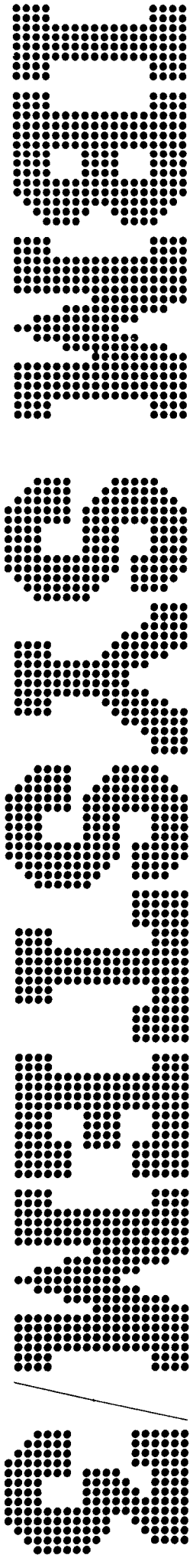

IBM System/3
Model 15D
System Measurement Facility
Reference and
Logic Manual

PRPQ 5799-AYQ

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This edition applies to version 4, modification 0 of the IBM System/3 Model 15D System Measurement Facility (Program Number 5799-AYQ) and to all subsequent versions and modifications until otherwise indicated in new editions or technical newsletters.

Changes or additions to the text and illustrations are indicated by a vertical line to the left of the change or addition.

Changes are periodically made to the information herein; before using this publication in connection with the operation of IBM systems, be sure you have the latest edition and any technical newsletters.

Use this publication only for the purposes stated in the *Preface*.

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Preface

This publication is intended primarily for users of the System/3 Model 15D. The reference information is intended for programmers, systems analysts and, occasionally, the operator. The logic information is intended for program support representatives and customer engineers.

The responsibility for the installation of this program and the interpretation of the results rests solely with the user. IBM assumes no responsibility for the interpretation of the results; any benefits to be gained from the use of this program must be assessed by the individual user.

The System/3 Model 15D System Measurement Facility is a licensed program that consists of two components: The *data collection program* collects information while user applications are executing and writes that information to a disk file; the *data reduction program* prints a summary of this information for interpretation.

This publication contains two parts, each addressing one of the programs. Part I describes the data collection program, its purpose, description, installation, operation, and logic. Part II describes the data reduction program, its purpose, description, installation, and operation; it also includes some examples of how the results might be interpreted.

The System Measurement Facility collects data relating to CCP and batch partitions, spool, the processing unit, 3340/3344 disk, and binary synchronous communications lines supported by CCP (BSCA, BSCC, and display adapter). The facility does not collect data relating to unit record devices (card readers and punches, directly attached 3741, and 1403 printers), tape drives, MLTA, SIOC, MRJE/WS, RPG II Telecommunications, or ML/MP programs.

Related Publications

The reader should be familiar with System/3 Model 15D and with CCP. If more information is required, refer to the following publications.

- *IBM System/3 Models 8, 10, 12 and 15 Components Reference Manual*, GA21-9236
- *IBM System/3 Model 15 Operator's Guide*, GC21-5075
- *IBM System/3 Model 15 System Messages*, GC21-5076
- *IBM System/3 Model 15 System Control Programming Concepts and Reference Manual*, GC21-5162
- *IBM System/3 Model 15 Communications Control Program System Reference Manual*, GC21-7620
- *IBM System/3 Communications Control Program System Design Guide*, GC21-5165
- *IBM System/3 Model 15 System Data Areas and Diagnostic Aids*, SY21-0052
- *IBM System/3 Model 15 Communications Control Program Data Areas and Diagnostic Aids*, SY21-0040

Note: The data collection program can be used only with version 3 or later versions of program 5704-SC2.

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PART 1: DATA COLLECTION

Part 1: Data Collection

PURPOSE AND DESCRIPTION

The data collection program, utilizing statistical sampling, provides information in a disk file concerning the status of the operating system and selected I/O devices of a System/3 Model 15D.

The data collection program can be loaded only in partition 1, and it becomes attached to the supervisor after loading. The program is then deallocated from the partition, freeing partition 1 (except for 10K) for other jobs.

Once started, the data collection program gains control of the system every two seconds and records the information obtained from the system queues and I/O devices. This information is written to a 3340/3344 main data area every 16 seconds.

The program records information until one of the following events occurs:

- The system operator stops the program;
- A disk error occurs while writing the statistical information;
- The disk file becomes full.

The system operator can start and stop the data collection process as many times as is required (see *Considerations*). The number of samples collected is limited only by the size of the file allocated during initiation of the program.

The collected information is written to a standard System/3 data file and may be accessed by a high-level language program (for example, COBOL, FORTRAN, or RPG II). For a description of the disk file, see *Record Descriptions*.

Installation

Use the following OCL and control statements for the library maintenance program ($MAINT) to copy the data collection program to an object library:

```
// LOAD $MAINT,unit1
// RUN
// COPY FROM-READER,TO-unit2,LIBRARY-O,
   NAME-S3DSMF,RETAIN-P
// END
```

where:

unit1 is the unit that contains $MAINT.

unit2 is any simulation area that contains an object library.

Operation

The data collection program (S3DSMF) must be loaded in Partition 1 using the following OCL:

```
// LOAD S3DSMF,unit1
// FILE NAME-$MONITOR,UNIT-Dx,
   PACK-packname,RETAIN-{T/P},TRACKS-nnn
// RUN
```

where:

unit1 is the simulation area that contains the data collection program.

Dx is any main data area.

packname is any valid System/3 pack name.

nnn is the number of tracks (see below).

The RETAIN code can be specified as either T (temporary) or P (permanent).

The number of tracks depends on the length of time that the data collection program is expected to run. About 1 track is required for each 96 seconds of execution. The following table can be used as a guide for determining the size of the file.

Approximate Time	Records	Tracks
15 minutes	450	10
30 minutes	900	19
60 minutes	1800	38
4 hours	7200	150
8 hours	14400	300
16 hours	28800	600
24 hours	43200	900

After the data collection program is loaded, a message is displayed on the console (MONITOR READY-PRESS PF4 TO START). The PF4 key activates the program. Pressing the PF6 key stops the program. Later, the PF4 key can again be used to start the data collection. Thus, the PF4 and PF6 keys can be used to select the intervals to be measured.

If the user wishes to reuse the $MONITOR file, the PF5 key may be pressed to clear the file.

If the trace program ($TRACE) or the transaction logging program ($TRLOG) is required at the same time as the data collection program (S3DSMF), then trace and/or transaction logging must be loaded first.

The data collection file ($MONITOR) must not be deleted, and the pack containing the file must not be removed while the data collection program is loaded (see *Considerations*).

Main Storage Requirements

The data collection program must be loaded into partition 1 which must be set to a size equal to or greater than 20K. After the data collection program is loaded (message MONITOR READY-PRESS PF4 TO START), partition 1 will be available for use by other programs at a size of 10K less than it was before the data collection program was loaded.

The 10K that the data collection program uses will remain unavailable to the rest of the system until an IPL is performed.

CONSIDERATIONS

Do not delete the $MONITOR file while the data collection program is loaded. Unpredictable results, such as overlaid data or invalid output, will occur.

Do not remove the pack that contains the $MONITOR file while the data collection program is loaded. Unpredictable results, such as overlaid data or invalid output, will occur.

Only the PF4, PF5, and PF6 keys on the system console can be used to control the data collection program. These keys must be available when the program is loaded; and once the program is loaded, these keys cannot be used by other programs.

To change a pack while the data collection program is loaded, press the PF6 key on the system console, change the pack, then press the PF4 key to resume data collection. Do not change the pack that contains the $MONITOR file.

The data collection program requires 10K for execution. Once the data collection program has been loaded, this 10K will not be available to any partition until an IPL is performed.

To shut down CCP while the data collection program is loaded, press the PF6 key on the system console and then shut down CCP. After the CCP partition has gone to EJ, the data collection program may be restarted by pressing the PF4 key on the system console.

To obtain a more meaningful picture of system resources and usage, it is recommended that several small intervals be recorded rather than one large interval. For example, six 10-minute intervals might give a better representation than one 1-hour interval (see *Sampling Considerations*).

The data collection program requires full timer support.

3340/3344 usage counts will not be saved for printout by the CE diagnostic programs while the data collection program is active.

If the $MONITOR file is to be reused and a printed report is desired from the collected data, the data reduction program must be loaded before the PF5 key is pressed to clear the $MONITOR file. Any data presently in the $MONITOR file will be lost when the file is cleared.

