

*Laser-Scan Ltd.*

*CONVERT PACKAGE*

*IFFDCW Reference*

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## CONTENTS

IFFDCW - Change Record . . . . .	i
PREFACE . . . . .	1
Intended audience . . . . .	1
Structure of this document . . . . .	1
Conventions used in this document . . . . .	2
 CHAPTER 1	
DCW FORMAT DESCRIPTION	
FORMAT DESCRIPTION . . . . .	1-1
The Digital Chart of the World Format . . . . .	1-1
The GEOREF Tiling System . . . . .	1-3
The DCW Directory Structure . . . . .	1-3
 CHAPTER 2	
DCW DATA PREPARATION	
DATA PREPARATION . . . . .	2-1
Comparison of DCW and IFF . . . . .	2-1
The DCW2I Feature Code Table Parameter File . . . . .	2-1
The DCW2I Attribute Code Table Parameter File . . . . .	2-3
Which Attributes To Put Into The FCT and ACT Parameter Files . . . . .	2-4
Null Coded Attributes . . . . .	2-6
Example Feature Code Table . . . . .	2-7
Example Attribute Code Table . . . . .	2-9
 CHAPTER 3	
DCW2I UTILITY	
UTILITY DCW2I . . . . .	3-1
FUNCTION . . . . .	3-1
FORMAT . . . . .	3-1
PROMPTS . . . . .	3-1
COMMAND QUALIFIERS . . . . .	3-1
RESTRICTIONS . . . . .	3-1
DESCRIPTION . . . . .	3-2
DCW Coverages And Their Classes . . . . .	3-2
Output Files . . . . .	3-3
The Parameter Files . . . . .	3-3
Program Action . . . . .	3-3
Recommendations . . . . .	3-4
DCW Area Features . . . . .	3-5
COMMANDS . . . . .	3-6
Summary of commands . . . . .	3-6
Alphabetical list of commands . . . . .	3-6
EXAMPLE . . . . .	3-13
MESSAGES (INFORMATIONAL) . . . . .	3-15
MESSAGES (WARNING) . . . . .	3-18
MESSAGES (ERROR) . . . . .	3-24
MESSAGES (FATAL) . . . . .	3-27
MESSAGES (OTHER) . . . . .	3-28

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IFFDCW - Change Record

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Version 1.0    S Townrow    20-July-1992

Module IFFDCW        - Documentation for new DCW2I utility created.

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Version 1.1    S Townrow    2-October-1992

Module IFFDCW        - Documentation for DCW2I revised and completed.

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Version 1.2    S Townrow    14-May-1993

Module IFFDCW        - The DCW Data Preparation section and DCW2I  
Reference Manual have been modified to warn the  
user not to try and convert NULL coded features  
because of the problems these cause.

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## PREFACE

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### Intended audience

This manual is intended for users of a specific utility of the Laser-Scan CONVERT package running under the VAX/VMS operating system. Each manual contains the documentation for a particular CONVERT utility and a site will only receive new or updated documentation for those utilities which they have purchased.

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### Structure of this document

This document is composed of 2 major sections.

The Introduction is an overview of the CONVERT package and its purpose.

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

- |                    |  |
|--------------------|--|
| MODULE             | - the name of the CONVERT module.  |
| FORMAT DESCRIPTION | - a description of the data format written or read by the utility programs in this conversion module.            |
| DATA PREPARATION   | - guidance on how to digitise or prepare the IFF and other data required by the utility programs in this module. |

For each utility program in the module, there will then be the following categories:

- |                    |   |
|--------------------|---|
| UTILITY            | - the name of the utility.  |
| FUNCTION           | - a synopsis of what the utility does.  |
| FORMAT             | - a summary of the utility command format and command qualifiers. Default qualifier settings are indicated.               |
| PROMPT             | - how it prompts the user.  |
| PARAMETERS         | - description of expected command parameters.   |
| COMMAND QUALIFIERS | - description of all command qualifiers. Qualifiers are ordered alphabetically and default argument values are indicated. |
| RESTRICTIONS       | - a summary of restrictions on the use of   |

	qualifiers
DESCRIPTION	- the definitive description of the utility action.
COMMANDS	- for interactive utilities only, a description of all commands. Commands are ordered alphabetically and default argument values are indicated.
EXAMPLES	- annotated examples of utility useage.
MESSAGES	- all classes of message are listed and described and suggested user action given. The messages are divided into sections according to message severity within which the messages are ordered alphabetically by message mnemonic.

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### 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>.
\$ <b>IFF2SIF</b> <CR>	Command examples show all user entered commands in <b>bold</b> type.
\$ <b>IFF2SIF</b> <CR> . . .	Vertical series of periods, or ellipsis, mean either that not all the data that CONVERT 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...	Horizontal elipsis indicates 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 assisment statement).

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Convention	Meaning
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'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).
'file-spec'	A VMS file specification is expected in the specified input or output field.
'device-name'	A VMS device specification (for instance, MTA0:) is expected in the specified input or output field.
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## CHAPTER 1

### DCW FORMAT DESCRIPTION

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**FORMAT DESCRIPTION**

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**The Digital Chart of the World Format**

The DCW is a general-purpose database containing digital map data covering the world and divided into thematic layers.

The DCW uses a georelational model called Vector Product Format (VPF) to support a vector-based, thematically layered database. The VPF is described in the document MIL-STD-600006.

The DCW is available on four separate CD-ROMs, each containing a region of the world at 1:1,000,000 scale called a library. Each CD-ROM also contains a BROWSE library which is an overview of the globe at 1:31,000,000 scale.

As the DCW database tables are binary in format, the data cannot be shown except as schematic tables denoting the rows and columns.

Any errors or faults present in the DCW data cannot be corrected due to fact that the data is read-only from CD-ROMs and the donor of the data should be contacted. However, it is possible to copy the required DCW files onto a writable media providing the directory hierarchy and contents remains the same and edit the files using PATCH/ABSOLUTE. This is only recommended for users who have a thorough knowledge of DCW database tables. PATCH/ABSOLUTE can only be used to overwrite data, not insert it which means editing the files will be of limited use.

All recipients of the DCW data should receive an accompanying manual called the DCW Product Specification (document MIL-D-89009) which describes, in detail, the format of all database tables.

This section will therefore only provide an overview of the structure of the database and how the tables relate to each other.

The highest level of hierarchy which exist within DCW is the database, below which exist the 5 libraries:

<b>BROWSE</b>	The World at 1:31,000,000 scale
<b>EURNASIA</b>	Europe and Northern Asia
<b>NOAMER</b>	Northern America
<b>SASAU</b>	Southern Asia and Australia
<b>SOAMAFR</b>	Southern America and Africa

Each library exists on its own CD-ROM except BROWSE which is duplicated on each of the others.

Within each library, there are a number of coverages which are analogous to IFF layers. There are 8 thematic layers in the BROWSE library and 17 in the others, each having a unique mnemonic. These are as follows:



**EURNASIA,NOAMER,SAS AUS,SOAMAFR  
 libraries**

**BROWSE library**

Thematic Layer	Mnemonic	Thematic Layer	Mnemonic
Aeronautical	AE	Compilation Date	CO
Cultural Landmarks	CL	Data Volume	DV
Data Quality	DQ	Drainage	DN
Drainage	DN	Geographic Regions	GR
Drainage-Supplemental	DS	Hypsographic Data	DA
Hypsography	HY	ONC index	IN
Hypsography-Supplemental	HS	Political/Oceans	PO
Land Cover	LC	Populated Places	PP
Ocean Features	OF		
Physiography	PH		
Political/Oceans	PO		
Populated Places	PP		
Railroads	RR		
Roads	RD		
Transportation Structure	TS		
Utilities	UT		
*Vegetation	VG		

\*Vegetation data is only available for a portion of the NOAMER library.

At the coverage level, features are grouped into classes of areas, lines, points and text. Each class is held as a Feature Table which contains all the features for the coverage over the whole extent of the library and can typically be very large.

The Feature Tables will be of the form ccAREA.AFT for areas, ccLINE.LFT for lines, ccPOINTS.PFT for points and ccTEXT.TFT for text where 'cc' is the coverage mnemonic. (eg DNLIN.LFT for the Drainage Line Feature Table).

Each coverage contains a Feature Class Schema (FCS) table which contains the primary and foreign key relationships between the various DCW tables.

The coverages overlay a tiling system which divides the globe up into a grid of tiles called GEOREFs which are themselves split into sub-tiles (henceforth simply called tiles). Refer to the GEOREF Tiling System below.

Each tile has a Primitive Table corresponding to a feature class which is cross-referenced with their respective Feature Tables using the foreign keys defined in the FCS table. The Feature Tables hold information at the feature level such as feature-coding and attributes while the Primitive Tables hold the geometry. If a particular Primitive Table is missing from a tile, then no features of that class are present in that area.

The Area Feature Table references the face (FAC), ring (RNG) and edge (EDG) Primitive Tables.

The Line Feature Table references the edge (EDG) Primitive Table.

The Point Feature Table references the node (END) Primitive Table.

The Text Feature Table references the text (TXT) Primitive Table.

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### **The GEOREF Tiling System**

The GEOREF system is a naming convention for each 15 degree square in a grid covering the world. Each 15 degree tile is identified by two letters; the first represents the latitude and the second represents the longitude. The valid longitude letters are A to Z (excluding I and O) and valid latitude letters are A to M (excluding I). Examples of invalid GEOREFs are II, AN and OC.

Each GEOREF on a DCW CD-ROM is divided into nine 5 degree square sub-tiles referenced in a 3 by 3 grid from 1,1 to 3,3 where the first number is in the x direction and the second is in the y direction.

The south-west corner of GEOREF AA11 is at (-180.0,-90.0) and for GEOREF ZM33 it is at (175.0,85.0) with NG11 at (0.0,0.0).

A figure of the GEOREF tiling system is presented in the DCW Product Specification which should be used as a reference when extracting files.

