PART 5
_____ **LIBRARIAN**

The LIBRARIAN processor has an overlay structure where the segments are used to perform housekeeping operations on system and user discs.

LIBRARIAN'S most important functions are:

- print all DAD names of a disc and the number of cylinders not used
- copy a disc to another disc
- condense a disc so that all unused cylinders will be consecutive
- save the contents of a disc on magnetic tape
- add a new DAD name on a specified disc
- delete a DAD name from a specified disc
- add a new directory (Userid) in a specified DAD
- delete a directory in a specified DAD
- print all catalogued user disc files (except for those which are not allowed to be listed)
- dump, in hexadecimal format, a set of consecutive records of a specified user, object or load module file
- print a set of consecutive records of a specified user or source file in ASCII format
- keep a file
- convert a load module file to an object file
- print the directory of a specified object library file.

Once the user has prepared his input and output devices, he may call the LIBRARIAN functions by giving one of the commands described in Chapter 4 of this Part.

The syntax rules of the BCL processor apply also to LIBRARIAN commands.

Also part of the LIBRARIAN processor are commands handling magnetic tape and cassette, henceforth called magnetic tape. All these magnetic tape commands are grouped together in Chapter 3 for easy referencing.

Some LIBRARIAN commands permit the user to set or reset attribute flags indicating how a file may be used. They too are grouped together in Chapter 3.

All other commands are given in alphabetical order in Chapter 4.

The LIBRARIAN processor is called by the BCL command input from the device assigned to /E0 or /EE:

    LIB [DUMP={ALL | PROG | NO}][,SIZE={MAX | <n>}]

The parameter DUMP indicates whether a dump must be made after an abort or an exit (LKM 3):

    ALL Dump the monitor and background machine in case of an abort or if bit
         8 is set in register A7 for LKM 3.
    PROG Dump only the background machine
    NO   No dump required. Default = NO.

The parameter SIZE reserves a work area of n pages for LIBRARIAN. It is only useful when the parameter SIZE is not specified when the batch machine is declared.

    MAX The system will reserve 32k words (16 pages) of work area for
         LIBRARIAN.
    n   A number, ranging from 0 to 16, specifying the number of additional
         pages required as work area. Default = 0 pages.

Error messages:

    PARAM. NOT VALID   a)   the DUMP parameter is erroneous; or
                              b)   n > 16 after SIZE parameter.
    PROCESSOR NOT CATALOGUED
    DAD ASSIGN ERROR
    I/O ERROR ON DISK
    SEARCH DIRECT. NOT POSSIBLE

If the LIB command is accepted and /E0 is assigned to an interactive device such as console keyboard or display, the message:
    LIB:

is output to that device. The user may now input one or more of the commands described in Chapters 3 and 4.

If the LIB command is rejected, then:
-   If /E0 is assigned to an interactive device, an error message explaining
    the error is output on this device, followed by the message:
    LIB:

    requesting the user to enter the correct LIB command.

-   If /E0 is assigned to a non-interactive device (such as a card reader), an
    error message is output on the ERR device, followed by the message:
    LIB:

    requesting the user to input the correct command from the device assigned
    to ERR.
-   If /E0 is assigned to a non-interactive device and there is no ERR device
    defined for this Job, the error message is output to the device assigned to
    /02 and the LIBRARIAN processor exits. The BCP is reloaded and reads all
    subsequent commands on /E0 until one of the commands :EOJ, :EOB or :STP is
    encountered.
-   In some cases an erroneous input of command parameters may start the
    execution of the command. When the execution cannot be finished due to

these parameters, the Librarian will exit to the BCP. The user must then give a new command LIB.

When input as positional parameters, the parameters must appear in the order given in the command syntax. When input as keyword parameters, the parameters may be entered in any order. Positional and keyword parameters may be mixed.

SET/RESET FLAG COMMANDS

Every disc file has four attribute flags:

- invisible flag
- system flag
- write protect flag
- shared flag.

These flags have no relevance for foreground machine users.

Invisible Flag

If this flag is set, the file will only be shown on the listing produced by the PRD command if that command was given in a background :JOB with USID=SYSTEM or the same USID as the directory in which the file occurs.

System Flag

If this flag is set, any attempt to modify the file will be terminated unless the :JOB is SYSTEM. Only the owner can modify the flag.

Write Protect Flag

If this flag is set, the file cannot be modified unless the flag is reset by the owner of the file.

Shared Flag

If this flag is set, any attempt to assign a filecode to the file is refused, except for the owner of the file. If the flag is reset, any Userid may assign a filecode to this file.

The flags are contained in the directory entry for the file. They can be set and reset by the following Librarian commands:

COMMAND MNEMONIC	OPERATION	ATTRIBUTE FLAG
SSH	Set	Shared
RSH	Reset	Shared
SPF	Set	Write Protect
RPF	Reset	Write Protect
SSF	Set	System
RSF	Reset	System
SIF	Set	Invisible
RIF	Reset	Invisible

Only the owner of the file may use these commands (the DAD and USID for the :JOB must be the same as those for the file whose attribute flags are being modified), except when the file has the Shared flag already set.

Set puts the flag on. Reset puts the flag off. All flags are off when the file is created and catalogued, except the System flag which is set for all files in the system DAD.

The syntax for all the commands is:

    nnn FNAM=fn,TYPE={UF | OB | SC | LM}[,VERS=v][,USID=u][,DAD=d]

where:

nnn   Command mnemonic
fn   Filename. The file is contained in the :JOB USID directory in the :JOB
          DAD. If the filename is longer than 6 characters, only the first 6 are
          taken into account.
v   Version number of the file. <u>Default</u> = 0.
TYPE   File type
u   Userid containing the catalogued file. <u>Default</u> = :JOB USID.
d   DAD containing the userid <u>. <u>Default</u> = :JOB DAD.

Error Messages:

    INVALID FILE TYPE
    I/O ERROR
    DAD UNKNOWN
    UNKNOWN FILE NAME
    USERID UNKNOWN
    NOT RECOGNIZED ERROR
    PARAM USID/DAD NOT ALLOWED

    See also Appendix A.

```
 -----                                                              -----
| FBS |                  Space File Backward                       | FBS |
 -----                                                              -----
```

Syntax: FBS FCOD=fc[,NUMB=n]

Use:
Space the tape backwards across the previous tapemark (:EOF) or across a number
of tapemarks.

   fc   Filecode of the magnetic tape device.
   n   A number indicating how many tapemarks must be spaced backwards. The
         heads are then positioned after the last one encountered.
         Default: Space backward across the previous tapemark.

Error Messages:
   NO TAPEMARK ON M.T. BEGINNING OF TAPE IS FOUND
   I/O ERROR ON M.T. (FCOD...), STATUS=
         Meaning: 1)   Filecode is missing.
                   2)   Erroneous filecode.
                   3)   Filecode unknown. The filecode was not specified at
                        batch machine definition time with FCD commands.
                   4)   I/O error.

   FCOD=... is always the filecode as specified by the user in the command.

   STATUS = the STATUS as returned by LKM DATA 1.

See also Appendix A.

   Status Word

   Positive: The operation has been completed:
   1   EOF encountered (Read)
   2   EOS encountered (Read)
   4   Data fault
   8   Incorrect length
   /10 End of tape; request terminated correctly
   /20 Beginning of tape
   /40 End of tape is reached but the current record is read or written
   /80 The EOV mark is detected.

Negative:

Bit 1 = 0 Bits 2 through 15 indicate a hardware status.
Bit 1 = 1 C001 Illegal filecode, or filecode not assigned
         C002 Device attached to another program
         C008 Buffer address or requested length not valid
         C010 Function unknown or not compatible with the device or file
         C020 Write protection on disc file
         C040 End of media, current operation not executed
         C080 Timeout
         C100 Disc queue overflow
         C200 Dynamic Area overflow, no disc blocking buffer free
         C400 Blocking overflow (no free granule).

Syntax: FFS FCOD=fc[,NUMB={n | ALL}]

Use:
The command is used to position the tape after a tapemark.

    fc   Filecode of the device.
    n   Number of tapemarks to be skipped.
    ALL The tape is read until at least two consecutive tapemarks are found
         (i.e. until after the last file on the tape). Then, the heads are
         positioned after the first EOF and a new file may be written,
         overwriting the second EOF.
         Default: the tape is skipped to the next tapemark and the heads are
                   positioned after it.