Sampling Considerations

The following is a discussion of sampling and statistical techniques that apply to the System Measurement Facility. A simple awareness of these potential problems should be sufficient to allow you to make very effective use of the Facility. Some of these items are included in the examples later in this publication.

A sampling technique best suited to a particular environment will vary from user to user. You might experiment with the variables, such as length of the period and the time of the day being sampled, until you find the most representative sample for your installation. The sample period should not be excessively long, nor should it be so short that the period is not meaningful.

If you adjust your application parameters based on a short measurement period, you may find that there was no effect, or even adverse effect, on throughput performance. Thus, selection of a representative measurement period is very important.

Many of the data items in the report are gathered through statistical sampling, rather than subtotaling counters. These include many of the utilization figures and average queue sizes. With any sampling method, there is some inherent random error in the result. This error does not imply that the results are not useful, but rather that you should use them with knowledge of this limitation. The error certainly is reduced with a larger number of samples. With the fixed inter-sample time of two seconds, a longer sampling period must be used.

If you understand this potential error, you can avoid a misinterpretation of the results. For example, you could erroneously attribute small changes in measured utilizations to changed workloads or to changed generation parameters, when actually no change occurred, and the difference is in random sampling error. Again, this possibility is reduced by using larger samples and considering only larger fluctuations in measured results.

The sample period should be representative of the entire period. That is, if you don't want to run the data collection program for the entire period, be sure that the sample period you select is representative.

By using several data collection periods over a time of interest, rather than one long period, you can collect information on how the system usage varies over time. Using several short periods, you may discover widely varying conditions contributing to, but not resembling, the single average. You could find that more than one problem area really exists.

Thus you might find, for example, that six 10-minute intervals yield better results than one 1-hour sample.

MESSAGES

The following messages are displayed on the system console by the data collection program.

MONITOR AND SYSTEM NOT COMPATIBLE

Reason

An attempt was made to load the data collection program under the control of version 1 or version 2 of program 5704-SC2.

PF4, PF5 OR PF6 KEY NOT AVAILABLE–MONITOR TERMINATED.

Reason

The data collection program was unable to allocate the PF4, PF5 or PF6 key on the system console. Another partition has the key allocated.

Recovery

Wait for the partition that owns the PF4, PF5 or PF6 key to terminate; then load the data collection program.

ATTEMPTING TO LOAD MONITOR IN OTHER THAN P1–TERMINATED.

Reason

An attempt was made to load the data collection program in other than partition 1. It must be loaded in partition 1. (The data collection program is not loaded.)

Recovery

Load the data collection program in partition 1.

MONITOR ALREADY LOADED.

Reason

An attempt was made to load the data collection program when it was previously loaded. The data collection program can be loaded only once per IPL.

Recovery

Wait for all partitions to go to end of job and perform an IPL; the data collection program may now be loaded.

P1 NOT 20K.

Reason

Partition 1 is not equal to or greater than 20K. The data collection program requires 20K for initiation.

Recovery

Set partition 1 to at least 20K; then load the data collection program.

MONITOR READY–PRESS PF4 TO START.

Reason

The data collection program has loaded successfully; the PF4 key on the system console will start the data collection process.

Recovery

None required.

MONITOR RUNNING–PRESS PF6 TO STOP.

Reason

The PF4 key on the system console has been pressed; the data collection program has started/resumed collecting system status.

Recovery

None required.

MONITOR STOPPED–PRESS PF4 TO START.

Reason

The PF6 key on the system console has been pressed; the data collection program has ceased collecting system status.

Recovery

Press the PF4 key on the system console to resume collecting the system status.

IS THE $MONITOR FILE TO BE CLEARED?
PRESS PF5 TO CLEAR–PF6 NOT TO.

Reason

The PF5 key on the system console has been pressed; the data collection program is making sure the $MONITOR file is to be cleared.

Recovery

Press the PF5 key on the system console to clear $MONITOR file. Press the PF6 key on the system console if the $MONITOR file is not to be cleared.

DISK FILE FULL–MONITOR STOPPED.
PRESS PF5 TO CLEAR THE FILE.

Reason

The $MONITOR file has reached end of extent; the data collection program has ceased collecting system status and is waiting for the $MONITOR file to be cleared.

Recovery

The PF5 key on the system console will clear the file and allow it to be used again. If the $MONITOR file is to be reused and a printed report is desired from the collected data, the data reduction program must be loaded before the PF5 key is pressed to clear the $MONITOR file. Any data presently in the $MONITOR file will be lost when the file is cleared.

PERMANENT DISK ERROR–MONITOR STOPPED.
PRESS PF4 TO START.

Reason

An error has occurred while writing to the $MONITOR file; the data collection program has ceased collecting the system status.

Recovery

Press the PF4 key on the system console to resume collecting the system status.

CCP NOT ACTIVE–MONITOR STOPPED.

Reason

CCP was shut down while the data collection program was collecting CCP information.

Recovery

An IPL is required to continue collecting system status.

Note: See *Considerations* for shutting down CCP while the data collection program is loaded.

RECORD DESCRIPTIONS

The data collection program writes one block of records (2048 bytes) every 16 seconds. Each block consists of eight 256-byte records.

There are two record types: Type 1 and Type 2. A type 1 record is written each time the PF4 key is pressed. Type 2 records are written every two seconds until the PF6 key is pressed.

In the record layouts, *form* refers to the format of the field:

Bin	–	Binary
Alpha	–	Alphanumeric
Hex	–	Hexadecimal
Dec	–	Decimal

Type 1 Record

The type 1 record consists of configuration information.

From	To	Form	Description
1	1	Dec	Digit 1 (type 1 record)
2	7	Bin	Time in timer units (each timer unit is 3.33 milliseconds)
8	13	Dec	System date (ddmmyy or mmddyy)
14	14	Hex	Main storage size:

Hex Value	*Meaning*
80	512K
60	384K
40	256K
38	224K
30	192K
28	160K
20	128K
18	96K

15 15 Hex Disk and tape device support:

Hex Value	*Meaning*
C0	3344s are supported
80	3340s are supported
38	D1, D2, D3, D4 are supported
30	D1, D2, D3 are supported
28	D1, D2 are supported
07	T1, T2, T3, T4 are supported
06	T1, T2, T3 are supported
05	T1, T2 are supported
04	T1 is supported

16 16 Hex Device support:

Hex Value	*Meaning*
80	5424
40	2560
20	1403
10	1442
08	2501
04	3741
02	Second 1403

From	To	Form	Description
17	17	Hex	Spool status: *Hex Value* — *Meaning* 80 — Spool is active
18	19	Hex	Assign/free size in increments of 512 bytes Example: 0001 = 512 bytes 0006 = 3072 bytes
20	23	Bin	Size of partition 1 in bytes
24	27	Bin	Size of partition 2 in bytes
28	31	Bin	Size of partition 3 in bytes
32	32	Hex	CCP partition ID
33	33	Alpha	CCP assignment set ID
34	34	Dec	Number of bisynchronous lines
35	35	Dec	Number of asynchronous lines
36	36	Dec	Number of serial input/output channels controlled by CCP
37	38	Bin	Number of CCP terminals
39	40	Bin	Size of main storage, in bytes, set aside for CCP TCBs (tasks) during system generation
41	42	Hex	Size of CCP user program area in 2K blocks (Example: 0001 = 2K; 0010 = 32K)
43	46	Bin	Allocated size of CCP teleprocessing buffer (TPBUFF)
47	50	Bin	Size of input/output area of CCP teleprocessing buffer
51	54	Bin	Size of input area of CCP teleprocessing buffer
55	58	Bin	Supervisor size (excluding spool), in bytes
59	60	Bin	Maximum CCP command length, in bytes
61	62	Bin	Maximum CCP program request under format (PRUF) length, in bytes
63	63	Hex	DFF line buffer support *Hex Value* — *Meaning* 80 — BSC line 1 DFF buffer supported 40 — BSC line 2 DFF buffer supported 20 — BSC line 3 DFF buffer supported 10 — BSC line 4 DFF buffer supported
64	256		Reserved

Type 2 Record

The type 2 record contains a sample of the status of the system (a snapshot).

An asterisk (*) next to the form (for example, Bin*) indicates that the count is continuously being updated by the system programming support. The other data reflect conditions that are in effect during the instant of the sample.