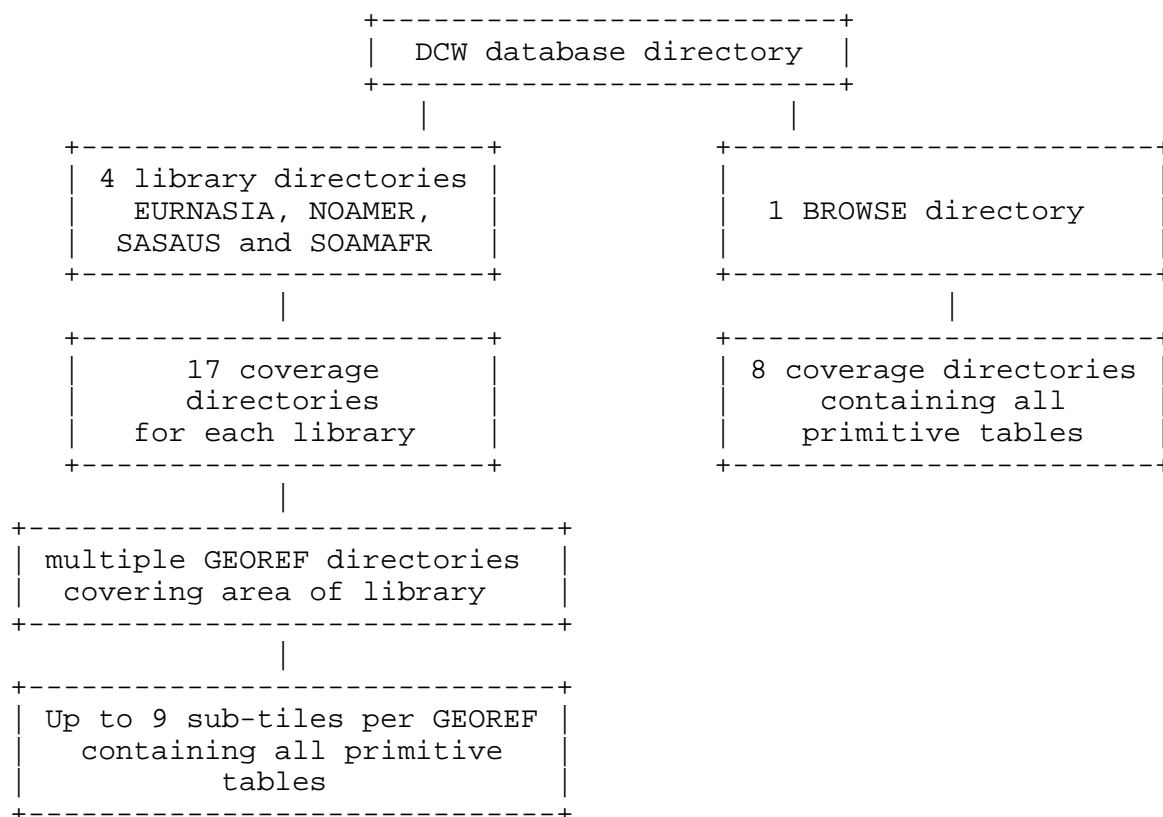
It should be noted that the GEOREF Tiling System underlies each library except the BROWSE library which has Primitive Tables covering the whole globe.

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### **The DCW Directory Structure**

Not all of the database tables present on the CD-ROMs are needed by the conversion software as some are intended for GIS applications, such as Thematic Index, Spatial Index and Bounding Rectangle tables. Variable-length index files are required to find the starting position of variable length text or coordinate records within certain tables.

An overview of the directory structure looks thus:



To explain the hierarchy of the database file on the CD-ROMs, an example is given below of all the files (and their directories) required for a particular tile.

Consider a single tile POWF33 which lies in the SASAUS library. If all of the classes are required for this tile, then the following database tables will be needed. Note the hierarchy of the directory structure.

LSLV4D\$DKA200:[DCW.SASAUS.PO]FCS	- Feature Class Schema Table
LSLV4D\$DKA200:[DCW.SASAUS.PO]POAREA.AFT	- Area Feature Table
LSLV4D\$DKA200:[DCW.SASAUS.PO]POLINE.LFT	- Line Feature Table
LSLV4D\$DKA200:[DCW.SASAUS.PO]POPOINT.PFT	- Point Feature Table
LSLV4D\$DKA200:[DCW.SASAUS.PO]POTEXT.TFT	- Text Feature Table
LSLV4D\$DKA200:[DCW.SASAUS.PO.W.F.33]FAC	- Face Primitive Table
LSLV4D\$DKA200:[DCW.SASAUS.PO.W.F.33]RNG	- Ring Primitive Table
LSLV4D\$DKA200:[DCW.SASAUS.PO.W.F.33]EDG	- Edge Primitive Table
LSLV4D\$DKA200:[DCW.SASAUS.PO.W.F.33]END	- Entity Node Primitive Table
LSLV4D\$DKA200:[DCW.SASAUS.PO.W.F.33]TXT	- Text Primitive Table

where LSLV4D\$DKA200 is the device name of the CD-ROM drive.

## CHAPTER 2

### DCW DATA PREPARATION

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## DATA PREPARATION

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### Comparison of DCW and IFF

IFF is a feature orientated data format - data is separated into features, and each feature represents one 'thing' on the map. An integer feature code is used to say what type of thing it is that the feature represents. A feature might thus be a contour, or a house, or a river, depending on the type of map being digitised, and the way that the data is to be used.

The DCW format shares this concept of a 'feature' but the various information relevant to a single feature is held in several database tables which reference each other using primary keys. Refer to the FORMAT DESCRIPTION section for details of the structure of the DCW data.

Features in DCW are identified not by a feature code or feature serial number, but by one or more attributes. The mechanism used by DCW2I to determine the feature code to be assigned to IFF features from DCW is via the Feature Code Table. This associates one or two DCW attributes with a numeric IFF feature code and must be defined prior to the conversion.

---

### The DCW2I Feature Code Table Parameter File

The Feature Code Table file is compulsory and relates one or two DCW attributes in each feature table to an IFF feature code.

In order to correctly define the Feature Code Tables, the user must have access the DCW Product Specification which lists all the attributes present in the DCW feature tables.

It is important to realise that the feature code is only given to feature whose attribute names and values exactly match those in the Feature Code Table so it is vital that the FCT is accurate. The FCT is used to select only those features required and so if the DCW table name or any of the primary/secondary attribute name/values given in the FCT does not exactly match a particular feature, it will be thrown away with no warnings to the user.

The lines of the table are free-format, so the order of entries matters, but the actual position of entries on the line is not important. Any line with the "!" character is regarded as a comment, and is ignored. Comments can appear at the end of lines containing fields, or on separate lines. Note that all text fields in the file will be upper cased in order to match the attribute names in the DCW tables.

A line of the Feature Code Table has the following form :-

**FC      DCWtable      P-Att      P-Val      S-Att      S-Val**

where the fields are :-

- FC** - the feature code to be given to the IFF feature if the **DCWtable** and any attribute names and values following match those in a DCW database table. This value is compulsory and should be in the range 1 to 32767.
- DCWtable** - the name of the DCW database Feature Table whose features will be assigned the feature code of this entry. If no Primary or Secondary attributes are given on the line, then all features in the Feature Table are given the feature code. The name should contain the appropriate extension for the class of table (ie. '.AFT', '.LFT', '.PFT' or '.TFT' for area, line, point and text feature tables respectively).
- P-Att** - the name of the Primary Attribute present in the **DCWtable** which contains a fixed attribute to be used when determining the feature code. This field is optional since some tables do not contain any fixed attributes, but if it is given, there must be an accompanying Primary Attribute value. The feature code is assign to a feature which comes from the **DCWtable** and which has a Primary Attribute defined as **P-Att** with value **P-Val**.
- P-Val** - the fixed value of the Primary Attribute, **P-Att**, present in the **DCWtable** to be used when determining the feature code. This field is optional but must be present if the Primary Attribute name is present. Primary Attribute values are always of type integer.
- S-Att** - the name of the Secondary Attribute present in the **DCWtable** which contains a fixed attribute to be used when determining the feature code. If this field is present, there must be an accompanying Secondary Attribute value. The feature code is assign to a feature which comes from the **DCWtable**, which has a Primary Attribute defined as **P-Att** with value **P-Val**, and has a Secondary Attribute called **S-Att** whose value is that of **S-Val**.
- S-Val** - the fixed value of the Secondary Attribute, **S-Att**, present in the **DCWtable** to be used when determining the feature code. This field is optional but must be present if the Secondary Attribute name is present. Secondary Attribute values are always of type integer.

-----  
**The DCW2I Attribute Code Table Parameter File**

The Attribute Code Table file is optional and can be used to assign to certain features any integer, date, or text attributes held in the DCW database.

In order to correctly define the Attribute Code Table, the user must have access the DCW Product Specification which lists all the attributes present in the DCW feature tables.

It is important to realise that an attribute will only be given to a feature with the correct feature code and if the attribute name and datatype match those in the Attribute Code Table, so it is vital that the ACT is accurate.

The lines of the table are free-format, so the order of entries matters, but the actual position of entries on the line is not important. Any line with the "!" character is regarded as a comment, and is ignored. Comments can appear at the end of lines containing fields, or on separate lines. Note that all text fields in the file will be upper cased in order to match the attribute names in the DCW tables.

A line of the Attribute Code Table has the following form :-

**AC      FC      Att-Name      Att-Type**

where the fields are :-

- AC**            - the attribute code (as defined in the ACD part of an FRT) to be given to the IFF feature with the feature code **FC**. This value is compulsory and should be in the range 1 to 32767.
- FC**            - the feature code of the feature to be assigned the attribute. This value is compulsory and should not only be in the range 1 to 32767, but also match the feature code of the corresponding entry in the Feature Code Table.
- Att-Name**   - the name of the attribute present in the **DCWtable** of the FCT defined by **FC**.
- Att-Type**   - the datatype of the attribute defined by **Att-Name** and must be of type 'T' (text), 'I' (integer) or 'D' (date). Defining a value of type 'I' in the ACT allows DCW attributes of type 'S' (short integer) or 'I' (long integer) to be converted. If the **Att-Name** matches an attribute in a DCW table, but the **Att-Type** is wrong, a warning will be produced and the true datatype from the DCW table will be used.

-----  
**Which Attributes To Put Into The FCT and ACT Parameter Files**

Certain attributes are defined in the DCW Product Specification as having fixed values and these can be used to sub-divide a feature class into several feature codes. The INT.VDT files listed in the DCW Product Specification lists the fixed attribute values for integer attributes of the classes in that coverage.