Error Messages:
    PARAM ERROR   No tapemark on the tape. The end of the tape is encountered.
    NO T.M ON THE TAPE END OF TAPE IS FOUND
    KEY PARAM TOO LONG If ALL is given, ALL should not be preceded by a number.
    I/O ERROR ON M.T. (FCOD=...), STATUS=
         meaning: see FBS command.

    See also Appendix A.

Syntax: PLB FCOD=fc

Use:
This command is used to print the volume label of a magnetic tape on the
operator's console. The tape is positioned at the first record of the file
following the label.

Error Messages:
    NO VOLUME LABEL No volume label on the tape.
                    The tape is rewound to load point.
    I/O ERROR ON M.T. (FCOD...),STATUS=
        Meaning: see FBS command.

    See also Appendix A.

Syntax: RBS FCOD=fc[,NUMB=n]

Use:
Space backward to the beginning of the preceding record (NUMB is not
specified), or past a number of records (NUMB parameter specified and greater
than 1).

    fc   Filecode of the device.
    n   Number of records to be spaced backwards.
          Default: 1 (space backward until the beginning of preceding record).

Error Messages:
    BEGINNING OF TAPE ENCOUNTERED
    EOF ENCOUNTERED - a tapemark is found
    I/O ERROR ON M.T. (FCOD...),STATUS=
          Meaning: see FBS command.
    NO DATA ON THE TAPE

    See also Appendix A.

Syntax: REF FCOD=fc

Use:
This command is used to rewind the tape until an EOF is encountered from a
previous file. Then the heads are positioned after the EOF record at the
beginning of the rewound file. If there is no previous file, the tape is
rewound to load point.

Error Messages:
    I/O ERROR ON M.T. (FCOD...),STATUS=
        Meaning: see FBS command.

    See also Appendix A.

Syntax: REW FCOD=fc

Use:
The magnetic tape on the device with filecode fc is rewound to its load point.

Error Messages:
    I/O ERROR ON M.T. (FCOD...),STATUS=
        Meaning: see FBS command.
    ERR ENCOUNTERED IN READ

    See also Appendix A.

Syntax: RFS FCOD=fc[,NUMB=n]

Use:
Space a record forward over the next physical record or over a number of
records. This command is not allowed on cassette.

    fc   Filecode of the device.
    n   The number of records to be spaced forward. Default: = 1.

Error Messages:
    EOF ENCOUNTERED — a tapemark is found on the tape
    END OF TAPE ENCOUNTERED
    EOV ENCOUNTERED
    I/O ERROR ON M.T. (FCOD=...), STATUS=
         Meaning: see FBS command.
    NO DATA ON THE TAPE

    See also Appendix A.

Syntax: ULD FCOD=fc

Use:
The device specified by fc is switched to manual state by sending a Switch Off
command to the unit.

Error Messages:
    THE FUNCTION HAS NOT WORKED CORRECTLY, (FCOD...),STATUS=...
        Meaning: see FBS command.

    See also Appendix A.

Syntax: WEF FCOD=fc[,NUMB=n]

Use:
This command writes one or more EOF records (tape marks) on the tape.

  fc   Filecode of the device.

  n   Number of EOF records to be written. At least two must be written to
        terminate the file. Default: = one EOF record is written.

Error Messages:
    I/O ERROR ON M.T. (FCOD=...),STATUS=   Meaning: see FBS command.

    See also Appendix A.

Syntax: WES FCOD=fc[,NUMB=n]

Use:
This command writes one or more EOS records on the tape.

    fc   Filecode of the device.
    n   Number of EOS records to be written. Default: = 1.

Error Messages:
    I/O ERROR ON M.T. (FCOD=...),STATUS=
        Meaning: see FBS command.

    See also Appendix A.

Syntax: WEV FCOD=fc

Use:
This command writes an End-of-Volume mark on the tape.

    fc   Filecode of the device.

Error Messages:
    I/O ERROR ON M.T. (FCOD=...),STATUS=
        Meaning: see FBS command.
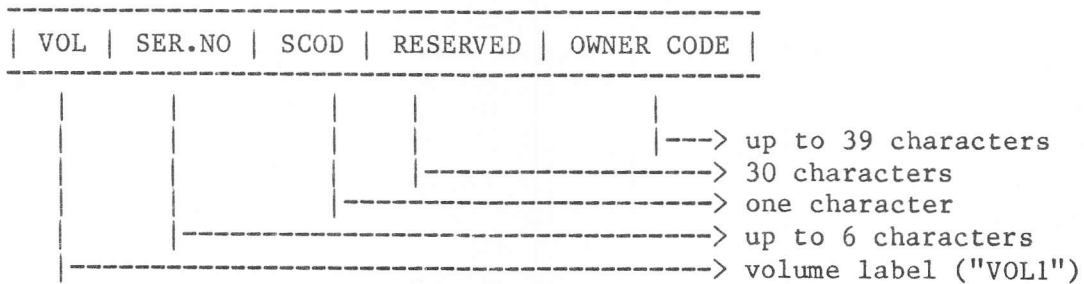
    See also Appendix A.

Syntax: WLB FCOD=fc[,SNUM=' '][,SCOD=' '][,OWNE=' ']

Use:
This command writes a volume label on the tape. The volume label is the identification on the tape.

fc	Filecode of the device.
SNUM=' '	Volume serial number between two quotes, consisting of up to 6 ASCII characters.
SCOD=' '	The security code; one ASCII character between two quotes.
OWNE=' '	A character string, between two quotes, of max. 39 characters. If more than 39 characters are given, the string is truncated. Blanks and commas are accepted as characters.

The label is written, in ASCII, as follows:

```
------------------------------------------------------
| VOL | SER.NO | SCOD | RESERVED | OWNER CODE |
------------------------------------------------------
     |      |        |       |            |
     |      |        |       |            |---> up to 39 characters
     |      |        |       |-------------------> 30 characters
     |      |        |-----------------------------> one character
     |      |-------------------------------------------> up to 6 characters
     |--------------------------------------------------> volume label ("VOL1")
```

The label is followed by a tapemark.

Error Messages:
   PARAM xxxx TOO LONG (xxxx identifies the parameter)
   I/O ERROR ON M.T. (FCOD=...),STATUS=
        Meaning: see FBS command.

   See also Appendix A.

```
 -----                                                                -----
| CDD |                          Condense Disc                       | CDD |
 -----                                                                -----
```

Syntax: CDD DISK=dc

Use:
This command may only be used in a System Job session. The DADs on the physical
disc dc are repositioned to remove embedded free cylinders. After condensing,
all free cylinders will be consecutive and occupy the high numbered cylinders.
The VTOC is regenerated to point at the new DAD locations.

> dc   A physical disc code in the range /C0 to /CF, defined by an SCL FCD
>   command before starting the background machine.

Error Messages:
    I/O ERROR WHEN READING VTOC
    INVALID DISK FILE CODE
    FILE CODE NOT ASSIGNED TO A DISK
    DISK VTOC DESTROYED
    THE FIRST DAD SHOULD BEGIN WITH CYLINDER 0
    VTOC ERROR, DISK PARTIALLY CONDENSED
    I/O ERROR
    I/O ERROR WHEN UPDATING VTOC
    DAD FC /.. ASSIGNED TO THE DAD xxxxxx IN MACHINE yyyyyy
    DYN. AREA OVERFLOW
    ERROR IN RELEASE DYN. AREA

    See also Appendix A.

Syntax: CDF INAM={fc1 | fn1}[,ITYP={SC | OB | LM | UF}][,IUSI=u1]
               [,IVER=v1][,IDAD=d1]
               ,ONAM={fc2 | fn2}[,OTYP={SC | OB | LM | UF}][,OUSI=u2]
               [,OVER=v2,][ODAD=d2]

Use:
This command is used to copy a disc file to another disc file.