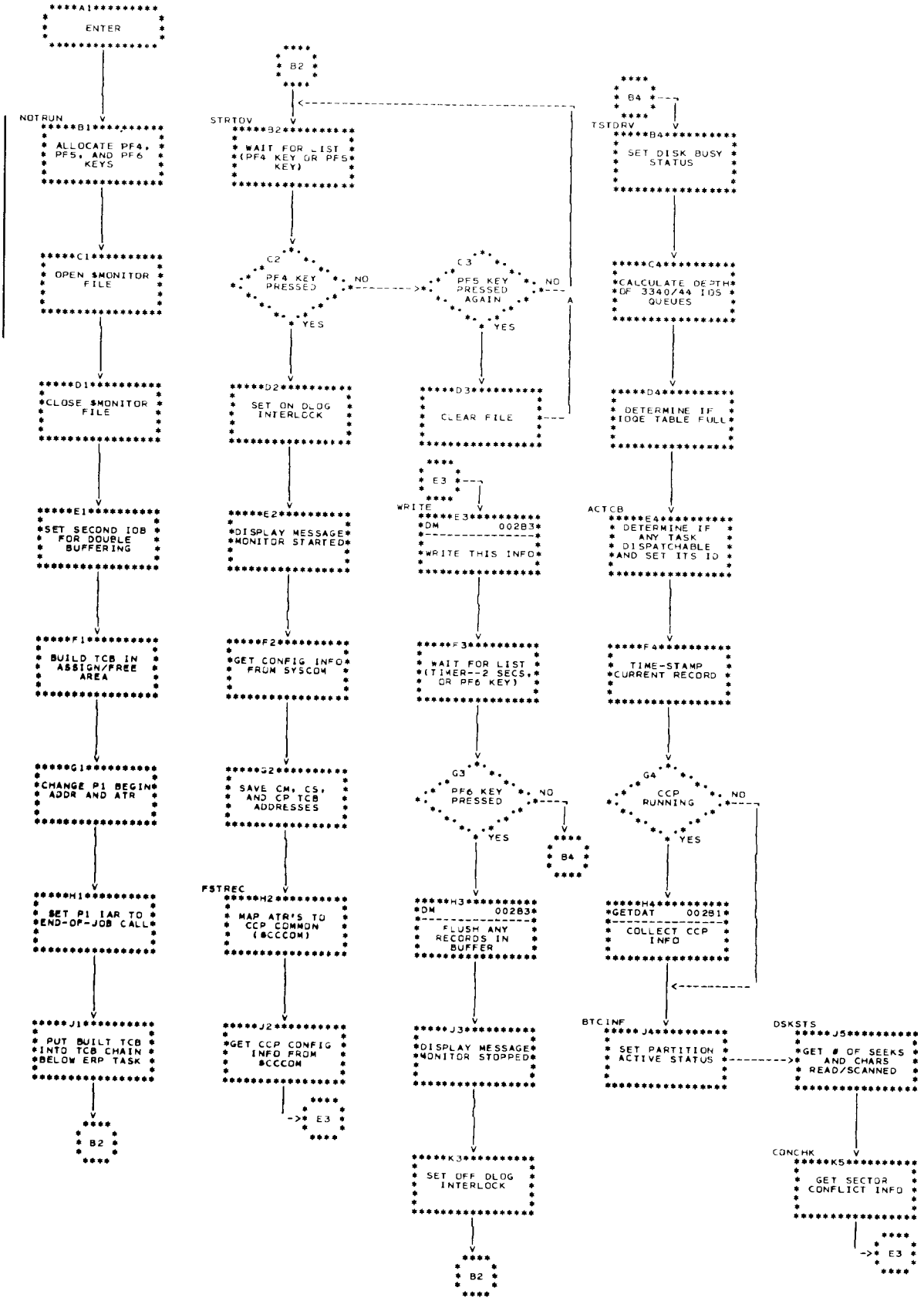
From	To	Form	Description
1	1	Dec	Digit 2 (type 2 record)
2	7	Bin	Time sample was taken in timer units (each timer unit is 3.33 milliseconds)
8	13	—	Reserved
14	15	Dec	Number of active CCP programs
16	17	Dec	Number of queued CCP programs
18	19	Dec	Number of CCP programs in termination
20	21	Dec	Number of CCP programs in allocation
22	23	Bin*	Number of times the command processor has received data from a terminal since the previous sample
24	25	Bin*	Number of programs physically loaded since the previous sample
26	27	Bin*	Number of program requests attached to already active MRT programs since the previous sample
28	29	Bin*	Number of task chains accepted since the previous sample
30	31	Hex	Total CCP user program area free (in 2K blocks) (Example: 0001 = 2K; 000A = 20K)
32	33	Hex	Largest CCP user program area free (in 2K blocks) (Example: 0001 = 2K; 0008 = 16K)
34	35	Bin	Number of free areas in CCP user program area
36	39	Bin	Size of total free input/output area in CCP teleprocessing buffer (TPBUFF)
40	43	Bin	Size of largest contiguous area in CCP teleprocessing buffer currently free for output
44	47	Bin	Size of largest contiguous area in CCP teleprocessing buffer currently free for input
48	49	Bin	Total number of free areas in CCP teleprocessing buffer
50	50	Hex	Information for BSC line 1: Bit 0 = 1—Line is active = 0—Line is inactive Bit 1 = 1—CCP is currently polling this line = 0—CCP is not currently polling this line Bit 2 = 1—CCP is currently transmitting data on this line Bit 7 = 1—CCP is currently using the DFF buffer on this line (Examples of preceding bit combinations: X'C0'—polling; X'A0'—transmitting data; X'80'—receiving data; X'00'—line is inactive)
51	52	Bin	Number of output parameter lists (put operations) waiting for teleprocessing buffer on BSC line 1
53	54	Bin	Number of input parameter lists (invite or get operations) waiting for teleprocessing buffer on BSC line 1
55	56	Bin	Number of parameter lists waiting to transmit data on BSC line 1 (have already obtained TP buffer)

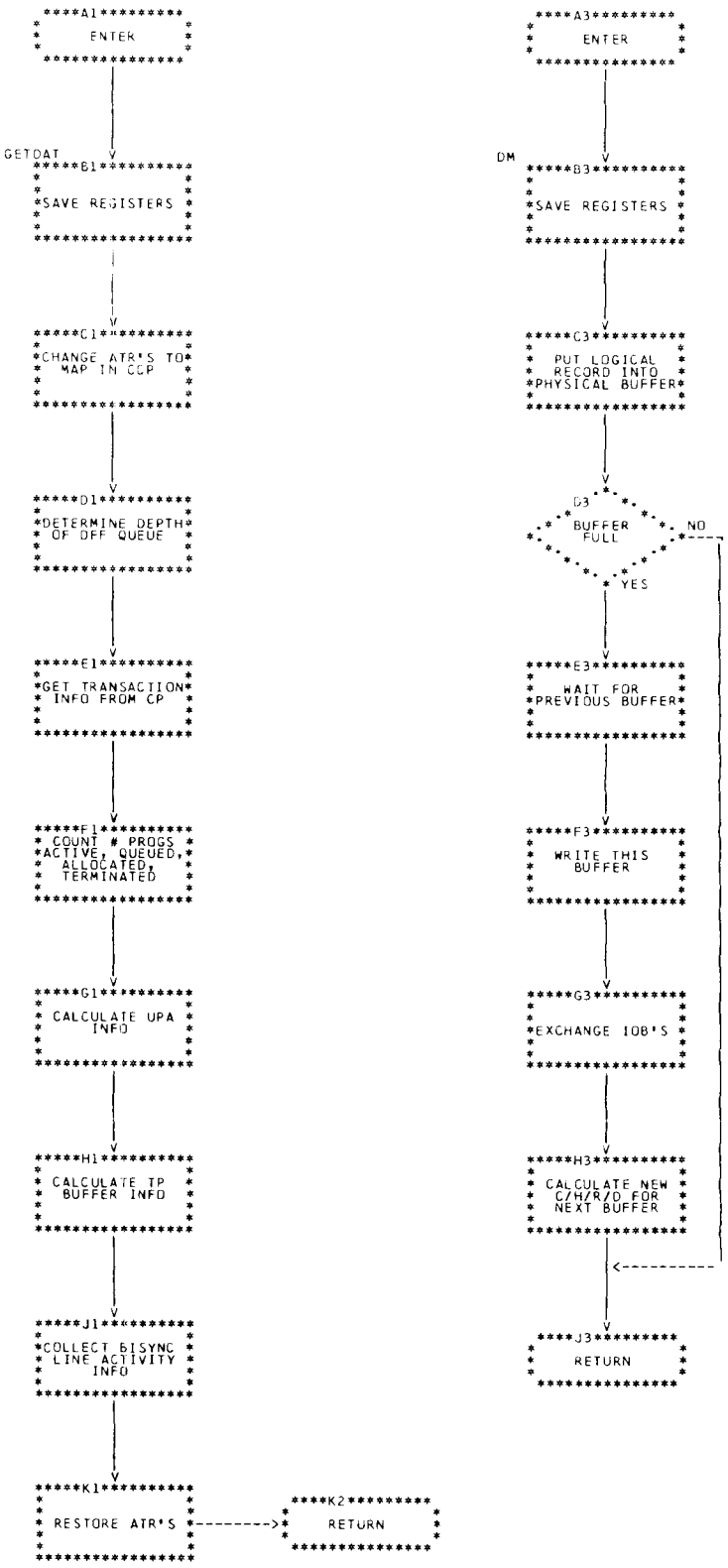
From	To	Form	Description
57	63	Bin	Information for BSC line 2 (for a description, see 50-56)
64	70	Bin	Information for BSC line 3 (for a description, see 50-56)
71	77	Bin	Information for BSC line 4 (for a description, see 50-56)
78	79	Bin*	Number of blocks sent on BSC line 1 since last sample
80	81	Bin*	Number of blocks received on BSC line 1 since last sample
82	85	Bin*	Number of bytes sent on BSC line 1 since last sample
86	89	Bin*	Number of bytes received on BSC line 1 since last sample
90	91	Bin*	Number of BSC errors (not device errors) on BSC line 1 since last sample
92	105	Bin	Information for BSC line 2 (for a description, see 78-91)
106	119	Bin	Information for BSC line 3 (for a description, see 78-91)
120	133	Bin	Information for BSC line 4 (for a description, see 78-91)
134	135	Bin*	Number of seeks on D1 since last sample
136	137	Bin*	Number of seeks on D2 since last sample
138	139	Bin*	Number of seeks on D3 since last sample
140	141	Bin*	Number of seeks on D4 since last sample
142	145	Bin*	Number of characters read/scanned on D1 since last sample
146	149	Bin*	Number of characters read/scanned on D2 since last sample
150	153	Bin*	Number of characters read/scanned on D3 since last sample
154	157	Bin*	Number of characters read/scanned on D4 since last sample
158	159	Bin	Number of IOBs (operations) in D1 queue
160	161	Bin	Number of IOBs (operations) in D2 queue
162	163	Bin	Number of IOBs (operations) in D3 queue
164	165	Bin	Number of IOBs (operations) in D4 queue
166	169	Bin*	Total sector conflicts since last sample
170	171	Bin	Number of sector conflicts currently in effect

