GC28-0754-0
File No. S370-34

Systems

OS/VS2 System Programming Library: System Management Facilities (SMF)

VS2.03.803
VS2.03.807
VS2.03.810
VS2.03.812

IBM

Pages numbered as duplicates in this publication must be retained because each of these documents information specific to individual Selectable Units.

This minor revision incorporates the following Selectable Units:

JES2 Release 4.0	**VS2.03.803**
Supervisor Performance #2	**VS2.03.807**
IBM 3800 Printing Susbsytem	**VS2.03.810**
JES3	**VS2.03.812**

First Edition (July, 1976)

This is a reprint of GC28-0706-0 incorporating changes released in the following Selectable Unit Newsletters and Technical Newsletter:

GN28-2734 (dated May 28, 1976) (SU)
GN28-2613 (dated May 28, 1976) (SU)
GN28-2730 (dated May 28, 1976) (SU)
GN28-2621 (dated January 16, 1976) (SU)
GN28-2733 (dated March 15, 1976) (TNL)

This edition applies to Release 3.7 of OS/VS2 and to all subsequent releases of OS/VS2 until otherwise indicated in new editions or Technical Newsletters. Changes are continually made to the information herein; before using this publication in connection with the operation of IBM systems, consult the latest *IBM System/370 Bibliography,* GC20-0001, for the editions that are applicable and current.

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Preface

The objective of this book is to help installation managers and system programmers plan for, install, and use SMF in an MVS system. This book explains:

- The five categories of information gathered by SMF data-collection routines.
- When each SMF record is written and the information contained in each record.
- The basic relationship of SMF to the operating system and to user-written exit routines.
- How to add user-written exit routines to the appropriate SMF exits either before or after SYSGEN.
- The system areas that require additional storage for SMF and approximately how much additional storage is needed in each area.
- How to execute the SMF dump program.
- How to use an SMFPRMxx member of SYS1.PARMLIB to define the use of SMF.
- How to write records to installation-defined or SMF-defined data sets.
- How to plan and write exit routines that will monitor jobs or job steps at various points during their processing cycle.
- How to test user-written routines using the TEXTEXIT procedure.
- How to use sort/merge programs to sequence SMF data.
- How to design report programs that format and print the data from SMF records.

Related Publications

The reader should be familiar with the information presented in the following publications:

- *Operator's Library: IBM 3850 Mass Storage System (MSS) Under OS/VS,* GC35-0014, describes the VARY ONLINE,S and VARY OFFLINE,S commands, which cause SMF to produce record type 22.
- *Operator's Library: OS/VS2 Reference (JES2),* GC38-0210, and *Operator's Library: OS/VS2 Reference (JES3),* GC38-0226, describe the HALT EOD and SWITCH SMF commands, which dump the SMF data sets; they also describe several other commands that cause SMF to produce records.
- *OS/VS Data Management Services Guide,* GC26-3783, describes the record descriptor word (RDW), which is used to write records in the SMF data sets.
- *OS/VS Message Library: VS2 System Codes,* GC38-1008, defines system completion codes.
- *OS/VS Message Library: VS2 System Messages,* GC38-1002, explains SMF messages.

- *OS/VS Utilities,* GC35-0005, describes the IEBUPDTE, IEBDG, IEBPTPCH, IFASTATR, and IEHUCAT utility programs, which are used to:
  1) Enter an SMFPRMxx member into SYS1.PARMLIB.
  2) Generate samples of standard parameter lists for user-written exit routines.
  3) Obtain listings of sample routines.
  4) Format and write information from SMF record type 21.
  5) Update an OS catalog to the level of a VSAM catalog.
- *OS/VS-VM/370 Assembler Programmer's Guide,* GC33-4021, illustrates the ASMFCL cataloged procedure, which assembles and link-edits user-written exit routines.
- *OS/VS2 Conversion Notebook,* GC28-0689, summarizes SMF compatibility between SVS and MVS and between MVT and MVS.
- *OS/VS2 JCL Reference,* GC28-0692, summarizes the OUTLIM parameter, which is used with user-written IEFUSO exit routines.
- *OS/VS2 System Data Areas,* SYB8-0606, describes the TIOT, JFCB, DCB, DEB and UCB data areas contained in SMF record types 14 and 15.
- *OS/VS2 System Programming Library: Initialization and Tuning Guide,* GC28-0681, describes:
  1) The MLPA parameter which is used for testing user-written exit routines.
  2) Several examples for using SMF to supplement MF/1 as a performance measurement tool.
  3) The service, transaction active time, and performance group number fields in SMF record types 4, 5, 34, 35 and 72.
- *OS/VS2 System Programming Library: JES2,* GC23-0001, and *OS/VS2 System Programming Library: JES,* GC28-0608, describes the JES2 and JES3 initialization parameters that specify the characteristics to be associated with a job class.
- *OS/VS2 System Programming Library: Job Management,* GC28-0627, describes the HASPRSCN exit, which interprets variables in the JOB card accounting field before the IEFUJV exit receives control.

(For information on the PL/1 and Sort/Merge program products, see *PL/1 Language,* SC33-0009, and *OS/VS Sort/Merge Programmer's Guide,* SC33-4035.)

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- How to design report programs that format and print the data from SMF records.

Related Publications

The reader should be familiar with the information presented in the following publications:

- *IBM 3800 Printing Subsystem Programmer's Guide,* GC26-3846, describes programming support for the 3800 Printing Subsystem. Several fields in record type 6 provide information on the activity of the 3800.
- *Operator's Library: IBM 3850 Mass Storage System (MSS) Under OS/VS,* GC35-0014, describes the VARY ONLINE,S and VARY OFFLINE,S commands, which cause SMF to produce record type 22.
- *Operator's Library: OS/VS2 MVS System Commands,* GC38-0229, describes the HALT EOD and SWITCH SMF commands, which dump the SMF data sets; it also describes several other commands that cause SMF to produce records.
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Notational Conventions

The parameters and instructions shown in this publication use the following notational conventions:

- **Bold** type letters, words, and symbols: code them exactly as shown.
- *Italic* type letters, words, and symbols: substitute specific information.
- ␣ (blank characters): code a blank.
- { } (braces): code only one of the items or use the default value. Do not code the braces.
- [ ] (brackets): code any enclosed item or items – they are optional. Do not code the brackets but specify commas if they are included with the items enclosed in the brackets.
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Contents

Figures

Summary of Amendments for GC28-0706 VS2 Release 3.7

This publication is a major revision of *OS/VS System Management Facilities (SMF)*, order number GC35-0004-6. It contains only VS2 information.

Programming Features

- Record type 6 (Output Writer) – In the description of an incomplete record type 6, the form number has been deleted from the list of fields that are zero.
- Record type 22 (Configuration) – The 40 bytes describing the 3850 Mass Storage System (MSS) units online at IPL have been defined.
- Record type 64 (VSAM Component Status) – Five new record fields describing data set characteristics have been added.
- Record types 63 (VSAM Entry Defined) and 67 (VSAM Entry Deleted) – These records have been added to the IFASMFR macro instruction.
- SMFFRMT program – This sample PL/1 source report program has been changed to format SMF record types 0, 2, 3, 7, 9, 10, 11 and 17-22.
- SMF dump program return code – A X'10' return code in register 15 indicating that the operator attempted to dump the active SMF data set has been added.
- Modifying JCL statements – A restriction for adding or modifying JCL-statement operand fields has been added to the IEFUJV exit.
- Common exit parameter area – Offset 31 of the common exit parameter area has been changed from a "reserved" field to a field containing the job class.
- VSAM records – A note indicating that VSAM record types 62 and 64 are not generated for system tasks has been added. If a system task caused VSAM record types 63, 67, 68 or 69 to be written, a note has been added to show that specific fields will be blank or zero.

Publication Features

- VS1 information – All VS1 information has been removed.
- Dumping the SMF data sets – Two sample procedures for dumping the SMF data sets to a standard-labeled tape by means of the operator START command have been added.
- User-written exit routines – The modules that interface with each SMF exit routine have been added.

- SMF records – The following information has been added to the SMF records:
  - The modules that write each SMF record.
  - The symbolic addresses of the SMF record fields as defined in the IFASMFR macro instruction.
  - The data area fields where SMF obtains the information for each field in each SMF record.
- EXCP count – Appendix B has been added to describe the functions included and excluded in the EXCP-count fields of record types 4, 14, 15, 34, 40 and 64.
- CPU time – Appendix C has been added to describe the functions included and excluded in the CPU-time fields of record types 4, 5, 34 and 35.
- Record descriptor word (RDW) – A note indicating that the address passed to the SMFWTM macro instruction must point to the RDW has been added.
- Figure on SMF in the operating system – The system routines that pass control to the SMF exits have been added.
- SMF storage requirements – Figure 4 has been added to summarize the additional storage required for SMF.
- IEFUTL interlock warning – A sample ENQ macro instruction has been added to assist the IEFUTL user in minimizing the chances of a system interlock.

Introduction

SMF (System Management Facilities) is a standard feature of MVS that collects and records several types of information:

- Accounting information, such as CPU time, device usage, and storage usage.
- Data set information, such as EXCP count and user identification.
- Subsystem information, such as JES2 options and completion codes.
- System information, such as system wait time and I/O configuration.
- Volume information, such as space available on direct access volumes and error statistics for tape volumes.

By creating analysis and report routines, installation managers or system programmers can use SMF-collected information in a variety of ways. For instance, they can use it for accounting system usage or for measuring system performance.

Note: SMF does *not* provide accounting support for: system tasks, subsystems, problem programs started from the console, and problem programs running in system keys. It does, however, produce records that describe the activities and events of the job entry subsystem.

SMF also has exits that can link to user-written routines for monitoring a job or job step at various points during its processing cycle. The user-written routines can perform functions such as: cancel jobs, write user-defined records to the SMF data set, access installation-defined data sets, or enforce standards such as user identification, resource allocation, and maximum execution time.

Because SMF data-collection routines and exit routines are independent of one another, one can use them in combination or separately. For example: by analyzing the information obtained by SMF data-collection routines, an installation manager can estimate a time limit for all jobs or job steps running on the system. Any job exceeding this time limit is automatically terminated. If, however, the installation manager would like to allow certain jobs to exceed the time limit, he or she can use the IEFUTL SMF exit to link to a user-written time-limit routine. Through the IEFUTL SMF exit, the execution time for selected jobs can be extended.

Information Collected By SMF

The information collected by SMF is formatted into many records that are categorized as follows:

- Accounting records
- Data set records
- Subsystem records
- System records
- Volume records

The following sections list the types of records in each of these categories, and describe some of the information they contain. For a detailed description of each SMF record and its format, see the chapter "SMF Records".

Accounting Records

The SMF accounting records are:

Type 4 – Step Termination
Type 5 – Job Termination
Type 6 – JES2 Output Writer
Type 6 – JES3 Output Writer
Type 20 – Job Initiation
Type 26 – JES2 Job Purge
Type 26 – JES3 Job Purge
Type 34 – TS-Step Termination
Type 35 – Logoff
Type 40 – Dynamic DD

These records describe the resources used by a job or job step. They include information such as:

- Job log and user identification
- Problem program name and start time
- Step name and number
- Job/step start and end times
- Amount of storage allocated and used
- Storage protect key
- Job/address space dispatching priority
- JES2 or JES3 job selection priority
- Job/step CPU time
- Accounting fields from JOB and EXEC statements
- I/O status indicators
- Job/step termination status
- Job/step completion code
- EXCP count, device class, unit type, and channel/unit address
- Page-ins, page-outs, swap-ins and swap-outs for both VIO and non-VIO data sets
- Service, transaction active time, and performance group number
- SYSOUT class and print/punch processor start and stop times
- JES2 or JES3-assigned job number
- JES2 or JES3 logical output device name
- FCB and UCS image identification
- Converter, execution processor and output processor start and stop times
- Output lines and output punched cards

Data Set Records

The SMF data set records are:

Type 14 – INPUT or RDBACK Data Set Activity
Type 15 – OUTPUT, UPDAT, INOUT, or OUTIN Data Set Activity
Type 17 – Scratch Data Set Status
Type 18 – Rename Data Set Status
Type 62 – VSAM Component or Cluster Opened
Type 63 – VSAM Entry Defined
Type 64 – VSAM Component or Cluster Status
Type 67 – VSAM Entry Deleted
Type 68 – VSAM Entry Renamed

These records describe the characteristics, activity, and user of data sets. They include information such as:

- Job log and user identification
- Portions of the TIOT, JFCB, DCB, DEB and UCB data areas
- Data set and catalog names
- Number of volumes
- Volume serial numbers
- Extents on volume
- EXCP count and device type
- Number of records in data component
- Record formats and lengths
- Newly defined, altered, or deleted catalog entries

Subsystem Records

The SMF subsystem records are:

Type 25 – JES3 Device Allocation
Type 43 – JES2 Start
Type 43 – JES3 Start
Type 45 – JES2 Withdrawal
Type 45 – JES3 Stop
Type 47 – JES2 SIGNON/Start Line
Type 47 – JES3 SIGNON/Start Line
Type 48 – JES2 SIGNOFF/Stop Line
Type 48 – JES3 SIGNOFF/Stop Line
Type 49 – JES2 Integrity
Type 49 – JES3 Integrity

These records describe the activities and events of the job entry subsystem. They include information such as:

- Number of tape and disk volumes fetched and mounted
- Time and date of first mount message
- Time and date of JES3 device verification

- JES2 or JES3 options
- Start/warm start indicator
- Withdrawal/abnormal termination indicator
- JES2 or JES3 completion code
- Remote name, line name, password
- Length and text of SIGNON message
- Number of EXCPs
- Number of negative acknowledgements to write text
- Number of data checks and time outs to read text
- Line adapter address

System Records

The SMF system records are:

Type 0 – IPL
Type 2 – Dump Header
Type 3 – Dump Trailer
Type 7 – Data Lost
Type 8 – I/O Configuration
Type 9 – VARY ONLINE
Type 10 – Allocation Recovery
Type 11 – VARY OFFLINE
Type 22 – Configuration
Type 31 – TIOC Initialization
Type 70 – CPU Activity
Type 71 – Paging Activity
Type 72 – Workload Activity
Type 73 – Channel Activity
Type 74 – Device Activity

These records describe the system configuration and SMF options in effect, give system statistics, and record the occurrence of specific events. They include information such as:

- Job log and user identification
- SMF options
- Real and virtual storage sizes
- Count of SMF records generated but not written during period when SMF data sets were not available for recording
- Start and end times of period without SMF recording
- Device class, unit type, and channel/unit address
- MSS units online at IPL
- Status of CPU, storage range, channel and MSS device following VARY command
- Number of TS buffers
- OWAIT and RESTART thresholds
- CPU wait time

- Page-ins, page-outs, page reclaims, swap-ins, and swap-outs for both VIO and non-VIO data sets
- Number of transactions terminated
- Service, transaction active time, and performance group number
- Workload level
- Channel identifier

- Number of successful START I/Os issued to channel
- Volume serial number
- Number of requests serviced by device

Volume Records

The SMF volume records are:

Type 19 – Direct Access Volume
Type 21 – Error Statistics by Volume
Type 69 – VSAM Data Space Defined, Extended, or Deleted

These records describe the space available on direct access volumes, give error statistics for tape volumes, and describe data spaces in a VSAM catalog. By using the IFHSTATR utility program or user-written routines that examine the tape information, one can address problems of volume deterioration. (See "IFHSTATR" in *OS/VS Utilities*.) The volume records include information such as:

- Number of unused alternate tracks
- Number of unallocated cylinders and tracks
- Number of cylinders and tracks in the largest free extent
- Owner identification
- Volume serial number
- Channel/unit addresses
- Number of read and write errors
- Volume on which data space is allocated
- Catalog in which data space is defined
- Number of free data space extents

SMF In The Operating System

Figure 1 summarizes the functions of SMF in the operating system. This section, which briefly describes Figure 1, assumes that user-written exit routines are supplied for all SMF exits; all SMF-formatted records are written to the SMF data set; and user-written analysis and report routines are supplied. In any real application, of course, the user-written routines that are supplied and the records that are specified to be written to the SMF data set depend upon the installation's requirements.

Initializing SMF

During system initialization, the SMF initialization routine receives control from the master scheduler and:

1. Checks for the existence and validity of an SMFPRMxx member of SYS1.PARMLIB. This member contains the SMF parameters that define the use of SMF in the operating system. If SYS1.PARMLIB does not contain an SMFPRMxx member, (1) the operator may enter the SMF parameters from the console if OPI=YES was specified, or (2) the initialization routine uses the IBM-supplied default member SMFPRM00. (For more information, see "SMFPRM**xx** Parameters" in the chapter "Defining the Use of SMF".)

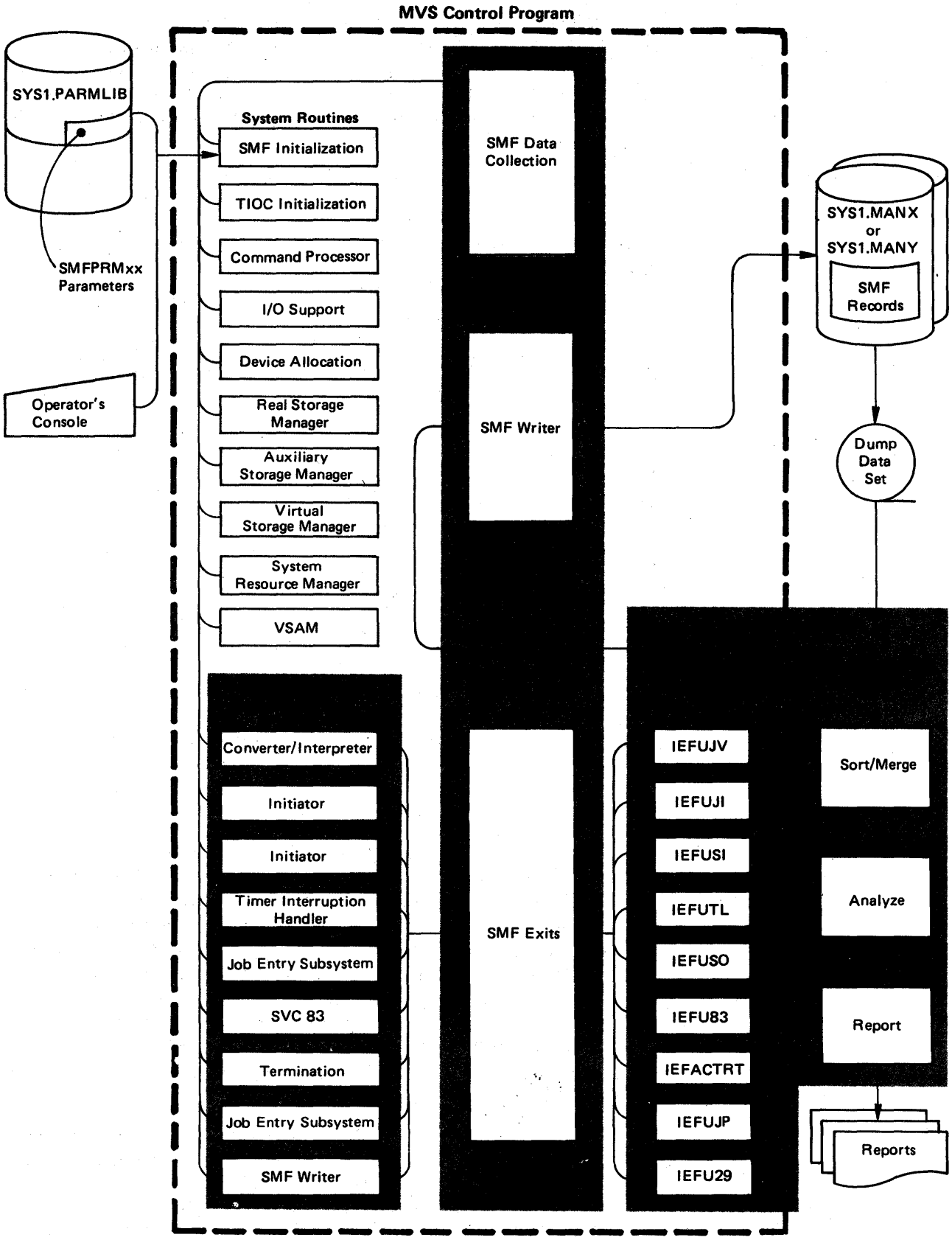

Figure 1. SMF in the Operating System

2. Checks for the existence and availability of the SMF data sets, SYS1.MANX and SYS1.MANY, if SMF recording was requested. If an error occurs, a message is issued indicating that recording on the SMF data sets is not allowed until the condition is corrected and the IPL procedure is repeated. If no errors occur, the initialization routine determines which SMF data set should receive records, as follows:

   If neither data set contains data, SYS1.MANX receives the SMF records. If one data set contains data and the other one is empty, the partially filled data set receives the records. If both data sets contain data, the data set with the lesser amount of data receives the records.

3. Creates the IPL record (type 0), the I/O configuration record (type 8), and the configuration record (type 22). These records are then written to the SMF data set.

After the SMF initialization completes without error, the initialization routine returns control to the master scheduler so that processing of input streams may begin.

Using User-Written Exit Routines

Before each job control statement (or cataloged procedure) in the input stream is interpreted, the converter passes control to the SMF job validation exit, IEFUJV. A user-written IEFUJV exit routine can verify fields in the JCL statement, modify the JCL, or reject jobs that do not meet installation standards. The same user-written IEFUJV exit routine receives control for further validity checking after all of the JCL is converted and again after all of the JCL is interpreted.

Before the initiator selects a job, it passes control to the SMF job initiation exit, IEFUJI. In a user-written IEFUJI exit routine, the user can decide whether to cancel or continue job processing based on accounting parameters associated with the job. Upon return from the routine, SMF creates the job initiation record (type 20) and writes it to the SMF data set. Similar processing occurs for each job step: before the initiator selects a job step, it passes control to the SMF step initiation exit, IEFUSI.

When a job step terminates, either normally or abnormally, SMF produces a job step termination record (type 4) and, before the record is written, the terminator passes control to the SMF termination exit, IEFACTRT. A user-written IEFACTRT exit routine can modify the SMF type 4 record and create user records. It can also write these records to installation-defined or SMF-defined data sets. A user-written IEFACTRT exit routine also indicates whether the job is to continue and whether the type 4 record is to be written to the SMF data set. (Upon return, the type 4 record is written unless the user-written IEFACTRT exit routine suppresses it.)

At job termination, SMF produces a job termination record (type 5) and, before the record is written, the terminator again passes control to the SMF termination exit, IEFACTRT, for similar record modification. (Upon return, the type 5 record is written unless the user-written IEFACTRT exit routine suppresses it.)

After a job has terminated and all the SYSOUT output that pertains to the job (including the SMF output writer record (type 6)) is written, the job entry subsystem passes control to the SMF job purge exit, IEFUJP. A user-written IEFUJP exit routine can write additional data statistics to the SMF data set. Upon return, the SMF job purge record (type 26) is written to the SMF data set.

Recording Events

For specific events SMF collects and formats the following types of information:

- Configuration information is recorded at IPL, when a VARY operator command is issued, and after allocation recovery.
- Data set information is recorded when a data set opened by a user program is scratched, renamed, closed, or processed by end-of-volume (EOV).
- Direct access volume information is recorded at IPL, when a HALT EOD or SWITCH SMF operator command is issued, and when a volume is demounted.
- Subsystem information is recorded when (1) the job entry subsystem is started or stopped, (2) a line is started or stopped, (3) a remote user signs on or off, and (4) an invalid password is used.
- System information is recorded at the end of specific lengths of time.

The following SMF exits also receive control whenever specific events occur:

- The time limit exit, IEFUTL, receives control from the timer interruption handler when the step CPU, job CPU, or continuous wait time limits are reached.
- The SYSOUT limit exit, IEFUSO, receives control from the job entry subsystem when the number of records written to a spooled output data set exceeds the output limit for that data set.
- The SMF record exit, IEFU83, receives control from the SVC 83 routine when an SMF record is ready to be written to the SMF data set.
- The SMF dump exit, IEFU29, receives control from the SMF writer when an SMF data set becomes full.

Dumping SMF Data Sets

SMF initially writes records to the SYS1.MANX data set until it becomes full. When SYS1.MANX is full, SMF opens and uses the SYS1.MANY data set to continue recording. When either SYS1.MANX or SYS1.MANY becomes full, the SMF writer notifies the operator that the data set needs to be dumped, and then passes control to the SMF dump exit, IEFU29. For a detailed description of the IEFU29 exit, see the chapter "User-Written Exit Routines". For more information on the SMF dump program, see "Dumping the SMF Data Sets" in the chapter "System Requirements and Considerations".

The operator can use the HALT EOD and SWITCH SMF commands to cause SMF to switch recording from the active SMF data set to the inactive one. (These commands also cause SMF to record volume statistics and to empty the SMF buffer into the active SMF data set before it is switched.) After the recording is switched, the operator can use the SMF dump program to copy the inactive data set to the dump data set. The dump data set can then serve as input to user-written analysis and report routines.

Using User-Written Analysis and Report Routines

In addition to user-written exit routines, an installation may supply various routines that can:

- Sort and merge the SMF records dumped by the operator from the SMF data set.
- Analyze the sorted SMF data to detect excessive system wait time, inefficient use of I/O devices, or any other statistics that might lead to improved system throughput.
- Report the data from selected SMF records and user-written analysis routines in an appropriate format.

System Requirements and Considerations

To record SMF data, an installation must define how it will use SMF (see the chapter "Defining the Use of SMF"), add user-written exit routines to the control program, allocate direct access space for the SMF data sets, and catalog the SMF data sets. This chapter describes these requirements as well as SMF storage requirements and performance considerations.

Including User-Written Exit Routines In The Operating System

User-written exit routines are optional – SMF automatically provides dummy routines for all unused SMF exits. To include user-written exit routines in the operating system, you can add them to the appropriate distribution libraries before SYSGEN, or link-edit them into the required load modules in SYS1.LPALIB after SYSGEN.

Figure 2 shows the distribution libraries to use to add exit routines prior to SYSGEN. It also shows the load module assignments to use to add exit routines after SYSGEN. When adding exit routines after SYSGEN, refer to your SYSGEN listing for exact load module names, aliases, link-edit control statements, and link-edit parameters. Specify link-edit parameters according to the characteristics of the user-written exit routines.

Exit Routine	Descriptive Name	Distribution Library for Adding User-Written Exit Routine before SYSGEN[1]	Load Module Assignment for Adding User-Written Exit Routine to SYS1.LPALIB after SYSGEN
IEFUJV	Job Validation	SYS1.AOSB3	IEFUJV
IEFUJI	Job Initiation	SYS1.AOSB3	IEFSD060
IEFUSI	Step Initiation	SYS1.AOSB3	IEFSD060
IEFUTL	Time Limit	SYS1.AOSB3	IEFSD060
IEFUSO	SYSOUT Limit	SYS1.ALPALIB	IEFUSO
IEFU83	SMF Record	SYS1.AOS00	IEFU83
IEFACTRT	Termination	SYS1.AOSB3	IEFW21SD
IEFUJP	Job Purge	SYS1.ALPALIB	IEFUJP
IEFU29	SMF Dump	SYS1.AOS00	IEEMB829

[1]User-written exit routines to be added before SYSGEN must be in load module format.

Figure 2. Including User-Written Exit Routines in the Operating System

Note: If a user-written exit routine is link-edited into a load module of an active system, a link-edit failure might make that load module inoperative. This is particularly important in the case of termination exit routines that direct output to SYSOUT because the cause of failure would also be lost.

Figure 3 shows sample JCL for adding user-written exit routines to SYS1.LPALIB after SYSGEN. Note that when user-written exit routines become part of SYS1.LPALIB they do not become active until the next IPL of the system.

Note: Refer to your SYSGEN listing for exact load module names, aliases, link-edit control statements, and link-edit parameters. Specify link-edit parameters according to the characteristics of the user-written exit routines.

```
//LINKEXIT    JOB     MSGLEVEL=1
//STEP1       EXEC    PGM=IEWL,PARM='link-edit parameters'
//SYSPRINT    DD      SYSOUT=A
//SYSLMOD     DD      DISP=(OLD,KEEP),DSN=SYS1.LPALIB
//SYSUT1      DD      UNIT=SYSDA,DISP=(,DELETE),
                      SPACE=(TRK,(20,5))
//SYSLIN      DD      *
(IEFUJV object deck)
  ENTRY       IEFUJV
  NAME        IEFUJV(R)
(IEFACTRT object deck)
  ENTRY       IEFBB401
  INCLUDE     SYSLMOD(IEFW21SD)
  ALIAS       aliasname1,aliasname2,. . .
  NAME        IEFW21SD(R)
(IEFUJI, IEFUSI, and IEFUTL object decks)
  ENTRY       IEFSD060
  INCLUDE     SYSLMOD(IEFSD060)
  ALIAS       aliasname1,aliasname2,. . .
  NAME        IEFSD060(R)
(IEFUSO object deck)
  ENTRY       IEFUSO
  NAME        IEFUSO(R)
(IEFU83 object deck)
  ENTRY       IEFU83
  NAME        IEFU83(R)
(IEFUJP object deck)
  ENTRY       IEFUJP
  NAME        IEFUJP(R)
/*
```

Figure 3. Sample JCL for Adding User-Written Exit Routines to SYS1.LPALIB after SYSGEN

Storage Requirements

SMF requires additional real storage in the pageable link pack area (PLPA), local system queue area (LSQA), system queue area (SQA), and common service area (CSA). SMF requires additional auxiliary storage for the SMF data sets and for user-written exit routines. Figure 4 summarizes the system areas that require additional storage for SMF and the amount of storage that is needed in each area.

Item	Additional Storage Required for SMF	Area in System
SMF Writer Routine	1560 bytes	Pageable Link Pack Area (PLPA)
Timing Control Table (TCT) (one is created for each active job step)	If OPT=1, 116 bytes for each TCT[1] If OPT=2, size of each TCT=132+12(a)+8(b)[1] where: a is the maximum number of DD statements per job step. b is the number of devices allocated because of each DD statement.	Fixed Local System Queue Area (LSQA)
System Management Control Area (SMCA)	180 bytes	Fixed System Queue Area (SQA)
Common Exit Parameter Area	36 bytes	Fixed LSQA
SMF Buffer	400 to 8,192 bytes (See the following section, "SMF Buffer.")	Pageable Common Service Area (CSA)
SMF Data Sets	(See "SMF Data Sets" later in this chapter.)	DASD
User-Written Exit Routines	Size of all user-written exit routines	SYS1.LPALIB
Work Area for User-Written Exit Routines	Size of user-requested area (See "Obtaining Additional Work Areas" in the chapter "User-Written Exit Routines")	Pageable CSA, SQA and/or LSQA

[1]When necessary, the dynamic allocation function will increase the TCT size in steps of 200 bytes.

Figure 4. SMF Storage Requirements

SMF Buffer

If records are to be written to the SMF data set, you must supply a buffer size in the SMFPRMxx BUF parameter before or during IPL. (For detailed information on the BUF parameter, see "SMFPRMxx Parameters" in the chapter "Defining the Use of SMF".) The minimum SMF buffer size is 400 bytes; the maximum is 8,192 bytes.

The SMF buffer has two parts: while one half is being filled with SMF records, the other half is being written to the SMF data set. If a record size should exceed half of the buffer size, the record is segmented before it is written. In order to prevent segmenting records (and thereby improve performance), specify a buffer size that is at least twice the size of the largest record to be written to the SMF data set.

Figure 5 summarizes the sizes of the SMF records. When calculating the largest record size, be sure to include the block descriptor word (four bytes) and the record descriptor word (four bytes). Do not make the buffer size larger than necessary; if the system should fail, the records in the SMF buffer will be lost.

Record Type	Record Size (in bytes)
0	31
2	14
3	14
4	147 + 8 per DD statement + length of step accounting fields
5	117 + length of job accounting fields
6	90 for JES2 writer / 112 for JES3 writer / 84 for external writer
7	24
8	16 + 4 per device
9	16 + 4 per device
10	40 + 4 per device
11	16 + 4 per device
14	264 + 24 per UCB + 28 per ISAM data set
15	264 + 24 per UCB + 28 per ISAM data set
17	88 + 8 per data set scratched
18	132 + 8 per data set renamed
19	64
20	61 + length of job accounting fields
21	44
22	18 + 42 at IPL + 6 per CPU, channel, storage range or device varied
25	88
26	232 for JES2 / 314 for JES3
31	54
34	147 + 8 per device + length of step accounting fields
35	117 + length of job accounting fields
40	62 + 8 per device
43	28 for JES2 / 38 for JES3
45	24 for JES2 / 26 for JES3
47	48 + 38 per SIGNON
48	71 for JES2 / 79 for JES3
49	86
62	138 + 10 per volume
63	132 + length of catalog records
64	250 + 26 per extent
67	130 + length of catalog records
68	170
69	102
70	52 + 16 per CPU
71	132
72	60 + 20 per performance group period
73	52 + 16 per channel
74	52 + 28 per device

Figure 5. SMF Record Sizes

Note: If you plan to reduce the SMF buffer size during consecutive IPL's, dump the SMF data sets first so that all records will be written with the same block size.

Storage Requirements

SMF requires additional real storage in the pageable link pack area (PLPA), local system queue area (LSQA), system queue area (SQA), and common service area (CSA). SMF requires additional auxiliary storage for the SMF data sets and for user-written exit routines. Figure 4 summarizes the system areas that require additional storage for SMF and the amount of storage that is needed in each area.

Item	Additional Storage Required for SMF	Area in System
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Timing Control Table (TCT) (one is created for each active job step)	If OPT=1, 116 bytes for each TCT[1] If OPT=2, size of each TCT=132+12(a)+8(b)[1] where: a is the maximum number of DD statements per job step. b is the number of devices allocated because of each DD statement.	Fixed Local System Queue Area (LSQA)
System Management Control Area (SMCA)	180 bytes	Fixed System Queue Area (SQA)
Common Exit Parameter Area	36 bytes	Fixed LSQA
SMF Buffer	400 to 8,192 bytes (See the following section, "SMF Buffer.")	Pageable Common Service Area (CSA)
SMF Data Sets	(See "SMF Data Sets" later in this chapter.)	DASD
User-Written Exit Routines	Size of all user-written exit routines	SYS1.LPALIB
Work Area for User-Written Exit Routines	Size of user-requested area (See "Obtaining Additional Work Areas" in the chapter "User-Written Exit Routines")	Pageable CSA, SQA and/or LSQA

[1]When necessary, the dynamic allocation function will increase the TCT size in steps of 200 bytes.

Figure 4. SMF Storage Requirements

SMF Buffer

If records are to be written to the SMF data set, you must supply a buffer size in the SMFPRMxx BUF parameter before or during IPL. (For detailed information on the BUF parameter, see "SMFPRMxx Parameters" in the chapter "Defining the Use of SMF".) The minimum SMF buffer size is 400 bytes; the maximum is 8,192 bytes.

The SMF buffer has two parts: while one half is being filled with SMF records, the other half is being written to the SMF data set. If a record size should exceed half of the buffer size, the record is segmented before it is written. In order to prevent segmenting records (and thereby improve performance), specify a buffer size that is at least twice the size of the largest record to be written to the SMF data set.

Figure 5 summarizes the sizes of the SMF records. When calculating the largest record size, be sure to include the block descriptor word (four bytes) and the record descriptor word (four bytes). Do not make the buffer size larger than necessary; if the system should fail, the records in the SMF buffer will be lost.

Record Type	Record Size (in bytes)
0	31
2	14
3	14
4	147 + 8 per DD statement + length of step accounting fields
5	117 + length of job accounting fields
6	90 for JES2 writer + 36 for 3800 fields / 112 for JES3 writer + 36 for 3800 fields / 84 for external writer
7	24
8	16 + 4 per device
9	16 + 4 per device
10	40 + 4 per device
11	16 + 4 per device
14	264 + 24 per UCB + 28 per ISAM data set
15	264 + 24 per UCB + 28 per ISAM data set
17	88 + 8 per data set scratched
18	132 + 8 per data set renamed
19	64
20	61 + length of job accounting fields
21	44
22	18 + 42 at IPL + 6 per CPU, channel, storage range or device varied
25	88
26	232 for JES2/314 for JES3
31	54
34	147 + 8 per device + length of step accounting fields
35	117 + length of job accounting fields
40	62 + 8 per device
43	28 for JES2/38 for JES3
45	24 for JES2/26 for JES3
47	48 + 38 per SIGNON
48	71 for JES2/79 for JES3
49	48 + 38 per SIGNON
62	138 + 10 per volume
63	132 + length of catalog records
64	250 + 26 per extent
67	130 + length of catalog records
68	170
69	102
70	52 + 16 per CPU
71	132
72	60 + 20 per performance group period
73	52 + 16 per channel
74	52 + 28 per device

Figure 5. SMF Record Sizes

Note: If you plan to reduce the SMF buffer size during consecutive IPL's, dump the SMF data sets first so that all records will be written with the same block size.

SMF Data Sets

You must allocate space for the SMF data sets, SYS1.MANX and SYS1.MANY, before IPL. Both data sets must be permanently resident on a direct access device. (Several factors, such as specific system configuration, amount of SMF data to be written, and report program requirements, will determine which device type is most efficient for a particular installation.) You must also catalog SYS1.MANX and SYS1.MANY.

Figure 6 illustrates sample DD statements for allocating the SMF data sets on direct access devices and cataloging them in the system catalog. Note that secondary space allocation is ignored.

```
//MANX  DD   DSNAME=SYS1.MANX,UNIT=190,VOLUME=SER=111111,
//             SPACE=(TRK,(20)),DISP=(NEW,CATLG)
//MANY  DD   DSNAME=SYS1.MANY,UNIT=191,VOLUME=SER=222222,
//             SPACE=(TRK,(20)),DISP=(NEW,CATLG)
```

Figure 6. Sample DD Statements for Allocating and Cataloging the SMF Data Sets

The amount of space to be allocated to SYS1.MANX and SYS1.MANY depends upon the amount of data generated by each job and how often the data sets are dumped. Figure 7 is an example of how to establish space requirements for an SMF data set, given certain assumptions. The values in Figure 7 are calculated for a four hour interval. Subsystem and MF/1 records are not shown in this example.

SYSTEM-RELATED RECORDS					
Event or Status	Record Type	Assumption for This Example	Example No. of Bytes per Record	Example No. of Records	Example Total No. of Bytes
IPL	0	Once per day	31	1	31
TIOC Initialization	31	Once per day	54	1	54
Devices Online at IPL	8	20 devices, including 6 DASD	96	1	96
	19		64	6	384
	22		60	1	60
End of Day	19	6 DASD	64	6	384
Devices Varied Online	9	Twice per hour	20	8	160
	22	1 MSS device per day	24	1	24
Device Recovered at Allocation	10	Once per hour	44	4	176
Devices Varied Offline	11	Twice per hour	20	8	160
	22	1 MSS device per day	24	1	24
TOTAL FOR SYSTEM-RELATED RECORDS				38	1553

Figure 7. Sample Data Set Space Requirements (Part 1 of 2)

JOB-RELATED RECORDS					
Event or Status	**Record Type**	**Assumption for This Example**	**Example No. of Bytes per Record**	**Example No. of Records**	**Example Total No. of Bytes**
Job Processing	5	Accounting data[1]	129	1	129
	20		73	1	73
	35		129	1	129
	19	Demount 2 DASD volumes	64	2	128
	21	1 EOV or CLOSE	44	1	44
Step Processing	4	4 DD statements per step, accounting data[1], 3 steps per job	191	3	573
	34		191	3	573
	14	1 EOV and 2 CLOSE per step, 3 steps per job	288	9	2592
	15	1 EOV and 2 CLOSE per step, 3 steps per job	288	9	2592
	17	Scratch non-VSAM data set in 1 step per 12 jobs[2]	96	1	96
	18	Rename non-VSAM data set in 1 step per 12 jobs[2]	140	1	140
	62	Open 2 components per step	168	2	336
	63	Define 1 non-VSAM entry per step	300	1	300
		Define VSAM index cluster in 1 step per 12 jobs[2]	280 cluster 550 data set 500 index	3	1330
		Alter each component of VSAM index cluster per step	1150 data set 930 index	2	2080
	64	1 EOV and 1 CLOSE per VSAM component	328	4	1312
	67	Delete non-VSAM entry per step	300	1	300
		Delete VSAM index cluster in 1 step per 24 jobs[2]	280 cluster 630 data set 530 index	3	1440
	68	ALTER rename a VSAM component in 1 step per 48 jobs[2]	170	1	170
	69	Define, extend or delete space on 1 volume in 1 step per 48 jobs[2]	102	1	102
SYSOUT Processing	6	JES2 writer, 3 steps per job	90	3	270
	26	Job purge	232	1	232
TOTAL FOR JOB-RELATED RECORDS PER JOB				53	14,868
TOTAL FOR 12 JOBS PER HOUR FOR 4 HOURS				2544	713,664
TOTAL FOR SYSTEM-RELATED AND JOB-RELATED RECORDS				2582	715,217
Record Descriptor Word	ALL	N/A	4	2582	10,328
Block Descriptor Word	N/A	6 records per block	4	430 blocks	1720
TOTAL NUMBER OF BYTES FOR THIS EXAMPLE					727,265

[1] Accounting data consists of two 5-byte items.

[2] The number of bytes for these events is calculated only once for the four-hour interval.

Figure 7. Sample Data Set Space Requirements (Part 2 of 2)

Dumping The SMF Data Sets

When either SYS1.MANX or SYS1.MANY becomes full, the SMF writer routine writes a message to the console requesting a dump. The operator should use the SMF dump program, IFASMFDP, to transfer a full SMF data set to another data set (usually on tape), and to reset the status of the dumped data set to empty so that it can be used again for recording data.

Figure 8 shows sample JCL for executing the SMF dump program. The output is a non-temporary data set on a standard-labeled tape. The operator should record the volume serial number of the output data set so that other jobs can reference it.

```
//DUMPX     JOB  MSGLEVEL=1
//STEP1     EXEC PGM=IFASMFDP
//DUMPIN    DD   DSN=SYS1.MAN{X|Y},DISP=OLD
//DUMPOUT   DD   DSN=SMFDATA,UNIT=tapeaddr,
//                DISP=(NEW,KEEP),LABEL=(,SL),VOL=SER=serial
//SYSPRINT  DD   SYSOUT=A
```

Note: Do not specify the DCB= keyword when executing the SMF dump program. Although RECFM=VBS for both the SMF data set and the output data set, the SMF dump program alternately changes from RECFM=VBS to RECFM=VB in order to dump segmented records by individual segments. (See Figure 29 for sample JCL describing the output data set SMFDATA.)

Figure 8. Sample JCL for Executing the SMF Dump Program

The SMF dump program uses the basic sequential access method (BSAM) to physically copy the input data set, DUMPIN, to the output data set, DUMPOUT. During the copy process, the dump program creates two SMF records and writes them to the output data set: a dump header (record type 2) at the beginning of the data set and a dump trailer (record type 3) at the end of the data set.

The SMF dump program also writes messages, as required, to SYSOUT:

- The operator must not dump a data set that is being filled. If the operator attempts to dump the active SMF data set, IFASMFDP returns a code of X'10' in register 15 and writes a message to the console notifying the operator of the error. In response, the operator must cancel the dump program and then invoke it again to dump the correct data set.
- If IFASMFDP is unable to open either the input or output data set, it writes an error message indicating which data set was not successfully opened.
- IFASMFDP determines whether the blocksize of the output data set is smaller than the blocksize of the input data set. If it is, IFASMFDP writes an error message to the console.
- If both SMF data sets and the SMF buffer become full, SMF will be in a data lost condition (unable to record) until dumping takes place. When this condition occurs, the lost records are tracked in SMF record type 7 and the operator receives a message stating that he or she should dump either data set.

