

IEHMAP Version IV-A

A Disk Listing Program

This Write-Up Revised

October 24, 1975

Section I: Introduction

Section I

Introduction

IEHMAP is a program that gives a formatted listing of a VTOC, a dataset or a catalog in a format that is more easily handled than that produced by the IEHLIST system utility. IEHMAP also has special features that have been incorporated as they were requested. Some of these features are the ability to restore missing tracks to a VTOC, to completely re-write the VTOC's format 5 chain, and to give space utilization reports by index level.

IEHMAP runs as a problem program under MVS and requires no special changes to be made to VS. It consists of two reentrant load modules which must have an authorization code (Linkage Editor SETCODE operation) of one (1).

IEHMAP may be invoked in the standard way, passing parameters and/or alternate DDNAME's. See the utilities SRL.

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Section I-A

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Section I-B: JCL To Execute IEHMAP

Section I-B

JCL To Execute IEHMAP

JCL required to execute IEHMAP is standard system utility JCL:

```
//STEPNAME EXEC PGM=IEHMAP<,REGION=xxxxxK>
// <,PARM='LINES=/L=nnn,MIN=mmm,MAX=vvv,TSO'>
//SYSPRINT DD SYSOUT=c<,DCB=BLKSIZE=bbbbbb>
//DDNAME1 DD VOL=SER=volid1,DISP=SHR,UNIT=unitttype
//DDNAME2 DD VOL=SER=volid2,DISP=SHR,UNIT=unitttype
.
.
.
//DDNAMEn DD VOL=SER=volidn,DISP=SHR,UNIT=unitttype
//SYSIN DD *<,DCB=BLKSIZE=sssss>
```

Where:

nnn (line count) is any number from 10 through 999. This will be used to set the line count per page. The default line count is 56.

Note:

If an invalid line count is passed to IEHMAP (less than 10 or greater than 999), the default line count (56) will be used. An error message will be issued; it will appear in the user's JCL.

For installations with unusual paper sizes, etc., this may be permanently overridden by superzapping the constant 'LINESIZE' in CSECT IEHMAPIN in load module IEHMAPIN.

TSO - This notifies IEHMAP that it is running under TSO, and, therefore, it is not authorized. When running under TSO, it cannot ENQ upon the VTOC or catalog; also, the FIXUP and SORT control cards cannot be specified.

mmm (MIN= parameter) is the minimum value (in k-bytes) for the variable conditional GETMAIN's IEHMAP does to obtain the area for control blocks, reading in DSCB's, etc. This will be rounded to the next higher 4-k boundary. The default is 64 (16 4-k pages).

Note:

This can be overridden permanently by superzapping the constant 'MINVALUE' in CSECT IEHMAPIN in load module IEHMAPIN.

Section I-B: JCL To Execute IEHMAP

vvv (MAX= parameter) is the maximum value (in k-bytes) for the variable conditional GETMAIN's IEHMAP does to obtain the area for control blocks, reading in DSCB's, etc. This will be rounded to the next higher j-k boundary. The value must be at least 1 (one) higher than the value of the MIN= parameter (or its default); if it is not, it will be set to mmm+4. The default value is 128 (32 4-k pages).

Note:

This can be permanently overridden by superzapping the constant 'MAXVALUE' in CSECT IEHMAPIN in load module IEHMAPIN.

c (SYSOUT CLASS) is any alpha character from A to Z or any numeric character from 0 through 9.

Note:

For proper output, IEHMAP requires a 132 position printer with a QN or equivalent train/chain; this is required as IEHMAP uses the special symbols <, >, ?, and _.

bbbb (BLKSIZE for SYSPRINT) is any multiple of 137 up to and including full-track blocking; LRECL is 137. The default blocksize is 3509. The record format is VBA.

sssss (BLKSIZE for SYSIN) is any multiple of 80 up to and including full-track blocking; LRECL is 80. The default blocking factor is 1; ie, BLKSIZE=80.

Section I-C: Core Requirements

Section I-C

Core Requirements

xxxxxx (REGION size) at the end of the output for a control card, IEHMAP prints four unnumbered messages giving statistics on core utilization, broken down by subpool number.

1. The second line gives core allocated in k-bytes, the third line gives core used in decimal bytes.
 - a. Region size - This is the size of the region (address space) IEHMAP is running in (under VS2 release 2 or above, this will be the size of the private area).
 - b. Program size - This is the total of subpools 252 (reentrant) and 251 (non-reentrant); it does not include any modules in the VS Link Pack Area.
 - c. Subpool 0 - This is the size of all areas obtained by IEHMAP and the system for i/o buffers, etc. This should be approximately two times the size of (sssss + bbbbb) rounded to a 4-k boundary.
 - d. Subpool 1 - This is the size of the area obtained by IEHMAP for SAVEAREAs for intra CSECT and inter CSECT linkages.
 - e. Subpool 2 - This is the size of the area obtained via variable conditional GETMAIN's for control blocks, read in areas for DSCB's, etc. The minimum and maximum values are controlled by the MIN= and MAX= parameters. Once obtained, this area is not freed until all control cards have been processed; ie, the size may go up with subsequent control cards, but it will never go down. Therefore, the amount used in subpool 2 may be greatly disproportionate to the size of subpool 2.
 - f. Subpool 3 - This is the size of IEHMAP's workarea (containing scratch areas, chain headers, DCB's, etc.)
 - g. MIN= and MAX= - These are the values of the MIN= and MAX= variables for obtaining subpool 2 core. If not overridden via the parm field, they will be set at MIN=64k and MAX=128k.
 - h. Region used - This is the total of all used core in the above subpools.

Section I-C: Core Requirements

2. The fourth line gives the approximate, minimum region required for the current control card running against the current volume. This is a total of the following:
 - a. Subpool 0 allocated
 - b. Subpool 1 allocated
 - c. Subpool 2 used rounded to the MIN= value
 - d. Subpool 3 allocated
 - e. Program size
3. Since IEHMAP does variable conditional GETMAIN's, when running under VS2 release 2 or above, a REGION size must be supplied on the JOB or EXEC JCL card or the SIZE parameter when logging onto TSO, if the default region size is not equal to or greater than the size given in the minimum region required message.
4. For volumes with a large number of datasets, for TTR control card output, for VERIFY control card output, and for SPACE, USERID or DEPT control card output, the region size may have to be increased to as large as 1000k or more.

Section I-D: DD Card's For IEHMAP

Section I-D

DD Card's For IEHMAP

SYSPRINT - This is the primary output for IEHMAP; it contains a listing of the control cards, any error messages that may have been generated, and the output requested by the control cards.