The attributes to use should be of the form 'ccxxnnnn' where 'cc' is the coverage mnemonic (eg. CL), 'xx' is the class (eg. PY, LN, PT for polygons, lines and point resp.) and 'nnnn' is the remainder of the name of any length. For example, HYLNTYPE is an attribute in the Hypsography line feature table.

The attributes which should be put in the FCT and ACT depends on how general a feature-coding scheme is required. If the Appendix of the DCW Product Specification lists all the possible values for an attribute then it may be used in the FCT to divide a class into more than one feature code.

For example, the contours in the Hypsography coverage have an attribute HYLNTYPE which can have possible values of 1, 2, 3, 4, 5, 8 or 9 to distinguish between contour types. This attribute could be entered in the Feature Code Table with a feature code for each of the possible values thus:

! FC	DCWtable	P-Att	P-Val	S-Att	S-Val
1050	HYLINE.LFT	HYLNTYPE	1		
1051	HYLINE.LFT	HYLNTYPE	2		
1052	HYLINE.LFT	HYLNTYPE	3		
1053	HYLINE.LFT	HYLNTYPE	4		
1054	HYLINE.LFT	HYLNTYPE	5		
1055	HYLINE.LFT	HYLNTYPE	8		
1056	HYLINE.LFT	HYLNTYPE	9		

This will ensure that each value of the HYLNTYPE attribute found in the table HYLINE.LFT will result in the IFF feature being given a different feature code to the others. As there is only one fixed attribute in the HYLINE.LFT, no secondary attribute is possible.

If a more general feature-coding scheme is required for the contours, just the feature code value and the table name could be entered thus:

! FC	DCWtable	P-Att	P-Val	S-Att	S-Val
1050	HYLINE.LFT				

As there are no attributes defined here, no attributes in the table HYLINE.LFT will be used to determine the feature code and all contour lines will be assigned the feature code of 1050.

The attribute HYLNVAL contains the actual contour height which is not a fixed attribute. It could therefore be entered in the Attribute Code File with the AC number it is to be given and the feature code of the feature. The feature code should match those in the FCT. For the



first of the FCT examples above, the corresponding ACT lines might look thus:

```
! AC  FC  Att      Type
2010 1050 HYLNVAL  I
2010 1051 HYLNVAL  I
2010 1052 HYLNVAL  I
2010 1053 HYLNVAL  I
2010 1054 HYLNVAL  I
2010 1055 HYLNVAL  I
2010 1056 HYLNVAL  I
```

Note that the same AC code (2010) will be given to each of the feature codes 1050 to 1056.

The second FCT example could have a corresponding ACT entry which looks like:

```
! AC  FC  Att      Type
2010 1050 HYLNVAL  I
```

Since there is only one feature code defined in the second FCT example, the ACT only needs one AC defined to be attached to feature code 1050.

For an example of the use of primary and secondary attributes, refer to the description of the Drainage line table, DNLN.LFT, in the appendix of the DCW Product Specification.

Attribute DNLNTYPE can have values 1 to 9 to classify the type of the drainage feature. There could therefore be 9 entries in the FCT if that degree of distinction is required between the types of drainage feature. Since this attribute distinguishes between such diverse drainage features as rivers, canals, shorelines and glaciers, the breaking down of these into different feature codes is almost essential.

A second fixed attribute, DNLNSTAT, has values which are only possible when combined with values of the DNLNTYPE attribute. For example, DNLNSTAT values 1 (perennial), 2 (nonperennial) and 6 (unsurveyed perennial) only apply to DNLNTYPE 1 (streams).

Following the description of the DNLN.LFT table is a table which defines the legal combinations for drainage line attributes. This can be used directly when creating the FCT for the Drainage line features which may look thus:

```
! FC  DCWtable  P-Att  P-Val  S-Att  S-Val
2004 DNLN.LFT  DNLNTYPE  1    DNLNSTAT  1
2005 DNLN.LFT  DNLNTYPE  1    DNLNSTAT  2
2006 DNLN.LFT  DNLNTYPE  1    DNLNSTAT  5
2007 DNLN.LFT  DNLNTYPE  1    DNLNSTAT  6
2008 DNLN.LFT  DNLNTYPE  2    DNLNSTAT  3
2009 DNLN.LFT  DNLNTYPE  2    DNLNSTAT  4
2010 DNLN.LFT  DNLNTYPE  3    DNLNSTAT  99
```

2011	DNLINE.LFT	DNLNTYPE	4	DNLNSTAT	7
2012	DNLINE.LFT	DNLNTYPE	4	DNLNSTAT	8
2013	DNLINE.LFT	DNLNTYPE	4	DNLNSTAT	9
2014	DNLINE.LFT	DNLNTYPE	4	DNLNSTAT	10
2015	DNLINE.LFT	DNLNTYPE	4	DNLNSTAT	11
2016	DNLINE.LFT	DNLNTYPE	5	DNLNSTAT	99
2017	DNLINE.LFT	DNLNTYPE	6	DNLNSTAT	99
2018	DNLINE.LFT	DNLNTYPE	7	DNLNSTAT	99
2019	DNLINE.LFT	DNLNTYPE	8	DNLNSTAT	99
2020	DNLINE.LFT	DNLNTYPE	9	DNLNSTAT	99

### ----- Null Coded Attributes

There are some attributes which are defined as NULL in the DCW database which means that the attribute does not apply to a feature or that a feature is incorrectly coded.

A list of null coded attributes is present in the VPFVIEW User Manual which should accompany the DCW CD-ROMs.

A null coded attribute will have the value -2147483637 (80000001 hexadecimal) and can be entered in the FCT as any other fixed attribute value thus:

! FC	DCWtable	P-Att	P-Val	
1018	LCAREA.AFT	LCPYTYPE	-2147483647	! HOLES IN LAND COVER
1019	LCAREA.AFT	LCPYTYPE	1	! RICE FIELDS
1020	LCAREA.AFT	LCPYTYPE	2	! CRANBERRY BOGS
[etc]				

For those cases where null codes occur there should not be a secondary attribute present. Some occurrences of the null coded values may be ignored, such as for attributes DQPYAHA and DQPYAVA since they are not used to determine the feature code and need not be in the FCT. They may however be present in the ACT file in which case the program will omit the attribute from the IFF file if the value is a null code.

### NOTE

Often, area features do not close because they have been incorrectly coded in the DCW data as having NULL codes. For example, some line features (rivers) in the DN (drainage) coverage are NULL coded as areas and never close and so trying to build an area out of these will cause the TOOMANYEDGES message. We therefore recommend that the NULL coded features ARE NOT PRESENT IN THE FEATURE CODE TABLE so that they will be ignored.

-----  
**Example Feature Code Table**

In the interest of brevity, the following table does not contain all the attributes present the DCW Product Specification but merely show examples of how feature-coding can be derived from particular attributes.

!-----!					
! DCW FEATURE CODE TABLE !					
! Fields: !					
! FC DCWtable P-Att P-Val S-Att S-Val !					
!-----!					
!Area FCs					
!					
1001	CLAREA.AFT				!CULTURE LANDMARK AREAS
1002	DQAREA.AFT				!DATA QUALITY AREAS
1004	DNAREA.AFT	DNPYTYPE	1		!INLAND WATER - PERENNIAL
1005	DNAREA.AFT	DNPYTYPE	2		!INLAND WATER - NONPERENNIAL
1006	DNAREA.AFT	DNPYTYPE	3		!WET SAND
1007	DNAREA.AFT	DNPYTYPE	4		!SNOWFIELDS, GLACIERS, ICE
1008	DNAREA.AFT	DNPYTYPE	9		!NONE
1009	HYAREA.AFT	HYPYTYPE	1		!BELOW MEAN SEA LEVEL
1010	HYAREA.AFT	HYPYTYPE	2		!0 TO 1000 FEET ABOVE MEAN SEA LEVEL
1011	HYAREA.AFT	HYPYTYPE	3		!1000 - 3000 FEET ABOVE MEAN SEA LEVEL
1012	HYAREA.AFT	HYPYTYPE	4		!3000 - 7000 FEET ABOVE MEAN SEA LEVEL
1013	HYAREA.AFT	HYPYTYPE	5		!7000 - 11000 FEET ABOVE MEAN SEA LEVEL
1014	HYAREA.AFT	HYPYTYPE	6		!OVER 11000 FEET ABOVE MEAN SEA LEVEL
1015	HYAREA.AFT	HYPYTYPE	7		!UNCONTOURED OR UNSURVEYED
1016	HYAREA.AFT	HYPYTYPE	8		!AREA DOES NOT HAVE A 1000-FOOT
INTERVAL					
1017	HYAREA.AFT	HYPYTYPE	9		!NONE
1019	LCAREA.AFT	LCPYTYPE	1		!RICE FIELDS
1020	LCAREA.AFT	LCPYTYPE	2		!CRANBERRY BOGS
1021	LCAREA.AFT	LCPYTYPE	3		!CULTIVATED AREAS, GARDENS
1022	LCAREA.AFT	LCPYTYPE	4		!PEAT CUTTINGS
1023	LCAREA.AFT	LCPYTYPE	5		!SALT PANS
1024	LCAREA.AFT	LCPYTYPE	6		!FISH PONDS/HATCHERIES
1025	LCAREA.AFT	LCPYTYPE	7		!QUARRIES/STRIP MINES/MINE BLASTING
AREAS					
1026	LCAREA.AFT	LCPYTYPE	8		!OIL/GAS FIELDS
1027	LCAREA.AFT	LCPYTYPE	10		!LAVA FLOWS
1028	LCAREA.AFT	LCPYTYPE	11		!DISTORTED SURFACE AREA
1029	LCAREA.AFT	LCPYTYPE	12		!UNCONSOLIDATED MATERIALS
1030	LCAREA.AFT	LCPYTYPE	13		!LANDMARK AREAS, NATURAL
1031	LCAREA.AFT	LCPYTYPE	14		!INUNDATED AREAS
1032	LCAREA.AFT	LCPYTYPE	15		!UNDIFFERENTIATED WETLANDS
1033	LCAREA.AFT	LCPYTYPE	99		!NONE (HOLES IN LAND COVER POLYS)
1034	POAREA.AFT	POPYTYPE	1		!LAND
1035	POAREA.AFT	POPYTYPE	2		!OPEN WATER
1036	POAREA.AFT	POPYTYPE	3		!POLAR ICE
1037	POAREA.AFT	POPYTYPE	4		!PACK ICE
1038	POAREA.AFT	POPYTYPE	5		!SHELF ICE