One method of executing the SMF dump program is to enter jobs that specify the program into the system, and hold them on the job queue until a dump is required. Another method is to start a reader to an input stream containing the JCL for the SMF dump program. Figure 9 illustrates two sample procedures (DUMPX and DUMPY) for dumping the SMF data sets to a standard-labeled tape (VOL=SER=SMFTAP) by means of the operator START command. In both procedures, the default tape specified on the PROC statement is 192. Figure 9 also illustrates sample JCL for adding these procedures to SYS1.PROCLIB.

```
//UPDATE    JOB   MSGLEVEL=1
//UPDATE    EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSUT1    DD    DSN=SYS1.PROCLIB,DISP=SHR
//SYSUT2    DD    DSN=SYS1.PROCLIB,DISP=SHR
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    DATA
./          ADD   NAME=DUMPX,LIST=ALL
//DUMPX     PROC  TAPE=192
//SMFDMP    EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSNAME=SYS1.MANX,DISP=OLD
//DUMPOUT   DD    DSNAME=SMFDATA,UNIT=&TAPE,DISP=(MOD,KEEP),
//               LABEL=(,SL),VOL=SER=SMFTAP
//SYSPRINT  DD    SYSOUT=A
./          ADD   NAME=DUMPY,LIST=ALL
//DUMPY     PROC  TAPE=192
//SMFDMP    EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSNAME=SYS1.MANY,DISP=OLD
//DUMPOUT   DD    DSNAME=SMFDATA,UNIT=&TAPE,DISP=(MOD,KEEP),
//               LABEL=(,SL),VOL=SER=SMFTAP
//SYSPRINT  DD    SYSOUT=A
./ENDUP
/*
```

Figure 9. Sample Procedures for Dumping the SMF Data Sets

Switching The SMF Data Sets

When an SMF data set becomes full, SMF writes a message to the console and automatically switches recording from the active SMF data set to the inactive SMF data set. To prepare an SMF data set for dumping *before* it becomes full, however, the operator can use the HALT EOD and SWITCH SMF commands. (These operator commands are fully described in *Operator's Library: OS/VS2 Reference (JES2)* and *Operator's Library: OS/VS2 Reference (JES3).*)

When the operator issues either the HALT EOD or the SWITCH SMF command, the following actions occur:

- A type 19 record is created for each online direct access device if DSV=1 or DSV=3 was specified.
- The SMF buffer is written to the SMF data set.
- The SMF data sets are switched so that the operator can dump the previously active data set.

Note: When switching the SMF data sets, the inactive data set cannot become active unless it is empty. Therefore, the operator must dump the inactive data set (or initialize the system) before issuing the HALT or SWITCH command.

Dumping The SMF Data Sets

When either SYS1.MANX or SYS1.MANY becomes full, the SMF writer routine notifies the operator that the data set needs to be dumped, automatically switches recording from the active SMF data set to the inactive SMF data set, and then passes control to the SMF dump exit, IEFU29. (For information on the IEFU29 exit, see the chapter "User-Written Exit Routines".) The operator should use the SMF dump program, IFASMFDP, to transfer a full SMF data set to another data set (usually on tape), and to reset the status of the dumped data set to empty so that it can be used again for recording data.

Figure 8 shows sample JCL for executing the SMF dump program. The output is a non-temporary data set on a standard-labeled tape. The operator should record the volume serial number of the output data set so that other jobs can reference it.

```
//DUMPX     JOB  MSGLEVEL=1
//STEP1     EXEC PGM=IFASMFDP
//DUMPIN    DD   DSN=SYS1.MAN{X},DISP=OLD
                              {Y}
//DUMPOUT   DD   DSN=SMFDATA,UNIT=tapeaddr,
//                DISP=(NEW,KEEP),LABEL=(,SL),VOL=SER=serial
//SYSPRINT  DD   SYSOUT=A
```

Note: Do not specify the DCB= keyword when executing the SMF dump program. Although RECFM=VBS for both the SMF data set and the output data set, the SMF dump program alternately changes from RECFM=VBS to RECFM=VB in order to dump segmented records by individual segments. (See Figure 29 for sample JCL describing the output data set SMFDATA.)

Figure 8. Sample JCL for Executing the SMF Dump Program

The SMF dump program uses the basic sequential access method (BSAM) to physically copy the input data set, DUMPIN, to the output data set, DUMPOUT. During the copy process, the dump program creates two SMF records and writes them to the output data set: a dump header (record type 2) at the beginning of the data set and a dump trailer (record type 3) at the end of the data set.

The SMF dump program also writes messages, as required, to SYSOUT:

- The operator must not dump a data set that is being filled. If the operator attempts to dump the active SMF data set, IFASMFDP returns a code of X'10' in register 15 and writes a message to the console notifying the operator of the error. In response, the operator must cancel the dump program and then invoke it again to dump the correct data set.
- If IFASMFDP is unable to open either the input or output data set, it writes an error message indicating which data set was not successfully opened.
- IFASMFDP determines whether the blocksize of the output data set is smaller than the blocksize of the input data set. If it is, IFASMFDP writes an error message to the console.
- If both SMF data sets and the SMF buffer become full, SMF will be in a data lost condition (unable to record) until dumping takes place. When this condition occurs, the lost records are tracked in SMF record type 7 and the operator receives a message stating that he or she should dump either data set.

One method of executing the SMF dump program is to enter jobs that specify the program into the system, and hold them on the job queue until a dump is required. Another method is to start a reader to an input stream containing the JCL for the SMF dump program. Figure 9 illustrates two sample procedures (DUMPX and DUMPY) for dumping the SMF data sets to a standard-labeled tape (VOL=SER=SMFTAP) by means of the operator START command. In both procedures, the default tape specified on the PROC statement is 192. Figure 9 also illustrates sample JCL for adding these procedures to SYS1.PROCLIB.

```
//UPDATE    JOB   MSGLEVEL=1
//UPDATE    EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSUT1    DD    DSN=SYS1.PROCLIB,DISP=SHR
//SYSUT2    DD    DSN=SYS1.PROCLIB,DISP=SHR
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    DATA
./          ADD   NAME=DUMPX,LIST=ALL
//DUMPX     PROC  TAPE=192
//SMFDMP    EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSNAME=SYS1.MANX,DISP=OLD
//DUMPOUT   DD    DSNAME=SMFDATA,UNIT=&TAPE,DISP=(MOD,KEEP),
//               LABEL=(,SL),VOL=SER=SMFTAP
//SYSPRINT  DD    SYSOUT=A
./          ADD   NAME=DUMPY,LIST=ALL
//DUMPY     PROC  TAPE=192
//SMFDMP    EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSNAME=SYS1.MANY,DISP=OLD
//DUMPOUT   DD    DSNAME=SMFDATA,UNIT=&TAPE,DISP=(MOD,KEEP),
//               LABEL=(,SL),VOL=SER=SMFTAP
//SYSPRINT  DD    SYSOUT=A
./ENDUP
/*
```

Figure 9. Sample Procedures for Dumping the SMF Data Sets

Switching The SMF Data Sets

To prepare an SMF data set for dumping *before* it becomes full the operator can use the HALT EOD and SWITCH SMF commands. (These operator commands are fully described in *Operator's Library: OS/VS2 Reference (JES2).*)

When the operator issues either the HALT EOD or the SWITCH SMF command, the following actions occur:

- A type 19 record is created for each online direct access device if DSV=1 or DSV=3 was specified.
- The SMF buffer is written to the SMF data set.
- The SMF data sets are switched so that the operator can dump the previously active data set.

Note: When switching the SMF data sets, the inactive data set cannot become active unless it is empty. Therefore, the operator must dump the inactive data set (or initialize the system) before issuing the HALT or SWITCH command.

Performance Considerations

SMF will reduce system throughput by various amounts depending upon factors such as:

- SMF options selected through the SMFPRMxx parameters. (For a description of these parameters, see the chapter "Defining the Use of SMF".)
- SMF buffer size. (If the buffer size is too small, SMF segments records before writing them.)
- SMF data set size, device type, and dumping requirements.
- Execution time of user-written exit routines.
- System configuration, especially the type and degree of multiprogramming.
- Processing characteristics, such as the number of jobs (the number of records generated by SMF is dependent on the number of jobs), the contention for SMF resources, and user data set requirements.

An installation must define how it will be using SMF through a SYS1.PARMLIB member SMFPRMxx:

- Required SMFPRMxx parameters specify the job wait time limit and the system on which SMF is active.
- Optional SMFPRMxx parameters allow an installation to select record types, to permit operator modification of SMF parameters, and to specify whether SMF exits are to be taken.

You can specify SMFPRMxx parameters (1) before the first IPL of a newly generated system by adding SMFPRMxx as a member in SYS1.PARMLIB, or (2) at each initialization of SMF by entering the parameters at the console.

SMFPRMxx Parameters

The SMFPRMxx parameters are described in Figure 10. Note that the JWT and SID parameters are required for SMF. The BUF parameter is also required unless MAN=NONE is specified.

Notes:

1. If a job is recovered in a warm start, the values for the DSV, EXT, OPT and REC parameters will be the values in effect when the job was read. Modifications for these parameters are ignored during a warm start IPL. The value for the SID parameter will be the value in effect when the job was read for record types 4, 5, 34 and 35 only.
2. To use the IEHUCAT utility program, specify: MAN=ALL, OPT=2, and DSV=2 or 3. These parameters are required for IEHUCAT to update an OS catalog to the level of a VSAM catalog. (For more information about IEHUCAT, see *OS/VS Utilities*.)

Parameter	Meaning and Use	Value Range	Default Value
BUF={*nnn* / *nnnn*}	This parameter is required unless MAN=NONE is specified. It indicates the SMF buffer size. (SMF buffer size requirements are discussed in the chapter "System Requirements and Considerations.") *Notes:* 1. Specify a BUF value that is a multiple of 8 bytes (double word); otherwise, SMF rounds the value to the next *lower* multiple of 8 bytes. 2. Before reducing the buffer size specified in the previous IPL, dump the SMF data set; otherwise the data sets cannot be dumped.	400 to 8,192	None (Operator is prompted if BUF value is needed.)
DSV={**0** / 1 / 2 / 3}	This optional parameter specifies whether data set information and/or direct access volume information is to be collected by SMF. 0 suppresses both data set information and direct access volume information. 1 generates direct access volume information and suppresses data set information. 2 generates data set information and suppresses direct access volume information. 3 generates both data set information and direct access volume information. *Note:* If OPT=1 and either DSV=2 or DSV=3 is specified, SMF converts OPT=1 into OPT=2 and issues a warning message.	0, 1, 2 or 3	0
EXT={**YES** / NO}	This optional parameter specifies whether SMF exits (except IEFUSO, which is always taken when the output limit is reached, and IEFU29, which is always taken when an SMF data set becomes full) are to be taken. YES specifies exits are to be taken. NO specifies exits are not to be taken. *Note:* If EXT=YES is specified, the exits taken will depend upon the data-collection parameter, OPT. If OPT=2, all exits defined for the system are taken. If OPT=1, the step initiation exit, IEFUSI, and the step termination exit, IEFACTRT, are not taken.	Not applicable	YES
JWT=*nnn*	This is a required parameter that initially specifies the number of minutes a job is allowed to wait continuously. When the specified time limit has expired, the time limit exit, IEFUTL, is entered (if exits are to be taken). The limit value can be changed by IEFUTL.	1-999	10
MAN={NONE / USER / **ALL**}	This optional parameter specifies whether user and/or SMF records are to be written to the SMF data sets. You must specify MAN=ALL or MAN=USER if records are to be written to the SMF data sets. Unless MAN=NONE is specified, the BUF parameter is also required. NONE does not write user or SMF records to the SMF data sets, regardless of values specified for DSV, OPT, and REC parameters. USER writes only user records (types 128 through 255) to the SMF data sets. ALL writes both SMF and user records to the SMF data sets. All SMF records are created unless suppressed by the DSV, OPT, or REC parameters. All SMF records that are created are written unless suppressed by user-written exit routines. *Note:* Even if MAN=USER is specified, the SMF record types 2, 3, and 7 will still be written.	Not applicable	ALL

Figure 10. SMFPRMxx Parameters (Part 1 of 2)

Parameter	Meaning and Use	Value Range	Default Value
OPI= {YES / NO}	This optional parameter specifies whether the SMFPRMxx parameters are to be presented on the console during IPL for the operator's inspection and/or modification. (This parameter is ignored if it is entered from the console.) YES allows the operator to modify the SMFPRMxx parameters. NO does not allow the operator to modify the SMFPRMxx parameters.	Not applicable	NO
OPT= {1 / 2}	This optional parameter specifies whether system and job information, as opposed to system, job, and job step information, is to be recorded. 1 generates only system and job-related information (that is, record types 4 and 34 are suppressed and the step initiation exit, IEFUSI, and step termination exit; IEFACTRT, are not taken). 2 generates system, job, and job step information. *Notes:* 1. For the system resource manager (SRM) to do I/O load balancing, specify OPT=2 so that SRM can access EXCP counts by job step. If OPT=1, I/O load balancing is non-operative. 2. If OPT=1 and DSV=2 or DSV=3 is specified, SMF converts OPT=1 into OPT=2 and issues a warning message.	1 or 2	2
REC= {0 / 2}	This optional parameter specifies whether record type 17 will be written for temporary data sets. This parameter is not effective unless either DSV=2 or DSV=3 is specified. 0 writes record type 17 for non-temporary data sets only. 2 writes record type 17 for both temporary and non-temporary data sets.	0 or 2	0
SID=*xxxx*	This is a required parameter that specifies the system and model on which SMF is active, provided the installation modifies the default value.	Four alphameric and/or special characters	H155

Figure 10. SMFPRMxx Parameters (Part 2 of 2)

Selecting SMF Records Using SMFPRMxx Parameters

Four SMFPRMxx parameters control the type of records to be written to the SMF data set: DSV, MAN, OPT, and REC. Figure 11 summarizes the use of these four parameters in selecting SMF records.

Parameter	Value	Meaning	Effect on SMF Records
DSV	0	No information for data sets or direct access volumes.	Suppresses record types 14, 15, 17, 18, 19, 62, 63, 64, 67, 68, and 69.
	1	Direct access volume information.[1]	Generates record types 19 and 69; suppresses record types 14, 15, 17, 18, 62, 63, 64, 67, and 68.
	2	Data set information.[2]	Generates record types 14, 15, 17, 18, 62, 63, 64, 67, and 68; suppresses record types 19 and 69.
	3	Data set and direct access information.[1,2]	Generates record types 14, 15, 17, 18, 19, 62, 63, 64, 67, 68, and 69.
MAN	NONE	No records.	The SMF data set is not used.
	USER	User records.	User record types 128 through 255 (and SMF record types 2, 3, and 7) can be written to the SMF data set.
	ALL	Both user and SMF records.[3]	Record types 0 through 255 can be written to the SMF data set.
OPT	1	System and job information.	Generates record types 0, 2, 3, 5-11, 20, 22, 25 (JES3 only), 26, 31, 35, 40, 43, 45, 47-49; suppresses record types 4 and 34.
	2	System, job, and job step information.	Generates record types 4, 34 and all the above record types.
REC	0	No information for temporary data sets.	Generates record type 17 for non-temporary data sets only.
	2	Temporary and non-temporary data set information.	Generates record type 17 for both temporary and non-temporary data sets.

[1]Record type 21 is always written to the SMF data set by the error statistics by volume (ESV) routine.

[2]If OPT=1 and either DSV=2 or DSV=3 is specified, SMF converts OPT=1 to OPT=2 and issues a warning message.

[3]MF/1 record types 70-74 can only be written when MAN=ALL is specified. These records are selected by the RECORD parameter for MF/1, as described in *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

Figure 11. Summary of the Use of SMFPRMxx Parameters to Select SMF Records

User-written exit routines IEFU83 (SMF writer) and IEFACTRT (termination) can also control which records are to be written to the SMF data set. After inspecting an SMF record, these routines return a code to the system indicating whether the record is to be written to the SMF data set.

Entering SMFPRMxx in SYS1.PARMLIB

When you have determined which SMF parameters to use, place them in an SMFPRMxx member of SYS1.PARMLIB. The two alphameric characters, represented by xx, are appended to SMFPRM to identify your SMFPRMxx member. If you do not specify an SMFPRMxx member (with system parameters, such as SMF=01 for member SMFPRM01, or with an alternate member, such as IEASYSxx), the default member SMFPRM00 is used. The parameters in SMFPRM00 are:

```
OPT=2,EXT=YES,SID=H155,BUF=2000,JWT=10,OPI=YES,MAN=ALL
```

The SMFPRMxx parameters can be in any order; however, note the following coding restrictions:

- Code each series of parameters in logical records no more than 80 bytes long.
- Use columns 1-71; columns 72-80 are ignored.
- Enter each parameter in the format: keyword=*value*.
- Do not use embedded blanks.
- Separate consecutive parameters by commas.
- Do not divide a parameter between consecutive records.
- Indicate continuation by placing a comma after the last entry on a record, followed by a blank before column 72.

To add the SMFPRMxx parameters as a member of SYS1.PARMLIB, use the IEBUPDTE utility program. Figure 12 illustrates sample JCL for using IEBUPDTE to enter SMFPRM01 into SYS1.PARMLIB. To change the default member, SMFPRM00, or the installation-defined SMFPRMxx member, replace them with a new version by again executing IEBUPDTE. For information on the IEBUPDTE program, see *OS/VS Utilities*.

```
//ENTER     JOB   MSGLEVEL=1
//          EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSPRINT  DD    SYSOUT=A
//SYSUT2    DD    DSNAME=SYS1.PARMLIB,DISP=(OLD,KEEP)[1]
//SYSIN     DD    DATA
./          ADD   LIST=ALL,NAME=SMFPRM01,LEVEL=01,SOURCE=0
(SMFPRM01 member)
./          ENDUP
/*
```

[1]To access SMFPRM00 on the distribution package before SYSGEN, use the SYS1.APARMLIB data set.

Figure 12. Sample JCL for Entering SMFPRM01 into SYS1.PARMLIB Using IEBUPDTE

If OPI=YES was specified, the operator can modify the SMFPRMxx parameter values from the console during system initialization. If parameter errors occur, the operator will be prompted for correct parameters regardless of the value specified for OPI.

SMF has exits in the control program that can link to user-written routines for monitoring jobs or job steps at various points in their processing cycles. An installation can use any or all of the SMF exits by including user-written exit routines in the appropriate distribution libraries before SYSGEN or in SYS1.LPALIB after SYSGEN. SMF automatically provides dummy routines for all unused exits. (For detailed information on adding user-written exit routines, see "Including Exit Routines in the Operating System" in the chapter "System Requirements and Considerations".)

Planning Exit Routines

This section introduces the SMF exits. It briefly describes when each exit is called, the parameters passed to it, and the return codes required from it.

Exit Routines and Their Characteristics

SMF supplies eight exits, which can link to user-written exit routines, as follows:

- The job validation exit (IEFUJV) receives control from the converter before each job control statement (or cataloged procedure) in the input stream is interpreted. This exit also receives control after all the JCL is converted and again after all the JCL is interpreted. It is not taken for JCL comment statements or for any statements for console-started tasks. A return code from this exit indicates whether processing of the job is to be continued.
- The job initiation exit (IEFUJI) receives control from the initiator before a job on the input queue is selected for initiation. A return code from this exit indicates whether the job is to be started or canceled.
- The step initiation exit (IEFUSI) receives control from the initiator before each job step is started (prior to allocation). A return code from this exit indicates whether the job step is to be started or the job is to be canceled.
- The time limit exit (IEFUTL) receives control from the timer interruption handler when one of the following time limits expires: the job CPU time limit (from the JOB statement); the step CPU time limit (from the EXEC statement or the default from the job entry subsystem); or the continuous wait time limit for the job (from the SMFPRMxx JWT parameter). A return code from this exit indicates whether the job step is to be terminated or processing is to be continued with a new time limit.
- The SYSOUT limit exit (IEFUSO) receives control from the job entry subsystem when the number of records written to an output data set exceeds the output limit for that data set. A return code from this exit indicates whether the job is to be terminated or processing is to be continued using a new limit.
- The SMF record exit (IEFU83) receives control from the SVC 83 routine before each record is written to the SMF data set. A return code from this exit indicates whether the current SMF record is to be suppressed.

- The termination exit (IEFACTRT) receives control from the terminator on the normal or abnormal termination of each job step and job. A return code from this exit indicates whether the job is to be continued (for job steps only) or terminated, and whether the SMF termination records are to be written to the SMF data set.

- The job purge exit (IEFUJP) receives control from the job entry subsystem when a job is ready to be purged from the system (that is, after the job has terminated and all SYSOUT output that pertains to the job has been written). A return code from this exit indicates whether the SMF job purge record is to be written to the SMF data set.

Figure 13 summarizes when each SMF exit is called, the modules that call each user-written exit routine, the information passed to each exit (in addition to the common exit parameters, described in Figure 16), and the return from each exit to the control program.

Module:	At:	Interfaces With:	For User Exit:	Parameters Passed:	Type of Return:
IEFVHEB	Prescan in Converter	directly	IEFUJV (entry codes 0-8)	JCL statement image, type of JCL statement.	Continue or cancel.
IEFVHF	Converter Termination	directly	IEFUJV (entry code 16)		
IEFVHN	Interpreter Termination	directly	IEFUJV (entry code 32)		
IEFSD060	Job Initiation	IEFSMFIE	IEFUJI	Programmer name, job priority, job accounting fields.	Continue or cancel.
IEFSD060	Step Initiation	IEFSMFIE	IEFUSI	Job step name, program name, step accounting fields.	Continue or cancel.
IEATLEXT	Timer Expiration	directly	IEFUTL	None.	Continue with new time limit or cancel.
HASPSSSM[1] IATDMEB[2]	Output Limit Expiration	directly	IEFUSO	None.	Continue with new limit or cancel.
IGC0008C	SMF Buffer Time	IEEMB830	IEFU83	SMF record to be written.	Write or do not write record to SMF data set.
IEFW21SD	Job Termination	IEFTB721	IEFACTRT	Job step name, programmer name, job CPU time, job accounting fields, step CPU time, step accounting fields, completion code, SMF termination record.	Continue or cancel; write or do not write record to SMF data set.
IEFW21SD	Step Termination	IEFTB721	IEFACTRT		
HASPACCT[1] IATPURG[2]	Job Purge	directly[1] IATOSDR[2]	IEFUJP	SMF job purge record.	Write or do not write record to SMF data set.

[1]These modules are for JES2 only.
[2]These modules are for JES3 only.

Figure 13. Exit Routine Characteristics

User-Written Exit Routines

SMF has exits in the control program that can link to user-written routines for monitoring jobs or job steps at various points in their processing cycles. An installation can use any or all of the SMF exits by including user-written exit routines in the appropriate distribution libraries before SYSGEN or in SYS1.LPALIB after SYSGEN. SMF automatically provides dummy routines for all unused exits. (For detailed information on adding user-written exit routines, see "Including Exit Routines in the Operating System" in the chapter "System Requirements and Considerations".)

Planning Exit Routines

This section introduces the SMF exits. It briefly describes when each exit is called, the parameters passed to it, and the return codes required from it.

Exit Routines and Their Characteristics

SMF supplies nine exits, which can link to user-written exit routines, as follows:

- The job validation exit (IEFUJV) receives control from the converter before each job control statement (or cataloged procedure) in the input stream is interpreted. This exit also receives control after all the JCL is converted and again after all the JCL is interpreted. It is not taken for JCL comment statements or for any statements for console-started tasks. A return code from this exit indicates whether processing of the job is to be continued.
- The job initiation exit (IEFUJI) receives control from the initiator before a job on the input queue is selected for initiation. A return code from this exit indicates whether the job is to be started or canceled.
- The step initiation exit (IEFUSI) receives control from the initiator before each job step is started (prior to allocation). A return code from this exit indicates whether the job step is to be started or the job is to be canceled.
- The time limit exit (IEFUTL) receives control from the timer interruption handler when one of the following time limits expires: the job CPU time limit (from the JOB statement); the step CPU time limit (from the EXEC statement or the default from the job entry subsystem); or the continuous wait time limit for the job (from the SMFPRMxx JWT parameter). A return code from this exit indicates whether the job step is to be terminated or processing is to be continued with a new time limit.
- The SYSOUT limit exit (IEFUSO) receives control from the job entry subsystem when the number of records written to an output data set exceeds the output limit for that data set. A return code from this exit indicates whether the job is to be terminated or processing is to be continued using a new limit.
- The SMF record exit (IEFU83) receives control from the SVC 83 routine before each record is written to the SMF data set. A return code from this exit indicates whether the current SMF record is to be suppressed.

- The termination exit (IEFACTRT) receives control from the terminator on the normal or abnormal termination of each job step and job. A return code from this exit indicates whether the job is to be continued (for job steps only) or terminated, and whether the SMF termination records are to be written to the SMF data set.
- The job purge exit (IEFUJP) receives control from the job entry subsystem when a job is ready to be purged from the system (that is, after the job has terminated and all SYSOUT output that pertains to the job has been written). A return code from this exit indicates whether the SMF job purge record is to be written to the SMF data set.
- The SMF dump exit (IEFU29) receives control from the SMF writer when an SMF data set becomes full. This exit does not return a code to the control program.

Figure 13 summarizes when each SMF exit is called, the modules that call each user-written exit routine, the information passed to each exit (in addition to the common exit parameters, described in Figure 16), and the return from each exit to the control program.

Module:	At:	Interfaces With:	For User Exit:	Parameters Passed:	Type of Return:
IEFVHEB	Prescan in Converter	directly	IEFUJV (entry codes 0-8)	JCL statement image, type of JCL statement.	Continue or cancel.
IEFVHF	Converter Termination	directly	IEFUJV (entry code 16)		
IEFVHN	Interpreter Termination	directly	IEFUJV (entry code 32)		
IEFSD060	Job Initiation	IEFSMFIE	IEFUJI	Programmer name, job priority, job accounting fields.	Continue or cancel.
IEFSD060	Step Initiation	IEFSMFIE	IEFUSI	Job step name, program name, step accounting fields.	Continue or cancel.
IEATLEXT	Timer Expiration	directly	IEFUTL	None.	Continue with new time limit or cancel.
HASPSSSM	Output Limit Expiration	directly	IEFUSO	None.	Continue with new limit or cancel.
IGC0008C	SMF Buffer Time	IEEMB830	IEFU83	SMF record to be written.	Write or do not write record to SMF data set.
IEFW21SD	Job Termination	IEFTB721	IEFACTRT	Job step name, programmer name, job CPU time, job accounting fields, step CPU time, step accounting fields, completion code, SMF termination record.	Continue or cancel; write or do not write record to SMF data set.
IEFW21SD	Step Termination	IEFTB721	IEFACTRT		
HASPACCT	Job Purge	directly	IEFUJP	SMF job purge record.	Write or do not write record to SMF data set.
IEEMB829	SMF Dump Time	directly	IEFU29	SMF data set name.	None.

Figure 13. Exit Routine Characteristics

Sample Exit Routines in SYS1.ASAMPLIB

Sample assembler language exit routines for some SMF exits are provided in the member SMFEXITS of SYS1.ASAMPLIB. Figure 14 shows sample JCL for obtaining a listing of these sample routines.

```
//PRINT     JOB      MSGLEVEL=1
//          EXEC     PGM=IEBPTPCH
//SYSPRINT  DD       SYSOUT=A
//SYSUT1    DD       DSNAME=SYS1.ASAMPLIB,DISP=(OLD,KEEP),
//                   UNIT=xxxx,VOLUME=SER=xxxxxx[1]
//SYSUT2    DD       SYSOUT=A
//SYSIN     DD       *
          PRINT    TYPORG=PO,MAXNAME=1,MAXFLDS=1
          MEMBER   NAME=SMFEXITS
          RECORD   FIELD=(80)
/*
```

[1]The volume and unit parameters depend upon your installation's request.

Figure 14. Sample JCL For Obtaining a Listing of Sample Exit Routines

A summary of the sample exit routines in SYS1.ASAMPLIB follows:

- IEFUJV – Sample routine checks the validity of a continued JOB statement and of values supplied for REGION, PRTY, TIME, and accounting parameters in the JOB statement. The routine uses characters from the account number to index a table that contains allowable values for these parameters. If any value is invalid, the sample IEFUJV routine terminates the job.
- IEFUJI – Sample routine determines how long a job has been on the input job queue before it is initiated. It then writes this value and the job priority to the SMF data set as a user record.
- IEFUSI – No sample provided.
- IEFUTL – Sample routine terminates a job if either the job CPU time limit or the job step CPU time limit has been exceeded. If the continuous wait time limit for the job has been exceeded, the routine extends the limit twice; on the third entry for exceeding the continuous wait time limit, it cancels the job. Each time the routine is entered for exceeding the continuous wait time limit, it writes a record describing the action taken to the SMF data set.
- IEFUSO – No sample provided.

- IEFU83 – Sample routine determines whether the record to be written is an IPL record. If it is, the routine writes to the operator with a reply request for the record types to be written. If the record is not an IPL record, the return code depends upon the records currently requested.

  The sample IEFU83 routine has a special macro definition for "write to operator with reply" so that output normally directed to the operator is suppressed and a standard reply is assumed for testing with the TESTEXIT procedure. Remove this macro definition if you want the message printed at the console. The sample routine also has special macro definitions for "write to operator" and "wait", which generate no-op instructions.

- IEFACTRT – Sample routine changes the SMF job termination and job step termination records (unless the job step is flushed) to user records, and attempts to write them to the SMF data set. If the data set is full, the routine writes a message to the console indicating that SMF records are being lost. At job termination, the routine writes a record containing the job name, programmer's name, and account number to the SYSOUT device.

- IEFUJP – No sample provided.

- IEFU29 – Sample routine issues a WTOR macro instruction requesting the operator to start a procedure to dump the full SMF data set. A sample dumping procedure is provided in SYS1.ASAMPLIB as member SMFDUMP. The SMFDUMP procedure uses the SMF dump program, IFASMFDP. This program dumps the full SMF data set, and resets the status of the dumped data set to empty so that it can be used again for recording data.

Writing Exit Routines

This section describes:

- Exit routine restrictions and facilities, including information on communication among user-written exit routines; the common parameters passed to all routines; the SMFWTM macro instruction, which is used to write records to the SMF data set; and the IFASMFR macro instruction, which is used to symbolically address fields in the SMF records.
- Exit routines, including a full description of the parameters passed to each routine and the required return codes.

Exit Routine Restrictions

This section describes only the restrictions and conditions common to most user-written exit routines. For those restrictions and conditions that involve only one or two exit routines, see the specific routine(s) later in this chapter.

Before writing an exit routine, note the following user-written exit routine restrictions and conditions:

- The SMF exits are not taken for problem programs started from the console or for problem programs running in system keys.
- All user-written exit routines must be reenterable.
- All user-written exit routines receive control via a BALR instruction. The routines must save registers when they receive control and restore registers when they return control to the control program. Register 13 contains the address of the register save area; register 14 contains the return address; and register 15 contains the entry point address.
- Figure 15 shows the storage protection key in which each user-written exit routine receives control.

Key	Exit Routine
0	IEFUJV (with entry code 32) IEFUJI IEFUSI IEFUTL IEFU83 IEFACTRT IEFU29
1	IEFUJV (with entry codes 0-16) IEFUSO IEFUJP

Figure 15. Storage Protection Keys

- All user-written exit routines receive control with the system enabled for interrupts.
- No user-written exit routines except IEFACTRT can write to the system output message data set.
- Do not allocate installation-defined data sets to SYSOUT.
- User-written exit routines entered for foreground jobs cannot write to installation-defined data sets. Routines entered for background jobs must write to installation data sets defined as follows:
  - A data set used by the exit routines IEFUJI, IEFUSI, IEFUTL and IEFACTRT requires a DD statement in the initiator cataloged procedure.
  - A data set used by the IEFUJV and IEFUJP exit routines requires a DD statement in the job entry subsystem cataloged procedure.
  - User-written exit routines IEFUSO, IEFU29, and IEFU83 cannot write to installation-defined data sets for background jobs.

- All user-written exit routines that issue a WTOR macro instruction should also specify the LONG=YES parameter in the WAIT macro instruction.

- If you plan to use the TESTEXIT procedure for testing user-written exit routines, see "TESTEXIT Exit Routine Requirements" in the chapter "Testing Exit Routines."

- If you plan to use the IBM OS/VS Sort/Merge Program Product, do not create user records smaller than the minimum length required by the program. (When using tape work devices, the minimum length this program can sort is 18 bytes. Otherwise, the minimum is one byte.)

Exit Routine Facilities

This section describes the facilities common to most user-written exit routines. For more information on the facilities that are particular to a specific exit routine, see that routine later in this chapter.

Common Exit Parameter Area

When a user-written exit routine receives control, register 1 points to a list of four-byte addresses. The first entry in this list is common to all exit routines except IEFU83 and IEFU29. The first entry points to a parameter area that is 36 bytes long.

Figure 16 describes the format of the common exit parameter area. Note that the fields in this parameter area are filled chronologically; therefore, not all fields are meaningful for all user-written exit routines.

Displacement from Pointer	Field Size	Data Format	Description
0	8	EBCDIC	Job name
8	4	binary	Time, in hundredths of a second, reader recognized the JOB card for this job
12	4	packed	Date reader recognized the JOB card for the job, in the form 00YYDDDF where F is the sign
16	4	EBCDIC	System identification (taken from SID parameter[1])
20	8	EBCDIC	User identification. SMF places this data in all subsequent records for this job. This field is initialized to EBCDIC blanks when each job is read[2]
28	1	binary	Number of the step being processed
29	1	binary	Indicator of the SMF options selected by the user *Bit* — *Meaning When Set* 0 — System and job accounting (OPT=1) 1 — System, job, and step accounting (OPT=2) 2 — User exits will be taken (EXT=YES) 3 — Data set accounting (DSV=2 or 3) 4 — Volume accounting (DSV=1 or 3) 5 — Reserved 6 — Type 17 records will be written for temporary data sets (REC=2) 7 — If 0, background job. If 1, foreground job
30	1	binary	Restart indicator *Bit* — *Meaning When Set* 0 — Step restart 1 — Checkpoint/restart 2 — Continue restart 3 — Reserved 4 — Warm start 5-7 — Reserved
31	1	EBCDIC	Job class
32	4	binary	User-communication field. This field is intended for communication among user-written exit routines. It is initialized to zeros when the job entry subsystem is started[2]

[1]Modifications for the SID parameter are ignored during a warm start IPL for SMF record types 4, 5, 34 and 35.

[2]These fields are provided for user modification.

Figure 16. Common Exit Parameter Area

Communicating between Exit Routines

User-written exit routines can communicate with each other in two ways: by using the user-communication field or by using the user-identification field. Both of these fields are contained in the common exit parameter area, which is passed to all user-written exit routines except IEFU83 and IEFU29.

All exit routines (except IEFU83 and IEFU29) that are executing within the same job can communicate via the user-communication field (displacement 32 in Figure 16) and the user-identification field (displacement 20 in Figure 16). The IEFUJV exit routine with entry code 1 is the only routine that can communicate between different jobs; it must use the user-communication field to do so.

Note: The user-communication field is initialized to zeros each time the job entry subsystem is started; the user-identification field is initialized to EBCDIC blanks each time a job is read. Neither of these fields is maintained if the system is restarted.

Obtaining Additional Work Areas

Any user-written exit routine can obtain an additional work area by issuing a GETMAIN macro instruction that specifies an appropriate subpool. Figure 17 shows the subpools (and their characteristics) that are required to obtain additional work areas. Be sure to consider the storage required by an additional work area when estimating the sizes of the common service area (CSA), system queue area (SQA), and local system queue area (LSQA).

Subpool Number	Area in Storage	Attributes of Subpool	Notes
231	CSA	Explicitly freed Pageable Fetch-protected System-oriented User Key	Because subpool 231 is fetch-protected, use it for exit communication only among exits of the same key (see Figure 15).
241	CSA	Explicitly freed Pageable Not fetch-protected System-oriented User key	Because SMF exit routines receive control in different keys (see Figure 15), and subpool 241 is not fetch-protected, use it for read access from all exits.
245	SQA	Explicitly freed Fixed Not fetch-protected System-oriented Key=0	Allows a task running in key 0 to acquire non-accountable, fixed, protected storage that is system-oriented.
253	LSQA (task-related)	Automatically freed at end of task Fixed Not fetch-protected Job-oriented Key=0 Swappable	Allows a task running in key 0 to acquire fixed, accountable, protected storage in the LSQA for the user's region that is job-oriented and freed when the task terminates.
254	LSQA (step-related)	Automatically freed at end of step Fixed Not fetch-protected Job-oriented Key=0 Swappable	Allows a task running in key 0 to acquire fixed, accountable, protected storage in the LSQA for the user's region that is job-oriented and freed when the job step terminates.
255	LSQA	Explicitly freed Fixed Not fetch-protected Job-oriented Key=0 Swappable	Allows a task running in key 0 to acquire fixed, non-accountable, protected storage in the LSQA that is job-oriented and must be explicitly freed.

Figure 17. Required Subpools for Obtaining Additional Work Areas

If desired, you can place the address of the work area in the user-communication field. However, be aware that the address will be destroyed if the field is re-initialized to zeros because the job entry subsystem was started.

Using the SMFWTM Macro to Write Records

Use the SMFWTM macro instruction to write records to the SMF data set. You can use this macro in any exit routine that has a storage protect key of zero except IEFU83 and IEFU29 (see Figure 15), and in any exit routine that has an APF authorization. The SMFWTM macro is written in assembler language and is supplied on SYS1.MACLIB. Its format is:

```
[label] SMFWTM {record address | (r)}
```

where:

record address
is the symbolic address of the record to be written.

(r)
is a register containing the address of the record to be written. The value for (r) can be either the absolute register number or a symbol for the register. In either case, you must code the parentheses, for example, (2) or (REG2).

Record types 128 through 255 are available for user-written records. When using the SMFWTM macro instruction to write user records, you must include the standard SMF record header and a record descriptor word (RDW) for each record. (For a description of the standard SMF record header, see the chapter "SMF Records" in this book. For a description of the RDW, see *OS/VS Data Management Services Guide.*)

Record types 0 through 127 are SMF-formatted records. For all SMF-formatted records except types 4, 5, 34 and 35, you must supply only the record type field in the standard SMF record header (offset 1 in Figure 30). The SMFWTM macro supplies the remaining header information.

The SMFWTM macro instruction returns a code in register 15 that indicates the record's status, as follows:

- 0 indicates the record was written without error.
- 4 indicates the record was truncated because it would not completely fit in an empty SMF data set.
- 8 indicates the record was not written because the length specified in the RDW was less than 18 bytes.
- 16 indicates the record was not written because (1) the MAN=NONE parameter suppressed the writing of records to the SMF data set, or (2) the writing of records was allowed but the SMF data set was full. (If the SMF data set is full, the operator must dump it before additional SMF records can be written. See "Dumping the SMF Data Sets" in the chapter "System Requirements and Considerations" for the procedure for executing the SMF dump program. Also see the description of the "IEFU29 – SMF Dump Exit" in this chapter.)
- 20 indicates the record was not written because the user-written IEFU83 exit routine suppressed the record.

Using the IFASMFR Macro to Address SMF Record Fields

Use the IFASMFR macro instruction in user-written exit routines (or in any problem program application) to symbolically address SMF record fields. The macro is written in assembler language and is supplied on SYS1.AMODGEN. (Depending on your installation's requirements, you may want to copy the IFASMFR macro from SYS1.AMODGEN into your own macro library or SYS1.MACLIB. Note that the IFASMFR macro is distributed as 14 submacros: IFASMFR, IFASMFR1, IFASMFR2,... IFASMFR9, IFASMFRA,... IFASMFRD.)

The format of the IFASMFR macro is

```
[label] IFASMFR n
```

where:

n

is the record type to be defined. You must specify at least one record type with the macro; if more than one record type is specified, you must enclose the record types in parentheses and separate them by commas. The values for n can be: 0, 2-11, 14, 15, 17-22, 25 (JES3 only), 26, 31, 34, 35, 40, 43, 45, 47-49, 62-64, 67-74.

Notes:

1. The "Name" column in all the SMF record formats (see the chapter "SMF Records") contains the symbolic addresses defined by the IFASMFR macro instruction.
2. Do not specify both record type 14 and record type 15 in the same program. Because these records are identical, whenever record type 15 is specified in the IFASMFR macro, record type 14 is defined.
3. If you do not want the IFASMFR macro to use part of the problem program's storage, then supply a CSECT or DSECT statement ahead of the macro instruction.

IEFUJV – Job Validation Exit

IEFUJV receives control from the converter before each job control statement (or cataloged procedure) in the input stream is interpreted. This exit routine also receives control after all of the JCL is converted and again after all the JCL is interpreted. It is not taken for comment statements or for any statements for console-started tasks. A user-written IEFUJV exit routine can do any or all of the following:

- Validate any account fields included in the JOB and EXEC statements by comparison with a standard list.
- Validate or assign the REGION request.
- Validate or assign job time and job step time parameters.
- Control output stream data by using the OUTLIM or SPACE parameters.
- Check for authorization to use data sets.
- Create user-written records.
- Assign the user identification to be included in the SMF termination records and the SMF SYSOUT records for the job.

Notes:

1. If a cataloged procedure is used, it is expanded *before* the IEFUJV exit routine receives control; the sequence of statements is JOB, EXEC PROC=. . . , EXEC PGM=. . . , followed by the other statements of the procedure. Override statements immediately precede the statements being overriden. Note, however, that symbolic parameters are resolved *after* the IEFUJV exit routine is taken.
2. When modifying a JCL statement, do not include additional JCL statements or continuation cards. Also, when adding or modifying operand fields, begin the first operand field in the same place that it was before any additions or modifications were made.
3. Depending upon the processing to be performed, it may be more efficient to check JOB and EXEC statement accounting fields in the IEFUJI exit routine and the first IEFUSI exit routine, respectively. The accounting fields are passed as parameters to IEFUJI and IEFUSI, making a statement scan routine unnecessary. Either of these exit routines can assign user identification, and the IEFACTRT exit routine can write messages to the system output message data set.
4. To use installation-defined data sets with this exit routine, you must define them with a DD statement in the job entry subsystem cataloged procedure.
5. When running JES2, you can use the job statement accounting field scan exit, HASPRSCN, as well as the IEFUJV exit. The HASPRSCN exit interprets any variables in the JOB card accounting field, and sets the appropriate fields in JES2 control blocks representing these variables. Because the HASPRSCN exit receives control before the IEFUJV exit, do not use the IEFUJV exit to change the following fields of the JOB card: CLASS, MSGLEVEL, NOTIFY, PRTY, and TYPRUN. For more information about the HASPRSCN exit, see *OS/VS2 System Programming Library: Job Management.*
6. A user-written IEFUJV exit routine (with entry code 1) can use the user-communication field to communicate between different jobs. Data placed in this field by IEFUJV will become part of each job, will be accessible by all exit routines entered during each job (except IEFU83), and will be the same the next time IEFUJV is entered unless the job entry subsystem is started. (When the job entry subsystem is started, the user-communication field is initialized to zeros.)
7. For jobs canceled by IEFUJV, only SMF record types 6 and 26 are generated.

Parameters

At entry to the IEFUJV exit routine, register 1 points to a list of four-byte addresses, as follows:

1. The address of the common exit parameter area. (See Figure 16.)
2. The address of an 80-character JCL statement image (in EBCDIC). (JCL statements are identical to those listed in the SYSOUT data set; control statements containing only comments, however, are not made available to this exit routine.)
3. The address of a one-byte area that indicates the type of JCL statement being passed to this exit routine. The indicator will be a binary value, as follows:
   0 indicates a null statement.
   1 indicates a JOB statement.
   2 indicates an EXEC statement.
   4 indicates a DD statement.
   8 indicates a PROC statement (for symbolic parameter definition).
   16 indicates all JCL has been converted.
   32 indicates all JCL has been interpreted and all JCL has been passed to IEFUJV.

