SIBAS II
Operator's Manual

ND-30.009.01

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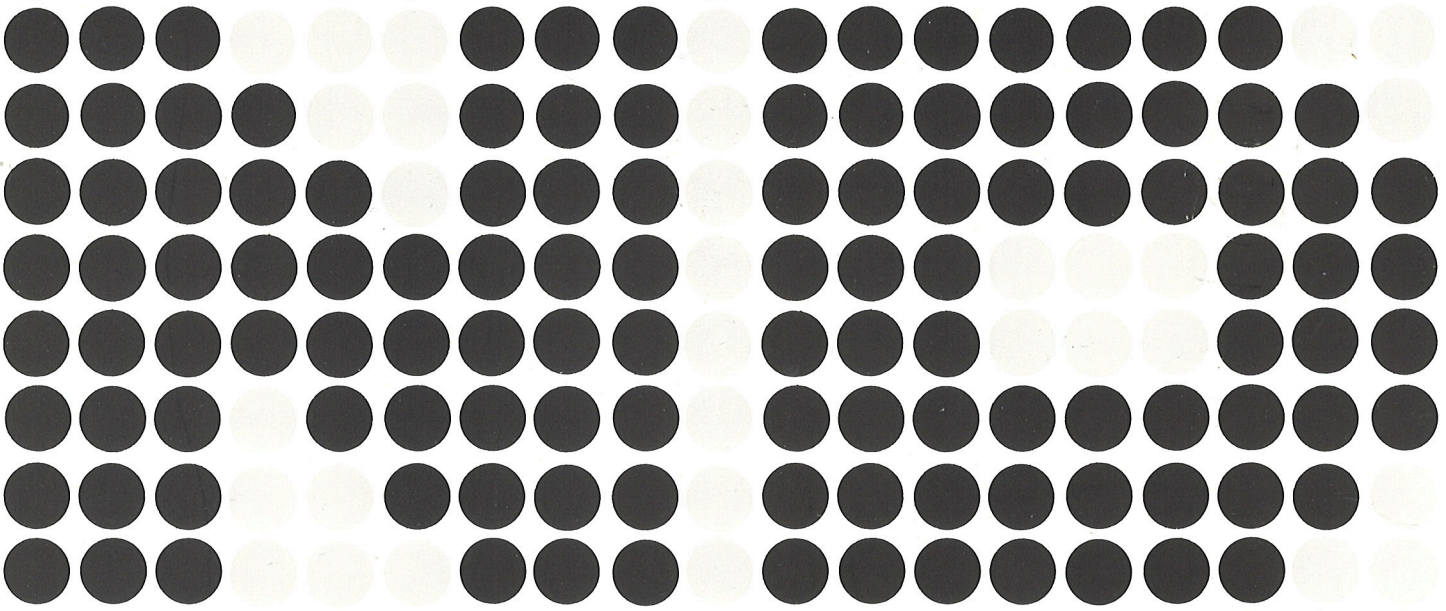

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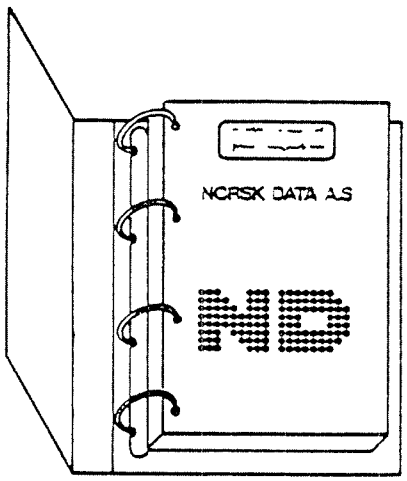

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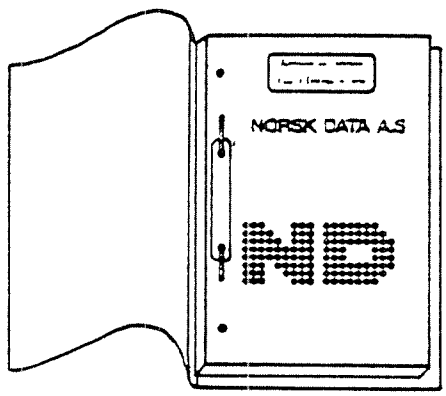

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Preface:

THE PRODUCT

This manual is intended to be a practical guide for people who operate the D Version of the SIBAS-II Database Management System.

THE READER

Operators who control the daily operation of the database system.

PREREQUISITE KNOWLEDGE

You should possess a general knowledge of databases and SINTRAN-III, the operating system of NORSK DATA. A basic knowledge of SIBAS-II is very helpful, but not absolutely necessary. It is essential, though that you have access to the SIBAS-II User's Manual for a fuller explanation of the concepts, terms and commands used in SIBAS.

RELATED MANUALS

SIBAS-II User's Manual (ND-60.127)

SINTRAN-III Real Time Guide (ND-60.133)

SINTRAN-III System Supervisor (ND-30.003)

THE MANUAL

This manual gives only the recommended or standardized ways of carrying out the various procedures which the operator is responsible for. It is not intended to explain the full range of ways of carrying out BACKUP, RECOVERY, etc.

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CHAPTER 1

The Role of the Operator

1 The Role of the Operator

What does an operator of SIBAS-II have to know how to do?

This chapter gives an outline of his/her tasks. The rest of the manual will give descriptions of these tasks, along with examples.

Please note that we assume that SIBAS is already installed at your work place.

1.1 Ensuring the avalilability and smooth running of the database system

It is extremely important for you, the operator, to do things carefully. It is assumed that you take orderly BACKUPs. It is equally important that you have a fixed operations strategy and mode files that you know work.

If you are careful and always do a recovery when the machine stops or whenever SIBAS is aborted, you will avoid losing data which causes inconsistent internal structures (eg., index structures or set structures) in the database.

The operator is responsible for:

- Starting and stopping of SIBAS
- Detecting and analysing errors
- Resolving Error situations
- Informing users of special conditions and broadcasting messages
- Maintaining database files and logfiles

1.2 BACKUP/Recovery

The operator is responsible for:

- Taking BACKUP regularly
- Administering BACKUP copies
- Initiating/reseting logfiles
- Reprocessing logfiles (copy in BACKUP) when recovery is required

1.3 Installing and maintaining SIBAS

The operator must:

- Keep up with new versions.
- Look out for Error Report/patches described in "ND Bulletin".
- Perform patches concerning "your" version of SIBAS.

C H A P T E R 2

Controlling the Database Control System (DBCS)

2 Controlling the Database Control System (DBCS)

2.1 What is the DBCS?

An installation may have from one to six DBCS'. The DBCS' are RT programs with the names: SIB2A, SIB2B,..., SIB2F and numbers: 0, 1,..., 5.

A DBCS (eg., SIB2A) can control only one database at a time.

Many users (maximum 64) may access a database simultaneously, and many different databases (maximum 6) may be used at the same time.

A database must be assigned to a free DBCS before use. Any free DBCS will do, unless you decide otherwise.

2.2 How do you control or supervise SIBAS (the DBCS)?

SIBAS (the DBCS) is normally controlled/supervised by:

1) SIBAS-SERVICE module.

2) Priviliged SINTRAN commands (in exceptional cases).

The operator/supervisor must enter the special RT-user or user SYSTEM in order to carry out the control.

Note that user RT or SYSTEM must have been created as a FRIEND and been given Read/Write/Append (RWA) access to the database files; if this has not been done, error messages will result.

2.3 Normal START and STOP

The database must be STARTed before any application can use it. Remember that it is of prime importance to STOP the database properly before a machine stop or BACKUP.

2.3.1 Starting the database

The database is started by using the START command in SIBAS-SERVICE. SIBAS must be in READY state for this command to be given. (See the SIBAS User's Manual, section 5.2, for an explanation of SIBAS states.)

The following points should be kept in mind:

- The user RT must have ben created as FRIEND of the database owner, with RWA access to the database files, prior to the issuing of the START command. Normally, this should be done at once when the database is created.

- The database files must exist and be closed for the START command to work.

- The database must be in RUNNING state before applications can use it. The DBCS is set RUNNING by the RUN command in SIBAS-SERVICE.

The following is an example of both the START and RUN commands.

```
@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: READY
>>START

  OWNER:M-L

  DATABASE-NAME:FORDB

  WORK-AREA-SIZE:20

SIBAS STATE: DBA
>>RUN
  NEW RUNFLAG ?:N

SIBAS STATE: RUNNING
>>DATABASE-STATUS

R-LOG  NOT ACTIVE

 INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-----------------------------------------------------------------
CURRENT    *     0   000 *       18       11:54:52     17.02. 1983
LAST OPEN  *     0   000 *        0       00:00:00     00.00.    0
LAST CLOSE *     0   000 *        0       00:00:00     00.00.    0
LAST CHECK *     0   000 *        0       00:00:00     00.00.    0

DATABASE FORDB    IS OPENED BY   0 USERS

SIBAS STATE: RUNNING
>>EXIT

 - EXIT -
```

Note that the database is not opened by setting SIBAS in RUNNING state. It will be physically opened when the first application program opens it. Therefore @LI-RTOPEN will not list the database files after the RUN command has been given in SIBAS-SERVICE.

The preceding is an example of a simple START. There is another kind of START: when the LOGs have to be initiated or reset (after BACKUP).

2.3.2 Stopping the database

IMPORTANT NOTE: The database must be stopped before one can take BACKUP or stop the machine. If the machine is stopped while the database is open, the database will be destroyed and a RECOVERY must be done.

The database is stopped by giving the STOP command when SIBAS is in RUNNING or DBA (database available) state.

