...55........65...70...75...80
```

(page 2 of 2):

```
CA JARS r12              C A  -  J A R S  /  C M S   C O N T R O L   R E P O R T     CAIJVR00  PAGE  2
Resource Accounting SP0                                                                                01 NOV yyyy 11.


CAJV516I 32 VM TYPE 01 RECORDS READ.
CAJV516I 31 VM TYPE 03 RECORDS READ.
CAJV516I 1 VM TYPE 05 RECORDS READ.
CAJV516I 4 USER TYPE C0 RECORDS READ.
CAJV516I 31 CAI TYPE C0 RECORDS READ.
CAJV520I 99 TOTAL RECORDS READ, 94 TOTAL RECORDS USED.

CAJV522I 2 CONTROL CARD(S) READ.

CAJV524I 32 CA JARS HISTORY RECORD(S) WRITTEN.

CAJV504I PROCESSING COMPLETE, RETURN CODE = 0.
```

Termination Report

```
CA JARS r12                    T E R M I N A T I O N   R E P O R T            CAIJFR99   PAGE 1
Resource Accounting SP0                                                                                  01 NOV yyyy 11.

** PRODUCT RETURN CODE -- 0000

** MESSAGES -- ** NO MESSAGES PRODUCED **

** FILE USAGE --

   NAME- CAIJFPR                                                  RECORD COUNTS-
                  ACCESS - SAM                                               0 -INPUT
                  BLKSIZE- 00130                                            33 -OUTPUT
                  LRECL  - 00130                                             0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED ANS-PR-CTL
                  USAGE  - OUTPUT MOVE
                  SYS    - LST
                  TAP.OPT- NONE

   NAME- CAIJFIN                                                  RECORD COUNTS-
                  ACCESS - SAM                                               2 -INPUT
                  BLKSIZE- 00080                                             0 -OUTPUT
                  LRECL  - 00080                                             0 -UPDATED
                  CISIZE - 00000
                  RECFORM- UNDEFINED
                  USAGE  - INPUT MOVE
                  SYS    - 000
                  TAP.OPT- NONE

   NAME- CAIJVS5                                                  RECORD COUNTS-
                  ACCESS - SAM                                              99 -INPUT
                  BLKSIZE- 00080                                             0 -OUTPUT
                  LRECL  - 00080                                             0 -UPDATED
                  CISIZE - 00000
                  RECFORM- FIXED
                  USAGE  - INPUT MOVE
                  SYS    - 005
                  TAP.OPT- STANDARD-LABEL REW-UNLOAD

   NAME- CAIJVS6                                                  RECORD COUNTS-
                  ACCESS - SAM                                               0 -INPUT
                  BLKSIZE- 04096                                            32 -OUTPUT
                  LRECL  - 04092                                             0 -UPDATED
                  CISIZE - 00000
                  RECFORM- VARIABLE BLOCKED
                  USAGE  - OUTPUT MOVE
                  SYS    - 006
                  TAP.OPT- STANDARD-LABEL REW-UNLOAD

** START TIME -- 11.41.56 END TIME -- 11.42.13 DURATION -- 00.00.17

** END OF JOB --
   HIGHEST RETURN CODE -- 0
```

Daily I/O Activity by User

```
           D A I L Y   I / O   A C T I V I T Y   B Y   U S E R
0BEGIN DATE - 01/14/yy                             RUN DATE - 02/01/yy
 END DATE   - 01/22/yy                                        PAGE 1

            CONNECT    READER    PRINTER      PUNCH  NON-SPOOL TOTAL VIRT
 CONTROL       TIME I/O COUNT  I/O COUNT  I/O COUNT  I/O COUNT  I/O COUNT

 CMSACT    00.00.29         0          0          0         36         36
 CMSBTCH2  00.03.10        66        717        446      1,391      2,620
 CMSVTM    00.00.27         0          0          0         52         52
 CMS3278   00.00.27         0          0          0         92         92
 ISPVM     00.48.25         0          0          0        116        116
 MONITOR   01.31.08     1,262          0      1,262        282      2,806
 MVSSP     09.32.14       116      5,549          0     27,652     33,317
 NOSTROMO  08.04.04         0          0          0      3,212      3,212
 OPERATOR  01.31.53       264          0        116        535        915
 RSCS      00.00.26         0          0          0         78         78
 VMPASS    08.52.54         0          0          0        709        709