1040 PPAREA.AFT PPPYTYPE 1

!BUILT-UP AREAS

```

1041 PPAREA.AFT  PPPYTYPE  2                !KAMPONGS
1042 VGAREA.AFT  VGPYTYPE 31                !HERBACEOUS RANGELAND
1043 VGAREA.AFT  VGPYTYPE 32                !SHRUB AND BRUSH RANGELAND
1044 VGAREA.AFT  VGPYTYPE 33                !MIXED RANGELAND
1045 VGAREA.AFT  VGPYTYPE 41                !DECIDUOUS FOREST LAND
1046 VGAREA.AFT  VGPYTYPE 42                !EVERGREEN FOREST LAND
1047 VGAREA.AFT  VGPYTYPE 43                !MIXED FOREST LAND
1048 VGAREA.AFT  VGPYTYPE 83                !BARE GROUND TUNDRA
1049 VGAREA.AFT  VGPYTYPE 99                !OTHER VEGETATION
!
!Line FCs
!
2001 CLLINE.LFT                !CULTURE LANDMARK LINES
2002 DQLINE.LFT                !DATA QUALITY LINES
2004 DNLINE.LFT  DNLNTYPE  1 DNLNSTAT  1 !STREAMS ETC. PERENNIAL
2005 DNLINE.LFT  DNLNTYPE  1 DNLNSTAT  2 !STREAMS ETC. NONPERENNIAL
2006 DNLINE.LFT  DNLNTYPE  1 DNLNSTAT  5 !STREAMS ETC. UNSURVEYED PERENNIAL
2007 DNLINE.LFT  DNLNTYPE  1 DNLNSTAT  6 !STREAMS ETC. UNSURVEYED NONPERENNIAL
2008 DNLINE.LFT  DNLNTYPE  2 DNLNSTAT  3 !INLAND SHORELINES. UNDEFINED LIMITS
2009 DNLINE.LFT  DNLNTYPE  2 DNLNSTAT  4 !INLAND SHORELINES. DEFINITE LIMITS
2010 DNLINE.LFT  DNLNTYPE  3 DNLNSTAT 99 !WET SAND LIMITS
2011 DNLINE.LFT  DNLNTYPE  4 DNLNSTAT  7 !CANALS, AQUEDUCTS, ETC, ABANDONED
2012 DNLINE.LFT  DNLNTYPE  4 DNLNSTAT  8 !CANALS, AQUEDUCTS, ETC, UNDER
CONSTRUCTION
  2013 DNLINE.LFT  DNLNTYPE  4 DNLNSTAT  9 !CANALS, AQUEDUCTS, ETC, SUSP. OR
ELEVATED
  2014 DNLINE.LFT  DNLNTYPE  4 DNLNSTAT 10 !CANALS, AQUEDUCTS, ETC, UNDERGROUND
  2015 DNLINE.LFT  DNLNTYPE  4 DNLNSTAT 11 !CANALS, AQUEDUCTS, ETC, ABOVE GROUND
  2016 DNLINE.LFT  DNLNTYPE  5 DNLNSTAT 99 !GLACIAL LIMITS
  2017 DNLINE.LFT  DNLNTYPE  6 DNLNSTAT 99 !SNOWFIELDS, GLACIERS, OR LAND ICE
  2018 DNLINE.LFT  DNLNTYPE  7 DNLNSTAT 99 !ICE FREE LIMITS (LAND/ICE LINE)
  2019 DNLINE.LFT  DNLNTYPE  8 DNLNSTAT 99 !CONNECTORS (ADDED TO INLAND WATER
AREAS)
  2020 DNLINE.LFT  DNLNTYPE  9 DNLNSTAT 99 !NONE (OUTER BOUNDARY)
[etc]

```

-----  
**Example Attribute Code Table**

```

!-----!
!   DCW ANCILLARY CODE TABLE   !
!                               !
!   Fields:                     !
!                               !
!   AC   FC   Att   Type       !
!                               !
!-----!
!
!Area ACs
!
1001 1001 CLPYLABEL  T !LANDMARK LABEL
1002 1002 DQPYSID   T !ONC SHEET IDENTIFIER
1003 1002 DQPYCOM    D !COMPILATION DATE OF THE ONC
1004 1002 DQPYREV    D !LAST REVISION DATE OF THE ONC
1005 1002 DQPYLIT    D !CURRENT REVISION LITHO OR PRINT DATE
1006 1002 DQPYREM    T !SHEET-WIDE MARGINALIA OR OBSERVED CHARACTERISTICS
1007 1002 DQPYAHA    I !ABSOLUTE HORIZONTAL ACCURACY
1008 1002 DQPYAVA    I !ABSOLUTE VERTICAL ACCURACY
1009 1034 POPYREG    T !REGION OR CONTINENT
1010 1034 POPYCOUN   T !COUNTRY OR OCEAN IDENTIFIER
1011 1034 POPYADMIN  T !ADMINISTRATIVE UNITS
1009 1035 POPYREG    T !REGION OR CONTINENT
1010 1035 POPYCOUN   T !COUNTRY OR OCEAN IDENTIFIER
1011 1035 POPYADMIN  T !ADMINISTRATIVE UNITS
1009 1036 POPYREG    T !REGION OR CONTINENT
1010 1036 POPYCOUN   T !COUNTRY OR OCEAN IDENTIFIER
1011 1036 POPYADMIN  T !ADMINISTRATIVE UNITS
1009 1037 POPYREG    T !REGION OR CONTINENT
1010 1037 POPYCOUN   T !COUNTRY OR OCEAN IDENTIFIER
1011 1037 POPYADMIN  T !ADMINISTRATIVE UNITS
1009 1038 POPYREG    T !REGION OR CONTINENT
1010 1038 POPYCOUN   T !COUNTRY OR OCEAN IDENTIFIER
1011 1038 POPYADMIN  T !ADMINISTRATIVE UNITS
!
!Line ACs
!
1012 2001 CLLNLABEL  T !LANDMARK LABEL
1013 2002 DQLNID     I !LINE IDENTIFIER
1014 2002 DQLNONC1   T !FIRST ONC SHEET
1015 2002 DQLNONC2   T !SECOND ONC SHEET
1016 2021 HYLNVAL    I !ELEVATION VALUE
1016 2022 HYLNVAL    I !ELEVATION VALUE
1016 2023 HYLNVAL    I !ELEVATION VALUE
1016 2024 HYLNVAL    I !ELEVATION VALUE
1016 2025 HYLNVAL    I !ELEVATION VALUE
1016 2026 HYLNVAL    I !ELEVATION VALUE
1016 2027 HYLNVAL    I !ELEVATION VALUE
1016 2028 HYLNVAL    I !ELEVATION VALUE
1017 2029 HSLNVAL    I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2030 HSLNVAL    I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2031 HSLNVAL    I !SUPPLEMENTAL CONTOUR ELEVATION VALUE

```

```

1017 2032 HSLNVAL      I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2033 HSLNVAL      I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2034 HSLNVAL      I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2035 HSLNVAL      I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2036 HSLNVAL      I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
1017 2037 HSLNVAL      I !SUPPLEMENTAL CONTOUR ELEVATION VALUE
!
!Point ACs
!
1018 3001 AEPTTYPE     T !AIRPORT NAME
1019 3001 AEPTNAME     T !AIRPORT ELEVATION VALUE
1020 3001 AEPTVAL      I !AIRPORT ELEVATION VALUE
1021 3001 AEPTDATE     D !AERONAUTICAL INFORMATION DATE
1022 3001 AEPTICAO     T !INTERNATIONAL CIVIL ORGANIZATION NUMBER
1023 3001 AEPTDKEY     T !DAFIF REFERENCE NUMBER
1018 3002 AEPTTYPE     T !AIRPORT NAME
1019 3002 AEPTNAME     T !AIRPORT ELEVATION VALUE
1020 3002 AEPTVAL      I !AIRPORT ELEVATION VALUE
1021 3002 AEPTDATE     D !AERONAUTICAL INFORMATION DATE
1022 3002 AEPTICAO     T !INTERNATIONAL CIVIL ORGANIZATION NUMBER
1023 3002 AEPTDKEY     T !DAFIF REFERENCE NUMBER
1018 3003 AEPTTYPE     T !AIRPORT NAME
1019 3003 AEPTNAME     T !AIRPORT ELEVATION VALUE
1020 3003 AEPTVAL      I !AIRPORT ELEVATION VALUE
1021 3003 AEPTDATE     D !AERONAUTICAL INFORMATION DATE
1022 3003 AEPTICAO     T !INTERNATIONAL CIVIL ORGANIZATION NUMBER
1023 3003 AEPTDKEY     T !DAFIF REFERENCE NUMBER
1018 3004 AEPTTYPE     T !AIRPORT NAME
1019 3004 AEPTNAME     T !AIRPORT ELEVATION VALUE
1020 3004 AEPTVAL      I !AIRPORT ELEVATION VALUE
1021 3004 AEPTDATE     D !AERONAUTICAL INFORMATION DATE
1022 3004 AEPTICAO     T !INTERNATIONAL CIVIL ORGANIZATION NUMBER
1023 3004 AEPTDKEY     T !DAFIF REFERENCE NUMBER
1018 3005 AEPTTYPE     T !AIRPORT NAME
1019 3005 AEPTNAME     T !AIRPORT ELEVATION VALUE
1020 3005 AEPTVAL      I !AIRPORT ELEVATION VALUE
1021 3005 AEPTDATE     D !AERONAUTICAL INFORMATION DATE
1022 3005 AEPTICAO     T !INTERNATIONAL CIVIL ORGANIZATION NUMBER
1023 3005 AEPTDKEY     T !DAFIF REFERENCE NUMBER
1024 3006 CLPTLABEL    T !POINT LANDMARK LABEL
1025 3016 HYPTVAL      I !SPOT ELEVATION VALUE
1025 3017 HYPTVAL      I !SPOT ELEVATION VALUE
1025 3018 HYPTVAL      I !SPOT ELEVATION VALUE
1025 3019 HYPTVAL      I !SPOT ELEVATION VALUE
1026 3020 HSPTVAL      I !SUPPLEMENTAL SPOT ELEVATION VALUE
1027 3026 POPTREG      T !REGION OR CONTINENT
1028 3026 POPTCOUN     T !COUNTRY OR OCEAN IDENTIFIER
1029 3027 PPPTNAME     T !POPULATED PLACE NAME
1029 3028 PPPTNAME     T !POPULATED PLACE NAME
1029 3029 PPPTNAME     T !POPULATED PLACE NAME
1029 3030 PPPTNAME     T !POPULATED PLACE NAME
1029 3031 PPPTNAME     T !POPULATED PLACE NAME
1029 3032 PPPTNAME     T !POPULATED PLACE NAME
1029 3033 PPPTNAME     T !POPULATED PLACE NAME
1029 3034 PPPTNAME     T !POPULATED PLACE NAME
1029 3035 PPPTNAME     T !POPULATED PLACE NAME

```

## CHAPTER 3

### DCW2I UTILITY



---

## UTILITY DCW2I

---

### FUNCTION

DCW2I extracts data from a Digital Chart of World (DCW) CD-ROM and creates individual IFF files for each 5 degree square tile for each coverage. The program must use a parameter file to determine which IFF feature codes to assign to features and this also controls feature selection. Any features not present in the Feature Code file will be omitted. A similar parameter file is required for the conversion of DCW attributes into IFF AC entries.