The command will only be successful if the database is physically closed when the comand is issued. You find out if the database is closed by giving the command DATABASE-STATUS (in SIBAS-SERVICE). If it is closed, you will get the message "DATABASE <name> IS OPENED BY 0 USERS".

The example on the next page shows a normal SIBAS STOP.

```
@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.


 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: RUNNING
>>DATABASE-STATUS

R-LOG  NOT ACTIVE

 INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-------------------------------------------------------------------
CURRENT    *     0   000 *       45      12:03:57     17.02. 1983
LAST OPEN  *     0   000 *        0      00:00:00     00.00.    0
LAST CLOSE *     0   000 *        0      00:00:00     00.00.    0
LAST CHECK *     0   000 *        0      00:00:00     00.00.    0

DATABASE FORDB    IS OPENED BY   0 USERS

SIBAS STATE: RUNNING
>>STOP

SIBAS STATE: READY
>>EXIT

 - EXIT -
```

2.4 Abnormal stops in error conditions

2.4.1 FORCE-CLOSE

A user must open the database before accessing it, and should close the database when finished.

If the user program stops without closing the database, eg., if it gets aborted by pressing the escape (ESC) key, the database should be explicitly closed. The exception is when the database is in error and RECOVERY has to be done.

The FORCE-CLOSE command in SIBAS-SERVICE can be used to:

1) Close the database for all users.

2) Close the database for a specific user.

The effect of the FORCE-CLOSE is to close the database for one of more users, leaving the database in RUNNING state.

2.4.1.1 Closing the database for a specific background user

Let's say that a user was running a program which was on terminal 45, s/he finished but left the database open. You want to close the database for that user. When you are logged in as user RT do the following (Your responses are underlined.):

```
@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: RUNNING
>>DATABASE-STATUS

R-LOG  NOT ACTIVE

 INTERFACE * LOG ADDRESS *                        TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-----------------------------------------------------------------------
CURRENT    *     0   000 *       47       12:28:30     17.02. 1983
LAST OPEN  *     0   000 *       36       12:18:10     17.02. 1983
LAST CLOSE *     0   000 *        0       00:00:00     00.00.    0
LAST CHECK *     0   000 *        0       00:00:00     00.00.    0

DATABASE FORDB    IS OPENED BY   2 USERS
USER-ID  UPDATE   LOG       TIME LAST UNCOMPLETED SEQUENCE
-------  ------   ---       ------------------------------
047524B   -?-     OFF
047610B   -?-     OFF

SIBAS STATE: RUNNING

>>EXIT

- EXIT-

@WHO

===>      49  RT
          50  KR-EL
          45  M-L
         670  SYSTEM
         672  SYSTEM
```

```
@LIST-DEVICE 45 0

RESERVED BY: BAK22

@LIST-RT-PROGRAM,,,

  NAME  RT-DESC  PRIOR STATUS   P-REG T.LEFT INTERV   ACTUAL SEGM

   DUMMY  46056      0 READY    11776                    0    0
   STSIN  46110      0 PASSIVE 111317                    5    3
   RTERR  46142     64 IO-WAIT 110035                    5   14
   -
   -
   -
   BAK22  47610     16 IO-WAIT  42237                  121  122
   -
   -

@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: RUNNING
>>FORCE-CLOSE

  OCTAL RUN-ID, (EXAMPLE  40106B), OR -1 IF ALL USERS:47610B

>>DATABASE-STATUS

R-LOG  NOT ACTIVE

 INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-----------------------------------------------------------------------
CURRENT    *     0   000 *       39       12:28:32     17.02. 1983
LAST OPEN  *     0   000 *       36       12:18:10     17.02. 1983
LAST CLOSE *     0   000 *        0       00:00:00     00.00.    0
LAST CHECK *     0   000 *        0       00:00:00     00.00.    0

DATABASE FORDB    IS OPENED BY   1 USERS
USER-ID  UPDATE   LOG       TIME LAST UNCOMPLETED SEQUENCE
-------  ------   ---       ------------------------------
047524B   -?-     OFF


SIBAS STATE: RUNNING
>>EXIT

 - EXIT -
```

2.4.1.2 Closing the database for a specific foreground user (RT program)

The procedure is the same as for closing the database for a background user with the FORCE-CLOSE command in SIBAS-SERVICE. See the previous section for details.

2.4.1.3 Closing the database for all users

This command must be used with great care! It could inconvenience SIBAS users unnecessarily, to say the least!

If you give this command when programs are actively accessing the database, these programs will get error messages the next time they try to access the database and will probably terminate.

Before giving the command, send a broadcast to all users telling them that you are going to use the FORCE-CLOSE command and exactly when you will give it. Tell them to terminate as soon as possible.

Example of closing the database for all users:

```
@SIBAS-SERVICE

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

SIBAS STATE:  RUNNING

>>FORCE-CLOSE -1

>>EXIT

  - EXIT -

@
```

Using the command FORCE-CLOSE with -1 closes the database for all users.

2.4.2 SUPER-STOP

The effect of this command is to close the database for all users and set SIBAS in the PASSIVE state.

This stop is "controlled" in the sense that all updated pages in the database will be written to disk. Any program that is accessing the database while the SUPER-STOP is going on, or after it, will return a negative status (which means an error condition).

Avoid using this command if any update users are active.

We suggest the following procedure in using this command:

1) After you have given the SUPER-STOP, you will be asked: "Force-close for all users?(Y/N)". Answer N (no). If the database is not opened for any users, the SUPER-STOP will be carried out with no problems, as in the example below.

2) If it is opened for any users, you will get the error message: "Illegal to call stops when database is open."

3) You should then use the MAIL system in SINTRAN to broadcast a message telling the users to stop work and close the database.

4) When they have closed the database, you can go back into SIBAS-SERICE and give the SUPER-STOP command again, as in step one above. This time it will work.

Remember that closing the database while any users are accessing it could be very inconvenient, causing error conditions to arise.

Example:

```
@SIBAS-SERVICE

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

SIBAS STATE:  RUNNING

>>SUPER-STOP

  Force-close for all users?(Y/N): N

SIBAS STATE: PASSIVE

>>EXIT
```

Note that if you get an error message, follow the procedure described above.

2.4.3 Aborting SIBAS

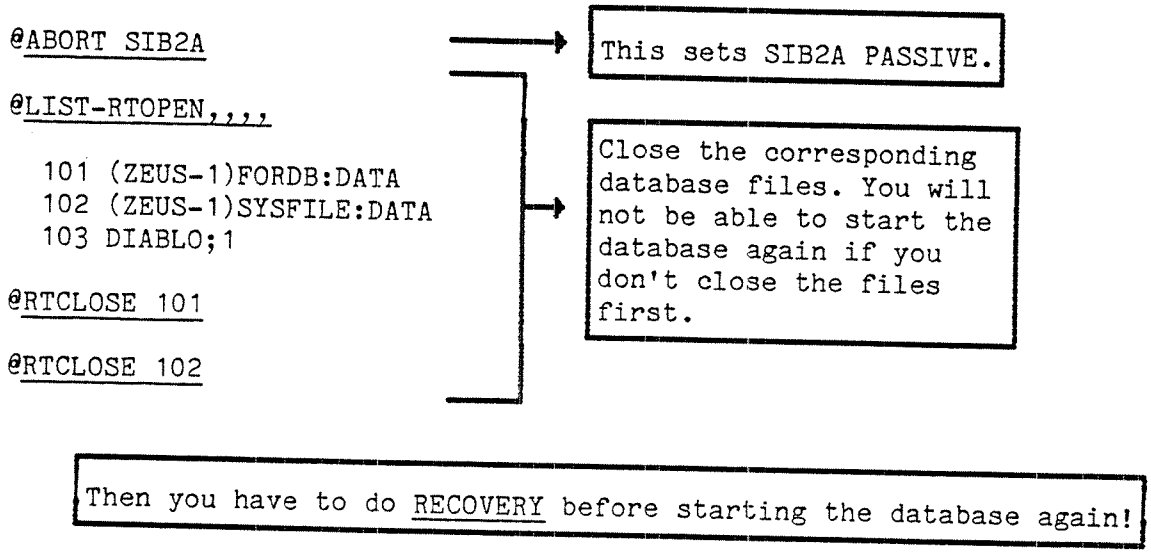
The @ABORT SIB2x command (in SINTRAN) will set SIBAS immediately in PASSIVE state without closing the database properly. This command is given in SINTRAN, ie., after the @ (the commercial at, which indicates that you are in SINTRAN).

This command destroys the database. It should only be used in the following circumstances (very seldom).

1) When a serious error is discovered and the database must be stopped immediately, ie., when RECOVERY has to be done anyway.

2) When the database is in error, eg., all applications hang and it is impossible to continue or to stop SIBAS by using any of the SIBAS-SERVICE commands.

Example:



The importance of using the @ABORT SIB2x command with the greatest of care and always doing RECOVERY afterwards cannot be stressed enough!

C H A P T E R 3

BACKUP and LOGGING

3 BACKUP and LOGGING

3.1 Introduction

You need to have BACKUP copies of the database in case the original database gets corrupted.

The following are instances which could lead to database corruption:

- Uncontrolled stop of SIBAS while the database is in use, eg., extended power failures, @ABORT SIB2x or someone pressing the STOP button.
- Hardware failure, such as a disk crash.
- System software failure, such as a hang, etc.
- Incorrect input data from a user, or bugs in programs which introduce incorrect data into the database.

3.2 Logging facilities

Doing RECOVERY using a BACKUP copy alone means having to rerun programs. This could be very time consuming. It might even be impossible if you have no manual records of what has been done on the database after the latest BACKUP was taken.

