Laser-Scan Ltd.

IMP

User Guide

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First customer issue of IMP user guide documentation.

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ICHECK documentation re-released.

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Inconsistencies with IMP Reference Manual corrected for modules: ICHECK,IDIFFERENCE,IFILTER,IPATCH,IRECODE,IRENUMBER,IREPORT,ISELECT, ISORT,ISTART,ITOTEXT and IWINDOW.

Version 1.3 Dave Catlow 06-August-1987

Module ISORT updated to record changed operation of /NODUPLICATES qualifier.

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All IMP utilities now deal with CB (Coordinate Block) entries.

Version 2.1 Tim Hartnall 02-March-1988

New ISTART /NOTICKS and /NOSYMBOLS qualifiers documented.

Version 2.2 TJ Ibbs **15-March-1988**

Adopt the new chapter naming conventions.

Version 2.3 J C Cadogan **09-February-1990**

New IINFO. /REVISION_LEVEL and /BRIEF qualifiers have been added to display the IFF revision level with or without the standard IINFO output.

Version 2.4 P Pan **12-February-1990**

New IMERGE /UNIQUEFSN qualifier documented.

Version 2.5 P Pan **14-May-1990**

New IDIFFERENCE /IGNORE qualifier documented.

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New IINFO /ABSOLUTE qualifier documented.

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New ICHECK /IGNORE qualifier documented.

Version 2.8 S Townrow **26-October-1990**

New IINFO /MH_TYPE qualifier documented.

New ISTART /MH_TYPE qualifier documented.

Version 2.9 J Barber **15-January-1991**

New IINFO /OUTPUT = file-spec qualifier documented.

New IINFO /SYMBOLS qualifier documented.

New IINFO /NORTH = n etc. qualifiers documented.

Version 3.0 S Gupta **28-May-1991**

New module ICUT documented.

Version 3.1 S Gupta **12-June-1991**

New IRECODE /ALPHABETIC = file-spec qualifier documented.

Version 3.2 S Townrow **21-June-1991**

User Guide revised and updated to reflect the IMP Reference Manual.

CHAPTER 1

INTRODUCTION

INTRODUCTION

GENERAL

The Laser-Scan IFF Map Processing package (IMP) operates on standard Digital Equipment VAX-11 series computers running version 4.0 (or higher) of the standard VMS operating system. It is recommended that the user becomes familiar with the LAMPS Environment Guide which outlines in some detail the hardware and software environment required by the LAMPS package as a whole (of which IMP is but a part). LAMPS is the **L**aser-Scan **A**utomated **M**ap **P**roduction **S**ystem. Readers are also referred to the collection of manuals on VMS produced by Digital Equipment Corporation for the detailed command structure and facilities.

The IMP package consists of independent modules which together form a powerful data manipulation system within an automated mapping environment. All the modules have common command syntax which is decoded using the Command Line Interpreter used by the VAX/VMS utilities. IMP modules all generate VMS format messages and set $STATUS on image exit. In command files the success of a preceding IMP module may be tested using $STATUS before proceeding. All IMP modules are comprehensively documented in the IMP Reference Manual and the documentation includes an explanation of all messages output by the modules together with suggested user action. All IMP modules handle IFF HI (HIstory), ZS (three dimensional strings) and type 2 MD (Map Descriptor) entries. (For a detailed description of these and the other IFF entries see the IMP User Reference Manual). These entries could not be handled by the DAMP (**DA**ta **M**anipulation **P**ackage) utilities which IMP was designed to replace. IMP is supplied with on-line help which is available via the VAX/VMS HELP utility.

IFF stands for Internal Feature File and is the Laser-Scan vector file format generated by LASERAID and other Laser-Scan mapping systems and used as the data structure throughout the Laser-Scan LAMPS system. IFF files are binary and cannot be manipulated directly using a text editor. The IMP package enables the user to perform a wide range of file manipulation tasks related to the requirements of the automated mapping industry. Within the VAX/VMS system IFF files can be treated as any other file type for file management purposes. To enable the user to instantly distinguish an IFF file from a file of another type IFF files have by default the file extension '.IFF'.

