

AAAAAA	CCCCCCCC	CCCCCCCC	DDDDDDDD	EEEEEEEEEE	FFFFFFFFFF	
AAAAAA	CCCCCCCC	CCCCCCCC	DDDDDDDD	EEEEEEEEEE	FFFFFFFFFF	
AA AA	CC	CC	DD DD	EE	FF	
AA AA	CC	CC	DD DD	EE	FF	
AA AA	CC	CC	DD DD	EE	FF	
AA AA	CC	CC	DD DD	EE	FF	
AA AA	CC	CC	DD DD	EEEEEEEE	FFFFFFFF	
AA AA	CC	CC	DD DD	EEEEEEEE	FFFFFFFF	
AAAAAAAAAA	CC	CC	DD DD	EE	FF	
AAAAAAAAAA	CC	CC	DD DD	EE	FF	
AA AA	CC	CC	DD DD	EE	FF
AA AA	CC	CC	DD DD	EE	FF
AA AA	CCCCCCCC	CCCCCCCC	DDDDDDDD	EEEEEEEEEE	FFFFFFFF
AA AA	CCCCCCCC	CCCCCCCC	DDDDDDDD	EEEEEEEEEE	FFFFFFFF

RRRRRRRR	EEEEEEEEEE	QQQQQQ
RRRRRRRR	EEEEEEEEEE	QQQQQQ
RR RR	EE	QQ QQ
RR RR	EE	QQ QQ
RR RR	EE	QQ QQ
RR RR	EE	QQ QQ
RRRRRRRR	EEEEEEEE	QQ QQ
RRRRRRRR	EEEEEEEE	QQ QQ
RR RR	EE	QQ QQ QQ
RR RR	EE	QQ QQ QQ
RR RR	EE	QQ QQ QQ
RR RR	EE	QQ QQ
RR RR	EEEEEEEEEE	QQQQ QQ
RR RR	EEEEEEEEEE	QQQQ QQ

MODULE ACCDEF(IDENT = 'V04-000') =

```

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```

++
FACILITY: ACC, Account file dumper

ABSTRACT:
This file contains definitions of general applicability to the accounting facility

ENVIRONMENT:
VAX/VMS operating system. unprivileged user mode,

AUTHOR: Greg Robert and Steve Forgey, January 1982

Modified by:

V03-002 TMH0002 Tim Halvorsen 14-Apr-1984
Remove MOVE_QUAD macro, which now exists in UTILDEF.

V03-001 DAS0001 David Solomon 03-Jan-1984
Remove two unused shared message definitions (CREATED and EXISTS). Change declaration of message codes from ACC to ACCS_.
Add literal for summation table index. Add ACCS_INVACCREC.
Allow error code LIBS_INPSTRTRU on call to SCR\$GET_SCREEN in GET_REPLY macro.

PROGRAM CONTROL

SWITCHES

ADDRESSING_MODE(
EXTERNAL=GENERAL,
NONEXTERNAL=WORD_RELATIVE);

PSECT

CODE= CODE,
PLIT= CODE,
OWN= DATA(ADDRESSING_MODE(LONG_RELATIVE)),
GLOBAL= DATA;

INCLUDE FILES

LIBRARY 'SYSSLIBRARY:STARLET'; ! VAX/VMS common definitions
REQUIRE 'SHRLIBS:UTILDEF'; ! Common VMS/DEVELOPMENT macros
LIBRARY 'SYSSLIBRARY:TPAMAC'; ! TPARSE macros

```

-----
DEFINE EXTERNAL REFERENCES
-----

```

EXTERNAL LITERAL

```

ACCS_INVACCREC,      ! Invalid accounting record format
ACCS_TOTAL,          ! Totals selected/rejected message
ACCS_MERGE,          ! 'Merge phase beginning' message
ACCS_INPUT,          ! File name/number message
ACCS_TITLETRUNC:    ! Title truncation warning

```

EXTERNAL ROUTINE