 850114    30.25.37     1,708      6,266      1,824     34,155     43,953
   .
   .
   .
 850115    12.26.23    29,781        372          0     45,208     75,361
   .
   .
   .
 850122    18.53.53    11,836      2,568      6,200     95,254    115,858

           90.06.53    51,306     78,281     12,424    477,560    619,571
```

Daily I/O Activity by User Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS  .    .    .    .    .    .    .    .    .    .    .   128   .    .
| SELECT .    1    .    .    .    .    .    .   .A    .    .    .    .    .
| CONFIG READ00C   .    .    .    .    .    .    .    .    .    .    .    .
| VMRATE .0100.  10000500   100   100  .100100100.    .    . 500500500500 .
|AHEADER  .  D A I L.Y   I / O.  A C T I.V I T Y  .B Y . U S.E R .    .    .
|ASORT   00406AE 01608A1.   .    .    .    .    .    .    .    .    .    .
|ADISPLAY V00011B1133134135139140 .    .    .    .    .    .    .    .    .
|AGROUP  0998 S2554X 2593P 2972 R .    .    .    .    .    .    .    .    .
|AGROUPC  1*VM/370* .    .    .    .    .    .    .    .    .    .    .    .
|AGROUPC  200000000 .    . X  .    .    .    .    .    .    .    .    .    .
|AGROUPC  300000    .    . X  .    .    .    .    .    .    .    .    .    .
|AGROUPC  4XX  .    .    .    .    .    .    .    .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

I/O Charge Detail by User

```
                        I / O   C H A R G E   D E T A I L   B Y   U S E R

BEGIN DATE - 01/14/yy                                                         RUN DATE - 02/01/yy
END DATE   - 01/22/yy                                                                    PAGE 2

             READER    PRINTER     PUNCH  NON-SPOOL TOTAL VIRT TAPE CONCT TDISK  CYL         I/O
CONTROL   I/O COUNT  I/O COUNT  I/O COUNT  I/O COUNT  I/O COUNT HR X 10000 HR X 10000      CHARGE

850115       29,781        372          0     33,039     63,192      8,371     48,680      $90.47
850121            0     21,680          0     28,436     50,116     20,647    443,828     $514.60

A42MAINT     29,781     22,052          0     61,475    113,308     29,018    492,508     $605.07
  .
  .
  .
  .
850121        1,052        284      1,451      2,430      5,217          0    204,064     $206.79
850122            0          0          0          0          0          0    117,418     $117.45

CMSGXB        1,052        284      1,451      2,430      5,217          0    321,482     $324.24
  .
  .
  .
850121            0          0          0      9,266      9,266          0    429,552     $438.82
850122            0          0          0        791        791          0    236,477     $237.27

V22MAINT          0          0          0     10,057     10,057          0    666,029     $676.09
  .
  .
  .
             51,306     78,281     12,424    477,560    619,571    126,978  3,840,852   $4,523.90
```

I/O Charge Detail by User Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS    .    .    .    .    .    .    .    .    .    .   128   .    .
| SELECT   .    1    .    .    .    .    .    .   .B    .    .    .    .    .
| CONFIG   READ00C   .    .    .    .    .    .    .    .    .    .    .    .
| VMRATE   .0100.  10000500   100   100  .100100100.    .    . 500500500500 .
|BHEADER   .  I / O  .C H A R G.E   D E T.A I L   B.Y   U S E.R   .    .    .
|BSORT     01608AE 00406A1.    .    .    .    .    .    .    .    .    .    .
|BDISPLAY  V0001133134135139140137138145 .    .    .    .    .    .    .    .
|BGROUP    0998 S    .    .    .    .    .    .    .    .    .    .    .    .
|BGROUPC   1*VM/370* .    .    .    .    .    .    .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

U/R And Setup Charges by User Report