To provide great flexibility in the production environment IFF files are referenced by all the IMP modules using logical name LSL$IF:. (For an explanation of logical names see volume 2 of the VAX/VMS document set). Logical name LSL$IF: is assigned to a device and directory specification either using the VMS ASSIGN command or the Laser-Scan SI utility. Use of the SI utility is described in detail in the IMP Reference Manual. Familiarisation with its use is strongly recommended. If a device and directory are not included in a command line file specification all the IMP modules will look for the file in the device and directory pointed to by the logical name LSL$IF:. The assignment made to LSL$IF: at login time is site dependent and may not point to the location of your IFF files. It is most important that the user remembers this and becomes familiar with the SI command.

GETTING STARTED

Once logged in the user must give two commands to initialise the IMP package before any any IFF manipulation can take place. The first command is IMPINI and should be issued thus: (see footnote for explanation of presentation conventions)

$ **IMPINI**

The IMPINI command invokes a command procedure which defines a DCL symbol (the module name) for each of the IMP modules. After using IMPINI the user need only type the symbol name to activate the module of his choice. IMPINI also installs process dependent IMP message definitions. These allow the user to examine the text represented by the condition code placed in DCL symbol $STATUS by all IMP modules on image exit.

As an alternative to explicitly typing the IMPINI command each time the user wishes to use the IMP package, the IMPINI command may be placed in the users login file, or in the site dependent default login file.

The second command which must be given before using the IMP package is the SI command. The SI command assigns the logical name LSL$IF: (or IF: for short) to the device-directory specification which contains the IFF file(s) that are to be manipulated. For example:

$ **SI DUA3:[BUREAU.TRIALS.DIGITISING]**

This will assign logical name LSL$IF: to the device and directory specification DUA3:[BUREAU.TRIALS.DIGITISING]

SCOPE OF THIS DOCUMENT

The IMP User Guide is not intended to be a definitive reference manual describing in detail all the qualifiers to each IMP command, each modules functionality and restrictions etc. This role is met by the IMP Reference Manual. Instead this document describes only the salient features of each IMP module. It should be regarded as a statement of package scope and content. The IMP User Guide should be used for the initial stages of production flowline planning or as an aid memoir for skilled IMP users.

The dollar symbol '$' is the default DCL prompt and signifies to the user that the computer is prompting for DCL commands. At this stage, any legal VMS command or appropriate Laser-Scan command can be entered as required.

The convention in all IMP documents is that **bold** type which follows the dollar prompt in an example command line indicates text that the user has typed. For a full description of the nomenclature and presentation conventions used in the IMP documentation see SECTION I of the IMP Reference Manual.

The modules are described in alphabetical order. Each module has a very brief section outlining its functionality, the format of the command used to invoke the module and a list of any command qualifiers.

CHAPTER 2

MODULE DESCRIPTIONS

MODULE ICHECK

FUNCTION

ICHECK is an IFF geometry checking utility. It scans the coordinates of an IFF file and reports on potential errors **within features**.

Options are provided to send output to terminal, text file, IFF plot file or to a LITES2 command file.

Checks are provided for:

- Loops within features, for example where the digitiser has looped back upon itself,
- Touching (within a user defined tolerance) segments within features, for example where the digitiser has looped back upon itself without crossing,
- Open features which do not intersect with a user defined sheet neatline and which start, or end, within a border zone offset from the neatline.
- Features which start or end outside a user defined sheet neatline,
- Feature characteristics at variance with the graphical type of that feature. The graphical types are read from a FRT (Feature Representation Table) file.

For a complete description of the ICHECK utility, including information about the ICHECK command and its qualifiers, and an explanation of ICHECK messages, see the IMP Reference Manual.

FORMAT

```
$ ICHECK file-spec
```

Command qualifiers	**Defaults**
/BASE_FC=integer	See text.
/BORDER	No border.
/[NO]CROSS	/CROSS
/[NO]DUPLICATES='EXACT' or 'NINT'	No duplicate point checks.
/FC=integer[,...]	All feature codes.
/FRT=file-spec	No checks against graphical types.
/IGNORE='INVISIBLE' or 'POLYGONS'	Process invisible steps.
/LAYER=integer[,...]	All layers.
/[NO]LITES2=file-spec	No LITES2 file output.
/[NO]LOG	/NOLOG
/[NO]MARKERS=file-spec	No marker file output.
/[NO]NEATLINE=('keyword-options'...)	No neatline check
/[NO]OUTPUT[=file-spec]	/OUTPUT=SYS$OUTPUT:
/[NO]PRINTER	/NOPRINTER
/[NO]TOUCH[=real]	No touch check.

