

NORD SOFTWARE LIBRARY DISKETTE

CONTAINING : SINTRAN-III ACCOUNTING SYSTEM

DIRECTORY NAME : ND-10315B
USER NAME : FLOPPY-USER

FILE 0 : (ND-10315B:FLOPPY-USER)ACC-SERV-PR-B:BFUN;1
FILE 1 : (ND-10315B:FLOPPY-USER)ACCRT-B:BFUN;1

25 SEPTEMBER 1981

PRODUCT	NAME	ND-NUMBER	CATEGORY
	SINTRAN-III ACCOUNTING SYSTEM	10315B	P
		ND-NUMBER FOR SOURCE	
		10314B	
ISSUED	DATE 81.09.21	BY (INITIALS) MJH	
COMPUTERS	X 10 ! . 12 ! . 50 ! X 100!	. 500!!
INSTR.SET	. 48 BIT FL.!	. 32 BIT FL.!	. COMMERCIAL!
OP.SYSTEM	X SIN III VS!	. SIN III RT!	. ALONE !
DOCUMENTATION	NUMBER:		
	TITLE: See the enclosed sheets.		
PURPOSE	To produce accounting information.		
PROGRAMS (FILES)	PROG.NUMB.	NAME	TYPE CONTAINING
	203073B	ACC-SERV-PROG	BIN Accounts processor.
	203074B	ACCRT	BIN Accounts RT-program.

LOADING/OPERATING PROCEDURE, USE

Under user SYSTEM :

@PLACE-BINARY ACC-SERV-PROG

@DUMP ACC-SERV-PROG 40000 40000

or

@DUMP-REENTRANT ACC-SERV-PROG 40000 40000 (ND:F-U)ACC-SERV-PROG:BPUN

To load the ACCRT real time program to segment :

@RT-LOADER

*READ-BINARY (ND:F-U)ACCRT:BPUN 32 Y

*END-LOAD

*EX

NOTE !!!!!

This version of the ACCRT RT-program has addresses for the F-version of SINTRAN. To run it under the E-version the following changes should be made after loading ACCRT to segment 32:

@LOOK

- 100351/ 13473 % OLD 13552
- 100353/ 13467 % OLD 13553
- 100557/ 13467 % OLD 13553
- 100560/ 13503 % OLD 13567

PRODUCT	NAME	ND-NUMBER
	SINTRAN-III ACCOUNTING SYSTEM	10315B
ISSUED	DATE 81.09.21	BY (INITIALS) MJH
REASON	X ERROR CORRECTION	. DIFFERENT ENVIRONMENT
	X CHANGE/ADDITION
FILES	PROG.NUMB. NAME	
CHANGED	203073B ACC-SERV-PROG	
OR NEW	203074B ACCRT	
FILES		

CHANGES

ACC-SERV-PROG:

- 1) The program now works correcetly on 32 and 48 bit floating point arithmetic machines.
- 2) SIN-540 no longer applies to this version.
- 3) In the commands DUMP-AND-ACCUMULATE and PRINT-ACCUMULATED-ACCOUNT the question SHORT-ACCUMULATION has been replaced by the question SHORT-LISTING.
- 4) Minoer errors corrected.

ACCRT:

- 1) This version is for the F-version of SINTRAN.
- 2) Minor errors corrected.

3. ACCOUNTING SECTION OF THE SYSTEM SUPERVISOR MANUAL

3.4. THE ACCOUNTING SYSTEM

This system provides the facility to account for usage of certain of the computer system's resources. Options can be chosen when your SINTRAN III is generated to permit accounting of:

- 1) Cpu time used for background users, RT-programs and ND-500 users.
- 2) Connect time for background users accessing a NORD-10, ND-100 or ND-500.
- 3) Block IO transfers through the file system (1K pages written to or read from files on disk).
- 4) Number of pages printed on printers to which output is spooled using the ND Spooling System.

The accounting system consists of (i) pointers, flags and tables within SINTRAN (ii) SINTRAN commands (iii) files belonging to user SYSTEM (iv) an RT-program to provide RT-accounting (option) and (v) a service program to manage the accounting files and to produce reports from the accounting data collected.