```
              U / R   +   S E T U P   C H A R G E S   B Y   U S E R
0BEGIN DATE - 01/14/yy                                        RUN DATE - 02/01/yy
 END DATE   - 01/22/yy                                                   PAGE 2

              CARDS     CARDS  STD LINES         U/R       TAPE   DISK       SETUP
 CONTROL       READ   PUNCHED    PRINTED      CHARGE     MOUNTS MOUNTS      CHARGE
   .
   .
   .
 850115      29,781         0        372     $152.63          1      0       $5.00
 850121           0         0     21,680     $216.80          1      0       $5.00

 A42MAINT    29,781         0     22,052     $369.43          2      0      $10.00

 850121         316        33          0       $1.75          0      0        $.00
 850122       2,293       165      1,615      $28.46          0      0        $.00

 CMSARS       2,609       198      1,615      $30.21          0      0        $.00

 850118           0         0          0        $.00          0      0        $.00
 850121       1,052     1,451        284      $15.37          0      0        $.00
 850122           0         0          0        $.00          0      0        $.00

 CMSGXB       1,052     1,451        284      $15.37          0      0        $.00
```

U/R and Setup Charges by User Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS    .    .    .    .    .    .    .    .    .    .    .   128   .    .
| SELECT   .    1    .    .    .    .    .    .    .C   .    .    .    .    .
| CONFIG   READ00C   .    .    .    .    .    .    .    .    .    .    .    .
| VMRATE   .0100.  10000500   100   100  .100100100.    .    . 500500500500 .
| FORMRATE.    .    1000 .    .    .    .    .    .    .    .    .    .    .
|CHEADER   .  U / R  .+   S E T U P . C H.A R G E S.  B Y   U.S E R    .    .
|CSORT     01608AE 00406A1.    .    .    .    .    .    .    .    .    .    .
|CDISPLAY  V00011A61A51E51545F01F1155    .    .    .    .    .    .    .    .
|CEDIT     F0 TF1 T  .    .    .    .    .    .    .    .    .    .    .    .
|CGROUP    0998 S    .    .    .    .    .    .    .    .    .    .    .    .
|CGROUPC   1*VM/370* .    .    .    .    .    .    .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

Processor and Connect Charge Breakdown by User and Date

```
                         P R O C E S S O R   A N D   C O N N E C T   C H A R G E
                           B R E A K D O W N   B Y   U S E R   A N D   D A T E

BEGIN DATE - 01/14/yy                                                                      RUN DATE - 02/01/yy
END DATE   - 01/22/yy                                                                                 PAGE 9

                       PROCESS     PROCESS     CONNECT     CONNECT  FIRST      PROD   ADJUSTED       TOTAL    PERCENT
                          TIME      CHARGE        TIME      CHARGE  PRODUCT     VAL       RATE      CHARGE      TOTAL
                           .
                           .
                           .
                        .00010        $.05      .01916        $.19                0    $500.00        $.24       .007
                        .00059        $.30      .08888        $.89                0    $500.00       $1.19       .033
                        .00131        $.66      .10111       $1.01                0    $500.00       $1.67       .047
                        .00087       $1.04      .00888        $.09  JSSCJSI      70  $1,200.00       $1.13       .032
                        .00002        $.01      .00000        $.00                0    $500.00        $.01       .000
                        .00027        $.30      .00083        $.01  LOADLIB      60  $1,100.00        $.31       .009
                        .00207       $2.48      .00611        $.06  JSSCJSI      70  $1,200.00       $2.54       .071
                        .00172        $.86      .13055       $1.31                0    $500.00       $2.17       .061
                        .00122        $.61      .01916        $.19                0    $500.00        $.80       .022
                        .00028        $.31      .00083        $.01  LOADLIB      60  $1,100.00        $.32       .009
                        .00007        $.04      .00166        $.02                0    $500.00        $.06       .002
                        .00207       $2.48      .00555        $.06  JSSCJSI      70  $1,200.00       $2.54       .071
                        .00250       $1.25      .30527       $3.05                0    $500.00       $4.30       .121
                        .00188        $.94      .07833        $.78                0    $500.00       $1.72       .048
                        .00029        $.32      .00083        $.01  LOADLIB      60  $1,100.00        $.33       .009
                        .00271       $1.36      .09750        $.98                0    $500.00       $2.34       .066
                        .00028        $.31      .00083        $.01  LOADLIB      60  $1,100.00        $.32       .009
                        .00205       $2.46      .00611        $.06  JSSCJSI      70  $1,200.00       $2.52       .071
                        .00039        $.20      .14777       $1.48                0    $500.00       $1.68       .047
   DATE 850122          .04520      $33.67     4.04672      $40.46               70                 $74.13      2.080
USERID CMSARS           .07561      $48.89     6.93529      $69.33               70                $118.22      3.320
         .
         .
         .