When the file is copied to a temporary disc file and the file is to be
catalogued, do not forget to give a KPF command.

    fc1 Filecode which has already been assigned by the user to the input
(catalogued or temporary) disc file. Parameters ITYP, IUSI, IVER and
IDAD are not required.

    fn1 Name of the catalogued file in the directory of the user u1 in DAD d1.

    d1   DAD code which has already been assigned by the user to the DAD which
contains the directory for the user u1. Default = :JOB DAD.

    u1   Userid which identifies which directory in the DAD contains the file
to be copied. Default = :JOB USID.

    v1   Version of file fn1 to be copied. Default = 0.

    SC   File to be copied is a source file

    OB   File to be copied is an object file

    UF   File to be copied is a user file; this is the Default.

    LM   File to be copied is a load module.

    fc2 Filecode which:
         a)   has already been assigned to a temporary disc output file; in
this case OTYP, OUSI, OVER and ODAD parameters are not required.
         b)   will be assigned to the output file; the OTYP, OUSI, OVER and
ODAD parameters are significant.

    fn2 The name to be given to the copy of the file.

    d2   The DAD code of the DAD into which the copy of the file is to be
written. Default = :JOB DAD.

    u2   The userid of the directory into which the file name of the copied
file is to be entered. Default = :JOB USID.

    v2   Version number to be given to the copied file. Default = 0.

    SC   The copied file is a source file

    OB   The copied file is an object file

    UF   The copied file is a user file

    LM   The copied file is a load module.

Error Messages:
    INVALID ITYP PARAMETER
    UNABLE TO ASSIGN THE FILE CODE
    INPUT FILE WRONG DEFINED
    I/O ERROR
    INPUT FILE IS NOT A DFM FILE
    INVALID OTYP PARAMETER
    WRONG OUTPUT DAD FILE CODE
    TOO MANY GRANULES REQUESTED FOR OUTPUT FILE
    OUTPUT FILE WRONG DEFINED
    OUTPUT FILE IS NOT A DFM FILE
    OUTPUT FILE CONSECUTIVE AND NOT ENOUGH DISK SPACE AVAILABLE
    SECTOR LENGTH OF BOTH FILES ARE DIFFERENT

    See also Appendix A.

Syntax: COB [LIBR=fn][,USID=u][,DAD=d]

Use:
This command causes the specified object library to be reorganised, to remove
embedded free sectors (occupied by deleted object modules) and to remove
embedded deleted entries from the object directory.

This command is mandatory whenever an object module is to be added to the
object library and the module is bigger than any of the embedded free areas and
bigger than the free area at the end of the object library.

    fn   The name of the object library to be condensed. Default = "USRLIB".
    u   The userid of the directory containing an entry for the object library
          to be condensed. Default = :JOB USID.
    d   The DAD code, already assigned by the user to the DAD containing the
          object library to be condensed. Default = :JOB DAD.

Error Messages:
    INVALID FILE CODE
    LIBRARY NAME TOO LONG
    USERID NOT CATALOGUED
    DISK I/O ERROR
    OBJECT LIBRARY NOT CATALOGUED
    SYNTAX ERROR
    ASSIGN CANNOT BE DONE
    ENTRY OF MOD STARTING AT SECTOR .... CANNOT BE FOUND IN OBJ. DIRECT.

    See also Appendix A.

Example: For the original object library with name EDITNG see the POD command.

    COB LIBR=EDITNG
    POD LIBR=EDITNG

        LABEL = MWSC   DATE = 02 01 74   1215PACK NBR = 0102

    DAD : MASDC1 USER: NMWSC2   OBJECT LIBRARY: EDITNG DATE: 23 02 78

MODULE NAME	DATE	ADDR	LGTH
M:CMDS	23 02 78	0000	0005
M:CASS	23 02 78	0005	0002
M:CC	23 02 78	0007	0002
M:MESS	23 02 78	0009	0004
M:PRNT	23 02 78	000D	0008
M:EDIT	23 02 78	0015	0007
M:SCRT	23 02 78	001C	0002
M:TERM	23 02 78	001E	0001

Syntax: CSF INAM={fc1 | fnl}[,ITYP={SC | OB | UF}][,IUSI=ul]
               [,IVER=vl][,IDAD=d1]
               ,ONAM={fc2 | fn2}[,OTYP={SC | OB | UF}][,OUSI=u2]
               [,OVER=v2][,ODAD=d2]

Use:
This command is used to copy a sequential disc or non-disc file to a disc or
non-disc device. The maximum record size is 2048 words.

When the file is copied to a temporary disc file and the file is to be
catalogued, do not forget to give a KPF command.

Note 1)   If the input file is assigned to the operator's console or a
          display,the system prints out CSF: after which one line of data may be
          input. After (LF) (CR), CSF: is printed again on the console and a new
          line may be input etc. The last item typed in should be :EOF.
     2)   A load module is not supported on a sequential file.

     fc1 Filecode which has already been assigned by the user to the input file
          (a physical non-disc device, or a catalogued or temporary disc file).
     fnl Name of the file catalogued in the directory of the user ul in DAD dl.
     d1   DAD code which has already been assigned by the user to the DAD which
          contains the directory of the user ul. Default = :JOB DAD.
     ul   Userid of the directory in the DAD containing the file to be copied.
          Default = :JOB USID.
     vl   Version number of file fnl to be copied. Default = 0.
     SC   File to be copied is a source file
     OB   File to be copied is an object file
     UF   File to be copied is a user file; this is the Default.

     fc2 Filecode which:
          a)   has already been assigned to the output file. It can be assigned
               to a non-disc device, or to a temporary or catalogued disc file.
               In this case parameters OTYP, OUSI, OVER and ODAD are not
               required.
          b)   will be assigned to the output file; the OTYP, OUSI, OVER and
               ODAD parameters are significant.
     fn2 The name to be given to the copied file.
     d2   The DAD code which has already been defined by the user, specifying
          the DAD into which the copy of the file is to be written.
          Default = :JOB DAD.
     u2   The userid of the directory into which the file name of the copied
          file is to be entered. The directory must be in the DAD d2.
          Default = :JOB USID.
     v2   Version number of the copied file. Default = 0.
     SC   The copied file is of type SC
     OB   The copied file is of type OB
     UF   The copied file is of type UF; this is the Default.

Error Messages:
     INVALID ITYP PARAMETER
     UNABLE TO ASSIGN THE FILE CODE
     INPUT FILE WRONG DEFINED
     I/O ERROR
     INVALID OTYP PARAMETER
     WRONG OUTPUT DAD FILE CODE
     TOO MANY GRANULES REQUESTED FOR OUTPUT FILE

OUTPUT FILE WRONG DEFINED
OUTPUT FILE CONSECUTIVE AND NOT ENOUGH DISK SPACE AVAILABLE
TOO MANY SECTORS REQUESTED FOR OUTPUT FILE
ILLEGAL INPUT FILE CODE
EOV ON INPUT FILE, MOUNT NEW TAPE
EOT ON OUTPUT FILE, MOUNT NEW TAPE

See also Appendix A.

Examples

1) Copy a non-disc file to a non-disc file:

   CSF INAM=/E1,ONAM=3

2) Copy a non-disc file to a temporary disc file, and catalogue the latter:

   CSF INAM=/E1,ONAM=/20,ODAD=/F3,OTYP=SC
   KPF FCOD=/20,USID=MWSC3,FNAM=SORT,TYPE=SC

3) Assign a catalogued disc file in DAD /F3 and copy to a temporary disc file
   in DAD /F2.

   ASG FCOD=/E1,DAD=/F3,USID=MWSC3,FNAM=SORT,TYPE=SC
   LIB
   CSF INAM=/E1,ONAM=/20,ODAD=/F2,OTYP=SC
   KPF FCOD=/20,FNAM=SOURCE,USID=MWSC2,TYPE=SC

4) Copy a catalogued disc file in DAD /F2 to a temporary file in DAD /F3. The
   copied file is catalogued with a new version number.