MODULE ICUT

FUNCTION

ICUT is a program for manipulating the features contained within an IFF file.

The program takes input from an existing IFF file, processes the input and generates an output IFF file. Features can be selected from the input on the basis of feature code and IFF layer number. Features not matching the criteria are simply copied to the output file without modification.

The program also has several command qualifiers which dictate the nature of the output features produced. These features can be restricted to having a maximum number of points per feature, or to a maximum length (in space) of a feature. In addition attributes of the parent features can be attached, as ancillary codes, to the output features.

For a complete description of the ICUT utility, including information about the ICUT command and its qualifiers, and a description of ICUT messages, see the IMP Reference Manual.

FORMAT

$ ICUT file-spec file-spec

Command qualifiers	**Defaults**
/AC=(FC,FSN,Z)	No ACs added
/FC=(integer,..)	All features selected
/FCP=filename	No file
/[NO]INVISIBLES	/NOINVISIBLES
/LAYER=(integer,..)	All layers selected
/[NO]LOG	/NOLOG
/LENGTH=number	No length restrictions
/NEWFC=integer	Keep input feature codes
/POINTS=integer	Features contain 1 point only
/XYONLY	Height coordinates retained

MODULE IDIFFERENCE

FUNCTION

IDIFFERENCE is a program for comparing two IFF files. The features inside them need not be sorted in order of feature serial number.

The program detects missing features (in either file), differences in feature code, ancillary codes, texts, and changes in the coordinates within features. Differences in the HI (HIstory), MD (Map Descriptor), RA (RAnge), CP (Control Point) and the CC (Cubic Coefficient) entries are reported.

For a complete description of the IDIFFERENCE utility, including information about the IDIFFERENCE command and its qualifiers, and a description of IDIFFERENCE messages, see the IMP Reference Manual.

FORMAT

$ IDIFFERENCE file-spec file-spec

Command qualifiers	**Defaults**
/DEBUG=integer	No debugging information
/FRT=file-spec	No FRT specified
/[NO]IGNORE=(FSFC,FSSTATUS,FSPCTEXT, FSUSERWORD,HI,MD,NS,TH)	/NOIGNORE
/[NO]LOG	/NOLOG
/LOOKAHEAD[=integer]	/LOOKAHEAD=20
/[NO]OS	/NOOS
/OUTPUT=file-spec	/OUTPUT=SYS$OUTPUT
/[NO]PLOT=(COORDINATES,ACS,OTHER)	/NOPLOT
/[NO]PRINTER	/NOPRINTER.
/SUMMARY	See IMP Reference Manual.
/TOLERANCE[=real]	/TOLERANCE=0.001

MODULE IFILTER

FUNCTION

IFILTER is designed to smooth or filter, or smooth and filter IFF strings using one of the following algorithms:

FILTERS:

- Least squares "BUNCH" filter,
- Douglas-Peuker filter,

SMOOTHING OPTIONS:

- Linear interpolation,
- McConologue cubic interpolation,
- Akima cubic interpolation,
- Bezier interpolation

For a complete description of the IFILTER utility, including information about the IFILTER command and its qualifiers, and an explanation of IFILTER messages, see the IMP Reference Manual.

FORMAT

$ IFILTER file-spec file-spec

Command qualifiers	**Defaults**
/[NO]AKIMA=(tolerance-spec[,...])	/NOAKIMA
/[NO]BEZIER=(tolerance-spec[,...])	/NOBEZIER
/[NO]BUNCH=(tolerance-spec[,...])	/NOBUNCH
/[NO]DP[=tolerance-spec]	/DP
/FC=integer[,...]	All feature codes.
/FILTER_FIRST	Smooth before filtering.
/LAYER=integer[,...]	All layers.
/[NO]LINEAR[=tolerance-spec]	/NOLINEAR
/[NO]LOG	/NOLOG
/[NO]MCCONALOGUE=(tolerance-spec[,...])	/NOMCCONALOGUE

