

Laser-Scan Ltd.

STRUCTURE

User Guide

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Version 4.3 Jon Barber 30-Aug-1989

New ILINK message definition for ILINK_TOOMNYPTS.

QUADSCAN error messages changed.

Version 4.4 Jon Barber

12-Mar-1991

New ILINK message definition for ILINK_TOOMNYLAYERS.

New ILINK message ILINK_MISSOUTFILE to signal missing output file in command line when it is required.

Usage of the ILINK /FCP file feature code entries clarified.

Messages added to the RELHT chapter.

Handling of ST/ZS or CB coordinate strings in ILINK and RELHT described in the Introduction chapter of the STRUCTURE Reference Manual.

Version 4.5 Steve Townrow

09-Aug-1991

New ILINK qualifier /MINTOL documented which enables the user to define the minimum distance between two points after which they are considered to be duplicate.

Version 4.6 Jon Barber

21-Aug-1991

ILINK qualifiers /STRUCTURE and /FREE_ENDS disallowed together.

Version 4.7 Jon Barber

07-Nov-1991

New ILINK qualifier /ABSOLUTE documented which enables the user to output all coordinates as absolute values.

Version 4.8 Steve Townrow

30-Mar-1991

Documentation for new utility, ICASE, added to reference manual. ICASE is suited to the production of large scale schematic road casings and `area fills as often seen in road atlases. Given a junction structured IFF file containing road centrelines, a table of feature codes, priorities and road widths, the program will create an output IFF file containing road casings and area fills for the selected features. It is important to realise that the input road centreline data must be geometrically clean to prevent spurious results occurring.

PREFACE

Intended audience

This manual is intended for all users of the Laser-Scan STRUCTURE (Structured IFF Map Processing) package running under the VAX/VMS operating system.

Structure of this document

This document is composed of 2 major sections.

The Introduction is an overview of STRUCTURE and is intended as a quick reference guide to the salient features of the STRUCTURE package.

There then follow summary User Guides for the individual modules which comprise STRUCTURE. Each individual module contains the same basic categories of information. These are:

- | | |
|----------|--|
| MODULE | - the name of the STRUCTURE module. |
| FUNCTION | - a synopsis of what the modules does |
| FORMAT | - a summary of the module command format and command qualifiers. Default qualifier settings are indicated. |

Associated documents

For detailed information about a specific STRUCTURE module see the STRUCTURE Reference Manual.

Conventions used in this document

Convention	Meaning
<CR>	The user should press the carriage control key on the terminal
<CTRL/x>	The phrase <CTRL/x> indicates that the user must press the key labelled CTRL while simultaneously pressing another key, for example, <CTRL/Z>.
\$ EXAMPLE JIM <CR>	Command examples show all user entered commands in bold type.
\$ EXAMPLE JIM <CR> . . .	Vertical series of periods, or ellipsis, mean either that not all the data that STRUCTURE would display in response to the particular command is shown or that not all the data that the user would enter is shown.
file-spec... entered.	Horizontal ellipsis indicate that additional parameters, values or information can be entered.
[logical-name]	Square brackets indicate that the enclosed item is optional. (Square brackets are not, however, optional in the syntax of a directory name in a file-specification, or in the syntax of a substring specification in a VMS assignment statement).
'integer'	An integer number is expected in the specified input or output field. (See "Command line data types" below).
'real'	A real number is expected in the specified input or output field. (See "Command line data types" below).

Convention	Meaning
FSN 'integer' ('integer')	FSN followed by two integer arguments indicates an IFF feature serial number. The integer number enclosed in round brackets is the feature internal sequence number.
00003DE7	A hexadecimal address of a location within an IFF file. STRUCTURE modules express all IFF addresses using hexadecimal radix. The address is always padded with leading zeros to a standard field width of 8 characters.

Command line data types

STRUCTURE utilities use the VMS Command Line Interpreter (CLI) to get and parse the program command line. STRUCTURE utilities thus offer a VMS emulating user interface. Unfortunately the VMS Digital Command Language (DCL) does not support the real (or "floating point") data type. Many STRUCTURE utilities require real value arguments for the specification of tolerances and distances etc. To meet this requirement, Laser-Scan have developed an enhanced CLI based command line decoding mechanism. This enables the interpretation of numbers as either "real" or "integer". Throughout this document the number types are differentiated by the words 'integer' for integer numbers and 'real' for real (or "floating point") numbers.

STRUCTURE command line decoding operates in decimal radix.

CHAPTER 1

INTRODUCTION

SECTION I
INTRODUCTION

INTRODUCTION

GENERAL

The STRUCTURE package consists of independent modules which together form a powerful structured IFF data manipulation system within the LAMPS automated mapping environment. LAMPS is the **L**aser-**S**can **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.

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 STRUCTURE is but a part).

All the STRUCTURE modules have common command syntax which is decoded using the Command Line Interpreter used by the VAX/VMS utilities. STRUCTURE modules all generate VMS format messages and set \$STATUS on image exit. In command files the success of a preceding STRUCTURE module may be tested using \$STATUS before proceeding. All STRUCTURE modules are comprehensively documented in the STRUCTURE Reference Manual and the documentation includes an explanation of all messages output by the modules together with suggested user action. Not all STRUCTURE modules handle IFF ZS entries (three dimensional strings).