```

ADD_SYMBOL,          ! Add a symbol to a symbol table
ALLOCATE,            ! Gets virtual memory
FIND_WATERMARK,      ! Determine high watermarks
HANDLER,             ! Local signal processor
LIB$ADDX,            ! Extended binary addition
LIB$CVT_DTB,         ! Converts decimal to binary
LIB$CVT_HTB,         ! Converts hex to binary
LIB$CVT_TIME,        ! Converts ascii to binary time
LIB$DAY,             ! Gets days since epoch
LIB$FILE_SCAN,       ! Does wildcarding and stickiness
LIB$ICHR,            ! Converts character to integer
LIB$LOOKUP_KEY,      ! Searches keyword lists
LIB$SUBX,            ! Extended precision subtract
LIB$SYS_ASCTIM,      ! Converts binary time to ascii
LIB$SYS_FAO,         ! Formatted ascii output
LIB$SYS_FAOL,        ! Library FAO routine
LIB$TPARSE,          ! Library parse routine
LOG_FILENAME,        ! Signals filenames and error messages
LOOKUP_SYMBOL,       ! Lookup a symbol in a symbol table
MAP_QUALIFIERS,      ! Establish qualifier maps
PARSE_OUTPUT_FILES, ! Sets up output fabs, rabs
RELEASE_TO_SORT,     ! Build keys and release to sort
SCAN_SYMBOLS,        ! Call action routine for every symbol
SHOW_RECORD,         ! Dispatch to output routines
SOR$END_SORT,        ! Clean up files etc.
SOR$INIT_SORT,       ! Initialize sort routines
SOR$RELEASE_REC,     ! SORT32 record interface routine
SOR$RETURN_REC,      ! Fetch a sorted record
SOR$SORT_MERGE,      ! Initiate merge processing
STR$APPEND,          ! Appends strings
STR$COMPARE,         ! Compares two strings
STR$DUPL_CHAR,       ! Generates a string
STR$LEFT,            ! Extract left justified substring
STR$PREFIX,          ! Prefix strings
STR$REPLACE,         ! Replaces substrings
STR$RIGHT,           ! Strips leading strings
STRIP_NEGATOR,       ! Check/strip leading negator
STRIP_TRAIL,         ! Strip trailing garbage
SUMMARIZE,           ! Summation main control loop

```

SYSSNUMTIM,
TRANSLATE_STATUS,
WRITE_BAR_GRAPH,
WRITE_BINARY,
WRITE_SUMMARY,
WRITE_TOTALS;

: Converts times
: Looks up status messages
: Output bar graph
: Output a binary record
: Output summary at end of file
: Output totals at end of program

.....

```

-----
DEFINE INTERNAL MACROS
-----

```

MACRO

COMPARE QUADWORD VALUES--

Macro to compare two quadword values using the user supplied operator. This macro is somewhat inefficient if the supplied operator is EQL or NEQL since the expansion becomes (in part):

```
IF Q1 EQL Q2 THEN IF Q1 EQL Q2 THEN TRUE ELSE FALSE
```

However the compiler may remove this inefficiency through optimization. This macro works better for values that are close to one another as it does the equality check of the high order words first. This macro could be improved by inspecting the supplied operator and generating a tailored macro.

```
COMPARE_QUAD (Q1, OPER, Q2) =
```

```
BEGIN
```

```
BIND A = Q1: VECTOR [2, LONG];
```

```
BIND B = Q2: VECTOR [2, LONG];
```

```
IF .A[1] EQL .B[1] THEN .A[0] OPER .B[0] ELSE .A[1] OPER .B[1]
END%
```

- A) Macro to describe a string
- B) Macro to generate a quadword string descriptor
- C) Macro to generate the address of a string descriptor
- D) Macro to abbreviate last macro

```
PRIMDESC [] = %CHARCOUNT (%STRING (%REMAINING)),
              UPLIT (%STRING (%REMAINING))%,
```

```
INITDESC [] = BBLOCK [DSC$C S BLN]
              INITIAL (PRIMDESC (%REMAINING))%,
```

```
ADDRDESC [] = UPLIT (PRIMDESC (%REMAINING))%,
```

```
AD [] = ADDRDESC (%REMAINING)%,
```

FIELD REFERENCE MACROS --

Define macros to reference fields.