MODULE IFIXAREA

FUNCTION

IFIXAREA is designed to read an IFF file and test for errors relating to area features. The errors to be checked for are specified on the IFIXAREA command line, and may be any combination of the following:

- Repeated adjacent vertices
- 'Almost repeated' vertices - i.e. adjacent points in a feature which become equal when their co-ordinates are rounded to the nearest integer, or lie within a specified tolerance of each other.
- Open features - i.e. having at least three points and unequal start and end points
- The direction of feature digitising (the usual orientation for an area feature being anticlockwise)

Checking takes place by default for all features in the file. Alternatively a restricted class of features may be selected for checking.

For a complete description of the IFIXAREA utility, including information about the IFIXAREA command and its qualifiers, and an explanation of IFIXAREA messages, see the IMP Reference Manual.

FORMAT

$ IFIXAREA file-spec file-spec

Command qualifiers	**Defaults**
/[NO]AC	/NOAC
/ANTI_CLOCKWISE	/ANTI_CLOCKWISE
/CLOCKWISE	/ANTI_CLOCKWISE
/[NO]CLOSE[=real]	/NOCLOSE
/[NO]DELETE	/NODELETE
/DFAD	See IMP Reference Manual.
/FC=integer[,...]	All feature codes.
/LAYER=integer[,...]	All layers.
/[NO]LOG	/NOLOG
/NEAR[=real]	See IMP Reference Manual.
/OUTPUT[=filename]	/OUTPUT=SYS$OUTPUT
/[NO]PRINTER	/NOPRINTER
/[NO]REVERSE	/NOREVERSE

MODULE IFROMTEXT

FUNCTION

ITOTEXT and IFROMTEXT are two programs which have been designed for the conversion of IFF data into a text expansion, and vice versa. It is envisaged that ITOTEXT will be used for the conversion of data into text form for transfer to external customers, and IFROMTEXT for creating template IFF files, standard grids, etc. The two programs can also be used to enable text editing of IFF files. This is done by converting an IFF file into text form using ITOTEXT, editing the text file, and creating a new IFF file from the edited text file using IFROMTEXT. The default file extensions are .IFF for IFF files and .TXT for text files.

For a complete description of the IFROMTEXT utility, including information about IFROMTEXT command qualifiers, together with an explanation of IFROMTEXT messages, see the IMP Reference Manual.

FORMAT

```
$ IFROMTEXT  text-filename iff-filename
```

Command qualifiers	**Defaults**
/[NO]ECHO	/NOECHO
/FRT=file-spec	No FRT specified
/[NO]LOG	/NOLOG

Input may be read from the terminal by specifying SYS$INPUT: in place of the input filename.

MODULE IINFO

FUNCTION

IINFO gives brief general information about the specified IFF file. The default information given is as follows:

- full file specification,
- RA (RAnge) entry,
- HI (HIstory) entry,
- CP (Control Point) entry,
- Optionally, MD (Map Descriptor) entry,
- Optionally, height range information (maximum and minimum Z, integer height and real height),
- Information per overlay; number of features, number of points and line length,
- Information per feature code; number of features, number of points and line length,
- Totals information.

For a complete description of the IINFO utility, including information about the IINFO command and its qualifiers, and an explanation of IINFO messages, see the IMP Reference Manual.

FORMAT

$ IINFO file-spec

Command qualifiers	**Defaults**
/[NO]ABSOLUTE	/NOABSOLUTE
/[NO]BRIEF	/NOBRIEF
/EAST	none
/[NO]HEIGHT	/NOHEIGHT
/[NO]LAYER	/NOLAYER
/[NO]MAP_DESCRIPTOR	/NOMAP_DESCRIPTOR
/[NO]MH_TYPE	/NOMH_TYPE
/NORTH	none
/[NO]OUTPUT	/NOOUTPUT
/[NO]PRINTER	/NOPRINTER
/[NO]REVISION_LEVEL	/NOREVISION_LEVEL
/[NO]SCAN	/NOSCAN

/SOUTH	none
/[NO]SYMBOLS	/NOSYMBOLS
/[NO]TIMINGS	/NOTIMIMGS
/WEST	none

MODULE ILAYFC

FUNCTION

ILAYFC enables the user to set all of the feature codes in one or more layers in an IFF file to specified values.