From	To	Form	Description
172	172	Hex	Bit significant information as follows: Bit 0 = 1 Drive 1 is busy executing a seek 1 = 1 Drive 2 is busy executing a seek 2 = 1 Drive 3 is busy executing a seek 3 = 1 Drive 4 is busy executing a seek 4 = 1 The 3340/44 disk attachment is busy 5 = 1 Partition 1 is in use (a program is loaded) 6 = 1 Partition 2 is in use 7 = 1 Partition 3 is in use
173	173	Hex	Bit significant information as follows: Bit 0 = 1 A task is dispatchable 1 = 1 A wait for assign/free area has occurred 2 = 1 Input/output queue element (IOQE) table is full 3 = 1 The highest priority dispatchable task will execute with I-cycles translate off
174	174	Alpha	The ID of the highest priority dispatchable task
175	176	Bin	Display format facility (DFF) task queue depth (number of parameter lists on DFF's queue)
177	256		Reserved

LOGIC INFORMATION

This section describes the logic flow of the data collection program. The high level flow charts are intended to be used with the assembly listings of the program.


A1
ENTER
B2
NOTRUN
B1
ALLOCATE PF4, PF5, AND PF6 KEYS
STRTDV
B2
WAIT FOR LIST (PF4 KEY OR PF5 KEY)
B4
TSTDRV
B4
SET DISK BUSY STATUS
C1
OPEN $MONITOR FILE
C2
PF4 KEY PRESSED
NO
YES
C3
PF5 KEY PRESSED AGAIN
NO
YES
A
C4
CALCULATE DEPTH OF 3340/44 IOS QUEUES
D1
CLOSE $MONITOR FILE
D2
SET ON DLOG INTERLOCK
D3
CLEAR FILE
D4
DETERMINE IF IOQE TABLE FULL
E1
SET SECOND IOB FOR DOUBLE BUFFERING
E2
DISPLAY MESSAGE MONITOR STARTED
E3
WRITE
E3
DM 00283
WRITE THIS INFO
ACTCB
E4
DETERMINE IF ANY TASK DISPATCHABLE AND SET ITS ID
F1
BUILD TCB IN ASSIGN/FREE AREA
F2
GET CONFIG INFO FROM SYSCOM
F3
WAIT FOR LIST (TIMER--2 SECS, OR PF6 KEY)
F4
TIME-STAMP CURRENT RECORD
G1
CHANGE P1 BEGIN ADDR AND ATR
G2
SAVE CM, CS, AND CP TCB ADDRESSES
G3
PF6 KEY PRESSED
NO
YES
B4
G4
CCP RUNNING
NO
YES
H1
SET P1 IAR TO END-OF-JOB CALL
FSTREC
H2
MAP ATR'S TO CCP COMMON (@CCCOM)
H3
DM 00283
FLUSH ANY RECORDS IN BUFFER
H4
GETDAT 00281
COLLECT CCP INFO
BTCINF
J1
PUT BUILT TCB INTO TCB CHAIN BELOW ERP TASK
J2
GET CCP CONFIG INFO FROM @CCCOM
E3
J3
DISPLAY MESSAGE MONITOR STOPPED
J4
SET PARTITION ACTIVE STATUS
DSKSTS
J5
GET # OF SEEKS AND CHARS READ/SCANNED
CONCHK
K3
SET OFF DLOG INTERLOCK
K5
GET SECTOR CONFLICT INFO
E3
B2


A1
ENTER
GETOAT
B1
SAVE REGISTERS
C1
CHANGE ATR'S TO MAP IN CCP
D1
DETERMINE DEPTH OF OFF QUEUE
E1
GET TRANSACTION INFO FROM CP
F1
COUNT # PROGS ACTIVE, QUEUED, ALLOCATED, TERMINATED
G1
CALCULATE UPA INFO
H1
CALCULATE TP BUFFER INFO
J1
COLLECT BISYNC LINE ACTIVITY INFO
K1
RESTORE ATR'S
K2
RETURN
A3
ENTER
DM
B3
SAVE REGISTERS
C3
PUT LOGICAL RECORD INTO PHYSICAL BUFFER
G3
BUFFER FULL
NO
YES
E3
WAIT FOR PREVIOUS BUFFER
F3
WRITE THIS BUFFER
G3
EXCHANGE IOB'S
H3
CALCULATE NEW C/H/R/D FOR NEXT BUFFER
J3
RETURN

PART 2: DATA REDUCTION

PURPOSE AND DESCRIPTION

The data reduction program, SMFSUM, reads the records written by the data collection program; reduces the information to average and maximum values; and presents the results for interpretation. The program is written in RPG II and runs in a batch partition. With this facility, you can obtain information about your system with the intention of determining where contentions in resource utilization exist. You can then make adjustments in your application design and/or system resource allocations to attempt to reduce those contentions.

SMFSUM processes the type 1 and type 2 records created by the data collection program. For a description of these records, see *Record Descriptions*. SMFSUM reads the type 1 records and all following type 2 records; calculates average and maximum for the interval; and prints the results. It will continue in this manner (summarizing each interval) until all records in the $MONITOR file have been read.

The data reduction program may be executed concurrently with the data collection program, and its output may be spooled.

All samples will be considered up to and including the last sample written to the file by the data collection program. The end of the interval is detected by (1) another type 1 record, (2) a blank record in the file, or (3) a record containing all 9s (hex F9).

Installation

Use the following OCL and control statements for the library maintenance program ($MAINT) to copy the data reduction program to an object library.

```
// LOAD $MAINT,unit1
// RUN
// COPY FROM-READER,TO-unit2,LIBRARY-O,
   NAME-SMFSUM,RETAIN-P
// END
```

where:

unit1 is the unit that contains the $MAINT program.

unit2 is any simulation area that contains an object library.

Operation

The data reduction program may be loaded in any batch partition using the following OCL:

```
// LOAD SMFSUM,unit1
// FILE NAME-$MONITOR,UNIT-unit2,
   PACK-packname,SHARE-NO
// RUN
```

where:

unit1 is the simulation area that contains the data reduction program (SMFSUM).

unit2 is the main data area that contains the $MONITOR file created by the data collection program.

packname is any valid System/3 pack name.