It is user the system supervisor's responsibility to supervise the accounting system. (In the following information references to RT-accounting can be ignored if your SINTRAN has not been generated with RT-accounting.) The following files must be created:

ACCOUNTS:DATA. This is an indexed file; its structure and contents are given in TABLE III.

PROJNAM:DATA. This is an indexed file; its structure and contents are given in table I.

RTPROJ:DATA. This is an indexed file; its structure and contents are given in table II.

Once these files have been created they should be given the access specified in the tables. Using the ACCOUNTS-SERVICE-PROGRAM, desired combinations of PROJECT NAME / PROJECT PASSWORD should be entered into PROJNAM:DATA and desired combinations of RT-PROGRAM NAME / PROJECT NAME should be entered into RTPROJ:DATA. The supervisor should notify users of their PROJECT-NAMES and PROJECT-PASSWORDS.

Accounting should be initialised with the SINTRAN command \$INIT-ACCOUNTING. After initialisation accounting should be controlled by \$START-ACCOUNTING (preferably in the LOAD MODE file) and \$STOP-ACCOUNTING.

The accounting data accumulated in ACCOUNTS:DATA should be periodically dumped to the file AACCOUNTS:DATA using the ACCOUNTING-SERVICE-PROGRAM, which will create this file and the file AACCOUNTS:ISAM. The ACCOUNTING-SERVICE-PROGRAM can be used to maintain the accounting file and also to produce accounting reports.

TABLE I: THE FILE PROJNAM:DATA

This contains the legal combinations of PROJECT PASSWORD and PROJECT NAME and should have access:

PUBLIC : NONE
 FRIEND : NONE
 OWNER : READ,WRITE,APPEND,COMMON,DIRECTORY

Format of PROJNAM:DATA file:

Block size : 16 words (Decimal; all words are 16 bit)
 Block 0 : word 1 (first word) : index of last block in file.
 (=0 if file is empty)
 Block n : words 1-8 PROJECT-PASSWORD
 words 9-16 PROJECT-NAME

Project password and project name are both ASCII character strings with unfilled character positions containing spaces (ASCII 40 Octal). The are not terminated by apostrophes.

TABLE II: The file RTPROJ:DATA

Each user RT-program can be associated with a PROJECT NAME. The RT-PROGRAM NAME / PROJECT NAME pairs are stored in this file. It should have access:

PUBLIC : NONE
 FRIEND : READ
 OWNER : READ,WRITE,APPEND,COMMON,DIRECTORY

This file is maintained by the ACCOUNTING-SERVICE-PROGRAM.

Format of RTPROJ:DATA file:

Block size : 12 words (decimal)
 Block 0 : word 1 (first word) : index of last block in file.
 Block n : words 1-4 RT-PROGRAM NAME (Upper case; no parity set)
 words 5-12 PROJECT-NAME

RT-program name and project name are both ASCII character strings with unfilled character positions containing ASCII spaces (ASCII 40 Octal). The are not terminated by apostrophes.

TABLE III : STRUCTURE AND CONTENTS OF ACCOUNTS:DATA

Block size : 28 words (decimal)
 Block 0 : word 1 - No. of records on the file.
 word 2 - desired No. of accounts.
 word 3 - maximum No. of accounts.

```

.....
" Block n :      Format of entries                               "
" .....
" WORD :   BACKGROUND :      RT      : SPOOLING      " ND-500      "
" -----
" 0  : USER NAME      : RT-PROGRAM : USER NAME  " USER NAME  "
" 1  :      "          :      NAME    :      "      "      "
" 2  :      "          :      "      :      "      "      "
" 3  :      "          :      "      :      "      "      "
" 4  :      "          :      "      :      "      "      "
" 5  :      "          :      "      :      "      "      "
" 6  :      "          :      "      :      "      "      "
" 7  :      "          :      "      :      "      "      "
" 10 : 0 (BACKGROUND) : 1 (RT)    : 2 (SPOOLING) " 3 (ND-500)  "
" 11 : LOGOUT TIME   : DUMP TIME : PRINT TIME   " LOGOUT TIME "
" 12 :      "        :      "    :      "       "      "
" 13 : TERMINAL TIME : 0         : 0           " TERMINAL   "
" 14 :      "        : 0         : 0           " TIME       "
" 15 : TERMINAL No.  : 0         : SPOOL DEV No. " 0          "
" 16 : TIME USED     : TIME USED  : No. OF PAGES " ND-500 CPU "
" 17 :      "        :      "    : PRINTED.    " TIME USED  "
" 20 : PROJECT NAME  : PROJECT NAME : PROJECT NAME " PROJECT NAME "
" 21 :      "        :      "    :      "      "      "
" 22 :      "        :      "    :      "      "      "
" 23 :      "        :      "    :      "      "      "
" 24 :      "        :      "    :      "      "      "
" 25 :      "        :      "    :      "      "      "
" 26 :      "        :      "    :      "      "      "
" 27 :      "        :      "    :      "      "      "
" 30 : BLOCK IO      : BLOCK IO   : 0           " 0          "
" 31 : TRANSFERS    : TRANSFERS  : 0           " 0          "
.....
    
```