Return Codes

Before the IEFUJV exit routine returns to the control program, it must place a return code in register 15, as follows:

0 indicates job processing should be continued.

4 indicates job processing should be canceled.

IEFUJI – Job Initiation Exit

IEFUJI receives control from the initiator when a job on the input queue is selected for initiation. A user-written IEFUJI exit routine can validate job accounting information or write to a user data set. It can also determine how long a job was on the input job queue before it was selected for initiation.

Notes:

1. If an installation uses major and minor account numbers with several fields, this exit routine is easier to use than IEFUJV for account number processing because the accounting fields are placed in a formatted list. Figure 18 shows the format of the JOB statement accounting information that is available to IEFUJI.

Offsets				
Dec.	Hex.	Length	Format	Description
0	0	1	binary	Number of accounting fields.
1	1	variable	EBCDIC	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

Figure 18. Format of Accounting Information Passed to IEFUJI, IEFUSI, IEFACTRT, and IEFUJP

2. At job step or job termination, use the termination indicators in record types 4, 5, 34 and 35 to determine whether IEFUJI canceled the job.
3. To use installation-defined data sets with this exit routine, you must define them with a DD statement in the initiator cataloged procedure.

Parameters

At entry to the IEFUJI exit routine, register 1 points to a list of four-byte addresses as follows:

1. The address of the common exit parameter area. (See Figure 16.)
2. The address of a 20-byte area containing the programmer's name (in EBCDIC) from the JOB statement. This area is aligned left and padded with blanks if necessary.
3. The address of a one-byte area indicating the requested job priority.
4. The address of an area containing the accounting information from the JOB statement. (See Figure 18.)

Return Codes

Before the IEFUJI exit routine returns control to the control program, it must place a return code in register 15, as follows:

0 indicates job processing should be continued.

4 indicates job processing should be canceled.

IEFUSI – Step Initiation Exit

IEFUSI receives control from the initiator before each job step is started (prior to allocation). A user-written IEFUSI exit routine can validate job step accounting information or write to a user data set.

Notes:

1. If OPT=1 was specified in the SMFPRMxx member or entered from the console at IPL time, this exit routine is not taken.
2. If an installation uses major and minor account numbers with several fields, this exit routine is easier to use than IEFUJV for account number processing because the accounting fields are placed in a formatted list. Figure 18 shows the format of the EXEC statement accounting information that is available to IEFUSI.
3. At job or job step termination, use the termination indicators in record types 4, 5, 34 and 35 to determine whether IEFUSI canceled the job.
4. To use installation-defined data sets with this exit routine, you must define them with a DD statement in the initiator cataloged procedure.

Parameters

At entry to the IEFUSI exit routine, register 1 points to a list of four-byte addresses, as follows:

1. The address of the common exit parameter area. (See Figure 16.)
2. The address of an eight-byte area containing the job step name (in EBCDIC) from the EXEC statement. This area is aligned left and padded with blanks if necessary.
3. The address of an eight-byte area containing the program name (in EBCDIC) from the EXEC statement. This area is aligned left and padded with blanks if necessary.
4. The address of an area containing the accounting information from the EXEC statement. (See Figure 18.)

Return Codes

Before the IEFUSI exit routine returns control to the control program, it must place a return code in register 15, as follows:

0 indicates job processing should be continued.

4 indicates job processing should be canceled.

IEFUTL – Time Limit Exit

IEFUTL receives control from the timer interruption handler when one of the following time limits expires:

- The job CPU time limit (from the JOB statement).
- The step CPU time limit (from the EXEC statement or the default from the job entry subsystem).
- The continuous wait time limit for the job (from the SMFPRMxx JWT parameter).

A user-written IEFUTL exit routine can control and record time expirations. For example, it can inform the operator that a job has exceeded its continuous wait time limit and request a reply to either cancel the job or extend the time limit.

Notes:

1. *A system interlock occurs anytime IEFUTL enqueues on a resource already enqueued on by the job step task or any of its subtasks.* (More specifically, the initiator abnormally terminates if IEFUTL enqueues on such a resource because the asynchronous exit interface routine sets a "step must complete" status before IEFUTL receives control.) The enqueue can come from within SVCs; for example, it can come from the SMFWTM and WTO macro instructions. To minimize the chances of an interlock, issue an ENQ macro of the following format before issuing an SMFWTM or WTO macro instruction:

   ENQ(QNAME,RNAME,M,3,SYSTEM) ,RET=TEST

2. A user-written IEFUTL exit routine should control the number of extensions for a given step to prevent looping. It can record the expiration in the SMF data set or write a message to the console, however, in doing so, a system interlock could occur. (See Note 1.) To record the expiration in installation-defined data sets, you must define the data sets with a DD statement in the initiator cataloged procedure.

3. CPU time is collected in two categories: execution under TCBs and execution under SRBs. The limiting function and the IEFUTL exit interfaces apply only to TCB time.

4. If TIME=1440 is specified on the JOB statement, all TCB timing for the job is eliminated. If TIME=1440 is specified on the EXEC statement and a job time limit is not specified on the JOB statement, all TCB timing for the job step is eliminated. SRB time is always collected (even if TIME=1440 is specified).

5. If a job time limit is not specified on the JOB statement, the time limit for each job step is the value specified for the TIME= parameter on the EXEC statement, or the default value from the job entry subsystem.

   If a job time limit is specified on the JOB statement, the time limit for each job step is the remaining job time or the job step time limit (from the TIME= parameter or the job entry subsystem default), whichever is smaller.

6. You can extend execution time only within a step. Each extension resets the limit for the entire step to the extension value. If the step does not use all of the extended execution time, the time is *not* carried over for the next step.
7. The smallest time extension granted is 2^{20} microseconds or 1.048576 seconds.
8. The CPU time-used field is checked each $10x2^{20}$ microseconds (10.48576 seconds) to see if the specified time limit has been exceeded. The actual time used may differ from the value in the time-used field because the field is not updated continuously. Thus, the specified time limit may be exceeded by a value between zero and $10x2^{20}$ microseconds.

Parameters

At entry to the IEFUTL exit routine, register 1 points to the four-byte address of the common exit parameter area. (See Figure 16.) Register 0 will have a binary value, as follows:

0 indicates the job CPU time limit expired.

4 indicates the step CPU time limit expired.

8 indicates the continuous wait time limit for the job expired.

Return Codes

Before the IEFUTL exit routine returns control to the control program, it must place a return code in register 15, as follows:

0 indicates job processing is to be canceled.

4 indicates job processing is to be continued with a time extension in timer units.

8 indicates job processing is to be continued with a time extension in seconds.

You must place the time extension in register 1; you can determine the number of timer units by the algorithm:

1 second = 38400 timer units.

IEFUSO – SYSOUT Limit Exit

IEFUSO receives control from the job entry subsystem when the number of records written to an output data set exceeds the output limit for that data set. Unless an IEFUSO exit routine is supplied, jobs are canceled when the output limit is reached. To specify the output limit, use the OUTLIM parameter on the DD statement defining the output data set. Note that the OUTLIM parameter limits output only to spooled data sets. This parameter is described in *OS/VS2 JCL Reference.*

Notes:

1. The IEFUSO exit routine is not controlled by the SMFPRMxx EXT parameter; if an IEFUSO exit routine is supplied, it will always receive control when the output limit for a data set having an OUTLIM value is reached. Otherwise, the job is canceled.
2. If IEFUSO indicates that the output limit is to be increased (register 15=4) but you do not increase the limit (register 1=0), the exit routine will receive control again when the next record is written to the output data set.
3. The IEFUSO exit routine cannot access installation-defined data sets.

Parameters

At entry to the IEFUSO exit routine, register 1 points to the four-byte address of the common exit parameter area. (See Figure 16.)

Return Codes

Before the IEFUSO exit routine returns control to the control program, it must place a return code in register 15, as follows:

0 indicates job step processing is to be canceled.

4 indicates job step processing is to be continued and the output limit is to be increased by the value placed in register 1.

IEFU83 – SMF Record Exit

IEFU83 receives control from the SVC 83 routine before each record is written to the SMF data set. This exit routine is not taken for records whose writing has been suppressed either because of a system failure, or because of options selected at IPL time (see "Selecting SMF Records Using SMFPRMxx Parameters" in the chapter "Defining the Use of SMF"). A user-written IEFU83 exit routine can select the records to be written to the SMF data set or check the circumstances that caused SMF to generate a given record. An example of the latter is asking the operator the reason for an IPL when SMF generates an IPL record. (IEFU83 can also direct output to the console.)

Notes:

1. The IEFU83 exit routine cannot access installation-defined data sets. Also, it cannot use the SMFWTM macro instruction to write to the SMF data set.
2. If the installation does not plan to use record types 63 (VSAM Entry Defined) or 67 (VSAM Entry Deleted), you can use IEFU83 to suppress writing them to the SMF data set or to truncate them.
3. The addresses of the user-communication and user-identification fields of the common exit parameter area are *not* passed to the IEFU83 exit routine.

Parameters

At entry to the IEFU83 exit routine, register 1 points to the four-byte address of the record descriptor word (RDW) of the SMF record to be written.

Return Codes

Before the IEFU83 exit routine returns control to the control program, it must place a return code in register 15, as follows:

0 indicates the record is to be written to the SMF data set.

4 indicates the record is not to be written to the SMF data set.

IEFACTRT – Termination Exit

IEFACTRT receives control from the terminator when each job or job step normally or abnormally terminates. If OPT=1 was specified in the SMFPRMxx member of SYS1.PARMLIB or the operator entered OPT=1 from the console at system initialization time, this exit routine receives control only at job termination. A user-written IEFACTRT exit routine can perform various functions that are unique to an installation's requirements. For example, it can change the SMF record types 4 and 5 to user records and write them to an installation-defined data set for further analysis.

Notes:

1. IEFACTRT is the only exit routine than can write to the system output message data set, and only by passing a message to module IEFYS. If a user-written IEFACTRT exit routine writes messages for system output, the contents of register 12 must be the same as when the routine received control, and register 13 must contain the address of an 18-word work area. Figure 19 shows the procedure to use when writing system output messages from IEFACTRT. Note that the maximum number of characters printed on one line is 132.

```
         MVC    36(4,12),MSGADDR   MOVE MESSAGE ADDRESS AND
         MVC    42(2,12),MSGLEN    LENGTH TO SYSTEM TABLE
         L      REG15,VIEFYS       BRANCH AND LINK TO MESSAGE
         BALR   REG14,REG15        ROUTINE
MSGADDR  DC     A(MSG)
MSG      DC     C'message text'
MSGLEN   DC     H'xx'              MESSAGE LENGTH[1]
VIEFYS   DC     V(IEFYS)
```

[1]The message will be truncated to 132 characters if necessary.

Figure 19. Writing System Output Messages from IEFACTRT

2. IEFACTRT can direct output to the console or to the system output device. It can also write to the SMF data set or to an installation-defined data set. To use installation-defined data sets with this exit routine, you must define them with a DD statement in the initiator cataloged procedure.
3. At job step or job termination, use the termination indicators in record types 4 and 5, respectively, to determine whether IEFACTRT canceled the job.

Parameters

At entry to the IEFACTRT exit routine, register 1 points to a list of four-byte addresses, as follows:

1. The address of the common exit parameter area. (See Figure 16.)
2. The address of an eight-byte area containing the job step name (in EBCDIC). This area is aligned left and padded with blanks if necessary. At job termination, the address is zero.
3. The address of a 20-byte area containing the programmer's name (in EBCDIC). This area is aligned left and padded with blanks if necessary.

4. The address of a four-byte area whose first three bytes contain the job CPU time under TCBs, in hundredths of a second (in binary), and whose last byte contains the number of accounting fields in the JOB statement (in binary).
5. The address of an area that contains accounting information from the JOB statement. This area has the format described earlier in Figure 18, excluding the first field shown (the number of accounting fields).
6. The address of a four-byte area whose first three bytes contain the step CPU time under TCBs, in hundredths of a second (in binary), and whose last byte contains the number of accounting fields in the EXEC statement (in binary). At job termination, the address is zero.
7. The address of an area that contains accounting information from the EXEC statement. This area has the format described earlier in Figure 18, excluding the first field shown (the number of accounting fields). At job termination, the address is zero.
8. The address of a two-byte area. The first byte is an indicator: if bit 7 is set to 1 when the exit routine is entered, the job has been canceled; if the exit routine sets bit 7 to 1, the job will be canceled. The second byte contains the number of the job step currently being processed. At job termination, the second byte contains the number of steps in the job.
9. The address of a two-byte area containing the termination status (condition or completion code) of the job or job step.
10. The address of an area containing a four-byte record descriptor word (RDW) immediately followed by the job step termination record (type 4 or 34) or the job termination record (type 5 or 35) to be written to the SMF data set.

At entry to the IEFACTRT exit routine, register 0 contains a binary code indicating the reason for entry, as follows:

12 indicates job step termination.

16 indicates job termination.

Return Codes

Before the IEFACTRT exit routine returns control to the control program, it must place return codes in registers 1 and 15, as follows:

- In register 1:

4	indicates the termination record is not to be written to the SMF data set.
A value other than 4	indicates the termination record is to be written to the SMF data set.

- In register 15:

4	indicates the remaining job steps are to be canceled.
A value other than 4	indicates job processing is to be continued.

IEFUJP – Job Purge Exit

IEFUJP receives control from the job entry subsystem when a job is ready to be purged from the system, that is, after a job has terminated and all the SYSOUT output that pertains to the job has been written. A user-written IEFUJP exit routine can summarize a job's activities in the system.

Note: To use installation-defined data sets with this exit routine, you must define them with a DD statement in the job entry subsystem cataloged procedure.

Parameters

At entry to the IEFUJP exit routine, register 1 points to a list of four-byte addresses, as follows:

1. The address of the common exit parameter area. (See Figure 16.)
2. The address of an area containing the job purge record (type 26) to be written to the SMF data set.

Return Codes

Before the IEFUJP exit routine returns control to the control program, it must place a return code in register 15, as follows:

4	indicates the job purge record is not to be written to the SMF data set.
A value other than 4	indicates the job purge record is to be written to the SMF data set.

IEFU29 – SMF Dump Exit

IEFU29 receives control from the SMF writer when an SMF data set becomes full. A user-written IEFU29 exit routine can issue a WTOR macro instruction requesting the operator to start a procedure to dump the full SMF data set.

Parameters

At entry to the IEFU29 exit routine, register 1 points to the four-byte address of the data set name for the full SMF data set.

Return Codes

None.

Testing Exit Routines

One method of testing user-written exit routines is by using the TESTEXIT procedure in SYS1.ASAMPLIB. This procedure contains an assembler language source program (also named TESTEXIT) which attaches the data generator utility program (IEBDG) to create sample parameter lists for all user-written exit routines except IEFU29. (The TESTEXIT procedure creates the parameter list for the IEFU29 exit routine without using the data generator utility program.) The source program then calls each user-written exit routine being tested, and passes the appropriate parameter list to it. Figure 20 illustrates the input/output and control flow of the TESTEXIT source program.

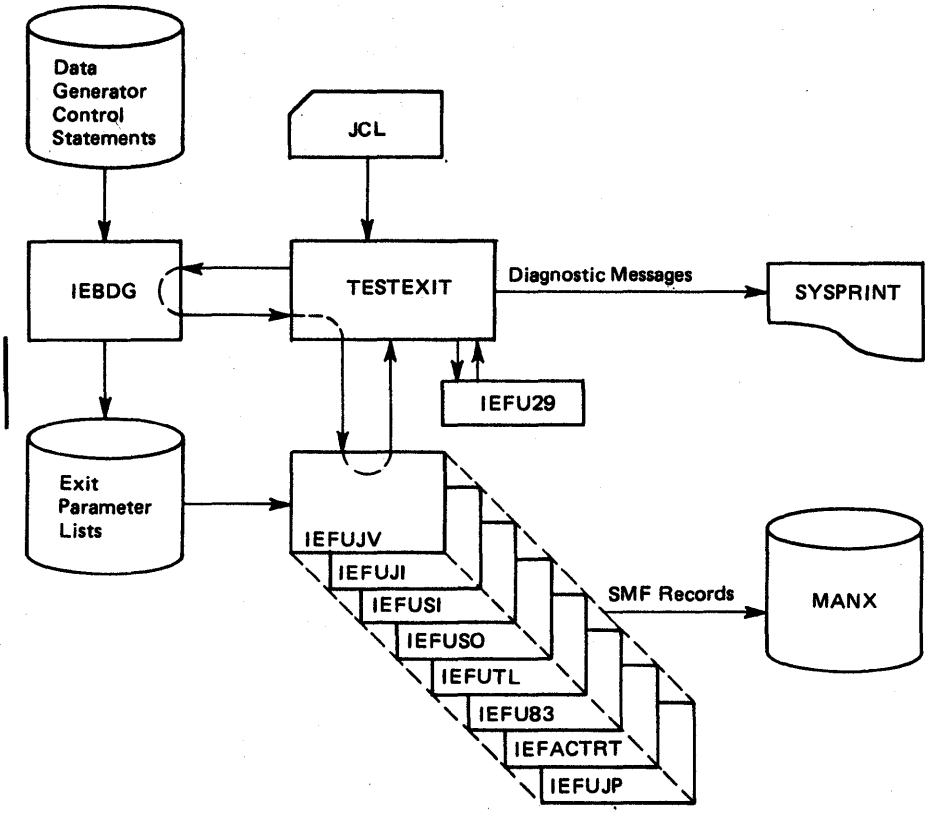

Figure 20. TESTEXIT Input/Output and Control Flow

Before using the TESTEXIT procedure:

1. Fulfill the following user-written exit routine testing requirements:
   - Specify a user subpool (0-127) in all GETMAIN macro instructions included in the routines.
   - Provide a special SMFWTM macro instruction in all routines that use the macro.
   - Place the routines in a partitioned data set.
2. Obtain the TESTEXIT procedure from SYS1.ASAMPLIB.
3. Modify the procedure to meet the installation's testing requirements.

TESTEXIT Exit Routine Requirements

Before using the TESTEXIT procedure, fulfill the following exit routine requirements:

- Specify a user subpool (0-127) in all GETMAIN macro instructions included in your routines. When testing is completed, specify one of the subpools shown in Figure 17 for the area used to communicate between exit routines.

- Provide a special SMFWTM macro instruction in all exit routines that use the macro. The special macro definition writes to the TESTEXIT data set defined by the DD statement named MANX. (With the normal SMFWTM macro instruction, the data is written to SYS1.MANX or SYS1.MANY.) Using this macro definition, then, data is processed without accessing the system data on SYS1.MANX or SYS1.MANY. When testing is completed, remove the macro definition. Figure 21 shows the SMFWTM macro instruction that is required for using the TESTEXIT procedure.

```
         MACRO
&NAME    SMFWTM   &MSGAD
         AIF      ('&MSGAD' EQ '') .E1
         AIF      ('&MSGAD' EQ '(1)') .BAL
         AIF      ('&MSGAD'(1,1) EQ '(') .REGA
         AGO      .LODIT
.E1      MNOTE    '*** NO OPERAND SPECIFIED ***'
         MEXIT
.BAL     ANOP
         CNOP     0,4
&NAME    BAL      15,*+8
.LIST    DC       V(TSMFWTM)
         L        15,0(15)
         BALR     14,15
         MEXIT
.REGA    ANOP
&NAME    LR       1,&MSGAD(1)
         CNOP     0,4
         BAL      15,*+8
         AGO      .LIST
 LODIT   ANOP
&NAME    LA       1,&MSGAD
         CNOP     0,4
         BAL      15,*+8
         AGO      .LIST
         MEND
```

Figure 21. SMFWTM Macro Definition Required for Using TESTEXIT

- Place the exit routines in a partitioned data set named EXITLIB. Figure 22 shows sample JCL for entering the routines into EXITLIB.

```
//UPDTE      JOB    MSGLEVEL=1
//            EXEC   PGM=IEBUPDTE,PARM=NEW
//SYSUT2     DD     DSNAME=EXITLIB,VOLUME=SER=231400,
//            UNIT=2314,SPACE=(TRK,(10,3,1)),DISP=(,KEEP),
//            DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//SYSPRINT   DD     SYSOUT=A
//SYSIN      DD     DATA
./ ADD       NAME=IEFUJV
(IEFUJV object deck)
./ ADD       NAME=IEFUJI
(IEFUJI object deck)
./ ADD       NAME=IEFUSI
(IEFUSI object deck)
./ ADD       NAME=IEFUTL
(IEFUTL object deck)
./ ADD       NAME=IEFUSO
(IEFUSO object deck)
./ ADD       NAME=IEFU83
(IEFU83 object deck)
./ ADD       NAME=IEFACTRT
(IEFACTRT object deck)
./ ADD       NAME=IEFUJP
(IEFUJP object deck)
./ ADD       NAME=IEFU29
(IEFU29 object deck)
./ ENDUP
/*
```

Figure 22. Sample JCL for Entering User-Written Exit Routines into EXITLIB

Obtaining TESTEXIT from SYS1.ASAMPLIB

Figure 23 shows sample JCL for obtaining a punched deck of TESTEXIT from SYS1.ASAMPLIB.

```
//PUNCH      JOB      MSGLEVEL=1
//            EXEC     PGM=IEBPTPCH
//SYSPRINT   DD       SYSOUT=A
//SYSUT1     DD       DSNAME=SYS1.ASAMPLIB,DISP=(OLD,KEEP),
//            UNIT=xxxx,VOLUME=SER=xxxxxx[1]
//SYSUT2     DD       UNIT=2540-2
//SYSIN      DD       *
            PUNCH    TYPORG=PO,MAXNAME=1,MAXFLDS=1
            MEMBER   NAME=TESTEXIT
            RECORD   FIELD=(80)
/*
```

[1]The volume and unit parameters depend on your installation's request.

Figure 23. Sample JCL for Obtaining a Punched Deck of TESTEXIT

Modifying the TESTEXIT Procedure

Figure 24 shows sample JCL for executing the TESTEXIT procedure in an unmodified system.

```
//TESTEXIT          JOB    MSGLEVEL=1
//TEST              EXEC   ASMFCL
//ASM.SYSIN         DD     *
(TESTEXIT Source Module)
/*
//LKED.SYSLMOD      DD     DSNAME=TESTLIB,VOLUME=SER=231400,
//                         UNIT=2314,SPACE=(TRK,(5,2,1)),
//                         DISP=(NEW,KEEP)
//LKED.EXITS        DD     DSNAME=EXITLIB,VOLUME=SER=231400,
//                         UNIT=2314,DISP=OLD
//LKED.SYSIN        DD     *
  INCLUDE EXITS(IEFUJV,IEFUJI,IEFUSI,IEFUTL,IEFUSO,                    C
                IEFU83,IEFACTRT,IEFUJP,IEFU29)
  ENTRY TESTEXIT
  NAME TESTEXIT
/*
//DATAGEN           JOB    MSGLEVEL=1
//                  EXEC   PGM=IEBUPDTE,PARM=NEW
//SYSUT2            DD     DSNAME=DGINPUT,UNIT=2314,DISP=(,KEEP),
//                         VOLUME=SER=231400,SPACE=(TRK,(10,5,1)),
//                         DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//SYSPRINT          DD     SYSOUT=A
//SYSIN             DD     DATA
./ ADD          NAME=UJV
(IEBDG Control Statements for IEFUJV)
./ ADD          NAME=UJI
(IEBDG Control Statements for IEFUJI)
./ ADD          NAME=USI
(IEBDG Control Statements for IEFUSI)
./ ADD          NAME=USO
(IEBDG Control Statements for IEFUSO)
./ ADD          NAME=UTL
(IEBDG Control Statements for IEFUTL)
./ ADD          NAME=U83
(IEBDG Control Statements for IEFU83)
./ ADD          NAME=ACT
(IEBDG Control Statements for IEFACTRT)
./ ADD          NAME=UJP
(IEBDG Control Statements for IEFUJP)
```

Figure 24. Sample JCL for Executing TESTEXIT (Part 1 of 2)

```
./ ENDUP
/*
//TESTING       JOB     MSGLEVEL=1
//JOBLIB        DD      DSNAME=TESTLIB,VOLUME=SER=231400,
//              UNIT=2314,DISP=(OLD,KEEP)
//              EXEC    PGM=TESTEXIT,
// PARM='UJV=25,UJI=8,USI=8,USO=5,UTL=5,U83=12,ACT=2,UJP=2,U29=2'
//INUJV         DD      DSNAME=DGINPUT(UJV),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INUJI         DD      DSNAME=DGINPUT(UJI),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INUSI         DD      DSNAME=DGINPUT(USI),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INUSO         DD      DSNAME=DGINPUT(USO),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INUTL         DD      DSNAME=DGINPUT(UTL),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INU83         DD      DSNAME=DGINPUT(U83),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INACT         DD      DSNAME=DGINPUT(ACT),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//INUJP         DD      DSNAME=DGINPUT(UJP),DCB=(LRECL=80,
//              BLKSIZE=400,RECFM=FB),DISP=(OLD,PASS),
//              UNIT=2314,VOLUME=SER=231400
//OUTUJV        DD      DSNAME=UJV(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//OUTUJI        DD      DSNAME=UJI(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//OUTUSI        DD      DSNAME=USI(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//OUTUSO        DD      DSNAME=USO(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//OUTUTL        DD      DSNAME=UTL(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)
//OUTU83        DD      DSNAME=U83(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=130,BLKSIZE=130,RECFM=FB)
//OUTACT        DD      DSNAME=ACT(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=180,BLKSIZE=180,RECFM=FB)
//OUTUJP        DD      DSNAME=UJP(OUT),UNIT=2314,DISP=(,PASS),
//              SPACE=(TRK,(10,5,1)),VOLUME=SER=231400,
//              DCB=(LRECL=130,BLKSIZE=130,RECFM=FB)
//MANX          DD      UNIT=2314,VOLUME=SER=231400,DSN=MANX,
//              SPACE=(TRK,(3,1)),DISP=(NEW,KEEP),
//              DCB=(BLKSIZE=200,LRECL=196)
//SYSPRINT      DD      SYSOUT=A,DCB=(BLKSIZE=136,LRECL=132)
//DGPRINT       DD      SYSOUT=A
//SYSABEND      DD      SYSOUT=A
/*
```

Figure 24. Sample JCL for Executing TESTEXIT (Part 2 of 2)

A summary of the operations performed by the procedure shown in Figure 24 is as follows:

- The TESTEXIT job assembles the TESTEXIT source program (not illustrated in the figure) and link-edits it with the exit routines being tested. (Note that the exit routines must reside in EXITLIB, a partitioned data set.)
- The DATAGEN job, using the IEBUPDTE utility program, creates a partitioned data set (DGINPUT) containing control statements for the IEBDG utility program, which will be attached by the TESTEXIT source program.
- The TESTING job includes the execution of the TESTEXIT source program.

Use the TESTEXIT procedure provided in SYS1.ASAMPLIB, without modification, to link-edit the sample exit routines in SYS1.ASAMPLIB, generate sample parameter lists, and test the sample exit routines. To adapt the TESTEXIT procedure to your installation's testing requirements, however, note the following modifications:

- The TESTEXIT job shown in Figure 24 link-edits the TESTEXIT source program with the exit routines. You must substitute an INCLUDE control statement specifying the names of the exit routines being tested.
- The DATAGEN job shown in Figure 24 creates a partitioned data set containing control statements that generate samples of standard parameter lists. You should omit control statements and their associated ADD statements for any exit routines not being tested. Note that control statements are not required for the IEFU29 exit routine because the TESTEXIT procedure creates the parameters needed to test that exit routine. When testing for special conditions or required additional test parameters, you must make appropriate modifications and additions to the control statements.
  Note that you must supply control statements in such an order that the records subsequently generated by the IEBDG utility program will be grouped as complete parameter lists that conform in length and format to the exit parameters previously defined in this chapter. (Be sure to include the entry code passed to exits IEFUTL and IEFACTRT in register 0 as a one-byte parameter at the end of the parameter lists for those exits.) For detailed information on the use of IEBDG control statements, see *OS/VS Utilities.*
- The TESTING job shown in Figure 24 includes the execution of the TESTEXIT source program. Values for the PARM parameter of the EXEC statement specify which exit routines are to be tested and the number of times each is to be tested. This parameter has the format:

```
PARM='xxx=nnn,...,xxx=nnn'
```

where:

xxx
is an exit routine identifier.

nnn
is the number of times an exit routine is to be tested (the maximum value is 255).

The DD statements to be included depend upon the exit routines being tested. Figure 25 shows the exit-routine identifiers, specified on the EXEC statement, and the DD statements that you must include for each exit routine being tested.

Exit Routine	Identifier	DD Statements
IEFUJV	UJV	INUJV, OUTUJV
IEFUJI	UJI	INUJI, OUTUJI
IEFUSI	USI	INUSI, OUTUSI
IEFUTL	UTL	INUTL, OUTUTL
IEFUSO	USO	INUSO, OUTUSO
IEFU83	U83	INU83, OUTU83
IEFACTRT	ACT	INACT, OUTACT
IEFUJP	UJP	INUJP, OUTUJP
IEFU29	U29	Not required
Any		MANX, SYSPRINT, DGPRINT, SYSABEND

Figure 25. Parameters and DD Statements for Executing TESTEXIT

Note that you must include DD statements for any other data sets used by the exit routines in the JCL for the TESTEXIT procedure.

Producing a report usually requires at least two operations: sorting the SMF records and writing them in an appropriate format.

Sorting SMF Records

Any sort/merge program can be used to sort SMF records; this section describes two sample sort/merge exit routines that you may use with the IBM OS/VS Sort/Merge Program Product (Program No. 5740-SM1). (For a detailed description of this particular sort/merge program, see *OS/VS Sort/Merge Programmer's Guide.*)

Sample Sort/Merge Exit Routines

The IBM OS/VS Sort/Merge Program Product can, during various phases of execution, pass control to routines designed and written to perform specific functions. SYS1.ASAMPLIB has two sample routines that receive control from exits E15 and E35 of this sort/merge program. The sample E15 exit routine, called SMFE15, extracts all SMF records without a job log identification (job name and time and date that the reader recognized the JOB card) from the SMF dump data set. SMFE15 retains the dump header and dump trailer records (types 2 and 3) in the temporary data set HDRDATA. It retains all other system-oriented records (records without a job log identification) in the temporary data set SORDATA.

The sample E35 exit routine, called SMFE35, places all the records extracted by the SMFE15 routine in the sort output data set. These records are inserted in the data set as follows: dump header records, dump trailer records, all other system-oriented records, and the sorted job-oriented records.

Note: If tape work devices are used, the minimum record length the IBM Sort/Merge Program Product can sort is 18 bytes. Otherwise, the minimum is one byte. The sample routines SMFE15 and SMFE35 use SMF record types 0 through 13 for input; the minimum length of these SMF records is 18 bytes.

Figure 26 shows sample JCL for obtaining a listing of the SMFE15 and SMFE35 exit routines from SYS1.ASAMPLIB. Figure 26 also shows sample JCL for obtaining a listing of the SYS1.ASAMPLIB member named SMFSORT. SMFSORT contains sample JCL for executing the IBM OS/VS Sort/Merge Program Product.

```
//PRINT     JOB     123456,SMITH
//          EXEC    PGM=IEBPTPCH
//SYSPRINT  DD      SYSOUT=A
//SYSUT1    DD      DSNAME=SYS1.ASAMPLIB,DISP=(OLD,KEEP),
//                  UNIT=xxxx,VOLUME=SER=xxxxxx[1]
//SYSUT2    DD      SYSOUT=A
//SYSIN     DD      *
          PRINT     TYPORG=PO,MAXNAME=4,MAXFLDS=4
          MEMBER    NAME=SMFSORT
          RECORD    FIELD=(80)
          MEMBER    NAME=SMFE15
          RECORD    FIELD=(80)
          MEMBER    NAME=SMFE35
          RECORD    FIELD=(80)
/*
```

[1]The volume and unit parameters depend on your installation's request.

Figure 26. Sample JCL for Obtaining a Listing of Sample Sort Exit Routines

To include the sample exit routines in your sort application, you must assemble and link-edit them before executing the sort/merge program. Figure 27 shows sample JCL for this procedure, including one possible sort application. In this example, SMF records are to be sorted first on the job log identification (major control field), and then on the time and date portions of the time stamp (minor control fields). Displacements of these fields (from the beginning of the physical record) are 19, 7, and 11, respectively.

```
//SMFSORT     JOB     MSGLEVEL=1
//STEP1       EXEC    ASMFCL[1]
//ASM.SYSIN   DD      *
(E15 Source Deck)
/*
//LKED.SYSLMOD DD     DSNAME=SMF1.EXITS,UNIT=2314,[2]
//             DISP=(NEW,KEEP),SPACE=(TRK,(10,5,1)),
//             VOL=SER=231400
//LKED.SYSIN  DD      *
            NAME    E15(R)[3]
/*
//STEP2       EXEC    ASMFCL[1]
//ASM.SYSIN   DD      *
(E35 Source Deck)
/*
//LKED.SYSLMOD DD     DSNAME=SMF1.EXITS,DISP=(OLD,KEEP),[2]
//             UNIT=2314,VOL=SER=231400
//LKED.SYSIN  DD      *
            NAME    E35(R)[3]
/*
//SORTSTEP    EXEC    PGM=SORT,REGION=100K[4]
//SYSOUT      DD      SYSOUT=A
//SORTLIB     DD      DSNAME=SYS1.SORTLIB,DISP=SHR
//EXITLIB     DD      DSNAME=SMF1.EXITS,DISP=(OLD,KEEP),[5]
//             UNIT=2314,VOL=SER=231400
//SORTIN      DD      UNIT=2400, VOL=SER=SYSMAN,DISP=OLD,[6]
//           LABEL=(,SL),DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//SORTWK01    DD      UNIT=2314,SPACE=(TRK,(50), ,CONTIG)[8]
//SORTWK02    DD      UNIT=2314,SPACE=(TRK,(50), ,CONTIG)[8]
//SORTWK03    DD      UNIT=2314,SPACE=(TRK,(50), ,CONTIG)[8]
//SORTOUT     DD      UNIT=2400,DSNAME=SMF1.SORTOUT,LABEL=(,SL),[9]
//           DISP=(,KEEP),DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//SORDATA     DD      UNIT=SYSDA,SPACE=(CYL,(1,1)),[10]
//             DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//HDRDATA     DD      UNIT=SYSDA,SPACE=(TRK,(5,5)),[10]
//             DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//SYSIN       DD      *
 SORT                FIELDS=(19,16,A,11,4,A,7,4,A),FORMAT=BI,SIZE=E4000[11]
 MODS                E15=(E15,700,EXITLIB,N),E35=(E35,1500,EXITLIB,N)[11]
 END
/*
```

[1] EXEC statement for cataloged procedure ASMFCL (assemble and link-edit). (For a description of the ASMFCL procedure, see *OS/VS–VM370 Assembler Programmer's Guide.*)

[2] The sample sort exit routines will be link-edited into data set SMF1.EXITS.

[3] Link-edit control statements specifying that E15 and E35 will be the load module names of the exit routines.

[4] EXEC statement for the sort/merge program.

[5] Data set SMF1.EXITS is specified as the library in which sort exit routines can be found.

[6] Input to the sort program is the SMF dump data set, contained on a tape having a volume serial number of SYSMAN.

[7] The LRECL value can be larger than the BLKSIZE value because records might be segmented. The LRECL value must be as large as the longest SMF record being created plus four bytes for the RDW. The BLKSIZE must be equal to one-half the BUF parameter. Modify these parameters according to the installation's buffer size and the longest record to be collected.

[8] Three sort work units are defined as being direct access devices.

[9] The sort output data set is to be written on tape.

[10] Two data sets required by the sample sort exit routines are defined on direct access devices.

[11] The sort/merge control statements define the sort control fields and exit routines to be used in this sort application.

Figure 27. Sample JCL for Executing a Sort Procedure

Designing a Report Program

The basic operations of a report program are formatting and printing data from SMF records. The input to a report program is normally the sorted SMF data set.

SYS1.ASAMPLIB has a sample PL/1 source report program, called SMFFRMT, which can format record types 0, 2, 3, 7, 9, 10, 11 and 17-22. Figure 28 illustrates sample output from the SMFFRMT program. To use this program to print selected types of SMF records, specify the record types to be printed, separated by commas, in the PARM field of the EXEC statement. To print all sample record types, the PARM parameter is not required.

```
RECORD                    HEADER/RECORD                                          DATE      720117
 TYPE                                                                            PAGE           1

 02      0102  00681590  0072017F  C2C2F4F5                          *.. .... .... BB45          *

 10      010A  00672333  0072017F  C2C2F4F5                          *.. .... .... BB45          *
         4040404040404040  00000000  00000000  4040404040404040  0006  *        .... ....        ..*
           0801000C                                                  * ....                      *

 03      0103  0068161A  0072017F  C2C2F4F5                          *.. .... .... BB45          *
```

Figure 28. Sample Output from SMFFRMT

Before using the SMFFRMT program, you must compile the program using the PL/1 compiler. Figure 29 shows sample JCL for executing the SMFFRMT program after it is compiled and link-edited into SYS1.LINKLIB.

```
//FORMAT    JOB   MSGLEVEL=1
//FRMT      EXEC  PGM=SMFFRMT,PARM='0,3,10'
//SYSPRINT  DD    SYSOUT=A
//REPORT    DD    SYSOUT=A,DCB=(RECFM=VBA,BLKSIZE=3500)
//SMFDATA   DD    DISP=(OLD,KEEP),LABEL=(,SL),VOL=SER=xxxxxx
//                UNIT=2400,DCB=(RECFM=VBS,BLKSIZE=1000)[1]
```

[1]The BLKSIZE is one-half the value specified in the BUF parameter. For this example, BUF is equal to 2000. See Figure 8 for the JCL defining the SMFDATA data set.

Figure 29. Sample JCL for Executing SMFFRMT

This chapter fully describes all of the SMF-formatted records. Note that the fields in these records marked "Reserved" are for use by SMF and are not available for your use.

Standard SMF Record Header

Each record written to the SMF data set by the SMF writer routine contains the standard SMF record header. Each record written to the SMF data set by user-written routines should also include the standard record header. Figure 30 illustrates the header; its length is 14 bytes.

Offsets		Name	Length	Format	Source	Description
0	0	(The "Name" field in all of the SMF records contains the symbolic addresses defined by the IFASMFR macro instruction.)	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1		1	binary	internal	Record type
2	2		4	binary	SVC 11 or SVC 83	Time, in hundredths of a second, record was moved to SMF buffer[1]
6	6		4	packed	SVC 11 or SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign[1]
10	A		4	EBCDIC	JMRCPUID or SMCASID	System identification (taken from SID parameter)

[1] In record types 2 and 3, these fields indicate the time and date that the record was moved to the dump data set. In record types 4, 5, 34 and 35, these fields indicate the time and date that the job or job step terminated.

Figure 30. Standard SMF Record Header

Note: When using the SMFWTM macro instruction to write a record to the SMF data set, you must add a record descriptor word (four bytes) to the beginning of the record header; the address passed to the macro instruction must point to the beginning of the record descriptor word (RDW). For a discussion of the RDW, see *OS/VS Data Management Services Guide.*

Summary of SMF Records

Figure 31 summarizes the SMF records according to the type of data they contain, such as VSAM or JES2 data, and the events (or status indicators) that cause SMF to generate the records. Also included in Figure 31 is a summary of the DSV and OPT SMFPRMxx parameters that control whether each record type is to be written to the SMF data set. To write all SMF-formatted records (except record types 2, 3 and 7) to the SMF data set, you must specify MAN=ALL and a value for the BUF parameter. To write record type 17 for temporary data sets, you must specify REC=2.

For a summary of the sizes of the SMF records, see "SMF Buffer" in the chapter "System Requirements and Considerations." For a summary of all of the fields in the SMF records, see "Appendix A: Field-to-Record Cross-Reference."

Category of Data	Event or Status		Record Type	SMFPRMxx Definition	
				DSV=	OPT=
Day Data	IPL		0		
	Devices online at IPL		8		
			19	1,3	
			22		
	End of day		19	1,3	
	MODIFY tcam command issued		31		
Machine Data	CPU, storage range or channel varied online or offline		22		
	Devices varied online		9		
			22		
	Devices recovered at allocation		10		
	Devices varied offline		11		
			22		
Auxiliary Storage Data	Space available on DASD volumes: at IPL, after HALT EOD or SWITCH SMF command, when demounted		19	1,3	
	Tape volume closed or processed by EOV		21		
	VSAM data space defined, extended, or deleted		69	1,3	
Processing Data	Step processing		4		2
			34		2
	Job processing		5		
			35		
	SYSOUT processing		6		
			26		
	Job initiated		20		
	Data set dynamically unallocated, concatenated or deconcatenated		40		
Non-VSAM Data Set Activity Data	Data set closed or processed by EOV	Data set opened for INPUT, or RDBACK	14	2,3	2
		Data set opened for OUTPUT, UPDAT, INOUT, or OUTIN	15	2,3	2
	Data set scratched		17	2,3	2
	Data set renamed		18	2,3	2
VSAM Data Set Activity Data	Component or cluster opened		62	2,3	2
	Entry defined		63	2,3	2
	Component or cluster status		64	2,3	2
	Entry deleted		67	2,3	2
	Entry renamed		68	2,3	2
JES2 Data	S JES2 or $E SYS command issued		43		
	$P JES2 command issued		45		
	$S LNEn or $E LNEn command issued, or remote user signed on		47		
	$P LNEn command issued or remote user signed off		48		
	$E LNEn command issued, or remote user attempted to sign on with invalid password		49		

Figure 31. Summary of SMF Records (Part 1 of 2)

Category of Data	Event or Status	Record Type	SMFPRMxx Definition	
			DSV=	OPT=
JES3 Data	Job processed by JES3 MDS	25		
	JES3 started	43		
	JES3 terminated	45		
	RJP line started or remote user signed on	47		
	RJP line stopped or remote user signed off	48		
	Remote user attempted to sign on with invalid password	49		
MF/1 Data[1]	CPU activity	70		
	Paging activity	71		
	Workload activity	72		
	Channel activity	73		
	Device activity	74		
Record Management Data	Dump header	2		
	Dump trailer	3		
	SMF records lost	7		
	Record descriptor word (RDW)	ALL	N/A	N/A
	Block descriptor word (BDW)	N/A	N/A	N/A

[1] Records containing MF/1 data are generated at the end of each MF/1 measurement interval.

Figure 31. Summary of SMF Records (Part 2 of 2)

Record Type 0 – IPL

Record type 0 is written by IEEMB823 after every IPL of the system. It includes the virtual and real storage sizes and the SMF options in effect. Its length is 31 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF0FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF0RTY	1	binary	internal	Record type
2	2	SMF0TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF0DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF0SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF0JWT	4	binary	SMCAJWT	Limit, in minutes, of continuous wait time for the job (taken from JWT parameter)
18	12	SMF0BUF	4	binary	SMCABUF*2	Number of bytes in SMF buffer (taken from BUF parameter)
22	16	SMF0VST	4	binary	(CVTMZ00+1)/1024	Number of 1K bytes in virtual storage
26	1A	SMF0OPT	1	binary	SMCAOPT	SMF options *Bit* *Meaning When Set* 0 System and job accounting (OPT=1) 1 System, job and step accounting (OPT=2) 2 User exits will be taken (EXT=YES) 3 Data set accounting (DSV=2 or 3) 4 Volume accounting (DSV=1 or 3) 5 Reserved 6 Type 17 records will be written for temporary data sets (REC=2) 7 Reserved
27	1B	SMF0RST	4	binary	(CVTEORM+1)/1024	Number of 1K bytes in real storage

Record Type 2 – Dump Header

Record type 2 is written directly to the dump data set by IFASMFDP, the SMF dump program. This record consists of only the standard SMF record header. It indicates the beginning of a dump of the SMF data set from a direct access device usually to a tape. Its length is 14 bytes.