For a complete description of the ILAYFC utility, including information about the ILAYFC command and its qualifiers, and an explanation of ILAYFC messages, see the IMP Reference Manual.

FORMAT

$ ILAYFC file-spec [file-spec]

Command qualifiers	**Defaults**
/CODES=(integer>integer[,...])	ILAYFC prompts for codes.
/[NO]IN_SITU	/NOIN_SITU
/[NO]LOG	/NOLOG

MODULE IMEND

FUNCTION

IMEND is used for recovery of IFF files which have been improperly closed as a result of system failure or operator error.

For a complete description of the IMEND utility, including information about the IMEND command and its qualifiers, and an explanation of IMEND messages, see the IMP Reference Manual.

FORMAT

$ IMEND file-spec file-spec

Command qualifiers	**Defaults**
/[NO]RANGE	/NORANGE
/[NO]TRUNCATE	Truncate file after last complete feature.

MODULE IMERGE

FUNCTION

IMERGE is an IFF file merge utility. It is used in four circumstances:

- After a map has been digitised on LASERTRAK and processed by LAPROCESS, IMERGE should be run to consolidate all the layer parts from different sessions, before further processing.
- To concatenate two or more IFF files into a single map, possibly offsetting the string coordinates using information from the MD entries.
- IMERGE can be used to merge out of the input file(s) only selected layers. The layers are selected using the /LAYER qualifier.
- To split a single (or multiple) input IFF file(s) into two separate output files on the basis of IFF layer. One output file contains all the features which lay within IFF layers selected from the input IFF file(s) and while the other contains the rest of the layers, i.e. those which were not selected. The output IFF files may use the layer numbers used in the input file(s) or a new single layer may be specified for each output file.

For a complete description of the IMERGE utility, including information about the IMERGE command and its qualifiers, and an explanation of IMERGE messages, see the IMP Reference Manual.

FORMAT

$ IMERGE file-spec[,...] file-spec

Command qualifiers	**Defaults**
/CP_EXPANSION	Take CP entry from first input file.
/[NO]DEBUG	/NODEBUG
/LAYER=integer[,...]	Use all layers.
/[NO]LOG	/NOLOG
/OUTPUT [=list-file-spec]	Do not create a listing file.
/REST_LAYER=integer	Create all the input file layers.
/SINGLE_LAYER=integer	Create all the input file layers.
/SPLIT [=iff-file-spec]	Create only one output file.
/[NO]UNIQUE_FSN	/NOUNIQUE_FSN

MODULE IPATCH

FUNCTION

IPATCH is the IFF file patch editor. It allows the user to inspect, edit or delete the various entries in the file. The file is not copied, and changes made in write mode are performed in-situ. Thus it is not possible to add extra information.

The default mode of operation is to open the IFF file for reading only.

For a complete description of the IPATCH utility, including information about the IPATCH commands and their qualifiers, and an explanation of IPATCH messages, see the IMP Reference Manual.

FORMAT

```
$ IPATCH file-spec
```

Command Qualifiers	**Defaults**
/[NO]COMMANDS[=file-spec]	/NOCOMMANDS
/[NO]FRT[=file-spec]	/NOFRT
/[NO]JOURNAL[=file-spec]	/NOJOURNAL
/[NO]LOG	/NOLOG
/[NO]REVISION_LEVEL=integer	/REVISION_LEVEL = -1
/[NO]STATUS	/STATUS
/WRITE	Open file for read only

MODULE IRECODE

FUNCTION

IRECODE enables the user to change selected Layers, Feature Codes or AC type numbers in an IFF file to specified new values.

For a complete description of the IRECODE utility, including information about the IRECODE command and its qualifiers, and an explanation of IRECODE messages, see the IMP Reference Manual.