```
KEY_W_TYPE      = 0,0,16,0%,   ! Sort key type
KEY_W_ORDER     = 2,0,16,0%,   ! Sort order
KEY_W_POS       = 4,0,16,0%,   ! Item position
KEY_W_LENGTH    = 6,0,16,0%,   ! Key length
```

```

SORT_TYPE      = 0,0,16,0%,    ! Sort key type (binary/char etc)
SORT_DESC      = 1,0,32,0%,    ! Address of item descriptor
SORT_LENGTH    = 2,0,16,0%,    ! Max. length of item in bytes

```

```

! SIGNAL_RETURN --
! Signal the given arguments and then return the first parameter.

```

```

Signal_return (status) [] =
  BEGIN
  signal (status, %remaining);
  return (status);
  END%,

```

```

! PERFORM MACRO --
! This renames the RETURN_IF_ERROR macro to be the PERFORM macro.

```

```

PERFORM (COMMAND) = RETURN_IF_ERROR (COMMAND)%,      ! *** HACK

```

```

! EXPAND FAO STRING
! Expand an FAO directive and yeild the address of a descriptor
! of the resultant buffer.

```

```

XFAO (DESC) =
  BEGIN
  EXTERNAL ROUTINE LIB$SYS_FAO: ADDRESSING_MODE (GENERAL);
  LOCAL  $$buffer:      vector [512, byte];
  LOCAL  $$buffdesc:   vector [2, long];

  $$buffdesc [0] = 512;      ! Initialize descriptor length
  $$buffdesc [1] = $$buffer; ! Initialize descriptor address

  signal_if_error (lib$sys_fao (
    desc,                ! Control string address
    $$buffdesc [0],      ! Resultant length
    $$buffdesc           ! Buffer descriptor
  %IF %LENGTH GTR 1 %THEN , %REMAINING %FI
  ));
  $$buffdesc
  END%,

```



```

XFAOL (DESC, LIST) =
    BEGIN
    EXTERNAL ROUTINE LIB$SYS_FAOL: ADDRESSING_MODE (GENERAL);
    LOCAL $$buffer: vector [512, byte];
    LOCAL $$buffdesc: vector [2, long];

    $$buffdesc [0] = 512;           ! Initialize descriptor length
    $$buffdesc [1] = $$buffer;     ! Initialize descriptor address

    signal_if_error (lib$sys_faol (
        desc,                       ! Control string address
        $$buffdesc [0],             ! Resultant length
        $$buffdesc,                 ! Buffer descriptor
        list                         ! Argument list
    ));
    $$buffdesc
    ENDX,

```

```

: CLI PARSING MACROS --
: Determine if a command line entity is present or get its value

```

```

GET_PRESENT (DESC) =
    BEGIN
    EXTERNAL ROUTINE CLIP$PRESENT: ADDRESSING_MODE (GENERAL);
    CLIP$PRESENT (DESC)
    ENDX,

PRESENT (QUAL_NUMB) =
    BEGIN
    EXTERNAL QUALIFIERS: BITVECTOR [64];
    .QUALIFIERS [QUAL_NUMB]
    ENDX,

GET_VALUE (STRING, DESC) =
    BEGIN
    EXTERNAL ROUTINE CLIP$GET_VALUE: ADDRESSING_MODE (GENERAL);
    CLIP$GET_VALUE (AD (STRING), DESC)
    ENDX,

```