SYSPRINT has a record format of variable blocked with ASA control characters (VBA), a logical record length of 137, and a default blocksize of 3509. The blocksize may be overridden via the DD card.

Note:

This is a change from IEHMAP versions I and II. Versions I and II had a record format of fixed blocked with ASA control characters (FBA) and a logical record length of 133. This was changed in version III to conserve space in the SYSPRINT file.

SYSIN - This is the control card input to IEHMAP. It contains the control cards the user has produced to tell IEHMAP what type of output he wants.

SYSIN has a record format of fixed blocked, a logical record length of 80, and a default blocksize of 80. The blocksize may be overridden via the DD card.

DDNAME1 through DDNAME_n - These DD card's (which can have any DDNAME except the following - SYSIN, SYSPRINT, JOBLIB, STEPLIB, JOBCAT, STEPCAT, SYSABEND, SYSUDUMP, and PGM=*.DD) supply a volume for IEHMAP to work with. If a VTOC listing is requested, IEHMAP will internally change the JFCB to point to the volume's VTOC, if a catalog listing, to the catalog, if a dataset, to the dataset.

Section II: Control Cards

Section II

Control Cards

Control cards for IEHMAP are free form with the following format:

<name> operation operand1 <,operand2> <,OPT=(options)>

name is optional, but if omitted, at least one blank is required. The length of the name field need not be less than or equal eight characters as it is ignored.

operand1 and/or operand2 can be one of the following:

dsname
VOL=valid
CNAME=alt-catalog-name
QUAL=qualifier-name

dsname - This is the fully qualified name of a dataset for IEHMAP to work with or, if the operation is CATLG or USERID, it may be an index level. If it is a member of a GDG, it can be supplied in the manner of JCL; ie, GDG(-1), GDG(0), etc.

VOL= - This is the volume (valid) for IEHMAP to work with or the volume on which dsname or the catalog resides.

CNAME= - This is the dsname to be used on a CATLG listing when the catalog's name is not SYSCTLG. This would be used when a backup copy of the catalog is being kept and you wish to list it.

QUAL= - This gives the number of digits that should be used for a dept operation. The qualifier-name may be any characters which add up to the length desired; eg, QUAL=ddd would give a 3 digit length.

OPT= - For certain of the IEHMAP operations, other operations may be compatible and can be specified as the options of the OPT= field. For certain operations (see below), OPT= must be specified.

Notes:

If valid is not given and dsname is, dsname is assumed to be cataloged and a search of the catalog will be made, using the "SYSRES" catalog as the start of the catalog search.

If valid is given with dsname, that volume will be used as the location of dsname, no catalog search will be made.

If dsname is given in the JCL form of a GDG member, it must be cataloged; therefore, if valid is given, it will be ignored.

If CNAME= is given, VOL= must also be specified, unless the alternate catalog is itself cataloged in the system catalog.

Section II: Control Cards

If multiple options are specified, they must be enclosed in parentheses and separated by commas; if only one option is specified, the parentheses may be omitted.

If the operation is DEPT or SPACE, the VOL= parameter may have multiple valid's enclosed in parentheses; eg,
VOL=(D06DB0,D89RES).

The QUAL= operand may be specified only if the operation is DEPT; in all other cases, it is ignored.

Continuation cards are free format and can start in any column. Continuation is indicated by a comma followed by at least one blank. Card column 72 need not be punched to indicate continuation. Card column one (1) of the continuation card must be blank.

If a control card is continued, the first control card must contain the operation and at least one operand.

Comments can appear anywhere on a control card after a comma and a blank (on continued cards) or after a blank following the last operand on the card.

Comment cards (* in column 1) can appear anywhere in the input stream. There is no limit on the number of comment cards that can be in the input stream, nor on their placement; ie, comment cards may be placed between continued cards.

Section II-A: Control Card Output

Section II-A

Control Card Output

IEHMAP's output can be classified into three general categories:

- output for an entire volume
- output for a specified dataset
- output for a specified catalog

The specific output depends upon the operation requested, the operands supplied, and any options chosen. This will be described briefly after each control card. A fuller description of the output will be given in an appendix along with some sample output.

A summary of each control card and its output follows. This is not comprehensive as the OPT= keyword may add additional output as described under the topics OPT= and other options.

Section II-B: Control Card Operations

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Control Card Operations

Currently, the following operations are implemented:

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Section II-C: Control Card Format

Section II-C

Control Card Format

NAME Control Card

1. <name> NAME VOL=volid

This will give:

a. Information taken from the formats 4, 5, and 6, giving:

- a description of the device type for volid
- a description of the VTOC of volid
- a summary of available space on the volume
- a summary of split cylinder datasets (if applicable)

b. An alphabetical listing of each dataset on volid, giving:

- creation date as dd/mm/yy
- expiration date as dd/mm/yy
- volid created on
- dataset sequence number

or (see OPT=)

- creation date as dd/mm/yy
- reference date as dd/mm/yy
- change date as dd/mm/yy
- DSORG, RECFM, BLKSIZE, LRECL, KEYLEN, OPTCD
- tracks allocated
- tracks actually used
- number of extents
- secondary allocation
- allocation type

Notes:

As IEHMAP validity checks creation and expiration dates (or creation, reference, and change dates) in the DSCB's, an invalid date will not be translated to dd/mm/yy but will be left in the form yy.ddd. This will usually appear on datasets with no expiration date (00.000) or the highest possible expiration date (99.366).

Section II-C: Control Card Format

DSORG (dataset organization) is given as one of the following:

- PS physical sequential
- PO partitioned organization
- IS indexed sequential
- DA direct organization
- VS virtual sequential
- ? Unknown

RECFM (record format) is given in standard DCB format:

- F fixed
- V variable
- U undefined
- B blocked
- S standard (with f)
- S spanned (with v)
- A asa control characters
- M machine control characters

An X in the RECFM indicates that both the ASA and machine bits were on.

A ? indicates that no bits were set.

BLKSIZE, LRECL, and KEYLEN are given in decimal.

OPTCD (option codes) is given in hexadecimal.

Allocation type is given in two columns:

column 1 is the type of allocation:

- C cylinder
- T tracks
- A absolute
- S split cylinder

column 2 is the options specified:

- C contig
- A alx
- M mxig
- R round

If no option was specified, column 2 will be blank.

Section II-C: Control Card Format

- c. The number of datasets on the volume and the space they occupy.

This is a count of the number of datasets (format 1 DSCB's) IEHMAP found on the volume. The space occupied is the sum of the space allocated to all datasets plus that allocated to "unaccounted space" (VTOC, etc.)