FORMAT

$ IRECODE input-file-spec [output-file-spec]

Command qualifiers	**Defaults**
/AC=(integer>integer[,...])	None.
/ALPHABETIC=file-name	/NOALPHABETIC
/FC=(integer>integer[,...])	IRECODE prompts for feature codes.
/TCC=(integer>integer[,...])	IRECODE prompts for text codes.
/IN_SITU	Create a new file.
/LAYER=(integer>integer[,...])	None.
/[NO]LOG	/NOLOG

MODULE IRENUMBER

FUNCTION

IRENUMBER takes an IFF file and creates a new version of the file in which the Feature Serial Numbers (FSNs) are reallocated in monotonically increasing order. IRENUMBER is intended mainly for recovery from error situations which have resulted in multiply allocated FSNs within an IFF file.

For a complete description of the IRENUMBER utility, including information about the IRENUMBER command and its qualifiers, and an explanation of IRENUMBER messages, see the IMP Reference Manual.

FORMAT

$ IRENUMBER file-spec [file-spec]

Command qualifiers	**Defaults**
/BASE=integer	/BASE=1
/INCREMENT=integer	/INCREMENT=1
/IN_SITU	Create a new output file.
/[NO]LOG	/NOLOG
/LOWER_LIMIT=integer	/LOWER_LIMIT=1
/UPPER_LIMIT=integer	/UPPER_LIMIT=65535

MODULE IREPORT

FUNCTION

IREPORT gives information about every occurrence of the selected IFF entries. Absence of the specified entry may be detected with the /ABSENT qualifier.

An option to output a LITES2 command file is provided.

For a complete description of the IREPORT utility, including information about the IREPORT command and its qualifiers, and an explanation of IREPORT messages, see the IMP Reference Manual.

FORMAT

$ IREPORT file-spec

Command qualifiers	**Defaults**
/ABSENT	Report presence.
/FRT=file-spec	No FRT file read.
/[NO]ADDRESS	/NOADDRESS
/OUTPUT=file-spec	/OUTPUT=SYS$OUTPUT
/[NO]PRINTER	/NOPRINTER
/IN_LAYER=integer[,...]	IFF entries in all layers considered.
/REVISION_LEVEL=integer (-1,0,1)	-1, all CB, ST and ZS entries read as themselves.
/WITH_FC=integer[,...]	Features with all Feature Codes considered.
/[NO]LOG	/NOLOG
/LITES2	/NOLITES2
IFF entry qualifiers:	
/AC[=integer[,...]]	
/CB	
/CP	
/CC	
/FC[=integer[,...]]	
/LAYER[=integer[,...]]	All layers reported unless /IN_LAYER specified
/NF	
/NS	
/RO	
/ST	
/TC	
/TH	
/TS[=integer[,...]]	
/TX	

/ZS

If IREPORT is run with no qualifiers set then nothing will be sent to SYS$OUTPUT

MODULE ISELAC

FUNCTION

ISELAC reads an IFF file and writes selected features to a new IFF file. Feature selection is based on AC (Ancillary Code) type or on one or more of the attributes associated with an AC entry. ISELAC utilises a series of dynamic command tables created from a user-defined 'skeleton' file, to offer greater AC selection flexibility.

For a complete description of the ISELAC utility, including information about the ISELAC commands, skeleton file generation and an explanation of ISELAC messages, see the IMP Reference Manual.

FORMAT

```
$ ISELAC
```

MODULE ISELECT

FUNCTION

ISELECT creates a new IFF file containing features selected from an existing IFF file on the basis of attributes specified by qualifiers on the command line. All specified criteria have to match for a feature to be copied.

For a complete description of the ISELECT utility, including information about the ISELECT command and its qualifiers, and an explanation of ISELECT messages, see the IMP Reference Manual.

FORMAT

$ ISELECT file-spec file-spec

Command qualifiers	**Defaults**
/[NO]AC[=(integer[,...]])	/NOAC
/FC=(integer[,...])	All feature codes selected
/EXCLUDE_FC=(integer[,...])	No features excluded
/[NO]FSN=(integer[,...])	/NOFSN
/[NO]INTEGER_HEIGHT=(integer[,...])	/NOINTEGER_HEIGHT
/[NO]LAYER=(integer[,...])	/NOLAYER
/[NO]LOG	/NOLOG
/[NO]MODULUS=integer	/NOMODULUS
/[NO]REAL_HEIGHT=real[,...]	/NOREAL_HEIGHT
/[NO]TCC=integer[,...]	/NOTCC

If no qualifiers are specified then the entire contents of the input file
are copied into the output file.