Note: Even if MAN=USER is specified in the SMFPRMxx member of SYS1.PARMLIB, a type 2 record is written.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF2FLG	1	binary	IFASMFDP	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF2RTY	1	binary	internal	Record type
2	2	SMF2TME	4	binary	SVC 11 (Set by IFASMFDP)	Time, in hundredths of a second, record was moved to the dump data set
6	6	SMF2DTE	4	packed	SVC 11 (Set by IFASMFDP)	Date record was moved to the dump data set, in the form 00YYDDDF where F is the sign
10	A	SMF2SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)

Record Type 3 – Dump Trailer

Record type 3 is written directly to the dump data set by IFASMFDP, the SMF dump program. This record consists of only the standard SMF record header. It marks the end of a dump of the SMF data set from a direct access device usually to a tape. Its length is 14 bytes.

Note: Even if MAN=USER is specified in the SMFPRMxx member of SYS1.PARMLIB, a type 3 record is written.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF3FLG	1	binary	IFASMFDP	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF3RTY	1	binary	internal	Record type
2	2	SMF3TME	4	binary	SVC 11 (Set by IFASMFDP)	Time, in hundredths of a second, record was moved to the dump data set
6	6	SMF3DTE	4	packed	SVC 11 (Set by IFASMFDP)	Date record was moved to the dump data set, in the form 00YYDDDF where F is the sign
10	A	SMF3SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)

Record Type 4 – Step Termination

Record type 4 is written by IEFTB722 at the normal or abnormal termination of a job step for a background job, or when a job step is flushed during or after job initiation. It is not written for a job step that follows a CANCEL operator command. Its length is 147 bytes plus (1) eight bytes for each device entry and (2) the length of the step accounting fields.

This record identifies the job step by the job log identification, step name, number of the step within the job, user identification, program name and performance group number. If accounting numbers (which can be alphameric) were specified in the EXEC statement, they are included.

This record also contains operating information such as the job step start and end times, step CPU time, amount of storage allocated and used, step termination status, number of records in DD DATA and DD* data sets for the step, device allocation start time, problem program start time, and storage protect key. It contains the number of page-ins, page-outs, swap-ins, and swap-outs for both VIO and non-VIO data sets.

Record type 4 has an entry for each non-spooled data set that was defined by a DD statement. Each entry lists the device class, unit type, channel address, unit address, and EXCP count for the data set.

Notes:

1. Data sets are recorded in the order of the step DD statements; they are not identified by name. (A user-written IEFUJV exit routine can record this order as each statement is validated.)
2. For data sets that are dynamically unallocated, the data set entry information is in record type 40 – not in record type 4.
3. For more information on EXCP count and CPU time, see Appendixes B and C, respectively.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF4FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF4RTY	1	binary	internal	Record type
2	2	SMF4TME	4	binary	SVC 11 (Set by IEFTB722	Time, in hundredths of a second, step terminated
6	6	SMF4DTE	4	packed	SVC 11 (Set by IEFTB722	Date step terminated, in the form 00YYDDDF, where F is the sign
10	A	SMF4SID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	SMF4JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF4RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF4RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF4UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF4STN	1	binary	JMRSTEP	Step number (first step=1, etc.)
39	27	SMF4SIT	4	binary	JCTJMRSS (Set by IEFSMFIE)	Time, in hundredths of a second, initiator selected this step
43	2B	SMF4STID	4	packed	JCTSSD (Set by IEFSMFIE)	Date initiator selected this step, in the form 00YYDDDF where F is the sign
47	2F	SMF4NCI	4	binary	SCTSMF	Number of card-image records in DD DATA and DD* data sets read by the reader for the step

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

(Continued)

Offsets		Name	Length	Format	Source	Description
51	33	SMF4SCC	2	binary	TCBCMPC	Step completion code: X'0ccc' indicates system ABEND in the job step where ccc is the system ABEND code. (See *OS/VS Message Library: VS2 System Codes.)* X'8ccc' indicates user ABEND in the job step where ccc is the user ABEND code. X'nnnn' indicates normal completion where nnnn is the contents of the two low-order bytes in register 15 at termination. X'0000' indicates either (1) the job step was flushed (not executed) because of an error during allocation or in a preceding job step, or (2) normal job completion with a return code of 0. Use this field in conjunction with the step termination indicator field (offset 83).
53	35	SMF4PRTY	1	binary	SCTSDP	Address space dispatching priority (taken from DPRTY= parameter on EXEC card or the APG value in CVTAPG)
54	36	SMF4PGMN	8	EBCDIC	SCTPGMNM	Program name (taken from PGM= parameter on EXEC card). If a backward reference was used (SCTSTYPE equals X'80'), then this field contains *.DD.
62	3E	SMF4STMN	8	EBCDIC	SCTSNAME	Step name (taken from name on EXEC card)
70	46	SMF4RSH0	2	binary	TCTRSZ	Private area size, in 1K units. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage reserved for the program (taken from REGION= parameter in JCL rounded to 4K boundary). See offset 98.[2]
72	48	SMF4SYST	2	binary	TCT, GDA ((PASTRT + PASIZE) —TCTHWM)/1024	Storage used from top of private area, in 1K units. This storage area includes the LSQA and SWA (subpools 229, 230, 236, 237 and 253-255), and is calculated as: highest address in private area minus lowest address of storage allocated from top of private area. If ADDRSPC=REAL is specified, this field equals the amount of storage used that was *not* from the contiguous real storage reserved for the program. See offsets 70 and 98.[2]
74	4A	SMF4H0ST	2	binary	(TCTLWM— TCTRBA)/1024	Storage used from bottom of private area, in 1K units. This storage area includes subpools 0-127, 251 and 252, and is calculated as: highest address in bottom of private area minus address of private area. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage that was used. See offsets 70 and 98.[2]
76	4C	SMF4RV1	6	binary		Reserved
82	52	SMF4SPK	1	binary	TCBPKF	Storage protect key, in the form xxxx0000 where xxxx is the key
83	53	SMF4STI	1	binary	 JCTJMRCL JCTJMRCL JCTJMRCL JCTSTEPR TCBFA TCTHWM	Step termination indicator *Bit* *Meaning When Set* 0-1 Reserved 2 Canceled by exit IEFUJI[3] 3 Canceled by exit IEFUSI[3] 4 Canceled by exit IEFACTRT[3] 5 Step is to be restarted 6 If 0, normal completion. If 1, ABEND. If step completion code (offset 51) equals 0322 or 0522, IEFUTL caused ABEND. If step completion code equals 0722, IEFUSO caused ABEND. 7 If 0, normal completion. If 1, step was flushed.
84	54	SMF4RV2	2	binary		Reserved
86	56	SMF4AST	4	binary	TCTAST (Set by IEFBB401)	Device allocation start time, in hundredths of a second

[2] If storage was not allocated (job step was flushed), these fields equal zero. **(Continued)**

[3] Job steps canceled by IEFUJI and IEFUSI will not be executed; therefore bit 7 will also be on. Job steps canceled by IEFACTRT will cause subsequent job steps to be canceled; record type 4 is not produced for subsequent job steps.

Offsets		Name	Length	Format	Source	Description
90	5A	SMF4PPST	4	binary	TCTPPST (Set by IEFAB820)	Problem program start time, in hundredths of a second
94	5E	SMF4RV3	1	binary		Reserved
95	5F	SMF4SRBT	3	binary	SCTSRBT	Step CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched via SRBs: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling.[4]
98	62	SMF4RIN	2	binary	TCTIEX SCTSSTAT	Record indicator *Bit* *Meaning When Set* 0-5 Reserved 6 EXCP count may be wrong[5] 7 If 0, storage is virtual. If 1, storage is real. 8-15 Reserved
100	64	SMF4RLCT	2	binary	internal	Offset from the beginning of the record header to the relocate section
102	66	SMF4LENN	2	binary	internal	Length of device entry portion of record. Calculated as: (8 times the number of devices) + 2
For each device assigned to each *non-spooled* data set, there is an eight-byte entry with the following format:[6]						
+0		SMF4DEVC	1	binary	UCBTBYT3	Device class
+1		SMF4UTYP	1	binary	UCBTBYT4	Unit type
+2		SMF4CUAD	1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address
+4		SMF4EXCP	4	binary	TCTDCTR	EXCP count (see offset 98)[5]
After the device entries are the following fields:						
Accounting Section:						
+0		SMF4LNTH	1	binary	internal	Length of accounting section, excluding this field
+1		SMF4SETM	3	binary	ACTJTIME (in JCT)	Step CPU time under TCBs, in hundredths of a second. This field includes the CPU time for all tasks that are dispatched via TCBs below the level of RCT.[4]
+4		SMF4NAF	1	binary	internal	Number of accounting fields
+5		SMF4ACTF	variable	EBCDIC	EXEC statement	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.
Relocate Section:						
+0[7]		SMF4PGIN[7]	4	binary	OUXBPIN + OUSBPIN	Number of non-VIO, non-swap page-ins for this step. This field includes page-ins required through page faults, specific page requests, and page fixes. It does not include page reclaims, page-ins for VIO data sets, pages that are swapped in, and page-ins for the common area.

(Continued)

[4] If TIME=1440 is specified on the JOB statement, all timing for the job is eliminated. If TIME=1440 is specified on the EXEC statement and a job time limit is not specified on the JOB statement, all timing for the job step is eliminated. For more information, see the IEFUTL exit.

CPU time is not expected to be constant between different runs of the same job step. For more information on CPU time, see Appendix C.

[5] If a GETMAIN for expanding the TCTIOT (the data area where EXCPs are maintained) fails, only the existing data sets are counted. If the functional recovery routine is entered, EXCP counting for the step is discontinued and no device entries are produced. If ADDRSPC=REAL is specified, the EXCP count does not include PCIs. For more information on EXCP count, see Appendix B.

[6] Entries for DD*, DD DATA, DD DUMMY and spooled data sets are zero. (A DD DUMMY entry results when a forward reference to a DD statement having that DD name is not found or when DD DUMMY is specified.) Entries for virtual I/O data sets are zero for class and type, and X'0FFF' for channel/unit address.

[7] The displacement of this field depends upon the size of the accounting fields and the number of devices. Offset 100 contains the displacement for this field.

Offsets	Name	Length	Format	Source	Description
Relocate Section: (Continued)					
+4	SMF4PGOT	4	binary	OUXBPOUT + OUSBPOUT	Number of non-VIO, non-swap page-outs for this step. This field includes page-outs required through specific page requests as well as those pages stolen by the paging supervisor as a result of infrequent use. It does not include page-outs for VIO data sets, pages that are swapped out, and page-outs for the common area.
+8	SMF4NSW	4	binary	PVTNSWPS	Number of address space swap sequences. (A swap sequence consists of an address space swap-out and swap-in.)
+12	SMF4PSI	4	binary	PVTSPIN	Number of pages swapped in. This field includes: LSQA, fixed pages, and those pages that the real storage manager determined to be active when the address space was swapped in. It does not include page reclaims nor pages found in storage during the swap-in process (such as pages brought in via SRB's started after completion of swap-in Stage 1 processing).
+16	SMF4PSO	4	binary	PVTSPOUT	Number of pages swapped out. This field includes: LSQA, private area fixed pages, and private area non-fixed changed pages.
+20	SMF4VPI	4	binary	OUXBVAMI + OUSBVAMI	Number of VIO page-ins for this step. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.
+24	SMF4VPO	4	binary	OUXBVAMO + OUSBVAMO	Number of VIO page-outs for this step. This field includes page-outs resulting from specific page requests on a VIO window, as well as those pages stolen by the paging supervisor as a result of infrequent use. It does not include VIO swap-outs or page-outs for the common area.
+28	SMF4SST	4	binary	OUXBJBS + OUXBTRS	Step service, in service units. This field is calculated as: total job service minus the accumulated job service prior to this step's initialization.[8]
+32	SMF4ACT	4	binary	OUXBJBT + OUXBTRT	Step transaction active time, in 1024-microsecond units. Calculated as: total job transaction active time minus the accumulated transaction active time prior to this step's initialization.[8]
+36	SMF4PGNO	2	binary	OUCBNPG	Step performance group number (taken from PERFORM= parameter on JOB or EXEC card)[8]
+38	SMF4TRAN	4	binary	OUXBJBR	Step transaction residency time, in 1024-microsecond units. That is the amount of time the transaction was in real storage.
+42	SMF4RECL	4	binary	OUSBPREC + OUXBPREC	Number of reclaims for this step
+46	SMF4RCLM	4	binary	OUSBVAMR + OUXBVAMR	Number of VIO reclaims for this step
+50	SMF4CPGN	4	binary	OUSBCAPI + OUXBCAPI	Number of common area page-ins for this step
+54	SMF4CRCL	4	binary	OUSBCAPR + OUXBCAPR	Number of common area reclaims for this step
+58	SMF4PGST	4	binary	OUSBSTCT + OUXBSTCT	Number of pages stolen from the storage for this step
+62	SMF4PSEC	8	binary	OUCBPSS	Number of page seconds for this step, in page millisecond units. Calculated as: the number of pages used by this step times the execution time it held that number of pages.

[8] For more information on service, transaction active time, and performance group number, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

Record Type 5 – Job Termination

Record type 5 is written by IEFTB722 at the normal or abnormal termination of a background job. Its length is 117 bytes plus the length of the job accounting fields. (The maximum length of this record is 261 bytes.)

This record identifies the job by job log identification, user identification, priority, input class, and programmer's name. If accounting numbers (which can be alphameric) were specified in the JOB statement, they are included.

This record also contains operating information such as the job start and end times, number of steps in the job, number of records in DD DATA and DD* data sets for the job, job termination status, device class, unit type, storage protect key, and job CPU time. (The job CPU time equals the sum of the job step times.)

Note: For more information on EXCP count and CPU time, see Appendixes B and C, respectively.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF5FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF5RTY	1	binary	internal	Record type
2	2	SMF5TME	4	binary	SVC 11 (Set by IEFTB722	Time, in hundredths of a second, job terminated
6	6	SMF5DTE	4	packed	SVC 11 (Set by IEFTB722	Date job terminated, in the form 00YYDDDF where F is the sign
10	A	SMF5SID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	SMF5JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF5RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF5RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF5UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF5NST	1	binary	JMRSTEP	Number of steps in the job
39	27	SMF5JIT	4	binary	JCTJMRJT (Set by IEFSMFIE)	Time, in hundredths of a second, initiator selected the job
43	2B	SMF5JID	4	packed	JCTJMRJD (Set by IEFSMFIE)	Date initiator selected the job, in the form 00YYDDDF where F is the sign
47	2F	SMF5NCI	4	binary	JMRJOBIN	Number of card-image records in DD DATA and DD* data sets read by the reader for the job

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

(Continued)

Offsets		Name	Length	Format	Source	Description
51	33	SMF5JCC	2	binary	TCBCMPC	Job completion code: X'0ccc' indicates system ABEND in the last job step where ccc is the system ABEND code (See *OS/VS Message Library: VS2 System Codes.*) X'8ccc' indicates user ABEND in the last job step where ccc is the user ABEND code. X'nnnn' indicates normal completion where nnnn is the contents of the two low-order bytes in register 15 at termination. X'0000' indicates normal job completion with a return code of 0. Use this field in conjunction with the job termination indicator field (offset 62).
53	35	SMF5JPTY	1	binary	JCTJPRTY	Job priority. This field normally equals the user-assigned priority of 0 to 13, but if the job fails while being scheduled, this field equals 14 (taken from JOB card)
54	36	SMF5RSTT	4	binary	JMRDRSTP	Time, in hundredths of a second, reader recognized the end of the job
58	3A	SMF5RSTD	4	packed	JMRDRSTP + 4	Date reader recognized the end of the job, in the form 00YYDDDF where F is the sign
62	3E	SMF5JBTI	1	binary	JCTJMRCL JCTJMRCL JCTJMRCL	Job termination indicator *Bit* *Meaning When Set* 0-1 Reserved 2 Canceled by exit IEFUJI 3 Canceled by exit IEFUSI 4 Canceled by exit IEFACTRT (step exit only) 5-7 Reserved
63	3F	SMF5SMCI	1	binary		Reserved
64	40	SMF5TRAN	4	binary	OUXBJBR	Job transaction residency time, in 1024-microsecond units. That is the total amount of time the transaction was in real storage.[3]
68	44	SMF5CKRE	1	binary		Reserved
69	45	SMF5RDCL	1	binary	JMRRDR	Reader device class. (This field is not filled in for jobs submitted via an internal reader.)
70	46	SMF5RUTY	1	binary	JMRRDR	Reader unit type. (This field is not filled in for jobs submitted via an internal reader.)
71	47	SMF5JICL	1	EBCDIC	JCTJCSMF	Job input class (taken from JOB card; default equals 'A')
72	48	SMF5SPK	1	binary	TCBPKF	Storage protect key, in the form xxxx0000 where xxxx is the key
73	49	SMF5SRBT	3	binary	SCTSRBT	Job CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched via SRBs: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling.[2]
76	4C	SMF5TJS	4	binary	OUXBJBS + OUXBTRS	Job service, in service units[3]

(Continued)

[2]If TIME=1440 is specified on the JOB statement, all timing for the job is eliminated. If TIME=1440 is specified on an EXEC statement and a job time limit is not specified on the JOB statement, all timing for that job step is eliminated. For more information, see the IEFUTL exit.

CPU time may not be constant between different runs of the same job. For more information on CPU time, see Appendix C.

[3]For more information on service, transaction active time, and performance group number, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.* Note that the service, active time, and residency time may have been accumulated under different performance group numbers.

Offsets		Name	Length	Format	Source	Description
80	50	SMF5TTAT	4	binary	OUXBJBT + OUXBTRT	Job transaction active time, in 1024-microsecond units[3]
84	54	SMF5RV2	4	binary		Reserved
88	58	SMF5PGNO	2	binary	OUCBNPG	Performance goup number of last step (taken from PERFORM= parameter on JOB or EXEC card)[3]
90	5A	SMF5RV3	2	binary		Reserved
92	5C	SMF5TLEN	1	binary	ACTLEN (in JCT)	Length of rest of record excluding this field
93	5D	SMF5PRGN	20	EBCDIC	ACTPRGNM (in JCT)	Programmer's name
113	71	SMF5JCPU	3	binary	ACTJTIME (in JCT)	Job CPU time under TCBs, in hundredths of a second. This field includes the CPU time for all tasks that are dispatched via TCBs below the level of RCT.[2]
116	74	SMF5ACTF	1	binary	ACTJNFLD (in JCT)	Number of accounting fields
117	75	SMF5JSAF	variable	EBCDIC	JOB statement	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

[2]If TIME=1440 is specified on the JOB statement, all timing for the job is eliminated. If TIME=1440 is specified on an EXEC statement and a job time limit is not specified on the JOB statement, all timing for that job step is eliminated. For more information, see the IEFUTL exit.

CPU time may not be constant between different runs of the same job. For more information on CPU time, see Appendix C.

[3]For more information on service, transaction active time, and performance group number, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.* Note that the service and active time may have been accumulated under different performance group numbers.

Record Type 6 – JES2 Output Writer

Record type 6 is written by HASPPRPU (JES2 writer) or IASXSD82 (external writer). It is written by the JES2 writer when processing is completed for a job output element (JOE), or when there is a change in certain information (indicated by "*") describing SYSOUT data sets processed in the same JOE. The external writer writes this record when processing is complexed for each JOE. This record is also written for spin data sets. If the JES2 writer is used, the record length is 90 bytes plus 36 bytes for the 3800 Printing Subsystem section. If an external writer or user-supplied writer is used, the length is 84 bytes.

This record identifies the output writer by SYSOUT class and form number, and identifies the job by job log identification, JES2-assigned job number, and user identification. It also contains information on the output writer activity such as the number of logical records processed, number of data sets processed, writer start and end times, input/output status indicators, data set control indicators, and JES2 logical output device name.

This record also provides information on the activity of the 3800 Printing Subsystem. For additional information on the 3800, see the *IBM 3800 Printing Subsystem Programmer's Guide.*

Note: If an external writer or user-supplied writer is used, SMF produces an incomplete record type 6. The incomplete record type 6 differs from the JES2 record type 6 as follows:

- Its length is 84 bytes – the page count field (offset 84) and the output route code field (offset 88) are not produced.
- The following fields are zero:
  - Number of logical records (offset 47)
  - I/O status indicators (offset 51)
  - Subsystem generating identification (offset 58)
  - Data set control indicators (offset 62)
  - JES2 logical output device name (offset 68)

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF6FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF6RTY	1	binary	internal	Record type
2	2	SMF6TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF6DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF6SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)

(Continued)

Offsets		Name	Length	Format	Source	Description
The following fields apply when the JES2 writer writes the record:						
14	E	SMF6JBN	8	EBCDIC	JCTJMRN	Job name[1]
22	16	SMF6RST	4	binary	JCTRDRON	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF6RSD	4	packed	JCTRDTON	Date reader recognized the JOB card for this job in the form 00YYDDDF where F is the sign[1]
30	1E	SMF6UIF	8	EBCDIC	JCTUSEID	User identification (taken from common exit parameter area)
38	26	SMF6OWC	1	EBCDIC	JOECURCL	*SYSOUT class. (This field is blank for non-SYSOUT data sets.)
39	27	SMF6WST	4	binary	PTIMEON (in PPPWORK)[2]	Start time, in hundredths of a second, of print/punch processor working on the data in this record
43	2B	SMF6WSD	4	packed	PTIMEON +4 (in PPPWORK)[2]	Start date of print/punch processor working on the data in this record, in the form 00YYDDDF where F is the sign
47	2F	SMF6NLR	4	binary	PPLNCDCT (in PPPWORK)[2]	Number of logical records written by the writer, by form number and class. (This field includes JOBLOG information and data set copies.)
51	33	SMF6IOE	1	binary	PPFLAGS (in PPPWORK)[2]	I/O status indicators *Bit* *Meaning When Set* 0-4 Reserved *5 Data buffer read error 6 Reserved *7 Control buffer read error
52	34	SMF6NDS	1	binary	PPJNDS (in PPPWORK)[2]	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field includes JOBLOG information.)
53	35	SMF6FMN	4	EBCDIC	DCTFORMS	Form number
57	39	SMF6PAD1	1	binary	UCBTYP	Section indicator *Bit* *Meaning When Set* 0 3800 Printing Subsystem section present 1-7 Reserved
58	3A	SMF6SBS	2	binary	internal	Subsystem identification — X'0002' signifies JES2
60	3C	SMF6LN1	2	binary	internal	Length of rest of record, including this field, but not including any additional sections indicated by the SMF6PAD1 field
62	3E	SMF6DCI	2	binary	PSMFDCI (in PPPWORK)[2]	Data set control indicators *Bit* *Meaning When Set* 0 Reserved 1 Record represents spin data sets *2 Operator terminated this data group *3 Operator interrupted this data group *4 Operator restarted this data group *5 Record represents continuation of interrupted data group *6 Operator overrode programmed carriage control (printer only) *7 Punch output was interpreted (3525 only) 8-15 Reserved
64	40	SMF6JNM	4	EBCDIC	JCTJOBID +4	JES2-assigned job number
68	44	SMF6OUT	8	EBCDIC	DCTDEVN	JES2 logical output device name
76	4C	SMF6FCB	4	EBCDIC	DCTFCB	*FCB image identification (printer only)
80	50	SMF6UCS	4	EBCDIC	DCTUCS	*UCS image identification (printer only)
84	54	SMF6PGE	4	binary	PRPAGECT (in PPPWORK)[2]	Approximate page count (printer only). A skip to any carriage control channel one is counted as a page.
88	58	SMF6RTE	2	binary	DCTNO	Output route code

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. **(Continued)**

[2]PPPWORK is the print/punch processor work area.

*A change in this field will cause a new record type 6 to be written.

Offsets		Name	Length	Format	Source	Description
3800 Printing Subsystem Section:						
+0		SMF6LN2	2	binary	internal	Length of 3800 Printing Subsystem section, including this field
+2		SMF6CPS	8	binary	PCOPYGRP (in PPPWORK)[2]	*Number of copies printed in each copy group. Each byte represents one copy group, and the sum of the 8 bytes is the total number of copies printed.
+10		SMF6CHR	16	EBCDIC	DCTCHAR1, 2, 3, 4	*Names of the character arrangement tables that define the characters used in printing. Each name is 4 bytes long, with a maximum of 4 names.
+26		SMF6MID	4	EBCDIC	DCTMODF	*Names of the copy modification module used to modify the data
+30		SMF6FLI	4	EBCDIC	DCTFLASH	*Name of the forms overlay printed on the copies
+34		SMF6FLC	1	binary	PFLASHC (in PPPWORK)[2]	*Number of copies on which the forms overlay is printed
+35		SMF6BID	1	binary	DCTPPSW2 PPFLAG2 (in PPPWORK)[2]	Options indicator *Bit* *Meaning When Set* *0 Output was burst into sheets by the Burster-Trimmer-Stacker *1 DCB subparameter OPTCD=J was specified. Each output data line contained a table reference character that selected the character arrangement table used when printing that line. 2-7 Reserved
The following fields apply when the external writer writes the record:						
14	E	SMF6JBN	8	EBCDIC	SSSOJOBN (in SSOB)	Job name[1]
22	16	SMF6RST	4	binary	job log[3] +4	Time, in hundredths of a second, reader recognized the JOB card for this job[1]

*A change in this field will cause a new record type 6 to be written. (continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

[2]PPPWORK is the print/punch processor work area.

[3]The job log is pointed to by SSSOWTRC field in the SSOB data area.

Offsets		Name	Length	Format	Source	Description
26	1A	SMF6RSD	4	packed	job log[3] +8	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign
30	1E	SMF6UIF	8	EBCDIC	job log[3] +12	User identification (taken from common exit parameter area)
38	26	SMF6OWC	1	EBCDIC	SSSOCLAS (in SSOB)	SYSOUT class. (This field is blank for non-SYSOUT data sets.)
39	27	SMF6WST	4	binary	SVC 11 (set by IASXSD82)	Start time, in hundredths of a second, of print/punch processor working on the data in this record
43	2B	SMF6WSD	4	packed	SVC 11 (set by IASXSD82)	Start date of print/punch processor working on the data in this record, in the form 00YYDDDF where F is the sign
47	2F	SMF6NLR	4	binary		Zero
51	33	SMF6IOE	1	binary		Zero
52	34	SMF6NDS	1	binary	internal	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field includes JOBLOG information.)
53	35	SMF6FMN	4	EBCDIC	SSSOFORM (in SSOB)	Form number
57	39	SMF6PAD1	1	binary		Reserved
58	40	SMF6SBS	2	binary		Zero
60	3C	SMF6LN1	2	binary	internal	Length of rest of record, including this field
62	3E	SMF6DCI	2	binary		Zero
64	40	SMF6JNM	4	EBCDIC	SSSOJOBI +4 (in SSOB)	JES2-assigned job number
68	44	SMF6OUT	8	EBCDIC	DCTDEVN	Zero
76	4C	SMF6FCB	4	EBCDIC	DCTFCB	FCB image identification (printer only)
80	50	SMF6UCS	4	EBCDIC	DCTUCS	UCS image identification (printer only)

[3]The job log is pointed to by SSSOWTRC field in the SSOB data area.

Record Type 6 – JES3 Output Writer

Record type 6 is written by IATOSWD for each data set processed by JES3 output service. One type 6 record is written for each copy with a given form name. This record is also written for spin data sets. Its length is 112 bytes.

This record identifies the output writer by SYSOUT class and form number, and identifies the job by job log identification, JES3-assigned job number, and user identification. It also contains information on the output writer activity such as the number of logical records processed, number of data sets processed, output service start time and date, I/O status indicators, data set control indicators, JES3 logical output device name, and output priority.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF6FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF6RTY	1	binary	internal	Record type
2	2	SMF6TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF6DTE	4	packed	SVC 83	Date record was moved to SMF buffer in the form 00YYDDDF where F is the sign
10	A	SMF6SID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	SMF6JBN	8	EBCDIC	IATISJB	Job name[1] (taken from job's RESQ)
22	16	SMF6RST	4	binary	IATXTOD macro (Set by IATISJB)	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF6RSD	4	packed	IATXTOD macro (Set by IATISJB)	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF6UIF	8	EBCDIC	JMRUSEID (Set by IATOSWD)	User identification (taken from common exit parameter area)
38	26	SMF6OWC	1	EBCDIC	OSECLASS	SYSOUT class. (This field is blank for non-SYSOUT data sets.)
39	27	SMF6WST	4	binary	IATXTOD macro (Set by IATOSWD)	Start time, in hundredths of a second, of output service working on the data in this record. This field is filled in at JES3 LOGIN time for the writer job.
43	2B	SMF6WSD	4	packed	IATXTOD macro (Set by IATOSWD)	Start date of output service working on the data in this record, in the form 00YYDDDF where F is the sign. This field is filled in at JES3 LOGIN time for the writer job.
47	2F	SMF6NLR	4	binary	IATOSWD	Number of logical records written by the writer, by form number and class. (This field is filled in when a data set is completed or restarted; it includes repeats and restarts.)
51	33	SMF6IOE	1	binary	IATOSWD	I/O status indicators *Bit* *Meaning When Set* 0-4 Reserved 5 Data buffer read error 6 Reserved 7 Control buffer read error

(Continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Offsets		Name	Length	Format	Source	Description
52	34	SMF6NDS	1	binary	IATOSWD	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field is filled in when a data set is completed or restarted; it does not include restarts.)
53	35	SMF6FMN	4	EBCDIC	SUPFORMS (in SUPUNITS entry for the output device)	Form number
57	39	SMF6PAD1	1	binary		Reserved
58	3A	SMF6SBS	2	binary	internal	Subsystem identification – X'0005' signifies JES3
60	3C	SMF6LN1	2	binary	internal	Length of rest of record, including this field
62	3E	SMF6DCI	2	binary	IATOSWD	Data set control indicators (These bits are set when a data set is completed or restarted.) *Bit* *Meaning When Set* 0 Reserved 1 Record represents spin data sets 2 Operator terminated this data group 3 Operator restarted data set with destination 4 Operator restarted this data group 5 Received operator restarted data set 6 Operator started with single space 7 Punch output was interpreted 8-15 Reserved
64	40	SMF6JNM	4	EBCDIC	IATISJB or IATOSWD	JES3-assigned job number (taken from the job's RESQ)
68	44	SMF6OUT	8	EBCDIC	SUPDD (in SUPUNITS entry for the output device)	JES3 logical output device name
76	4C	SMF6FCB	4	EBCDIC	SUPCARR (in SUPUNITS entry for the output device)	FCB image identification (printer only)
80	50	SMF6UCS	4	EBCDIC	SUPUCS (in SUPUNITS entry for the output device)	UCS image identification (printer only)
84	54	SMF6PGE	4	binary	IATOSWD	For printer, approximate page count (A skip to carriage control channel one is counted as a page.) For punch, number of cards punched. This field is filled in when a data set is completed or restarted.
88	58	SMF6DFE	2	binary	IATOSWD	Data format error indicators (These bits are set when a data set is completed or restarted.) *Bit* *Meaning When Set* 0-5 Reserved 6 Some first character control data bad, default used 7 Bad record length (truncate or pad) 8-15 Reserved
90	5A	SMF6OPR	2	binary	OSEPRTY	Output priority
92	5C	SMF6GRP	8	EBCDIC	SUPGROUP (in SUPUNITS entry for the output device)	JES3 logical output device group name
100	64	SMF6RSVJ	8	EBCDIC		Reserved for JES3
108	6C	SMF6RSVU	4	EBCDIC		Reserved for user

Record Type 6 – JES3 Output Writer

Record type 6 is written by IATOSWD for each data set processed by JES3 output service. One type 6 record is written for each copy with a given form name. This record is also written for spin data sets. Its length is 112 bytes plus 36 bytes for the 3800 Printing Subsystem section.

This record identifies the output writer by SYSOUT class and form number, and identifies the job by job log identification, JES3-assigned job number, and user identification. It also contains information on the output writer activity such as the number of logical records processed, number of data sets processed, output service start time and date, I/O status indicators, data set control indicators, JES3 logical output device name, and output priority.

This record also provides information on the activity of the 3800 Printing Subsystem. For additional information on the 3800, see the *IBM 3800 Printing Subsystem Programmer's Guide.*

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF6FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF6RTY	1	binary	internal	Record type
2	2	SMF6TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF6DTE	4	packed	SVC 83	Date record was moved to SMF buffer in the form 00YYDDDF where F is the sign
10	A	SMF6SID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	SMF6JBN	8	EBCDIC	IATISJB	Job name[1] (taken from job's RESQ)
22	16	SMF6RST	4	binary	IATXTOD macro (Set by IATISJB)	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF6RSD	4	packed	IATXTOD macro (Set by IATISJB)	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF6UIF	8	EBCDIC	JMRUSEID (Set by IATOSWD)	User identification (taken from common exit parameter area)
38	26	SMF6OWC	1	EBCDIC	OSECLASS	SYSOUT class. (This field is blank for non-SYSOUT data sets.)
39	27	SMF6WST	4	binary	IATXTOD macro (Set by IATOSWD)	Start time, in hundredths of a second, of output service working on the data in this record. This field is filled in at JES3 LOGIN time for the writer job.
43	2B	SMF6WSD	4	packed	IATXTOD macro (Set by IATOSWD)	Start date of output service working on the data in this record, in the form 00YYDDDF where F is the sign. This field is filled in at JES3 LOGIN time for the writer job.
47	2F	SMF6NLR	4	binary	IATOSWD	Number of logical records written by the writer, by form number and class. (This field is filled in when a data set is completed or restarted; it includes repeats and restarts.)
51	33	SMF6IOE	1	binary	IATOSWD	I/O status indicators *Bit* *Meaning When Set* 0-4 Reserved 5 Data buffer read error 6 Reserved 7 Control buffer read error

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

(Continued)

Offsets		Name	Length	Format	Source	Description
52	34	SMF6NDS	1	binary	IATOSWD	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field is filled in when a data set is completed or restarted; it does not include restarts.)
53	35	SMF6FMN	4	EBCDIC	SUPFORMS (in SUPUNITS entry for the output device)	Form number
57	39	SMF6PAD1	1	binary	IATOSDR	Section indicator *Bit* *Meaning When Set* 0 3800 Printing Subsystem section present 1-7 Reserved
58	3A	SMF6SBS	2	binary	internal	Subsystem identification — X'0005' signifies JES3
60	3C	SMF6LN1	2	binary	internal	Length of rest of record, including this field, but not including any additional sections indicated by the SMF6PAD1 field
62	3E	SMF6DCI	2	binary	IATOSWD	Data set control indicators (These bits are set when a data set is completed or restarted.) *Bit* *Meaning When Set* 0 Reserved 1 Record represents spin data sets 2 Operator terminated this data group 3 Operator restarted data set with destination 4 Operator restarted this data group 5 Received operator restarted data set 6 Operator started with single space 7 Punch output was interpreted 8-15 Reserved
64	40	SMF6JNM	4	EBCDIC	IATISJB or IATOSWD	JES3-assigned job number (taken from the job's RESQ)
68	44	SMF6OUT	8	EBCDIC	SUPDD (in SUPUNITS entry for the output device)	JES3 logical output device name
76	4C	SMF6FCB	4	EBCDIC	SUPCARR (in SUPUNITS entry for the output device)	FCB image identification (printer only)
80	50	SMF6UCS	4	EBCDIC	SUPUCS (in SUPUNITS entry for the output device)	UCS image identification (printer only)
84	54	SMF6PGE	4	binary	IATOSWD	For printer, approximate page count (A skip to carriage control channel one is counted as a page.) For punch, number of cards punched. This field is filled in when a data set is completed or restarted.
88	58	SMF6DFE	2	binary	IATOSWD	Data format error indicators (These bits are set when a data set is completed or restarted.) *Bit* *Meaning When Set* 0-5 Reserved 6 Some first character control data bad, default used 7 Bad record length (truncate or pad) 8-15 Reserved
90	5A	SMF6OPR	2	binary	OSEPRTY	Output priority
92	5C	SMF6GRP	8	EBCDIC	SUPGROUP (in SUPUNITS entry for the output device)	JES3 logical output device group name
100	64	SMF6RSVJ	8	EBCDIC		Reserved for JES3
108	6C	SMF6RSVU	4	EBCDIC		Reserved for user

(continued)

Offsets	Name	Length	Format	Source	Description
3800 Printing Subsystem Section:					
+0	SMF6LN2	2	binary	internal	Length of 3800 Printing Subsystem section, including this field
+2	SMF6CPS	8	binary	OSEMODRC	Number of copies printed in each copy group. Each byte represents one copy group, and the sum of the 8 bytes is the total number of copies printed.
+10	SMF6CHR	16	EBCDIC	OSECHARS	Names of the character arrangement tables that define the characters used in printing. Each name is 4 bytes long, with a maximum of 4 names.
+26	SMF6MID	4	EBCDIC	OSEMODID	Name of the copy modification module used to modify the data
+30	SMF6FLI	4	EBCDIC	OSEFLASH	Name of the forms overlay printed on the copies
+34	SMF6FLC	1	binary	OSEFLCNT	Number of copies on which the forms overlay is printed
+35	SMF6BID	1	binary		Options indicator
					Bit *Meaning When Set*
				OSESTACK	0 Output was burst into sheets by the Burster-Trimmer-Stacker
				OSEDFLG1	1 DCB subparameter OPTCD=J was specified. Each output data line contained a table reference character that selected the character arrangement table used when printing that line.
					2-7 Reserved

Record Type 7 – Data Lost

Record type 7 is the first record built when an SMF data set becomes available for recording after a period when no data sets were available. Data existing in the SMF buffer is written to the newly available SMF data set before record type 7 is built in the buffer. Consequently record type 7 is not the first record in the data set. It is written by IEEMB829 and its length is 24 bytes.

This record contains a count of the SMF records that were not written, and the start and end times of the period during which no records were written. (The end time is the time recorded in offset 2.)

Notes:

1. In record types 4 and 5, the time stamp reflects the time that the job step or job ended instead of the time that the record was moved to the SMF buffer. Therefore, it is possible for these records, which follow the type 7 record in the SMF data set, to have a time stamp earlier than that of the type 7 record.
2. Even if MAN=USER is specified in the SMFPRMxx member of SYS1.PARMLIB, a type 7 record is built and written to the SMF data set.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF7FLG	1	binary	IEEMB829	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF7RTY	1	binary	internal	Record type
2	2	SMF7TME	4	binary	SVC 11 (Set by IEEMB829)	Time, in hundredths of a second, record was built in SMF buffer
6	6	SMF7DTE	4	packed	SVC 11 (Set by IEEMB829)	Date record was built in SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF7SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF7NRO	2	binary	SMCADSCT	Number of SMF records lost because no SMF data sets were available for recording
16	10	SMF7STM	4	binary	SMCADSTM (Set by IEEMB829)	Start time, in hundredths of a second, of period during which no SMF data sets were available for recording
20	14	SMF7STD	4	packed	SMCADSTM (Set by IEEMB829)	Start date of period during which no SMF data sets were available for recording, in the form 00YYDDDF where F is the sign

Record Type 8 – I/O Configuration

Record type 8 is written by IEEMB823 after the IPL of the system is completed and the SET DATE operator command is issued. This record identifies each device that is online at IPL by device class, unit type, channel address, and unit address. Its length is 16 bytes plus four bytes for each device online at IPL.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF8FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF8RTY	1	binary	internal	Record type
2	2	SMF8TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF8DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF8SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF8LENN	2	binary	internal	Length of rest of record including this field
For each online device, there is a four-byte entry with the following format:						
+0		SMF8IODV	1	binary	UCBTBYT3	Device class
+1			1	binary	UCBTBYT4	Unit type
+2			1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address

Record Type 9 – VARY ONLINE

Record type 9 is written by ICB2MSG (for the 3850 Mass Storage Control), IEECLEAN, IEEVPTH, and IEE2303D when a VARY ONLINE command is processed. This record identifies the device being added to the configuration by device class, unit type, channel address, and unit address. Its length is 16 bytes plus four bytes for each device varied online.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF9FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF9RTY	1	binary	internal	Record type
2	2	SMF9TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF9DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF9SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF9LENN	2	binary	internal	Length of rest of record including this field
For each device varied online, there is a four-byte entry with the following format:						
+0		SMF9DVAD	1	binary	UCBTBYT3	Device class
+1			1	binary	UCBTBYT4	Unit type
+2			1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address

Record Type 10 – Allocation Recovery

Record type 10 is written by IEFAB488 after a successful device allocation recovery. Its length is 40 bytes plus four bytes for each device entry.

This record identifies the device that is made available by device class, unit type, channel address, and unit address. It identifies the job requiring the allocation by job log identification and user identification.

Note: This record is not produced if the operator cancels the job instead of attempting recovery.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF10FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF10RTY	1	binary	internal	Record type
2	2	SMF10TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF10DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF10SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF10JBN	8	EBCDIC	JMRJOB	Job name. This field contains blanks if allocation recovery is for a system task [1]
22	16	SMF10RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job. This field equals zero if allocation recovery is for a system task [1]
26	1A	SMF10RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign. This field equals zero if allocation recovery is for a system task [1]
30	1E	SMF10UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF10LN	2	binary	internal	Length of rest of record including this field
For each device made available, there is a four-byte entry with the following format:						
+0		SMF10DEV	1	binary	UCBTBYT3	Device class
+1			1	binary	UCBTBYT4	Unit type
+2			1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Record Type 11 – VARY OFFLINE

Record type 11 is written when a VARY OFFLINE command is processed. It is written by ICB2MSG (for the 3850 Mass Storage Control), IEECLEAN, IEEVPTH, IEFAB421, IGC0005I, and IGC0905I. This record identifies the device being removed from the configuration by device class, unit type, channel address, and unit address. Its length is 16 bytes plus four bytes for each device varied offline.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF11FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF11RTY	1	binary	internal	Record type
2	2	SMF11TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF11DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF11SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF11LN	2	binary	internal	Length of rest of record including this field
For each device varied offline, there is a four-byte entry with the following format:						
+0		SMF11DEV	1	binary	UCBTBYT3	Device class
+1			1	binary	UCBTBYT4	Unit type
+2			1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address

Record Type 14 – INPUT or RDBACK Data Set Activity

Record type 14 is written for non-VSAM direct access or tape data sets that are defined by DD statements and opened for INPUT or RDBACK processing by problem programs. It is written by IFG0202H and IFG0202I when a data set, as described above, is closed or processed by EOV. Its length varies from 288 to 6,412 bytes, depending upon the number of volumes for the data set.