```

: ATTRIBUTE DEFINITIONS

```

```

BOLD           = SCRSM_BOLD%,
REVERSE        = SCRSM_REVERSE%,
BLINK          = SCRSM_BLINK%,
UNDERLINE      = SCRSM_UNDERLINE%,

```

```

:SET OUTPUT MACRO --
:   This macro establishes an output stream through the screen package.
:

```

```

SET_OUTPUT (STREAM, FILENAME, USERSUB, ARGUMENT, PREVIOUS) =
BEGIN
EXTERNAL ROUTINE SCR$SET_OUTPUT: ADDRESSING_MODE (GENERAL);
SIGNAL_IF_ERROR (SCR$SET_OUTPUT (
  %IF %NULL (STREAM)      %THEN 1 %ELSE STREAM %FI,
  %IF %NULL (FILENAME)    %THEN 0 %ELSE FILENAME %FI,
  %IF %NULL (USERSUB)     %THEN 0 %ELSE USERSUB %FI,
  %IF %NULL (ARGUMENT)    %THEN 0 %ELSE ARGUMENT %FI,
  %IF %NULL (PREVIOUS)    %THEN 0 %ELSE PREVIOUS %FI
));
END%,

```

```

:SCREEN MACRO --
:   This macro invokes the screen package to determine output
:   characteristics.
:

```

```

SCREEN_INFO (BUFFER) =
BEGIN
EXTERNAL ROUTINE SCR$SCREEN_INFO: ADDRESSING_MODE (GENERAL);
SIGNAL_IF_ERROR (SCR$SCREEN_INFO (BUFFER));
END%,

```

```

SCREEN (ARG) =
BEGIN
EXTERNAL SCREEN_CHAR: BBLOCK [SCR$K_LENGTH];
SCREEN_CHAR [
  %IF %IDENTICAL (ARG, FLAGS)      %THEN SCR$L_FLAGS %FI
  %IF %IDENTICAL (ARG, WIDTH)      %THEN SCR$W_WIDTH %FI
  %IF %IDENTICAL (ARG, LENGTH)     %THEN SCR$W_PAGESIZE %FI
  %IF %IDENTICAL (ARG, TYPE)       %THEN SCR$B_DEVTYPE %FI
] END%,

```

```

:SET CURSOR --
:

```

```

SET_CURSOR (LINE, COLUMN) =
BEGIN
EXTERNAL ROUTINE SCR$SET_CURSOR: ADDRESSING_MODE (GENERAL);
SIGNAL_IF_ERROR (SCR$SET_CURSOR (LINE, COLUMN))
END%,

```

```

:SET SCROLL --
:

```

```
! Establish a scrolling region
!
SET_SCROLL (TOP, BOTTOM) =
  BEGIN
  EXTERNAL ROUTINE SCR$SET_SCROLL: ADDRESSING_MODE (GENERAL);
  SIGNAL_IF_ERROR (SCR$SET_SCROLL (
    TOP
    %IF %LENGTH GTR 1 %THEN , %FI
    BOTTOM))
  END%,

! ERASE SCREEN --
!
ERASE_PAGE (LINE, COLUMN) =
  BEGIN
  EXTERNAL ROUTINE SCR$ERASE_PAGE: ADDRESSING_MODE (GENERAL);
  SIGNAL_IF_ERROR (SCR$ERASE_PAGE (
    %IF %NULL (LINE) %THEN 1 %ELSE LINE %FI,
    %IF %NULL (COLUMN) %THEN 1 %ELSE COLUMN %FI
    ))
  END%,

! ERASE LINE--
!
ERASE_LINE (LINE, COLUMN) =
  BEGIN
  EXTERNAL ROUTINE SCR$ERASE_LINE: ADDRESSING_MODE (GENERAL);
  SIGNAL_IF_ERROR (SCR$ERASE_LINE (LINE, COLUMN))
  END%,