SIBAS offers logging facilities to make RECOVERY safer and much faster. The loging facilities available are:

- ROUTINE-LOG (R-LOG)
- BEFORE-IMAGE-LOG (BIM-LOG)

Let us suppose you take a BACKUP every day and you have heavy database activity. RECOVERY with R-LOG will take about one to two. On the other hand, RECOVERY with BIM-LOG will normally only take a few minutes. HOWEVER, the normal operation of BIM-LOG requires more disk I/O.

3.2.1 ROUTINE-LOG (R-LOG)

The ROUTINE-LOG is a file which contains:

1) the Data Manipulation Language (DML) calls/commands given to SIBAS.

2) the input/output data to/from SIBAS.

The data on the R-LOG can be used for reprocessing. This makes the reexecution of the programs which have been run after the latest BACKUP was taken unnecessary.

You may look at the ROUTINE-LOG file by using a program called SIB2-LOOKLOG. Refer to The SIB2-LOOKLOG User's Guide, Appendix B.

3.2.2 BEFORE-IMAGE-LOG (BIM-LOG)

The BIM-LOG is a part of the database and resides on the SIBAS SYSTEM REALM. The BIM-LOG contains copies of the database pages just before they get updated.

In the case of a database failure, the contents of the database pages which have been updated after the last "safe point in time" are discarded by "rolling back" the BIM pages. For a more complete description of this, refer to the SIBAS-II User's Guide, chapter 5.

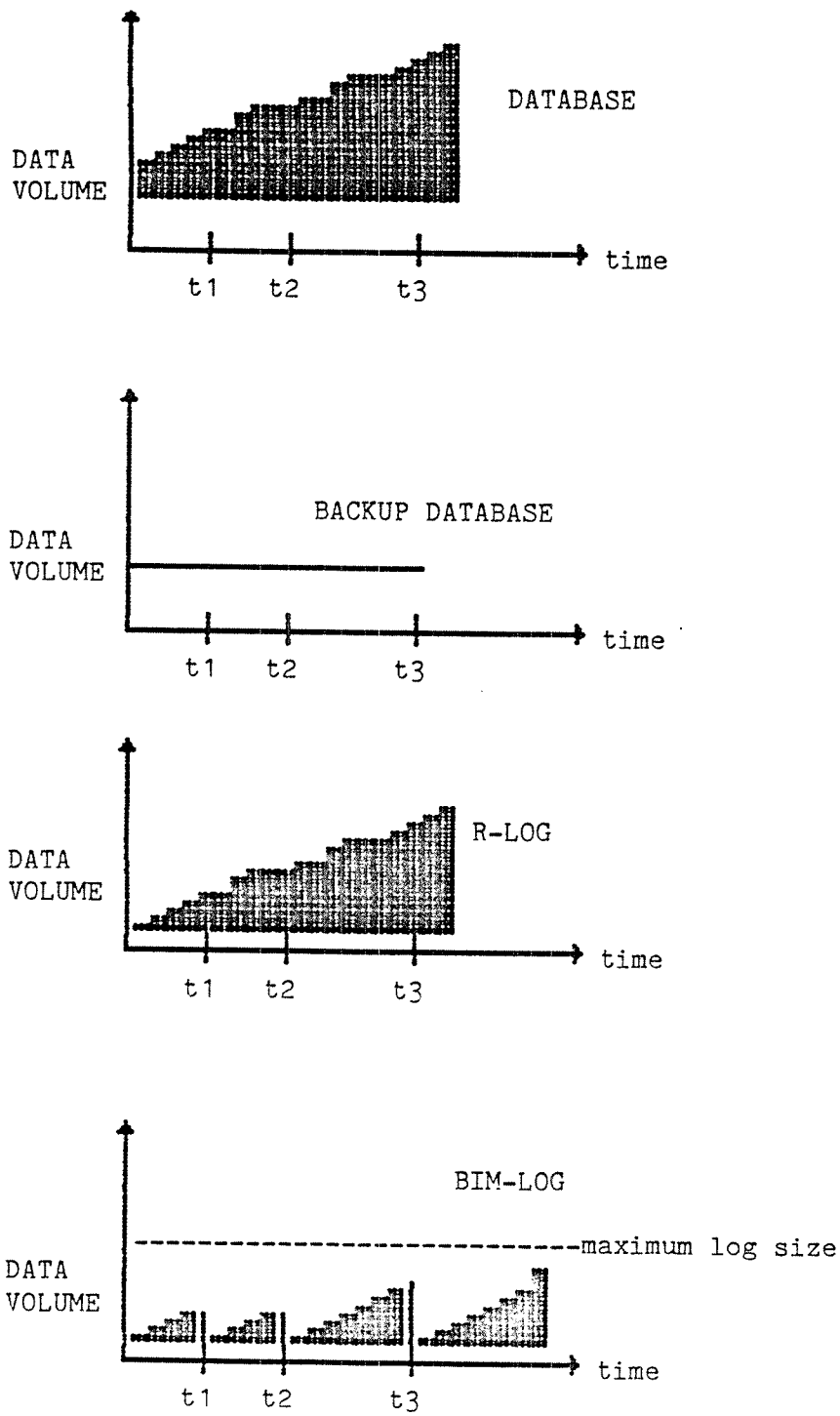
The latest "safe point in time" known to the database is when the last checkpoint was taken.

3.2.3 Checkpoints

Checkpoints are taken:

- When the database is geting physically closed.
- When the BIM-LOG approaches the end of the file.
- When explicit checkpoint commands are given.

The following figure is a graphic representation of the database, BACKUP database, R-LOG and BIM-LOG.



RECOVERY means rollingback the database to t3 (time 3) and reprocessing the LOG from that point in time.

3.3 Initiating LOG files (start using the LOG)

3.3.1 R-LOG

The process of initiating the R-LOG has four steps.

1. Create the LOG file.

   - The file must have the same name as the database, but be of the type :LOGG instead of type :DATA.
   - The file must have the same owner as the database, but can reside on a different disk-pack.
   - For better response time, the file must be a disk file and should be "continuous".

2. Initiate LOG.

   - Use the INIT-LOG command in SIBAS-SERVICE when the database is in READY state. This command takes some time, approximately one minute for each 1000 pages of R-LOG.

3. Taking BACKUP.

   - The BACKUP copy must be marked as running with R-LOG, otherwise you will not be able to reprocess against the BACKUP copy.

4. Set RUNFLAG.

   - Set SIBAS in RUNNING state. Set the RUNFLAG according to decisions about how the LOG file is to be used.

This process is necessary only the first time, later on you need only reset the R-LOG after BACKUP. See the example in section 3.5.2.

Example of starting up using the R-LOG:

```
ENTER M-L
PASSWORD:

OK
@CREATE-FILE FORDB:LOGG 100

@LOG

ENTER RT
PASSWORD:

OK
@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: READY
>>INIT-LOG

  OWNER:M-L

  DATABASE-NAME:FORDB

    1: INIT-R-LOG
    2: RESET-R-LOG
    3: REMOVE-R-LOG
    4: INIT-DELAYED-UPDATE-LOG
    5: INIT-BEFORE-IMAGE-LOG
    6: REMOVE-PAGE-LOG I.E. 4 OR 5

  CODE:1

    MAX-SIZE-1K-PAGES
     WHEN CODE=5: BETWEEN 510 AND 2046
     WHEN CODE=1: BETWEEN 2 AND 30000

  SIZE:100

    2: DIRECT-R-LOG
    3: CIRCULAR-R-LOG

  LOG-TYPE:2

INITIATION MAY TAKE TIME -WAIT-

SIBAS STATE: READY
>>EXIT

 - EXIT -
```

- Take BACKUP of the database

```
@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: READY
>>START

  OWNER:M-L

  DATABASE-NAME:FORDB

  WORK-AREA-SIZE:20

SIBAS STATE: DBA
>>RUN

  NEW RUNFLAG ?:Y

ALL USERS READ ONLY ? N

ALL USERS LOGGED  (EVEN READ) ? N

IMMEDIATE WRITE OF R-LOG ? N

SGET ANSWER LOGGED ? N

GCHPO ALLOWED ? N

TURN-ON/OFF R-LOG ALLOWED ? N

SIBAS STATE: RUNNING
>>DATABASE-STATUS

 INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-------------------------------------------------------------------
CURRENT    *     1   004 *       18      12:45:25     17.02. 1983
INITIATION *     1   004 *       48      12:44:30     17.02. 1983
LAST OPEN  *     0   000 *        0      00:00:00     00.00.    0
LAST CLOSE *     0   000 *        0      00:00:00     00.00.    0
LAST CHECK *     0   000 *       48      12:44:30     17.02. 1983

FILE SIZE  *   200   LOGGED CALLS =      0 LOG-TYPE: DIRECT
DATABASE FORDB    IS OPENED BY    0 USERS
RUNFLAG 002775B,OFLOG NOT ALLOWED,SGET ANSWERS NOT LOGGED

SIBAS STATE: RUNNING
>>EXIT

 - EXIT -
```

3.3.2 BIM-LOG

Remember that the BIM-LOG is part of the database and resides on the SIBAS SYSTEM REALM.

To be able to use the BIM-LOG you must use the following procedure:

1) Ensure that space is available on disk, we recommend that the file be continuous.

   Example:

   @CREATE-FILE x:DATA,2000 CR

   @COPY-FILE x:DATA,FORDB:DATA CR

   @DELETE-FILE FORDB:DATA CR

   @RENAME-FILE x:DATA,FORDB:DATA CR

2) Initiate the BIM-LOG using SIBAS-SERVICE.