This record contains information (associated with both the access method used and the type of data set used) from the TIOT, JFCB, DCB, DEB, and UCB data areas. For more information about these data areas, see *OS/VS2 System Data Areas.*

Note: Record type 14 is not written for a data set defined by a DD* or DD DATA statement. For accounting purposes, the card-image count for these data sets is provided in record type 4.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF14FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF14RTY	1	binary	internal	Record type
2	2	SMF14TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF14DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF14SID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	SMF14JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF14RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job [1]
26	1A	SMF14RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign [1]
30	1E	SMF14UID	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF14RIN	2	binary		Record and data set indicator *Bit* *Meaning When Set* 0 Reserved 1 Record written by EOV (Register 14=0 if CLOSE; register 14=4 if EOV) 2 DASD device 3 Temporary data set. (A data set is temporary if it has a system-generated name, is created within a job or job step, and exists only for the duration of that job or job step.) 4 DCBDSORG=DA. (The data set organization being used is direct access.) 5 DCBSORG=IS and DCBMACRF not EXCP. (The data set organization being used is indexed sequential and the EXCP access method is not being used.) 6 JFCDSORG=IS. (The data set organization being used is indexed sequential.) 7 VIO data set 8-15 Reserved
					internal	
					UCBTYP	
					JFCBDSNM	
					DCBDSORG	
					DCBDSORG	
					JFCDSORG (in JFCB)	

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

(Continued)

Offsets		Name	Length	Format	Source	Description
Section Sizes:						
40	28	SMF14SDC	1	binary	internal	Size of DCB/DEB section. This field equals 24.
41	29	SMF14NUC	1	binary	internal	Number of UCB sections. There is always one UCB section for each UCB currently processing except for ISAM and BPAM-concatenated data sets. For ISAM data sets, this field is calculated as: one for the index extent, one per volume for primary extents, and one for the overflow extent. For BPAM-concatenated data sets, there is one UCB section for each data set in the concatenated data set.
42	2A	SMF14SUC	1	binary	internal	Size of each UCB section. This field equals 24.
43	2B	SMF14SET	1	binary	internal	Size of ISAM extension section. This field equals 28 (or 0 if there are no ISAM data sets).
44	2C	SMF14RV1	4	binary		Reserved
TIOT Section – a portion of the TIOT, including:						
48	30	SMFTIOE1	1	binary	TIOELNGH	Length, in bytes, of the DD entry (including all device entries)
49	31	SMFTIOE2	1	binary	TIOESTTA	Status indicator. This field indicates the tape label processing to be performed; whether unallocating, rewinding, or unloading tape data sets is required; and whether this is the first DD entry for a split cylinder.
50	32	SMFTIOE3	1	binary	TIOEWTCT	Number of devices requested for this data set during allocation
51	33	SMFTIOE4	1	binary	TIOELINK	During allocation, this field indicates a link to the appropriate prime split, unit affinity, volume affinity, or suballocate TIOT entry. After allocation, it is a data set and device indicator.
52	34	SMFTIOE5	8	EBCDIC	TIOEDDNM	DDname
60	3C	SMFTIOE6	3	binary	TIOEJFCB	Relative track address (TTR) of the JFCB. During allocation, this field contains the TTR of the SIOT.
63	3F	SMFTIOE7	1	binary	TIOESTTC	Status indicator during allocation only and set to zeros at the end of allocation. This field indicates whether the unit affinity, volume affinity, and suballocate TIOT entry are primary or secondary.
JFCB Section:						
64	40	SMFJFCB1	176	binary	JFCB	The JFCB, excluding JFCB extensions
DCB/DEB Section – portions of the DCB and DEB, including:						
240	F0	SMFDCBOR	2	binary	DCBDSORG	Data set organization being used
242	F2	SMFDCBRF	1	binary	DCBRECFM	Record format
243	F3	SMFDCBMF	2	binary	DCBMACRF	Type of I/O macro instruction and options
245	F5	SMFDCBFL	1	binary	DCBOFLGS	Indicator used by the OPEN routine such as the type of the last I/O operation, and the return from the user's exit.
246	F6	SMFDCBOP	1	binary	DCBOPTCD	Option codes used by access-method interfaces
247	F7	SMF14RV2	1	binary		Reserved
248	F8	SMFDEBFL	1	binary	DEBOFLGS	Data set and device status indicator. This field indicates whether a data set is modified, new or old, and shows the status of DASD.
249	F9	SMFDEBOP	1	binary	DEBOPATB	Indicator showing both the method of I/O processing and the disposition that is to be performed when an end-of-volume (EOV) condition occurs.
250	FA	SMFDEBVL	2	binary	DEBVLSEQ	Volume sequence number. For direct access, the sequence number is relative to the first volume of the data set. For tape, the sequence number is relative to the first volume processed.

(Continued)

Offsets	Name	Length	Format	Source	Description
For each DCB/DEB tape extension, there is a 12-byte entry with the following format:					
+0	SMFDCBBL	4	binary	DCBBLKCT	Block count for each volume
+4	SMFDSSNO	6	binary	UCBSQC	Data set serial number
+10	SMF14RV3	2	binary		Reserved
The following 12 bytes apply to the DCB/DEB DASD extension:					
+0	SMF14NTU	4	binary	DCBFDAD	Relative track and concatenation number (TTRN) of the last record processed for a physical sequential or partitioned data set. N is always zero except for BPAM-concatenated data sets. If the last operation was a read (DCBOFLGS bit 0 is off) the TTR is: (1) zero, (2) the start of a BPAM member if there are two or more IOBs, or (3) the last write of the data set if there is one IOB. This is true because the access method maintains DCBFDAD while reading only if RECFM=FS, RECFM=FBS, or only one IOB (BUFNO, NCP) is used.
+4	SMF14NTR	4	binary	TCTTKRLD	Number of tracks released by the DADSM routine
+8	SMF14NER	1	binary	TCTEXRLD	Number of extents released by the DADSM routine
+9	SMF14RV4	3	binary		Reserved
UCB Section — a portion of the UCB (see offsets 41 and 42), including:					
+0	SMFUCBCH	1	binary	UCBCHA	Channel address[2]. (A mass storage volume is indicated when the high-order bit of this field is on.)
+1	SMFUCBUA	1	binary	UCBUA	Unit address[2]
+2	SMFSRTEV	6	binary	UCBVOLI	Volume serial number
+8	SMFUCBTY	4	binary	UCBTYP	Unit type
+12	SMFSRTES	1	binary	UCBSTAB	DASD volume status indicator. This field indicates whether this DASD volume is a private, public, storage, or control volume.
+13	SMF14NEX	1	binary	internal (in DEB)	Number of extents
+14	SMF14RV5	2	binary		Reserved
+16	SMFEXCP	4	binary	TCTDCTR	EXCP count for entire step. Note that if a data set is opened and closed twice during a single step, the count in the second type 14 record is the sum of all EXCPs for both uses of the data set. (The EXCP count in the last type 14 record for the step is equal to the corresponding entry for the data set in record type 4. For more information about EXCP count, see Appendix B.)
For each UCB tape extension, there is a four-byte entry with the following format:					
+0	SMFSRTEF	2	binary	UCBFSCT	Data set sequence count
+2	SMFSRTEQ	2	binary	UCBFSEQ	Data set sequence number
The following four bytes apply to the UCB DASD extension:					
+0	SMF14NTA	4	binary	DEBNMTRK for all extents	Number of tracks allocated on the device
ISAM Extension Section (DCBDSORG=IS and DCBMACRF not EXCP):					
+0	SMF14RV6	2	binary		Reserved
+2	SMFDCBMA	1	binary	DCBMAC	Extension of I/O macro instruction field (DCBMACRF) for ISAM
+3	SMFDCBNL	1	binary	DCBNLEV	Number of index levels
+4	SMFDCBR3	4	binary	DCBRORG3	For each use of the data set, number of read or write accesses to an overflow record which is not first in a chain of such records
+8	SMFDCBNR	4	binary	DCBNREC	Number of logical records in the prime data area
+12	SMFDCBR2	2	binary	DCBRORG2	Number of tracks (whole or partial) remaining in the overflow area

[2]These fields are zero for DD*, DD DATA, DD DUMMY and spooled data sets. For virtual I/O data sets, the channel/unit address is X'0FFF'.

(Continued)

Offsets	Name	Length	Format	Source	Description
ISAM Extension Section: (Continued)					
+14	SMFDCBNO	2	binary	DCBNOREC	Number of logical records in the overflow area
+16	SMFDCBR1	2	binary	DCBRORG1	Number of cylinder overflow areas that are full
+18	SMF14RV7	1	binary		Reserved
+19	SMFDEBNI	1	binary	DEBNIEE	Number of extents in the independent index area
+20	SMFDEBNP	1	binary	DEBNPEE	Number of extents in the prime data area
+21	SMFDEBNO	1	binary	DEBNOEE	Number of extents in the independent overflow area
+22	SMFNCYLS	2	binary	internal (in DEB)	Number of cylinders in the independent index area
+24	SMFNPCYL	2	binary	internal (in DEB)	Number of cylinders in the prime data area
+26	SMFNOCYL	2	binary	internal (in DEB)	Number of cylinders in the independent overflow area

Record Type 15 – OUTPUT, UPDAT, INOUT, or OUTIN Data Set Activity

Record type 15 is written for non-VSAM direct access or tape data sets that are defined by DD statements and opened for OUTPUT, UPDAT, INOUT, or OUTIN processing by problem programs. It is written by IFG0202H and IFG0202I when a data set, as described above, is closed or processed by EOV. Its length varies from 288 to 6,412 bytes, depending upon the number of volumes for the data set.

This record contains information (associated with both the access method used and the type of data set used) from the TIOT, JFCB, DCB, DEB, and UCB data areas. For more information about these data areas, see *OS/VS2 System Data Areas*.

Note: Record type 15 is not written for data sets defined as SYSOUT data sets on DD statements. For accounting purposes, the SYSOUT logical record count is provided in record type 6.

The format for this record is the same as the format for record type 14.

Record Type 17 – Scratch Data Set Status

Record type 17 is written by IGG0290D when a non-VSAM data set that is defined by a DD statement (either explicitly or implicitly) is scratched. (When a DD statement defines a volume, all the data sets on that volume are implicitly defined.) This record contains the data set name, number of volumes, and volume serial numbers. Its length varies from 96 to 2,136 bytes, depending upon the number of volumes for the data set.

Note: If REC=0 is specified, record type 17 is generated for non-temporary data sets only. If REC=2 is specified, this record is generated for both temporary and non-temporary data sets.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF17FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF17RTY	1	binary	internal	Record type
2	2	SMF17TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF17DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF17SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF17JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF17RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job [1]
26	1A	SMF17RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign [1]
30	1E	SMF17UID	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF17RIN	2	binary		Reserved
40	28	SMF17DSN	44	EBCDIC	user's parameter list	Data set name
84	54	SMF17RV1	3	binary		Reserved
87	57	SMF17NVL	1	binary	user's parameter list	Number of volumes
For each volume, there is a eight-byte entry with the following format:						
+0		SMF17RV2	2	binary		Reserved
+2		SMF17FVL	6	EBCDIC	user's parameter list	Volume serial number

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Record Type 18 – Rename Data Set Status

Record type 18 is written by IGG03001 when a non-VSAM data set that is defined by a DD statement (either explicitly or implicitly) is renamed. (When a DD statement defines a volume, all the data sets on that volume are implicitly defined.) This record contains the old data set name, new data set name, number of volumes, and volume serial numbers. Its length varies from 140 to 2,180 bytes, depending upon the number of volumes for the data set.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF18FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF18RTY	1	binary	internal	Record type
2	2	SMF18TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF18DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF18SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF18JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF18RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job [1]
26	1A	SMF18RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign [1]
30	1E	SMF18UID	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF18RIN	2	binary		Reserved
40	28	SMF18ODS	44	EBCDIC	user's parameter list	Old data set name
84	54	SMF18NDS	44	EBCDIC	user's parameter list	New data set name
128	80	SMF18RV1	3	binary		Reserved
131	83	SMF18NVL	1	binary	user's parameter list	Number of volumes
For each volume, there is an eight-byte entry with the following format:						
+0		SMF18RV2	2	binary		Reserved
+2		SMF18FVL	6	EBCDIC	user's parameter list	Volume serial number

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Record Type 19 – Direct Access Volume

Record type 19 is written by IGC0107H (1) for each direct access device that is online at IPL, (2) when a HALT EOD or SWITCH SMF command is processed, and (3) when a volume that is defined by a DD statement is demounted. Its length is 64 bytes.

This record contains the volume serial number, VTOC address, owner identification, unit type, number of unused alternate tracks, number of unallocated cylinders and tracks, number of cylinders and tracks in the largest free extent, and number of unallocated extents. It also contains the channel address, unit address, and module identification for devices having movable address plugs.

Notes:

1. Record type 19 is not produced for DOS volumes used under the operating system.
2. In order to determine the latest status of a shared file, the CPU clocks must be synchronized.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF19FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF19RTY	1	binary	internal	Record type
2	2	SMF19TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF19DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF19SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF19RV1	2	binary		Reserved
16	10	SMF19VOL	6	EBCDIC	volume label[1] (VOLSERNO)	Volume serial number
22	16	SMF19OID	10	EBCDIC	volume label[1] (VOLOWNER)	Owner identification of direct access volume
32	20	SMF19DEV	4	binary	UCBTYP	Unit type
36	24	SMF19VTC	5	binary	volume label[1] (VOLVTOC)	VTOC address
41	29	SMF19VTI	1	binary	DS4VTOCI (in DSCB4) DS4DIRF DS4DICVT	VTOC indicator *Bit* *Meaning When Set* 0-4 Reserved 5 Possible VTOC error 6 VTOC error has been fixed 7 Reserved
42	2A	SMF19NDS	2	binary	internal	Number of DSCBs, calculated as: number of DSCBs per track times number of tracks in VTOC
44	2C	SMF19DSR	2	binary	DS4DSREC (in DSCB4)	Number of DSCB0s, that is, number of available DSCBs
46	2E	SMF19NAT	2	binary	DS4NOATK (in DSCB4)	Number of unused alternate tracks
48	30	SMF19SPC	2	binary	internal (DSCB5)	Number of unallocated cylinders
50	32		2	binary	internal (DSCB5)	Number of unallocated tracks
52	34	SMF19LEX	2	binary	internal (DSCB5)	Number of cylinders in the largest unallocated extent
54	36		2	binary	internal (DSCB5)	Number of tracks in the largest unallocated extent
56	38	SMF19NUE	2	binary	internal (DSCB5)	Number of unallocated extents
58	3A	SMF19RV2	2	binary		Reserved
60	3C	SMF19CUU	1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
61	3D		1	binary	UCBUA	Unit address
62	3E	SMF19IND	2	binary	internal	Module identification or drive number indicating physical identity of devices having moveable address plugs. This field is taken from bits 2-7 of sense byte 4 for these devices. (See the component descriptions of these devices for the meaning of sense byte 4.)

[1]The volume label for the direct access device is record 3 of cylinder 0 of track 0.

Record Type 20 – Job Initiation

Record type 20 is written by IEFSMFIE at job initiation (including TSO logon). This record contains the job log identification, user identification, programmer's name, number of accounting fields on the JOB statement, and accounting fields. Its length is 61 bytes plus the length of the JOB statement accounting fields.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF20FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF20RTY	1	binary	internal	Record type
2	2	SMF20TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF20DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF20SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF20JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF20RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF20RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF20UID	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF20RIN	2	binary		Reserved
40	28	SMF20PGM	20	EBCDIC	ACTPRGNM (in JCT)	Programmer's name
60	3C	SMF20NAF	1	binary	ACTJNFLD (in JCT)	Number of accounting fields
61	3D	SMF20ACT	variable	EBCDIC	JOB statement	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Record Type 21 – Error Statistics by Volume

Record type 21 is written by IGC0009A when a user data set on magnetic tape is demounted. This record contains statistics for the entire volume during the period of time that the volume is mounted regardless of the number of data sets on the volume being accessed and regardless of the number of CLOSE macro instructions issued. Its length is 44 bytes.

This record contains the volume serial number, channel address, unit address, unit type, and tape density. It also contains the number of: temporary and permanent read and write errors, START I/Os, noise blocks, erase gaps, and cleaner actions.

Notes:

1. The IFHSTATR utility program formats and prints the error-statistics-by-volume (ESV) information in this record. For a detailed description of this utility program, see *OS/VS Utilities.*
2. If a maximum count is reached, a type 21 record is generated indicating the maximum. When the volume is demounted, another type 21 record is generated indicating the count since the maximum had been reached.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF21FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF21RTY	1	binary	internal	Record type
2	2	SMF21TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF21DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF21SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF21LGH	2	binary	internal	Length of rest of record including this field. (This field is always 30.)
16	10	SMF21VOL	6	EBCDIC	UCBVOLI	Volume serial number
22	16	SMF21CA	1	binary	UCBCHA	Channel address
23	17		1	binary	UCBUA	Unit address
24	18	SMF21UCB	4	binary	UCBTYP	Unit type
28	1C	SMF21TR	1	binary	UCBTR	Number of temporary read errors
29	1D	SMF21TW	1	binary	UCBTW	Number of temporary write errors
30	1E	SMF21SIO	2	binary	UCBSIO	Number of START I/Os
32	20	SMF21PR	1	binary	UCBPR	Number of permanent read errors
33	21	SMF21PW	1	binary	UCBPW	Number of permanent write errors
34	22	SMF21NB	1	binary	UCBNB	Number of noise blocks
35	23	SMF21ERG	2	binary	UCBERG	Number of erase gaps
37	25	SMF21CLN	2	binary	UCBCLN	Number of cleaner actions

(Continued)

Offsets		Name	Length	Format	Source	Description
39	27	SMF21DEN	1	binary	DCBDEN	Tape density — 2400 and 3400 series magnetic tape units *Bits* *Meaning When Set* *Code* *7-Track* *9-Track* DCBMTDN0 6,7 0 200 BPI N/A DCBMTDN1 1,6,7 1 556 BPI N/A DCBMTDN2 0,6,7 2 800 BPI 800 BPI DCBMTDN3 0,1,6,7 3 N/A 1600 BPI DCBMTDN4 0,1,3,6,7 4 N/A 6250 BPI
40	28	SMF21BLS	2	binary	DCBBLKSI	Block size. This field is zero if DCBRECFM indicates variable or unblocked records, or if you are doing your own EXCP processing.
42	2A	SMF21RV0	2	binary		Reserved (not necessarily zero)

Record Type 22 – Configuration

Record type 22 is written (1) by ICB2MSG and IEEMB823 after every IPL of the system, (2) by IEECLEAN when a VARY CPU or VARY CH operator command is processed, (3) by IEEMPVST when a VARY STOR operator command is processed, and (4) by IGC0012F when a VARY ONLINE,S or VARY OFFLINE,S operator command is processed. This record describes the CPU, channel, storage range or mass storage device that is varied. It also describes the MSS units online at IPL. Its length is 18 bytes plus the length of the sections in the record.

Notes:

1. During system initialization, the Mass Storage Control (MSC) creates a configuration record (called Message 92) and puts it in a message buffer. After SMF is initialized, ICB2MSG creates the "MSS IPL Configuration section" of record type 22 from the Message 92 in the MSC buffer.
2. By using the VARY ONLINE,S and VARY OFFLINE,S commands, the operator can modify the configuration. (The format of these commands is described in *Operator's Library: IBM 3850 Mass Storage System (MSS) Under OS/VS.*) In a record type 22, a "VARY ONLINE,S section" or a "VARY OFFLINE,S section" is written for *each* unit varied by these commands.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF22FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF22RTY	1	binary	internal	Record type
2	2	SMF22TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF22DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF22SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF22IND	2	binary		Record creator indicator *Value* *Meaning* 1 IPL 2 VARY ONLINE 3 VARY OFFLINE 4 MSS at IPL 5 VARY ONLINE,S 6 VARY OFFLINE,S
					IEEMB823	
					IEECLEAN/ IEEMPVST	
					IEECLEAN/ IEEMPVST	
					ICB2MSG	
					IGC0012F	
					IGC0012F	
16	10	SMF22ECT	2	binary	internal	Number of sections following

(Continued)

Offsets	Name	Length	Format	Source	Description
CPU Section:					
+0	SMF22RV0	1	binary		Reserved
+1	SMF22PID	1	binary	IEECLEAN	CPU section identification. (This field is always 1.)
+2	SMF22CPN	2	binary	IEECLEAN	CPU model number (taken from VARY CPU command)
+4	SMF22RV1	1	binary		Reserved
+5	SMF22CPA	1	binary	IEECLEAN	CPU address (taken from VARY CPU command or default in PSACPUPA)
Channel Section:					
+0	SMF22RV2	1	binary		Reserved
+1	SMF22CID	1	binary	IEECLEAN	Channel section identification. (This field is always 2.)
+2	SMF22CHN	2	binary	IEECLEAN	Channel type and model number (taken from VARY CH command)
+4	SMF22CHA	1	binary	IEECLEAN	Channel address (taken from VARY CH command)
+5	SMF22CPD	1	binary	IEECLEAN	CPU address (taken from VARY CH command or default in PSACPUPA)
Storage Section:					
+0	SMF22RV3	1	binary		Reserved
+1	SMF22TID	1	binary	IEEMPVST	Storage section identification. (This field is always 3.)
+2	SMF22PGL	2	binary	IEEMPVST	Address of lowest page in real contiguous storage (taken from VARY STOR command)
+4	SMF22NPG	2	binary	IEEMPVST	Number of pages in real contiguous storage (taken from VARY STOR command)
MSS IPL Configuration Section:					
+0	SMF22RV4	1	binary		Reserved
+1	SMF22IID	1	binary	ICB2MSG	MSS IPL configuration section identification. (This field is always 4.)
The following 40 bytes contain the bit pattern of MSS units online at IPL:					
+2	SMF22ION	1	binary	(See Note 1)	Data recording devices (DRDs) of MSF(0) *Bit* *SSID* 0 200 1 201 2 202 3 203 4 204 5 205 6 206 7 207
+3		1	binary		Data recording devices (DRDs) of MSF(1) *Bit* *SSID* 0 210 1 211 2 212 3 213 4 214 5 215 6 216 7 217
+4		2	binary		Reserved
+6		2	binary		Staging Adapters *Bit* *SSID* 0 800 1 810 2 820 3 830 : : 15 8F0

(Continued)

Offsets	Name	Length	Format	Source	Description
MSS IPL Configuration Section: (Continued)					
+8		1	binary		Device recording controls (DRCs) of MSF(0) *Bit* *SSID* 0 400 1 401 2 402 3 403 Device recording controls (DRCs) of MSF(1) 4 410 5 411 6 412 7 413
+9		1	binary		Reserved
+10		28	binary		Staging spindles in staging data groups (SDGs) *SDG* *Bits* *SSIDs* 0 0-7 000-007 1 0-7 008-00F 2 0-7 010-017 3 0-7 018-01F 27 0-7 0E8-0EF
+38		3	binary		Reserved
+41		1	binary		MSF indicator *Bit* *Meaning When Set* 0 MSF(0) with SSID of 101 1 MSF(0) with SSID of 102 2 MSF(1) with SSID of 111 3 MSF(1) with SSID of 112 4-7 Reserved
VARY ONLINE,S Section:					
+0	SMF22RV5	1	binary		Reserved
+1	SMF22NID	1	binary	IGC0012F	VARY ONLINE,S section identification. (This field is always 5.)
+2	SMF22RVA	1	binary		Reserved
+3	SMF22NSI	3	binary	IGC0012F	Subsystem identification of device (taken from VARY ONLINE,S command)
VARY OFFLINE,S Section:					
+0	SMF22RV6	1	binary		Reserved
+1	SMF22FID	1	binary	IGC0012F	VARY OFFLINE,S section identification. (This field is always 6.)
+2	SMF22RVB	1	binary		Reserved
+3	SMF22FSI	3	binary	IGC0012F	Subsystem identification of device (taken from VARY OFFLINE,S command)

Record Type 25 – JES3 Device Allocation

Record type 25 is written by IATPURG for each job processed by JES3 main device scheduling (MDS). One type 25 record is written for all device allocations required through the user's DD statements for the job. In addition, separate type 25 records are written for each group of JES3 allocations for private catalogs required for the job, and for each dynamic allocation request. Its length is 88 bytes.

This record contains allocation-related information such as the number of tape and disk volumes fetched and mounted, the time and date of the first mount message, and the time and date of JES3 device verification.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF25FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF25RTY	1	binary	internal	Record type
2	2	SMF25TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF25DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF25SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF25JBN	8	EBCDIC	JSTJBNAM	Job name[1]
22	16	SMF25RST	4	binary	JMRENTRY (Set by IATISJB)	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF25RSD	4	packed	JMREDATE (Set by IATISJB)	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF25UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
Descriptor Section:						
38	26	SMF25IND	2	binary	JST25FG1	Allocation indicators *Bit* *Meaning When Set* 0 If 0, allocation by user's DD statements. If 1, dynamic allocation. 1 If 0, non-catalog allocation by JES3. If 1, catalog allocation by JES3. 2 If 0, manual allocation by operator. If 1, automatic allocation by JES3. (See the MDS parameter SETPARAM in *OS/VS2 System Programming Library: JES3 System Programmer's Guide* for more information.) 3-15 Reserved
40	28	SMF25NTF	4	binary	JST25NIF	Number of tape volumes required for the job to execute (fetched)
44	2C	SMF25NDF	4	binary	JST25NDF	Number of disk volumes required for the job to execute (fetched)
48	30	SMF25FST	4	binary	JST25FST (Set by IATMDFE)	Time, in hundredths of a second, fetch processing started. That is, the time that the first phase of MDS started. (During this phase, messages are issued to inform the operator of the volumes required for the job to execute.)

(Continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Offsets		Name	Length	Format	Source	Description
Descriptor Section (Continued)						
52	34	SMF25FSD	4	packed	JST25FSD (Set by IATMDFE)	Date fetch processing started, in the form 00YYDDDF where F is the sign
56	38	SMF25SST	4	binary	JST25SST (Set by IATMDDR)	If manual allocation, time *START SETUP operator command issued (see *Operator's Library: OS/VS2 Reference (JES3)*). If automatic allocation, this field contains zeros.
60	3C	SMF25SSD	4	packed	JST25SSD (Set by IATMDDR)	If manual allocation, date *START SETUP operator command issued. If automatic allocation, this field contains zeros.
64	40	SMF25NTM	4	binary	JST25NTM	Number of tape volumes mounted
68	44	SMF25NDM	4	binary	JST25NDM	Number of disk volumes mounted
72	48	SMF25MST	4	binary	JST25MST (Set by IATMDSL)	Time, in hundredths of a second, of first volume mount message. If no mounts were required, this field equals the time of JES3 allocation.
76	52	SMF25MSD	4	packed	JST25MSD (Set by IATMDSL)	Date of first volume mount message, in the form 00YYDDDF where F is the sign. If no mounts were required, this field equals the date of JES3 allocation.
80	56	SMF25VVT	4	binary	JST25VVT (Set by IATMDVE)	Time, in hundredths of a second, of JES3 device verification
84	5A	SMF25VVD	4	packed	JST25VVD (Set by IATMDVE)	Date of JES3 device verification, in the form 00YYDDDF where F is the sign

Record Type 26 – JES2 Job Purge

Record type 26 is written by HASPMISC at job purge after all SYSOUT for the job is processed. This record identifies the job by job log identification, JES2-assigned job number and programmer's name.

Record type 26 also contains operating information such as, message class, job class, JES2 job selection priority, JES2 logical input device name, output lines, output punched cards, print/punch route codes, and start and stop times for the reader, converter, execution processor, and output processor. Its length is 232 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF26FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF26RTY	1	binary	internal	Record type
2	2	SMF26TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF26DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF26SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF26JBN	8	EBCDIC	JCTJMRJN	Job name[1]
22	16	SMF26RST	4	binary	JCTRDRON	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF26RSD	4	packed	JCTRDTON	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF26UIF	8	EBCDIC	JCTUSEID	User identification (taken from common exit parameter area)
38	26	SMF26RSV	4	binary		Reserved
42	2A	SMF26SBS	2	binary	internal	Subsystem identification – X'0002' signifies JES2
44	2C	SMF26IND	2	binary		Reserved
Descriptor Section:						
46	2E	SMF26LN1	2	binary	internal	Length of descriptor section, including this field
48	30	SMF26RV1	2	binary		Reserved
50	32	SMF26IN2	1	binary	JCTJOBFL	Job information indicator *Bit* *Meaning When Set* 0 Background batch job 1 Foreground TSO user 2 System task 3 No journal option 4 No output option 5 TYPRUN=SCAN was specified 6 TYPRUN=COPY was specified 7 Reserved

(Continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Offsets	Name	Length	Format	Source	Description
MSS IPL Configuration Section: (Continued)					
+8		1	binary		Device recording controls (DRCs) of MSF(0) *Bit* *SSID* 0 400 1 401 2 402 3 403 Device recording controls (DRCs) of MSF(1) 4 410 5 411 6 412 7 413
+9		1	binary		Reserved
+10		28	binary		Staging spindles in staging data groups (SDGs) *SDG* *Bits* *SSIDs* 0 0-7 000-007 1 0-7 008-00F 2 0-7 010-017 3 0-7 018-01F : : : 27 0-7 0E8-0EF
+38		3	binary		Reserved
+41		1	binary		MSF indicator *Bit* *Meaning When Set* 0 MSF(0) with SSID of 101 1 MSF(0) with SSID of 102 2 MSF(1) with SSID of 111 3 MSF(1) with SSID of 112 4-7 Reserved .
VARY ONLINE,S Section:					
+0	SMF22RV5	1	binary		Reserved
+1	SMF22NID	1	binary	IGC0012F	VARY ONLINE,S section identification. (This field is always 5.)
+2	SMF22RVA	1	binary		Reserved
+3	SMF22NSI	3	binary	IGC0012F	Subsystem identification of device (taken from VARY ONLINE,S command)
VARY OFFLINE,S Section:					
+0	SMF22RV6	1	binary		Reserved
+1	SMF22FID	1	binary	IGC0012F	VARY OFFLINE,S section identification. (This field is always 6.)
+2	SMF22RVB	1	binary		Reserved
+3	SMF22FSI	3	binary	IGC0012F	Subsystem identification of device (taken from VARY OFFLINE,S command)

Record Type 26 – JES2 Job Purge

Record type 26 is written by HASPMISC at job purge after all SYSOUT for the job is processed. This record identifies the job by job log identification, JES2-assigned job number and programmer's name.

Record type 26 also contains operating information such as, message class, job class, JES2 job selection priority, JES2 logical input device name, output lines, output punched cards, print/punch route codes, and start and stop times for the reader, converter, execution processor, and output processor. Its length is 232 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF26FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF26RTY	1	binary	internal	Record type
2	2	SMF26TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF26DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF26SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF26JBN	8	EBCDIC	JCTJMRJN	Job name[1]
22	16	SMF26RST	4	binary	JCTRDRON	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF26RSD	4	packed	JCTRDTON	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF26UIF	8	EBCDIC	JCTUSEID	User identification (taken from common exit parameter area)
38	26	SMF26RSV	4	binary		Reserved
42	2A	SMF26SBS	2	binary	internal	Subsystem identification – X'0002' signifies JES2
44	2C	SMF26IND	2	binary		Reserved
Descriptor Section:						
46	2E	SMF26LN1	2	binary	internal	Length of descriptor section, including this field
48	30	SMF26RV1	2	binary		Reserved
50	32	SMF26IN2	1	binary	JCTJOBFL	Job information indicator *Bit* *Meaning When Set* 0 Background batch job 1 Foreground TSO user 2 System task 3 No journal option 4 No output option 5 TYPRUN=SCAN was specified 6 TYPRUN=COPY was specified 7 RESTART = Y was specified

(Continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Offsets		Name	Length	Format	Source	Description
Descriptor Section: (Continued)						
51	33	SMF26INF	1	binary	JCTJOBFL	Job information indicator *Bit* *Meaning When Set* 0 /* PRIORITY card present or keyword 'PRTY =' was specified on JOB card 1 /* SETUP card(s) present 2 TYPRUN=HOLD was specified 3 No job log option 4 Execution batching 5 Job was entered on internal reader 6 Job was rerun by JES2 7 Job was canceled by the operator
52	34	SMF26JNM	4	EBCDIC	JCTJOBID + 4	JES2-assigned job number
56	38	SMF26JID	8	EBCDIC	JCTJOBID	Job identification in the form xxx0yyyy where yyyy is the JES2-assigned job number and xxx is: JOB — for normal JES2 job STC — for started task control job TSU — for TSO job
64	40	SMF26NAM	20	EBCDIC	JCTPNAME	Programmer's name (taken from JOB card)
84	54	SMF26MSG	1	EBCDIC	JCTMCLAS	Message class (taken from JOB card)
85	55	SMF26CLS	1	EBCDIC	JCTJCLAS	Job class (taken from JOB card)
86	56	SMF26XPI	1	binary	JCTIPRIO	JES2 job selection priority when the job was initially read
87	57	SMF26XPS	1	binary	JCTPRIO	JES2 job selection priority when the job was selected
88	58	SMF26OPI	1	binary	JCTIOPRI	JES2 initial output selection priority
89	59	SMF26OPS	1	binary	JCTOPRIO	JES2 output selection priority when the output was selected
90	5A	SMF26LOC	2	binary	JCTROUTE	Input route code
92	5C	SMF26DEV	8	EBCDIC	JCTINDEV	JES2 logical input device name
100	64	SMF26ACT	4	EBCDIC	JCTACCTN	Programmer's accounting number[2]
104	68	SMF26ROM	4	EBCDIC	JCTROOMN	Programmer's room number[2]
108	6C	SMF26XTM	4	binary	JCTETIME	Estimated execution time, in hundredths of a second[2]
112	70	SMF26ELN	4	binary	JCTESTLN	Estimated output lines[2]
116	74	SMF26EPU	4	binary	JCTESTPU	Estimated output punched cards[2]
120	78	SMF26FRM	4	EBCDIC	JCTFORMS	Output form number[2]
124	7C	SMF26CYP	2	binary	JCTCPYCT	Job print copy count[2]
126	7E	SMF26LIN	2	binary	JCTLINCT	Lines per page[2]
128	80	SMF26PRR	2	binary	JCTPROUT	Job print route code
130	82	SMF26PUR	2	binary	JCTPUOUT	Job punch route code
132	84	SMF26PDD	8	EBCDIC	JCTPROCN	Procedure DDNAME used for JCL conversion
Events Section:						
140	8C	SMF26LN2	2	binary	internal	Length of events section, including this field
142	8E	SMF26RV2	2	binary		Reserved
144	90	SMF26RPT	4	binary	JCTRDROF	Reader stop time, in hundredths of a second
148	94	SMF26RPD	4	packed	JCTRDTOF	Reader stop date, in the form 00YYDDDF where F is the sign
152	98	SMF26CST	4	binary	JCTCNVON	Converter start time, in hundredths of a second
156	9C	SMF26CSD	4	packed	JCTCDTON	Converter start date, in the form 00YYDDDF where F is the sign
160	A0	SMF26CPT	4	binary	JCTCNVOF	Converter stop time, in hundredths of a second
164	A4	SMF26CPD	4	packed	JCTCDTOF	Converter stop date, in the form 00YYDDDF where F is the sign

(Continued)

[2]These fields are JES2-defined subfields from the accounting information field in the JOB card or default values assigned for this job.

Offsets		Name	Length	Format	Source	Description
Events Section: (Continued)						
168	A8	SMF26XST	4	binary	JCTXEQON	Execution processor start time, in hundredths of a second
172	AC	SMF26XSD	4	packed	JCTXDTON	Execution processor start date, in the form 00YYDDDF where F is the sign
176	B0	SMF26XPT	4	binary	JCTXEQOF	Execution processor stop time, in hundredths of a second
180	B4	SMF26XPD	4	packed	JCTXDTOF	Execution processor stop date, in the form 00YYDDDF where F is the sign
184	B8	SMF26OST	4	binary	JCTOUTON	Output processor start time, in hundredths of a second
188	BC	SMF26OSD	4	packed	JCTODTON	Output processor start date, in the form 00YYDDDF where F is the sign
192	C0	SMF26OPT	4	binary	JCTOUTOF	Output processor stop time, in hundredths of a second
196	C4	SMF26OPD	4	packed	JCTODTOF	Output processor stop date, in the form 00YYDDDF where F is the sign
Actuals Section:						
200	C8	SMF26LN3	2	binary	internal	Length of actuals section, including this field
202	CA	SMF26RV4	2	binary		Reserved
204	CC	SMF26ICD	4	binary	JCTCARDS	Number of input cards for job. This field includes JCL and SYSIN cards.
208	D0	SMF26XLN	4	binary	JCTLINES	Number of output lines generated to spool
212	D4	SMF26XPU	4	binary	JCTPUNCH	Number of punched cards generated to spool
216	D8	SMF26RID	4	EBCDIC	JCTRDSID	Input processor system (CPU) identification
220	DC	SMF26CID	4	EBCDIC	JCTCVSID	Conversion processor system (CPU) identification
224	E0	SMF26XID	4	EBCDIC	JCTEXSID	Execution processor system (CPU) identification
228	E4	SMF26OID	4	EBCDIC	JCTOTSID	Output processor system (CPU) identification

Record Type 26 – JES3 Job Purge

Record type 26 is written by IATPURG at job purge after all SYSOUT for the job is processed. This record identifies the job by job log identification, JES3-assigned job number, and programmer's name.

Record type 26 also contains operating information such as message class, job class, JES3 job selection priority, JES3 logical input device name, execution time, output lines, output punched cards, deadline schedule type, deadline schedule time and date, and the start and stop times and dates for the reader, the converter, the execution processor, and the output processor. Its length is 314 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF26FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF26RTY	1	binary	internal	Record type
2	2	SMF26TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF26DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF26SID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	SMF26JBN	8	EBCDIC	IATISJB	Job name[1] (taken from job's RESQ)
22	16	SMF26RST	4	binary	IATXTOD macro (Set by IATISJB)	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF26RSD	4	packed	IATXTOD macro (Set by IATISJB)	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF26UIF	8	EBCDIC	JMRUSEID (Set by IATPURG)	User identification (taken from common exit parameter area)
38	26	SMF26RSV	4	binary		Reserved
42	2A	SMF26SBS	2	binary	internal	Subsystem identification – X'0005' signifies JES3
44	2C	SMF26IND	2	binary		Reserved
Descriptor Section:						
46	2E	SMF26LN1	2	binary	internal	Length of descriptor section, including this field
48	30	SMF26RV1	2	binary		Reserved
50	32	SMF26IN3	1	binary		Job information indicator *Bit* *Meaning When Set* IATISNT 0 Dependent job (//* NET card processed) IATISDL 1 Deadline scheduling (DEADLINE parameter was specified on //* MAIN card) IATPURG 2 Deadline job met deadline IATISPR 3 Process job (//* PROCESS card processed) IATNJDJ 4 Job left system via NJP (network job processing) IATNJDJ 5 Job entered system via NJP IATDJOT 6 Job left system via DJ (dump job) IATDJIN 7 Job entered system via DJ

(Continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Offsets		Name	Length	Format	Source	Description
Descriptor Section: (Continued)						
51	33	SMF26INF	1	binary	IATISJB IATIIDR IATISJB IATISJB IATMSIN for ASP, or IATMSMS for JES3 IATPURG	Job information indicator *Bit* *Meaning When Set* 0 Job priority (taken from PRTY= parameter on JOB card) 1 Job processed by preexec setup 2 TYPRUN=HOLD was specified on JOB card 3-4 Reserved 5 Job was entered on internal reader 6 Job was rerun on an ASP main reader or a JES3 reader 7 Job was canceled by the operator
52	34	SMF26JNM	4	EBCDIC	IATISJB or IATPURG	JES3-assigned job number (taken from job's RESQ)
56	38	SMF26JID	8	EBCDIC	IATISJB	Job identification in the form xxx0yyyy where yyyy is the JES3-assigned job number and xxx is: JOB — for normal JES3 job STC — for started task control job TSU — for TSO job
64	40	SMF26NAM	20	EBCDIC	IATIIPR	Programmer's name (taken from JOB card)
84	54	SMF26MSG	1	EBCDIC	IATISJB	Message class (taken from MSGCLASS= parameter on JOB card)
85	55	SMF26CLS	1	EBCDIC	IATISJB	Job class (taken from CLASS= parameter on JOB card). This field is blank if the default is used or if a valid CLASS= parameter is specified on the //* MAIN card. See offset 172.
86	56	SMF26XPI	1	binary	IATISJB if PRTY= parameter or IATISEN	JES3 job selection priority when the job was initially read (taken from: 1) PRTY= parameter on JOB card, 2) class default priority from main processor job class table, or 3) default priority from TVT)
87	57	SMF26XPS	1	binary	IATMSIN for ASP, IATMSMS for JES3	JES3 job selection priority when the job was selected (taken from job's RESQ)
88	58	SMF26RV8	4	binary		Reserved
92	5C	SMF26DEV	8	EBCDIC	IATISJB or IATNJDJ if NJP	JES3 logical input device name, or user identification if TSO job, or line name if NJP job
100	64	SMF26RVA	8	binary		Reserved
108	6C	SMF26XTM	4	binary	IATIIPR	Estimated execution time, in seconds
112	70	SMF26ELN	4	binary	IATISMN if LINES= parameter or IATISJB if default	Estimated output lines (taken from LINES= parameter on //* MAIN card or default (JOBLINES field in TVT times 1000))
116	74	SMF26EPU	4	binary	IATISMN if CARDS= parameter or IATISJB if default	Estimated output punched cards (taken from CARDS= parameter on //* MAIN card or default (JOBCARDS field in TVT times 100))
120	78	SMF26DTY	1	EBCDIC	IATISDL	Deadline schedule type (taken from DEADLINE parameter on //* MAIN card). Valid types are A-Z and 0-9.
121	79	SMF26RV6	3	binary		Reserved
124	7C	SMF26IGP	8	EBCDIC	IATISJB	JES3 logical input device group name
132	84	SMF26PD3	8	EBCDIC	IATISMN if PROC= parameter or IATISJB if default	Procedure DDNAME used for JCL conversion (taken from PROC= parameter on //* MAIN card or default (IATPLBST))

(Continued)

Offsets		Name	Length	Format	Source	Description
Descriptor Section: (Continued)						
140	8C	SMF26NJO	8	EBCDIC	IATNJDJ	Name of system to which job is sent via NJP
148	94	SMF26NJI	8	EBCDIC	IATNJDJ	Name of local NJP terminal supplied by the JES3 initialization deck
156	9C	SMF26NET	8	EBCDIC	IATISNT	Identification of dependent job net to which this job belongs (taken from //* NET card)
164	A4	SMF26DTM	4	binary	IATISDL	Deadline schedule time, in hundredths of a second (taken from DEADLINE parameter on //* MAIN card)
168	A8	SMF26DDT	4	packed	IATISDL	Deadline schedule date, in the form 00YYDDDF where F is the sign (taken from DEADLINE parameter on //* MAIN card)
172	AC	SMF26CLN	8	EBCDIC	IATISMN if CLASS= parameter or IATISJB if default	Job class (taken from CLASS= parameter on //* MAIN card if valid, or the default (JS3BATCH))
Events Section:						
180	B4	SMF26LN2	2	binary	internal	Length of events section, including this field
182	B6	SMF26RV2	2	binary		Reserved
184	B8	SMF26RPT	4	binary	IATXTOD macro (Set by IATISJB)	Reader stop time, in hundredths of a second. This field is filled in during JOB card processing.
188	BC	SMF26RPD	4	packed	IATXTOD macro (Set by IATISJB)	Reader stop date in the form 00YYDDDF where F is the sign. This field is filled in during JOB card processing.
192	C0	SMF26CST	4	binary	IATXTOD macro (Set by IATIIDR)	Converter start time, in hundredths of a second. This field is filled in following the JES3 LOGIN of the interpreter job.
196	C4	SMF26CSD	4	packed	CVTDATE (Set by IATIIDR)	Converter start date, in the form 00YYDDDF where F is the sign. This field is filled in following the JES3 LOGIN of the interpreter job.
200	C8	SMF26CPT	4	binary	IATXTOD macro (Set by IATIIDR)	Converter stop time, in hundredths of a second. This field is filled in at the end of the interpreter function.
204	CC	SMF26CPD	4	packed	CVTDATE (Set by IATIIDR)	Converter stop date, in the form 00YYDDDF where F is the sign. This field is filled in at the end of the interpreter function.
208	D0	SMF26XST	4	binary	IATXTOD macro (Set by IATMSIN for ASP, or IATMSMS for JES3)	Execution processor start time, in hundredths of a second. This field is filled in when the job is scheduled to run on an ASP main processor or a JES3 local or global processor.
212	D4	SMF26XSD	4	packed	CVTDATE (Set by IATMSIN for ASP, or IATMSMS for JES3)	Execution processor start date, in the form 00YYDDDF where F is the sign. This field is filled in when the job is scheduled to run on an ASP main processor or a JES3 local or global processor.
216	D8	SMF26XPT	4	binary	IATXTOD macro (Set by IATMSTM for ASP, or IATMSMS for JES3)	Execution processor stop time, in hundredths of a second. This field is filled in when the job is terminated on an ASP main processor or a JES3 local or global processor.
220	DC	SMF26XPD	4	packed	IATXTOD macro (Set by IATMSTM for ASP, or IATMSMS for JES3)	Execution processor stop date, in the form 00YYDDDF where F is the sign. This field is filled in when the job is terminated on an ASP main processor or a JES3 local or global processor.
224	E0	SMF26OST	4	binary	IATXTOD macro (Set by IATOSDR)	Output processor start time, in hundredths of a second. This field is filled in when output service starts to process the job's data sets.