FORMAT OF THESE ENTRIES

BLOCK IO TRANS. The number of pages read from or written to disk files in the file system. This is not necessarily the same as the number of pages read and written from a user's program.

DUMP TIME This contains the time and date when the RT system usage data were dumped to the file by the ACCRT program. All times and dates are packed by SINTRAN packs them, ie. year, month, day, hour, minute and

<Dump-interval> is the number of seconds (decimal) between dumps of the RT-accounting-table on the file ACCOUNTS:DATA.

To start RT-accounting system, the RT-program ACCRT must have been loaded.

<ND-500> is asked, if and only if, there is an ND-500 in your system.

`§STOP-ACCOUNTING <Background>[,<RT>][,<ND-500>]`

The answers are YES or NO.

`§INIT-ACCOUNTING <desired number of accounts>,
<maximum number of accounts>,
<background>[,<RT>,<clearing logged information>,
<logging interval>][,<ND-500>]`

This command initializes the file ACCOUNTS:DATA, creating it if it does not exist. The number of accounts before warning and the maximum number of accounts may be specified. Default values are 500 and 600 respectively. The command then continues in the same way as the START-ACCOUNTING command.

INIT-ACCOUNTING resets the ACCOUNTS:DATA file and should only be used the first time the ACCOUNTING is started. If other values for DESIRED... and MAXIMUM... are required later, the command DUMP-AND-ACCUMULATE in the ACCOUNTING-SERVICE-PROGRAM should be used and the ACCOUNTS:DATA file contents will not be lost.

When background accounting is running the command processor will ask for the PROJECT PASSWORD when a user tries to log in. The user answer is read with no-echo and checked against legal values. If the password is correct, the PROJECT NAME is printed on the terminal, if it is incorrect the question is repeated. After three unsuccessful attempts to give a valid PROJECT PASSWORD the LOGOUT command is automatically executed.

If there are no entries in the PROJNAM:DATA file log in will be as if background accounting were not running.

RT accounting is started by the command START-ACCOUNTING and the CPU time used by those programs specified as parameters to the command START-RT-ACCOUNT is accumulated.

`§START-RT-ACCOUNTING <RT-program-name>`

The parameter <RT-program-name> is checked against names in the file RTPROJ:DATA and if a match is found the program is flagged in the RT-accounting-table. The RT-ACCOUNTING may be started for user RT-programs only.

RT-description address is used as index in the tables ACCTAB and IOACCTAB and if the RT-program is reloaded using another RT-description it is necessary to STOP-RT-ACCOUNT for this program (before reloading) and START-RT-ACCOUNTING after reloading the program.

`$STOP-RT-ACCOUNTING <RT-program-name>`

RT-ACCOUNTING is stopped for the specified RT-program.

`$LIST-RT-ACCOUNT`

The names of all RT-programs being logged will be listed on the terminal with the PROJECT-NAME and the time used since last dump of the RT-accounting-table

3.6. ACCRT Program

This program dumps the RT-program accounting-tables on the file ACCOUNTS:DATA. It is delivered on diskette as ACCRT:BPUN and loaded onto segment 32 using the READ-BINARY command in the RT-LOADER, i.e.

```
$RT-LOADER
*READ-BINARY ACCRT:BPUN 32
*YES
*END-LOAD
*EXIT
```

ACCRT is started by commands `$START-ACCOUNTING` or `$INIT-ACCOUNTING` and stopped by the command `$STOP-ACCOUNTING`.