This program will read the $MONITOR file and produce a printed report. For a description of the report, see *Description of Output*.

Main Storage Requirements

The data reduction program (SMFSUM) requires a 22K batch partition.

DESCRIPTION OF OUTPUT

The data reduction program produces a two-page report for each measured interval. An interval consists of the data sampled between type 1 records in the $MONITOR file. An interval contains the data gathered between pressing the PF4 key and pressing the PF6 key.

The first page of the report is system configuration information; the second page is a summary of the sample information gathered during the interval. (See Figures 1 and 3 under *Examples*.)

An asterisk (*) indicates that the count is being updated continuously by the system programming support. The other data reflects conditions that are in effect during the instant of the sample.

System Configuration Information

DATE

The date of the interval.

MAIN STORAGE SIZE -K-

The main storage size of the system specified in K bytes (K equals 1024).

SUPERVISOR SIZE

The size, in bytes, of the system supervisor. This size does not include spool support routines, transaction logging, trace, or file share area.

ASSIGN/FREE AREA SIZE

The size, in bytes, of the assign/free storage pool. This area of main storage resides in, and is included in, the supervisor size. It is used as a working storage area by programs and system tasks on an as-needed basis.

PARTITION 1 SIZE

The size, in bytes, of partition 1 at the start of this interval. If the partition size is changed during the interval, the change will not be reflected in this number.

PARTITION 2 SIZE

The size, in bytes, of partition 2 at the start of this interval. If the partition size is changed during the interval, the change will not be reflected in this number.

PARTITION 3 SIZE

The size, in bytes, of partition 3 at the start of this interval. If the partition size is changed during the interval, the change will not be reflected in this number.

DEVICE SUPPORT

A device that is supported by the system is indicated by the character Y. A device that is not supported is indicated by the character N.

SPOOL ACTIVE

The character Y indicates that spool is active; the character N indicates that spool is not active.

The following configuration information is printed only if CCP was active at the beginning of the measured interval:

CCP PARTITION ID

The partition ID in which CCP was executing.

ASSIGNMENT SET ID

The active CCP assignment set ID.

CCP PARTITION SIZE

The size, in bytes, of the CCP partition.

USER PROGRAM AREA SIZE -K-

The size of the CCP user program area, in K (1024) bytes.

TP BUFFER SIZE

The size, in bytes, of the CCP teleprocessing buffer.

TP BUFFER I/O AREA SIZE

The size, in bytes, of the area of the teleprocessing buffer that is available for input (invite or get) and output (put) operations.

TP BUFFER INPUT AREA SIZE

The size, in bytes, of the area of the teleprocessing buffer that is available for input (invite or get) operations.

NUMBER OF BISYNC LINES

The number of binary synchronous communications lines supported by the current CCP assignment set.

NUMBER OF ASYNC LINES

The number of asynchronous communications lines supported by the current CCP assignment set.

CHANNEL CONNECT – CCP

The letter Y indicates that the current CCP assignment set supports channel connected systems.

NUMBER OF TERMINALS

The number of terminals (and ports, if channel-connected) supported by the current CCP assignment set.

NUMBER OF CCP TASKS SUPPORTED

The maximum number of concurrent CCP user programs supported by the current supervisor.

MAX PRUF LENGTH

The maximum program read under format (PRUF) length supported by the current CCP assignment set.

MAX COMMAND LENGTH

The maximum command length support by the current CCP assignment set.

BSC LINE 1 DFF BUFFER
BSC LINE 2 DFF BUFFER
BSC LINE 3 DFF BUFFER
BSC LINE 4 DFF BUFFER

The letter Y indicates that the current CCP assignment set supports individual DFF line buffers.

Summary of Sample Information

The sample information collected for the measured interval is reduced to average and maximum values for interpretation by the user. Following is a description of each field. (See Figures 2 and 4 under *Examples*.)

CPU

The activity within the partitions of the system is presented under four headings (five if spool is active). The figure under each heading is a fraction of the total *partition time* consumed by that task. The total partition time is 1.000. The four headings are:

WAITING–Indicates that no tasks were prepared to execute for this fraction of the total time, or that the system was executing cycle steals.

P1–The fraction of the total time that partition 1 was executing.

P2–The fraction of the total time that partition 2 was executing.

P3–The fraction of the total time that partition 3 was executing.

P1, P2, or P3 will be replaced by the heading *CCP* if CCP was active in that partition at the start of the interval being measured. A fifth heading, *SPOOL*, will be printed if spool was active during the interval being measured–indicating the fraction of the total time that spool was executing.

DISK

Information pertaining to the disk drives is presented under six headings:

ATTACH BUSY–The fraction of the total time that the 3340/3344 disk attachment was busy scanning or transferring data to or from the processing unit. The total time is 1.000. A value of .057 under this heading would indicate that the disk attachment was busy 5.7% of the total time interval.

SEEK BUSY–The fraction of the total time that the indicated drive was busy performing a seek operation. The total time is 1.000. A value of 0.003 under this heading would indicate that the specified drive (D1, D2, D3, or D4) was busy performing a seek operation 0.3% of the total time interval

SEEK COUNT*–The total number of seeks (that require disk arm movement) performed by all disk drives and the total number of seeks performed by each disk drive.

CHARACTERS READ/SCANNED*–The total number of characters read or scanned by the 3340 controller and the number of characters read or scanned by each disk drive during the interval measured.

IOB DEPTH–The average and maximum number of disk operations outstanding for *all* disk drives and the average and maximum disk operations outstanding for *each* disk drive.

SECTOR CONFLICTS–The *total** number of conflicts that occurred during the interval; the *maximum* number of conflicts found at any sample point; and the *average* of the number of conflicts found at all of the sample points during the interval.

A sector conflict occurs when:

- Separate programs attempt to update the same record in a file.
- A program attempts to update a record and that record (or a part of it) currently resides in the buffer of another program.
- Separate programs simultaneously perform additions to the same file.

When a sector conflict occurs, one of the programs must wait until the other has released the record.

BISYNC

Information pertaining to the binary synchronous communications lines is presented under eight headings:

INACTIVE–The fraction of the total time that the indicated BSC line spent in the inactive state (neither polling nor transferring data). The total time is 1.000. A value of .010 would indicate that the BSC line was inactive 1% of the time interval measured.

POLL–The fraction of the total time that the indicated BSC line spent polling. The total time is 1.000. A value of .972 would indicate that the BSC line was polling 97.2% of the time interval measured.

IN–The fraction of the total time that the indicated BSC line spent transferring data into the processing unit. The total time is 1.000. A value of .003 would indicate that the BSC line was transferring data into the processing unit .3% of the time interval measured.

Note: The System/3 transfers data into the processing unit on a cycle-steal basis. The system programming is unaware that data is being placed into the processing unit from a BSC line until an operation-end interrupt occurs. When the op-end occurs, the system programming changes the state of the BSC line from *polling* to *transferring data in*. Therefore, the first block of data into the processing unit will not be reflected in this value; rather, it will be reflected under *POLL*.

OUT–The fraction of the total time that the indicated BSC line spent transferring data out of the processing unit. The total time is 1.000. A value of .015 would indicate that the BSC line was transferring data out of the processing unit 1.5% of the time interval measured.

BLOCKS*–The total number of text blocks sent and received on the indicated BSC line during the interval measured.

BYTES*–The total number of bytes sent and received on the indicated BSC line during the interval measured, excluding BSC control characters.

ERRORS*–The total number of errors encountered on the indicated BSC line during the interval measured.

OUTPUT PENDING–The average and maximum number of output operations outstanding for the indicated BSC line during the interval measured.

UPA

Information pertaining to the CCP user program area is presented under three headings:

AVERAGE UTILIZATION–The fraction of the total CCP user program area, on the average, that was in use during the interval measured. The total area is 1.000. A value of .134 under this heading would indicate that, on the average, 13.4% of the total CCP user program area was in use during the interval measured.

MAXIMUM UTILIZATION–The maximum amount of CCP user program area, expressed as a fraction, that was used during the interval measured. The total area is 1.000. A value of .178 under this heading would indicate that 17.8% of the CCP user program area was the most that was used during the interval measured.

FREE BLOCKS–The average and maximum number of free areas available in the CCP user program area. This is an indication of the fragmentation of the user program area. Values of 2.024 and 3 would indicate that the average number of free areas was 2.024 and the maximum number of free areas was 3 during the interval measured.

TP BUFF

Information pertaining to the CCP teleprocessing buffer is presented under five headings:

AVERAGE UTILIZATION–The fraction of the CCP teleprocessing buffer, on the average, that was in use during the interval measured. The total area is 1.000. A value of .274 under this heading would indicate that 27.4% of the teleprocessing buffer was in use, on the average, during the interval measured.