   CSF INAM=SOURCE,ITYP=SC,ONAM=/20,ODAD=/F3,OTYP=SC
   KPF FCOD=/20,FNAM=SORT,USID=MWSC3,TYPE=SC

Syntax: DCD DNAM=dn,NCYL=n,NINT=i,[NSPT=st],NSPG=sg,[SLNG=sl],DISK=dc

Use:
This command may only be used in a System Job session. LIB attempts to allocate n consecutive cylinders on the disc, format them (create an empty DAD catalogue), and enter the new DAD name into the Volume Table of Contents (VTOC). The DAD is then available for use by any machine, and can be assigned to foreground, background or system filecodes.

Note: When the user has declared one or more new DADs and he wishes to use them, he must restart the system by giving IPL, defining the machines etc., to enable the system to build new tables.

dc   A physical disc code in the range from /C0 to /CF, defined by an SCL FCD command.

dn   A DAD name of up to 6 ASCII characters, i.e. from A through Z and 0 through 9, plus special characters like $ or / but not colon (:) nor up-arrow. The first character must be a letter. If more than 6 characters are given but less than 9, the name is truncated to 6 characters and then placed in the VTOC. If more than 8 characters are specified, an error message is output.

n   Number of cylinders to be allocated to this DAD; from 1 to 199 for the X1215 disc, from 1 to 399 for the X1216 disc, from 1 to 400 for the CDC 40MB disc and from 1 to 800 for the CDC 80MB disc.

sl   Sector length in characters. Only relevant for CDC discs.

          CDC 40/80MB disc: A variable number ranging from 200 to 4096 characters.

          X1215/16 disc: Always 410 characters per sector. The parameter need not be specified.

st   Number of sectors per track. Only relevant for CDC discs.

          CDC 40/80MB disc: A variable number ranging from 4 (if 4096 characters per sector) to 64 (if 200 characters per sector).

          X1215/16 disc: Always 16 sectors per track. The parameter need not be specified.

        Note: NSPT and NINT may not have any common divisor.

sg   Number of sectors per granule. The system has loaded 8 sectors in granule 0 of the first DAD which was defined at premark time.

i   Number of interlaces:
For the X1215 and X1216 it may be an odd number from 1 to 15 and having no common divisor with 16.
LIBRARIAN will write the 16 logical sectors for each track in the physical sectors 0, i, 2i, 3i, etc., so that i − 1 sectors will lie between two consecutive logical sectors; e.g. when i = 3, the logical sectors 0 − 15 are written to the physical sectors 0, 3, 6, 9, 12, 15, 2, 5, 8, 11, 14, 1,4, 7, 10, 13.
For the CDC 40MB and 80MB it may be a number from 1 to 38, and having no common divisor with 39. In fact, i is the closest number to st / 4 having no common divisor with st.

```
Example:          CDC disc: SLNG = 410
                            NSPT = 39
                            NINT = 10 or 11

                 X1215/16: SLNG = 410
                            NSPT = 16
                            NINT = 5.
```

Error Messages:
    INVALID FILE CODE
    I/O ERROR
    INVALID DEVICE TYPE
    NSPT OR SLNG NOT PRESENT
    DAD ALREADY CATALOGUED
    VTOC OVERFLOW
    DISK OVERFLOW
    TOO MANY BAD TRACKS ON DISC
    NSPT AND NSPG VALUES INCOMPATIBLE
    SLNG AND NCYL VALUES INCOMPATIBLE
    I/O ERROR ON VTOC
    NINT AND NSPT VALUES INCOMPATIBLE
    A MAXIMUM OF 64 RECORDS PER TRACK IS ALLOWED
    SECTOR/TRACK OVERFLOW - either:
        (a) sector cannot contain the specified number of characters, or
        (b) too many sectors/track specified.
    DAD MUST NOT EXCEED 32768 SECTORS
    DEVICE NOT OPERABLE
    INVALID SECTOR LENGTH
    DAD DECLARATION ABORTED BECAUSE OF BAD TRACK DETECTION
    NSPG TOO BIG OR DAD TOO SMALL

    See also Appendix A.

Example

    DCD DISK=/CO,DNAM=MASDC1,NCYL=30,NSPG=8,NINT=5
    DCD DISK=/CO,DNAM=MASDC2,NCYL=20,NSPG=8,NINT=5

    LIB=DISK OVERFLOW
    EXIT CODE = 0083
    <register contents>

    LIB
    DCD DISK=/CO,DNAM=MASDC2,NCYL=10,NSPG=8,NINT=5

Syntax: DCU USID=u,DAD=d[,PASW=p][,ACNT=a]

Use:
This command may only be used in a System Job session. It creates a new entry
for this user in the DAD catalogue and a new directory within the DAD.

This command may be followed by an SMV command in which the highest number of
file versions may be specified. This number is valid for all the files created
in the library. The DCU command initialises the maximum version number to 0.

    d   DAD code (/F0 through /FF) already assigned by the user in the FCD
          command.
    u   User identification, consisting of 1 through 8 characters, the first
          of which must be a letter. This name is placed in the calalogue of
          the DAD d. Special characters like colon (:) or semicolon (;) should
          be avoided.
    p   Password for use by user accounting routines (if any). It may consist
          of up to 8 ASCII characters which will be right padded to 8
          characters, if necessary, with blanks. The password is stored in the
          DAD catalogue entry for this user as two words, the contents of which
          are obtained by converting the 8 ASCII characters. Default = 0.
    a   An account number ranging from 0 to /7FFF, which will be stored in the
          DAD catalogue entry for this user. Default = 0.

Error Messages:
    USER ALREADY CATALOGUED
    DAD CATALOGUE OVERFLOW
    DISK I/O ERROR
    INVALID FILE CODE the DAD has not been given this filecode in FCD command.
    INVALID ACCOUNT NUMBER
    DAD OVERFLOW
    SECTOR SIZE EXCEEDS 1024 CHARACTERS

    See also Appendix A.

Example:

    LIB

    DATE :FEB 23 78 // TIME : OOH.OOM.OOS.
    LIBRARIAN REL 06 (01 06 76)
    DCU USID=MWSC1,DAD=/F2,PASW=CHEF,ACNT=35
    DCU USID=MWSC2,DAD=/F2
    DCU USID=MWSC3,DAD=/F3
    DCU USID=MWSC4,DAD=/F3

Syntax: DLD DNAM=dn,DISK=dc

Use:
This command may only be used in a System Job session. It removes the DAD name
from the VTOC.

The embedded free area of cylinders can be used for a new DAD which is not
larger than the one deleted.

Use the CDD command, if required, to move the free cylinders to the end of all
DADs.

    dc   A physical disc code (/C0 to /CF) already defined by an SCL FCD
         command.
    dn   The name of the DAD to be deleted. It must be present in the VTOC of
         this disc.

Error Messages:
    DAD UNKNOWN
    INVALID FILE CODE
    DISK I/O ERROR
    FIRST DAD CANNOT BE DELETED - the SYSTEM DAD is protected against deleting.
    DAD FC /.. ASSIGNED TO THIS DAD IN MACHINE yyyyyy

    See also Appendix A.

Example:

    DLD DISK=/C0,DNAM=SSDOC1
    DLD DISK=/C0,DNAM=SSDOC2

Syntax: DLF FNAM=fn[,TYPE={SC | UF | LM}][,USID=u][,DAD=d]
               [,VERS={v | OLD | ALL}]

Use: This command deletes a file or module from a library.

    fn   The name of the file to be deleted.
    d   The DAD code of the DAD containing the file to be deleted. Default:
          :JOB DAD.
    u   USERID of the directory in the DAD d in which the file is catalogued.
           Default: :JOB USID.
    SC   File of type SC to be deleted
    UF   File of type UF to be deleted - Default.
    LM   File of type LM to be deleted.
    v   Version number of the file to be deleted. The old version numbers are
          updated and decremented by 1, depending on the SMV command.
          Default: 0.
    OLD   All versions, except version 0, are deleted.
    ALL   All versions are deleted.

Error Messages:
    INVALID FILE TYPE
    I/O ERROR
    DAD UNKOWN
    UNKNOWN FILE
    DAD FILE CODE ERROR
    USERID UNKNOWN
    FILE TYPE ERROR
    ERROR NOT RECOGNIZED
    INVALID VERSION PARAMETER
    SYSTEM FILE MAY ONLY BE DELETED BY SYSTEM JOBS
    GRANTB OF A VERSION OVERWRITTEN, ADDRESS IN DAD: xxxx
    FILE IN USE

    See also Appendix A.