                       1.65526     $880.22   268.07097   $2,680.06               70              $3,560.28    100.096
```

Processor and Connect Charge Breakdown by User and Date Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS    .    .    .    .    .    .    .    .    .    .    .   128   .    .
| CONFIG   READ00C   .    .    .    .    .    .    .    .    .    .    .    .
| VMRATE   .0500.  10001000   100   .    .    .    .    .    .    .    .    .
|DSELECT   .    1    .    .    .    .    .    .   .D    .    .    .    .    .
|DHEADER   .  P R O C.E S S O R.  A N D  .C O N N E.C T . C H.A R G E  .    .
|DHEADER   .  B R E A.K D O W N.  B Y   U.S E R   A.N D . D A.T E .    .    .
|DSORT     01608AE 00406A1.    .    .    .    .    1    .    .    .    .    .
|DDISPLAY V00020292442B02B32E4221243346342    .    .    .    .    .    .    .
|DTITLE    02   .    .    .    .    .    .    .    .    .    .    .    .    .
|DDESCRIPT2****0961 . DATE     .    .    .    .    .    .    .    .    .    .
|DDESCRIPT1****0881USERID.     .    .    .    .    .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

VM Total Charge Summary by User and Date

```
                          V M   T O T A L   C H A R G E   S U M M A R Y
                                  B Y   U S E R   AND   D A T E

BEGIN DATE - 01/14/yy                                                  RUN DATE - 02/01/yy
END DATE   - 01/22/yy                                                             PAGE 2

          VM            CONNECT      PROCESS          I/O         U/R       SETUP        TOTAL    PERCENT
          USERID         CHARGE       CHARGE       CHARGE      CHARGE      CHARGE       CHARGE      TOTAL

    DATE 850115          $10.54       $31.29       $90.47     $148.91       $5.00      $286.21      3.380
    DATE 850121          $26.18       $12.72      $514.60        $.00       $5.00      $558.50      6.595

USERID A42MAINT          $36.72       $44.01      $605.07     $148.91      $10.00      $844.71      9.975

    DATE 850118           $3.33         $.77         $.00        $.00        $.00        $4.10       .048
    DATE 850121         $110.51        $6.31      $206.79      $12.53        $.00      $336.14      3.969
    DATE 850122          $58.70         $.02      $117.45        $.00        $.00      $176.17      2.080

USERID CMSGXB           $172.54        $7.10      $324.24      $12.53        $.00      $516.41      6.097

    DATE 850118           $3.33         $.00         $.00        $.00        $.00        $3.33       .039
    DATE 850121          $50.76       $44.78      $119.32       $4.86        $.00      $219.72      2.595
    DATE 850122          $41.92       $27.64      $131.89      $26.14        $.00      $227.59      2.686