3.7. THE ACCOUNTING-SERVICE-PROGRAM

This program should be loaded according to the PD-sheets delivered with the diskettes.

3.7.1. ESSENTIAL PRECAUTION

The ACCOUNTING-SERVICE-PROGRAM makes use of ND ISAM to store accounting records. There is always a possibility that an error will leave the ISAM files (in this case AACCOUNTS:DATA and AACCOUNTS:ISAM) in an inconsistent state. It is essential to take adequate back up of these files before using the ACCOUNTING-SERVICE-PROGRAM if any of the following commands are to be used:

```
DUMP-AND-ACCUMULATE
DELETE-ACCUMULATED-USER
DELETE-ACCUMULATED-PROJECT
```

3.7.2. COMMANDS

These are indicated by a leading asterisk in the body of the text.

```
HELP
EXIT
```

RESET-BACKGROUND-PROJECT-TABLE
CREATE-BACKGROUND-PROJECT
DELETE-BACKGROUND-PROJECT
LIST-BACKGROUND-PROJECTS
RESET-RT-PROJECT-TABLE
CREATE-RT-PROJECT
DELETE-RT-PROJECT
LIST-RT-PROJECTS
DUMP-AND-ACCUMULATE
LOOK-ACCUMULATED
DELETE-ACCUMULATED-PROJECT
DELETE-ACCUMULATED-USER
PRINT-ACCUMULATED-ACCOUNTS

***HELP**

Lists all available commands on the terminal.

***EXIT**

Stops the ACCOUNTING-SERVICE program. The time used is printed by the program on the TERMINAL.

***RESET-BACKGROUND-PROJECT-TABLE**

The word giving the number of records written onto the file PROJNAM:DATA, is set to zero.

***CREATE-BACKGROUND-PROJECT <project-password>, <project-name>**

Specifies PROJECT-PASSWORDS and their corresponding PROJECT-NAMES. The entries are stored as records in the file PROJNAM:DATA which is read during the LOG IN routine when ACCOUNTING is on. A PROJECT-PASSWORD not in this file will not be accepted during LOG IN. The PROJECT-PASSWORD must be unique. If there are no entries on the file users will be able to LOG IN as if accounting is not running.

***DELETE-BACKGROUND-PROJECT <project-name>**

Deletes entries from the PROJNAM:DATA file. Background projects should not be deleted whilst background accounting is running.

***LIST-BACKGROUND-PROJECTS <outputfile>**

Lists PROJECT-PASSWORDS and their corresponding PROJECT-NAMES from entries on the PROJNAM:DATA file.

***RESET-RT-PROJECT-TABLE <rt-program-name>, <rt-project-name>**

The word giving the number of entries in the file RTPROJ:DATA is set to zero.

***CREATE-RT-PROJECT <rt-program-name>, <rt-project-name>**

Associates an RT-PROGRAM-NAME with a PROJECT-NAME. Specified entries are stored on the file RTPROJ:DATA and used when START-RT-ACCOUNTING is specified. An RT-program name can only occur once in the file. Only USER RT-programs (not SYSTEM RT-PROGRAMS) can be

accounted; there is no check in the ACCOUNTING-SERVICE program but there is in SINTRAN.

***DELETE-RT-PROJECT <rt-program-name>**

Deletes entries from the RTPROJ:DATA file. RT-projects should not be deleted whilst RT-accounting is running.

***LIST-RT-PROJECT**

Lists the entries in the file RTPROJ:DATA; i.e. RT-program and their corresponding RT-PROJECT-NAMES.

***DUMP-AND-ACCUMULATE**

This command accumulates the data contained in the file ACCOUNTS:DATA for each project name and each user name (RT-program name) and writes it to the file AACCOUNTS:DATA as the INTERMEDIATE values (see table IV) in each record for each project and each user. These totals are also added to ACCUMULATED totals in these records. Thus the intermediate values contain the resource usage between the last and preceding DUMP-AND-ACCUMULATE command for each project and each user name. The accumulated values contain the total resource utilisation to the last DUMP-AND-ACCUMULATE command. The values in the table of accounts by user name/project name given by this command are those from the intermediate entries. An optional log can be produced from the data in ACCOUNTS:DATA.