MAXIMUM UTILIZATION–The maximum amount of CCP teleprocessing buffer, expressed as a fraction, that was used during the interval measured. The total area is 1.000. A value of .393 would indicate that 39.3% of the CCP teleprocessing buffer was the most that was used during the interval measured.

WAITING FOR INPUT–The average and maximum number of teleprocessing input operations that could not be initiated due to the unavailability of sufficient teleprocessing buffer. A value of 1.05 under the heading *AVG* would indicate that, at any time during the interval measured, 1.05 terminals were unable to send data to the processing unit due to the unavailability of teleprocessing buffer. A value of 9 under the heading *MAX* would indicate that, at some point in time during the interval measured, nine terminals were unable to send data to the processing unit due to the unavailability of teleprocessing buffer.

WAITING FOR OUTPUT–The average and maximum number of teleprocessing output operations that could not be initiated due to the unavailability of sufficient teleprocessing buffer. A value of 2.67 under the heading *AVG* would indicate that, at any time during the interval measured, 2.67 terminals were unable to receive a response due to the unavailability of teleprocessing buffer. A value of 5 under the heading *MAX* would indicate that, at some point in time during the interval measured, five terminals were unable to receive a response due to the unavailability of teleprocessing buffer.

FREE BLOCKS–The average and maximum number of free areas available in the CCP teleprocessing buffer. This is an indication of the fragmentation of the teleprocessing buffer. Values of 6.05 and 10 would indicate that the average number of free areas was 6.05 and the maximum was 10 during the interval measured.

CCP PGMS

Information pertaining to the CCP program activity is presented under eight headings:

ACTIVE–The average and maximum number of CCP programs that were active during the interval measured.

QUEUED–The average and maximum number of CCP programs that were in a queued state pending execution during the interval measured. (When a CCP program is unable to obtain a TCB or a tasking area, it is placed into queued state.)

IN ALLOCATE–The average and maximum number of CCP programs that were in allocation during the interval measured. A program is placed in allocation when a required resource (such as required terminal or no-share disk file) is unavailable.

IN TERMINATE–The average and maximum number of CCP programs that were in a termination status during the interval measured. A CCP program is placed into termination status when it has requested end of job.

PHYSICALLY LOADED*–The *total* number of CCP programs that were read from disk and loaded into main storage during the interval measured. The *average* is the total divided by the number of samples. The *maximum* is the highest number of programs read from disk and loaded into main storage during any two-second sample during the interval measured.

PROGRAM REQUESTS OR COMMANDS*–The *total* number of program requests or commands received during the interval measured. The *average* is the total divided by the number of samples. The *maximum* is the highest number of program requests or commands that occurred during any two-second sample during the interval measured.

REQUESTS ATTACHED TO ACTIVE MRTS*–The *total* number of program requests received that did not require a physical program load from disk. The *average* is the total divided by the number of samples. The *maximum* is the highest number of requests that occurred during any two-second sample during the interval measured.

TASK CHAINS ACCEPTED*–The *total* number of task chains that were successful during the interval measured; a task chain was successful if the TUB was available and if TP buffer was available. The *average* is the total divided by the number of samples. The *maximum* is the highest number of task chains accepted that occurred during any two-second sample during the interval measured.

DFF

Information pertaining to the DFF task is presented under one heading:

QUEUE–The average and maximum number of operations pending for the DFF task.

TIME

The start time and stop time of each interval is presented in hours, minutes, and seconds. A start time of 07 48 27 and a stop time 07 59 39 would indicate the interval started at 48 minutes and 27 seconds past 7 a.m. and stopped at 59 minutes and 39 seconds past 7 a.m., for a total interval of 11 minutes and 12 seconds.

SAMPLE COUNT

The number of samples collected during this interval.

EXAMPLES

Example 1

Figures 1 through 3 show an example of the information produced by the data reduction program.

Figure 1 shows the system configuration at the beginning of the interval measured. Figure 3 is a fictitious example of the information printed on the second page of the output. It is presented to serve as the basis for a discussion of the interpretation of the output.

System Configuration

The system configuration is explained in Figure 2. The left column in the figure is an example of the information printed by the program. The right column is not printed by the program, but it presents notes and comments relative to the data in the figure. Some additional remarks are noteworthy:

1. The size of partition 1 is shown as 22K (22,528 bytes). This is the space currently available to partition 1 for user programs. The original size was specified as 32K by the user, but 10K was subtracted for use by the data collection program.

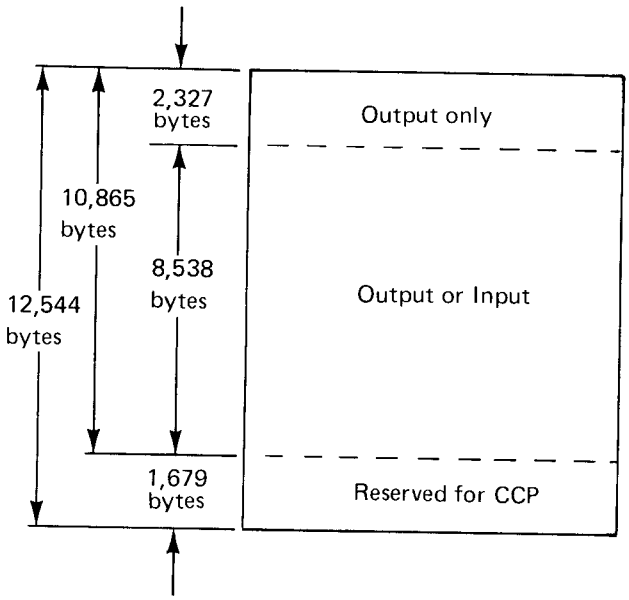
2. A main storage map derived from this data is as follows:

Supervisor area	34K	(includes 3K assign/free)
Partition 1	22K	
Data collection program	10K	
Partition 2	430K	
Partition 3	0K	
Other uses: file share area, trace, transaction logging, spool	16K	
Total	512K	

3. The CCP partition is used as follows:

User program area	322K
TP Buffer	12K
Subtotal	334K
Resident CCP (430-334)	96K
Total	430K

4. The TP buffer (12,544 bytes) is used as follows:



```
                        15D  SYSTEM MEASUREMENT FACILITY

                        S Y S T E M   C O N F I G U R A T I O N          PAGE 1

DATE     7/06/78
MAIN STORAGE SIZE -K-                    512
SUPERVISOR SIZE                       34,816
ASSIGN/FREE AREA SIZE                  3,072
PARTITION 1 SIZE                      22,528
PARTITION 2 SIZE                     440,320
PARTITION 3 SIZE                           0
DEVICE SUPPORT
      3344                                 Y
        D1                                 Y
        D2                                 Y
        D3                                 Y
        D4                                 Y
        T1                                 N
        T2                                 N
        T3                                 N
        T4                                 N
      5424                                 N
      2560                                 N
    1403-1                                 Y
    1403-2                                 N
      1442                                 Y
      2501                                 N
      3741                                 N
SPOOL ACTIVE                               Y

CCP PARTITION ID                           2
 ASSIGNMENT SET ID                         3
CCP PARTITION SIZE                   440,320
USER PROGRAM AREA SIZE -K-               322
TP BUFFER SIZE                        12,544
TP BUFFER I/O AREA SIZE               10,865
TP BUFFER INPUT AREA SIZE              8,538
NUMBER OF BISYNC LINES                     4
NUMBER OF ASYNC LINES                      0
CHANNEL CONNECT - CCP                      N
NUMBER OF TERMINALS                       77
NUMBER OF CCP TASKS SUPPORTED             15
MAX PRUF LENGTH                        2,057
MAX COMMAND LENGTH                        91
BSC LINE 1 DFF BUFFER                      N
BSC LINE 2 DFF BUFFER                      N
BSC LINE 3 DFF BUFFER                      N
BSC LINE 4 DFF BUFFER                      N
```

Figure 1. System Configuration—Example 1

SYSTEM CONFIGURATION

(1st Column)

		Notes and Comments
DATE	7/06/78	
MAIN STORAGE SIZE -K-	512	512K = 524,288 bytes
SUPERVISOR SIZE	34,816	Bytes
ASSIGN/FREE AREA SIZE	3,072	Bytes
PARTITION 1 SIZE	22,528	Bytes
PARTITION 2 SIZE	440,320	Bytes
PARTITION 3 SIZE	0	Bytes
DEVICE SUPPORT		
3344	Y	Yes, device is supported, not necessarily used during the interval.
D1	Y	
D2	Y	
D3	Y	
D4	Y	
T1	N	No, tape is not supported.
T2	N	
T3	N	
T4	N	
5424	N	No, MFCU is not supported.
2560	N	No, MFCMis not supported.
1403-1	Y	Yes, first 1403 is supported.
1403-2	N	No, second 1403 is not supported.
1442	Y	Yes, 1442 is supported.
2501	N	No, 2501 is not supported.
3741	N	No, 3741 directly attached is not supported.
SPOOL ACTIVE	Y	Yes, spooling is active.