USERID CMSPLM            $96.01       $72.42      $251.21      $31.00        $.00      $450.64      5.320

                      $2,680.06      $880.22    $4,523.90     $318.82      $65.00    $8,468.00     99.958
```

VM Total Charge Summary by User and Date Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS   .    .    .    .    .    .    .    .    .    .    .   128   .    .
| SELECT  .    1    .    .    .    .    .    .   .E    .    .    .    .    .
| CONFIG  READ00C   .    .    .    .    .    .    .    .    .    .    .    .
| VMRATE  .0500.  10001000   100   100  .100100100.    .    . 500500500500 .
|EHEADER  .  V M   T.O T A L  .C H A R G.E   S U M.M A R Y .    .    .    .
|EHEADER  .  B Y   U.S E R   AND   D A T.E   .    .    .    .    .    .    .
|ESORT    01608AE 00406A1.    .    .    .    .    .    .    .    .    .    .
|EDISPLAY V00020B3244245254255246242    .    .    .    .    .    .    .    .
|EGROUP   0998 S    .    .    .    .    .    .    .    .    .    .    .    .
|EGROUPC  1*VM/370* .    .    .    .    .    .    .    .    .    .    .    .
|EDESCRIPT2****1061 .  DATE   .    .    .    .    .    .    .    .    .    .
|EDESCRIPT1****0881USERID.    .    .    .    .    .    .    .    .    .    .
|ETITLE   02    .    . VM .    .    .    . USERID .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

Tape and Disk Activity Report

```
                    T A P E   AND   D I S K
                 A C T I V I T Y   R E P O R T

BEGIN DATE - 01/15/yy                         RUN DATE - 02/01/yy
END DATE   - 01/22/yy                                    PAGE 1

VM  USER /            TAPE CONCT    TAPE   TDISK  CYL       CONNECT
  REC DATE            HR X 10000   MOUNTS  HR X 10000          TIME
    .
    .
    .
USERID A42MAINT           20,647        1      443,828      2.61830
USERID BACKUP1A            2,094        1            0       .24111
USERID BACKUP1B            3,330        1            0       .33305
USERID CMSARS                  0        0       57,708      2.88857
USERID CMSBEC                  0        0       79,952      3.99772
USERID CMSCED              2,705        1       48,666       .99971
USERID CMSGXB                  0        0      204,064     10.38663
USERID CMSPLM                  0        0       86,692      4.38784
USERID CMSRMG                  0        0        3,666       .04250
USERID CMSROA                  0        0      796,173     11.19967
USERID JARMAINT            2,647        1            0       .33305
USERID V22MAINT                0        0      429,552     11.05301
  DATE 850121             31,423        5    2,150,301     48.48116
    .
    .
    .
  DATE 850122             19,989        6    1,631,317     25.65424
                          63,116       13    3,840,852     76.58063
```

Tape and Disk Activity Report Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS    .    .    .    .    .    .    .    .    .    .    .   128   .    .
| SELECT   .    1    .    .    .    .    .    .   .0    .    .    .    .    .
| CONFIG   READ00C   .    .    .    .    .    .    .    .    .    .    .    .
| VMRATE   .    .    . 0500    . 9999999999100100999.    .    .    .   500   .
|OHEADER   .  T A P E.  AND   D.I S K   .    .    .    .    .    .    .    .
|OHEADER   .  A C T I.V I T Y  .R E P O R.T  .    .    .    .    .    .    .
|OSORT     00406A2 01608A2.    .    .    .    .    .    .    .    .    .    .
|ODISPLAY V00023373F03383B0    .    .    .    .    .    .    .    .    .    .
|ODESCRIPT2****0881USERID.     .    .    .    .    .    .    .    .    .    .
|ODESCRIPT1****0881 .DATE.     .    .    .    .    .    .    .    .    .    .
|OGROUP    2414X.2453P 4754P 2963 R .    .    .    .    .    .    .    .    .
|OGROUPC   100000000 .    . X  .    .    .    .    .    .    .    .    .    .
|OGROUPC   200000    .    . X  .    .    .    .    .    .    .    .    .    .
|OGROUPC   30000000  .    . X  .    .    .    .    .    .    .    .    .    .
|OGROUPC   4XXX .    .    .    .    .    .    .    .    .    .    .    .    .
|OTITLE    02VM .USER./   .    .   REC DATE   .    .    .    .    .    .    .
|OEDIT     F0 T .    .    .    .    .    .    .    .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

Virtual Machine Paging Profile

```
              V I R T U A L   M A C H I N E   P A G I N G   P R O F I L E

BEGIN DATE - 01/14/yy                                           RUN DATE - 02/01/yy
END DATE   - 01/22/yy                                                      PAGE 4