- d. A count of the DSCB's in the VTOC

This is a count of the DSCB's IEHMAP read from the VTOC. A count of each type of DSCB is given plus a total of all DSCB's.

see message MAP059I

- e. Errors found in DSCB's counts

Any errors found in the count of DSCB's actually read into core versus the information obtained from the format 4, and the formats 1, 5, 6, and 4 chains.

see message MAP060I

- f. The number of different types of dataset organizations found.

This is a totaling of the various dataset organizations found in the vtoc.

see message MAP068I

- g. The number of datasets by extents.

This is a totaling of the datasets found in the VTOC by the number of extents they occupy.

see message MAP069I

- h. The allocation of datasets by tracks.

This is a totaling of the datasets found in the VTOC by the number of tracks they occupy.

see message MAP070I

- i. The number of contiguous available cylinders.

This is a totaling of available space found in the VTOC by the number of contiguous cylinders it occupies.

see message MAP071I

Section II-C: Control Card Format

- j. The number of contiguous available tracks.

This is a totaling of available space found in the VTOC by the number of contiguous tracks it occupies.

see message MAP072I

- 2. <name> NAME VOL=volid,OPT=NOPRINT

This will give the same information as name 1.a., 1.c. through 1.j; ie, it will not list the dataset information. This is provided to give a quick summary of the VTOC.

TRACKS Control Card

- 1. <name> TRACKS VOL=volid

This will give:

- a. The allocation of each track on the volume in CCHHR order

the starting cchh
the ending cchh
the name of the dataset it is assigned to
an indication that it is free space
an indication that it is assigned to "unaccounted space"
(vtoc, etc.)
the extent number (if assigned to a dataset)
the number of tracks in the extent

- b. A listing of any errors found in track allocation

overlapping tracks
missing tracks
invalid extents

Note:

If missing tracks are found, in place of the starting and ending CCHH's a hexadecimal number will appear; this is the value that would have to be placed in a format 5 to recover this space as available space.

- c. A totalling of all tracks found

- d. A totalling of all tracks missing (if applicable)

Section II-C: Control Card Format

2. <name> TRACKS VOL=volid,OPT=NOPRINT

This will give the same information as tracks 1.b. through 1.d.; ie, it will not print the allocation of each track on the volume.

MAP Control Card

1. <name> MAP VOL=volid

This will give a combination of the output of name and tracks for volid. This would be the normal control card for IEHMAP.

NAME and TRACKS would normally be used only if the message:

MAP032W *** NO MORE CORE, ABORTED ***

appears, and a larger region could not be obtained to run IEHMAP in.

2. <name> MAP VOL=volid,OPT=NOPRINT

This will give the same information as under NAME 2. And TRACKS 2.

DUMP Control Card

1. <name> DUMP VOL=volid

This will give the same information as MAP VOL=volid plus a hex dump of each DSCB in the format 4, 5, and 6 chains, and the format 1 chain.

2. <name> DUMP dsname

This will give the same information about dsname that NAME would give, plus a dump of the DSCB's associated with dsname.

DUMP456 Control Card

1. <name> DUMP456 VOL=volid

This will give the information about the vtoc that a name VOL=volid control card would give, plus a hex dump of the format 4, 5, and 6 chains.

Section II-C: Control Card Format

2. <name> DUMP456 dsname

This will give the same information as a DUMP dsname control card would give; ie, it will not investigate the format 4, 5, and 6 chains but the format 1 chain.

CCHHR Control Card

1. <name> CCHHR VOL=valid

This will give the same information as a DUMP VOL=valid control card would give; however, the DSCB's will be dumped in CCHHR order; that is, they will be dumped in the order they are in the VTOC, not alphabetically by dataset name. Also, the various chains of DSCB's (the format 1 chain, the format 5 chain, and the format 6 chain) will not be dumped in chain order. This is similar to the dump option of IEHLIST.

2. <name> CCHHR dsname

This will give the same information as a CCHHR VOL=valid control card would for the volume on which dsname resides; ie, it will not dump only the DSCB's associated with dsname - this would be accomplished by using the DUMP dsname control card.

DSNAME Control Card

1. <name> DSNAME dsname

This will give the same information as a NAME control card for dsname only.

PDS Control Card

1. <name> PDS dsname

This will give the same information as a DSNAME control card for dsname if it is a partitioned organization (PO) dataset.

It will also give a listing of the members from the directory in alphabetical order, along with a dump of the directory information in hexadecimal, and a summary of the directory space.

Note:

An 'A' after a member name indicates that it is an alias.

If dsname is not PO, there will be no output for this control card. The DSNAME control card would have to be used in this case.

Section II-C: Control Card Format

2. <name> PDS VOL=valid

This will give the PDS control card output for each PO dataset on valid.

TTR Control Card

1. <name> TTR dsname

This will give the same information as a PDS control card would; however, the members from the directory will be listed in TTR order, not alphabetically. Alias names will be sorted alphabetically after the true member name.

2. <name> TTR VOL=valid

This will give the TTR control card information for each PO dataset on valid.

ATTRIB Control Card

1. <name> ATTRIB dsname

This will give the same information as a DSNAME control card for dsname if it is a partitioned organization (PO) dataset.

It will also give a listing of the members from the directory in alphabetical order, and if the members are load modules, it will format the linkage editor data from the directory as follows:

- the member name
- an indication that the member is an alias
- the ttr where the member starts
- the number of user ttr's
- the ttr where the text records start
- the os/vs linkage editor flags
- the load module size (storage required)
- the load module entry point
- the setssi data (if present)
- the setcode data (if present)
- the true member name if an alias
- the true entry point if an alias
- the load modules linkage editor attributes

- REFR refreshable
- RENT re-entrant
- REUS reuseable
- DC downward compatible
- OL only loadable
- OVLY overlay
- NE not editable
- NOTEX not executable

Section II-C: Control Card Format

Notes:

If the load module was link edited with the OS linkage editor, the VS linkage editor flags will not be present.

If an alias member was not link edited with the VS linkage editor, the true member name and entry point will only appear if the load module is re-entrant or refreshable.

If the module was link edited with the OS linkage editor, the SETCODE information will not be present.

2. <name> ATTRIB VOL=valid

This will give the attrib control card output for each PO dataset on valid.

DIR Control Card

1. <name> DIR dsname

This will give the same information as a dsname control card for dsname if it is a PO dataset, plus the summary of the directory space that a PDS control card gives.

2. <name> DIR VOL=valid

This will give the DIR control card information for each PO dataset on valid.