Note that to find out if the BIM-LOG is active give the DATABASE-STATUS command (in SIBAS-SERVICE) and the first line of information that follows will be the message "BEFORE IMAGE LOG ACTIVE", as in the following example.

```
@SIBAS-SERVICE

 S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
 MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: READY
>>INIT-LOG

  OWNER:M-L

  DATABASE-NAME:FORDB

    1: INIT-R-LOG
    2: RESET-R-LOG
    3: REMOVE-R-LOG
    4: INIT-DELAYED-UPDATE-LOG
    5: INIT-BEFORE-IMAGE-LOG
    6: REMOVE-PAGE-LOG I.E. 4 OR 5

  CODE:5

    MAX-SIZE-1K-PAGES
     WHEN CODE=5: BETWEEN 510 AND 2046
     WHEN CODE=1: BETWEEN 2 AND 30000

  SIZE:520

SIBAS STATE: READY
>>START

  OWNER:M-L

  DATABASE-NAME:FORDB

  WORK-AREA-SIZE:20

SIBAS STATE: DBA
>>DATABASE-STATUS

 BEFORE IMAGE LOG ACTIVE
R-LOG  NOT ACTIVE

 INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-----------------------------------------------------------------------
CURRENT    *     0   000 *       41       12:51:36     17.02. 1983
LAST OPEN  *     0   000 *        0       00:00:00     00.00.    0
LAST CLOSE *     0   000 *        0       00:00:00     00.00.    0
LAST CHECK *     0   000 *        0       00:00:00     00.00.    0

DATABASE FORDB    IS OPENED BY   0 USERS

SIBAS STATE: DBA
```

>>EXIT

- EXIT -

3.4 BACKUP Procedure

What procedure must be followed to do BACKUP?

1) Broadcast a message (using MAIL in SINTRAN) to all users that the database will be unavailable due to BACKUP and tell them to stop their work and close the database.

2) Enter SIBAS-SERVICE and check when the database is closed, ie., when DATABASE-STATUS shows that the database is opened of 0 users. Use the "FORCE-CLOSE -1" (close the database for all users) if, after a reasonable length of time, the database is still open for one or more users and you suspect that they have left without closing the database.

3) Use the STOP command to stop SIBAS, thus preventing further use of the database.

4) Loggin as the user who owns the database and run a mode file to VERIFY the database. This is not absolutely necessary, but will increase database security.

5) If verification shows that the database is okay, carry out the BACKUP copying.

6) Enter SIBAS-SERVICE when the BACKUP copying is finished and reset the R-LOG!! That is very important. See section 3.5.2.

7) Start up SIBAS as usual.

8) Send broadcast to users saying that the database is available again.

3.4.1 Database verification

To VERIFY a database means checking to see if the internal database structures are correct. An example of this would be checking to se if the INDEX-KEY Anne in the INDEXTABLE really points to a database record with the name Anne.

Verification of the database is done by means of the SIBAS module called SIB2-DBM (Database Maintenance Module). Refer to chapter 6 of the SIBAS User's Guide for a detailed description of the DBM.

The easiest way to do the verification is to use a mode file (see the example which follows).

The time taken by the database verification depends on the size of the database and the number of INDEXES, SETS and CALC REALMS defined. It could take anywhere from a few minutes to several hours.

We advise you to run a database verification before taking the BACKUP copy to avoid making a copy of an erroneous database. Remember that errors are typically introduced if the database is ABORTed without doing RECOVERY aterwards.

If verification takes too long to be run with every BACKUP, do it at the beginning of a BACKUP cycle, ie., before you start overwriting an old BACKUP copy, thus insuring that you always have at least one internally correct BACKUP copy.

Example:

Example of a mode-file doing a complete verification of the database, and the result of this verification.

@MODE VERIFY L-P

Output from line-printer:

@SIB-DBM

S I B A S - I I - D , DBM-MODULE - JAN. 1983

EXPLANATION ? N

INTERACTIVE ? Y

1: START FORDB.

2: READY ALL.

3: FREE-SPACE-STAT.

REALM	TYPE	PAGES RESERVED	PAGES USED	MAX NO. RECORDS	FREE + RECORDS	FREED	PERCENT USED
FORDB	SYS	10304	64	10303	10240 +	1	0
INDRELM	SYS	52	7	51	45 +	0	11
PERSON	SERIAL	60	3	236	228 +	0	3
PROJECT	SERIAL	32	2	217	210 +	0	3
REPORT	CALC	32	24	279	72 +	0	74

4: VERIFY MODE READ-ONLY.

*** VERIFY IS SET IN READ ONLY MODE ***

5: VERIFY INDEX DATABASE.

```
REALM :  PERSON       ITEM :  PENAME

  RECORDS READ FROM INDEXES:          7
  RECORDS READ FROM REALM:            7  INDEXES:        7


REALM :  PERSON       ITEM :  PESOSENO

  RECORDS READ FROM INDEXES:          7
  RECORDS READ FROM REALM:            7  INDEXES:        7


REALM :  PROJECT      ITEM :  PRNO

  RECORDS READ FROM INDEXES:          3
  RECORDS READ FROM REALM:            3  INDEXES:        3


REALM :  PROJECT      ITEM :  PRTYNO

  RECORDS READ FROM INDEXES:          3
  RECORDS READ FROM REALM:            3  INDEXES:        3


REALM :  REPORT       ITEM :  REPERPRO

  RECORDS READ FROM INDEXES:          3
  RECORDS READ FROM REALM:            3  INDEXES:        3


REALM :  REPORT       ITEM :  RESOSENO

  RECORDS READ FROM INDEXES:          3
  RECORDS READ FROM REALM:            3  INDEXES:        3
```

6: VERIFY CALC DATABASE.

```
REPORT    :          3  RECORDS READ
```

7: VERIFY SET DATABASE.

```
SET     :  PERREP
  NUMBER OF OWNERS  READ :          7
  NUMBER OF MEMBERS READ :          3

  MEMBERS READ IN PHYSICAL ORDER :          3  VIA SET :          3

SET     :  PROJREP
  NUMBER OF OWNERS  READ :          3
  NUMBER OF MEMBERS READ :          3

  MEMBERS READ IN PHYSICAL ORDER :          3  VIA SET :          3
```

8: EXIT.

```
060627 STOP     0
```

3.4.2 What to do if the database verification gives error messages

1) Get an older BACKUP copy and check if this is okay. If you have not verified it already, go back in copies until you find one that is okay.

2) Reprocess the LOGFILE(S) corresponding to the older BACKUP(s) until you are at today's date. This is, of course, only possible if you keep BACKUP copies of LOGFILES!

   Note! If this stage cannot be carried out, contact the DBA or ND SERVICE.

3) Now that you have a good copy, do the BACKUP.

3.5 Taking BACKUP copies

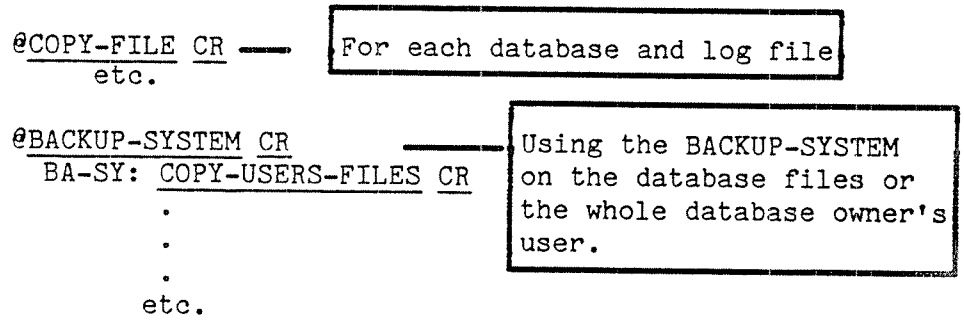
3.5.1 The ways of taking BACKUP copies

There are several ways of taking BACKUP:

- Using stand alone programs (Pack to Pack BACKUP) which requires that SINTRAN be stopped. The actual copying is quick (copying 75Mb takes about 5 minutes), even though SINTRAN must be stopped.

  This can be done along with SYSTEM BACKUP and is described in the SINTRAN Supervisor Manual.

- Using any of the FILE-SYSTEM commands, for example:



  This method of doing BACKUP is slower, but it is done when SINTRAN is running, therefore it is okay for very small databases.

- Using a special programs made for fast copy-verifying of large continuous files.

Note: For detailed instructions on how to cary out the BACKUP using the BACKUP-SYSTEM, see the ND SINTRAN-III SYSTEM SUPERVISOR Manual.

3.5.2 Resetting the LOGFILE

You should always reset the LOG after taking BACKUP!

Example of reseting the LOGFILE:

```
@SIBAS-SERVICE

S I B A S - I I - D   SERVICE-PROGRAM JAN 1983
MON-SIBAS COMMUNICATION.
```

```
 EXPLANATION* ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL,10-89=REMOTE):0

SIBAS STATE: READY
>>INIT-LOG

  OWNER:M-L

  DATABASE-NAME:FORDB

    1: INIT-R-LOG
    2: RESET-R-LOG
    3: REMOVE-R-LOG
    4: INIT-DELAYED-UPDATE-LOG
    5: INIT-BEFORE-IMAGE-LOG
    6: REMOVE-PAGE-LOG I.E. 4 OR 5

  CODE:2

SIBAS STATE: READY
>>START

  OWNER:M-L

  DATABASE-NAME:FORDB

  WORK-AREA-SIZE:20

SIBAS STATE: DBA
>>RUN

  NEW RUNFLAG ?:N

SIBAS STATE: RUNNING
>>DATABASE-STATUS

 INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-------------------------------------------------------------------
CURRENT    *     1   004 *       49       14:00:44     17.02. 1983
INITIATION *     1   004 *       17       14:00:42     17.02. 1983
LAST OPEN  *     0   000 *        0       00:00:00     00.00.    0
LAST CLOSE *     0   000 *        0       00:00:00     00.00.    0
LAST CHECK *     0   000 *       17       14:00:42     17.02. 1983

FILE SIZE  *   200   LOGGED CALLS =      0 LOG-TYPE: DIRECT
DATABASE FORDB    IS OPENED BY   0 USERS
RUNFLAG 002775B,OFLOG NOT ALLOWED


SIBAS STATE: RUNNING
>>EXIT

 - EXIT -
```

C H A P T E R 4

SIBAS-500 logging

4 SIBAS-500 logging

At present, routine-logging and BIM-logging are available from a SIBAS-500 process. The function of these are exactly the same as on a SIBAS-100 system, and hence a crashed SIBAS-500 database may be rolled back (reprocessed) by using a SIBAS-100 process (and vice versa).