MODULE ISORT

FUNCTION

ISORT is an IFF file sort program. Its primary purpose is to sort the features in an IFF file into ascending Feature Serial Number (FSN) order prior to output from IFF to a customer format, as the order will usually have been disturbed by editing with LITES2. It is also useful in that it outputs a summary of feature serial number allocation including duplicated feature serial numbers, and gaps. The FSNs will normally be unique within any one layer. If duplicated FSNs are present then the /NODUPLICATES qualifier may be used to override the default mechanism of retaining all features with duplicate FSNs. When /NODUPLICATES=FIRST is selected only the first feature with a duplicated FSN in a given layer is kept. When /NODUPLICATES=LAST is selected only the last feature with a duplicated FSN in a given layer is kept. Alternatively, /INTERNAL qualifier may be specified in order that sorting be based on the feature's internal sequence number (ISN) instead of the FSN as this will be unique within the file. Sorting based on the feature's FC (Feature Code) can be specified with the /FC qualifier. Within each layer, the features with the same code, which will generally be plotted in the same colour, will be grouped together and so will be plotted consecutively. This may speed up the action of some colour plotters by reducing the number of pen changes required.

For a complete description of the ISORT utility, including information about the ISORT command and its qualifiers, and an explanation of ISORT messages, see the IMP Reference Manual.

FORMAT

```
$ ISORT file-spec
```

Command qualifiers	**Defaults**
/DUPLICATES	Keep duplicate FSNs
/NODUPLICATES=FIRST	Keep only first duplicate FSN
/NODUPLICATES=LAST	Keep only last duplicate FSN
/FC	
/INTERNAL	Sort on the basis of FSN.
/[NO]LOG	/NOLOG
/OUTPUT[=file-spec]	/OUTPUT=SYS$OUTPUT:
/[NO]PRINTER	/NOPRINTER

MODULE ISTART

FUNCTION

ISTART is designed to create an IFF file as a pre-digitising template. The file is then filled with data captured during the digitising process. ISTART enables the user to specify the control points and origin offset information which are written to the template CP (Control Point) and MD (Map Descriptor) entries respectively. ISTART offers three modes of operation:

- Template mode, where prompts are issued for the user to type the control points,
- Ordnance survey mode, but prompts are issued for Ordnance Survey specific information,
- Digitising table mode, where the control point values are collected from a digitising table.

For a complete description of the ISTART utility, including information about the ISTART command and its qualifiers, and an explanation of ISTART messages, see the IMP Reference Manual.

FORMAT

$ ISTART file-spec

Command qualifiers	**Defaults**
/[NO]CHECK	Control points are checked.
/FC=integer	Feature code 0 used for registration ticks or crosses.
/[NO]LASERAID	See IMP Reference Manual.
/LAYER=integer	Empty layer 1 created.
/[NO]LEARNER	Minimal prompting.
/[NO]LOG	/NOLOG
/MCE	Standard Laser-Scan file.
/MH_TYPE	/MH_TYPE=2
/MUART_TABLE	Template mode.
/OS	Standard Laser-Scan file.
/TABLE	Template mode.
/[NO]SYMBOLS	Registration ticks.
/[NO]TICKS	Registration ticks.
/USER_ORIGIN	Origin offset automatically derived.

Digitising table qualifiers	**Defaults**
/ADDRESSABILITY=real	See IMP Reference Manual.
/BUTTONS=(NUMBER:integer,BASE:integer)	16 button cursor, base value 1
/CENTRE	Map origin at bottom left corner.

/COUNTS	Digitiser output in millimetres.
/REPEAT=integer	Points to be digitised 3 times.
/[NO]ROTATION	/ROTATION
/THOU	Digitiser output in millimetres.

MODULE ITOTEXT

FUNCTION

ITOTEXT and IFROMTEXT are two programs which have been designed for the conversion of IFF data into a text expansion, and vice versa. It is envisaged that ITOTEXT will be used for the conversion of data into text form for transfer to external customers, and IFROMTEXT for creating template IFF files, standard grids, etc. The two programs can also be used to enable text editing of IFF files. This is done by converting an IFF file into text form using ITOTEXT, editing the text file, and creating a new IFF file from the edited text file using IFROMTEXT. The default file extensions are .IFF for IFF files and .TXT for text files.