IFF stands for **I**nternal **F**eature **F**ile and is the Laser-Scan vector file format generated by LASERAID and other Laser-Scan mapping systems. IFF is 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 STRUCTURE package enables the user to perform a wide range of structured data 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 STRUCTURE 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 IFF User Guide. If a device and directory are not included in a command line file specification, all the STRUCTURE 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 STRUCTURE package before any IFF manipulation can take place. The first command is STRUCTUREINI and should be issued thus: (see footnote for explanation of presentation conventions)

\$ STRUCTUREINI

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

As an alternative to explicitly typing the STRUCTUREINI command each time the user wishes to use the STRUCTURE package, the STRUCTUREINI 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 STRUCTURE 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 STRUCTURE User Guide is not intended to be a definitive reference manual describing in detail all the qualifiers to each STRUCTURE command, each module's functionality or restrictions etc. This role is met by the STRUCTURE Reference Manual. Instead, this document describes only the salient features of each STRUCTURE module. It

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 STRUCTURE 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 STRUCTURE documentation see SECTION I of the STRUCTURE Reference Manual.

should be regarded as a statement of package scope and content. The STRUCTURE User Guide should be used for the initial stages of production flowline planning or as an aid memoir for skilled STRUCTURE users.

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.

SECTION II

MODULE DESCRIPTIONS

CHAPTER 2

MODULE MODULES

MODULE ILINK

FUNCTION

ILINK is an IFF geometry tidying and structuring utility. It can join feature **ends to ends**, **ends to lines** (i.e. to any point along a feature, including points along line segments between original feature vertices), or **lines to lines** (ie. feature alignment). It can also merge duplicate feature sections into single features, break features into separate features where they cross, or produce a **link-node structure**.

One-point features are treated as linear features with zero length.

Structured data can be used for many network processing operations, such as polygon generation, route planning, map colouring and data-base compilation.

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

FORMAT

\$ ILINK input-file-spec [output-file-spec]

Command qualifiers
Defaults

/[NO]ABSOLUTE	/NOABSOLUTE
/BPF=real	/BPF=2
/BREAK	See STRUCTURE Reference Manual.
/EXTOL[=real]	Same as /JNTOL argument.
/FREE_ENDS[=(FC:int,LAYER:int)]	See STRUCTURE Reference Manual.
/FCC[=file-spec]	SYS\$DISK:[]FCC.FCC;0
/FCP[=file-spec]	SYS\$DISK:[]FCP.FCP;0
/LCP[=file-spec]	SYS\$DISK:[]LCP.LCP;0
/FRT[=file-spec]	LSL\$FRT:FRT.FRT;0
/JNTOL[=real]	/JNTOL=0.0
/LAYER=integer[,...]	All layers.
/[NO]LIST[=file-spec]	/NOLIST
/[NO]LITES2[=file-spec]	/NOLITES2
/LLJOIN	See STRUCTURE Reference Manual.
/LPJOIN	See STRUCTURE Reference Manual.
/MERGE	See STRUCTURE Reference Manual.
/MINTOL[=real]	See STRUCTURE Reference Manual.
/[NO]MONITOR	/NOMONITOR
/PAC[=file-spec]	SYS\$DISK:[]PAC.PAC;0
/[NO]PARENT	/NOPARENT
/PPJOIN	See STRUCTURE Reference Manual.
/[NO]PROJECT	/PROJECT
/SHRFC=integer	/SHRFC=999
/SORTARMS	See STRUCTURE Reference Manual.
/STRUCTURE	See STRUCTURE Reference Manual.
/TOL[=file-spec]	SYS\$DISK:[]TOL.TOL;0

```
/[NO]VERIFY  
/[NO]VERTEX  
/VRTOL[=real]
```

```
/NOVERIFY  
/NOVERTEX  
/VRTOL=0.0
```

MODULE RELHT

FUNCTION

RELHT assigns relative heights to the ends of all links in a junction structured IFF file. RELHT requires for input the junction structured IFF file and an ASCII file containing a user defined table of feature code height priorities. The junction structured file may be produced by either ILINK or LASERAID.

The relative height coding for the ends of each link are placed in type 10 and type 11 AC (Ancillary Code) entries for the start and end of each link respectively.

The junction structure is not preserved in the output file.

The relative height coding may be used to determine which feature "lies on top of" another for reprographic and GIS applications. For example, the relative height information may be used to ensure that motorway features are plotted as a continuous feature, while a river feature would be broken where it intersects with the motorway features.

FORMAT

\$ RELHT input-file-spec output-file-spec

Command qualifiers**Defaults**

/[NO]LITES2
/[NO]LOG
/[NO]NODE_LIST

/NOLITES2
/NOLOG
/NONODE_LIST

MODULE ICASE

FUNCTION

ICASE is suited to the production of large scale schematic road casings and area fills as often seen in road atlases. Given a junction structured IFF file containing road centrelines, a table of feature codes, priorities and road widths, the program will create an output IFF file containing road casings and area fills for the selected features.

It is important to realise that the input road centreline data must be geometrically clean to prevent spurious results occurring.

Note that for small scales work, it is often easier to generate road casings 'on the fly' during display and plotting, using the prioritised multiple representation capabilities of FRTLIB now used in LITES2 and FPP.

FORMAT

\$ ICASE file-spec file-spec

Command qualifiers	Defaults
/[NO]CASINGS	/CASINGS
/[NO]FILLS	/FILLS
/FRT=file-spec	No FRT
/PARAMETER=file-spec	Parameter file compulsory
/TOLERANCE=real	Minimum casing width

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