4.1 Routine logging/call log

The routine log (sometimes called the call log or R-log) on SIBAS-500 is handled in the same way as in a SIBAS-100 system, i.e., (most) input and output packets are recorded on a file when they are passed between SIBAS and the applications.

Logged calls are (by default) buffered in 1/2 K memory buffers. This means that approximately 10 to 40 calls must be executed before the buffer will be written onto the disk-file. However, buffering may be avoided by setting the 'no-buffering-flag' in the SRUN call, (i.e., through the RUN-command in SIBAS-SERVICE). Running a SIBAS process with such 'immediate write' of the R-log requires a great deal of extra disk transfers, and should therefore normally be avoided.

SIBAS-500 has expanded the R-log usertable from 64 in SIBAS-100 to a maximum of 90 simultaneous updating users.

Reprocessing is implemented and have the exact same function as SIBAS-100 reprocessing. Since the R-log format is also identical, a 'SIBAS-100 R-log' may be reprocessed by means of SIBAS-500, and vice versa.

Reprocessing should normally be initiated and controlled by using the SIBAS-SERVICE program.

4.2 BIM-logging

Before-image-logging is implemented as on SIBAS-100. A copy of a page is recorded on the before-image-area in the SIBAS system realm just before the page is updated. The BIM-logg format is exactly the same as on SIBAS-100, but the actual algorithm used by a SIBAS-500 process is more efficient (the BIM logg is buffered).

Note that SIBAS-500 will write onto the last BIM-page whenever the database is physical opened and BIM is defined. This is to ensure enough Sintran pages are allocated for the BIM logg if the file is continous.

C H A P T E R 5

Maintaining files

5 Maintaining files

5.1 Creating database files

This is a job for the database designer or the database administrator.

Suggested procedure:

1) Create the database files as index files. Example:

```
@CREATE-FILE FORDB:DATA,,,
```

2) Run the DRL Module to initiate the database.

Example of a run of the DRL module to initiate the database :

```
@SIB-DRL
S I B A S - I I - D    DEFINITION REDEFINITION LANGUAGE ,  JAN 1983
EXPLANATION (Y/N) ? N
INTERACTIVE ? N
INPUT-FILE   : FORDB:SYMB
LIST-FILE    : LINE-PRINTER

*****************************************************************************
* D A T A B A S E    FORDB     I N I T A T E D    14.58   1983.02.16 *
*****************************************************************************
@
```

Look at the report generated by the SIB-DRL (LIST-FILE), and check the file sizes calculated by SIBAS.

```
**********************************
OS-FILE NAMED SYSFILE  IS DEFINED
**********************************

      PAGESIZE  =   256 WORDS

      DIRECTORY =    DEFAULT
```

```
REALMS DEFINED ON FILE :
------------------------
REALM : INDRELM              SIZE =     52 PAGES
REALM : PERSONM              SIZE =     60 PAGES
REALM : PROJECT              SIZE =     32 PAGES
REALM : REPORTT              SIZE =     32 PAGES
                             --------------------
                       SUM SIZE =    176 PAGES
                       ======================

NUMBER OF 1K SINTRAN BLOCKS                 =     44
```

3) Delete the database files and then create them again, this time as continuous files with the correct number of pages. Example:

```
@CREATE-FILE SYSFILE:DATA 44 CR
```

4) Initiate the database again (SIB-DRL, etc.), this time using continous files.

Note:

- If you choose to have continuous database files, you save system overhead on disk access.
- If you choose indexed files, there is the risk that the user area will run out of space while the database is being used.

5.2 Creating the R-LOG

The R-LOG must be a continuous file. It will be formatted when it is initiated, therefore it cannot be expanded later!!

The size of the R-LOG depends on:

1) The activity on the database.
2) The R-LOG strategies, eg., are READ-ONLY users logged.
3) How often it is reset, ie., BACKUP frequency.

Suggested procedure:

- Create a large enough R-LOG, eg., 5000 pages, if you have enough room.
- Keep an eye on the log volume for the first two weeks or so. This is done by giving the DATABASE-STATUS command in SIBAS-SERVICE.
- When carrying out BACKUP, change the R-LOG size to a size which is more suitable.

To Change the R-LOG size, carry out the BACKUP and instead of reseting the R-LOG:

- Remove the R-LOG.

```
@SIBAS-SERVICE
  -------
  -------
  -------
>>INIT-LOG
  CODE = 3  ------> CODE 3 means REMOVE
>>EXIT
  - EXIT -
@
```

- Delete the R-LOG.
- Create R-LOG with the correct size.
- Initiate a new R-LOG.

```
@SIBAS-SERVICE
  -------
  -------
  -------
>>INIT-LOG
  CODE = 1  ------> CODE 1 means INITIATE
  --------
  --------
  --------
>>EXIT
  - EXIT -
@
```

5.3 Checking file and realm sizes

There are three ways of checking file/realm sizes:

1) R-LOG: using the DATABASE-STATUS command in SIBAS-SERVICE while the database is in the DBA (available), RUNNING or RECOVER states will tell you how much space is left on the R-LOG file.

2) SIBAS REALMS: using the :FREE-SPACE-STAT command in SIB-DBM will tell you how much space is left on the realms.

3) Using the SINTRAN commands FILE-STATISTICS or USER-STATISTICS will tell you how much space is used by the files and how much space is left for files in your user area. Of course this is only of interest if you have indexed files.

If the ROUTINE LOG gets full, the error message:

```
...time... ERROR 29 IN SIB2x AT
   ADDRESS
   FILE SYSTEM ERROR
   FILE ERROR NO: 3
   END OF FILE
```

will be written on the SINTRAN-ERROR DEVICE (the console).

The database users will not be affected by this, as SIBAS will keep on running. The database should be stopped as soon as possible and a BACKUP taken.

Note that SIBAS will give error messages to the users (DBEC = 910 or DBEC = 920) if the realms get full and SIBAS WILL KEEP ON RUNNING AS USUAL.

If the user-area gets full, error messages will be written on the SINTRAN-ERROR-DEVICE and SIBAS will stop. You should then give more space to the database user.

5.4 Changing size of files or realms

5.4.1 Changing size of the R-LOG

See the example in section 3.3.1, Creating the R-LOG.

5.4.2 Increasing the size of a realm

This is a task for the database administrator. It must be done while the database is in READY state and NOT while the database is in use.

The procedure is as follows:

- Take a BACKUP of the database.
- Rename the file which the realm is a part of. Create a new file with the new size. (This will be the expanded file.) Copy the renamed file into the one just created, and delete the old file.
- Redefine the database with the new realm size. See the example below.

Example:

- Take a BACKUP of the database.

```
@RENAME-FILE

 FILE NAME: SYSFILE:DATA

 NEW FILE NAME AND TYPE: SYSFILE-2:DATA

@CREATE-FILE

 FILE NAME: SYSFILE:DATA

 NUMBER OF PAGES : 300

@COPY-FILE

 DESTINATION FILE: SYSFILE:DATA

 SOURCE FILE: SYSFILE-2:DATA
```

- Redefinition with new realm size.

```
START REDEFINITION DATABASE FORDB
      MODE PRODUCTION SYSTEM-REALM COP-FORDB SCRATCH-FILE SCRATCH.

CHANGE SERIAL-REALM PERSON  OS-FILE SYSFILE REALMSIZE 100.

END REDEF.
```

C H A P T E R 6

RECOVERY

6 RECOVERY

RECOVERY is required:

- If SIBAS is stopped abnormally (eg., a machine stop or SIBAS is ABORTed) while the database is in use.
- If FATAL errors are discovered (eg., inconsistent data).
- If errors are discovered by a database VERIFICATION run.
- If any of the database files are ruined, eg., by disk crash.

6.1 RECOVERY using a BACKUP copy and ROUTINE LOG

The procedure for RECOVERY using a BACKUP copy and the ROUTINE LOG is as follows:

1) Send a broadcast to all database users that RECOVERY action is to be taken and they should stop work.
2) ABORT SIBAS, if not already stopped.
3) Close any database file or R-LOG which may be open.
4) Ask the user to log out (or log them out yourself).
5) Replace/overwrite the database with the BACKUP copy.
6) Enter SIBAS-SERVICE and set SIBAS in RECOVER state.
7) Reprocess the LOG file.
8) Finish RECOVERY and set SIBAS back in RUNNING state.
9) Close the database for all users.
10) Send broadcast to users that it is now okay to use the database.

On the next page is an example of a Standard Reprocess (steps 6, 7, 8 and 9).