(Continued)

Offsets		Name	Length	Format	Source	Description
Events Section: (Continued)						
228	E4	SMF26OSD	4	packed	IATXTOD macro (Set by IATOSDR)	Output processor start date, in the form 00YYDDDF where F is the sign. This field is filled in when output service starts to process the job's data sets.
232	E8	SMF26OPT	4	binary	IATXTOD macro (Set by IATOSWS)	Output processor stop time, in hundredths of a second. This field is filled in: 1) when an RQ is removed from the writer queue, 2) when all output OSEs are deleted/ released, and 3) when a request from the SYSOUT interface is processed.
236	EC	SMF26OPD	4	packed	IATXTOD macro (Set by IATOSWS)	Output processor stop date, in the form 00YYDDDF where F is the sign. This field is filled in: 1) when an RQ is removed from the writer queue, 2) when all output OSEs are deleted/released, and 3) when a request from the SYSOUT interface is processed.
Actuals Section:						
240	F0	SMF26LN3	2	binary	internal	Length of actuals section, including this field
242	F2	SMF26RV4	2	binary		Reserved
244	F4	SMF26IOD	4	binary	IATISEN	Number of input cards for job. This field includes JCL and SYSIN cards.
248	F8	SMF26XLN	4	binary	IATMSTM for ASP, or IATMSMS for JES3	Number of output lines generated to spool. This field is filled in when the job is terminated on an ASP main processor or a JES3 local or global processor.
252	FC	SMF26XPU	4	binary	IATMSTM for ASP, or IATMSMS for JES3	Number of punched cards generated to spool. This field is filled in when the job is terminated on an ASP main processor or a JES3 local or global processor.
256	100	SMF26RID	4	EBCDIC	TVTCPUID (Set by IATISJB)	Input processor system (CPU) identification
260	104	SMF26CID	4	EBCDIC	TVTCPUID (Set by IATIIDR)	Conversion processor system (CPU) identification
264	108	SMF26XID	4	EBCDIC	TVTCPUID (Set by IATMSMS)	Execution processor system (CPU) identification
268	10C	SMF26OID	4	EBCDIC	TVTCPUID (Set by IATOSDR)	Output processor system (CPU) identification
272	120	SMF26JAF	42	EBCDIC	JOB statement	Reserved for job accounting fields

Record Type 31 – TIOC Initialization

Record type 31 is written by IKJGG001 when a MODIFY tcam operator command is issued. This record contains the number of time-sharing buffers, buffer size, maximum number of output and input buffers allowed per terminal before OWAIT[1] or LWAIT[2] , OWAIT and RESTART thresholds, number of buffers reserved on the free queue, and the size of one terminal status block. Its length is 54 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	TTIRFLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	TTIRCDTY	1	binary	internal	Record type
2	2	TTIRCDTS	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	TTIRCDTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	TTICPUID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	TTINBF	2	binary	TIOCNBF (in TIOCRPT)	Number of time-sharing buffers
16	10	TTIBUFSE	2	binary	TIOCBFSZ (in TIOCRPT)	Time-sharing buffer size, in bytes
18	12	TTIRSVRD	2	binary		Reserved
20	14	TTIOMAX	2	binary	TIOCAOMX (in TIOCRPT)	Maximum number of output buffers allowed per terminal before OWAIT[1]
22	16	TTIIMAX	2	binary	TIOCAIMX (in TIOCRPT)	Maximum number of input buffers allowed per terminal before LWAIT[2]
24	18	TTIOWTH	2	binary	TIOCWTH (in TIOCRPT)	OWAIT threshold. The number of buffers that must be freed in order to be freed from OWAIT.[1]
26	1A	TTIRSTH	2	binary	TIOCRSTH (in TIOCRPT)	RESTART threshold. The number of buffers that must be freed in order to be freed from LWAIT.[2]
28	1C	TTIUSLW	2	binary	TIOCUSLW (in TIOCRPT)	Number of buffers reserved on the free queue. (Less than this number results in a system-wide LWAIT.[2])
30	1E	TTIUSSL	2	binary		Reserved
32	20	TTITSBS	1	binary	TIOCTSBS (in TIOCRPT)	Size of one terminal status block (TSB)
33	21	TTIUSCH	21	binary		Reserved

[1]OWAIT is the suspension of the program during input/output processing to the terminal because no output buffers are available.

[2]LWAIT is the locking of the terminal's keyboard because the terminal user filled all of the available input buffers.

Record Type 34 – TS-Step Termination

Record type 34 is written by IEFTB722 when the TSO logoff function processes a job step termination. Its length is 147 bytes plus (1) eight bytes for each device entry and (2) the length of the step accounting fields.

This record identifies the job by job name, logon time and date, user identification, program name, and performance group number. If accounting numbers (which can be alphameric) were specified on the EXEC card, they are included.

This record also contains operating information such as initiator start time, number of TPUTs issued, number of TGETs satisfied, amount of storage allocated and used, termination status, device allocation start time, problem program start time, step CPU time and storage protect key. It contains the number of page-ins, page-outs, swap-ins, and swap-outs for both VIO and non-VIO data sets.

Record type 34 also has an entry for each non-spooled data set that was defined by a DD statement. Each entry lists the device class, unit type, channel address, unit address, and EXCP count for the data set.

Notes:

1. Data sets are recorded in the order of the step DD statements; they are not identified by name. (A user-written IEFUJV exit routine can record this order as each statement is validated.)
2. For data sets that are dynamically unallocated, the data set entry information is in record type 40 – not in record type 34.
3. For more information on EXCP count and CPU time, see Appendixes B and C, respectively.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	TIVRFLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	TIVRCDTY	1	binary	internal	Record type-
2	2	TIVRCDTS	4	binary	SVC 11 (Set by IEFTB722)	Time, in hundredths of a second, step terminated
6	6	TIVRCDTE	4	packed	SVC 11 (Set by IEFTB722)	Date step terminated, in the form 00YYDDDF where F is the sign
10	A	TIVCPUID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	TIVUIF	8	EBCDIC	JMRJOB	Job name
22	16	TIVONTME	4	binary	JMRENTRY	Logon time, in hundredths of a second
26	1A	TIVONDTE	4	packed	JMREDATE	Logon date, in the form 00YYDDDF where F is the sign
30	1E	TIVUDATA	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	TIVINVSQ	1	binary	JMRSTEP	Step number. (This field always equals 1.)
39	27	TIVSIT	4	binary	JCTJMRSS (Set by IEFSMFIE)	Time, in hundredths of a second, initiator selected this step

(Continued)

Offsets		Name	Length	Format	Source	Description
43	2B	TIVOUTCT	4	binary	TCTLOUT	Number of lines of terminal output, that is, number of TPUTs issued
47	2F	TIVINCT	4	binary	TCTLIN	Number of lines of terminal input, that is, number of TGETs satisfied
51	33	TIVSTAT	2	binary	TCBCMPC	Step completion code: X'0ccc' indicates system ABEND where ccc is the system ABEND code. (See *OS/VS Message Library: VS2 System Codes.*) X'8ccc' indicates user ABEND where ccc is the user ABEND code. X'nnnn' indicates normal completion where nnnn is the contents of the two low-order bytes in register 15 at termination. X'0000' indicates either (1) the job step was flushed (not executed) because of an error during allocation, or (2) normal job completion with a return code of 0. Use this field in conjunction with the step-termination indicator field (offset 83).
53	35	TIVPRI	1	binary	SCTSDP	Address space dispatching priority (taken from DPRTY= parameter on EXEC card or the APG value in CVTAPG)
54	36	TIVPRGNM	8	EBCDIC	SCTPGMNM	Program name (taken from PGM= parameter on EXEC card). If a backward reference was used (SCTSTYPE equals X'80'), then this field contains *.DD.
62	3E	TIVINVNM	8	EBCDIC	SCTSNAME	Step name (taken from name on EXEC card)
70	46	TIVEFRGN	2	binary	TCTRSZ	Private area size in 1K units. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage reserved for the program (taken from REGION= parameter in JCL rounded to 4K boundary). See offset 98.[1]
72	48	TIVSYST	2	binary	TCT, GDA ((PASTRT + PASIZE) – TCTHWM)/1024	Storage used from top of private area, in 1K units. This storage area includes the LSQA and SWA (subpools 229, 230, 236, 237 and 253-255), and is calculated as: highest address in private area minus lowest address of storage allocated from top of private area. If ADDRSPC=REAL is specified, this field equals the amount of storage used that was *not* from the contiguous real storage reserved for the program. See offsets 70 and 98.[1]
74	4A	TIVMCRE	2	binary	(TCTLWM – TCTRBA)/1024	Storage used from bottom of private area, in 1K units. This storage area includes subpools 0-127, 251 and 252, and is calculated as: highest address in bottom of private area minus address of private area. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage that was used. See offsets 70 and 98.[1]
76	4C	TIVRVC	6	binary		Reserved
82	52	TIVSPK	1	binary	TCBPKF	Storage protect key, in the form xxxx0000 where xxxx is the key

(Continued)

[1] If storage was not allocated (job step was flushed), these fields equal zero.

Offsets		Name	Length	Format	Source	Description
83	53	TIVSTI	1	binary		Step termination indicator *Bit* *Meaning When Set* 0-1 Reserved JCTJMRCL 2 Canceled by exit IEFUJI[2] JCTJMRCL 3 Canceled by exit IEFUSI[2] JCTJMRCL 4 Reserved JCTSTEPR 5 Step is to be restarted 6 If 0, normal completion. TCBFA If 1, ABEND. If step completion code (offset 51) equals 0322 or 0522, IEFUTL caused ABEND. If step completion code equals 0722, IEFUSO caused ABEND. TCTHWM 7 If 0, normal completion. If 1, step was flushed.
84	54	TIVRV1	2	binary		Reserved
86	56	TIVAST	4	binary	TCTAST (Set by IEFBB401)	Device allocation start time, in hundredths of a second
90	5A	TIVPPST	4	binary	TCTPPST (Set by IEFAB820)	Problem program start time, in hundredths of a second
94	5E	TIVRV2	1	binary		Reserved
95	5F	TIVSRBT	3	binary	SCTSRBT	Step CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched via SRBs: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling.[3]
98	62	TIVRIN	2	binary		Record indicator *Bit* *Meaning When Set* 0-5 Reserved TCTIEX 6 EXCP count may be wrong[4] SCTSSTAT 7 If 0, storage is virtual. If 1, storage is real. 8-15 Reserved
100	64	TIVRLCT	2	binary	internal	Offset from the beginning of the record header to the relocate section
102	66	TIVVAR	2	binary	internal	Length of device entry portion of record. Calculated as: (8 times the number of devices) + 2
For each device assigned to each *non-spooled* data set, there is an eight-byte entry with the following format:[5]						
+0		TIVDEVC	1	binary	UCBTBYT3	Device class
+1		TIVUTYP	1	binary	UCBTBYT4	Unit type
+2		TIVCUAD	1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address
+4		TIVNEXCP	4	binary	TCTDCTR	EXCP count (see offset 98)[4]

(Continued)

[2]Job steps canceled by IEFUJI and IEFUSI will not be executed; therefore bit 7 will also be on.

[3]If TIME=1440 is specified on the JOB statement, all timing for the job is eliminated. If TIME=1440 is specified on the EXEC statement and a job time limit is not specified on the JOB statement, all timing for the job step is eliminated. For more information, see the IEFUTL exit.

CPU time is not expected to be constant between different runs of the same job step. For more information on CPU time, see Appendix C.

[4]If a GETMAIN for expanding the TCTIOT (the data area where EXCPs are maintained) fails, only the existing data sets are counted. If the functional recovery routine is entered, EXCP counting for the step is discontinued and no device entries are produced. If ADDRSPC=REAL is specified, the EXCP count does not include PCIs. For more information on EXCP count, see Appendix B.

[5]Entries for DD*, DD DATA, DD DUMMY and spooled data sets are zero. (A DD DUMMY entry results when a forward reference to a DD statement having that DD name is not found or when DD DUMMY is specified.) Entries for VIO data sets are zero for class and type, and X'0FFF' for channel/unit address.

Offsets	Name	Length	Format	Source	Description
After the device entries are the following fields:					
Accounting Section:					
+0	TIVVARA	1	binary	internal	Length of accounting section, excluding this field
+1	TIVCPUTM	3	binary	ACTJTIME (in JCT)	Step CPU time under TCBs, in hundredths of a second. This field includes the CPU time for all tasks that are dispatched via TCBs below the level of RCT.[3]
+4	TIVNBRAC	1	binary	internal	Number of accounting fields
+5	TIVACFLD	variable	EBCDIC	EXEC statement	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.
Relocate Section:					
+0[6]	TIVPGIN[6]	4	binary	OUXBPIN + OUSBPIN	Number of non-VIO, non-swap page-ins for this step. This field includes page-ins required through page faults, specific page requests, and page fixes. It does not include page reclaims, page-ins for VIO data sets, pages that are swapped in, and page-ins for the common area.
+4	TIVPGOUT	4	binary	OUXBPOUT + OUSBPOUT	Number of non-VIO, non-swap page-outs for this step. This field includes page-outs required through specific page requests as well as those pages stolen by the paging supervisor as a result of infrequent use. It does not include page-outs for VIO data sets, pages that are swapped out, and page-outs for the common area.
+8	TIVRGNS	4	binary	PVTNSWPS	Number of address space swap sequences. (A swap sequence consists of an address space swap-out and swap-in.)
+12	TIVSIN	4	binary	PVTSPIN	Number of pages swapped in. This field includes: LSQA, fixed pages, and those pages that the real storage manager determined to be active when the address space was swapped in. It does not include page reclaims nor pages found in storage during the swap-in process (such as pages brought in via SRB's started after completion of swap-in Stage 1 processing).
+16	TIVSOUT	4	binary	PVTSPOUT	Number of pages swapped out. This field includes: LSQA, private area fixed pages, and private area non-fixed changed pages.
+20	TIVVPI	4	binary	OUXBVAMI + OUSBVAMI	Number of VIO page-ins for this step. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.
+24	TIVVPO	4	binary	OUXBVAMO + OUSBVAMO	Number of VIO page-outs for this step. This field includes page-outs resulting from specific page requests on a VIO window, as well as those pages stolen by the paging supervisor as a result of infrequent use. It does not include VIO swap-outs or page-outs for the common area.
+28	TIVSST	4	binary	OUXBJBS + OUXBTRS	Step service, in service units[7]
+32	TIVACT	4	binary	OUXBJBT + OUXBTRT	Step transaction active time, in 1024-microsecond units[7]
+36	TIVPGNO	2	binary	OUCBNPG	Step performance group number (taken from PERFORM= parameter on JOB or EXEC card)[7]

(continued)

[3] If TIME=1440 is specified on the JOB statement, all timing for the job is eliminated. If TIME=1440 is specified on the EXEC statement and a job time limit is not specified on the JOB statement, all timing for the job step is eliminated. For more information, see the IEFUTL exit.

CPU time is not expected to be constant between different runs of the same job step. For more information on CPU time, see Appendix C.

[6] The displacement of this field depends upon the size of the accounting fields and the number of devices. Offset 100 contains the displacement for this field.

[7] For more information on service, transaction active time, and performance group number, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

Offsets	Name	Length	Format	Source	Description
+38	TIVTRANT	4	binary	OUXBJBR	Step transaction residency ttime, in 1024-microsecond units. That is the amount of time the transaction was in real storage.
+42	TIVRECLM	4	binary	OUSBPREC + OUXBPREC	Number of reclaims for this step
+46	TIVRCLAM	4	binary	OUSBVAMR + OUXBVAMR	Number of VIO reclaims for this step
+50	TIVCPGIN	4	binary	OUSBCAPI + OUXBCAPI	Number of common area page-ins for this step
+54	TIVCRECL	4	binary	OUSBCAPR + OUXBCAPR	Number of common area reclaims for this step
+58	TIVPGSTL	4	binary	OUSBSTCT + OUXBSTCT	Number of pages stolen from the storage for this step
+62	TIVPGSEC	8	binary	OUCBPSS	Number of page seconds for this step, in page millisecond units. Calculated as: the number of pages used by this step times the execution time it held that number of pages.

Record Type 35 – LOGOFF

Record type 35 is written by IEFTB722 when a logoff process is completed. Its length is 117 bytes plus the length of the job accounting fields.

This record identifies the job by job name, logoff time and date, logon time and date, user identification, and performance group number. If accounting numbers (which can be alphameric) were specified on the JOB card, they are included.

This record also contains operating information such as number of TPUTs issued, number of TGETs satisfied, termination status, storage protect key, job service, transaction active time, number of transactions, and job CPU time.

Note: For more information on CPU time, see Appendix C.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	TLGRFLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	TLGRCDTY	1	binary	internal	Record type
2	2	TLGRCDTS	4	binary	SVC 11 (Set by IEFTB722)	Logoff time, in hundredths of a second
6	6	TLGRCDTE	4	packed	SVC 11 (Set by IEFTB722)	Logoff date, in the form 00YYDDDF where F is the sign
10	A	TLGCPUID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	TLGUIF	8	EBCDIC	JMRJOB	Job name
22	16	TLGONTME	4	binary	JMRENTRY	Logon time, in hundredths of a second
26	1A	TLGONDTE	4	packed	JMREDATE	Logon date, in the form 00YYDDDF where F is the sign
30	1E	TLGUDATA	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	TLGSTPCT	1	binary	JMRSTEP	Number of steps in session. (This field always equals 1.)
39	27	TLGCRTME	4	binary		Reserved
43	2B	TLGOUTCT	4	binary	TCTLOUT	Number of lines of terminal output, that is, number of TPUTs issued
47	2F	TLGINCT	4	binary	TCTLIN	Number of lines of terminal input, that is, number of TGETs satisfied
51	33	TLGSTAT	2	binary	TCBCMPC	Job completion code: X'0ccc' indicates system ABEND where ccc is the system ABEND code (See *OS/VS Message Library: VS2 System Codes.*) X'8ccc' indicates user ABEND where ccc is the user ABEND code. X'nnnn' indicates normal completion where nnnn is the contents of the two low-order bytes in register 15 at termination. X'0000' indicates normal job completion with return code of 0. Use this field in conjunction with the job termination indicator field (offset 62).

(Continued)

Offsets		Name	Length	Format	Source	Description
53	35	TLGPRI	1	binary	JCTJPRTY	Logon priority. This field normally equals the user-assigned priority of 0-13, but if the job fails while being scheduled, this field equals 14 (taken from JOB card)
54	36	TLGNQTME	4	binary	JMRDRSTP	Logon enqueue time, in hundredths of a second
58	3A	TLGNQDTE	4	packed	JMRDRSTP + 4	Logon enqueue date, in the form 00YYDDDF where F is the sign
62	3E	TLGTRMI	1	binary	JCTJMRCL JCTJMRCL	Job termination indicator *Bit* *Meaning When Set* 0-1 Reserved 2 Canceled at exit IEFUJI 3 Canceled at exit IEFUSI 4-7 Reserved
63	3F	TLGOUTCL	1	binary		Reserved
64	40	TLGTRANT	4	binary	OUXBJBR	Job transaction residency time, in 1024-microsecond units. That is the total amount of time all transactions were in real storage.[2]
68	44	TLGRVC	4	binary		Reserved
72	48	TLGSPK	1	binary	TCBPKF	Storage protect key, in the form xxxx0000 where xxxx is the key
73	49	TLGSRBT	3	binary	SCTSRBT	Job CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched via SRB: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling.[1]
76	4C	TLGTJS	4	binary	OUXBJBS + OUXBTRS	Job service, in service units[2]
80	50	TLGTTAT	4	binary	OUXBJBT + OUXBTRT	Job transaction active time, in 1024-microsecond units[2]
84	54	TLGNTSN	4	binary	OUXBTRC	Number of transactions[2]
88	58	TLGPGNO	2	binary	OUCBNPG	Performance group number (taken from PERFORM= parameter on JOB card)[2]
90	5A	TLGRV2	2	binary		Reserved
92	5C	TLGVAR	1	binary	ACTLEN (in JCT)	Length of rest of record, excluding this field
93	5D	TLGRVB	20	EBCDIC		Reserved
113	71	TLGCPUTM	3	binary	ACTJTIME (in JCT)	Job CPU time under TCBs, in hundredths of a second. This field includes the CPU time for all tasks that are dispatched via TCBs below the level of RCT.[1]
116	74	TLGNBRAC	1	binary	ACTJNFLD (in JCT)	Number of accounting fields
117	75	TLGACFLD	variable	EBCDIC	JOB statement	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

[1] If TIME=1440 is specified on the JOB statement, all timing for the job is eliminated. If TIME=1440 is specified on an EXEC statement and a job time limit is not specified on the JOB statement, all timing for that job step is eliminated. For more information, see the IEFUTL exit.

CPU time may not be constant between different runs of the same job. For more information on CPU time, see Appendix C.

[2] For more information on service, transaction active time, and performance group number, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.* Note that the service, active time, and residency time may have been accumulated under different performance group numbers.

Record Type 40 – Dynamic DD

Record type 40 is written by IEFDB4F9 when an unallocation, concatenation, or deconcatenation request is processed. For an unallocation request, this record contains a device entry only for the data set unallocated. For a concatenation or deconcatenation request, this record contains a device entry for each DD entry in the TCTIOT. Its length is 62 bytes plus eight bytes for each device entry.

Record type 40 contains the job log identification, user identification, step number, functional indicator, and device entries. Each device entry consists of the device class, unit type, channel address, unit address, and EXCP count for the data set.

Note: For more information on EXCP count and CPU time, see Appendixes B and C, respectively.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	TDDRFLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	TDDRCDTY	1	binary	internal	Record type
2	2	TDDRCDTS	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	TDDRCDTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	TDDCPUID	4	EBCDIC	JMRCPUID	System identification (taken from SID parameter)
14	E	TDDUIF	8	EBCDIC	JMRJOB	Job name[1]
22	16	TDDONTME	4	binary	JMRENTRY	Logon time, in hundredths of a second (If background job, this field contains the time the reader recognized the JOB card.)[1]
26	1A	TDDONDTE	4	packed	JMREDATE	Logon date, in the form 00YYDDDF where F is the sign. (If background job, this field contains the date the reader recognized the JOB card.)[1]
30	1E	TDDUDATA	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	TDDINVSQ	1	binary	JMRSTEP	Step number (first step = 1, etc.)
39	27	TDDFLG	1	binary	internal	Functional indicator *Value* *Meaning* 2 Unallocation 3 Concatenation 4 Deconcatenation
40	28	TDDRIN	2	binary	TCTIEX	Record indicator *Bit* *Meaning When Set* 0-6 Reserved 7 EXCP count may be wrong[2] 8-15 Reserved

(Continued)

[1] The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

[2] If a GETMAIN for expanding the TCTIOT (the data area where EXCPs are maintained) fails, only the existing data sets are counted. If the functional recovery routine is entered, EXCP counting for the step is discontinued and no device entries are produced. If ADDRSPC=REAL is specified, the EXCP count does not include PCIs. For more information on EXCP count, see Appendix B.

Offsets		Name	Length	Format	Source	Description
42	2A	TDDRVA	18	binary		Reserved
60	3C	TDDVAR	2	binary	internal	Length of device entry portion of this record. Calculated as: (8 times the number of devices) + 2
For each device, there is an eight-byte entry with the following format:[3]						
+0		TDDDEVC	1	binary	UCBTBYT3	Device class
+1		TDDUTYP	1	binary	UCBTBYT4	Unit type
+2		TDDCUAD	1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)
+3			1	binary	UCBUA	Unit address
+4		TDDNEXCP	4	binary	TCTDCTR	EXCP count (see offset 40)[2]

[2]If a GETMAIN for expanding the TCTIOT (the data area where EXCPs are maintained) fails, only the existing data sets are counted. If the functional recovery routine is entered, EXCP counting for the step is discontinued and no device entries are produced. If ADDRSPC=REAL is specified, the EXCP count does not include PCIs. For more information on EXCP count, see Appendix B.

[3]The device entry is zero when the DD entry is TERM, DUMMY, or unallocated DYNAM. (A DD DUMMY entry also results when a forward reference to a DD statement having that DD name is not found.) Entries for virtual I/O data sets are zero for class and type, and X'0FFF' for channel/unit address.

Record Type 43 -- JES2 Start

Record type 43 is written by HASPINIT when an S JES2 command (to start JES2) is issued, and by HASPMISC when a $E SYS command (to reclaim the job processing that was being done on the named system in a Multi-Access Spool complex) is issued. This record contains a start/warm start indicator, JES2 start options, and the identification of the system whose job processing is to be reclaimed. Its length is 28 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF43FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF43RTY	1	binary	internal	Record type
2	2	SMF43TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF43DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF43SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF43SBS	2	binary	internal	Subsystem identification -- X'0002' signifies JES2
16	10	SMF43RSV	2	binary		Reserved
18	12	SMF43LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF43RV1	2	binary		Reserved
22	16	SMF43RST	1	binary	internal	Start/warm start indicator *Bit* *Meaning When Set* 0 If 0, record written for S JES2 command. If 1, record written for $E SYS command (see offset 24). 1-7 Reserved
23	17	SMF43OPT	1	binary	$OPTSTAT (in HCT)	JES2 start options. (This field is zero for $E SYS command.) *Bit* *Meaning When Set* 0 Format the spool 1 Cold start 2 Request automatic initiator 3 List replacement card option 4-7 Reserved
24	18	SMF43EID	4	EBCDIC	QSESID	If $E SYS command, identification of system whose job processing is to be reclaimed (see offset 22). If S JES2 command, zero.

Record Type 43 -- JES3 Start

Record type 43 is written by IATINTK during JES3 initialization. This record contains an indicator for the type of JES3 start, JES3 initialization deck origin type and contents, and JES3 procedure name. Its length is 38 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF43FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF43RTY	1	binary	internal	Record type
2	2	SMF43TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF43DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF43SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF43SBS	2	binary	internal	Subsystem identification -- X'0005' signifies JES3
16	10	SMF43RSV	2	binary		Reserved
18	12	SMF43LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF43RV1	2	binary		Reserved
22	16	SMF43RST	1	binary	Set by IATINGL	JES3 start record indicator (taken from operator's response to WTOR macro) *Bit* *Meaning When Set* 0 Cold start 1 Warm start 2 Hot start 3 Start is with JES3 queue analysis 4 JES3 global processor. This bit is always set if start is a cold start or warm start. 5 JES3 local processor. This bit is always set if start is a hot start. 6 Reserved 7 Dynamic system interchange was invoked by operator to convert a local processor to the global processor. Bits 2 and 4 will also be set.
23	17	SMF43RV2	2	binary		Reserved
25	19	SMF43NMU	1	EBCDIC	Set by IATINGL	JES3 initialization deck origin type (taken from operator's response to WTOR macro)
26	1A	SMF43ORG	8	EBCDIC	Set by IATINGL	JES3 initialization deck origin location (taken from operator's response to WTOR macro) *Type* *Contents* *Location* N Member name JCL in JES3 procedure M Member name Data set in JES3 procedure U Unit address Unit at specified address
34	22	SMF43PJ3	4	EBCDIC	JESPJESN in JESCT	JES3 procedure name

Record Type 45 – JES2 Withdrawal

Record type 45 is written by HASPNUC when a $P JES2 command (to withdraw JES2 from the system) is issued. It is also written at the abnormal termination of JES2 if JES2 regains control long enough to write the record. This record contains a termination indicator and JES2 completion code. Its length is 24 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF45FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF45RTY	1	binary	internal	Record type
2	2	SMF45TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF45DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF45SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF45SBS	2	binary	internal	Subsystem identification – X'0002' signifies JES2
16	10	SMF45RSV	2	binary		Reserved
18	12	SMF45LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF45IND	2	binary	internal	Termination indicator *Bit* *Meaning When Set* 0 If 0, record written for $P JES2 command (JES2 withdrawal). If 1, record written for abnormal JES2 termination. 1-15 Reserved
22	16	SMF45JCC	2	binary	internal	JES2 completion code

Record Type 45 – JES3 Stop

Record type 45 is written by IATINTK during JES3 termination. This record contains an indicator for the type of JES3 stop and the JES3 completion code. Its length is 26 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF45FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF45RTY	1	binary	internal	Record type
2	2	SMF45TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF45DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF45SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF45SBS	2	binary	internal	Subsystem identification – X'0005' signifies JES3
16	10	SMF45RSV	2	binary		Reserved
18	12	SMF45LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF45FG1	1	binary	Set by IATNUC Set by IATYIK macro	JES3 stop record indicator *Bit* *Meaning When Set* 0 JES3 abnormally terminated (taken from completion code in ECB) 1 Dynamic system interchange was invoked by operator to convert a local processor to the global processor 2-7 Reserved
21	15	SMF45J3C	3	binary	Set by IATNUC	JES3 completion code (taken from completion code in ECB) where bits 0-11 represent a system code and bits 12-23 represent a user code. Note that the JES3 completion code, as recorded on the operator's console, is always S 2FB.
24	18	SMF45RV1	2	binary		Reserved

Record Type 47 – JES2 SIGNON/Start Line

Record type 47 is written by HASPRTAM when (1) a $S LNEn command (to start a line) is issued, (2) a $E LNEn command (to restart a line) is issued, and (3) a remote user signs on. This record contains a record indicator, remote name, line name, password, and message text. Its length is 48 bytes for a $S LNEn command and 86 bytes for a SIGNON record.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF47FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF47RTY	1	binary	internal	Record type
2	2	SMF47TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF47DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF47SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF47SBS	2	binary	internal	Subsystem identification – X'0002' signifies JES2
16	10	SMF47RSV	2	binary		Reserved
18	12	SMF47LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF47EVT	2	binary	internal	Record indicator *Bit* *Meaning When Set* 0-13 Reserved 14 Record written for $S LNEn command 15 Record written for SIGNON
Identification Section:						
22	16	SMF47LN1	2	binary	internal	Length of identification section, including this field
24	18	SMF47RMT	8	EBCDIC	RATNAME	Remote name. (This field is filled in only if a remote terminal is connected to this line.)
32	20	SMF47LIN	8	EBCDIC	DCTDEVN	Line name
40	28	SMF47PSW	8	EBCDIC	MDCTPSWD (in DCT)	Password
The following fields apply when a remote user signs on:						
Message Section:						
48	30	SMF47LN2	2	binary	internal	Length of rest of record, including this field
50	32	SMF47MSG	36	EBCDIC	SIGNON record	Message text. This field includes columns 35-70 of the SIGNON card image.

Record Type 47 – JES3 SIGNON/Start Line

Record type 47 is written by IATRJM3 when (1) an RJP line is started, and (2) a remote user signs on. This record contains a record indicator, remote name, line name, password, and SIGNON message text. Its length is 48 bytes for a started line and 86 bytes for a SIGNON record.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF47FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF47RTY	1	binary	internal	Record type
2	2	SMF47TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF47DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF47SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF47SBS	2	binary	internal	Subsystem identification – X'0005' signifies JES3
16	10	SMF47RSV	2	binary		Reserved
18	12	SMF47LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF47EVT	2	binary	IATRJM1 IATRJM3	Record indicator *Bit* *Meaning When Set* 0-13 Reserved 14 Record written for started line 15 Record written for SIGNON
Identification Section:						
22	16	SMF47LN1	2	binary	internal	Length of identification section including this field
24	18	SMF47RMT	8	EBCDIC	IATRJM1 for line, IATRJM3 for SIGNON	Remote name. (This field is filled in only if a remote terminal is connected to this line.)
32	20	SMF47LIN	8	EBCDIC	IATRJM1 for line, IATRJM3 for SIGNON	Line name
40	28	SMF47PSW	8	EBCDIC	SIGNON record	Password
The following fields apply when a remote user signs on:						
Message Section:						
48	30	SMF47LN2	2	binary	internal	Length of message section, including this field
50	32	SMF47MSG	36	EBCDIC	SIGNON record	Message text. This field includes columns 35-70 of the SIGNON card image.

Record Type 48 – JES2 SIGNOFF/Stop Line

Record type 48 is written by HASPRTAM when (1) a $P LNEn command (to stop a line) is issued, (2) a $E LNEn command (to restart a line) is issued, and (3) a remote user signs off. This record contains a record indicator, remote name, line name, password, line adapter address, and the number of EXCPs, negative acknowledgements to write text, data checks to read text, and time outs to read text. Its length is 71 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF48FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF48RTY	1	binary	internal	Record type
2	2	SMF48TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF48DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF48SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF48SBS	2	binary	internal	Subsystem identification – X'0002' signifies JES2
16	10	SMF48RSV	2	binary		Reserved
18	12	SMF48LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF48EVT	2	binary	internal	Record indicator *Bit* *Meaning When Set* 0-13 Reserved 14 Record written for $P LNEn command 15 Record written for SIGNOFF
22	16	SMF48RV1	2	binary		Reserved
24	18	SMF48RMT	8	EBCDIC	RATNAME	Remote name. (This field is filled in only if a remote terminal is connected to this line.)
32	20	SMF48LIN	8	EBCDIC	DCTDEVN	Line name
40	28	SMF48PSW	8	EBCDIC	MDCTPSWD (in DCT)	Password
48	30	SMF48IO	4	binary	MDCTSXCP or MDCTXCP[1]	EXCP count
52	34	SMF48NAK	4	binary	MDCTSNAK or MDCTNAK[1]	Number of negative acknowledgements to write text
56	38	SMF48DCK	4	binary	MDCTSDCK or MDCTDCK[1]	Number of data checks to read text
60	3C	SMF48OUT	4	binary	MDCTSTO or MDCTTO[1]	Number of time outs to read text
64	40	SMF48ERR	4	binary	MDCTSREM or MDCTREM[1]	Sum of all other line errors
68	44	SMF48LAA	3	EBCDIC	UCBNAME	Line adapter address

[1]The field names beginning with MDCTS are for SIGNOFF and contain session totals; the other fields are for $P LNEn commands and contain connection totals.

Record Type 48 – JES3 SIGNOFF/Stop Line

Record type 48 is written by IATRJM3 when (1) an RJP line is stopped, and (2) a remote user signs off. This record contains a record indicator, remote name, line name, password, line adapter address, and the number of EXCPs, line errors, time outs, NAKs, command rejects, interventions required, bus-out checks, equipment checks, data checks, data overruns, and lost datas. Its length is 79 bytes.

Note: The statistics in this record are accumulated for the line from SIGNON to SIGNOFF.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF48FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF48RTY	1	binary	internal	Record type
2	2	SMF48TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF48DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF48SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF48SBS	2	binary	internal	Subsystem identification – X'0005' signifies JES3
16	10	SMF48RSV	2	binary		Reserved
18	12	SMF48LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF48EVT	2	binary	 IATRJM4 IATRJM4	Record indicator *Bit* *Meaning When Set* 0-13 Reserved 14 Record written for stopped line 15 Record written for SIGNOFF
22	16	SMF48RV1	2	binary		Reserved
24	18	SMF48RMT	8	EBCDIC	IATRJM4	Remote name. (This field is filled in only if a remote terminal is connected to this line.)
32	20	SMF48LIN	8	EBCDIC	IATRJM4	Line name
40	28	SMF48PSW	8	EBCDIC	IATRJM4	Password
48	30	SMF48TRN	4	binary	IATRJM4	EXCP count
52	34	SMF48ERS	4	binary	IATRJM4	Number of line errors
56	38	SMF48TOT	2	binary	IATRJM4	Number of time outs to read text
58	3A	SMF48NKS	2	binary	IATRJM4	Number of negative acknowledgements to write text
60	3C	SMF48S0	1	binary	IATRJM4	Number of command rejects
61	3D	SMF48S1	1	binary	IATRJM4	Number of interventions required
62	3E	SMF48S2	1	binary	IATRJM4	Number of bus-out checks
63	3F	SMF48S3	1	binary	IATRJM4	Number of equipment checks
64	40	SMF48S4	1	binary	IATRJM4	Number of data checks
65	41	SMF48S5	1	binary	IATRJM4	Number of data overruns
66	42	SMF48S6	1	binary	IATRJM4	Number of lost datas
67	43	SMF48USR	9	binary		Reserved
76	4C	SMF48ADP	3	EBCDIC	IATRJM4	Line adapter address

Record Type 49 – JES2 Integrity

Record type 49 is written by HASPRTAM when a remote user attempts to sign on with an invalid password. This record is the same as record type 47 except the password is invalid. It contains a record indicator, remote name, line name, invalid password, and message text. Its length is 86 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF49FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF49RTY	1	binary	internal	Record type
2	2	SMF49TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF49DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF49SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF49SBS	2	binary	internal	Subsystem identification – X'0002' signifies JES2
16	10	SMF49RSV	2	binary		Reserved
18	12	SMF49LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF49EVT	2	binary	internal	Record indicator *Bit* *Meaning When Set* 0-14 Reserved 15 Record written for SIGNON
Identification Section:						
22	16	SMF49LN1	2	binary	internal	Length of identification section, including this field
24	18	SMF49RMT	8	EBCDIC	RATNAME	Remote name. (This field is filled in only if a remote terminal is connected to this line.)
32	20	SMF49LIN	8	EBCDIC	DCTDEVN	Line name
40	28	SMF49PSW	8	EBCDIC	SIGNON record	Invalid password
Message Section:						
48	30	SMF49LN2	2	binary	internal	Length of rest of record, including this field
50	32	SMF49MSG	36	EBCDIC	SIGNON record	Message text. This field includes columns 35-70 of the SIGNON card image.

Record Type 49 – JES3 Integrity

Record type 49 is written by IATRJM3 when a remote user attempts to sign on with an invalid password. This record is the same as record type 47 except the password is invalid. It contains a record indicator, remote name, line name, invalid password, and SIGNON message text. Its length is 86 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF49FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF49RTY	1	binary	internal	Record type
2	2	SMF49TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF49DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF49SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF49SBS	2	binary	internal	Subsystem identification – X'0005' signifies JES3
16	10	SMF49RSV	2	binary		Reserved
18	12	SMF49LRR	2	binary	internal	Length of rest of record, excluding this field
20	14	SMF49EVT	2	binary	IATRJM3	Record indicator *Value Meaning* 1 Terminal not defined 2 Invalid password 3 Line already signed on 4 Terminal already signed on
Identification Section:						
22	16	SMF49LN1	2	binary	internal	Length of identification section, including this field
24	18	SMF49RMT	8	EBCDIC	IATRJM3	Remote name (This field is filled in only if a remote terminal is connected to this line.)
32	20	SMF49LIN	8	EBCDIC	IATRJM3	Line name
40	28	SMF49PSW	8	EBCDIC	SIGNON record	Invalid password
Message Section:						
48	30	SMF49LN2	2	binary	internal	Length of message section, including this field
50	32	SMF49MSG	36	EBCDIC	SIGNON record	Message text. This field includes columns 35-70 of the SIGNON card image.

Record Type 62 – VSAM Component or Cluster Opened

Record type 62 is written by IDA0192A and IDA0192S at the successful or unsuccessful opening of a VSAM component or cluster. Its length is 138 bytes plus ten bytes for each volume listed.

Record type 62 identifies the VSAM component or cluster and indicates whether it was successfully opened. It names the VSAM catalog in which the object is defined and the volumes on which the catalog and object are stored. It also identifies the job that issued the OPEN macro by job log identification and user identification.

Note: This record is not generated when a system task issues the OPEN macro.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF62FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF62RTY	1	binary	internal	Record type
2	2	SMF62TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF62DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF62SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF62JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF62RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF62RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF62UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF62IND	4	binary	Set by IDA0192A and passed to IDA0192S in parameter list	Open status indicator *Bit* *Meaning When Set* 0 Component or cluster was successfully opened 1 Security violation, that is, invalid password 2-31 Reserved
42	2A	SMF62CNM	44	EBCDIC	CAXCNAM (in IGGCAXWA)	Name of the catalog in which the component or cluster is defined
86	56	SMF62CVS	6	EBCDIC	UCBVOLI	Volume serial number of the volume containing the catalog
92	5C	SMF62DNM	44	EBCDIC	JFCBDDNM	Name of the component or cluster being opened
136	88	SMF62VCT	2	binary	OPEN routine calculates from VMT entries	Number of online volumes containing the component or cluster. (This field is also the number of ten-byte fields that list the volumes.)
For each online volume, there is a ten-byte entry with the following format:						
+0		SMF62VSR	6	EBCDIC	VMTVLSER	Volume serial number of the volume containing the component or cluster
+6		SMF62DTY	4	binary	UCBTYP	Unit type of the volume containing the component or cluster

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Record Type 63 – VSAM Entry Defined

Record type 63 is written by IGG0CLBV when a VSAM catalog entry (a component, cluster, catalog, alternate index, path, or non-VSAM data set) (1) is defined by the DEFINE Access Method Service command, (2) is altered with new space allocation information (that is, when the VSAM end-of-volume (EOV) routine extends the entry's object), and (3) is changed by the ALTER Access Method Services command. One record type 63 is written for each newly created or altered entry. Its length is 132 bytes plus the length of the catalog records required to describe the entry.

Record type 63 identifies the catalog in which the object is defined, gives the catalog record for the newly defined object, and, for an alteration, gives the parts of the old catalog record before they were altered. It identifies the job by job log identification and user identification.

Notes:

1. The IEHUCAT utility program uses SMF record types 63 and 67 to update an OS catalog to the level of a VSAM catalog. For more information on IEHUCAT, see *OS/VS Utilities.*
2. The length of this record can be from 1000 to 4000 bytes or more, depending upon the sizes of the new and old catalog records (offsets 40 and 42, respectively). If this record is to be written to the SMF data set, be sure to include the sizes of these catalog records when estimating the additional storage required for the SMF buffer and the SMF data sets.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF63FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF63RTY	1	binary	internal	Record type
2	2	SMF63TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF63DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF63SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF63JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF63RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF63RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF63UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)[1]
38	26	SMF63FDT	1	binary	VSAM catalog record entry type	Record creator/entry type indicator *Bit* *Meaning When Set* 0 New definition 1 Altered definition 2-5 Reserved 6 Path defined or altered 7 Alternate index defined or altered

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. If a system task caused the record to be written, the job-name and user-identification fields contain blanks and the time and date fields contain zeros.

(Continued)

Offsets		Name	Length	Format	Source	Description
39	27	SMF63TYP	1	binary	VSAM catalog record entry type	Entry type indicator *Bit* *Meaning When Set* 0 VSAM cluster 1 VSAM data component 2 VSAM index component 3 VSAM catalog 4 Non-VSAM data set 5 Generation data group 6 Alias 7 Reserved
40	28	SMF63NSZ	2	binary	internal	Size of new catalog record. (Be sure to include the contents of this field when estimating the additional storage required by SMF.)[2]
42	2A	SMF63OSZ	2	binary	internal	Size of old catalog record. This field contains the size of the old records before they were altered. (Be sure to include the contents of this field when estimating the additional storage required by SMF.)[2]
44	2C	SMF63CNM	44	EBCDIC	CAXCNAM (in IGGCAXWA)	Name of catalog in which the entry is defined
88	58	SMF63ENM	44	EBCDIC	Name field of VSAM catalog record	Entry name
132	84	SMF63NCR	variable	binary	VSAM catalog entry records	New catalog record followed by old catalog record.[2] For the new catalog record, the complete new entry is recorded. For the old catalog record, this field contains only those old records that were altered; it shows what these records were before they were altered.

[2]A VSAM catalog record is contained in one or more physical catalog records. Offsets 40 and 42 are the sums of the sizes of the physical catalog records that constitute the total logical VSAM catalog record.