---

### FORMAT

\$ DCW2I

**Command qualifiers**  
None.

---

### PROMPTS

DCW2I is an interactive, command driven utility. Command input is expected when the following prompt is given:

DCW2I >

---

### COMMAND QUALIFIERS

None.

---

### RESTRICTIONS

Text features will not be output along shaped lines. In DCW data, text features may be accompanied with a SHAPE\_LINE field which controls the position and orientation along a line. DCW2I will output the first point of the SHAPE\_LINE as the lower left corner of the string. If the SHAPE\_LINE contains one point, the feature will be given a rotation (RO) of zero, otherwise it will be given a rotation equal to the angle between the first and last points.

Coverages GAZETTE, LIBREF and TILEREF are not catered for.

The program does not guarantee that the area features created from the DCW database are 'correct' when traversed (ie the inside is always on the same side of the edge). Typically, areas containing holes will have line segments which cross and these may cause problems if the IFF files are used with other LAMPS programs such as IPOLYGON.

---

**DESCRIPTION**

**DCW Coverages And Their Classes**

In summary, the coverages and their respective classes for the DCW libraries EURNASIA, NOAMER, SOAMAFR and SASAUS are as follows:

Thematic Layer	Coverage Mnemonic	Available Classes			
Aeronautical	AE			Points	
Cultural Landmarks	CL	Areas	Lines	Points	Text
Data Quality	DQ	Areas	Lines		Text
Drainage	DN	Areas	Lines	Points	Text
Drainage-Supplemental	DS			Points	
Hypsography	HY	Areas	Lines	Points	
Hypsography-Supplemental	HS		Lines	Points	
Land Cover	LC	Areas		Points	Text
Ocean Features	OF		Lines	Points	Text
Physiography	PH		Lines		Text
Political/Oceans	PO	Areas	Lines	Points	Text
Populated Places	PP	Areas		Points	Text
Railroads	RR		Lines		Text
Roads	RD		Lines		Text
Transportation Structure	TS		Lines	Points	Text
Utilities	UT		Lines		Text
*Vegetation	VG	Areas			

\*Vegetation data is only available for a portion of the NOAMER library.

The coverages and classes available for the BROWSE library are:

Thematic Layer	Coverage Mnemonic	Available Classes			
Compilation Date	CO	Areas			
Data Volume	DV	Areas			
Drainage	DN	Areas	Lines		
Geographic Regions	GR	Areas	Lines		Text
Hypsographic Data	DA	Areas			
Availability					
ONC index	IN	Areas			Text
Political/Oceans	PO	Areas	Lines		Text
Populated Places	PP			Points	Text

## **Output Files**

The output IFF files have the following characteristics:

The format of the filename is CCGGnn.IFF where CC is the coverage, GG is the GEOREF and nn is the sub-tile (eg DQXE32).

For each coverage, a sub-directory (with the coverage name) is created into which all files relating to that coverage will go. For example, if a target directory of LSL\$DATA\_ROOT:[DCWDATA] is given, all IFF files created from the Data Quality (DQ) coverage will be put into a directory called LSL\$DATA\_ROOT:[DCWDATA.DQ].

The IFF range entry (RA) will lie between 0.0 and 5.0 in x and y and the origin offset in the Map Descriptor (MD) entry will be set to the south-west corner of the tile from which it originated. For example, a tile at GEOREF XE32 will have origin offset (145.0,-25.0). Refer to the GEOREF Tiling System diagram in the back of the DCW Product Specification for information on the longitude and latitude of each GEOREF.

## **The Parameter Files**

A description of the Feature and Attribute Code files can be found in the DATA PREPARATION section of the IFFDCW Reference Manual.

The Feature Code file is compulsory and relates one or two DCW attributes in each feature table to an IFF feature code.

The Attribute Code is optional and is used to define the output IFF AC codes and their datatypes for any DCW attributes. If it is not given, no attributes will be present in the output IFF files.

## **Program Action**

Before the program is invoked, the desired DCW CD-ROM should be mounted using CD\_MOUNT. Alternatively, it is possible to emulate the CD-ROM by copying the required files onto another device providing the directory hierarchy and content remains the same. It is not possible to copy the DCW directory files (.DIR) onto to a VAX/VMS device since they originated from MS-DOS and are not compatible. They will have to be created with the same names and hierarchy using CREATE/DIRECTORY.

When the program is invoked, the user is presented with a prompt at which all commands must be entered. The GO command begins the translation but before it is specified the Feature Code file, library, device, target directory and at least one feature class must be given.

The program begins by reading the Feature Class Schema (FCS) table which is essential for all coverages as it contains the primary and foreign key relationships between the various DCW tables. If this file cannot be read then no data in the coverage can be translated.

Now, the Feature Tables for each coverage will be read and since these files cover the whole library they are usually quite large and may take a long time. These files are read into memory and structured in a way that will allow fast access to any row of the table. This, however, has a large memory overhead and may exceed the page file quota allocated to the user process. If this happens, see if the page file quota can be increased or run the program one class at a time.

It is recommended that only those classes required in the translation are selected as this will prevent the need to hold potentially very large tables in memory which are never used. This will also help in reducing the processing time.

Each IFF file will now be opened and the Primitive Tables for each class will be read. These are cross-referenced with their respective Feature Tables using the foreign keys defined in the FCS table. The Feature Tables hold information at the feature level such as attributes and the Primitive Tables hold the geometry.

The Area Feature Table references the face (FAC), ring (RNG) and edge (EDG) Primitive Tables.

The Line Feature Table references the edge (EDG) Primitive Table.

The Point Feature Table references the node (END) Primitive Table.

The Text Feature Table references the text (TXT) Primitive Table.

When the IFF file is closed, the memory used for the Primitive Tables can be freed but this is not the case for the Feature Tables. Only when all the tiles in a particular coverage have been translated can the memory assigned to the Feature Tables be freed and made available for the next set of coverage tables.

### **Recommendations**

When processing large volumes of data, the following factors are advised.

- o Run the program as a batch job.  
This will ensure a log file is produced which will provide a list of all files created and any problems that occurred.
- o Translate one coverage at a time.  
The more coverages that are converted in one go, the greater the amount of memory used. Even though the memory allocated to Feature Tables is freed between coverages, there is inevitably some 'latent' memory build up which may tip the balance and cause the program to exceed its page file quota.
- o Only select those feature classes required.  
This will prevent the program from holding large unused tables in memory and help speed up the translation.

- o Use the ENABLE VERBOSE option. This is the default.  
The output of additional messages during the translation can help in identifying the source of any problems that occur.

### **DCW Area Features**

DCW holds area features in face (FAC), ring (RNG) and edge (EDG) tables. The face table contains a face ID number and a pointer to the ring table. The ring table contains a list of all the edges which make up a face, the first edge being the perimeter and any subsequent edges are holes within the polygon. This list in the ring table is series of pointers into the edge table which denotes the start edge of the perimeter or hole. By following edges through the edge table, the pointers should cycle back to the start edge.

Area features are created in DCW2I by building up a list of edges making up the perimeter and joining the holes in the area by invisible line segments. The starting edge of the perimeter (or hole) may point to other edges and the list cycles back around to the start edge again, thus closing the perimeter (or hole). Any holes in the polygon will be connected to the last point of the perimeter by an invisible line (pen-up) segment.

It has been discovered (in coverage PO for example) that there are some edges in the EDG table which have the same face on both sides and are often used to connect islands to a coast by this single line. However, there are examples where these edges are used in such a way that causes the IFF area features to close but be 'inside-out' and not filled correctly.

These edges (with the same face on both side) can also cause the edge list not to close which would result in the program creating an infinite list of edges which make up an area. The program therefore checks if the number of entries in the list has exceeded a limit which will only result in a warning message (TOOMANYEDGES) and the feature being ignored.

### **NOTE**

Often, these area features do not close because they have been incorrectly coded in the DCW data as having NULL codes. For example, some line features (rivers) in the DN (drainage) coverage are NULL coded as area and never close and so trying to build an area out of these will cause the TOOMANYEDGES message. We therefore recommend that the NULL coded features ARE NOT PRESENT IN THE FEATURE CODE TABLE so that they will be ignored.

It is therefore recommended that inspection of area features is performed using LITES2 to identify and try to correct any problems.

---

## COMMANDS

DCW2I is driven by various commands. One command may be given on each prompt line - anything after that command is ignored.

Commands may be abbreviated, so long as the abbreviation is not ambiguous (the program will complain if it is, and ignore the abbreviation).

### Summary of commands

In summary, the available commands are:

@file-spec	read commands from indirect file
ACFILE file-spec	read Attribute Code file
DESELECT CLASS class	remove class selection
DESELECT COVERAGE coverage	remove coverage selection
DESELECT GEOREF georefs	remove GEOREF selection
DESELECT LIBRARY library	remove library selection
DEVICE name	device name of mounted CD-ROM
DISABLE REPLY	turn command reply off
DISABLE VERBOSE	turn messages off
ENABLE REPLY	acknowledge each command
ENABLE VERBOSE	provide more feedback
FCFILE file-spec	read Feature Code file
GO	start processing
QUIT	leave program (before GOing)
RETURN	return to interactive input
SELECT CLASS class	choose which classes to extract
SELECT COVERAGE coverage	choose which coverages to extract
SELECT GEOREF georefs	choose which GEOREFs to extract
SELECT LIBRARY library	choose which library to extract
SHOW ALL	display all options
SHOW ENABLE	display the enabled options
SHOW SELECTIONS	display everything selected
SPAWN command-line	execute a DCL command line
TARGET directory	specify destination for files
TEXTGAP tolerance	padding distance between characters

### Alphabetical list of commands

@'file-spec'

The ampersand ('@') command tells the program to read commands from the indirect command file following the character. Each command will then be read from this file until a RETURN or GO command is encountered. If any error occurs while reading the file then control passes back to interactive input and subsequent commands after the offending one will be ignored.