Recovery with only R-LOG in use.

```
@SIBAS-SERVICE

 S I B A S - I I - D    SERVICE-PROGRAM JAN 1983
MON-SIBAS COMMUNICATION.

 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL, 10-89=REMOTE):0

SIBAS STATE: READY
>>START

  OWNER:M-L

  DATABASE-NAME:FORDB

  WORK-AREA-SIZE:20

SIBAS STATE: DBA
>>DATABASE-STATUS

  INTERFACE * LOG ADDRESS *                          TIME
 STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-------------------------------------------------------------------------
 CURRENT    *   165   771 *       28      20:38:40       17.02.    1983
 INITIATION *     1   004 *       35      20:29:57       17.02.    1983
 LAST OPEN  *     1   077 *       42      20:32:06       17.02.    1983
 LAST CLOSE *     1   061 *       37      20:31:50       17.02.    1983
 LAST CHECK *     1   071 *       11      20:31:51       17.02.    1983

 FILE-SIZE  *  200   LOGGED CALLS = 728  LOG-TYPE: DIRECT
 DATABASE FORDB  IS OPENED BY  3 USERS
 RUNFLAG 002775B,OFLOG NOT ALLOWED,SGET ANSWERS NOT LOGGED

 USER-ID  UPDATE  LOG     TIME LAST UNCOMPLETED SEQUENCE

  036601B  YES    ON      21   20:32:31  17.02.    1983
  037003B  YES    ON      14   20:35:00  17.02.    1983
  036751B  YES    ON      34   20:34:38  17.02.    1983

 SIBAS STATE: DBA
 >>RECOVER

 SIBAS STATE: RECOVERY
 >>STANDARD-REPRO

   ROLL-BACK TO LAST CHECKPOINT ? :NO

   PASSWORD:

  REPROCESSING WILL NORMALLY TAKE SOME TIME - WAIT -

  REPROCESSING/LISTING STOPPED, REASON:
  END OF LOG FOUND
```

```
>>DATABASE-STATUS

  INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-------------------------------------------------------------------
CURRENT    *   165   771 *       36      20:38:41      17.02.   1983
INITIATION *     1   004 *       35      20:29:57      17.02.   1983
LAST OPEN  *     1   117 *       13      20:38:52      17.02.   1983
LAST CLOSE *     1   071 *       42      20:38:47      17.02.   1983
LAST CHECK *     1   071 *       11      20:31:51      17.02.   1983

FILE-SIZE  *  200   LOGGED CALLS = 730  LOG-TYPE: DIRECT
DATABASE FORDB  IS OPENED BY  3 USERS
RUNFLAG 002775B,OFLOG NOT ALLOWED,SGET ANSWERS NOT LOGGED

USER-ID  UPDATE  LOG     TIME LAST UNCOMPLETED SEQUENCE

 036601B  YES    ON       21   20:32:31  17.02.    1983
 037003B  YES    ON       14   20:35:00  17.02.    1983
 036751B  YES    ON       34   20:34:38  17.02.    1983

SIBAS STATE: RECOVERY
>>FINISH

WILL YOU REALLY FINISH RECOVERY ?Y

SIBAS STATE: DBA
>>FORCE-CLOSE

  OCTAL RUN-ID, (EXAMPLE 40106B), OR -1 IF ALL USERS:-1

>>RUN

  NEW RUNFLAG ?:N

SIBAS STATE: RUNNING
>>EXIT

 - EXIT -
```

6.2 RECOVERY using BIM-LOG and R-LOG

The BACKUP copy is not to be copied.

For RECOVERY using BIM-LOG and R-LOG do the following:

1) Send a broadcast to the users that SIBAS is not available due to RECOVERY.

2) If SIBAS is RUNNING, ABORT SIBAS:

3) Close database files and log file if open.

4) Have the user log out or do it for him/her.

5) Enter SIBAS-SERVICE and set the database in RECOVER state.

6) ROLLBACK the database and REPROCESS the log (Standard reprocess command).

7) Set SIBAS back in RUNNING state.

8) Close the database for all users.

9) Send a broadcast that the database is okay for use.

Example of a Standard Reprocess when BIM-LOG is used (steps 5, 6, 7 and 8):

Recovery with Before-image and Routine log in use.

```
@SIBAS-SERVICE

 S I B A S - I I - D    SERVICE-PROGRAM JAN 1983
MON-SIBAS COMMUNICATION.


 EXPLANATION ? N

GIVE SIBAS SYSTEM NUMBER (0-9=LOCAL, 10-89=REMOTE):0

SIBAS STATE: READY
>>START

  OWNER:M-L

  DATABASE-NAME:FORDB

  WORK-AREA-SIZE:20

SIBAS STATE: DBA
>>DATABASE-STATUS

  BEFORE IMAGE LOG ACTIVE
  INTERFACE * LOG ADDRESS *                          TIME
STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
-----------------------------------------------------------------------
CURRENT    *    80   000 *       22      21:26:49      17.02.    1983
INITIATION *     1   004 *       10      21:19:09      17.02.    1983
LAST OPEN  *    10   570 *       43      21:21:12      17.02.    1983
LAST CLOSE *    10   552 *       28      21:20:56      17.02.    1983
LAST CHECK *    10   610 *       20      21:21:12      17.02.    1983

FILE-SIZE  *  200   LOGGED CALLS = 741  LOG-TYPE: DIRECT
DATABASE FORDB  IS OPENED BY  3 USERS
RUNFLAG 002775B,OFLOG NOT ALLOWED,SGET ANSWERS NOT LOGGED
```

```
 USER-ID  UPDATE  LOG      TIME LAST UNCOMPLETED SEQUENCE

  036601B  YES    ON        7   21:24:04  17.02.    1983
  037003B  YES    ON       48   21:23:57  17.02.    1983
  036751B  YES    ON       44   21:23:57  17.02.    1983


 SIBAS STATE: DBA
 >>RECOVER

 SIBAS STATE: RECOVERY
 >>STANDARD-REPRO

   ROLL-BACK TO LAST CHECKPOINT ? :YES

   PASSWORD:

  ROLL-BACK WILL NORMALLY TAKE SOME TIME - WAIT -
  REPROCESSING WILL NORMALLY TAKE SOME TIME - WAIT -

  REPROCESSING/LISTING STOPPED, REASON:
  END OF LOG FOUND

>>DATABASE-STATUS

 BEFORE IMAGE LOG ACTIVE, SIZE: 520 C-P TRIGGER: 433 CURRENT:  59
  INTERFACE * LOG ADDRESS *                        TIME
 STATISTICS * BLOCK  WORD * BASIC-UNIT HOUR/MIN./SEC. DAY/MONTH/YEAR
 ------------------------------------------------------------------------
 CURRENT    *    80   000 *        5      21:27:19      17.02.    1983
 INITIATION *     1   004 *       10      21:19:09      17.02.    1983
 LAST OPEN  *    10   337 *       23      21:20:50      17.02.    1983
 LAST CLOSE *    10   552 *       28      21:20:56      17.02.    1983
 LAST CHECK *    10   610 *       20      21:21:12      17.02.    1983

 FILE-SIZE  *  200   LOGGED CALLS = 757  LOG-TYPE: DIRECT
 DATABASE FORDB  IS OPENED BY  3 USERS
 RUNFLAG 002775B,OFLOG NOT ALLOWED,SGET ANSWERS NOT LOGGED

 USER-ID  UPDATE  LOG      TIME LAST UNCOMPLETED SEQUENCE

  036601B  YES    ON        7   21:24:04  17.02.    1983
  037003B  YES    ON       48   21:23:57  17.02.    1983
  036751B  YES    ON       44   21:23:57  17.02.    1983

 SIBAS STATE: RECOVERY
 >>FINISH

 WILL YOU REALLY FINISH RECOVERY ?Y

 SIBAS STATE: DBA
 >>FORCE-CLOSE

   OCTAL RUN-ID, (EXAMPLE 40106B), OR -1 IF ALL USERS:-1

 >>RUN
```

```
   NEW RUNFLAG ?:N

 SIBAS STATE: RUNNING
 >>EXIT

  - EXIT -
```

A P P E N D I X A

Commands in SIBAS-SERVICE

SIBAS-SERVICE program has the following functions:

1 To initiate and reset logging

2 To carry out reprocess and recovery

3 Monitor functions:

- who is on
- time for last CHECKPOINT/OPEN DATABASE
- Run-time authorizations

The program can set SIBAS in different states - each in which different functions may be carried out. The commands in SIBAS-SERVICE are self-explanatory, parameters are explicitly asked for, if not given along with the command. COMMANDS

The command HELP lists the commands alphabetically, The command EXPLAIN <command> gives a closer description of a particular command.

The commands and explain text are sorted here alphabetically.

The commands in SIBAS-SERVICE should be used one at a time.

COMMAND ALLOWED IN STATE :	READY	DBA	RUNNING	RECOVERY
HELP	X	X	X	X
CLOSE-DATABASE		X	X	
DATABASE-STATUS		X	X	X
EXIT	X	X	X	X
EXPLAIN-COMMAND	X	X	X	X
FINISH				X
FORCE-CLOSE		X	X	
GET-UPDATE-STATISTICS		X	X	
GET-SIBAS-STATE	X	X	X	X
GIVE-CHECKPOINT			X	
GIVE-MESSAGE-TO-SIBAS		X	X	
INITIATE-LOG	X			
OPEN-DATABASE		X	X	
PAUSE			X	
RECOVER		X		
REPROCESS-DATABASE				X
RETURN-CHECKPOINT			X	
ROLL-BACK				X
RUN-DATABASE		X		
SET-CONDITIONS-FOR-REPROCESSING				X
SET-PASSIVE	X			
SET-ROUTINE-LOGGING-ON/OFF			X	
SET-SIBAS-AVAILABLE		X	X	
SET-SIBAS-UNAVAILABLE		X	X	
STANDARD-REPROCESS				X
START-DATABASE	X			
STOP-DATABASE		X	X	
SUPER-START	X			
SUPER-STOP			X	
TURN-ON/OFF-TERMINAL-LOG		X		
UPDATE-DATABASE-IN-PLACE		X		

SIBAS-SERVICE COMMANDS

CLOSE-DATABASE

CLOSE-DATABASE

Close database for this run-unit.