Record Type 64 – VSAM Component or Cluster Status

Record type 64 is written when (1) a VSAM component or cluster is closed, (2) VSAM must switch to another volume to continue to read or write, and (3) there is no more space available for VSAM to continue processing. If a cluster is closed, one record is written for each component in the cluster. This record is written by IDA0192S, IDA0200B, IDA0231B, and IDA0557A. Its length is 250 bytes plus 26 bytes for each extent.

Record type 64 indicates why the record was created (a component was closed, another volume was switched to, or no additional space was available). It describes the device and volume(s) on which the object is stored, and gives the extents of the object on the volume(s). It also gives statistics about various processing events that have occurred since the object was defined, such as the number of records in the data component, the number of records that were inserted, and the number of control intervals that were split. This record identifies the job by job log identification and user identification.

Notes:

1. This record is not generated for system tasks.
2. For more information on EXCP count, see Appendix B.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF64FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF64RTY	1	binary	internal	Record type
2	2	SMF64TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF64DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF64SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF64JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF64RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF64RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF64UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)
38	26	SMF64RIN	1	binary	internal	Situation indicator *Bit* *Meaning When Set* 0 Component closed 1 Volume switched 2 No space available 3-7 Reserved
39	27	SMF64DTY	1	binary	AMBTYPE	Indicator of component being processed *Bit* *Meaning When Set* 0 Data component 1 Index component 2-7 Reserved
40	28	SMF64CNM	44	EBCDIC	CAXCNAM (in IGGCAXWA)	Name of the catalog in which the component is defined
84	54	SMF64DNM	44	EBCDIC	VSAM catalog (ENTNAME)	Name of the component being processed
128	80	SMF64NTR	2	binary	VSAM catalog (PRIMSPAC for primary allocation; SCONSPAC for secondary allocation)	Number of tracks that were requested but could not be allocated
130	82	SMF64CHR	4	binary	ARDHRBA (in ARDB)	Highest used relative byte address (RBA) of the component
134	86	SMF64ESL	2	binary	DEBNMEXT * 26	Length of extent entry portion of record, excluding this field
For each extent, there is a 26-byte entry with the following format:						
+0		SMF64FCC	4	binary	DEBSTRCC	Beginning cylinder and track, in the form CCHH where CC is the cylinder number and HH is the track number
+4		SMF64TCC	4	binary	DEBENDCC	Ending cylinder and track, in the form CCHH where CC is the cylinder number and HH is the track number
+8		SMF64VSN	6	EBCDIC	UCBVOLI	Volume serial number of the volume containing the extent
+14		SMF64CUU	1	binary	UCBCHA	Channel address. (A mass storage volume is indicated when the high-order bit of this field is on.)[2]
			1	binary	UCBUA	Unit address[2]
+16		SMF64IND	2	binary	internal	Spindle identification

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. (Continued)

[2]These fields are zero for DD*, DD DATA, DD DUMMY and spooled data sets.

Offsets		Name	Length	Format	Source	Description
+18		SMF64UTY	4	binary	UCBTYP	Unit type
+22		SMF64RV1	4	binary		Reserved
Statistics Section: [3]						
Accumulative Statistics from Creation Until the Current OPEN:						
+0		SMF64SLN	4	binary	internal	Length of the statistics section, including this field
+4		SMF64NIL	4	binary	AMDNIL	Number of levels in the index
+8		SMF64NEX	4	binary	AMDNEXT	Number of extents
+12		SMF64NLR	4	binary	AMDNLR	Number of records in the component
+16		SMF64NDE	4	binary	AMDDELR	Number of records that were deleted from the component
+20		SMF64NIN	4	binary	AMDIREC	Number of records that were inserted into the component
+24		SMF64NUP	4	binary	AMDUPR	Number of records that were updated in the component
+28		SMF64NRE	4	binary	AMDRETR	Number of records that were retrieved from the component
+32		SMF64NFS	4	binary	AMDFSCA	Number of unused control intervals in the component
+36		SMF64NCS	4	binary	AMDNCIS	Number of control intervals that were split in the component
+40		SMF64NAS	4	binary	AMDNCAS	Number of control areas that were split in the component
+44		SMF64NEP	4	binary	AMDEXCP	Number of EXCPs. (For more information about EXCP count, see Appendix B.)
Change in Statistics from OPEN to Time of EOV and CLOSE:						
+48		SMF64DIL	4	binary	AMDNIL	Change in number of levels in the index
+52		SMF64DEX	4	binary	AMDNEXT	Change in number of extents
+56		SMF64DLR	4	binary	AMDNLR	Change in number of records in the component
+60		SMF64DDE	4	binary	AMDDELR	Change in number of records that were deleted from the component
+64		SMF64DIN	4	binary	AMDIREC	Change in number of records that were inserted into the component
+68		SMF64DUP	4	binary	AMDUPR	Change in number of records that were updated in the component
+72		SMF64DRE	4	binary	AMDRETR	Change in number of records that were retrieved from the component
+76		SMF64DFS	4	binary	AMDFSCA	Change in number of unused control intervals in the component. (This field may be negative.)
+80		SMF64DCS	4	binary	AMDNCIS	Change in number of control intervals that were split in the component
+84		SMF64DAS	4	binary	AMDNCAS	Change in number of control areas that were split in the component
+88		SMF64DEP	4	binary	AMDEXCP	Change in number of EXCPs. (For more information about EXCP count, see Appendix B.)
Data Set Characteristics Section:						
+92		SMF64DBS	4	binary	LPMBLKSZ (in IDALPMB)	Physical block size
+96		SMF64DCI	4	binary	AMDCINV (in AMDSB)	Control interval size
+100		SMF64DLS	4	binary	AMDLRECL (in AMDSB)	Maximum logical record size
+104		SMF64DKL	2	binary	AMDKEYLN (in AMDSB)	Key length
+106		SMF64DDN	8	EBCDIC	TIOEDDNM	DD name. When the record is written for a VSAM catalog or catalog recovery area, this field may contain zeros. When the record is written for a volume switch or no space available condition, and the volume is associated with a concatenated TIOT entry, this field contains blanks.

[3] All the fields in this section are present and are taken from the AMDSB data area; inapplicable fields contain zeros.

Record Type 67 – VSAM Entry Deleted

Record type 67 is written by IGG0CLBV when a VSAM catalog entry (a component, cluster, catalog, alternate index, path, or non-VSAM data set) is deleted. A type 63 record is written for each entry affected by the DELETE Access Method Services command. For example, three records are written for an indexed cluster: one for the relationship between the components of the cluster, one for the data component, and one for the index component. Its length is 130 bytes plus the length of the catalog records required to describe the entry.

Record type 67 identifies the deleted entry, the VSAM catalog in which the entry was defined, and the deleted catalog records. It identifies the job by job log identification and user identification.

Notes:

1. The IEHUCAT utility program uses SMF record types 63 and 67 to update an OS catalog to the level of a VSAM catalog. For more information on IEHUCAT, see *OS/VS Utilities.*
2. The length of this record can be from 1000 to 4000 bytes or more, depending upon the sizes of the catalog records that describe the entry (offset 128). If this record is to be written to the SMF data set, be sure to include the sizes of these catalog records when estimating the additional storage required for the SMF buffer and the SMF data sets.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF67FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF67RTY	1	binary	internal	Record type
2	2	SMF67TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF67DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF67SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF67JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF67RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF67RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF67UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)[1]
38	26	SMF67FDT	1	binary	VSAM catalog record entry type	Record creator/entry type indicator *Bit* *Meaning When Set* 0 Uncataloged[2] 1 Scratched[2] 2-5 Reserved 6 Path deleted 7 Alternate index deleted

(Continued)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. If a system task caused the record to be written, the job-name and user-identification fields contain blanks and the time and date fields contain zeros.

[2]Both indicators are set for VSAM component or cluster entries. For all other VSAM entries, only the uncataloged bit is set. For non-VSAM entries, the uncatalog bit is always set and the scratched bit is set if the physical non-VSAM space was deleted.

Offsets		Name	Length	Format	Source	Description
39	27	SMF67IOD	1	binary	VSAM catalog record entry type	Entry type indicator *Bit* *Meaning When Set* 0 VSAM cluster 1 VSAM data component[3] 2 VSAM index component[3] 3 VSAM catalog 4 Non-VSAM data set 5 Generation data group 6 Alias 7 Reserved
40	28	SMF67CNM	44	EBCDIC	CAXCNAM (in IGGCAXWA)	Name of catalog in which the entry was defined
84	54	SMF67DEN	44	EBCDIC	Name field of VSAM catalog record	Entry name
128	80	SMF67RSZ	2	binary	internal	Size of catalog record that defined the entry.[4] (Be sure to include the contents of this field when estimating the additional storage required by SMF.)
130	82	SMF67CRC	variable	binary	VSAM catalog entry records	Catalog record[4]

[3]A data or index component can only be deleted as one of the three catalog records deleted when a cluster is deleted.

[4]A VSAM catalog record is contained in one or more physical catalog records. Offset 128 is the sum of the sizes of the physical catalog records that constitute the total logical VSAM catalog record.

Record Type 68 – VSAM Entry Renamed

Record type 68 is written by IGG0CLBV when a VSAM catalog entry (a component, cluster, catalog, alternate index, path, or non-VSAM data set) is renamed using the ALTER Access Method Services command. This record identifies the VSAM catalog in which the object is defined, and gives the old and new names for the object. It also identifies the job by job log identification and user identification. Its length is 170 bytes.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF68FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1.
1	1	SMF68RTY	1	binary	internal	Record type
*2	2	SMF68TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF68DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF68SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF68JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF68RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF68RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF68UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)[1]
38	26	SMF68CNM	44	EBCDIC	CAXCNAM (in IGGCAXWA)	Name of catalog in which the entry is defined
82	52	SMF68ONM	44	EBCDIC	Pointed to by CTGFVENT field in IEZCTGFV parameter list	Old name of the entry. (AMS obtains this name from the ALTER command.)
126	7E	SMF68NNM	44	EBCDIC	Pointed to by CTGNEWNM field in IEZCTGPL parameter list	New name of the entry. (AMS obtains this name from the ALTER command.)

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. If a system task caused the record to be written, the job-name and user-identification fields contain blanks and the time and date fields contain zeros.

Record Type 69 – VSAM Data Space Defined, Extended, or Deleted

Record type 69 is written by IGG0CLBV when a VSAM data space is defined, extended, or deleted using the DEFINE or DELETE Access Method Services commands. Record type 69 is not written when a catalog or a unique data set is defined or deleted. Its length is 102 bytes.

This record identifies the catalog in which the data space is defined and the volume on which it is (or was) allocated. It also gives the number of free data space extents and the amount of unallocated space on the affected volume after the definition, extension, or deletion. It identifies the job by job log identification and user identification.

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF69FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 VS1
1	1	SMF69RTY	1	binary	internal	Record type
2	2	SMF69TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF69DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF69SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
14	E	SMF69JBN	8	EBCDIC	JMRJOB	Job name[1]
22	16	SMF69RST	4	binary	JMRENTRY	Time, in hundredths of a second, reader recognized the JOB card for this job[1]
26	1A	SMF69RSD	4	packed	JMREDATE	Date reader recognized the JOB card for this job, in the form 00YYDDDF where F is the sign[1]
30	1E	SMF69UIF	8	EBCDIC	JMRUSEID	User identification (taken from common exit parameter area)[1]
38	26	SMF69CUU	1	binary	UCBCHA	Channel address[2]
39	27		1	binary	UCBUA	Unit address[2]
40	28	SMF69IND	2	binary	EXCP of sense data	Spindle identification
42	2A	SMF69NDS	2	binary	VSAM catalog volume entry	Number of free data space extents on the affected volume after the data space is defined, extended, or deleted
44	2C	SMF69NUC	2	binary	VSAM catalog volume entry	Number of unallocated cylinders in all of the data spaces on the volume
46	2E	SMF69NUT	2	binary	VSAM catalog volume entry	Number of unallocated tracks in all of the data spaces on the volume in addition to the number of unallocated cylinders
48	30	SMF69LNC	2	binary	VSAM catalog volume entry	Number of cylinders in the largest continuous unallocated area in any data space on the volume
50	32	SMF69LNT	2	binary	VSAM catalog volume entry	Number of tracks (in addition to the number of cylinders) in the largest continuous unallocated area in any data space on the volume
52	34	SMF69CNM	44	EBCDIC	CAXCNAM (in IGGCAXWA)	Name of catalog in which the data space is defined
96	60	SMF69VSR	6	EBCDIC	Name field of VSAM catalog volume entry	Volume serial number of the volume on which the data space is defined

[1]The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. If a system task caused the record to be written, the job-name and user-identification fields contain blanks and the time and date fields contain zeros.

[2]These fields are zero for DD*, DD DATA, DD DUMMY and spooled data sets.

Record Type 70 – CPU Activity

Record type 70 is written by IRBMFDCP for each measurement interval and when MF/1 is terminated by a STOP operator command. It contains data that identifies each CPU, its status, and the amount of wait time that has taken place during an MF/1 reporting interval. Data is included for each CPU that has been online at the end of at least one reporting interval since MF/1 was started. Data is not included for CPUs that were offline at the end of the reporting interval, or that had any VARY activity during the interval. Its length is 52 bytes plus 16 bytes for each CPU entry. For more information about using this record, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF70FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF70RTY	1	binary	internal	Record type
2	2	SMF70TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF70DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF70SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
Common Control Data Section:						
14	E	SMF70SIZ	2	binary	internal	Size of common control data section
16	10	SMF70IST	4	packed	CVTTZ and STCK operand of TIME macro (Set by IRBMFDCP)	Time MF/1 measurement interval started, in the form 0HHMMSSF where F is the sign
20	14	SMF70DAT	4	packed	CVTDATE (Set by IRBMFDCP)	Date MF/1 measurement interval started, in the form 00YYDDDF where F is the sign
24	18	SMF70INT	4	packed	STCK operand of TIME macro (Set by IRBMFDCP)	Duration of MF/1 measurement interval, in the form MMSSTTTF where F is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
28	1C	SMF70CYC	2	packed		Reserved, in the form 000F
30	1E	SMF70SUB	6	binary		Reserved
36	24	SMF70MFV	2	EBCDIC	STSCMF1V (in STSCT)	MF/1 version number
38	26	SMF70RV1	2	binary		Reserved
40	28	SMF70RLS	4	EBCDIC	CVTRELNO	Operating system release number and level, in the form NNLL
CPU Control Section:						
44	2C	SMF70SCC	2	binary	internal	Size of CPU control section
46	2E	SMF70CPU	2	binary	CVTMAXMP + 1	Number of CPU data sections in this record. (Data is not printed for CPUs that were offline at the end of the measurement interval, or had any VARY activity during the interval.)
48	30	SMF70SCD	2	binary	internal	Size of each CPU data section
50	32	SMF70RV2	2	binary		Reserved

(Continued)

Offsets	Name	Length	Format	Source	Description
CPU Data Section:					
+0	SMF70WAT	8	binary	LCCAWTIM (Set by IRBMFDCP)	CPU wait time, where bit 51 = 1 microsecond. That is, the amount of time that the CPU is not executing instructions (PSW wait state bit is on).
+8	SMF70CID	2	binary	internal (CVTMAXMP for maximum)	CPU identification (either 0 or 1)
+10	SMF70RV3	1	binary		Reserved
+11	SMF70CNF	1	binary		Configuration activity indicator
					Bit *Meaning When Set* 0-5 Reserved
				CSDMF1CP	6 CPU varied online or offline during the measurement interval. Data for this CPU is invalid.
				CSDCPUAL	7 CPU currently online
+12	SMF70RV4	1	binary		Reserved
+13	SMF70SER	3	EBCDIC	PCCACPID	CPU serial number (6 hexadecimal digits)

Record Type 71 – Paging Activity

Record type 71 is written by IRBMFDPP for each measurement interval and when MF/1 is terminated by a STOP operator command. It contains information about the demands made on the system paging facilities and the utilization of real and auxiliary storage during the reporting interval. Its length is 132 bytes. For more information about using this record, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF71FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF71RTY	1	binary	internal	Record type
2	2	SMF71TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF71DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF71SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
Common Control Data Section:						
14	E	SMF71SIZ	2	binary	internal	Size of common control data section
16	10	SMF71IST	4	packed	CVTTZ and STCK operand of TIME macro (Set by IRBMFDPP)	Time MF/1 measurement interval started, in the form 0HHMMSSF where F is the sign
20	14	SMF71DAT	4	packed	CVTDATE (Set by IRBMFDPP)	Date MF/1 measurement interval started, in the form 00YYDDDF where F is the sign
24	18	SMF71INT	4	packed	STCK operand of TIME macro (Set by IRBMFDPP)	Duration of MF/1 measurement interval, in the form MMSSTTTF where F is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
28	1C	SMF71CYC	2	packed		Reserved, in the form 000F
30	1E	SMF71SUB	6	binary		Reserved
36	24	SMF71MFV	2	EBCDIC	STSCMF1V (in STSCT)	MF/1 version number
38	26	SMF71RV1	2	binary		Reserved
40	28	SMF71RLS	4	EBCDIC	CVTRELNO	Operating system release number and level, in the form NNLL
Paging Control Section:						
44	2C	SMF71SPC	2	binary	internal	Size of paging control section
46	2E	SMF71SPD	2	binary	internal	Size of paging data section
Paging Data Section:						
48	30	SMF71PIN	4	binary	PVTNPIN[1]	Number of non-VIO, non-swap page-ins. This field includes page-ins required through page faults, specific page requests, and page fixes. It does not include page reclaims, page-ins for VIO data sets, and pages that are swapped in.[1]
52	34	SMF71POT	4	binary	PVTNPOUT[1]	Number of non-VIO, non-swap page-outs. This field includes page-outs required through specific page requests as well as those pages stolen by the paging supervisor as a result of infrequent use. It does not include page-outs for VIO data sets and pages that are swapped out.[1]

(Continued)

[1]These fields refer to total system statistics.

Offsets		Name	Length	Format	Source	Description
Paging Data Section: (Continued)						
56	38	SMF71PRC	4	binary	PVTNPREC[1]	Number of non-VIO page reclaims. This field contains the number of requests for pages as a result of page faults, specific page requests, and page fixes, that are satisfied without starting new page-ins. It does not include those pages that are recovered by explicit VIO reclaim.[1]
60	3C	SMF71SSQ	4	binary	PVTNSWPS[1]	Number of address space swap sequences. (A swap sequence consists of an address space swap-out and swap-in.)[1]
64	40	SMF71SIN	4	binary	PVTSPIN[1]	Number of pages swapped in. This field includes: LSQA, fixed pages, and those pages that the real storage manager determined to be active when the address space was swapped in. It does not include page reclaims.[1]
68	44	SMF71SOT	4	binary	PVTSPOUT[1]	Number of pages swapped out. This field includes: LSQA, private area fixed pages, and private area non-fixed changed pages.[1]
72	48	SMF71VIN	4	binary	PVTVAMI[1]	Number of VIO page-ins. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.[1]
76	4C	SMF71VOT	4	binary	PVTVAMO[1]	Number of VIO page-outs. This field includes page-outs resulting from specific page requests on a VIO window, as well as those pages stolen by the paging supervisor as a result of infrequent use. It does not include VIO swap-outs or page-outs for the common area.[1]
80	50	SMF71VRC	4	binary	PVTVAMR[1]	Number of VIO page reclaims. This field includes page reclaims required through a VIO request that was satisfied without page-in by means of the explicit VIO reclaim interface.[1]
84	54	SMF71SNI	4	binary	PVTCAIN	Number of non-VIO page-ins performed in common area
88	58	SMF71SNO	4	binary	PVTCAOUT	Number of non-VIO page-outs performed in common area
92	5C	SMF71SNR	4	binary	PVTCAREC	Number of non-VIO page reclaims performed in common area
96	60	SMF71SVI	4	binary	PVTCAVI	Number of VIO page-ins performed in common area
100	64	SMF71SVO	4	binary	PVTCAVO	Number of VIO page-outs performed in common area
104	68	SMF71SVR	4	binary	PVTCAVR	Number of VIO page reclaims performed in common area
108	6C	SMF71AFC	4	binary	PVTAFC	Number of page frames available in real storage
112	70	SMF71TFC	4	binary	PVTPOOL	Number of page frames defined in real storage. (This field does not include frames occupied by the nucleus and frames marked as bad or offline.)
116	74	SMF71TSC	4	binary	ASMSLOTS	Number of auxiliary storage page slots in the user pool of paging data sets
120	78	SMF71DSC	4	binary	ASMVSC	Number of auxiliary storage page slots allocated to VIO data sets in the user pool
124	7C	SMF71VSC	4	binary	ASMNVSC	Number of auxiliary storage page slots allocated to non-VIO address spaces in the user pool
128	80	SMF71NSC	4	binary	ASMSLOTS – (ASMVSC + ASMNVSC + ASMERRS)	Number of auxiliary storage page slots that have not been allocated

[1]These fields refer to total system statistics.

Record Type 72 – Workload Activity

Record type 72 is written by IRBMFDWP for each performance group (PG) defined in the installation performance specification (IPS). Type 72 records are generated in the order of low to high PG number. Each record contains data on the one-to-eight PG periods for a PG number. Its length is 60 bytes plus 20 bytes for each PG period data section.

This record contains the PG number, number of PG periods, IPS name, number of terminated transactions, elapsed time of terminated transactions, and active time, service and workload level of all transactions. For more information about using this record, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF72FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF72RTY	1	binary	internal	Record type
2	2	SMF72TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF72DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF72SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
Common Control Data Section:						
14	E	SMF72SIZ	2	binary	internal	Size of common control data section
16	10	SMF72IST	4	packed	CVTTZ and STCK operand of TIME macro (Set by IRBMFDWP)	Time MF/1 measurement interval started, in the form 0HHMMSSF where F is the sign
20	14	SMF72DAT	4	packed	CVTDATE (Set by IRBMFDWP)	Date MF/1 measurement interval started, in the form 00YYDDDF where F is the sign
24	18	SMF72INT	4	packed	STCK operand of TIME macro (Set by IRBMFDWP) or WAMTTOC and WAMTTMA (Set by IRARMWAR)	Duration of MF/1 measurement interval, in the form MMSSTTTF where F is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
28	1C	SMF72CYC	2	packed		Reserved, in the form 000F
30	1E	SMF72SUB	2	binary	internal	Performance group (PG) number. The range of values is 1 to 255.
32	20	SMF72SAM	4	binary		Reserved
36	24	SMF72MFV	2	EBCDIC	STSCMF1V (in STSCT)	MF/1 version number
38	26	SMF72RV1	2	binary		Reserved
40	28	SMF72RLS	4	EBCDIC	CVTRELNO	Operating system release number and level, in the form NNLL

(Continued)

Offsets		Name	Length	Format	Source	Description
Workload Control Section:						
44	2C	SMF72SWC	2	binary	internal	Size of workload control section
46	2E	SMF72PGP	2	binary	internal (in WAMT)	Number of PG period data sections in this record
48	30	SMF72SPD	2	binary	internal	Size of each PG period data section
50	32	SMF72HPG	2	binary	WAMTHPG	Highest PG number defined in installation performance specification (IPS)
52	34	SMF72IPS	8	EBCDIC	WAMTIPS	Name of IPS
Performance Group Period Data Section:						
+0		SMF72TTX	4	binary	WAMPTRN	Number of transactions terminated
+4		SMF72ACT	4	binary	WAMPTAT (Set by IRARMWAR)	Active time of all transactions, in 1024-microsecond units. This field includes the total time that each transaction was in real storage plus any swapped-out time that the transactions were *not* in a "wait" state. It does not include time between job steps for batch transactions.
+8		SMF72SER	4	binary	WAMPSRV	Service used in all transactions, in service units
+12		SMF72TTM	4	binary	WAMPTET (Set by IRARMWAR)	Elapsed time accumulated by all transactions that terminated in this PG period, in 1024-microsecond units
+16		SMF72LEV	4	binary	WAMPNWL	Workload level of all transactions, in units of 1/256 of a level

Record Type 73 – Channel Activity

Record type 73 is written by IRBMFDHP for all channels in the system that have been online at least once since MF/1 was started. It is not produced for channels that were offline at the end of the reporting interval, or for channels that were varied during the interval. Its length is 52 bytes plus 16 bytes for each channel data section.

This record contains the sampling cycle length, number of samples, number of channels, CPU identification, channel identification, number of successful START I/Os issued to the channel, number of samples in which the channel was in burst mode, and number of samples in which the channel was busy and the CPU was in the wait state. For more information about using this record, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF73FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF73RTY	1	binary	internal	Record type
2	2	SMF73TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF73DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF73SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
Common Control Data Section:						
14	E	SMF73SIZ	2	binary	internal	Size of common control data section
16	10	SMF73IST	4	packed	CVTTZ and STCK operand of TIME macro (Set by IRBMFDHP)	Time MF/1 measurement interval started, in the form 0HHMMSSF where F is the sign
20	14	SMF73DAT	4	packed	CVTDATE (Set by IRBMFDHP)	Date MF/1 measurement interval started, in the form 00YYDDDF where F is the sign
24	18	SMF73INT	4	packed	STCK operand of TIME macro (Set by IRBMFDHP)	Duration of MF/1 measurement interval, in the form MMSSTTTF where F is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
28	1C	SMF73CYC	2	packed	internal	Sampling cycle length, in the form TTTF where F is the sign (taken from CYCLE keyword). The range of values is 0.050 to 0.999 seconds.
30	1E	SMF73SUB	2	binary		Reserved
32	20	SMF73SAM	4	binary	internal (Set by IRBMFECH)	Number of samples
36	24	SMF73MFV	2	EBCDIC	STSCMF1V (in STSCT)	MF/1 version number
38	26	SMF73RV1	2	binary		Reserved
40	28	SMF73RLS	4	EBCDIC	CVTRELNO	Operating system release number and level, in the form NNLL

(Continued)

Offsets		Name	Length	Format	Source	Description
Common Control Data Section: (Continued)						
44	2C	SMF73SHC	2	binary	internal	Size of channel control section
46	2E	SMF73CHA	2	binary	internal	Number of channel data sections in this record
48	30	SMF73SHD	2	binary	internal	Size of each channel data section
50	32	SMF73RV2	2	binary		Reserved
Channel Data Section:						
+0		SMF73CID	2	binary	internal (CVTMAXMP for maximum)	CPU identification (either 0 or 1)
+2		SMF73HID	1	binary	internal (CSDCHAD for maximum)	Channel identification. The range of values is 0 to 15.
+3		SMF73FG2	1	binary		Channel indicator (If zero, selector channel) *Bit* *Meaning When Set* 0-1 Reserved 2 Block multiplexor 3 Byte multiplexor 4 Reserved 5 Invalid channel identification 6 Data recorded is invalid because channel was varied during interval 7 Channel is currently online
					CATCHID	
					CATCHID	
					CATNID	
					CATNOP	
					CATNOP	
+4		SMF73CNT	4	binary	CATSIOCT	Number of successful START I/Os issued to the channel. This field includes redundant, successful START I/O Fast Release instructions (condition code zero). It does not include "sense" START I/Os.
+8		SMF73BSY	4	binary	TCH instruction (Set by IRBMFTCH or IRBMFECH)	Number of samples in which the channel was in burst mode. (This field is zero for byte multiplexor channels.)
+12		SMF73OLP	4	binary	Set by IRBMFTCH or IRBMFECH when TCH has condition code 2 and PSATOLD= CVTWTCB	Number of samples in which the channel was busy and the CPU was in the wait state. (This field is zero for byte multiplexor channels.)

Record Type 74 – Device Activity

Record type 74 is written by IRBMFDDP for all devices in the device classes selected by device-class keywords. It is only written for devices that have been online at least once since MF/1 was started. Record type 74 is not written for devices that were offline at the end of the reporting interval, or for devices that were varied during the interval. Its length is 52 bytes plus 28 bytes for each device data section.

This record contains the sampling cycle length, number of samples, number of devices, volume serial number, number of requests serviced on the device, number of samples in which the device was busy, number of requests enqueued for the device, and device address, class and type. For more information about using this record, see *OS/VS2 System Programming Library: Initialization and Tuning Guide.*

The format is:

Offsets		Name	Length	Format	Source	Description
0	0	SMF74FLG	1	binary	SVC 83	System indicator *Bit* *Meaning When Set* 0-5 Reserved 6 VS2 7 Reserved
1	1	SMF74RTY	1	binary	internal	Record type
2	2	SMF74TME	4	binary	SVC 83	Time, in hundredths of a second, record was moved to SMF buffer
6	6	SMF74DTE	4	packed	SVC 83	Date record was moved to SMF buffer, in the form 00YYDDDF where F is the sign
10	A	SMF74SID	4	EBCDIC	SMCASID	System identification (taken from SID parameter)
Common Control Data Section:						
14	E	SMF74SIZ	2	binary	internal	Size of common control data section
16	10	SMF74IST	4	packed	CVTTZ and STCK operand of TIME macro (Set by IRBMFDDP)	Time MF/1 measurement interval started, in the form 0HHMMSSF where F is the sign
20	14	SMF74DAT	4	packed	CVTDATE (Set by IRBMFDDP)	Date MF/1 measurement interval started, in the form 00YYDDDF where F is the sign
24	18	SMF74INT	4	packed	STCK operand of TIME macro (Set by IRBMFDDP)	Duration of MF/1 measurement interval, in the form MMSSTTTF where F is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
28	1C	SMF74CYC	2	packed	internal	Sampling cycle length in the form TTTF where F is the sign (taken from CYCLE keyword). The range of values is 0.050 to 0.999 seconds.
30	1E	SMF74SUB	2	binary	UCBTBYT3	Device class (in right byte)
32	20	SMF74SAM	4	binary	internal (Set by IRBMFEDV)	Number of samples
36	24	SMF74MFV	2	EBCDIC	STSCMF1V (in STSCT)	MF/1 version number
38	26	SMF74RV1	2	binary		Reserved
40	28	SMF74RLS	4	EBCDIC	CVTRELNO	Operating system release number and level, in the form NNLL

(Continued)

Offsets		Name	Length	Format	Source	Description
Device Control Section:						
44	2C	SMF74SDC	2	binary	internal	Size of device control section
46	2E	SMF74DEV	2	binary	internal	Number of device data sections in this record
48	30	SMF74SDD	2	binary	internal	Size of each device data section
50	32	SMF74RV2	2	binary		Reserved
Device Data Section:						
+0		SMF74ADD	2	packed	UCBNAME	Device address, in the form HHHF where F is the sign
+2		SMF74RV3	1	binary		Reserved
+3		SMF74CNF	1	binary		Device indicator *Bit* *Meaning When Set* 0-5 Reserved 6 Data recorded is invalid because device was varied during interval 7 Device is currently online
					UCBONLI or UCBNAME (Set by IRBMFEDV)	
					UCBONLI (Set by IRBMFEDV)	
+4		SMF74TYP	4	binary	UCBTYP	Unit type
+8		SMF74SER	6	EBCDIC	UCBVOLI	Volume serial number of the volume mounted on this device
+14		SMF74RV4	2	binary		Reserved
+16		SMF74CNT	4	binary	UCBMFCNT (Set by IRBMFEDV)	Number of requests serviced on this device
+20		SMF74ACT	4	binary	UCBBSY (Set by IRBMFEDV)	Number of samples in which this device was busy
+24		SMF74QUE	4	binary	UCBCNT (Set by IRBMFEDV)	Number of requests enqueued for this device observed at samples

Appendix A: Field-to-Record Cross-Reference

This appendix lists all of the fields in the SMF records in alphabetical order and identifies the record type containing each field. It also gives the displacement of the field within the record.

Some records have sections of fields that are generated only when specific events occur, such as when IPL is completed or when a device is varied online or offline. The following abbreviations will appear under the "offset" column to indicate the section of the record where the field is found:

ACT	Accounting section
CHAN	Channel section
CHND	Channel data section
CPU	CPU section
CPUD	CPU data section
DCB	DCB/DEB DASD extension entry
DEV	Device entry
DEVD	Device data section
DSC	Data set characteristics section
EXT	Extent entry
ISAM	ISAM extension section
MSS	MSS IPL configuration section
PERF	Performance group period data section
PRNT	3800 Printing Subsystem section **(VS2.03.810)**
REL	Relocate section
STAT	Statistics section
STOR	Storage section
TAPD	DCB/DEB tape extension entry
TAPU	UCB tape extension entry
UCB	UCB section
VAR	VARY ONLINE,S and VARY OFFLINE,S section
VOL	Volume entry

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
Access-method interfaces option codes	14	246	F6
	15	246	F6
Accounting fields, job	5	117	75
	20	61	3D
	35	117	75
Accounting fields, step	4	ACT	
	34	ACT	
Accounting number, programmer's	26*	100	64
Address, CPU	22	CPU	
	22	CHAN	
Address, line adapter	48*	68	44
	48**	76	4C (VS2.03.812)
Address, VTOC	19	36	24
Address of lowest page in real contiguous storage	22	STOR	
Address space dispatching priority	4	53	35
	34	53	35
Address space swap sequences	4	REL	
	34	REL	
	71	60	3C
Allocation, device start time	4	86	56
	34	86	56
Allocation status indicator	14	63	3F
	15	63	3F
	25**	38	26 (VS2.03.812)
Alternate tracks, number of unused	19	46	2E
Auxiliary storage page slots allocated to non-VIO address spaces in the user pool	71	124	7C
Auxiliary storage page slots allocated to VIO data sets in the user pool	71	120	78
Auxiliary storage page slots in the user pool of paging data sets	71	116	74
Auxiliary storage page slots that have not been allocated	71	128	80
Beginning cylinder and track	64	EXT	
Block count volume	14	TAPD	
	15	TAPD	
Block size	21	40	28
	64	DSC	
BUF parameter	0	18	12
Buffer, date record was moved to	ALL[1]	6	6
Buffer, number of bytes in	0	18	12

*These records are for JES2 only.
**These records are for JES3 only.
[1]Except 2, 3, 4, 5, 34 and 35.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
Buffer, size of time-sharing	31	16	10
Buffer, time record was moved to	ALL[1]	2	2
Buffers, number allowed per terminal before LWAIT	31	22	16
Buffers, number allowed per terminal before OWAIT	31	20	14
Buffers, number reserved on free queue	31	28	1C
Buffers, number of time-sharing	31	14	E
Burst mode, number of samples in which channel was in	73	CHND	
Burster-Trimmer-Stacker	6	PRNT	(VS2.03.810)
Bus-out checks, number of	48**	62	3E (VS2.03.812)
Busy, number of samples in which channel/device was	73 74	CHND DEVD	
Cards, input, number of	26* 26**	204 244	CC F4 (VS2.03.812)
Cards, punched, number of	26	116	74
Cards generated to spool, number of	26* 26**	212 248	D4 F8 (VS2.03.812)
Card-image records in DD DATA and DD* data sets read for step/job	4 5	47 47	2F 2F
Catalog name	62 63 64 67 68 69	42 44 40 40 38 52	2A 2C 28 28 26 34
Catalog record size	63 63 67	40 42 128	28 2A 80
Catalog records	63 67	132 130	84 82
CCHH, beginning	64	EXT	
CCHH, ending	64	EXT	
Channel address	4 8 9 10 11 14 15 19 21 22 34 40 64 69	DEV DEV DEV DEV DEV UCB UCB 60 22 CHAN DEV DEV EXT 38	 3C 16 26

*These records are for JES2 only.
**These records are for JES3 only.
[1]Except 2, 3, 4, 5, 34 and 35.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
Channel indicator	73	CHND	
Channel model number	22	CHAN	
	73	CHND	
Character arrangement table names	6	PRNT	(VS2.03.810)
Class, job	5	71	47
	26	85	55
Class, message	26	84	54
Class, SYSOUT	6	38	26
Cleaner actions, number of	21	37	25
Command rejects, number of	48**	60	3C (VS2.03.812)
Common area page-ins	4	REL	(VS2.03.807)
	34	REL	(VS2.03.807)
Common area reclaims	4	REL	(VS2.03.807)
	34	REL	(VS2.03.807)
Completion code, JES2	45*	22	16
Completion code, JES3	45**	21	15 (VS2.03.812)
Completion code, job	5	51	33
	35	51	33
Completion code, step	4	51	33
	34	51	33
Component indicator	64	39	27
Component or cluster name	62	92	5C
	64	84	54
Configuration activity indicator	70	CPUD	
Continuous wait time limit	0	14	E
Control areas, number that were split	64	STAT	
Control interval size	64	DSC	
Control intervals, number of unused	64	STAT	
Control intervals, number that were split	64	STAT	
Conversion processor (CPU) identification	26*	220	DC
	26**	260	104 (VS2.03.812)
Converter start time and date	26*	152	98
	26**	192	C0 (VS2.03.812)
Converter stop time and date	26*	160	A0
	26**	200	C8 (VS2.03.812)
Copies, number printed with overlay	6	PRNT	(VS2.03.810)
Copy groups	6	PRNT	(VS2.03.810)

*These records are for JES2 only.
**These records are for JES3 only.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Hex.	
Copy modification module name	6	PRNT		(VS2.03.810)
CPU address	22	CPU		
CPU identification	70	CPUD		
	73	CHND		
CPU model number	22	CPU		
	70	CPUD		
CPU time	4	95	5F	
	4	ACT		
	5	73	49	
	5	113	71	
	34	95	5F	
	34	ACT		
	35	73	49	
	35	113	71	
CPU wait time	70	CPUD		
Cycle length, sampling	73	28	1C	
	74	28	1C	
Cylinder overflow areas that are full, number of	14	ISAM		
	15	ISAM		
Cylinders, number of unallocated	19	48	30	
	69	44	2C	
Cylinders in independent index, prime data, and independent overflow areas, number of	14	ISAM		
	15	ISAM		
Cylinders in largest continuous unallocated area, number of	69	48	30	
Cylinders in largest unallocated extent, number of	19	52	34	
DASD volume status indicator	14	UCB		
	15	UCB		
Data checks to read text, number of	48*	56	38	
	48**	64	40	(VS2.03.812)
Data format error indicators	6**	88	58	(VS2.03.812)
Data overruns, number of	48**	65	41	(VS2.03.812)
Data recording devices (DRDs)	22	MSS		
Data set control indicator	6	62	3E	
Data set indicator	14	38	26	
	14	51	33	
	14	248	F8	
	15	38	26	
	15	51	33	
	15	248	F8	
Data set name	17	40	28	
	18	40	28	
	18	84	54	
Data set organization	14	240	F0	
	15	240	F0	

*These records are for JES2 only.
**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.
Data set sequence count	14	TAPU	
	15	TAPU	
Data set sequence number	14	TAPU	
	15	TAPU	
Data set serial number	14	TAPD	
	15	TAPD	
Data sets processed by writer, number of	6	52	34
Data space extents, number of free	69	42	2A
Date, deadline schedule	26**	168	A8 (VS2.03.812)
Date, JES3 allocation	25**	76	52 (VS2.03.812)
Date, JES3 device verification	25**	84	5A (VS2.03.812)
Date, logoff	35	6	6
Date, logon	34	26	1A
	35	26	1A
	40	26	1A
Date, logon enqueue	35	58	3A
Date *START SETUP command issued	25	60	3C (VS2.03.812)
Date converter started	26*	156	9C
	26**	196	C4 (VS2.03.812)
Date converter stopped	26*	164	A4
	26**	204	CC (VS2.03.812)
Date execution processor started	26*	172	AC
	26**	212	D4 (VS2.03.812)
Date execution processor stopped	26*	180	B4
	26**	220	DC (VS2.03.812)
Date fetch processing started	25**	52	34 (VS2.03.812)
Date first volume mount message issued	25**	76	52 (VS2.03.812)
Date initiator selected step/job	4	43	2B
	5	43	2B
Date job terminated	5	6	6
	35	6	6
Date MF/1 interval started	70	20	14
	71	20	14
	72	20	14
	73	20	14
	74	20	14
Date output processor started	26*	188	BC
	26**	228	E4 (VS2.03.812)
Date output processor stopped	26*	196	C4
	26**	236	EC (VS2.03.812)

*These records are for JES2 only.
**These records are for JES3 only.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Date output service started	6**	43	2B	(VS2.03.812)
Date print/punch processor started	6*	43	2B	
Date reader recognized end of job	5	58	3A	
	26*	148	94	
	26**	188	BC	(VS2.03.812)
Date reader recognized the JOB card	4	26	1A	
	5	26	1A	
	6	26	1A	
	10	26	1A	
	14	26	1A	
	15	26	1A	
	17	26	1A	
	18	26	1A	
	20	26	1A	
	25**	26	1A	(VS2.03.812)
	26	26	1A	
	40	26	1A	
	62	26	1A	
	63	26	1A	
	64	26	1A	
	67	26	1A	
	68	26	1A	
	69	26	1A	
Date record was moved to dump data set	2	6	6	
	3	6	6	
Date record was moved to SMF buffer	ALL[1]	6	6	
Date recording was started when SMF data set became available	7	20	14	
Date step terminated	4	6	6	
	34	6	6	
DCB=OPTCD=J	6	PRNT		(VS2.03.810)
DD DATA and DD* data set records read for step/job	4	47	2F	
	5	47	2F	
DD entry length	14	48	30	
	15	48	30	
DD name	14	52	34	
	15	52	34	
	26	132	84	
	64	DSC		
Deadline schedule date	26**	168	A8	(VS2.03.812)
Deadline schedule time	26**	164	A4	(VS2.03.812)
Deadline schedule type	26**	120	78	(VS2.03.812)
Deleted records, number of	64	STAT		
Density, tape	21	39	27	
Dependent job net identification	26**	156	9C	(VS2.03.812)
Device address	74	DEVD		
Device allocation requests, number of	14	50	32	
	15	50	32	

*These records are for JES2 only.
**These records are for JES3 only.
[1]Except 2, 3, 4, 5, 34 and 35.