(2nd Column)

CCP PARTITION ID	2	CCP loaded in partition 2
ASSIGNMENT SET ID	3	Using set number 3
CCP PARTITION SIZE	440,320	Bytes
USER PROGRAM AREA SIZE -K-	322	322K = 329,728 bytes
TP BUFFER SIZE	12,544	Bytes
TP BUFFER I/O AREA SIZE	10,865	Bytes
TP BUFFER INPUT AREA SIZE	8,538	Bytes
NUMBER OF BISYNC LINES	4	
NUMBER OF ASYNC LINES	0	MLTA not supported
CHANNEL CONNECT - CCP	N	Channel (SIOC) connected systems not supported
NUMBER OF TERMINALS	77	Supported by this assignment set
NUMBER OF CCP TASKS SUPPORTED	15	Per system generation
MAX PRUF LENGTH	2,057	Bytes
MAX COMMAND LENGTH	91	Bytes
BSC LINE 1 DFF BUFFER	N	No, individual line DFF buffers are not supported
BSC LINE 2 DFF BUFFER	N	
BSC LINE 3 DFF BUFFER	N	
BSC LINE 4 DFF BUFFER	N	

Figure 2. Example of System Configuration Printed by the Data Reduction Program

Summary

Figure 3 shows an example of the second page of the two-page listing produced by the data reduction program.

Drawing any conclusions from one interval sample would not be statistically accurate. Therefore, in the following discussion, it is assumed that Figure 3 reflects an interval that is representative of a number of intervals measured.

Five fields are shown in the first row, *CPU*. Since CCP was running in partition 2, the heading *P2* has been replaced by the heading *CCP*. Only the CCP partition (P2) was active; P1, P3, and spool were inactive, as indicated by .000 in each column. The value under the CCP heading, .680, indicates that the CCP partition was loading, terminating, or executing CCP user programs 68% of the time interval. The remaining time is shown under the heading *WAITING* (.320) and indicates that the CCP partition had no work to perform for 32% of the time interval, or that it was unable to perform more work due to a wait for some other system resource.

The duration of the time interval can be determined from the start and stop times printed near the end of the page. The start time of this interval was 17 minutes and 43 seconds past 7 p.m. (1900 hours). The stop time was 30 minutes and 11 seconds past 7 p.m. Subtracting these two times, you can determine the time of the interval; 12 minutes and 28 seconds, or 748 seconds.

Thus, during this interval, CCP was working for 8 minutes, 29 seconds (68%), and was not working for 3 minutes, 59 seconds (32%).

The values in the second row, *DISK*, indicate a possible bottleneck in the system. Of the more than 26 million characters read or scanned, most of it was read from drive 4–more than 23 million characters, or better than 91%. Of the 3,636 seeks performed, 2,723 (75%) were on drive 4. Over 13 times as many characters were read from drive 4 as were read from any other drive; more than 3.5 times as many seeks were performed on drive 4 as were performed on any other drive.

As shown by the average IOB depth for drive 4, ten times as many input/output requests were outstanding at any given time during the interval than were outstanding for any other drive.

The conclusion to be drawn from the above discussion is that the disk activity on drive 4 is quite high. Throughput for the system, and quite possibly response time, might be enhanced by spreading the disk load over the four drives.

The figures in third row, *BISYNC*, also point out a possible system bottleneck on the BSC lines. Of the 335 total blocks received, 227 (68%) were on line 1; and of 354 total blocks sent, 241 (68%) were also on line 1. Line 3 had 30% of the activity. Throughput and response time might be improved by spreading the line load across the four BSC lines, rather than concentrating the load on lines 1 and 3.

In the last column in the row, *OUTPUT PENDING*, the average of .630 for line 1 indicates that almost one output operation was in progress at any given time during the interval measured. A higher speed line may enhance system throughput and response time. Alternatively, the number of characters sent or received per transmission could be examined to determine if unnecessary characters are being sent on that line.

In the next row, *U.P.A.*, the average utilization (.189) and maximum utilization (.403) indicate that more main storage is being set aside for CCP user programs than is required. Of the 322K set aside (see Figure 1), the most ever used was 40.3%, or 129.8K.

Similarly, more TP buffer is being reserved than is required. Of the 10,865 bytes of TP buffer I/O area (see Figure 1), the most ever used during the interval was 5,606 bytes (.516 times 10,865). Caution must be used in addressing the usage of TP buffer, however. If there is a possibility that the program requiring the maximum PRUF length of 2057 bytes (see Figure 1) is pending from all four BSC lines at the same time, the minimum TP buffer I/O area required is 8244 bytes (4 times (2057 + 4)). But since Figure 3 shows that there was no waiting for input, you can assume that this situation did not occur.

S U M M A R Y

	WAITING	P1	CCP	P3	SPOOL
CPU	.320	.000	.680	.000	.000

	ATTACH BUSY	SEEK BUSY	SEEK COUNT	CHARACTERS READ/SCANNED	IOB DEPTH AVG	IOB DEPTH MAX	SECTOR CONFLICTS TOTAL	SECTOR CONFLICTS AVG	SECTOR CONFLICTS MAX
DISK	.203		3,636	26,039,808	.335	3	2	.002	1
D1		.000	28	139,520	.000	0			
D2		.000	109	275,712	.005	1			
D3		.005	776	1,770,496	.030	1			
D4		.038	2,723	23,854,080	.300	3			

	IN-ACTIVE	POLL	IN	OUT	BLOCKS RECVED	BLOCKS SENT	BYTES RECVED	BYTES SENT	ERRORS	OUTPUT PENDING AVG	OUTPUT PENDING MAX
BISYNC											
L1	.028	.393	.057	.520	227	241	58,112	72,300	0	.630	3
L2	.000	.997	.002	.000	7	7	700	700	0	.0000	0
L3	.006	.807	.046	.140	101	106	1,010	3,180	0	.181	3
L4	.000	1.000	.000	.000	0	0	0	0	0	.000	0

	AVERAGE UTILIZATION	MAXIMUM UTILIZATION	WAITING FOR INPUT AVG	WAITING FOR INPUT MAX	WAITING FOR OUTPUT AVG	WAITING FOR OUTPUT MAX	FREE BLOCKS AVG	FREE BLOCKS MAX
U.P.A.	.189	.403					1.250	3
T.P.BUFF.	.174	.516	.00	0	.00	0	2.713	5

	ACTIVE AVG	ACTIVE MAX	QUEUED AVG	QUEUED MAX	IN ALLOCATE AVG	IN ALLOCATE MAX	IN TERMINATE AVG	IN TERMINATE MAX	PHYSICALLY LOADED TOTAL	PHYSICALLY LOADED AVG	PHYSICALLY LOADED MAX
CCP PGMS	3.079	6	.000	0	.000	0	.008	1	197	.543	3

	PROGRAM REQUESTS OR COMMANDS TOTAL	PROGRAM REQUESTS OR COMMANDS AVG	PROGRAM REQUESTS OR COMMANDS MAX	REQUESTS ATTACHED TO ACTIVE MRTS TOTAL	REQUESTS ATTACHED TO ACTIVE MRTS AVG	REQUESTS ATTACHED TO ACTIVE MRTS MAX	TASK CHAINS ACCEPTED TOTAL	TASK CHAINS ACCEPTED AVG	TASK CHAINS ACCEPTED MAX
	200	.550	3	0	0	0	0	0	0

	QUEUE AVG	QUEUE MAX
DFF	.002	1

TIME START -- 19 17 43
STOP -- 19 30 11

INTERVAL SAMPLE COUNT 363

Figure 3. Sample Summary—Example 1

The next row, *CCP PGMS*, shows that no CCP program ever had to wait for a task area or a task control block (QUEUED = 0). Also, no program had to wait for a resource, such as a required terminal, printer, punch, or disk file (IN ALLOCATE = 0). Since the maximum number of active tasks was six, perhaps more CCP task areas were generated than were required; from Figure 1, you can see that the maximum (15) was generated. By reducing the number of tasks supported, you can reduce the size of the supervisor (approximately 320 bytes per task).