Example:

    :JOB USID=SYSTEM
    DATE :FEB 23 78 // TIME : 00H.00M.00S.

    ** BCP RELEASE   18.01.78
    LIB

    DATE :FEB 23 78 // TIME : 00H.00M.00S.
    LIBRARIAN REL 06 (01 06 76)
    DLF FNAM=M:CMDS,TYPE=SC

Syntax: DLU USID=u,DAD=dc

Use:
This command may only be used in a System Job. The entry for this user in the
DAD catalogue is removed. The granules which were occupied by the user
directory, and all the files pointed at by the directory, are freed for use by
other users in the DAD.

    d   DAD code (/F1 to /FF) of the DAD containing the userid u.
    u   User identification to be deleted.

Error Messages:
    INVALID FILE CODE
    DISK I/O ERROR
    USERID NOT CATALOGUED
    GRANTB OF FILE OVERWRITTEN, ADDRESS IN DAD : xxxx
    FILE IN USE, DLU PARTIALLY DONE

    See also Appendix A.

Examples

    DLU USID=MWSC1,DAD=/F2
    DLU USID=MWSC2,DAD=/F2
    DLU USID=MWSC3,DAD=/F3
    DLU USID=MWSC4,DAD=/F3

Syntax: DOB [LIBR=ln][,MNAM=mn]

Use:

This command deletes one or all object modules of an object library. The name of the object module is removed from the object library directory. If the object library becomes empty, or if MNAM is not specified, the whole object library is deleted from the user library.

    ln   Name of the object library. The name must be present in the directory
         for the :JOB DAD and USID. Default = "USRLIB".
    mn   Name of the object module to be deleted from the object library.
         Default = all modules in the specified library will be deleted.

Error Messages:
    LIBRARY NAME TOO LONG
    MODULE NAME TOO LONG
    DISK I/O ERROR
    OBJECT LIBRARY NOT CATALOGUED
    OBJECT MODULE NOT CATALOGUED
    ASSIGN CANNOT BE DONE
    GRANTB OVERWRITTEN, ADDRESS IN DAD: xxxx
    LIBRARY IS IN USE

    See also Appendix A.

Example

    DOB MNAM=M:LIST

    LIB=OBJECT LIBRARY NOT CATALOGUED
    DOB LIBR=EDITNG,MNAM=M:LIST
    DOB LIBR=EDITNG,MNAM=M:CA
    DOB LIBR=EDITNG,MNAM=M:GO

Syntax: DUF FNAM={fc | fn}[,TYPE={SC | OB | UF | LM}][,USID=u][,VERS=v]
                 [,DAD=d][,PRNT=pc][,FROM=from][,TO=to]

Use:
This command dumps in hexadecimal format the specified disc or non-disc file on
the listing device. Printable characters are printed on the listing.

   fc   Filecode of the file to be dumped. If a non-disc file is to be dumped,
         the file must be positioned at the beginning of the file.
   fn   File name of the file to be dumped. This name must exist in the
         directory for the user u in DAD d.
   SC   The file is catalogued as a source file
   OB   The file is catalogued as an object file
   UF   The file is catalogued as a user file
   LM   The file is catalogued as a load file.
   u   Userid of the directory pointing to the file to be dumped.
         Default = :JOB USID.
   v   Version of the file to be dumped. Default = 0.
   d   DAD code of the DAD in which the disc file to be dumped occurs.
         Default = :JOB DAD.
   pc   Filecode of the listing device. Default = /02.
   from When disc file:
         File logical sector number of the first sector to be dumped. This can
         be used, for example, to dump the directory of an object file, by
         specifying FROM=1590. Load modules are almost always non-consecutive.
         The first sector number = 0.
         When non-disc file:
         The number of the first record to be dumped. Default = 0.
   to   When disc file:
         File logical sector number of the last sector to be dumped.
         When non-disc file:
         The number of the last record to be dumped. Default = EOF.

Error Messages:
   SYNTAX ERROR
   UNABLE TO ASSIGN THE FILE CODE
   INVALID INPUT FILE CODE
   FILE CODE ASSIGNED TO A DISK UNIT
   INVALID OUTPUT FILE CODE
   I/O ERROR

   See also Appendix A.

Example

   DUF FNAM=EDITNG,TYPE=LM
   DUF FNAM=EDITNG,TYPE=OB,FROM=1590,TO=1596

Note: if a DAD filecode is supplied as the FNAM parameter, the requested
         sectors of the DAD are dumped. In this case, the FROM and TO para-
         meters refer to the DAD logical sector numbers, including inter-
         lacing. The TYPE, USID, VERS and DAD parameters are not required.

Syntax: HLP [CMND=<cmd>]

Use:
This command lists the parameters to a Librarian command; the key words are
output in the order in which positional parameters should be input. Output is
to filecode /01.

    cmd Specifies the command whose parameters are to be listed.
         Default: all commands are listed.

Error Messages:
    INVALID COMMAND - <cmd> is not a valid Librarian command.

Syntax: KOM [LIBR=ln][,MNAM=mn][,USID=u][,DAD=d][,FCOD=fc]

Use:
This command catalogues one or more object modules in an object library.

    d   DAD code of the DAD in which the module(s) must be kept, in the range
         /F0 through /FF. Default = :JOB DAD.

    u   USERID of the directory in which the module(s) must be kept.
         Default = :JOB USID.

    fc   The filecode which has already been assigned in the :JOB to a disc
         temporary file of type OB, containing the module(s) to be kept.
         Default = The filecode assigned by ASM to its object file (/D5).

    ln   The name of the object library in which the object module(s) will be
         kept. If no library existed, it will be created. Default = "USRLIB".

    mn   The name of the module to be kept; this must be the name given to the
         module in the IDENT statement.
         If MNAM is omitted, all modules in the object file will be kept.

    Note: To keep only a set of modules in an object file, enter a KOM
            command without the MNAM parameter, then use one or more DOB
            commands to remove the unwanted modules.

Error Messages:
    INVALID FILE CODE
    LIBRARY NAME TOO LONG
    MODULE NAME TOO LONG
    DISK I/O ERROR
    USER DIRECTORY OVERFLOW
    OBJECT LIBRARY OVERFLOW
    ASSIGN CANNOT BE DONE
    OBJECT MODULE NOT FOUND
    DAD OVERFLOW
    SYNTAX ERROR
    USERID NOT CATALOGUED
    INV. MODULE IN TEMP. OBJ. FILE
    TEMP. OBJ. FILE CODE NOT ASSIGNED

    See also Appendix A.

Example: The modules were placed on the /O file after assembling each module.

    KOM DAD=/F2,USID=MWSC2,LIBR=EDITNG

Syntax: KPF FCOD=fc[,TYPE={SC | UF | LM}][,FNAM=fn][,USID=u]

Use:
This command is used to catalogue a temporary disc file in the directory of the
current or specified USERID.

The implied DAD is the DAD relating to the USERID.

If a file of the same name and type already existed in the directory, its
version number is updated when more than one version number of the file is
permitted through the SMV command. The new version is kept under version number
0, and the numbers of the old versions are incremented by 1.

If no SMV command was given after the DCU command, the old version of the file
is deleted and the new one is kept.

    fc   Filecode, assigned by the user to a disc temporary file, defining the
          file to be kept.
    u   Userid in whose directory the file must be catalogued. This directory
          must be in the implied DAD. Default = :JOB USID.
    fn   Name, consisting of up to 6 ASCII characters, to be given to the file.
          This parameter is obligatory with an LM type file. If the type is SC,
          the parameter may be omitted, in which case the name given to the file
          in the first IDENT record is taken.
          Note: the format of the IDENT record must be:
                     ......IDENT name   comments
                     Backslashes are not recognised.
    type File type of the file to be entered in the directory.
          Default = the type specified or defaulted when the filecode fc was
                    assigned by the user.