VERIFY Control Card

1. <name> VERIFY VOL=valid

This gives the same information as a NAME VOL=valid control card; in addition, a verification of the format 4, 5, 6, and 1 chains is performed.

By verification is meant the following:

- all formats 5 are validated to be chained from the first format 5
- all formats 6 are validated to be chained from the format 4
- all formats 2 are validated to be chained from a format 1
- all formats 3 are validated to be chained from a format 1 or 2

Any errors, such as dangling (ie, non-chained) formats 2, 3, 5 or 6 are listed.

Section II-C: Control Card Format

If a second format 4 is found, it will be listed.

If the key of a format 0 DSCB is not 44 hex zeroes, it too will be listed.

If an unknown DSCB type (with an id higher than 6) is found, it will also be listed.

FREE Control Card

1. <name> FREE VOL=valid

This gives a description of the VTOC and a summary of the available space. This is a modification of the NAME control card card output (QV).

CATLG Control Card

Note:

The catalog processing routines of IEHMAP cannot process a VSAM catalog.

1. <name> CATLG VOL=valid

This will give:

- a. A summary of the catalog for valid giving:

the number of blocks in the catalog
the first available ttr in the catalog
the first extent of the catalog
the number of extents the catalog occupies
the number of catalog blocks per track

- b. An alphabetical listing of all catalog entries giving:

the catalog entry
the type of entry
the number of volumes a dataset is cataloged to
valid(s) a dataset is cataloged to
volume type in hex
volume description
volume sequence number

Note:

A volume description of 'unknown' says that that particular type of device is not in IEHMAP's table of volume types. This usually occurs on datasets that are cataloged via IEHPROGM using VOL=SYSDA=valid.

Section II-C: Control Card Format

This can be corrected by superzapping the CATDEV CSECT in load module IEHMAP.

If an entry is an alias, the true name will appear to the right of the alias name.

c. Information from a GDG index

The number of entries to keep the flags

d. A summary of the index blocks found giving:

the number of GDG indices found
the number of CVOL entries found
the number of unused indices found
the number of datasets cataloged
the number of alias entries found
the maximum number of indices in a name

e. A usage summary of the catalog blocks

the number of blocks in the catalog
the number of unused blocks in the catalog

f. A summary of i/o operations

the number of entries to the read routine
the number of catalog blocks found in core

These two statistics give some indication of the fragmentation of the catalog indices. The number of entries to the read routine is the number of times a chain of blocks was being followed (either forward or backwards). The number of catalog blocks found in core is the number of times a previously read catalog block was requested (for efficiency and to lessen i/o operations, as IEHMAP goes forward down an index chain, it keeps the previously read blocks in core).

2. <name> CATLG

This will be interpreted as requesting the catalog of the current "SYSRES" device.

Note:

a DD card for "SYSRES" is required.

Section II-C: Control Card Format

3. <name> CATLG dsname<,VOL=volid>

This will start the catalog listing at dsname. The dsname may be fully qualified or may be an index level; it may be a GDG member and may be given in the manner of JCL (ie, of the form GDG(-1), etc.)

4. <name> CATLG CNAME=dsname,VOL=volid

This indicates to IEHMAP that dsname is an alternate catalog (ie, it does not have a dsname of SYSCTLG), and tells IEHMAP to give a CATLG listing of it.

All options valid for CATLG control cards can be specified with CNAME=.

5. <name> CATLG VOL=volid,OPT=NOPRINT

This gives the information about the catalog on volid that CATLG 1.a, 1.d through 1.f gives.

All options valid for CATLG control cards, including CNAME=, may be specified with OPT=NOPRINT.

OVERLAP Control Card

1. <name> OVERLAP VOL=volid

This will check the VTOC of volid for overlapping extents and list any that are found. This is a modification of the TRACKS control card output (QV).

MISSING Control Card

1. <name> MISSING VOL=volid

This will check the VTOC of volid for missing tracks, and list any that are found. This is a modification of the tracks control card output (QV).

AVAIL Control Card

1. <name> AVAIL VOL=volid

This will list all available space on volid in CCHHR order. This is a modification of the TRACKS control card output (QV).

Section II-C: Control Card Format

SPACE Control Card

1. <name> SPACE VOL=volid

This requests that a listing of all datasets available to IEHMAP (via DD cards pointing to volumes) be given by first level qualifier, that a check be made for their being cataloged in the catalog on volid, and a space accounting be made of the track allocation and usage.

Datasets which are cataloged but not available to IEHMAP will be flagged with the indication:

NOT ON VOLUME OR VOLUME NOT MOUNTED

2. <name> SPACE VOL=(volid,volid,...)

This tells IEHMAP that a space report should be given and that multiple catalogs are to be used. The catalogs are on volid, volid, ...

USERID Control Card

1. <name> USERID index,VOL=volid

This requests that a SPACE control card output be given for the index level given on the control card. A space accounting for all datasets available to IEHMAP (via DD card's) for the index level specified will be given. The volid given in the VOL= operand is the location of the catalog for the index given.

DEPT Control Card

1. <name> DEPT QUAL=qualifier,VOL=volid

This requests that a SPACE control card output be given, but the output should be segmented by departments. The size of the departmental id is given by the number of characters in the qualifier; ie, the count of characters determines where IEHMAP should start accounting for a new department. Eg, QUAL=xxx specifies that the departmental identifiers are in the first three characters of all indices.

2. <name> DEPT QUAL=qualifier,VOL=(volid,volid,...)

This requests that the DEPT control card output be given for multiple catalogs. The catalogs are on volid, volid, ...

Section II-C: Control Card Format

FIXUP Control Card

1. <name> FIXUP VOL=volid

This tells IEHMAP to make an attempt to recover missing tracks on volid. This is done by adding missing extents to the last format 5 in the format 5 chain, and in addition, one extra format 5 will be build from a format 0. By this means, from 26 to 51 missing extents may be recovered.

The output of FIXUP is the same as two TRACKS control cards. The first output shows the missing tracks that were found, and the action that IEHMAP took (replaced or not replaced). The second is a normal TRACKS output showing what the VTOC looks like after the FIXUP operation.

SORT Control Card

1. <name> SORT VOL=volid

This requests IEHMAP to make a more encompassing attempt to recover missing tracks than a FIXUP will do. IEHMAP attempts to arrange the missing tracks in CCHHR order in the format 5 chain, then the format 5 chain is rewritten.

The output of a SORT operation is the same as a FIXUP; however, all free space will be listed as missing, and the action IEHMAP took will be shown.