In the last row, *DFF*, the low queue average (.002) indicates that the DFF task is not a system bottleneck.

Finally, you will notice that 363 samples were collected during the interval of 748 seconds. Part of the interval time is attributed to the interrupt level, cycle steal time, and timer inertia. Therefore, the interval sample time (748 seconds) is not the same as 363 samples times 2 seconds (726 seconds).

Example 2

Figure 4 shows another example of a sample summary produced by the data reduction program.

In the third row, *BISYNC*, you can see that there is a potential system bottleneck on BSC line 2. This line is being heavily used, as indicated by the average output pending of 66.8% (.668). A higher speed line may improve response time.

In the *U.P.A.* row, you can see that the CCP user program area is being used, on the average, 77.6% (.776) of the time. Note, however, that the maximum utilization is 90.6%. The average queuing is 3.665, indicating that at any given time during the interval measured, there were more than three programs unable to execute because of the unavailability of main storage in the CCP user program area. Also, at any given time during the interval measured, more than two programs were encumbering an area in the UPA (IN ALLOCATE, AVG = 2.111), but these were unable to execute because of the unavailability of a required resource, such as a disk file, required terminal, or unit record device.

Looking at the figures for TP buffer, you can see that, at any given time during the interval measured, more than one terminal was unable to transmit data to the processing unit (WAITING FOR INPUT, AVG = 1.22). Almost one terminal was unable to receive data from the processing unit (WAITING FOR OUTPUT, AVG = .76) due to the unavailability of TP buffer.

Futhermore, at some point in time during the interval measured, six terminals were unable to transmit data to the processing unit, and three terminals were unable to receive data from the processing unit, because of insufficient TP buffer.

The figure of .556 in the *DFF* row indicates that some improvement in response time might be seen by bypassing the DFF task–possibly by not using PRUF screens for program requests that require little, if any, data with the program request.

Example 3

Figure 5 shows another example of a sample summary produced by the data reduction program.

This example is similar to Figure 4 except that it utilizes an individual DFF line buffer for BSC line 2. Using an individual DFF line buffer in this case produced a noticeable improvement in the TP buffer area over that of Figure 4.

S U M M A R Y

	WAITING	CCP	F2	F3	SPOOL
CPU	.456	.544	.000	.000	.000

	ATTACH BUSY	SEEK BUSY	SEEK COUNT	CHARACTERS READ/SCANNED	IOB DEPTH AVG	IOB DEPTH MAX	SECTOR CONFLICTS TOTAL	SECTOR CONFLICTS AVG	SECTOR CONFLICTS MAX
DISK	.145		1,910	5,697,448	.213	3	0	.000	0
D1		.003	302	904,960	.026	1			
D2		.000	0	0	.000	0			
D3		.015	525	1,656,064	.061	1			
D4		.022	1,083	3,136,424	.125	2			

BISYNC	IN-ACTIVE	POLL	IN	OUT	BLOCKS RECVED	BLOCKS SENT	BYTES RECVED	BYTES SENT	ERRORS	OUTPUT PENDING AVG	OUTPUT PENDING MAX
L1	1.000	.000	.000	.000	0	0	0	0	0	.000	0
L2	.046	.101	.285	.568	128	232	6,400	59,392	0	.668	3
L3	1.000	.000	.000	.000	0	0	0	0	0	.000	0
L4	1.000	.000	.000	.000	0	0	0	0	0	.000	0

	AVERAGE UTILIZATION	MAXIMUM UTILIZATION	WAITING FOR INPUT AVG	WAITING FOR INPUT MAX	WAITING FOR OUTPUT AVG	WAITING FOR OUTPUT MAX	FREE BLOCKS AVG	FREE BLOCKS MAX
U.F.A.	.776	.906					4.761	7
T.F.BUFF.	.773	.901	1.22	6	.76	3	3.003	6

	ACTIVE AVG	ACTIVE MAX	QUEUED AVG	QUEUED MAX	IN ALLOCATE AVG	IN ALLOCATE MAX	IN TERMINATE AVG	IN TERMINATE MAX	PHYSICALLY LOADED TOTAL	PHYSICALLY LOADED AVG	PHYSICALLY LOADED MAX
CCP PGMS	7.665	10	3.665	8	2.111	4	.760	2	50	.190	2

PROGRAM REQUESTS OR COMMANDS TOTAL	PROGRAM REQUESTS OR COMMANDS AVG	PROGRAM REQUESTS OR COMMANDS MAX	REQUESTS ATTACHED TO ACTIVE MRTS TOTAL	REQUESTS ATTACHED TO ACTIVE MRTS AVG	REQUESTS ATTACHED TO ACTIVE MRTS MAX	TASK CHAINS ACCEPTED TOTAL	TASK CHAINS ACCEPTED AVG	TASK CHAINS ACCEPTED MAX
75	.286	3	0	0	0	0	0	0

	QUEUE AVG	QUEUE MAX
DFF	.556	3

TIME START -- 10 38 34
STOP -- 10 47 33

INTERVAL SAMPLE COUNT 262

Figure 4. Sample Summary—Example 2

S U M M A R Y

	WAITING	CCP	P2	P3	SPOOL
CPU	....	.775	.000	.000	.000

	ATTACH BUSY	SEEK BUSY	SEEK COUNT	CHARACTERS READ/SCANNED	TOR DEPTH AVG	TOR DEPTH MAX	SECTOR CONFLICTS TOTAL	SECTOR CONFLICTS AVG	SECTOR CONFLICTS MAX
DISK	.145		1,910	5,697,448	.213	3	0	.000	0
D1		.003	302	904,960	.026	1			
D2		.000	0	0	.000	0			
D3		.015	525	1,656,064	.061	1			
D4		.022	1,083	3,136,424	.125	2			

BISYNC	IN-ACTIVE	POLL	IN	OUT	BLOCKS RECVED	BLOCKS SENT	BYTES RECVED	BYTES SENT	ERRORS	OUTPUT PENDING AVG	OUTPUT PENDING MAX
L1	1.000	.000	.000	.000	0	0	0	0	0	.000	0
L2	.046	.101	.285	.568	128	232	4,400	59,392	0	.668	3
L3	1.000	.000	.000	.000	0	0	0	0	0	.000	0
L4	1.000	.000	.000	.000	0	0	0	0	0	.000	0

	AVERAGE UTILIZATION	MAXIMUM UTILIZATION	WAITING FOR INPUT AVG	WAITING FOR INPUT MAX	WAITING FOR OUTPUT AVG	WAITING FOR OUTPUT MAX	FREE BLOCKS AVG	FREE BLOCKS MAX
U.P.A.	.776	.906					4.761	7
T.P.BUFF.	.357	.812	.31	2	.00	0	4.530	8
L2 BUFF	.419				.14	1		

	ACTIVE AVG	ACTIVE MAX	QUEUED AVG	QUEUED MAX	IN ALLOCATE AVG	IN ALLOCATE MAX	IN TERMINATE AVG	IN TERMINATE MAX	PHYSICALLY LOADED TOTAL	PHYSICALLY LOADED AVG	PHYSICALLY LOADED MAX
CCP PGMS	7.665	10	3.665	8	2.111	4	.760	2	50	.190	2

	PROGRAM REQUESTS OR COMMANDS TOTAL	PROGRAM REQUESTS OR COMMANDS AVG	PROGRAM REQUESTS OR COMMANDS MAX	REQUESTS ATTACHED TO ACTIVE MRTS TOTAL	REQUESTS ATTACHED TO ACTIVE MRTS AVG	REQUESTS ATTACHED TO ACTIVE MRTS MAX	TASK CHAINS ACCEPTED TOTAL	TASK CHAINS ACCEPTED AVG	TASK CHAINS ACCEPTED MAX
	75	.286	3	0	0	0	0	0	0

	QUEUE AVG	QUEUE MAX
DFF	.556	3

TIME START -- 9 46 44
STOP -- 9 57 45

INTERVAL SAMPLE COUNT 263

Figure 5. Sample Summary—Example 3

Technical Newsletter

This Newsletter No.	GN21-5726
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Base Publication No.	GC21-5207-1
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IBM System/3
Model 15D
System Measurement Facility
Reference and
Logic Manual

This technical newsletter applies to the current version and modification of the applicable System/3 program listed in the edition notice and provides replacement pages for the subject publication. These replacement pages remain in effect for subsequent versions and modifications unless specifically altered. Pages to be inserted and/or removed are:

1-5, 1-6

Changes to text and illustrations are indicated by a vertical line at the left of the change.

Summary of Amendments

Change to PERMANENT DISK ERROR message.

Note: Please file this cover letter at the back of the manual to provide a record of changes.

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