**ACFILE** 'file-spec'

The Attribute Code file must be read by the program if it is to handle attributes in the translation. This file models a lookup mechanism between DCW attributes and IFF AC codes and can also be used to select which attributes will be translated, so that any not present in the file will be ignored.

The lookup mechanism enables any field (not just attributes) of a DCW table to be output as an IFF AC attached to the feature, provided it is of type integer (I), short integer (S in DCW, but I in the AC file), date (D) or text (T). This is especially useful for debugging as it would enable, for example, the ID from a DCW table to be output as an AC which would help in locating problems in the data.

**DESELECT** 'sub-command'

This command is the inverse of the SELECT command. It has identical sub-commands and undoes particular selections made.

**DESELECT CLASS** ALL|AREAS|LINES|POINTS|TEXT

This is used to remove all or one feature class type from the list of selected classes. Initially all feature classes will be selected and at least one class must be selected before attempting to use the GO command. The arguments to SELECT and DESELECT CLASS are themselves sub-commands and only one is permitted at a time. If more are required, type in the whole command again.

**DESELECT COVERAGE** coverage-list

This is used to remove one or more coverages from the current list of selected ones. No coverages are initially selected as these depend on which library is required. If no coverages are selected when the GO command is specified, a warning is given and all coverages are selected.

Valid BROWSE coverages are CO, DV, DN, GR, DA, IN, PO and PP.

Valid coverages for the libraries other than BROWSE are AE, CL, DQ, DN, DS, HY, HS, LC, OF, PH, PO, PP, RR, RD, TS, UT and VG

It is also permitted to specify ALL in which case all coverages in the current library will be deselected.

#### **DESELECT GEOREF** GEOREF-list

This is used to remove one or more GEOREFs or single GEOREF sub-tiles from the current list of selected ones. If the GEOREF-list contains just a single GEOREF such as XE, then all 9 sub-tiles (11 to 33) will automatically be removed. It is also possible to remove individual sub-tiles by specifying XE:32, for example, which removes tile 32 in GEOREF XE providing XE has already been selected.

#### **DESELECT LIBRARY** BROWSE|EURNASIA|NOAMER|SAS AUS|SOAMAFR

This command can be used to deselect the currently selected library. Since the coverages in the BROWSE library are different to those in the other libraries, all coverages will be deselected when swapping between them. However, when changing between libraries with the same coverages, no such deselection is made. Selecting a new library with the SELECT LIBRARY command has exactly the same effect.

#### **DEVICE** 'device-name'

This compulsory command tells the program the device name of the CD-ROM reader from which the data is to be extracted. The device should contain a DCW CD-ROM mounted in accordance with ISO 9660 provided by the CD\_MOUNT utility. The program checks that there is a top-level directory called 'DCW' on the mounted media.

It is possible to copy files from the CD-ROM onto another device and use that provided that the directory structure and content are identical. An example of the structure would be 'device-name:[DCW.SAS AUS.DQ.X.E.33]'.

#### **DISABLE** 'sub-command'

This command is the inverse of the ENABLE command. It has identical sub-commands and turns off the enabled options.

#### **DISABLE REPLY**

This command is used to prevent the program from confirming each command given with a reply.

#### **DISABLE VERBOSE**

This command is used to inform the program to produce only the minimal number of messages required during processing. If a problem occurs during the translation, it may not be immediately obvious where it occurred without the additional messages and so the verbose option is enabled by default. If, as will often be the case, the program is run as a



batch process, the batch log file will contain a useful record of any problems and having the verbose option enabled will help.

**ENABLE** 'sub-command'

This command is used to turn on certain options.

**ENABLE REPLY**

This command is used to tell the program to confirming each command given with a reply. This is the default action.

**ENABLE VERBOSE**

This command is used to inform the program to output more messages during processing. If the program is run as a batch process, the batch log file will contain a useful record of any problems and having the verbose option enabled will help. This is the default action.

**FCFILE** 'file-spec'

The Feature Code file is compulsory and is used to determine which feature codes to assign to each IFF feature based on one or two DCW attributes. This file models a lookup mechanism between DCW attributes and IFF feature codes but can also be used to select which features will be translated, so that any not present in the file will be ignored.

**GO**

This command should be the last one given and starts the processing of the data based on the selections made. Before the GO command is given it is necessary to have specified the Feature Code file, library, device, target directory and at least one feature class.

**QUIT**

This command is used to exit the program before processing is started with the GO command. After processing is finished, the program is automatically terminated and so QUIT is not needed then. Ctrl-Z will also abort the program from the interactive prompt.

## **RETURN**

This command is required at the end of an indirect command file and is used to tell the program to return from reading the file back to interactive input. If it is not given, control will return when the end of the file is reached.

## **SELECT** 'sub-command'

This command is used to determine which aspects of the DCW data set are required to be translated into IFF.

### **SELECT CLASS** ALL|AREAS|LINES|POINTS|TEXT

This is used to add all or one feature class type to the list of selected classes. The arguments to SELECT and DESELECT CLASS are themselves sub-commands and only one is permitted at a time. If more are required, type in the whole command again. Initially all feature classes will be selected and at least one class must be selected before attempting to use the GO command. The ability to select just a few classes prevents the program from reading those (potentially very large) unwanted DCW tables and hence decreases the time and memory requirements on the program.

### **SELECT COVERAGE** coverage-list

This is used to add one or more coverages to the current list of selected ones. No coverages are initially selected as these depend on which library is required. If no coverages are selected when the GO command is specified, a warning is given and all coverages are selected.

Valid BROWSE coverages are CO, DV, DN, GR, DA, IN, PO and PP.

Valid coverages for the libraries other than BROWSE are AE, CL, DQ, DN, DS, HY, HS, LC, OF, PH, PO, PP, RR, RD, TS, UT and VG

It is also permitted to specify ALL in which case all coverages in the current library will be selected.

### **SELECT GEOREF** GEOREF-list

This is used to add one or more GEOREFs or single GEOREF sub-tiles to the current list of selected ones. If the GEOREF-list contains just a single GEOREF such as XE, then all 9 sub-tiles (11 to 33) will be extracted. It is also possible to extract individual sub-tiles by specifying XE:32, for example, which will add tile 32 in GEOREF XE to the

list, providing XE has already been selected. If no GEOREFs are selected when the GO command is specified, a warning is given and all will be selected.

It is likely that all GEOREFs will be extracted at once but 10 individual ones are permitted. For each one in this list, a record is kept of which of the 9 sub-tiles are required. If the limit of 10 GEOREFs is not sufficient, then the program should be run as many times as required.

**SELECT LIBRARY** BROWSE|EURNASIA|NOAMER|SAS AUS|SOAMAFR

This command is used to choose which library is required. Since the coverages in the BROWSE library are different to those in the other libraries, all coverages will be deselected when swapping between them. However, when changing between libraries with the same coverages, no such deselection is made.

**SHOW** 'sub-command'

This command is used display the current options made so far as a result of other commands.

**SHOW ALL**

This command reports the device, target directory, text gap, enabled options and selections made.

**SHOW ENABLE**

This command is used to show the currently enabled options.

**SHOW SELECTIONS**

This command is used to show the currently selected library, coverages, GEOREFs and feature classes. This is done automatically when the GO command is given to aid the user.

**SPAWN** 'command-line'

This enables the user to execute a single DCL command-line from within DCW2I and immediately returns to terminal input.

**TARGET** 'directory'

This command is required to define the destination directory for the output IFF files. A node and directory should be given of the form 'device:[directory]' and IFF files are output at one level of hierarchy below this. In the given directory, a sub-directory will be created for each coverage and each tile of that coverage will be placed there. For example, if a target directory of LSL\$DATA\_ROOT:[DCWDATA] is given, all IFF files created from the Data Quality (DQ) coverage will be put into a directory called LSL\$DATA\_ROOT:[DCWDATA.DQ].

**TEXTGAP** 'tolerance'

This command defines the spacing between characters which, if exceeded, will result in an extra space being inserted between each character of a text string.

Each DCW text Feature Table contains a TEXTGAP field which contains a value defining the spacing between characters. In order to give the user control over this, additional spaces can be inserted by entering a tolerance which is less than those in the table. However, DCW text data already contains extra spaces between characters and so the default tolerance is large (100.0) so that the user must explicitly set it to force the insertion of extra spaces.

---

**EXAMPLE**

```
$ CD_MOUNT LSLV3B$DKB500: SASAUS<CR>
%MOUNT-I-CDROM_ISO, SASAUS:DMA_DCW (1 of 1) , mounted on _LSLV3B$DKB500:
$
$ DCW2I<CR>
Digital Chart of the World to IFF converter
Version 1.0 of 10:48:35 22-JUL-92
DCW2I> @EXAMPLE.COM<CR>
%DCW2I-I-CMDINPUT, Command input being read from file SYS$DISK:[ ]EXAMPLE.COM;0

DCW2I> DEVICE LSLV3B$DKB500:<CR>
Device name      : LSLV3B$DKB500

DCW2I> TARGET LSLV3B$DKB100:[LSLDATA]<CR>
Target directory : LSLV3B$DKB100:[LSLDATA]

DCW2I> DESELECT CLASS ALL<CR>
Classes selected : NONE

DCW2I> SELECT CLASS AREAS<CR>
Classes selected : AREAS

DCW2I> SELECT LIBRARY SASAUS<CR>
Library selected : SASAUS, Southern Asia and Australia

DCW2I> SELECT COVERAGE DQ<CR>
Coverages selected : DQ

DCW2I> SELECT GEOREF XE:33<CR>
GEOREFs selected  : XE, Tiles: 33

DCW2I> ACFILE LSLV3B$DKB100:[LSLDATA]DCW.ACT<CR>
Reading file : LSLV3B$DKB100:[LSLDATA]DCW.ACT

DCW2I> FCFILE LSLV3B$DKB100:[LSLDATA]DCW.FCT<CR>
Reading file : LSLV3B$DKB100:[LSLDATA]DCW.FCT

DCW2I> GO<CR>

Library selected : SASAUS, Southern Asia and Australia
Coverages selected : DQ
GEOREFs selected : XE, Tiles: 33
Classes selected : AREAS

Reading LSLV3B$DKB500:[DCW.SASAUS.DQ]FCS
Reading LSLV3B$DKB500:[DCW.SASAUS.DQ]DQAREA.AFT

Creating IFF file LSLV3B$DKB100:[LSLDATA.DQ]DQXE33.IFF
Reading LSLV3B$DKB500:[DCW.SASAUS.DQ.X.E.33]FAC
Reading LSLV3B$DKB500:[DCW.SASAUS.DQ.X.E.33]RNG
Reading LSLV3B$DKB500:[DCW.SASAUS.DQ.X.E.33]EDG
4 Feature(s) written to file
```

Freeing memory allocated to feature tables...