Error Messages:
    INVALID FILE CODE
    INVALID TYPE PARAMETER
    TYPE PARAMETER=OB IS INCORRECT
    TYPE PARAMETER=LM IS INCORRECT
    TYPE PARAMETER=SC IS INCORRECT
    FNAM PARAMETER SHOULD BE PROVIDED IN THE COMMAND
    -    the file to be kept had no IDENT record.
    I/O ERROR
    KPF COMMAND REFUSED
    GRANTB OF PREVIOUS VERSION OVERWRITTEN, ADDRESS IN DAD: xxxx
    LAST VERSION TO BE DELETED IS IN USE
    INVALID IDENT PARAMETER

    See also Appendix A.

Example: See CSF command.

Syntax: LEN

Use:
This command must be given when all the necessary LIBRARIAN commands have been
input. Control is returned to the BCP.

Syntax: LTO [LNAM={fc1 | fn1}][,LUSI=u1][,LDAD=d1][,LVER=v][,ONAM={fc2 | fn2}]
        [,ODAD=d2][,IDEN=m]

Use:
This command is used to convert and punch or write a load module in object
cluster format. The load module may not be segmented.

The input parameter defines the input file containing the load module. If this
parameter is omitted, the default = /D6. If it is specified, the parameter may
have one of two formats.

The output parameter defines the output file. If this parameter is omitted,
the default = /03. Otherwise it may have one of two formats.

    fc1 Filecode already assigned by the user to the file; in this case LUSI,
         LDAD and LVER parameters are not required.
    fn1 Name of the catalogued load module; the LUSI, LDAD and LVER parameters
         are significant.
    u   Userid of the directory in which the file name is catalogued.
         Default: = :JOB USID.
    d1   DAD containing the file. Default: :JOB DAD.
    v   Version number of the load module. Default: 0.

    fc2 Filecode:
         a)   already assigned to the temporary file; ODAD and IDEN parameters
              are not required.
         b)   to be assigned to the temporary file on disc; ODAD and IDEN
              parameters are significant.
    d2   The DAD in which the object module must be written.
    m   Name to be given to the object module. This parameter is compulsory if
         LNAM is defaulted or is a filecode; otherwise it defaults to the load
         module name.

Error Messages:
    IDENT PARAMETER MISSING
    ILLEGAL INPUT FILE CODE
    SECTOR LENGTH OF INPUT DAD EXCEEDING
    UNABLE TO ASSIGN INPUT FILE
    UNABLE TO ASSIGN OUTPUT FILE
    I/O ERROR
    LOAD MODULE IS SEGMENTED

    See also Appendix A.

    LTO LNAM=EDITNG,ONAM=/03,IDEN=EDIT02

Syntax: POD [LIBR=fn][,EXTN={YES | NO}][,USID=u][,DAD=d][,PRNT=fc]

Use:
This command gives a listing of an object file library on a listing device.

On the listing each module name in the directory is accompanied by the date,
the sector number where the module starts (ADDR = hexa no), and the module's
length in sectors (LGTH = decimal no). Optionally, also the module's external
references may be printed (EN = entry, EX = external and CO = common).

To obtain a dump of an object directory for debugging purposes, the DUF command
may be given with parameter FROM=1400 (or 1300 if a large directory).

Object module clusters are placed in sectors 0, 1, 2, 3, etc. The last sector
of each module contains :EOS. The number of the first sector occupied by the
module is printed on the listing when this command is given (ADDR). Entries in
the object directory are of variable length; the last entry in the directory is
terminated by /FFFE. Deleted entries are not re-used by newly entered modules
until a COB command is given.

    fc   Background machine filecode, already assigned to the device to which
          the listing is to be output. Default = /02.
    EXTN If NO is specified, only module names are to be listed.
          If YES is specified, external references are also listed.
          Default = NO.
    fn   Name of the object library to be listed. Default = "USRLIB".
    u   Userid of the directory containing the filename. Default = :JOB USID.
    d   DAD code defining the DAD whose catalogue contains the USERID.
          Default = :JOB USID.

The directory has the following format, starting in sector 1597, containing the
directory header, and continuing on sectors 1596 downwards with specific
information on a module.

Directory Header
_____

Sector 1597

Word 0	Cylinder Number (X1215/16). For CDC set to zero	
Word 2	Number of Characters Used in this Sector	
Word 4	Day (2 ASCII Characters)	
Word 6	Month (2 ASCII Characters)	
Word 8	Year (2 ASCII Characters)	
Word 10	Number of Sectors in Directory	
Word 12	Initial Number of Sectors in Object Modules	
Word 14	Actual Number of Sectors in Object Modules	
Word 16	reserved	
Word 18	reserved	

Sectors 1596 and downwards:

```
--------------------------------------------------------------------
|       Cylinder Number (X1215/16). For CDC set to zero.          |
--------------------------------------------------------------------
| L | Number of chars used in sector, excluding this word         |
--------------------------------------------------------------------
|     Number of chars used in this entry, excluding this word     |
--------------------------------------------------------------------
|     Module name (if binary zero, the entry is deleted)          |
--------------------------------------------------------------------
|     Module name                                                 |
--------------------------------------------------------------------
|     Module name                                                 |
--------------------------------------------------------------------
|     Relative sector number of first sector of module            |
--------------------------------------------------------------------
|     Initial number of sectors in module                         |
--------------------------------------------------------------------
|     Current number of sectors in module                         |
--------------------------------------------------------------------
|     Day                                                         |
--------------------------------------------------------------------
|     Month                                                       |
--------------------------------------------------------------------
|     Year                                                        |
--------------------------------------------------------------------
|     Reserved                                                    |
--------------------------------------------------------------------
|     Reserved                                                    |
--------------------------------------------------------------------
|     Clusters of Types 5, 2, 6 and End                           |
--------------------------------------------------------------------
=                                                                 =
--------------------------------------------------------------------
|     Number of chars used in second entry, excluding this word   |
--------------------------------------------------------------------
|     Etc. for second and subsequent entries                      |
--------------------------------------------------------------------
```

Note: If bit L in the 2nd word of the sector is set to 1, it means that this
         is the last sector of the directory.

Error Messages:
    INVALID FILE CODE
    DISK I/O ERROR
    SYNTAX ERROR
    USERID NOT CATALOGUED
    ASSIGN CANNOT BE DONE
    OBJECT LIBRARY NOT CATALOGUED
    INVALID OBJECT DIRECTORY

    See also Appendix A.

Syntax: PRC DAD=d

Use:
This command lists on the device assigned to /02:

- The disc pack number, label and date, entered when the disc was Premarked.
- The number of free granules in the DAD.
- The largest number of consecutive free granules in the DAD.
- Information on each USERID in the DAD catalogue:
    - the USERID name (USERID)
    - the account number (ACNT NBR)
    - the sector number of the sector containing the beginning of the
      directory for this USERID.

Note: the addesses printed are in hexadecimal.

Error Messages:
    INVALID FILE CODE
    DISK I/O ERROR

    See also Appendix A.

Examples

    PRC DAD=/F2
    PRC DAD=/F3

Syntax: PRD [USID=u][,DAD=d][,PRNT=fc]

Use:

This command prints the directory of the specified user or, if all parameters
are omitted, the directory of the current JOB user on the designated print
device. The listing is preceded by the printing of the disc pack identifi-
cation, the DAD name and the USERID under which the directory is kept. Then,
the command outputs for each file in the directory:

- Filename
- Filetype (SC, OB, LM, UF)
- Version number (a number from 0 to 7 if the SMV command was given)
- Date on which the file was catalogued, if a date was specified, otherwise
  the disc creation date is taken
- Sector number address of the file header
- Organisation: NC non-consecutive
-                C consecutive.
- Number of granules the file occupies (only shown if a consecutive
  organisation)
- Attributes (shared, write protect, system, invisible); invisible files are
  only shown on the print-out when the PRD command is given in a JOB whose
  USID is allowed to see the file.

Note: addresses are printed in hexadecimal.

    d   DAD code (/FC to /FF) containing the userid. Default = :JOB DAD.
    u   USERID whose directory must be printed. Default = :JOB USID.
    fc   Filecode of the listing device. Default = /02.

Error Messages:
    INVALID FILE CODE
    DISK I/O ERROR
    SYNTAX ERROR
    USERID NOT CATALOGUED

    See also Appendix A.