SIBAS state: RUNNING,DBA

DATABASE-STATUS

DATABASE-STATUS

Give information about logging (R-log and BIM) and list users with open database.

SIBAS state: RUNNING, DBA, RECOVERY

EXIT

EXIT

Return to SINTRAN

SIBAS state: ALL

EXPLAIN-COMMAND

EXPLAIN-COMMAND <command>

List specified command with parameter(s), and give a short description.

SIBAS state: ALL

FINISH

FINISH

Change the SIBAS process from RECOVERY to DBA state.

SIBAS state: RECOVERY

FORCE-CLOSE

FORCE-CLOSE <octal run-id (EXAMPLE 40106B, or -1 if all users)>

Force one or all run-units to close the database. The command should be used if a run-unit has left the database open. The command DATABASE-STATUS will give a list of all run-units with open database.

SIBAS state: RUNNING, DBA

GET-SIBAS-STATE

GET-SIBAS-STATE

Print the current SIBAS state.

SIBAS state: ALL

GET-UPDATE-STATISTICS

GET-UPDATE-STATISTICS

Print "DELAYED UPDATE" statistic

SIBAS state: RUNNING, DBA

GIVE-CHECKPOINT

GIVE-CHECKPOINT <basic unit><second><minute><hour><day><month><year>

Define a check-point on log file(s) where the database is consistent. If a FATAL ERROR occurs at a later point in time, then the database can be restored to the consistent state when the last CHECKPOINT was taken. "Delayed-update" or "Before image log" must be in use, otherwise only the "routine log" buffers will be written. RUN-FLAG must permit this call (see RUN-DATABASE).

SIBAS state: RUNNING

GIVE-MESSAGE-TO-SIBAS

GIVE-MESSAGE-TO-SIBAS

Read a message from this terminal. The message will be written to the Routine-log file and the SIBAS error-device. It will also be written to the SIBAS error-device during reprocessing. It advises that the message text could be used for instructions concerning special conditions, eg., special reprocessing requirements.

SIBAS state: RUNNING, DBA

INITIATE-LOG

INITIATE-LOG <owner><database-name> <(1: INIT-R-LOG
,2: RESET-R-LOG
,3: REMOVE-R-LOG
,4: INIT-DELAYED-UPDATE-LOG
,5: INIT-BEFORE-IMAGE-LOG
,6: REMOVE-PAGE-LOG I.E 4 OR 5)CODE> <LOG-DIRECTORY, 4 CHAR.>
<MAX-SIZE-1K-PAGES, WHEN CODE=5: BETWEEN 513 AND 2046> <(2:
DIRECT-R-LOG
,3: CIRCULAR-R-LOG)LOG-TYPE>

Define/remove or reset the log file(s) which a SIBAS process will use. INIT-R-LOG preformats the R-log file, and this may take some time.It is possible to initiate the R-log under a user other than the database-owner. This may be specified in the LOG-DIRECTORY parameter (ie.,:RT). This parameter must not exceed 4 characters. RESET-R-LOG does not take much time, but assumes that the R-log has been initiated.

SIBAS state: READY

OPEN-DATABASE

OPEN-DATABASE <update?><password>

Open database for this run-unit.

SIBAS state: RUNNING, DBA

PAUSE

PAUSE

Change the SIBAS process from RUNNING to DBA state.

SIBAS state: RUNNING

RECOVER

RECOVER

Change the SIBAS process from DBA to RECOVER state.

SIBAS state: DBA

REPROCESS-DATABASE

```
REPROCESS-DATABASE <(0: SCAN TO END OF LOG OR NO-CALL
 ,1: SCAN BUT REMOVE ALL CRITICAL SEQ STARTING AFTER TIME
 ,2: SCAN UP TO A CHECKPOINT IDENTIFIED BY TIME OR LATER
 ,3: SCAN UP TO A LOG-BLOCK WRITTEN BY TIME OR LATER) CONDITION> <(0:
CONTINUE SCANNING
 ,1: START REPROCESSING WITHOUT PRINT
 ,2: START REPROCESSING AND PRINT
 ,3: PRINT ONLY
 ,4: PRINT ONLY SHORT) MODE> <NO-CALL OR 0 IF ALL> <(1: PRINT ONLY
CANDIDATES TO REMOVE / INSERT
 ,2: PRINT ALL CALLS
 ,3: PRINT ONLY CHECKPOINTS
 ,4: PRINT BEGIN/END SEQ AND CHECKPOINTS) PRINT OPTION> <RUN-ID
0=ALL><REMOVE-FLAG = REINSERT ? >
```

Reprocess and/or print the DML calls from the R-log file according to the conditions specified in the command and the conditions specified by the preceding SET-CONDITIONS commands. (The STANDARD-REPROCESS command may be used to carry out RECOVERY operations in a similar way).

SIBAS state: RECOVERY

RETURN-CHECKPOINT

RETURN-CHECKPOINT

Define a checkpoint on log-file(s) where the database is consistent. If a FATAL ERROR occurs at a later point in time, then the database can be restored to the consistent state when the last checkpoint was taken. "Delayed-update" or "Before-image log" must be in use. Otherwise only the "routine-log" buffers would be written. SIBAS will return the time of the CHECKPOINT.

SIBAS state: RUNNING

ROLL-BACK

ROLL-BACK <password><basic unit><second><minute><hour><day><month><year>

Reestablish the database state at a previous checkpoint. Delayed update or Before-image must be in use, otherwise the command will be ignored.

SIBAS state: RECOVERY

SET-CONDITIONS-FOR-REPROCESSING

SET-CONDITIONS-FOR-REPROCESSING <(0: RELEASE CONTROL TABLE ENTRY GIVEN BY RUN-ID
,1: REMOVE A SEQ IDENTIFIED BY TIME AND RUN-ID
,2: REMOVE ALL SEQ IDENTIFIED BY SEQ-NAME AND RUN-ID
,3: REMOVE ALL SEQ IDENTIFIED BY SEQ-NAME AND RUN-ID AFTER TIME
,4: REMOVE ALL CALLS FOR THIS RUN-ID
,5: REMOVE ALL CALLS FOR THIS RUN-ID FROM BEGIN SEQ-NAME
,6: REMOVE ALL CALLS FOR THIS RUN-ID FROM BEGIN SEQ IDENT BY TIME
,7: REMOVE UNCOMPLETED SEQUENCES FOR THIS RUN-ID OR ALL IF RUN-ID=0)
CODE><OCTAL RUN-ID (EXAMPLE 40146B) >

Specify which DML calls on the Routine-log that should be included in the reprocessing. This must be done for each individual run-unit, unless code 7 is used. The reprocessing condition for each run-unit will be kept in a control table which will be used when the REPROCESS command is given.
Note: If code 7 is wanted, this call must be executed in advance of rollback.

SIBAS state: RECOVERY

SET-PASSIVE

SET-PASSIVE

Change the SIBAS process from READY to PASSIVE state.

SIBAS state: READY

SET-ROUTINE-LOGGING-ON/OFF

SET-ROUTINE-LOGGING-ON/OFF <on/off>

Define the start or end of a section in which the R-logging is/isn't in effect for this run-unit. Routine-log must be active, and RUN-FLAG must permit this call (see RUN-DATABASE).

SIBAS state: RUNNING

SET-SIBAS-AVAILABLE

SET-SIBAS-AVAILABLE

Allow run-units to access (open) the database again after some time with database unavailable. (Inverse of SET-SIBAS-UNAVAILABLE).

SIBAS state: RUNNING, DBA

SET-SIBAS-UNAVALIABLE

SET-SIBAS-UNAVALIABLE

Prohibit run-units from opening the database. Run-units already having opened the database will continue to run and can access the database until they close the database.

SIBAS state: RUNNING, DBA

STANDARD-REPROCESS

STANDARD-REPROCESS <roll-back to last checkpoint ?><password>

Rollback (if Before-image log is in use) and reprocess to end of routine-log without print. If Before-image log is not in use, it is assumed that a BACKUP has been copied onto the database. Uncompleted sequences (if any) will be skipped.

SIBAS state: RECOVERY

START-DATABASE

START-DATABASE <owner><database-name><work-area-size>

Change the SIBAS process from READY to DBA state.
Example of work-area size: 25

SIBAS state: READY

STOP-DATABASE

STOP-DATABASE

Change the SIBAS process from DBA to READY state.

SIBAS state: DBA

SUPER-START

```
SUPER-START <owner><database-name><work-area-size><open-for-update ?>
                                                    <password>
```

Change the SIBAS process from READY to RUNNING state and open the database.

SIBAS state: READY

SUPER-STOP

```
SUPER-STOP <force-close-all-users?>
```

Change the SIBAS process from RUNNING to PASSIVE state.

SIBAS state: RUNNING

TURN-ON/OFF-TERMINAL-LOG

```
TURN-ON/OFF-TERMINAL-LOG <terminal-number>
                         <0: TERM-LOG OFF
                          1: TERM-LOG ON
                          2: TERM-LOG AND INTERNAL SIBAS TRACE ON
                          )MODE>
```

Turn on/off terminal-log for a specified terminal number.

SIBAS state: DBA

UPDATE-DATABASE-IN-PLACE

```
UPDATE-DATABASE-IN-PLACE <RATIO (UPDATE:NORMAL><0: IMMEDIATELY
                         1: AT CHECKPOINT  2: AT CLOSE DATABASE)
                         CODE>
            <BASIC UNIT><SECOND><MINUTE><HOUR><DAY><MONTH><YEAR>
```

Apply the updates from the update-file to the database files, and release the space on the update file. All pages that were changed up to the CHECKPOINT will be moved. Before this operation takes place, a CHECKPOINT is automatically taken, ensuring the consistency of all disk files.