Freeing memory allocated to feature/attribute code tables...

ELAPSED: 0 00:00:33.06 CPU: 0:00:09.79 BUFIO: 71 DIRIO: 63 FAULTS: 1416  
\$

This example shows a user outputting a single IFF file containing just the area features in the Data Quality (DQ) coverage of GEOREF XE, sub-tile 32. Only the Area Feature Table (DQAREA.AFT) is read to prevent the need to read the tables for unwanted classes.

-----  
**MESSAGES (INFORMATIONAL)**

These messages give information only, and require no immediate action by the user. They are used to provide information on the current state of the program, or to supply explanatory information in support of a warning or error message.

ALLSEL, No 'missing-selection' have been selected. All will be extracted

**Explanation:** This message applies to both coverages and GEOREFs and informs the user that one set was not explicitly selected and so ALL have been selected for you.

**User action:** Check that you really did intend this and you did not just forget to select the appropriate coverages or GEOREFs. Abort the program and run again as necessary.

CMDINPUT, Command input being read from file 'file-spec'

**Explanation:** This message is to confirm that input is being read from an indirect file and reports the name of the file.

**User action:** None.

COORDS, Potential problem at or near coordinate 'x','y'

**Explanation:** The coordinates reported refer to the approximate absolute position of a problem that occurred due to 'dangling edges' when constructing an area feature.

**User action:** The coordinates are intended to aid the user when checking for problems in the data using LITES2. The FSN reported by the message TWODANGLES should also help check that the area feature is complete.

MISSINGTABLE, Missing 'name' table for 'class' features in tile 'tilename'

**Explanation:** In order to extract the features in the tile for the particular class, certain primitive tables must be present in the data. For area features, these are the FAC,RNG and EDG tables; for line features, the EDG table; for point features, the END table and for text features, the TXT table are needed.

**User action:** If a particular feature table exists for a coverage but the required primitive table does exist in the tile, then that feature class is not present in that 5 degree tile. If the feature table exists for the coverage, then there must be some tile within the library that has the required primitive table, but the reported tile did not, in which case the message should be ignored.

NODIR, 'directory' - no IFF file 'filename'

**Explanation:** The directory given does not exist in the library of the current CD-ROM being read. No IFF file with the corresponding name can therefore be created.

**User action:** None. This indicates that the CD-ROM simply does not contain data for that coverage and tile.

RETURN, RETURN command detected - returning to terminal input

**Explanation:** This message is to confirm that the RETURN command was detected and input has been returned to the terminal.

**User action:** None.

SKIPCOV, Skipping coverage 'name' due to above problem

**Explanation:** Due to some problem while reading the specified, processing can not continue and so it has been skipped in order to proceed on to any remaining selected coverages.

**User action:** This message will be accompanied with another which will give a clue as to the nature of the problem. It is most likely to be a problem outside the user's control. If you are unable to ascertain the cause, you should contact Laser-Scan.

SKIPGEO, Skipping GEOREF 'name' due to above problem

**Explanation:** Due to some problem while reading the specified GEOREF, processing can not continue and so it has been skipped in order to proceed on to any remaining GEOREFs in the current coverage.

**User action:** This message will be accompanied with another which will give a clue as to the nature of the problem. It is most likely to be a problem outside the user's control. If you are unable to ascertain the cause, you should contact Laser-Scan.

SKIPTILE, Skipping tile 'name' due to above problem

**Explanation:** Due to some problem while reading the specified tile, processing can not continue and so it has been skipped in order to proceed on to any remaining tiles in the current coverage.

**User action:** This message will be accompanied with another which will give a clue as to the nature of the problem. It is most likely to be a problem outside the user's control. If you are unable to ascertain the cause, you should contact Laser-Scan.



ZEROFEAT, File contained no features. It has been deleted

**Explanation:** The message reports that no features were written to the IFF file and hence it was deleted. This may well be the case if no features of the selected classes were present in the tile, or if the features in the tile did not match any entries in the Feature Code Table. DCW data contains only those tiles which contain any data and so, for example, a tile would not exist if it was located in the middle of an ocean.

**User action:** If you expected features to be present in the tile for the selected feature classes then check that all the primary and secondary names and values are present in the Feature Code Table so that they will match the features.

-----  
**MESSAGES (WARNING)**

These messages are output when an error has occurred that can be corrected immediately by the user or that the program will attempt to overcome.

8BITASCII, FSN 'number' text string has 8 bit ASCII character

**Explanation:** The program expects all text characters to be in 7-bit ASCII form and an 8-bit ASCII character was encountered (ie ASCII value greater than 127).

**User action:** Examine the text entry of the reported feature to identify the offending character. Since this should not occur in DCW, it should be removed using IPATCH/WRITE.

ACTYPE, Invalid AC type on line 'number'

**Explanation:** The attribute type present on the reported line contained too many characters or was of the wrong type. The only permitted attribute types are of type integer (I), date (D) or text (T).

**User action:** Change the offending line so that the AC type is valid.

BADDIR, Directory 'dir-name' does not exist or is read-only

**Explanation:** The directory reported cannot be used as a destination for the IFF files because it does not exist or it is read-only.

**User action:** Enter the name of a directory which both exists and can be written to.

BADSUBTILE, GEOREF 'geo-type' has invalid sub-tile

**Explanation:** The sub-tile following the reported GEOREF was invalid. Each DCW GEOREF is split into 9 sub-tiles which are referenced 11 to 33 where the first digit applies to longitude and the second to latitude.

**User action:** Enter the command again but with a legal GEOREF sub-tile.

BADTYPE, Attribute 'name' is of type 'char' but in AC file as type 'char'

**Explanation:** The attribute reported matched one in the Attribute Code file but was of the wrong type. The true type as define in the VPF table header is used.

**User action:** Make a note of the true type and correct it in the Attribute Code file.

CANTDESEL, Cannot deselect individual GEOREFs when all selected

**Explanation:** Since there is a limit on the number of individual GEOREFs allowed, it is not possible to deselect individual ones when they are all selected as it may still exceed the limit. There are 288 (24 by 12) potential GEOREFs and if, for example, one was deselected it is not possible to maintain a list of 287 individual one as this would still exceed the limit.

**User action:** If a large number of GEOREFs (but not all) are required to be extracted and the number of individual GEOREFs is not sufficient, simply run the program as many times as required.

CANTGO, Must specify 'missing-item' before you can GO

**Explanation:** The GO command was given before the minimum number of options/selections have been made. Before processing can begin, you must have specified the library, device, target directory, Feature Code Table and at least one feature class type. The GO command was ignored.

**User action:** Specify the missing requirement and GO again.

CANTREAD, Unable to read 'column-type' from line 'line-no'

**Explanation:** The entry type reported could not be read from a line of the file. This failure could be due to trying to interpret a string as a number, for example. NOTE: This will result in the line being omitted which may cause missing features or ACs on features since they will not match. Ideally, you should have no warnings when reading the AC and FC file to ensure all lines have been read.

**User action:** Examine the offending line, amend the appropriate column and run the program again.

CANTSPAWN, Unable to spawn command, returning to DCW2I

**Explanation:** The command attempting to be spawned failed for some reason.

**User action:** This messages should be accompanied by another which may give a clue as to nature of the problem.

CODEXT, FSN 'number' text string has code extension character

**Explanation:** The program has encountered a code extension character in the reported FSN. These characters are escape (ESC - ASCII 27), shift in (SI - ASCII 14) and shift out (SO - ASCII 15) and are used to allow extension to other alphabets.

**User action:** Examine the text entry of the reported feature to identify the offending character. Since this should not occur in DCW, it should be removed using IPATCH/WRITE.

COVINVALID, Coverage 'cover-name' is not available for library 'library-name'

**Explanation:** Each DCW library has a certain set of valid coverages which may be selected and an attempt was made to select an unavailable one from a library.

**User action:** A list of these can be found in the DCW2I documentation. Reenter the command but with valid coverage names for the reported library.

DCL, The SPAWN command must precede a valid DCL command line

**Explanation:** No DCL command line was given after the SPAWN command

**User action:** Re-enter the SPAWN command with a valid command line

GEOINVALID, GEOREF 'georef-name' is not valid

**Explanation:** The GEOREF reported is not a valid one as defined by the DCW Product Specification. A valid GEOREF consists of two characters; the first represents the longitude and the second is the latitude. Acceptable longitude values are A to Z (except I and O) and acceptable latitude values are A to M (except I).

**User action:** Reenter the command but with valid GEOREF names.

GEONOTSEL, GEOREF 'geo-type' is not selected

**Explanation:** An attempt was made to deselect a GEOREF which is not selected. The command has been ignored.

**User action:** Only previously selected GEOREFs can be deselected.

GIVELIB, Coverages dependent on library. Select library first

**Explanation:** An attempt was made to make a coverage selection before the library has been selected. Since the browse coverages are different from the other coverages, the library must be known in advance.

**User action:** Select the library before any coverages.

ILLEGALDIR, That is not a valid directory name

**Explanation:** The directory following the TARGET command could not be parsed as a valid directory.

**User action:** Enter the command again but with a legal directory name.

INVDEV, Invalid device name

**Explanation:** The device name given is invalid. No directory, filename, extension or version is permitted when giving the device name. Node names are permitted and the device should end with a colon.