Example

    PRD DAD=/F2,USID=MWSC2

Syntax: PRF FNAM={fc | fn},[TYPE={SC | UF}][,USID=u][,VERS=v][,DAD=d]
                 [,PRNT=pc][,FROM=from][,TO=to]

Use:
This command dumps a sequential file on the print unit. The file must consist
of ASCII characters; a record may not exceed 2048 words. If the line exceeds 80
characters when printed, the line is continued on the next one(s).

Each line printed is preceded by a sequential line number. The maximum number
of lines that will be printed is 32767. Non-printable characters are replaced
by space characters. Trailing blanks are removed.

   fc   Filecode of the file to be dumped. If this is a disc file, it is
         rewound before printing starts. A non-disc file is assumed to be
         correctly positioned. The filecode must have been assigned before
         starting the command.
   fn   Name of the file to be dumped. This name must exist in the directory
         for the user u in DAD d or in the current DAD.
   SC   The file is catalogued as a source file.
   UF   The file is catalogued as a user file.
   u   Userid of the directory pointing to the file to be dumped.
         Default = :JOB USID.
   v   Version of the file to be dumped. Default = 0.
   d   DAD code of the DAD in which the disc file to be dumped occurs.
         Default = :JOB DAD.
   pc   Filecode of the listing device. Default = /02.
   from Line number of the first line to be printed.
         Default = 0 (the first line in the file).
   to   Line number of the last line to be dumped.
         Default = Line before :EOF record.

Error Messages:
    SYNTAX ERROR
    UNABLE TO ASSIGN THE FILE CODE
    I/O ERROR
    INVALID PRINT FILE CODE

    See also Appendix A.

Example

    PRF FNAM=M:LIST,TYPE=SC,FROM=120,TO=125

Notes:

1) When printing a non-disc file, the PRF command is not aborted if an I/O
    error occurs before the first record is read.
2) If an I/O error occurs between the first and last records to be printed, an
    I/O error message is output, containing:
    -     the I/O status;
    -     the line number for which the error occurred.

Syntax: PRV DISK=dc

Use:
This command lists on the device assigned to /02 all DADs on the disc specified
by the physical disc code /C0 to /CF, which was defined by a SCL FCD command
before the background machine was started, and specific information for each
DAD:

- the DAD name
- the last cylinder number of the DAD
- the sector length
- number of sectors per track
- number of sectors per granule
- interlace factor.

The table is preceded by the disc pack number, the disc label and the date the
disc was last Premarked.

Note: Addresses are printed in decimal.

Error Messages:
    INVALID FILE CODE
    DISK I/O ERROR
    INVALID VTOC

    See also Appendix A.

Example

    PRV DISK=/C0

Syntax: REC LCOD=lc,FNAM={fc | fn}[,TYPE={SC | OB | LM | UF}][,USID=u]
                 [,VERS=v][,DAD=dfc]

Use:
This command is used, together with the SEN command, to copy disc files from
one machine to another through a data communications link, using BSC
procedure. The operating procedure is described under the SEN command.

    lc   Datacom linecode, which must already be assigned to a line.
    fc   Filecode:
        a)   already assigned to a (temporary or catalogued) disc file; DAD
           and TYPE parameters are not required.
        b)   to be assigned to a non-consecutive temporary disc file; DAD and
           TYPE parameters are significant, but USID and VERS are not
           required.
    fn   Name of the already catalogued output file; TYPE, USID, VERS and DAD
          parameters are all significant.
  TYPE   The type of the output file. Default: TYPE=UF.
     u   The userid on which the file has been catalogued. Default: :JOB USID.
     v   The version number of the catalogued file. Default: 0.
   dfc   The DAD containing the output file. Default: :JOB DAD.

 Error Messages:
   EMITTER ABORTED TRANSM

The following error messages apply to both SEN and REC commands:

   SYNTAX ERROR
   INVALID LINE CODE
   NO DATEM ON SYSTEM
   LIB NOT CORE RES
   LINE CODE NOT ASSIGNED
   CONTROLLER IS NOT SLCU2
   FILE NAME TOO LONG
   INVALID VERSION NB
   DISK I/O ERROR AT ASSIGN
   DYNAMIC AREA OVERFLOW
   DAD UNKNOWN
   FILE CODE NOT ASSIGNED
   DAD OVERFLOW
   FILE NOT CATALOGUED
   FC NOT ASSIGNED TO A DFM FILE
   TRANSMISSION ERROR, STATUS = xxxx
   NO RESPONSE ON LINE
   USERID UNKNOWN
   ILLEGAL FILE TYPE
   INVALID FILE CODE
   SECTOR LENGTH ARE DIFF
   DISC I/O ERROR, STATUS = xxxx

   See also Appendix A.

Syntax: SDD DISK=d1,ONTO=d2

Use:
This command may only be used in a system Job session. It copies the physical
disc d1, sector by sector, to the physical disc d2. The volume label of the
latter is not changed.

   d1 and d2 are two different physical disc codes in the range /C0 to /CF.

Notes: 1)   Remember that /C0 is the system disc.
         2)   The receiving disc is condensed at DAD level.

Error Messages:
     I/O ERROR WHEN READING VTOC OF OUTPUT DISK
     INVALID OUTPUT FILE CODE
     OUTPUT DEVICE IS NOT A DISK
     OUTPUT DISK NOT PREMARKED OR VTOC DESTROYED
     I/O ERROR WHEN READING VTOC OF INPUT DISK
     INVALID INPUT FILE CODE
     INPUT DEVICE IS NOT A DISK
     INPUT DISK VTOC DESTROYED
     INPUT AND OUTPUT DISKS ARE NOT SIMILAR
     THE FIRST DAD SHOULD BEGIN WITH CYLINDER 0
     VTOC OVERFLOW, DISK PARTIALLY MOVED
     I/O ERROR
     INVALID DISK TYPE
     INSUFFICIENT OUTPUT DISK CAPACITY
     INPUT DISK I/O ERROR
     OUTPUT DISK I/O ERROR
     ERROR IN RELEASE DYN. AREA
     DISK IS SAVED
       ***VTOC OF SOURCE DISK IS PARTIALLY DESTROYED!

   See also Appendix A.

Syntax: SDM DISK=dc,ONTO=t[,CK={YES | NO}]

Use:

This command may only be used in a system Job session. It causes the specified
disc to be dumped on magnetic tape. First, two records (an IPL and a stand-
alone program) are written to the tape. This will be used later when restoring
the disc from tape (see below).

Then the disc is dumped, DAD by DAD. Each tape record consists of n disc
sectors, where n is the number of sectors which can be contained in 2048 words.

>   One X1215 disc requires 120 feet of 1600 BPI tape.
>   One X1216 disc requires 240 feet of 1600 BPI tape.
>   One CDC 40MB disc requires 2200 feet of 1600 BPI tape.
>   One CDC 80MB disc requires 4400 feet of 1600 BPI tape.

>   dc   Is a physical disc code in the range /C0 to /CF, defined by an SCL FCD
>   command before the background machine was started.
>   t   A background machine filecode assigned to the tape onto which the disc
>   must be dumped.
>   YES the tape is rewound, re-read and compared with the information on
>   disc, after the disc has been dumped.
>   NO   no comparing of information takes place.

Error Messages:
>   INVALID FILE CODE
>   SYNTAX ERROR
>   MAG TAPE I/O ERROR
>   DISK I/O ERROR
>   ERRONEOUS COPY   an error was found while comparing the tape and the
>   disc.
>   DATA FAULT ON CYL /   , HEAD   , LOGICAL SECTOR
>   THIS SECTOR IS REPLACED ON TAPE BY A ZERO SECTOR (/30)
>   DATA FAULT ON BLOCK STARTING AT RSN=
>   UP TO 16 PHYSICAL SECTORS MAY BE CONCERNED
>   UNACCEPTED DISK TYPE

>   See also Appendix A.