! WRITE TO SCREEN --
! Output a string to the screen with associated attributes at
! indicated cursor position. Do not append carriage control.
!
WRITE_AT (DESC, LINE, COLUMN, ATTR) =
  BEGIN
  EXTERNAL ROUTINE SCR$PUT_SCREEN: ADDRESSING_MODE (GENERAL);
  SIGNAL_IF_ERROR (SCR$PUT_SCREEN (
    DESC,
    LINE,
    COLUMN,
    %IF %NULL (ATTR) %THEN 0 %ELSE ATTR %FI
    ))
```

END%.

WRITE LINE TO SCREEN --

Output a string to the screen with associated attributes,
scroll the indicated number of LINES, and append a carriage return.

WRITE_LINE (DESC, LINES, ATTR) =

```
BEGIN
EXTERNAL ROUTINE SCR$PUT_LINE: ADDRESSING_MODE (GENERAL);
SIGNAL_IF_ERROR (SCR$PUT_LINE (
DESC,
%IF %NULL (LINES) %THEN 1 %ELSE LINES %FI,
%IF %NULL (ATTR) %THEN 0 %ELSE ATTR %FI
))
```

END%.

WRITE FAO STRING TO SCREEN --

Write a STRING to the screen at the given line and
column with no attributers after first processing it
through FAO.

WRITE_FAO_AT (DESC, LINE, COLUMN) =

```
WRITE_AT (
XFAO (DESC
%IF %LENGTH GTR 3 %THEN , %REMAINING %FI
),
LINE,
COLUMN,
0)%.
```

GET INPUT

GET_REPLY (REPLY, PROMPT, LENGTH) =

```
BEGIN
EXTERNAL ROUTINE SCR$GET_SCREEN: ADDRESSING_MODE (GENERAL);
EXTERNAL LITERAL
LIB$ _INPSTRTRU;
```

```
LOCAL
STATUS;
```

```
%IF %NULL (REPLY) %THEN
LOCAL $$TEMP,
$$TEMPDESC: VECTOR [2];
$$TEMPDESC [0] = 4;
$$TEMPDESC [1] = $$TEMP;
```

```

%FI
STATUS = SCR$GET_SCREEN (
    %IF %NULC (REPLY) %THEN $$TEMPDESC %ELSE REPLY %FI,
    PROMPT,
    LENGTH);
IF NOT .STATUS AND ( .STATUS NEQU LIB$_INPSTRTRU )
THEN
    BEGIN
        SIGNAL( .STATUS );
        RETURN .STATUS;
    END;
END%.

```

```

: SET AND FLUSH BUFFER
:

```

```

SET_BUFFER (BUFFER) =
    BEGIN
        EXTERNAL ROUTINE SCR$SET_BUFFER: ADDRESSING_MODE (GENERAL);
        SIGNAL_IF_ERROR (SCR$SET_BUFFER (BUFFER))
    END%.

```

```

PUT_BUFFER (BUFFER) =
    BEGIN
        EXTERNAL ROUTINE SCR$PUT_BUFFER: ADDRESSING_MODE (GENERAL);
        SIGNAL_IF_ERROR (SCR$PUT_BUFFER (BUFFER))
    END%.

```

```

: LOOKUP MACRO --
: This macro invokes lib$lookup_key and, if the lookup fails,
: signals the user with the status and the failed value and
: returns to the caller.
:

```

```

LOOKUP (KEY, TABLE, RESULT) =
    BEGIN
        EXTERNAL ROUTINE LIB$LOOKUP_KEY: ADDRESSING_MODE (GENERAL);
        LOCAL STATUS;
        IF NOT (STATUS = LIB$LOOKUP_KEY (KEY, TABLE, RESULT))
        THEN SIGNAL_RETURN (MSG$_SYNTAX, 1, KEY);
    END;%

```