For a complete description of the ITOTEXT utility, including information about ITOTEXT command qualifiers, together with an explanation of ITOTEXT messages, see the IMP Reference Manual.

FORMAT

$ ITOTEXT IFF-file-spec text-file-spec

Command qualifiers	**Defaults**
/[NO]ADDRESS	/NOADDRESS
/[NO]BRIEF	/NOBRIEF
/[NO]CUSTOMER	/NOCUSTOMER
/[NO]FRT=file-spec	no FRT specified.
/[NO]KEEP	/NOKEEP
/[NO]LOG	/NOLOG
/[NO]MH	/MH
/[NO]PRINTER	/NOPRINTER
/[NO]REVISION_LEVEL=integer	/REVISION_LEVEL = -1

Output may be directed to the terminal by specifying SYS$OUTPUT: in place of the output file-spec.

MODULE ITRANS

FUNCTION

ITRANS is a powerful general map projection program. It allows transformation between spheroidal data (latitude and longitude) and specified map projections and will also transform data from one map projection directly into another. Plane transformations ("4 point transformations") can also be carried out. ITRANS is primarily intended for operation on data held in IFF files, but it can also be used to transform individual points.

For a complete description of the ITRANS utility, including information about the ITRANS command and its qualifiers, and an explanation of ITRANS messages, see the IMP Reference Manual.

FORMAT

$ ITRANS input-file-spec [output-file-spec]

Command Qualifiers	**Defaults**
/[NO]ABSOLUTE	/NOABSOLUTE
/[NO]CONTROL	/NOCONTROL
/[NO]DATUM_SHIFT	/NODATUM_SHIFT
/DESCRIPTOR	None.
/[NO]FOUR	/NOFOUR
/[NO]HEIGHT_ADJUST	/NOHEIGHT_ADJUST
/[NO]LEARNER	/NOLEARNER
/[NO]LOG	/NOLOG
/[NO]OUTPUT[=file-spec]	/NOOUTPUT
/POINT	None.
/[NO]PROJECTIVE	/NOPROJECTIVE
/[NO]RETAIN_CP	/NORETAIN_CP
/[NO]SIX	/NOSIX
/[NO]THREE	/NOTHREE
/[NO]TWO	/NOTWO

MODULE IWINDOW

FUNCTION

IWINDOW clips IFF map data to a rectangular boundary or "window".

The window can be given explicitly using the /NORTH, /SOUTH, /EAST and /WEST qualifiers or it can be extracted from the map header or control point entries by use of the /MAP_HEADER or /CONTROL_POINT qualifiers. There is no default unless running in Ordnance Survey mode, when it is /MAP_HEADER.

For a complete description of the IWINDOW utility, including information about the IWINDOW command and its qualifiers, together with a description of IWINDOW messages, see the IMP Reference Manual.

FORMAT

$ IWINDOW file-spec file-spec

Command qualifiers	**Defaults**
/[NO]ABSOLUTE	/NOABSOLUTE
/[NO]AREA=keyword=(integer[,...])	/NOAREA
/CONTROL_POINTS	None.
/[NO]DEBUG	/NODEBUG
/EAST=real	None.
/[NO]FC_IGNORE=(integer[,...])	/NOFC_IGNORE
/[NO]FRT=file-spec	/NOFRT
/[NO]FSN_BY_LAYER	/NOFSN_BY_LAYER
/[NO]LAYER_IGNORE=(integer,...])	/NOLAYER_IGNORE
/[NO]LITES2	/NOLITES2
/[NO]LOG	/NOLOG
/MAP_HEADER	None.
/NORTH=real	None.
/OFFSET=real	None.
/ORIGIN	SW control coordinates not changed.
/OS	See IMP Reference Manual.
/OUTPUT=file-spec	Output to SYS$OUTPUT.
/[NO]RETAIN_FSN	/NORETAIN_FSN
/[NO]RESET_CP	/NORESET_CP
/SOUTH=real	None.
/VOID	None.
/WEST=real	None.

Ordnance Survey mode

/CLIP_GRID	See IMP Reference Manual.
/KEEP_TEXT	See IMP Reference Manual.

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