For SDM continuation in case of multi-volume saving operation (one tape is not
sufficient), mount a new tape on the unit after print-out of the message:

>   MOUNT NEXT TAPE, THEN CARRIAGE RETURN, PLEASE

Restoring a Disc from Tape

To restore a disc from a tape created by an SDM command, the operator should
IPL from the tape. The following message is output on the operator's console:

>   DISK PHYSICAL ADDRESS

after which the operator must enter the required disc address as 2 hexadecimal
digits without preceding slash (/). If the operator's reply is invalid, the
following error message is output:

UNKNOWN ADDRESS

otherwise the volume label of the saved disc, the date the copy was made and the following message are output:

    WRITING THE VOLUME LABEL?

to which the operator may reply YES or NO.

    YES   the volume label on the tape is written on disc (the disc need not be premarked).
    NO   the disc volume label will be left as it is.

When ready, the message: END OF RESTORING is printed.

Error Messages:
    DISK I/O ERROR
    MAG TAPE I/O ERROR
    COPIED AND ACTUAL DISKS ARE NOT COMPATIBLE

Syntax: SEN LCOD=lc,FNAM={fc | fn}[,TYPE={SC | OB | LM | UF}][,USID=u]
                [,VERS=v][,DAD=dfc]

Use:

This command is used, together with the REC command, to copy a disc file from
one machine to another through a data communications link, usng BSC procedure.
The file is sent one sector at a time; the sector sizes of the emitting and
receiving files must be identical. The emitting file may be sequential or not,
and consecutive or not.

Before issuing the command, the linecode must be assigned and the line
connected and ready to operate. Then both operators enter their commands, SEN
and REC respectively. A delay of 100 s is allowed for the two computers to
synchronise. The commands SEN and REC are available only if the Monitor
includes the DATEM2 extension with the BSC special character tables.

    lc   Datacom linecode, which must already be assigned to an SLCU2S line.
    fc   Filecode already assigned to a disc file; in this case the parameters
          TYPE, USID, VERS and DAD are not required.
    fn   The file is a catalogued disc file; the parameters TYPE, USID, VERS
          and DAD are significant.
    TYPE The type of the disc file. Default: TYPE=UF.
    u   The userid containing the catalogued disc file. Default: :JOB USID.
    v   The version number of the catalogued disc file. Default: 0.
    dfc   The DAD code of the DAD containing the catalogued disc file. Default:
          :JOB DAD.

Error Messages:
    RECEIVER ABORTED TRANM.

    See also the error messages listed under the REC command.

Syntax: SMV VERS=n

Use:
By means of this command the user may define the highest version number of all
his files. The number may range from 0 through 7.

The DCU command initialises the version number counter to 0. The value given is
stored in the directory, and is valid until a new SMV command is given.

If a version is created whilst the highest number defined in this command is
already attained, the oldest version (with the highest number) is deleted.

Error Messages:
    INVALID VERSION NUMBER
    DISK I/O ERROR

    See also Appendix A.

Syntax: SRD IVOL=<fc1>,OVOL=<fc2>,DAD=<name>]
                   [,NSPT=<int1>][,NINT=<int2>][,OPT={ALL | ONLY}]

Use:
This command copies a DAD:
-   From one disc to another disc; the two discs are not necessarily of the
    same type.
-   From a disc to a magnetic tape.
-   From a magnetic tape to a disc; the magnetic tape must have been written by
    a previous run of SRD.

When copying to a disc, the named DAD must not already be present on the disc.

Copying is performed sector by sector. When copying to a disc, the new DAD is
inserted into the free space on the disc; it is recommended to execute a CDD
command to condense the target disc, before executing this command. When
copying from disc to disc, if the two discs are of the same type then the
source and copied DADs will have the same characteristics; if the two discs are
of different types, only the number of sectors/granule, the number of granules
and the sector size will be the same.

        <fc1>   Specifies the source filecode, assigned to either a disc or a
                    magnetic tape; in the latter case, the tape must have been
                    written by a previous run of SRD.
        <fc2>   Specifies the target filecode, assigned to either a disc or a
                    magnetic tape.
        <name>   Specifies the name of the DAD to be copied; the output DAD also
                    takes this name.
        <int1>   Specifies the number of sectors per track, if <fc2> specifies a
                    disc; it must be supplied in this case, but it will be ignored
                    for an X1215/X1216 disc, which assumes <int1> = 16. Not required
                    if <fc2> specifies a tape.
        <int2>   Specifies the interlace factor, if <fc2> specifies a disc. It
                    must be supplied if <fc1> specifies a magnetic tape, or a disc of
                    a different type from <fc2>. <int2> and <int1> must not have a
                    common divisor.
        ALL   Specifies that all granules are copied.
        ONLY   Specifies that only the allocated granules are copied; if the OPT
                    parameter is omitted, this is the default.

        Note: When copying to a disc, and the source disc is of a different
                    type from the target disc, the number of cylinders occupied by
                    the new DAD is, if necessary, rounded up to the next integer; the
                    size in granules of the new DAD, however, is the same as that of
                    the source DAD. This remains the case even if the source DAD was
                    first copied to tape, which is then copied to the new disc.

Error Messages:
    INPUT FILE CODE NOT ASSIGNED
    INVALID INPUT DEVICE
    OUTPUT FILE CODE NOT ASSIGNED
    INVALID OUTPUT DEVICE
    NSPT OR NINT OMITTED IN THE COMMAND
    THE DAD HAS NOT BEEN SAVED ON MT BY A PRECEDING SRD COMMAND
    DAD DOES NOT EXIST ON MT OR MT IS NOT WELL POSITIONED
    DAD IS NOT CATALOGUED ON INPUT DISK
    DAD ALREADY EXISTS ON OUTPUT DISK

```
I/O ERROR ON VTOC STAT = <xxxx> FCOD = /<yy>
I/O ERROR STAT = <xxxx> FCOD = /<yy>
NO FREE ENTRY IN VTOC
DISK OVERFLOW
A MAX OF 64 SECTORS PER TRACK IS ALLOWED
NSPT AND NINT VALUES INCOMPATIBLE
SECTOR/TRACK OVERFLOW
DEVICE TYPE UNKNOWN
EOF ENCOUNTERED
INCORRECT SECTOR SIZE
```

See also Appendix A.

Syntax: SVU IUSI=ul[,IDAD=dl][,OUSI=u2][,ODAD=d2]

Use:
This command copies all files existing in the user area defined by DAD dl and
USER ul, to the user area defined by DAD d2 and USER u2.

A file already existing in the second area, with the same filename and type as
a file being copied, will become an old version of that file. Thus if, before
the SVU command is given, an SC type file exists as follows:

-    in user area 1 ---> versions 0, 1, 2
-    in user area 2 ---> versions 0, 1, 2, 3, 4, 5, 6, 7

then, after the SVU command has been performed, the user area 2 contains for
that SC type file:

```
    0,1,2                                    -area 1
    |     0,1,2,3,4,5,6,7                    -area 2
    |     | | | | |     |
    v     v v v v v     |
    0,1,2,3,4,5,6,7   v                      -area 2 after copying
                  5,6,7                      -of old area 2 are deleted.
```

How many versions are kept depends on the number specified in the SMV command
for user area 2.

The second user area is automatically condensed during the execution of the SVU
command.

The file, which is being copied, is listed on file code /01 and file code /02
if this file code is not assigned to the same device.

    Note: for CDC discs (which allow the sector length to vary for
               different DADS), the sector length of the input and output DADS
               must be the same.

    ul   Userid defining the directory, contained in DAD dl, from which the
           files are copied.
    dl   DAD code of the DAD in which the files to be copied can be found.
           Default = :JOB DAD.
    u2   USERID defining the directory, contained in DAD d2, to which the files
           are to be copied. Default = :JOB USID.
    d2   DAD code of the DAD into which the files must be copied.
            Default = :JOB DAD.

Error Messages:
    INVALID FILE CODE
    DISK I/O ERROR
    USERID NOT CATALOGUED
    DAD OVERFLOW
    USER DIRECTORY OVERFLOW
    ASSIGN CANNOT BE DONE
    USERS HAVE DIFFERENT SECTOR LENGTHS
    GRANTB OF FILE pppppp OVERWRITTEN, ADDRESS IN DAD: xxxx
    FILE pppppp IN USE, IS NOT DELETED

    See also Appendix A.