SORT should be used if the second output of a FIXUP shows that IEHMAP has created multiple contiguous extents, and/or the volume has more than three formats 5. By multiple contiguous free extents is meant two or more contiguous extents marked as 'AVAILABLE' on the second output of FIXUP.

SEND Control Card

1. <name> SEND message-to-be-sent-to-system-operator

This allows the user of IEHMAP to send a message to the system operator. This could be used to supply the password for a 'read' protected dataset during a PDS operation, etc.

The message cannot be continued beyond column 71; for messages longer than the allowable length, multiple SEND cards would have to be used.

There is no limit to the number of send cards that can be in the IEHMAP input stream nor their placement as they are treated as comment cards (see below).

Section II-C: Control Card Format

Comment Cards

Comments may be included in the IEHMAP input stream by having an asterisk (*) in column 1. The comment may be extended to column 80 as no check of the card is made.

There is no limit as to the number of comment cards that may be included, nor on their positioning.

PASS Option

1. <name> operation operand1<,operand2>,OPT=PASS

The PASS option may be specified for PDS, TTR, DIR or ATTRIB control cards. If a dataset is partitioned but is protected for 'read' (ie, pwread), IEHMAP will not attempt to give a PDS, TTR, DIR, or ATTRIB listing for this dataset unless OPT=PASS was specified. This is done to minimize operator intervention during an IEHMAP run. If a dataset is protected only for 'write' (ie, pwwrite), IEHMAP will open it and give the directory information requested.

TTR Option

1. <name> ATTRIB operand1,OPT=TTR

The TTR option, when specified on the attrib control card, will give the same output as the ATTRIB control card; however, the member names will be sorted in TTR order not alphabetical.

OTHER Options

1. <name> operation operand1<,operand2>,OPT=DUMP

The DUMP option may be specified on most control cards. The control cards on which it is most useful are PDS, TTR, DIR, ATTRIB, and CATLG.

On the PO dataset operations, the DSCB's associated with the dataset will be dumped, in hex, after the requested output.

On the CATLG operation, each catalog block will be dumped, in hex, as it is read; ie, the catalog entry following the dumped catalog block may not belong to that block but may have been built from up to 22 previous blocks (the maximum number of indices in a cataloged dataset name).

The equivalent of OPT=DUMP for a MAP control card is the DUMP control card, but OPT=DUMP may be specified on a MAP control card.

Section II-C: Control Card Format

2. <name> operation operand1<,operand2>,OPT=AQUEUE

This says that the open, close, and eov routines have been modified to set a reference and change date in the format 1 DSCB. This requests that the creation, reference and change dates be formatted in place of the volume created on, the dataset sequence number, and the expiration date.

3. <name > operation operand1<,operand2>,OPT=NOPRINT

The NOPRINT option may be specified on most control cards. The control cards on which it is most useful are MAP and CATLG.

When NOPRINT is specified, no dataset information will be given; only the summaries will be outputted. Therefore, it is not advisable to use OPT=NOPRINT on PDS, ATTRIB, etc. control cards.

Section III: Messages

Section III

Messages

All IEHMAP messages are of the following format:

msgid-msgnumber-severity message

msgid is always MAP

msgnumber is the number in IEHMAP's table

severity is a one character code

I informational	.....	RC=0
W warning	.....	RC=4
E error	.....	RC=8
T terminal	.....	RC=12
C catastrophic	.....	RC=16

Notes:

I informational - this is a message to inform the user of some event, data, total, etc.

W warning - this is a message to inform the user of some unusual occurrence which may or may not have some effect on IEHMAP's processing of the current control card.

E error - this is a message to inform the user of some condition that precludes IEHMAP from processing the current control card.

T terminal - this is a message to inform the user of a condition that precludes IEHMAP processing any control card.

C catastrophic - this is a message to inform the user of a condition that IEHMAP recognizes as being disastrous to its processing, such as possible loops, etc. This will be accompanied by a userabend.

Section III-A: Messages in SYSPRINT

Section III-A

Messages In SYSPRINT

MAP000I input card from SYSIN

This is an echo of the control card from SYSIN in the SYSPRINT file.

MAP001I TSO SPECIFIED, OPERATION CANCELLED

The TSO parameter was specifeid in the parm field; therefore, neither the SORT nor the FIXUP operations can be specified.

MAP002T NO SYSIN DD CARD

This appears in the SYSPRINT output when the SYSIN DD card or its alternate did not open.

MAP003W "oooooooo" UNKNOWN OPERATION/OPERAND

This appears when an invalid operation was requested; ooooooooo is the invalid operation.

MAP004E F1 DOES NOT -> AT F2 OR F3

This appears when a format 1 indicates that there is another DSCB chained from it, but that DSCB is not a format 2 or 3. It is accompanied by a dump of the format 1 and the DSCB it pointed to.

MAP005E F2 DOES NOT -> AT F3

This appears when a format 2 indicates there is a format 3 chained from it, but the DSCB was not a format 3. It is accompanied by a dump of the format 2 and the DSCB it pointed to.

MAP006E F4 DOES NOT -> AT F6

This appears when the format 4 indicates there is a format 6 chain, but the DSCB pointed to was not a format 6. It is accompanied by a dump of the format 4 and the DSCB it pointed to.

MAP007I DDDDD TOTAL TRACKS MISSING

This appears at the end of the track map listing when one or more tracks are missing.

Section III-A: Messages in SYSPRINT

MAP008I dddd TRACKS ACCOUNTED FOR

This appears at the end of the track map listing indicating how many tracks were accounted for. Depending upon overlaps, invalid extents, and missing tracks, this may be accurate or not; however, this is the total that dasdm will regard as the number of tracks, both free and used, that this volume contains.

MAP009E CANNOT FIND DDCARD FOR VOLUME

This appears when a search of the tiot did not find a useable DD card that would allocate the required volume to IEHMAP. IEHMAP will not use DD cards with the following names:

SYSIN
SYSPRINT
JOBLIB
STEPLIB
JOB CAT
STEP CAT
SYSABEND
SYSUDUMP
PGM=*.DD

also, IEHMAP will not use DD cards that are concatenated.

MAP010E DEVICE NOT DIRECT ACCESS

This appears when the volid obtained, either through a VOL=volid parameter or a search of the catalog, was not a direct access device type. Only direct access devices are supported by IEHMAP.

MAP011E UNKNOWN DEVICE TYPE

This appears whenever the volid obtained, either through the VOL=volid parameter or a catalog search, is on a device type that IEHMAP does not support. IEHMAP supports the following devices only:

2301, 2302, 2303, 2305-1, 2305-2, 2311, 2314, 3330, 3330-1,
and 3340

IEHMAP does not support 2321's.