VM          VIRT CPU   TOT  CPU      PAGE-IN     PAGE-OUT      TOTAL   CPU  ELAP   I/O
USER ID         TIME   TIME-AVG        COUNT        COUNT      PAGES  PAGE  PAGE  INDX

A42MAINT    00.00.21   00.00.11          336          173        509     6     4   548
BACKUP1A    00.00.13   00.00.20          334          231        565     6     7   384
BACKUP1B    00.00.13   00.00.28          176           82        258     3     4   357
  .
  .
  .
CMSROA      00.01.52   00.00.17        1,044          462      1,506     9     8   124
CMSVTM      00.00.03   00.00.07            2            0          2     0     0    71
DOSDEV      00.00.32   00.00.33          290          628        918    14    26   149
JARMAINT    00.00.02   00.00.03           37           28         65     6     1   274
MVSSP       00.03.36   00.03.57          102            0        102     0     3    44
VSPMAINT    00.00.03   00.00.03           24           46         70    20     4    41
V22MAINT    00.00.39   00.00.12          383          234        617    10     6   152

850121      00.19.10   00.00.17       10,047        4,757     14,804     7     8   153
  .
  .
  .
850122      00.06.08   00.00.04        1,490          486      1,976     4     1   141

            00.32.42   00.00.12       19,574        5,504     25,078     7     5   152
```

Virtual Machine Paging Profile Control Statements