Field Description	Record Type	Offset Dec.	Offset Hex.	
Device class	4	DEV		
	5	69	45	
	8	DEV		
	9	DEV		
	10	DEV		
	11	DEV		
	34	DEV		
	40	DEV		
	74	30	1E	
Device indicator	14	51	33	
	14	248	F8	
	15	51	33	
	15	248	F8	
	74	DEVD		
Device name, logical input	26	92	5C	
Device name, logical output	6	68	44	
Device recording controls, MSF	22	MSS		
Device SSID	22	VAR		
Devices, MSF data recording	22	MSS		
Devices requested during allocation, number of	14	50	32	
	15	50	32	
Device allocation start time	4	86	56	
	34	86	56	
Disk volumes fetched, number of	25**	44	2C	(VS2.03.812)
Disk volumes mounted, number of	25**	68	44	(VS2.03.812)
Drive number	19	62	3E	
DSCBs, number of	19	42	2A	
DSCB0s, number of	19	44	2C	
Dump data set, date record was moved to	2	6	6	
	3	6	6	
Dump data set, time record was moved to	2	2	2	
	3	2	2	
End-of-volume indicator	14	249	F9	
	15	249	F9	
Ending cylinder and track	64	EXT		
Entry name	63	88	58	
	67	84	54	
	68	82	52	
	68	126	7E	
Entry type indicator	63	38	26	
	63	39	27	
	67	38	26	
	67	39	27	
Equipment checks, number of	48**	63	3F	(VS2.03.812)

**These records are for JES3 only.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Erase gaps, number of	21	35	23	
Errors, line	48*	64	40	
	48**	52	34	(VS2.03.812)
EXCP count	4	DEV		
	14	UCB		
	15	UCB		
	34	DEV		
	40	DEV		
	48	48	30	
	64	STAT		
Execution processor (CPU) identification	26*	224	E0	
	26**	264	108	(VS2.03.812)
Execution processor start time and date	26*	168	A8	
	26**	208	D0	(VS2.03.812)
Execution processor stop time and date	26*	176	B0	
	26**	216	D8	(VS2.03.812)
Execution time, estimated	26	108	6C	
Extents, number of	14	UCB		
	15	UCB		
	64	STAT		
Extents, number of unallocated	19	56	38	
Extents in independent index, prime data, and independent overflow areas, number of	14	ISAM		
	15	ISAM		
Extents released by DADSM routine, number of	14	DCB		
	15	DCB		
FCB image identification	6	76	4C	
Fetch processing start date	25**	52	34	(VS2.03.812)
Fetch processing start time	25**	48	30	(VS2.03.812)
Form number	6	53	35	
	26*	120	78	
Forms Overlay name	6	PRNT		(VS2.03.810)
Functional indicator	40	39	27	
Highest used relative byte address	64	130	82	
I/O processing method indicator	14	249	F9	
	15	249	F9	
I/O status	6	51	33	
Index levels, number of	14	ISAM		
	15	ISAM		
	64	STAT		
Initialization deck origin	43**	25	19	(VS2.03.812)
Initiator select date for step/job	4	43	2B	
	5	43	2B	
Initiator select time for step/job	4	39	27	
	5	39	27	
	34	39	27	

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VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
Input cards for job, number of	26*	204	CC
	26**	244	F4 (VS2.03.812)
Input class for job	5	71	47
Input processor (CPU) identification	26*	216	D8
	26**	256	100 (VS2.03.812)
Input route code	26*	90	5A
Input/output (*see* I/O)			
Inserted records, number of	64	STAT	
Interventions required, number of	48**	61	3D (VS2.03.812)
IPS name	72	52	34
JES2 completion code	45	22	16
JES2 identification	6*	58	3A
	26*	42	2A
	43*	14	E
	45*	14	E
	47*	14	E
	48*	14	E
	49*	14	E
JES2 job selection priority	26*	86	56
	26*	87	57
JES2 logical input device name	26*	92	5C
JES2 logical output device name	6*	68	44
JES2 output selection priority	26*	88	58
	26*	89	59
JES2 start options	43*	23	17
JES2 termination indicator	45*	20	14
JES2-assigned job number	6*	64	40
	26*	52	34
JES3 allocation date	25**	76	52 (VS2.03.812)
JES3 allocation time	25**	72	48 (VS2.03.812)
JES3 completion code	45**	21	15 (VS2.03.812)
JES3 device verification date	25**	84	54 (VS2.03.812)
JES3 device verification time	25**	80	56 (VS2.03.812)
JES3 identification	6*	56	3A (VS2.03.812)
	26**	42	2A (VS2.03.812)
	43**	14	E (VS2.03.812)
	45**	14	E (VS2.03.812)
	47**	14	E (VS2.03.812)
	48**	14	E (VS2.03.812)
	49**	14	E (VS2.03.812)
JES3 initialization deck origin location	43**	26	1A (VS2.03.812)

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VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
JES3 initialization deck origin type	43**	25	19 (VS2.03.812)
JES3 job selection priority	26**	86	56 (VS2.03.812)
	26**	87	57 (VS2.03.812)
JES3 logical input device group name	26**	124	7C (VS2.03.812)
JES3 logical input device name	26**	92	5C (VS2.03.812)
JES3 logical output device group name	26**	92	5C (VS2.03.812)
JES3 logical output device name	26**	68	44 (VS2.03.812)
JES3 procedure name	43**	34	22 (VS2.03.812)
JES3 start options	43**	22	16 (VS2.03.812)
JES3 termination indicator	45**	20	14 (VS2.03.812)
JES3-assigned job number	6**	64	40 (VS2.03.812)
	26**	52	34 (VS2.03.812)
JFCB	14	64	40
	15	64	40
JFCB TTR address	14	60	3C
	15	60	3C
Job accounting fields	5	117	75
	20	61	3D
	35	117	75
Job class	5	71	47
	26	85	55
Job class name	26**	172	AC (VS2.03.812)
Job completion code	5	51	33
	35	51	33
Job CPU time	5	73	49
	5	113	71
	35	73	49
	35	113	71
Job identification	26	56	38
Job information indicator	26	50	32
Job log identification	4	14	E
	5	14	E
	6	14	E
	10	14	E
	14	14	E
	15	14	E
	17	14	E
	18	14	E
	20	14	E
	25**	14	E (VS2.03.812)
	26	14	E
	40	14	E
	62	14	E
	63	14	E
	64	14	E
	67	14	E
	68	14	E
	69	14	E

**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.	
Job name	4	14	E	
	5	14	E	
	6	14	E	
	10	14	E	
	14	14	E	
	15	14	E	
	17	14	E	
	18	14	E	
	20	14	E	
	25**	14	E	(VS2.03.812)
	26	14	E	
	34	14	E	
	35	14	E	
	40	14	E	
	62	14	E	
	63	14	E	
	64	14	E	
	67	14	E	
	68	14	E	
	69	14	E	
Job number	6	64	40	
	26	52	34	
Job print copy count	26*	124	7C	
Job print route code	26*	128	80	
Job priority	5	53	35	
	35	53	35	
Job selection priority	26	86	56	
	26	87	57	
Job punch route code	26*	130	82	
Job service	5	76	4C	
	35	76	4C	
Job termination date	5	6	6	
	35	6	6	
Job termination indicator	5	62	3E	
	35	62	3E	
Job termination time	5	2	2	
	35	2	2	
Job transaction active time	5	80	50	
	35	80	50	
Job transaction residency time	5	64	40	(VS2.03.807)
	35	64	40	(VS2.03.807)
Job wait time limit	0	14	E	
JWT parameter	0	14	E	
Key, storage protect	4	82	52	
	5	72	48	
	34	82	52	
	35	72	48	
Key length	64	DSC		

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Field Description	Record Type	Offset Dec.	Offset Hex.
Length of DD entry	14	48	30
	15	48	30
Limit, continuous wait time	0	14	E
Line adapter address	48*	68	44
	48**	76	4C (VS2.03.812)
Line errors	48*	64	40
	48**	52	34 (VS2.03.812)
Line name	47	32	20
	48	32	20
	49	32	20
Lines, output, number of	26	112	70
Lines, terminal input, number of	34	47	2F
	35	47	2F
Lines, terminal output, number of	34	43	2B
	35	43	2B
Lines generated to spool, number of	26*	208	D0
	26**	248	F8 (VS2.03.812)
Lines per page, number of	26*	126	7E
Logical record size, maximum	64	DSC	
Logical records, number written	6	47	2F
Logical records in overflow and prime data areas, number of	14	ISAM	
	15	ISAM	
Logoff date	35	6	6
Logoff time	35	2	2
Logon date	34	26	1A
	35	26	1A
	40	26	1A
Logon enqueue date	35	58	3A
Logon enqueue time	35	54	36
Logon priority	35	53	35
Logon time	34	22	16
	35	22	16
	40	22	16
Lost datas, number of	48**	66	42 (VS2.03.812)
Lowest page address in real contiguous storage	22	STOR	
Macro instruction and option types	14	243	F3
	14	ISAM	
	15	243	F3
	15	ISAM	
Maximum logical record size	64	DSC	
Message class	26	84	54
Message text	47	50	32
	49	50	32

*These records are for JES2 only.
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Field Description	Record Type	Offset Dec.	Offset Hex.
MF/1 interval duration	70	24	18
	71	24	18
	72	24	18
	73	24	18
	74	24	18
MF/1 interval start date	70	20	14
	71	20	14
	72	20	14
	73	20	14
	74	20	14
MF/1 interval start time	70	16	10
	71	16	10
	72	16	10
	73	16	10
	74	16	10
MF/1 version number	70	36	24
	71	36	24
	72	36	24
	73	36	24
	74	36	24
Model number, channel	22	CHAN	
Model number, CPU	22	CPU	
Module identification	19	62	3E
MSF data recording devices	22	MSS	
MSF device recording controls	22	MSS	
MSF indicator	22	MSS	
Name of catalog	62	42	2A
	63	44	2C
	64	40	28
	67	40	28
	68	38	26
	69	52	34
Name of component or cluster	62	92	5C
	64	84	54
Name of data set	17	40	28
	18	40	28
	18	84	54
Name of device logical	6	68	44
	26	92	5C
Name of entry	63	88	58
	67	84	54
	68	82	52
	68	126	7E
Name of IPS	72	52	34

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
Name of job	4	14	E
	5	14	E
	6	14	E
	10	14	E
	14	14	E
	15	14	E
	17	14	E
	18	14	E
	20	14	E
	25**	14	E (VS2.03.812)
	26	14	E
	34	14	E
	35	14	E
	40	14	E
	62	14	E
	63	14	E
	64	14	E
	67	14	E
	68	14	E
	69	14	E
Name of job class	26**	172	AC (VS2.03.812)
Name of line	47	32	20
	48	32	20
	49	32	20
Name of program	4	54	36
	34	54	36
Name of programmer	5	93	5D
	20	40	28
	26	64	40
Name of remote device	47	24	18
	48	24	18
	49	24	18
Name of step	4	62	3E
	34	62	3E
Name of system, if NJP	26**	92	5C (VS2.03.812)
	26**	140	8C (VS2.03.812)
	26**	148	94 (VS2.03.812)
Negative acknowledgements to write text, number of	48*	52	34
	48**	58	3A (VS2.03.812)
New catalog record	63	132	84
	67	130	82
New catalog record size	63	40	28
	67	128	80
New data set name	18	84	54
New entry name	68	126	7E
Noise blocks, number of	21	34	22

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VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Non-VIO, non-swap page-ins	4	REL		
	34	REL		
	71	48	30	
	71	84	54	
Non-VIO, non-swap page-outs	4	REL		
	34	REL		
	71	52	34	
	71	88	58	
Non-VIO page reclaims	71	56	38	
	71	92	5C	
Number of address space swap sequences	4	REL		
	34	REL		
	71	60	3C	
Number of auxiliary storage page slots allocated to non-VIO address spaces in the user pool	71	124	7C	
Number of auxiliary storage page slots allocated to VIO data sets in the user pool	71	120	78	
Number of auxiliary storage page slots in the user pool	71	116	74	
Number of auxiliary storage page slots that have not been allocated	71	128	80	
Number of blocks per volume	14	TAPD		
	15	TAPD		
Number of buffers allowed per terminal before LWAIT	31	22	16	
Number of buffers allowed per terminal before OWAIT	31	20	14	
Number of buffers reserved on free queue	31	28	1C	
Number of bus-out checks	48**	62	3E	(VS2.03.812)
Number of bytes in real storage	0	27	1B	
Number of bytes in SMF buffer	0	18	12	
Number of bytes in virtual storage	0	22	16	
Number of cards, input	26*	204	CC	
	26**	244	F4	(VS2.03.812)
Number of cards, output punched	26	116	74	
Number of cards generated to spool	26*	212	D4	
	26**	252	FC	(VS2.03.812)
Number of card-image records in DD DATA and DD* data sets read for step/job	4	47	2F	
	5	47	2F	
Number of cleaner actions	21	37	25	
Number of command rejects	48**	60	3C	(VS2.03.812)

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VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Number of copies printed	6	PRNT		(VS2.03.810)
Number of cylinders in independent index, prime data, and independent overflow areas	14 15	ISAM ISAM		
Number of cylinders in largest continuous unallocated area	69	48	30	
Number of cylinders in largest unallocated extent	19	52	34	
Number of data checks to read text	48* 48**	56 64	38 40	 (VS2.03.812)
Number of data overruns	48**	65	41	(VS2.03.812)
Number of data set sequences	14 15	TAPU TAPU		
Number of data sets processed by writer	6	52	34	
Number of devices requested during allocation	14 15	50 50	32 32	
Number of disk volumes fetched	25**	44	2C	(VS2.03.812)
Number of disk volumes mounted	25**	68	44	(VS2.03.812)
Number of DSCBs	19	42	2A	
Number of DSCB0s	19	44	2C	
Number of equipment checks	48**	63	3F	(VS2.03.812)
Number of erase gaps	21	35	23	
Number of EXCPs	4 14 15 34 40 48 64	DEV UCB UCB DEV DEV 48 STAT	 30	
Number of extents	14 15 64	UCB UCB STAT		
Number of extents in independent index, prime data, and independent overflow areas	14 15	ISAM ISAM		
Number of extents released by DADSM routine	14 15	DCB DCB		
Number of free data space extents	69	42	2A	
Number of full cylinder overflow areas	14 15	ISAM ISAM		
Number of interventions required	48**	61	3D	(VS2.03.812)
Number of line errors	48* 48**	64 52	40 34	 (VS2.03.812)
Number of lines per page	26*	126	7E	

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Field Description	Record Type	Offset Dec.	Offset Hex.	
Number of logical records in overflow and prime data areas	14 15	ISAM ISAM		
Number of logical records written	6	47	2F	
Number of lost datas	48**	66	42	(VS2.03.812)
Number of negative acknowledgements to write text	48* 48**	52 58	34 3A	 (VS2.03.812)
Number of noise blocks	21	34	22	
Number of non-VIO, non-swap page-ins	4 34 71 71	REL REL 48 84	 30 54	
Number of non-VIO, non-swap page-outs	4 34 71 71	REL REL 52 88	 34 58	
Number of non-VIO page reclaims	71 71	56 92	38 5C	
Number of output lines	26	112	70	
Number of output lines generated to spool	26* 26**	208 248	D0 F8	 (VS2.03.812)
Number of output punched cards	26	116	74	
Number of page frames available in real storage	71	108	6C	
Number of page frames defined in real storage	71	112	70	
Number of page seconds	4 34	REL REL		(VS2.03.807) (VS2.03.807)
Number of pages in real contiguous storage	22	STOR		
Number of pages printed	6	84	54	
Number of pages stolen	4 34	REL REL		(VS2.03.807) (VS2.03.807)
Number of pages swapped in	4 34 71	REL REL 64	 40	
Number of pages swapped out	4 34 71	REL REL 68	 44	
Number of permanent read errors	21	32	20	
Number of permanent write errors	21	33	21	
Number of read or write accesses to an overflow record	14 15	ISAM ISAM		

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VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Number of reclaims	4	REL		(VS2.03.807)
	34	REL		(VS2.03.807)
Number of records deleted, inserted, updated, and retrieved from component	64	STAT		
Number of records in component	64	STAT		
Number of records lost	7	14	E	
Number of requests enqueued for this device	74	DEVD		
Number of requests serviced on this device	74	DEVD		
Number of samples	73	32	20	
	74	32	20	
Number of split control areas	64	STAT		
Number of split control intervals	64	STAT		
Number of START I/Os	21	30	1E	
	73	CHND		
Number of step	4	38	26	
	34	38	26	
	40	38	26	
Number of steps in job	5	38	26	
	35	38	26	
Number of swap sequences	4	REL		
	34	REL		
	71	60	3C	
Number of tape volumes fetched	25**	40	28	(VS2.03.812)
Number of tape volumes mounted	25**	64	40	(VS2.03.812)
Number of temporary read errors	21	28	1C	
Number of temporary write errors	21	29	1D	
Number of terminal input lines	34	47	2F	
	35	47	2F	
Number of terminal output lines	34	43	2B	
	35	43	2B	
Number of time-outs to read text	48*	60	3C	
	48**	56	38	(VS2.03.812)
Number of time-sharing buffers	31	14	E	
Number of tracks allocated on device	14	UCB		
	15	UCB		
Number of tracks in largest unallocated extent	19	54	36	
Number of tracks in largest continuous unallocated area	69	50	32	
Number of tracks in overflow area	14	ISAM		
	15	ISAM		

Field Description	Record Type	Offset Dec.	Offset Hex.	
Number of tracks released by DADSM routine	14 15	DCB DCB		
Number of tracks requested but not allocated	64	128	80	
Number of transactions	35 72	84 PERF	54	
Number of unallocated extents	19	56	38	
Number of unallocated cylinders	19 69	48 44	30 2C	
Number of unallocated tracks	19 69	50 46	32 2E	
Number of unused alternate tracks	19	46	2E	
Number of unused control intervals	64	STAT		
Number of VIO page reclaims	71 71	80 104	50 68	
Number of VIO page-ins	4 34 71 71	REL REL 72 96	 48 60	
Number of VIO page-outs	4 34 71 71	REL REL 76 100	 4C 64	
Number of volumes	17 18 62	87 131 136	57 83 88	
Old catalog record	63	132	84	
Old catalog record size	63	42	2A	
Old data set name	18	40	28	
Old entry name	68	82	52	
OPEN routine indicator	14 15	245 245	F5 F5	
Open status indicator	62	38	26	
OPTCD=J	6	PRNT		(VS2.03.810)
Options, SMF	0	26	1A	
Output form number	26*	120	78	
Output lines, number of	26	112	70	
Output lines generated to spool, number of	26* 26**	208 248	D0 F8	 (VS2.03.812)
Output priority	6**	90	5A	(VS2.03.812)

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VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Output processor (CPU) identification	26*	228	E4	
	26**	268	10C	(VS2.03.812)
Output processor start time and date	26*	184	B8	
	26**	224	E0	(VS2.03.812)
Output processor stop time and date	26*	192	C0	
	26**	232	E8	(VS2.03.812)
Output punched cards, number of	26	116	74	
Output route code	6*	88	58	
Output selection priority	26*	88	58	
	26*	89	59	
Output service start date	26**	43	2B	(VS2.03.812)
Output service start time	26**	39	27	(VS2.03.812)
Overlay name	6	PRNT		(VS2.03.810)
OWAIT threshold	31	24	18	
Owner identification of direct access volume	19	22	16	
Page frames available in real storage	71	108	6C	
Page frames defined in real storage	71	112	70	
Page reclaims, non-VIO	71	56	38	
	71	92	5C	
Page reclaims, VIO	71	80	50	
	71	104	68	
Page seconds	4	REL		(VS2.03.807)
	34	REL		(VS2.03.807)
Page slots allocated to non-VIO address spaces in the user pool	71	124	7C	
Page slots allocated to VIO data sets in the user pool	71	120	78	
Page slots in the user pool of paging data sets	71	116	74	
Page slots that have not been allocated	71	128	80	
Page-ins, non-VIO, non-swap	4	REL		
	34	REL		
	71	48	30	
	71	84	54	
Page-ins, VIO	4	REL		
	34	REL		
	71	72	48	
	71	96	60	
Page-outs, non-VIO, non-swap	4	REL		
	34	REL		
	71	52	34	
	71	88	58	

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Field Description	Record Type	Offset Dec.	Offset Hex.	
Page-outs, VIO	4	REL		
	34	REL		
	71	76	4C	
	71	100	64	
Pages, number in real contiguous storage	22	STOR		
Pages, number of printed	6	84	54	
Pages swapped in, number of	4	REL		
	34	REL		
	71	64	40	
Pages swapped out, number of	4	REL		
	34	REL		
	71	68	44	
Password	47	40	28	
	48	40	28	
	49	40	28	
Performance group number	4	REL		
	5	88	58	
	34	REL		
	35	88	58	
	72	30	1E	
Performance group number, highest defined in IPS	72	50	32	
Permanent read errors, number of	21	32	20	
Permanent write errors, number of	21	33	21	
Print copy count, job	26*	124	7C	
Print route code, job	26*	128	80	
Print/punch processor start date	6*	43	2B	
Print/punch processor start time	6*	39	27	
Priority, address space dispatching	4	53	35	
	34	53	35	
Priority, job	5	53	35	
	35	53	35	
Priority, job selection	26	86	56	
	26	87	57	
Priority, logon	35	53	35	
Priority, output selection	6**	90	5A	(VS2.03.812)
	26*	88	58	
	26*	89	59	
Private area, storage used from bottom of	4	74	4A	
	34	74	4A	
Private area, storage used from top of	4	72	48	
	34	72	48	
Private area size	4	70	46	
	34	53	35	

*These records are for JES2 only.
**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.	
Procedure DDNAME	26	132	84	
Procedure name, JES3	43**	34	22	(VS2.03.812)
Program name	4	54	36	
	34	54	36	
Program start time	4	90	5A	
	34	90	5A	
Programmers accounting number	26*	100	64	
Programmers name	5	93	5D	
	20	40	28	
	26	64	40	
Programmers room number	26*	104	68	
Punch route code, job	26*	130	82	
Punched cards, number of	26	116	74	
Punched cards generated to spool, number of	26*	212	D4	
	26**	252	FC	(VS2.03.812)
RBA, highest used	64	130	82	
Read errors, number of	21	28	1C	
	21	32	20	
Read or write accesses to an overflow record, number of	14	ISAM		
	15	ISAM		
Reader device class	5	69	45	
Reader end date	5	58	3A	
	26*	148	94	
	26**	188	BC	(VS2.03.812)
Reader end time	5	54	36	
	26*	144	90	
	26**	184	B8	(VS2.03.812)
Reader start date	4	26	1A	
	5	26	1A	
	6	26	1A	
	10	26	1A	
	14	26	1A	
	15	26	1A	
	17	26	1A	
	18	26	1A	
	20	26	1A	
	25**	26	1A	(VS2.03.812)
	26	26	1A	
	40	26	1A	
	62	26	1A	
	63	26	1A	
	64	26	1A	
	67	26	1A	
	68	26	1A	
	69	26	1A	

*These records are for JES2 only.
**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.	
Reader start time	4	22	16	
	5	22	16	
	6	22	16	
	10	22	16	
	14	22	16	
	17	22	16	
	18	22	16	
	20	22	16	
	25**	22	16	(VS2.03.812)
	26	22	16	
	40	22	16	
	62	22	16	
	63	22	16	
	64	22	16	
	67	22	16	
	68	22	16	
	69	22	16	
Reader unit type	5	70	46	
Real storage, number of bytes in	0	27	1B	
Record format	14	242	F2	
	15	242	F2	
Record indicator	4	98	62	
	14	38	26	
	15	38	26	
	22	14	E	
	34	98	62	
	40	40	28	
	47	20	14	
	48	20	14	
	49	20	14	
	63	38	26	
	67	38	26	
Record size, maximum logical	64	DSC		
Records, logical, number written	6	47	2F	
Records deleted, inserted, updated, and retrieved from component, number of	64	STAT		
Records in component, number of	64	STAT		
Records in overflow and prime data areas, number of logical	14	ISAM		
	15	ISAM		
Record type	ALL	1	1	
Records lost, number of	7	14	E	
Relative address of JFCB or SIOT	14	60	3C	
	14	60	3C	
Relative address of last record processed for a physical sequential or partitioned data set	14	DCB		
	15	DCB		
Relative byte address, highest used	64	130	82	

**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.
Release number of operating system	70	40	28
	71	40	28
	72	40	28
	73	40	28
	74	40	28
Remote name	47	24	18
	48	24	18
	49	24	18
RESTART threshold	31	26	1A
Room number, programmers	26*	104	68
Route code	6*	88	58
	26*	90	5A
	26*	128	80
	26*	130	82
Samples, number of MF/1	73	32	20
	74	32	20
Sampling cycle length	73	28	1C
	74	28	1C
Service, job	5	76	4C
	35	76	4C
	72	PERF	
Service, step	4	REL	
	34	REL	
	72	PERF	
SID parameter	ALL	10	A
Situation indicator	64	38	26
SIOT TTR address	14	60	3C
	15	60	3C
Size of catalog record	63	40	28
	63	42	2A
	67	128	80
Size of control interval	64	DSC	
Size of private area	4	70	46
	34	70	46
Size of terminal status block	31	32	20
Size of time-sharing buffer	31	16	10
SMF options	0	26	1A
Spindle identification	64	EXT	
	69	40	28
SSID of device	22	VAR	
Staging adapters	22	MSS	
Staging spindles in staging data groups	22	MSS	
Start date of recording when SMF data set became available	7	20	14

*These records are for JES2 only.

Field Description	Record Type	Offset Dec.	Offset Hex.	
START I/Os, number of	21	30	1E	
	73	CHND		
Start time of recording when SMF data set became available	7	16	10	
Start/warm start indicator	43	22	16	
Step accounting fields	4	ACT		
	34	ACT		
Step completion code	4	51	33	
	34	51	33	
Step CPU time	4	95	5F	
	4	ACT		
	34	95	5F	
	34	ACT		
Step name	4	62	3E	
	34	62	3E	
Step number	4	38	26	
	34	38	26	
	40	38	26	
Step performance group number	4	REL		
	5	88	58	
	34	REL		
	35	88	58	
Step service	4	REL		
	34	REL		
Step termination date	4	6	6	
	34	6	6	
Step termination indicator	4	83	53	
	34	83	53	
Step termination time	4	2	2	
	34	2	2	
Step transaction active time	4	REL		
	34	REL		
Step transaction residency time	4	REL		**(VS2.03.807)**
	34	REL		**(VS2.03.807)**
Storage, real, number of bytes in	0	27	1B	
Storage, used from bottom of private area	4	74	4A	
	34	74	4A	
Storage, used from top of private area	4	72	48	
	34	72	48	
Storage, virtual, number of bytes in	0	22	16	
Storage protect key	4	82	52	
	5	72	48	
	34	82	52	
	35	72	48	

Field Description	Record Type	Offset Dec.	Offset Hex.
Subsystem identification	6	58	3A
	26	42	2A
	43	14	E
	45	14	E
	47	14	E
	48	14	E
	49	14	E
Subsystem identification of device	22	VAR	
Swap sequences, number of	4	REL	
	34	REL	
	71	60	3C
Swap-ins, number of	4	REL	
	34	REL	
	71	64	40
Swap-outs, number of	4	REL	
	34	REL	
	71	68	44
SYSOUT class	6	38	26
System identification	ALL	10	A
System identification from $E SYS command	43*	24	18
System indicator	ALL	0	0
System name (if NJP)	26**	92	5C (VS2.03.812)
	26**	140	8C (VS2.03.812)
	26**	148	94 (VS2.03.812)
System release number	70	40	28
	71	40	28
	72	40	28
	73	40	28
	74	40	28
Tape density	21	39	27
Tape volumes fetched, number of	25**	40	28 (VS2.03.812)
Temporary read errors, number of	21	28	1C
Temporary write errors, number of	21	29	1D
Terminal input lines, number of	34	47	2F
	35	47	2F
Terminal output lines, number of	34	43	2B
	35	43	2B
Terminal status block, size of	31	32	20
Termination indicator, JES2 or JES3	45	20	14
Termination indicator, job	5	62	3E
	35	62	3E
Termination indicator, step	4	83	53
	34	83	53
TGETs satisfied, number of	34	47	2F
	35	47	2F

*These records are for JES2 only.
**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.
Time, continuous wait	0	14	E
Time, CPU wait	70	CPUD	
Time, deadline schedule	26**	164	A4 (VS2.03.812)
Time, execution	26	108	6C
Time, JES3 allocation	25**	72	48 (VS2.03.812)
Time, JES3 device verification	25**	80	56 (VS2.03.812)
Time, job CPU	5	73	49
	5	113	71
	35	73	49
	35	113	71
Time, logoff	35	2	2
Time, logon	34	22	16
	35	22	16
Time, logon enqueue	35	54	36
Time, step CPU	4	95	5F
	4	ACT	
	34	95	5F
	34	ACT	
Time, job transaction active	5	80	50
	35	80	50
	72	PERF	
Time, step transaction active	4	REL	
	34	REL	
	72	PERF	
Time *START SETUP command issued	25**	56	38 (VS2.03.812)
Time converter started	26*	152	98
	26**	192	C0 (VS2.03.812)
Time converter stopped	26*	160	A0
	26**	200	C8 (VS2.03.812)
Time device allocation started	4	86	56
	34	86	56
Time execution processor started	26*	168	A8
	26**	208	D0 (VS2.03.812)
Time execution processor stopped	26*	176	B0
	26**	216	D8 (VS2.03.812)
Time fetch processing started	25**	48	30 (VS2.03.812)
Time first volume mount message issued	25**	72	48 (VS2.03.812)
Time initiator selected step/job	4	39	27
	5	39	27
	34	39	27

*These records are for JES2 only.
**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.	
Time job terminated	5	2	2	
	35	2	2	
Time MF/1 interval started	70	16	10	
	71	16	10	
	72	16	10	
	73	16	10	
	74	16	10	
Time output processor started	26*	184	B8	
	26**	224	E0	(VS2.03.812)
Time output processor stopped	26*	192	C0	
	26**	232	E8	(VS2.03.812)
Time output service started	6**	39	27	(VS2.03.812)
Time-outs to read text, number of	48*	60	3C	
	48**	56	38	(VS2.03.812)
Time print/punch processor started	6*	39	27	
Time program started	4	90	5A	
	34	90	5A	
Time reader recognized end of job	5	54	36	
	26*	144	90	
	26**	184	B8	(VS2.03.812)
Time reader recognized the JOB card	4	22	16	
	5	22	16	
	6	22	16	
	10	22	16	
	14	22	16	
	15	22	16	
	17	22	16	
	18	22	16	
	20	22	16	
	25**	22	16	(VS2.03.812)
	26	22	16	
	40	22	16	
	62	22	16	
	63	22	16	
	64	22	16	
	67	22	16	
	68	22	16	
	69	22	16	
Time record was moved to dump data set	2	2	2	
	3	2	2	
Time record was moved to SMF buffer	ALL[1]	2	2	
Time recording was started when SMF data set became available	7	16	10	
Time step terminated	4	2	2	
	34	2	2	
Time-sharing buffer size	31	16	10	
Time-sharing buffers, number of	31	14	E	
TIOT status indicator	14	49	31	
	15	49	31	
TPUTs issued, number of	34	43	2B	
	35	43	2B	

*These records are for JES2 only.
**These records are for JES3 only.
[1]Except 2, 3, 4, 5, 34 and 35.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.
Tracks, number in largest unallocated extent	19	54	36
Tracks, number of unallocated	19	50	32
	69	46	2E
Tracks, number of unused alternate	19	46	2E
Tracks allocated on device, number of	14	UCB	
	15	UCB	
Tracks in largest continuous unallocated area, number of	69	50	32
Tracks in overflow area, number of	14	ISAM	
	15	ISAM	
Tracks released by DADSM routine, number of	14	DCB	
	15	DCB	
Tracks requested but not allocated, number of	64	128	80
Transaction active time, job	5	80	50
	35	80	50
	72	PERF	
Transaction active time, step	4	REL	
	34	REL	
	72	PERF	
Transaction residency time, job	5	64	40 (VS2.03.807)
	35	64	40 (VS2.03.807)
Transaction residency time, step	4	REL	(VS2.03.807)
	34	REL	(VS2.03.807)
Transactions, number of	35	84	54
	72	PERF	
TSB (terminal status block),size of	31	32	20
TSO user identification	26**	92	5C (VS2.03.812)
TTR of JFCB or SIOT	14	60	3C
	15	60	3C
TTRN of last record processed for a physical sequential or partitioned data set	14	DCB	
	15	DCB	
Type of deadline schedule	26**	120	78 (VS2.03.812)
Type of I/O macro instruction and options	14	243	F3
	15	243	F3
UCS image identification	6	80	50

**These records are for JES3 only.

VS2.03.807
VS2.03.810
VS2.03.812

Field Description	Record Type	Offset Dec.	Offset Hex.	
Unit address	4	DEV		
	8	DEV		
	9	DEV		
	10	DEV		
	11	DEV		
	14	UCB		
	15	UCB		
	19	61	3D	
	21	23	17	
	34	DEV		
	40	DEV		
	64	EXT		
	69	39	27	
Unit type	5	70	46	
	8	DEV		
	9	DEV		
	10	DEV		
	11	DEV		
	14	UCB		
	15	UCB		
	19	32	20	
	21	24	18	
	34	DEV		
	40	DEV		
	62	VOL		
	64	EXT		
	74	DEVD		
Updated records, number of	64	STAT		
User identification	4	30	1E	
	5	30	1E	
	6	30	1E	
	10	30	1E	
	14	30	1E	
	15	30	1E	
	17	30	1E	
	18	30	1E	
	20	30	1E	
	25**	30	1E	(VS2.03.812)
	26	30	1E	
	34	30	1E	
	35	30	1E	
	40	30	1E	
	62	30	1E	
	63	30	1E	
	64	30	1E	
	67	30	1E	
	68	30	1E	
	69	30	1E	
VIO page reclaims, number of	4	REL		(VS2.03.807)
	34	REL		(VS2.03.807)
	71	80	50	
	71	104	68	
VIO page-ins, number of	4	REL		
	34	REL		
	71	72	48	
	71	96	60	

**These records are for JES3 only.

Field Description	Record Type	Offset Dec.	Offset Hex.
VIO page-outs, number of	4	REL	
	34	REL	
	71	76	4C
	71	100	64
Virtual storage, number of bytes in	0	22	16
Volume mount message date	25**	76	52 (VS2.03.812)
Volume mount message time	25**	72	48 (VS2.03.812)
Volume owner identification	19	22	16
Volume sequence number	14	250	FA
	15	250	FA
Volume serial number	14	UCB	
	15	UCB	
	17	VOL	
	18	VOL	
	19	16	10
	21	16	10
	62	86	56
	62	VOL	
	64	EXT	
	69	96	60
	74	DEVD	
Volumes, number of	17	87	57
Volumes fetched, number of	25**	40	28 (VS2.03.812)
Volumes mounted, number of	25**	64	40 (VS2.03.812)
VTOC address	19	36	24
VTOC indicator	19	41	29
Wait time, CPU	70	CPUD	
Warm start/start indicator	43	22	16
Workload level	72	PERF	
Write errors, number of	21	29	1D
	21	33	21

**These records are for JES3 only.

SMF record types 4, 14, 15, 34, 40 and 64 have fields that contain the number of EXCPs for a given job or job step. The EXCP count in these records equals the number of *physical* records for non-spooled data sets. (The number of logical records for spooled data sets appears in SMF record types 6 and 26 only.) This appendix summarizes the I/O activity included and that which is excluded in the EXCP-count fields of these SMF records.

The EXCP count includes:

- EXCPs issued via an EXCP macro (SVC 0)
- EXCPs issued in a user's channel-end appendage
- EXCPs issued in a user's abnormal-end appendage
- I/O for VSAM data sets
- I/O for VIO data sets

The EXCP count does not include:

- EXCPs issued via an EXCPVR macro (SVC 114)
- EXCPs issued in a user's PCI when ADDRSPC=REAL
- I/O for system services performed in system keys (0-7), for example:
  - Joblib/steplib processing
  - Jobcat/stepcat processing
  - Overlay supervisor processing
  - Checkpoint data set processing
- EXCPs handled by the job entry subsystem
- TPUTs and TGETs handled by macro instructions (For TPUTs and TGETs, EXCPs are accumulated on a system basis in the TCT and are contained in SMF record types 34 and 35 only.)

Notes:

1. In SMF record types 14 and 15, the EXCP count accumulates over the entire job step. Therefore, if a data set is opened and closed twice during a single job step, the count in the second record is the sum of all EXCPs for both uses of the data set.
2. The EXCP count in the last type 14 and 15 records for a given job step equals the corresponding entry for the data set in the type 4 record.
3. If a concatenated data set contains more than one data set member with the same physical device, the EXCP count is accumulated in the first data set entry having that device entry.
4. If a GETMAIN for the expanding TCTIOT data area (where the EXCP count is maintained) fails, only the existing data sets are counted.
5. In case of system failure, EXCP counting for the job step is discontinued and no device entries are produced.

SMF record types 4, 5, 34 and 35 have fields that contain the job and job step CPU times which installations use for billing purposes. To assist you in creating billing algorithms that use these CPU-time fields, this appendix summarizes the different times that are included and those that are excluded. This appendix also lists a few examples of some of the major causes of CPU-time variation between different runs of the same job or job step.

Job step CPU time is the amount of time devoted by the central processing unit to the execution of instructions for a given job step. Job CPU time is the sum of job step CPU times for all of the steps in a given job. For OS/VS2 Release 3.7, CPU timing is done by the dispatcher on an address space basis. The accumulation of CPU time is separated into two fields: execution time under TCBs and execution time under SRBs.

CPU Time Under TCBs

When a job step is set dispatchable by the initiator, the accumulated job step time field for tasks (ASCBEJST) is initialized to zeros. Task CPU time is determined as follows:

1. Whenever any task is dispatched, the current TOD value is stored in the LCCADTOD field.
2. Whenever an I/O or external interrupt occurs, the current TOD value is stored in the LCCAITOD field.
3. Whenever the dispatcher selects a new unit of work, the CPU time attributed to the pre-emptied task is accumulated in the ASCBEJST field as follows:
   a. If the LCCAITOD $\neq$ 0, the dispatcher was entered from the interrupt handlers and the CPU time for the interrupted task is accumulated by adding the difference between the LCCAITOD and LCCADTOD values to the ASCBEJST value.

      ASCBEJST = ASCBEJST + (LCCAITOD – LCCADTOD)

      This excludes the interrupt handlers' time from the task time.

      Note: In the case of page faults that result in suspension of the current task, the LCCAITOD value represents the TOD value when the program check (page fault) occurred.

   b. If LCCAITOD = 0, the dispatcher was entered from Exit Prologue (that is, an SVC WAIT was issued) and there has been no interrupt since the task was dispatched. If the current task is no longer dispatchable or if it is pre-emptied for higher priority work: 1) the current TOD value is stored in the ASCBEWST field, and 2) the difference between the ASCBEWST and LCCADTOD values is added to the ASCBEJST value.

      ASCBEJST = ASCBEJST + (ASCBEWST – LCCADTOD)

   In both a and b above, the ASCBEJST value is updated via CDS for MP serialization.

Note: If the current task is the RCT task, CPU time is not accumulated. This eliminates the time that is spent in swap-out/swap-in processing and its purging of I/O.

CPU timing is continually accumulated as described above until the job step terminates. At that time the CPU time in the ASCBEJST field is moved into the ACTJTIME field in the account control tables of the JCT. It is from this field that SMF obtains the "CPU time under TCBs" value for its records.

Included/Excluded TCB Times

Timing values accumulated by the dispatcher for the address space under TCB control include:

- Problem program time
- SVCs
- Page faults resolved by reclaim
- Program check handling
- Lock spins encountered in an MP environment
- EMS (emergency signals between CPUs) interrupt occuring within a lock spin
- Abend/Abterm

Times excluded are:

- I/O interrupt time
- External interrupt time
- Page fault processing if not resolved by reclaim
- PCFLIH time if valid SPIE in effect
- CPU "stopped" time if START/STOP commands used
- Time spent in active DSS breakpoints
- RCT time (swap-out/swap-in processing)
- Attention processing time for TSO

CPU Time Under SRBs

When a job step is set dispatchable by the initiator, the accumulated job step time field for SRBs (ASCBSRBT) is initialized to zeros. SRB time is determined as follows:

1. Whenever the SRB is dispatched, the current TOD value is stored in the LCCADTOD field.
2. Whenever the SRB terminates: 1) the current TOD value is stored in the ASCBEWST field, and 2) the difference between the ASCBEWST and LCCADTOD values is added to the ASCBSRBT value.

   ASCBSRBT = ASCBSRBT + (ASCBEWST – LCCADTOD)

3. If an SRB is suspended for a page fault, the local lock, or the CMS lock, CPU time is accumulated as described in 2 above. Whenever the suspended SRB is redispatched, CPU timing is done as described in 1 above.

Note: Because SRBs are non-preemptible, except for the events described in 3 above, the time spent in the interrupt handlers is included.

CPU timing is continually accumulated until the job step terminates. At that time the CPU time in the ASCBSRBT field is moved into the SCTSRBT field for use by SMF.

Included/Excluded SRB Times

Timing values accumulated by the dispatcher for the address space under SRB control include:

- Page resolution
- Swap control
- Cross-memory communications
- TQE scheduling
- I/O completion processing

Times excluded are:

- Page fault suspension
- Lock request suspension

CPU-Time Variation

There are many contributing factors prohibiting repeatable CPU-time measurement. Following is a list of examples of some of the major causes of variation:

- Cycle stealing on systems with integrated channels (370/125-158) – CPU instruction execution is temporarily suspended when channels require the use of hardware resources shared with the CPU.
- CPUs using a high speed buffer (370/155-195) – CPU time may vary due to any of the following:
  - Buffer interference caused by concurrent tasks
  - Partial or full disabling of a buffer because of storage errors
  - Page table lookaside buffer affect on MIPS or instruction speed
- Storage access – The CPU cannot access real storage if a channel is using it. Storage-access time depends on CPU architecture such as interleaving, data widths and paths.
- DASD space allocation – If the number of extents is not exactly the same as before, additional end-of-extent processing is required.

- Temporary I/O errors – Additional SVCs such as SVC 15 (ERREXCP), SVC 16 (PURGE), and SVC 55 (EOV) may be required for temporary I/O errors.
- EXCP request (SVC 0) – The time to process an EXCP request varies depending on the availability status of the requested device and channel. Some possibilities are:
  (a) The device and primary channel are available – the SIO preparation and execution are done immediately.
  (b) The device is available, the primary channel is busy, but one of the alternate channels is available – the time to test alternate channels is added to the time required in (a).
  (c) All devices and channels are busy – the request must be queued on a FIFO basis.
  (d) In an MP environment, the device is available but there are no channels or the channels from one CPU are busy – that CPU will issue a SIGP macro to signal the other CPU.
- BLDL/FIND requests – If BPAM is used extensively, CPU time for processing BLDL/FIND requests varies if there was a change in the PDS directory. That is, a change in the location of the entry for the required member is reflected by a change in the time needed to find the block containing it.
- STOW processing – A difference in the PDS directory may also vary STOW processing time because of the additional reordering or bumping that may be necessary.
- Macro processing – Processing time for macros such as LINK, LOAD, XCTL, ATTACH and BLDL is affected by where the requested module is located. For example, CPU time may be less if the module is in the LPA and joblibs and steplibs are not used.
- Availability of serially reusable resources (locks) – System ENQ routine time will vary depending on whether the resource is available. If a resource is not available, additional time is taken to queue up the current request and to wake the requester. DEQ time also increases if other tasks have subsequently requested the resource that the current task is releasing.
- Wait processing – CPU time varies depending on whether or not ECBs have been posted prior to issuance of the WAIT macro instruction.
- Lock spins – If a job is run on an MP, CPU time may vary due to lock spins encountered in supervisor services.
- Queue searching – System service time varies with the status of the queue environment. For instance, the time to process an ENQ request varies with the number of QCBs to be examined and chained, and whether or not storage must be obtained for new QCBs. The time to process a GETMAIN request varies with the length of the FQE chain; FREEMAIN time varies with the status (free or allocated) of the adjacent areas. Also, global queue searching affects SVC time; for example, GETMAIN is greatly affected if storage is fragmented.
- Time requests – For task and real time requests, timer ENQ routine processing time varies with the number of elements on the timer queue that must be checked to find the proper slot for the current request.

- WTO, WTOR and WTL processing – CPU time may vary depending on the time required to find a free WQE and/or RQE, and possibly on whether a GETMAIN is necessary to build a new element. If the WTO or reply elements are at their limit, additional time is required for enqueuing.

- Generalized trace facility (GTF) – When GTF is active, CPU time increases depending on the system functions (SVC, SIO, IO, PCI, DSP) that are selected for current GTF recording. If USR functions are to be recorded and the application contains GTRACE macros, the CPU time variability is even more pronounced.

- FREEMAIN resulting in available real page – When a FREEMAIN results in making a real page available to an MP system, the page must be invalidated and both CPUs' translation lookaside buffers must be purged of the entry. The invalidation and purge are synchronous: one CPU may wait (spin) a variable amount of time until the other CPU is enabled to receive a signal (EMS interrupt) and perform the synchronizing function.

- System resource manager (SRM) – SRM is run either scheduled as an SRB, as a subroutine of quiesce (RCT), or as a subroutine of a service invoked by a job. SRM execution may cause CPU time to vary when it is invoked from services such as ENQ, WAIT (LONG=YES option), STIMER, WTOR, TPUT and TGET.

- SRM page stealing – SRM page stealing affects the number of page faults that a particular job incurs. CPU time varies depending on both the number of page faults resolved by I/O and the number of page faults resolved by reclaim.

Index

OS/VS2 System Programming Library:
System Management Facilities (SMF)
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