MAP012E ATTEMPT TO OPEN VTOC FAILED

This appears when the DCBOFLGS bit in the DCB for the VTOC was not set by open. This should never occur as IEHMAP has done a TIOT search for the DD card allocating the volume to itself. If this does occur, it is probably an error in open.

Section III-A: Messages in SYSPRINT

MAP013E FIRST DSCB NOT F4

This appears when the first DSCB read from the VTOC is not a format 4. This indicates the volume is not useable by VS.

MAP014E BAD DSCB; SHOULD HAVE BEEN F5

This appears when the second DSCB read from the VTOC is not a format 5. This indicates that the volume is not useable by VS. A dump of the bad DSCB accompanies the message.

MAP015I CONTAINS mmmm MEMBERS, aaaa ALIASES, AND USES uuuu OF THE dddd DIRECTORY BLOCKS ALLOCATED.

This is the summary of the directory of a PO dataset. This is only put out for a PDS, ATTRIB, TTR or DIR control card.

mmm is the number of members
aaaa is the number of aliases
uuuu is the number of used blocks
dddd is the number of allocated blocks

MAP016E CARD IN ERROR

This appears when the card listed in the MAP000I message above this message has a syntax error.

MAP017E CVOL NOT MOUNTED

This appears when a cvol was not mounted for a locate operation. (locate return code 4)

MAP018E DATASET NOT CATALOGED

This appears when a catalog search could not find the dataset name. (locate return code 8)

MAP019E INDEX FOUND AT DATASET LEVEL

This appears when an index level was given instead of a dataset name; ie, the dataset name needs further qualification. (locate return code 12)

MAP020E DATASET FOUND AT INDEX LEVEL

This appears when a dataset name is too fully qualified; ie, the dsname is really shorter than given. (locate return code 16)

Section III-A: Messages in SYSPRINT

MAP021E SYNTAX ERROR IN DATASET NAME

This appears when some syntax error was found by the locate routines in the dsname. This could be a 9 character index, etc. IEHMAP does not validity check dataset names passed to it via control cards other than for those on a CATLG control card. (locate return code 20)

MAP022E PERMANENT I/O ERROR IN CATALOG

This appears when the locate routines diagnose an i/o error in the catalog. (locate return code 24)

MAP023E RELATIVE TTR NOT IN CATALOG

This appears when a TTR obtained from some previous catalog block points outside the catalog extents. (locate return code 28)

MAP024E VOLUME NOT MOUNTED

This appears when an obtain of a DSCB, via the obtain SVC, failed. (obtain return code 4)

MAP025E DATASET NOT FOUND ON VOLUME

This appears when obtain could not find the DSCB for dsname on the volume found through the catalog or via the VOL=valid parameter. (obtain return code 8)

MAP026E PERMANENT I/O ERROR IN VTOC

This appears when the obtain routines diagnose an i/o error in the VTOC. (obtain return code 12)

MAP027E INVALID WORKAREA ->

This appears when the obtain routines determine that the workarea pointer passed by IEHMAP is not valid. As IEHMAP does a GETMAIN for its workarea, the occurrence of this message is an error in GETMAIN. (obtain return code 16)

MAP028E CCHHR NOT IN VTOC

This appears when a DSCB has a pointer to a chained DSCB and the pointer was to an address outside of the VTOC. (obtain return code 20)

MAP029E EOF READING F4

This appears when an end of file condition was encountered when reading the first DSCB from the VTOC. This means the volume is not useable by VS.

Section III-A: Messages in SYSPRINT

MAP030E EOF READING 1ST F5

This appears when an end of file condition was encountered when the second DSCB of the VTOC was being read, this is the first format 5 in the VTOC. This means that the volume is not useable by VS.

MAP031E F6 DOES NOT -> AT F6

This appears when a format 6 indicates that there is another format 6 chained from it, but the DSCB pointed to was not a format 6. This is accompanied by a dump of the format 6 and the DSCB that it was pointing to.

MAP032W *** NO MORE CORE, ABORTED ***

This appears when IEHMAP could not get enough core to do the requested operation in. IEHMAP will attempt to give as much useful information as it can from what it has been able to read into core with the core available.

MAP033E F3 DOES NOT -> AT F3

This appears when a format 3 indicates that there is another format 3 chained from it, but that DSCB was not a format 3. This is accompanied by a dump of the format 3 and the DSCB that was chained from it.

This will probably never appear, as at present, VS does not support more than one format 3 to a dataset.

MAP034E ERROR RE-WRITING F5

This appears when IEHMAP had an i/o error attempting to re-write the format 5 chain during a FIXUP or SORT operation.

MAP035W PERMANENT I/O ERROR IN DIRECTORY

This appears when an i/o error occurred while IEHMAP was reading a PO dataset's directory. This probably means that the directory has been overwritten.

MAP036I DDDD TRACKS REPLACED

This appears on a FIXUP or SORT operation giving the number of tracks IEHMAP was able to recover to the format 5 chain.

MAP037I DDDDD TRACKS NOT REPLACED

This appears on a FIXUP or SORT operation giving the number of tracks IEHMAP was not able to add back into the format 5 chain. If this appears, another FIXUP or SORT operation should be tried. IEHMAP will add only one format 0 into the format 5 chain during any one FIXUP or SORT operation.

Section III-A: Messages in SYSPRINT

MAP038W VTOC CONTAMINATED, WARNING

This appears when the BOS/DOS bit is set in the format 4 of the VTOC. This means that the information obtained from the format 5 chain may be erroneous (neither BOS nor DOS maintain the format 5 chain).

MAP039E F5 DOES NOT -> AT F5

This appears when a format 5 indicated that there was another format 5 chained from it, but the DSCB was not a format 5. This is accompanied by a dump of the format 5 and the DSCB that was chained from it.

MAP040W *** OUTPUT MAY BE ERRONEOUS DUE TO ERRORS ***

This appears when some non-terminal error occurred to notify the user that the output may be inaccurate.

MAP041I TOTALS FOR VOLUME

This is the heading which precedes the totals produced for a volume. Messages MAP059I, MAP068I, MAP069I, MAP070I, MAP071I, and MAP072I follow this heading. Also, if there were error in the DSCB counts, message MAP060I will follow MAP059I.

MAP042E "VVVVVV" DOES NOT CONTAIN CATALOG

This appears when the volume specified in the VOL=valid parameter of a CATLG control card did not contain a SYSCTLG dataset (the catalog) or the dsname given in the CNAME=dsname parameter.