**User action:** Enter a correct device name.

LIBNOTSEL, That library is not selected

**Explanation:** An attempt was made to deselect a library which is not selected. The command has been ignored.

**User action:** Only selected libraries can be deselected.

NOFILNAM, "@" must precede file-spec

**Explanation:** No file name was given after the '@' character.

**User action:** In order for the program to read commands from an indirect file it must be invoked by typing '@' followed by the file name.

NOGEOS, Individual GEOREFs not available for BROWSE library

**Explanation:** An attempt was made to make a GEOREF selection while the BROWSE map is selected. Since individual GEOREFs are not available for the BROWSE map, the command has been ignored.

**User action:** Do not attempt to select any GEOREFs from the BROWSE library.

NONAME, No 'type' name given

**Explanation:** This message is used for two purposes. Either the SELECT COVER or the SELECT GEOREF command was not followed by a coverage or GEOREF name. The command has been ignored.

**User action:** Reenter the command followed by a valid name.

NORET, RETURN command ignored - command input already from terminal

**Explanation:** The RETURN command was given when input is already from the terminal. It will be ignored.

**User action:** None.

NOSUCHCOV, Selected coverage 'name' does not exist for library 'name'

**Explanation:** The selected coverage is not available for the library specified. For example, coverage VG (vegetation) only exists in DCW for library NOAMER (North America)

**User action:** If you think this coverage should exist, then check that you have given the correct library name and have mounted the appropriate CD-ROM.

NUMPTS, Too 'amount' points for feature class - feature ignored

**Explanation:** This is a two-fold message which reports that there are either too few or too many points for the type of feature. Area features should contain more than 4 coordinate pairs, line features should contain at least 2, point and text features should only contain one.

**User action:** Since it is very difficult to check the feature in question, you may wish to contact Laser-Scan stating the offending tile and classes used.

OUTOFRANGE, 'code-type' value of 'value' out of range on line 'number'

**Explanation:** The reported code-type (AC code or feature code) is out of range in the Feature/Attribute Code file. The valid range for these is from 0 to 32767.

**User action:** Amend the offending value in the file and run the program again.

TABLEFAIL, Failed to read table 'name'

**Explanation:** A problem occurred while reading the specified table. This could be due to any number of things and since the VPF database tables are binary it is quite difficult to find what is wrong with a table.

**User action:** This may be a problem with the data and should be reported to Laser-Scan.

TILENOTSEL, Tile 'sub-tile' of GEOREF 'geo-tile' not selected

**Explanation:** An attempt was made to deselect a sub-tile of a particular GEOREF which has not previously been selected.

**User action:** Only try and deselect those tiles which have previously been selected.

TOOMANY, Only 'max' individual GEOREFs allowed

**Explanation:** Too many GEOREFs were selected. Most of the time, all GEOREFs will be required but for testing purposes over small areas, a few can be extracted. Refer to the DCW2I documentation for the current limit on the number of individual GEOREFs allowed.

**User action:** If the number of individual GEOREFs is not sufficient, the program should be run as many times as required.

TOOMANYEDGES, More than 'number' edges in face. Face edges do not close

**Explanation:** This problem is caused when building up a list of all the edges which constitute an area feature. In doing so, it is necessary to follow the pointers from one edge to another until it cycles around to the start edge again, thus closing the feature. For some reason (often caused by edges with the same face on both sides) the edges followed have not cycled back to the beginning after the number of reported edges. This is most likely to be a problem in the left or right edge keys and will be very hard cure since the data is binary and cannot easily be edited even if it were copied onto a disk so that the files could be written to.

**User action:** Please contact the donor of the data, stating which tile is corrupt. Since no feature is written to the IFF file and identifying the DCW feature in the VPF table would not help, this message should be ignored. The user will know in which GEOREF tile this occurred which should be inspected in LITES2.

TWOCHARS, Two characters are required for 'type' name

**Explanation:** A coverage or GEOREF name was entered which did not contain exactly two characters. Refer to the DCW2I documentation for a list of valid coverage names and GEOREFs

**User action:** Reenter the command with valid coverage names or GEOREFs.

TWODANGLES, Two dangling edges together in area with FSN 'number'

**Explanation:** When building up a list of edges which comprise an area feature, two dangling edges (edges with the same face on both sides) have been found, one after the other. These edges can cause problems, particularly if they are digitised in different directions. The program will ignore the dangling edges in preference for a normal edge on the perimeter of the area in the hope that it will close properly. It is often the case that two or more dangling edges can be thrown away with no loss of data, but there may be cases where two dangles lead to a hole in the area which could be lost and so we recommend that the user performs the following action.

**User action:** Examine the reported area feature in LITES2 for this tile and compare it with the DCW data held on CD-ROM which can be displayed on a PC using the VPFVIEW software, which accompanies the DCW package.

UNEXPEND, unexpected end of indirect command file detected - returning to terminal input

**Explanation:** The end-of-file was detected when reading the indirect command file. The usual way of telling the program to return to interactive input is by having a RETURN command on the end and one was not found.

**User action:** All the commands in the file will have been executed and so the RETURN command may be omitted but for a tidy exit you should edit the command file to ensure that there is a RETURN command at the end. However, a RETURN command is not required after a GO because this terminates the program when complete.

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**MESSAGES (ERROR)**

These messages indicate an error in processing which will cause the program to terminate. The most likely causes are a corrupt or otherwise invalid input file, or an error related to command line processing and file manipulation.

BADVPFLEN, Illegal header length

**Explanation:** The first 4 bytes in every VPF table contains the length of the header section. This was found to be less than zero which is a nonsense. The table will be ignored and processing will skip to the next tile.

**User action:** This is be a problem with the data and should be reported to the donor of the CD-ROM.

CANTOPEN, Unable to open file 'file-spec'

**Explanation:** The specified file could not be opened.

**User action:** The associated LSLLIB message is likely to explain the cause.

DATATYPE, No such datatype 'char'

**Explanation:** While parsing the header data definition, an unrecognised datatype was found. The program will recognise all those datatypes listed in the DCW Product Specification dated 7 December 1991.

**User action:** If the datatype is unknown and not listed in the DCW Product Specification, then contact the donor of the data stating the nature of the problem.

ERRINFILE, error reading from 'file-type' file at line 'number'

**Explanation:** The given line could not be read from the parameter file. An additional LSLLIB message will follow, giving the reason for the failure.

**User action:** Ascertain the cause of the failure from the messages given, and take the appropriate remedial action. If the error is due to a serious problem such as a system failure, the System Manager should be informed.

INDERR, Indirect file error - returning to terminal input

**Explanation:** An error occurred while reading from the indirect command file. This would most likely be due to an invalid command in the file.

**User action:** The associated LSLLIB message is likely to explain the cause.



INVFCFS, Invalid FCS table format

**Explanation:** In order to read the FCS successfully, the table should contain fields labelled TABLE1, TABLE2, FOREIGN\_KEY and PRIMARY\_KEY. One or more of these fields was not present in the table and hence could not be read.

**User action:** Check the contents of the text header part of the FCS against the description in the DCW Product Specification and if it is wrong, please contact the donor of the DCW CD-ROM.

NOFREELUN, No free logical unit numbers

**Explanation:** Before any file can be opened, it has to be assigned a logical unit number (LUN). A request was made for the the next free one from a pool of free LUNs and none were available.

**User action:** This error should not normally happen. Ask your system manager for advice on the availability of logical unit numbers or contact Laser-Scan.

NOID, No 'ID' in header definition

**Explanation:** The current table being read was found to contain no 'ID' field in the header section. This is invalid since every table should have a first field called 'ID'.

**User action:** This would indicate a problem in the content of the VPF table. It may be possible to copy the relevant files from the CD-ROM to a disk and edit the offending file since the header definition is of text format. Note that in order for the program to accept the device as valid, the directory structure must be identical to that of the CD-ROM.

NOSUCHFILE, File 'name' does not exist

**Explanation:** The file is specified is essential for use in this part of the processing and could not be found on the CD-ROM.

**User action:** This would indicate a problem in the structure or content of the CD-ROM which could be checked by hand. Examine the DCW Product Specification to determine if the file should exist for the current coverage. If it is missing for the CD-ROM, you should contact the donor of the DCW data, otherwise it may indicate a problem with the program and you should contact Laser-Scan.

NOSUCHLIB, Library 'name' does not exist on that CD-ROM

**Explanation:** The library specified does not exist on that CD-ROM. Each CD-ROM contains one library and the browse map.

**User action:** Ensure that the correct CD-ROM is in the CD reader and that the appropriate library name was selected.

NOTDCWROM, 'device' is not the device name of a DCW CD-ROM

**Explanation:** A valid device name was given but it is not that of a CD-ROM reader containing a DCW CD.

**User action:** Enter the device name of CD-ROM reader with a DCW CD correctly mounted.

STATFILE, Cannot open file descriptor for 'filename'

**Explanation:** The file descriptor could not be opened for the reported file. This is necessary to determine the file length and may be caused by a corrupt file or protection violation. This should not happen under normal circumstances.

**User action:** Check that the file in question is not corrupt and see your System Manager about any potential problems. If the problem persists, please contact Laser-Scan.

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**MESSAGES (FATAL)**

These messages indicate a severe error in processing, or some form of system failure, which has caused the program to terminate.

NOMEMORY, Out of virtual memory

**Explanation:** Due to the large quantities of data that must be held, the request to allocate some virtual memory has failed. This message will be followed by a report of the number of bytes allocated before the program failed.

**User action:** See your System Manager about the possibility of increasing your page file quota or, as a last resort, run the program a few classes at a time (ie extract all the areas, then all the lines etc) and merge the results.

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**MESSAGES (OTHER)**

In addition to the above messages which are generated by the program itself, other messages may be produced by the command line interpreter (CLI) and by Laser-Scan libraries. In particular, messages may be generated by the IFF library and by the Laser-Scan I/O library, LSLLIB. IFF library messages are introduced by '%IFF' and are documented in the IFF library users' guide. In most cases IFF errors will be due to a corrupt input file, and this should be the first area of investigation. If the cause of the error cannot be traced by the user, and Laser-Scan are consulted, then the output file should be preserved to facilitate diagnosis. LSLLIB messages are introduced by '%LSLLIB' and are generally self-explanatory. They are used to explain the details of program generated errors.