SIBAS state: DBA

A P P E N D I X B

SIB2-LOOKLOG User guide

1. INTRODUCTION

SIB2-LOOKLOG is a program to look at recorded DML-calls and checkpoints in a SIBAS II routine-log file. It also has some search facilities.

The program is meant to be a tool for programmers, system supervisors and database administrators using SIBAS.

The user ought to have some knowledge of DML-calls and SIBAS routine logging.

SIB2-LOOKLOG can be helpful in many cases, for instance when errors appears while reprocessing the database or for tracing the course of execution of some transactions, either while debugging new applications or after production failures.

The user may list all calls in the log file or all calls within a defined area. S/he may also specify which DML-call(s) are to be listed by giving the name of the call and/or by giving an user-id. The output from the program is normally the VDU (the terminal), but it can be duplicated on a file (a line-printer for example).

A DML-call will later be refered to as a SIBAS packet.

2. OUTPUT FORMATS

A SIBAS packet can be presented in two different formats.

FULL FORMAT

Example:

```
BLOCK W   USER-ID CALL  PARAMETERS      WRITTEN:  43  09:57:47  26.01.1982
-------------------------------------------------------------------------------
   16 354  044450 SMDFY 000000 000001 051501 046104 047525 052040 ....SALDOUT
                       000003 040013 161440 000000 006601 026405 ..@.. ....-.
    ANSWER    1
```

- Address: Log block no (BLOCK), and start position (W) (decimal).
- User-id: RT-description address (octal) of background terminal or RT-program that called SIBAS .
- DML call : Name of the DML call (5 characters).
- Time : Time and date when the log block was written (WRITTEN) Basic time-unit Hour:minute:second day.month.year
- Input parameters: Parameters will be displayed both in octal and character form. Control characters will be dispalyed as dots "(.)". (PARAMETERS)
- Status : Returned status. (Not all calls will have the status logged) (ANSWER)
- Output parameters: Same as for input parameters

SHORT FORMAT

Example:

```
BLOCK:    16 / 354 USER-ID: 044450 CALL: SMDFY ANSWER:    1
```

- Address: Log block no (BLOCK), and start position (decimal).
- User-id: Address to RT-description (octal).
- DML -call: Name of the DML -call (5 characters).
- Status : Returned status. (Not all calls will have the status logged) (ANSWER)

CHECKPOINT FORMAT

A checkpoint will always be displayed this way:

```
**** CHECKPOINT AT:  23  10:16:51  25.01.1982      BLOCK/WORD:    10 295
```

3.RUNNING THE PROGRAM, OPENING THE LOG FILE

When the program is started, it will ask for the log file name. Default file type is :LOGG, but is it possible to specifiy other file types as well. If the program is not able to open the file, an error message will be written, and the program will again ask for the file name.

If the actual SIBAS process has been aborted (not stopped in a controlled way), the index to the last log block might be erroneus. The program will then write the message "SCAN TO END OF LOG.." When the log file has been opened. This indicates that recovery should be performed.

The command syntax is similar to SINTRAN III, which means that commands can be abbreviated, and parameters can be given in several ways. When a prompt character (">>") is written, it means that the program is ready to accept a command. The HELP command will give a list of all commands or those commands specified. The EXPLAIN command lists the parameters for a specified command and gives a short explanation.

Example:

```
@SIB2-LOOKLOG

 S I B A S  I I  D , LOOK-AT-LOG JANUARY 1983
 LOG-FILE: KTO-BASE

 >>
```

4.COMMANDS

FIRST/LAST /NEXT/PREVIOUS

Function:
Find and display a SIBAS packet according to the command. If no packet is found, the message - NOT POSSIBLE - will be written.

DEFINE-AREA

Function:
Define an area on the log file

Example:

```
 >>DEFINE-AREA
   FIRST BLOCK (default=1) :5
   LAST BLOCK (default=last) :6
```

The program will now see the log file as if it started in block no. 5, and ended in block no. 6.

This command will be practical if you have a large log file, and you want to save time when searching for specified SIBAS packets, or if you want to list all packets between the limits.

SHORT-PRINT

Function:
Select output format. Normally short print will be off, and all SIBAS packets will be displayed in full format.

CALL-TABLE/CALL-SELECTION

A SIBAS packet which contains information about which DML -call the packet describes. By manipulating a table named CALL-TABLE, it is possible to select some specific DML calls. The command CALL-SELECTION will tell the program whether it should scan in the call-table or not.

Note: A checkpoint can also be looked upon as a SIBAS packet, and it is identified in the call-table as "C-P".

Example:

```
 >>CALL-TABLE

     1:  Insert call
     2:  Remove call
     3:  Clear table
   CODE :1
   CALL-NAME (Max 5 char.) :SGET

 >>CALL-SELECT
   ON=1 (default=OFF) :1
```

The commands FIRST/LAST/NEXT/PREVIOUS/LIST will now only display SGET calls.

USER-TABLE/USER-SELECTION

These commands work in the same way as CALL-TABLE/CALL-SELECTION. The commands make it possible to select some specific user-id's.

STATUS

This command will give information about the current program status. The defined area, the content of the call-table and user-table will be displayed.

DELETE

This command will delete the last displayed SIBAS packet from the log file.

DEFINE-PRINT-FILE/ON-OFF-PRINTER

These commands makes it possible to get a "hard copy" of the SIBAS-packets displayed on the terminal.

BLOCK-LIST

This command will give a list of all log blocks within the defined area, containing information about number of packets in each block, date and time when the log block was written, etc.

LIST

This command will list all SIBAS packets found within the defined area.

DATABASE-STATUS

This command will give information about the status of the log file.

EXIT

This command will terminate the program.

A SESSION WITH SIB-LOOKLOG

Example :

```
@SIB-LOOKLOG

 S I B A S  I I  D , LOOK-AT-LOG  JANUARY 1983

 LOG-FILE: TBASE:LOGG


>>HELP

HELP
FIRST
LAST
NEXT
PREVIOUS
DEFINE-AREA
SHORT-PRINT
USER-SELECTION
CALL-SELECTION
USER-TABLE
CALL-TABLE
STATUS
DELETE
DEFINE-PRINT-FILE
ON-OFF-PRINTER
BLOCK-LIST
LIST
DATABASE-STATUS
EXIT
@-SPARE-COMMAND-NAME
EXPLAIN-COMMAND

>>DEFINE-AREA
  FIRST BLOCK (default=1) :2
  LAST BLOCK (default=last) :4


>>CALL-TABLE

    1: Insert call
    2: Remove call
    3: Clear table

  CODE :1
  CALL-NAME (Max 5 char.) :SGET


>>CALL-SELECTION
  ON=1 (default=OFF) :1
```

```
>>USER-TABLE

    1: Insert user-id
    2: Remove user-id
    3: Clear table
  CODE:1
  USER-ID:125377B

>>USER-SELECTION
  ON=1 (default=OFF) :1

>>FIRST

BLOCK W   USER-ID CALL  PARAMETERS      WRITTEN:   7  10:04:01  02.12.1982
-------------------------------------------------------------------------------
    2  16  125377 SGET  000000 000001 046505 046502 042514 020040 ....MEMBEL
                       000000 000000                               ....
    ANSWER    2        000014 000014                               ....

>>NEXT

BLOCK W   USER-ID CALL  PARAMETERS      WRITTEN:   7  10:04:01  02.12.1982
-------------------------------------------------------------------------------
    2  59  125377 SGET  000000 000001 046505 046502 042514 020040 ....MEMBEL
                       000000 000000                               ....
    ANSWER    2        000015 000015                               ....

>>SHORT-PRINT
  ON=1 (default=OFF) :1

>>PREVIOUS

BLOCK:     2 /  16 USER-ID: 125377 CALL: SGET  ANSWER:    2

>>LAST

BLOCK:     4 / 478 USER-ID: 125377 CALL: SGET  ANSWER:    2

>>STATUS

* CURRENT LOG-BLOCK:      4 AREA:      2 :      4
  - USER-SELECT IS ON
  - CALL-SELECT IS ON

      USER-SELECT TABLE :
              125377
      CALL-SELECT TABLE :
              SGET
```

```
>>DEFINE-PRINT-FILE

 FILE-NAME: LINE-PRINTER

>>ON-OFF-PRINTER
  ON=1 (default=OFF) :1

>>LIST

BLOCK:      2 /  16 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      2 /  59 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      2 / 231 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      3 /  31 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      3 / 461 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      4 /   5 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      4 / 435 USER-ID: 125377 CALL: SGET  ANSWER:    2
BLOCK:      4 / 478 USER-ID: 125377 CALL: SGET  ANSWER:    2

>>EXIT

- EXIT -
```

* * * * * * * * * * SEND US YOUR COMMENTS!!! * * * * * * * * *

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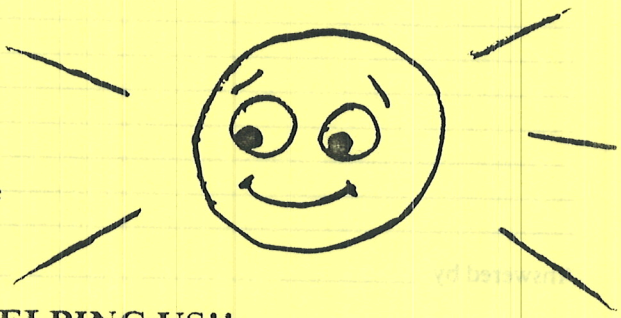

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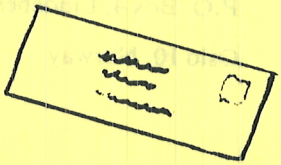

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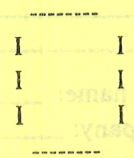

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