MAP043W AT XXXXXX DID NOT FIND ICE

This appears when some previous catalog block indicated that there was an ICE (index control entry) at relative TTR xxxxxx. This is accompanied by a dump of the block found, the IEHMAP MAPCAT control queues, and all catalog blocks currently in core.

MAP044W AT XXXXXX FOUND ICE

This appears when a previous catalog block indicated that there was a non-ICE block at relative TTR xxxxxx, and an ICE was found there. This is accompanied by a dump of the block found, the IEHMAP MAPCAT control queues, and all catalog blocks currently in core.

MAP045W AT XXXXXX FOUND INVALID ENTRY TYPE

This appears when the catalog block at relative TTR xxxxxx could not be identified as a valid catalog entry. It is accompanied by a dump of the block found, the IEHMAP MAPCAT control queues, and all blocks currently in core.

Section III-A: Messages in SYSPRINT

MAP046E COULD NOT FIND SYSRES DEVICE

This appears when a CATLG control card with no VOL= parameter was in the input stream, and the "SYSRES" volume could not be found through a search of the UCB's.

This message will probably never appear -- OS would have crashed first.

MAP047W PASSWORD PROTECTED, NO PDS LIST

This appears when a PO dataset was found that was protected for read and the OPT=PASS parameter was not specified. This can be bypassed by using OPT=PASS and supplying the password to the system operator.

MAP048W F0 KEY NOT ALL HEX ZEROES

This appears when, on a VERIFY operation, a format 0 was found that did not have a key of 44 hex zeroes. It is accompanied by a dump of the format 0.

MAP049W FOUND SECOND F4

This appears when, on a VERIFY operation, a second format 4 was found in the VTOC. It is accompanied by a dump of the second format 4.

MAP050W FOUND UNCONNECTED F5

This appears when, on a VERIFY operation, a format 5 was found that was not in the format 5 chain. It is accompanied by a dump of the format 5.

MAP051W FOUND UNCONNECTED F6

This appears when, on a VERIFY operation, a format 6 was found that was not in the format 6 chain. It is accompanied by a dump of the format 6.

MAP052W FOUND UNCONNECTED F2

This appears when, on a VERIFY operation, a format 2 was found that was not connected to a format 1. It is accompanied by a dump of the format 2.

MAP053W FOUND UNCONNECTED F3

This appears when, on a VERIFY operation, a format 3 was found that was not in a format 1 chain. It is accompanied by a dump of the format 3.

Section III-A: Messages in SYSPRINT

MAP054W FOUND UNKNOWN DSCB TYPE

This appears when, on a VERIFY operation, a DSCB was found that was not a format 0, 1, 2, 3, 4, 5, or 6. It is accompanied by a dump of the DSCB.

MAP055E VERIFY CANCELLED, NO MORE CORE

This appears on a verify operation when another block of core could not be obtained to save DSCB's in.

MAP056I unused at present

MAP057I NUM GEN.IX=gggg NUM CVOL=cccc NUM INDEX=iiii
NUM ALIAS=aaaa MAX INDEX=mmmm

This is a summary of the catalog indices

gggg is the number of gdg indices
cccc is the number of cvol pointers
iiii is the number of unused indices
dddd is the number of datasets cataloged
aaaa is the number of alias entries
mmmm is the maximum number of indices in a name

MAP058W COULD NOT OPEN dataset-name

This appears when an attempt to open a PO dataset's directory failed. Dataset-name is replaced by the name of the dataset.

MAP059I NUMF0=zzzz NUMF1=oooo NUMF2=iiii NUMF3=tttt NUMF4=vvvv
NUMF5=ffff NUMF6=ssss

This is a summary of the totals of different DSCB types for the VTOC

zzzz is the number of formats 0 (unused DSCB's)
oooo is the number of formats 1 (dataset names)
iiii is the number of formats 2 (ISAM extension)
tttt is the number of formats 3 (secondary allocation)
vvvv is the number of formats 4 (VTOC descriptor)
ffff is the number of formats 5 (free space)
ssss is the number of formats 6 (split cylinder)

MAP060I F0ERROR F1ERROR F2ERROR F3ERROR F4ERROR F5ERROR
F6ERROR TOTAL ERROR

This is a summary of any errors found in the count of DSCB's read versus the counts obtained from the format 4 and formats 1, 5, and 6 chains. The word 'yes' after any of the headings indicates that an error was found.

Section III-A: Messages in SYSPRINT

MAP061E DSNAME GT 44 CHARACTERS

A dataset name passed via the control card was more than 44 characters long. No dataset name can be more than 44 characters long.

MAP062E VOLID GT 6 CHARACTERS

A volid passed via the control card was more than 6 characters long. No volid can be more than 6 characters long.

MAP063E OPERATION GT 8 CHARACTERS

The operation field on the control card was more than 8 characters. No IEHMAP operation is more than 8 characters long.

MAP064E QUALIFIER GT 42 CHARACTERS

The index level given on a CATLG or a USERID control card was more than 42 characters long, this does not leave space for final qualifiers in the dsname.

MAP065I FOR INDEX iiiiiiii TRACKS ALLOCATED=tttttt
TRACKS USED=uuuuuu NUMBER OF DATASETS=dddddd

This is an accounting of space utilization given for each first level qualifier by the space control card or for the qualifier specified on userid control card.

iiiiiii is the first level qualifier
tttttt is the total tracks allocated
uuuuuu is the total tracks used
dddddd is the number of datasets found

MAP066I NUMBER OF CATALOG BLOCKS=nnnnnn
NUMBER OF BLOCKS UNUSED=uuuuuu

This is an accounting of the number of free blocks in the catalog.

nnnnnn is the total number of blocks in the catalog
uuuuuu is the total number of blocks unused

MAP067C SAVEAREA COUNT EXCEEDED

Due to some error in the control card or in IEHMAP itself, the maximum depth of SAVEAREAs was exceeded; ie, IEHMAP recursed upon itself until the depth of SAVEAREAs exceeded 100.

This will be accompanied by a user 001 abend.