The command asks the following questions:

RESET ACCOUNTING FILE	: <yes/no>
DO YOU WANT A LOG	: <yes/no>
DO YOU WANT ACCOUNTING BY USER NAME	: <yes/no>
DO YOU WANT ACCOUNTING BY PROJECT NAME	: <yes/no>
DO YOU WANT A SHORT LISTING	: <yes/no>
OUTPUT FILE (DEFAULT IS LINE-PRINTER)	: <file name>
LINES PER PAGE (DEFAULT IS 55)	: <No. of lines>

RESET ACCOUNTING FILE

If this is answered YES following questions are asked:

1. Required number of accounts before warning: <No. of accounts>
 2. Maximum number of accounts : <No. of accounts>
- Default values for these parameters are 500 and 600 respectively.

When the ACCOUNTS:DATA file is reset, the first three words are given the values zero and the answers specified in questions 1. & 2. The zero is the number of accounts currently in the file.

When the warning limit is reached the error-message "APPROACHING END OF ACCOUNTING FILE" is given on the terminal on each logout whilst accounting is running. When the maximum number of accounts is reached the message "END OF ACCOUNTING FILE ENCOUNTERED" is written on the terminal at each logout.

With this command the accounting file can be expanded while the accounting is running, even after a warning error-message.

ACCOUNTING LOG

This prints number of one line entries derived from the data in ACCOUNTS:DATA on the output file. The USER NAME (or RT-PROGRAM NAME), PROJECT NAME, terminal number (if applicable), connect time, cpu time used, number of spooling pages printed, number of block I/O transfers through the file system, log in time and date, and logout time and date are listed on each line. The order is in increasing logout time and date.

ACCOUNTING BY USER/PROJECT NAME

These can be produced for USER (RT-PROGRAM) NAME, PROJECT NAME or both. For each USER NAME a table is produced showing the total usage by this user and sub-totals by project name. The accumulated data are for console time, cpu time, number of pages printed and block IO transfers. The magnitude of the usage and its percentage of the whole are given. Similar tables are produced for the accounts by PROJECT NAME but with sorting on the project name as the primary key and sub-totalling on the user name.

SHORT LISTING

This gives accounting by user / project name but with no sub-totalling.

*LOOK-ACCUMULATED <user-name>/<project-name>

To look at a specific entry in the AACCOUNTS:DATA. Ie. accumulated accounts for a given user or project name.

*DELETE-ACCUMULATED-PROJECT <project-name> and

*DELETE-ACCUMULATED-USER <user-name>

Removes a specific PROJECT or USER from the file AACCOUNTS:DATA.

PRINT-ACCUMULATED-ACCOUNTS

This produces a listing of the accounts up to the last dump of the ACCOUNTS:DATA file sorted by the user name or project with or without sub-totalling as in the case of DUMP-AND-ACCUMULATE. The data is from the ACCUMULATED entries in the file AACCOUNTS:DATA and gives system useage up to the last DUMP-AND-ACCUMULATE command.

This asks the following questions:

DO YOU WANT ACCOUNTING BY USER NAME	:	<yes/no>
DO YOU WANT ACCOUNTING BY PROJECT NAME	:	<yes/no>
DO YOU WANT A SHORT LISTING	:	<yes/no>
OUTPUT FILE (DEFAULT IS LINE-PRINTER)	:	<file name>
LINES PER PAGE (DEFAULT IS 55)	:	<No. of lines>

These parameters have the same meaning as for DUMP-AND-ACCUMULATE.

TABLE IV : FORMAT OF RECORDS IN AACCOUNTS:DATA

Format of the ISAM records in the AACCOUNTS:DATA file.

Word	Type	Explanations
1 -8	CHARACTER*16	User Name or RT-PROGRAM name.
9 -16	CHARACTER*16	Project Name
17-18	DOUBLE INTEGER	Accumulated CPU time
19-20	DOUBLE INTEGER	Accumulated CONSOLE time
21-22	DOUBLE INTEGER	Accumulated number of page printed
23-24	DOUBLE INTEGER	Intermediate CPU time
25-26	DOUBLE INTEGER	Intermediate CONSOLE time
27-28	DOUBLE INTEGER	Intermediate number of page printed
29-30	DOUBLE INTEGER	Accumulated No. of block I/O transfers
31-32	DOUBLE INTEGER	Intermediate No. of block I/O transfers