```

: THIS RENAMES THE $BYTEOFFSET MACRO TO BE $BOFF FOR BREVITY
:

```

```

$BOFF (arg) = $BYTEOFFSET (arg)%;      ! Make a shorter name

```

DEFINE INTERNAL STRUCTURES

DEFINE MESSAGE CODES

\$SHR_MESSAGES (MSG,159,

! COMMON I/O AND MISC. MESSAGES

***** * NAME * *****	***** * SEVERITY * *****	***** * DESCRIPTION * *****
(SEARCHFAIL,	ERROR),	-Error while searching for file
(OPENIN,	ERROR),	-Unable to open or connect to input
(READERR,	ERROR),	-Error while reading input
(CLOSEIN,	ERROR),	-Unable to close output
(OPENOUT,	ERROR),	-Unable to create, open, or connect to output
(WRITEERR,	ERROR),	-Error while writing output
(CLOSEOUT,	ERROR),	-Unable to close output
(SYNTAX,	SEVERE),	-Parse failure
);		

```

-----
EQUATED SYMBOLS
-----

```

LITERAL

: FLAGS AND MISCELLANEOUS VALUES --

```

COLUMNS_PER_GROUP = 15,      ! Bar graph column grouping factor
REC_PREFIX         = 8,       ! Size of data prefixed to record
ACCSK_UNKNOWN     = 0,       ! Reserve the value 0 for unknown types
NEGATOR           = '-',     ! Define list negator character

```

: QUALIFIER NUMBERS

```

Define local bitnumbers for qualifers (also used as symbol table index
numbers for summation).

```

```

ACCOUNT           = 00,
BAR_GRAPH         = 01,
BEFORE           = 02,
BINARY           = 03,
USER             = 04,
ENTRY           = 05,
FULL            = 06,
IDENT           = 07,
IMAGE           = 08,
JOB             = 09,
LOG            = 10,
ADDRESS         = 11,
NODE           = 12,
OWNER          = 13,
OUTPUT         = 14,
PRIORITY       = 15,
PROCESS        = 16,
QUEUE         = 17,
REJECTED      = 18,
REMOTE_ID     = 19,
REPORT        = 20,
SINCE        = 21,
STATUS       = 22,
SORT         = 23,
SUMMARY      = 24,
TERMINAL     = 25,
TITLE        = 26,
TYPE         = 27,
UIC          = 28,
QUAL_COUNT   = 29,
EXPAND_DATE  = 31,
UIC_GROUP    = 32,
UIC_MEMBER   = 33,

```

! See /REPORT parsing

SUMMATION_TABLE = 63, ! Must be different than above numbers.

SUMMATION TYPES --

These numbers describes the various summation rules for fields
in accounting records when /SUMMARY is invoked

SUM_TYPE_ADD	= 0,	! Simple longword addition
SUM_TYPE_ADDX	= 1,	! Extended longword addition
SUM_TYPE_PEAK	= 2,	! Longword peak value recording
SUM_TYPE_INCR	= 3,	! Increment per occurrence
SUM_TYPE_TYPE	= 4,	! Increment if type matches
SUM_TYPE_ELAP	= 5,	! Summarize connect time
SUM_ENT_TYPE	= 0,	! Type of summation entry
SUM_ENT_ADR	= 1,	! Address or other value
SUM_ENT_BSIZE	= 2,	! Accumulation bucket size in longwords
SUM_ENT_FAO	= 3,	! Address of FAO directive
SUM_ENT_HDR1	= 4,	! Address of 1st column header
SUM_ENT_HDR2	= 5,	! Address of 2nd column header

MAXIMUM TABLE SIZES --

Specify the maximum number of entries the user can make in qualifier
value lists for /SORT and /SUMMARIZE.

MAX_DEFAULT	= 30,	! Default maximum
MAX_SUM	= MAX_DEFAULT,	! Maximum number of /SUMMARY values
MAX_REPORT	= MAX_DEFAULT,	! Maximum number of /REPORT values
MAX_SORT	= 10;	! Sort keys -- sort package limit