Section III-A: Messages in SYSPRINT

```
MAP068I DATASET ORGANIZATONS PS=sssss PO=ooooo DA=aaaaa
      IS=iiiiii VS=vvvvvv UNKNOWN=uuuuu
```

This is a total of the different types of dataset organizations found on the volume.

```
sssss is the number of PS datasets
ooooo is the number of PO datasets
aaaaa is the number of DA datasets
iiiiii is the number of ISAM datasets
vvvvv is the number of VSAM datasets
uuuuu is the number of undefined datasets
```

```
MAP069I DATASETS BY EXTENTS 0=zzzzz 1=ooooo 2=ttttt 3=rrrrr
      4=fffff 5=iiiiii 5LT10=lllll 10=eeeeee 10+=ppppp 16=sssss
      HIGH=hhhhh
```

This is a total of the different datasets by the number of extents they occupy.

```
zzzzz is the number having 0 extents
ooooo is the number having 1 extent
ttttt is the number having 2 extents
rrrrr is the number having 3 extents
fffff is the number having 4 extents
iiiiii is the number having 5 extents
lllll is the number having more than 5 but less than 10
extents
eeeeee is the number having 10 extents
ppppp is the number having more than 10 extents
sssss is the number having 16 extents
hhhhh is the highest number of extents found
```

```
MAP070I ALLOCATION BY TRACK 0=zzzzz 1=ooooo 2=ttttt 3=rrrrr
      4=fffff 5=iiiiii 5LT10=lllll 10=eeeeee 10+=ppppp 19=nnnnn
      HIGH=hhhhh
```

This is the total of the different datasets by the number of tracks they occupy.

```
zzzzz is the number having 0 tracks
ooooo is the number occupying 1 track
ttttt is the number occupying 2 tracks
rrrrr is the number occupying 3 tracks
fffff is the number occupying 4 tracks
iiiiii is the number occupying 5 tracks
lllll is the number occupying more than 5 but less than 10
tracks
eeeeee is the number occupying 10 tracks
ppppp is the number occupying more than 10 tracks
nnnnn is the number occupying 19 tracks
hhhhh is the highest number of tracks allocated to a
dataset
```

Section III-A: Messages in SYSPRINT

```
MAP071I CONTIG AVAIL BY CYL 0=zzzzz 1=ooooo 2=ttttt 3=rrrrr
4=fffff 5=iiiii 5LT10=lllll 10=eeee 10+=ppppp 19=nnnnn
HIGH=hhhhh
```

This is a totaling of the available, contiguous cylinders found in the VTOC. This includes only cylinders on cylinder boundaries.

```
zzzzz is the number having 0 cylinders
ooooo is the number having 1 cylinder
ttttt is the number having 2 cylinders
rrrrr is the number having 3 cylinders
fffff is the number having 4 cylinders
iiiii is the number having 5 cylinders
lllll is the number having more than 5 but less than 10
cylinders
eeee  is the number having 10 cylinders
ppppp is the number having more than 10 cylinders
nnnnn is the number having 19 cylinders
hhhhh is the highest number of contiguous cyliners
```

```
MAP072I CONTIG AVAIL BY TRK 0=zzzzz 1=ooooo 2=ttttt 3=rrrrr
4=fffff 5=iiiii 5LT10=lllll 10=eeee 10+=ppppp 19=nnnnn
HIGH=hhhhh
```

This is a totaling of the available, contiguous tracks found in the VTOC. This includes tracks that are before and after available cylinders; ie, they would be described as one extent in the format 5.

```
zzzzz is the number having 0 tracks
ooooo is the number having 1 track
ttttt is the number having 2 tracks
rrrrr is the number having 3 tracks
fffff is the number having 4 tracks
iiiii is the number having 5 tracks
lllll is the number having more than 5 but less than 10
tracks
eeee  is the number having 10 tracks
ppppp is the number having more than 10 tracks
nnnnn is the number having 19 tracks
hhhhh is the highest number of contiguous tracks
```

Section III-B: Messages in JCL

Section III-B

Messages In JCL

The following messages will appear in the user's JCL.

MAP090T SYSPRINT DID NOT OPEN

SYSPRINT or its alternate did not open.

MAP091W UNRECOGNIZABLE PARM

A character string in the parm field was not recognized by the parm field processing routine.

MAP092W INVALID PAGESIZE, DEFAULT USED

The linecount given in the LINES= or L= parameter was less than 10 or greater than 999.

MAP093W NON DECIMAL IN PARM FIELD

One of the parameters passed via the parm field contained a non-decimal character.

MAP094W PARM FIELD TOO LONG

One of the parameters passed via the parm field was more than three (3) digits long.

MAP095W MAX VALUE TOO LOW, CHANGED TO MIN+4

The value passed in the MAX= parameter was lower or equal to the MIN= parameter or the default for MIN=.

Section III-C: Unnumbered Messages

Section III-C

Unnumbered Messages

Most unnumbered messages produced by IEHMAP are headings for the formatted listings. These will be presented in alphabetical order by the first word.

To Be Added

Section III-D: Abend Codes

Section III-D

Abend Codes

IEHMAP will produce a user abend in conditions where it cannot recover from an error. The abend will be preceded by a severity 'C' message.

Abend Code 001

This is issued when the SAVEAREA chaining routine has determined that 100 SAVEAREAs have been chained, and another is being requested. This is probably a loop in the program. This will be accompanied by message MAP069C.

Section IV: Abbreviations

Section IV

Abbreviations

Many IEHMAP operations and operands have one or more abbreviations; they are given here in alphabetical order with the full operation or operand, and the page it appears on

A	ATTRIB	P 18
AQ	AQUEUE	P 26
ATTR	ATTRIB	P 18
ATTRIB	ATTRIB	P 18
AVAIL	AVAIL	P 22
C=	CNAME=	P 8
CATLG	CATLG	P 20
CCHHR	CCHHR	P 17
CNAME=	CNAME=	P 8
DEPT	DEPT	P 23
DIR	DIR	P 19
DSN	DSNAME	P 17
DSNAME	DSNAME	P 17
DUMP	DUMP	P 16
DUMP456	DUMP456	P 16
D456	DUMP456	P 16
FIXUP	FIXUP	P 24
FREE	FREE	P 20
M	MAP	P 16
MAP	MAP	P 16
MISSING	MISSING	P 22
NAME	NAME	P 12
NOPRINT	NOPRINT	P 26

Section IV: Abbreviations

NP	NOPRINT	P 26
O=	OPT=	P 25
OPT=	OPT=	P 25
OVERLAP	OVERLAP	P 22
PASS	PASS	P 25
PDS	PDS	P 17
Q=	QUAL=	P 8
QUAL=	QUAL=	P 8
S	SEND	P 24
SEND	SEND	P 24
SORT	SORT	P 24
SPACE	SPACE	P 23
TRACKS	TRACKS	P 15
TTR	TTR	P 18
U	USERID	P 23
USERID	USERID	P 23
VALIDATE	VERIFY	P 19
VERIFY	VERIFY	P 19
V=	VOL=	P 8
VOL=	VOL=	P 8