```
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
| PARMS    .    .    .    .    .    .    .    .    .    .    .   128   .    .
| SELECT   .    1    .    .    .    .    .    .   .P    .    .    .    .    .
| CONFIG   READ00C   .    .    .    .    .    .    .    .    .    .    .    .
|PHEADER   .  V I R T.U A L   M.A C H I N.E   P A G.I N G   P.R O F I L.E   .
|PSORT     00406AE 01608A1.    .    .    .    .    .    .    .    .    .    .
|PDISPLAY  V00012C8391373374375277276278 .    .    .    .    .    .    .    .
|PGROUP    0998 S2814X 2853P 2972 R .    .    .    .    .    .    .    .    .
|PGROUPC   1*VM/370* .    .    .    .    .    .    .    .    .    .    .    .
|PGROUPC   200000000 .    . X  .    .    .    .    .    .    .    .    .    .
|PGROUPC   300000    .    . X  .    .    .    .    .    .    .    .    .    .
|PGROUPC   4XX  .    .    .    .    .    .    .    .    .    .    .    .    .
|PTITLE    01VM .    .    .    . USER ID .    .    .    .    .    .    .    .
0....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+.
```

EXTDATA Reports

Sample CA Earl and CA Easytrieve reports that will process VM Interface EXTDATA records are provided in CAJREARL and CAJREZTR respectively. The members that produce these reports are as follows:

Member Name	Report Name	SMF/EXT Record Type
EZXTX001	VM Transmission Report	SIEX
EZXTZ001	VM Resource Utilization Utility	z/VM accounting records 1, 2, 3 SIEZ
EZXTZ002	Session Detail Stats	z/VM accounting record 1 SIEZ
EZXTZ004	VM zIIP Processor Use	z/VM accounting record 1 SIEZ

For a sample of each report, see the "Interface Reports" chapter in the *Reports Guide.* The EXTDATA record layout is described in the section CA Earl and CA Easytrieve SMF Data Dictionary in the *User Guide.*

Running the VM Interface

The VM Interface translate component is included on the product distribution tape for z/OS. This section explains how VM data can be introduced to CA JARS.

Transporting VM Accounting Data to a Guest System

To execute the VM Interface under z/OS, the raw VM accounting data must reside on a storage medium accessible by z/OS. Most data centers institute a procedure to process the data from the reader, thereby creating a file. The file containing the data must be transported to z/OS where the VM Interface can process it. The following are examples of job streams that execute IBM utility programs, which can be used to facilitate transporting the data. These examples can be created and modified by using the XEDIT facility.

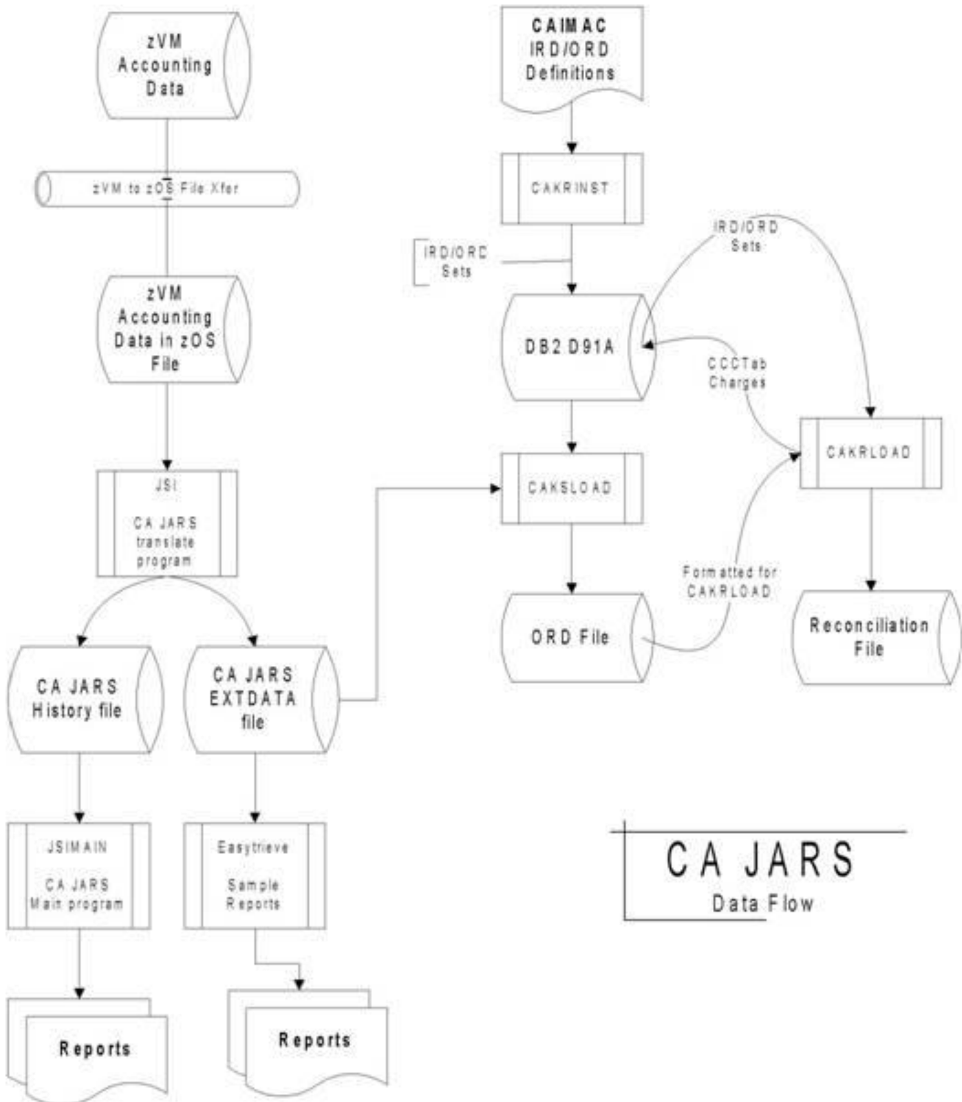
For z/OS users:

```
//VMIJOB JOB ,??????,CLASS=?,MSGCLASS=?
//STEP01 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=.
//SYSUT2 DD DSN=VMI.ACCT.RAW.DATA,
//   DISP=(NEW,CATLG,DELETE),
//   DCB=(RECFM=F,LRECL=80,BLKSIZE=80),
//   SPACE=(80,(2000,100)),
//   UNIT=SYSDA,
//   VOL=SER=??????
//SYSUT1 DD DATA,DLM=')('
***===> Insert Your VM Accounting Data Here <===**.
)(
//SYSIN DD DUMMY,DCB=BLKSIZE=80
```

The FTP utility, XMIT/RECEIVE, or another file transfer utility can be substituted.

Translate Execution

The CA JARS data flow diagram shows the flow of information through translate (JSI) to CA JARS (JSIMAIN) and to Chargeback(CAKSLOAD).



Translate (JSI) creates the account summary or history file and the EXTDATA file that is more detailed than the summary, and is the only Translate output file that supports z/VM 5.2 and later account records. Translate is the first step of the two-step job. The files used by Translate are explained in the following table:

Filename	Description	Predefined File Attributes
CAIJFIN	Describes the input control file containing the VMPARM and CRITERIA statements.	RECFM=F LRECL=80 BLKSIZE=80
CAIJVS5	Describes the input data file to be processed. This is the file of raw VM account records.	RECFM=F LRECL=80 BLKSIZE=80
CAIJVS6	Describes the output account/summary file created by Translate. This file is input to the Report Writer.	RECFM=VB LRECL=8188 BLKSIZE=8192
CAIJVS7	Contains orphan, Type C0, Product, or Project Accounting records that could not be paired with Type 01 records within this run.	RECFM=F LRECL=80 BLKSIZE=80
CAIJFPR	Describes the output file where generated messages are printed.	RECFM=F LRECL=133 BLKSIZE=133
CAIJFSN	SNAP output for bad records	RECFM=F LRECL=133 BLKSIZE=133
SORTMSG SORTLIST	Describes the data sets for messages generated by the sort program.	RECFM=F LRECL=133 BLKSIZE=133
STEPLIB	Defines the LOADLIB or LOADLIB(s) in which necessary programs can be found. CAJRLOAD LOADLIB must always be included in this FILEDEF.	N/A

Main Program Execution

Execution of JSIMAIN is optional. The CA JARS Translate program (JSI) creates two files, which are used like this:

History File: Summarized data per z/VM session in a rigid format "known" to JSIMAIN. The reporting component of JSIMAIN will produce performance reporting and will apply billing rates (see VMRATE later in this section).

EXTDATA File: Summarized data per z/VM session in a more flexible format that is more appropriate to z/VM accounting records from z/VM 5.2 and later. This file is used for performance and usage reporting using the more powerful CA Easytrieve product. EXTDATA can also be used to "feed" to the CA JARS Accounting and Chargeback product.

EXTDATA is not input to JSIMAIN.

JSIMAIN reporting concerns only the History file. Standard reports are discussed later in this section. The files used by JSIMAIN follow:

Filename	Usage Description	Predefined File Attributes
CAIJSCIN	Describes the input control file containing the Report Writer control statements.	RECFM=F LRECL=80 BLKSIZE=80
CAIJSHST	Describesthe input data file produced by the Translate component. This must be the same file created as output (CAIJVS6) by the Translate element.	RECFM=VB LRECL=8188 BLKSIZE=8192
histout	Describes the output history file created by the Report Writer. You need not create a history file in every run of the Report Writer. The output file name is supplied on the SORT statement.	RECFM=VB LRECL=8188 BLKSIZE=8192
CAIJSPRT	Describes an output file where generated messages are printed. This file also includes your output reports, unless you override the report destination with the PRINT SUFFIX feature of your SORT statement.	RECFM=FBA LRECL=133 BLKSIZE=133
CAIJSNAP	Defines where invalid records are displayed.	RECFM=FA LRECL=133 BLKSIZE=133
CAIJSCT1	A working file to store control statement images.	RECFM=80 LRECL=80 BLKSIZE=80
CAIJSCT2	A working file to store control statement images.	RECFM=F LRECL=80 BLKSIZE=80
CAIJSACT	A working file of account records.	RECFM=VB LRECL=8188 BLKSIZE=8192
SORTMSG SORTLIST SYSOUT	Describes the data set for messages generated by your sort program.	RECFM=FA LRECL=133 BLKSIZE=133
STEPLIB	Defines the LOADLIB or LOADLIBs in which necessary programs can be found. CAJRLOAD LOADLIB must always be included in this DD statement. If you wish to place user exits in a LOADLIB, that LOADLIB should be concatenated to //STEPLIB.	N/A

Use the IVP JCL as a model for setting up your production JCL for the VM Interface. Modifications should reflect your data center's standards.

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