Laser-Scan Ltd.

DFAD

Reference Manual

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CONTENTS

DFAD Reference Documentation Change Record

Version 1.0 8 April 1988 J.M.Billing, D.R.Catlow, J.D.Barber

        First issue of DFAD reference documentation.

Version 1.1 14 June 1988 D.R.Catlow

        Chapter 2 - new example runs for Module DFAD2I inserted

        Chapter 3 - the use of the /NOAC qualifier in DFADVAL has been made
        clearer

        Chapter 4 - modified to reflect small changes to the layout of
        FADTINPUT forms.

        Chapter 5 - additional error message added for FADTMERGE

        Chapter 6 - incorrect reference to DFAD2I (rather than I2DFAD) removed
----

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        Chapter 3 - the qualifier /[NO]DUPLICATES added to DFADVAL

        Chapter 5 - description of command line qualifiers ordered
        alphabetically

        Introduction - updated to reflect changes to Chapters 3 and 5

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        Chapter 2 - examples runs modified to reflect diagnostic changes

        Chapter 4 - option to delete a FADT feature record added

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        Chapter 3 - /LITES2 option - file-spec parsed with default
        LSL$LITES2CMD:DFADVAL.LCM

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        Chapter 3 - /LAYER qualifier added to DFADVAL

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> Chapter 4 - Description of new logical names for setting up certain default values for the ACCURACY, DSI, and DLMS HEADER forms which override the supplied defaults.

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> Chapter 4 - The numeric keys on the keypad can now be used to enter value into fields.

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> Chapter 4 - The PF4 and F17 keys now do the same as TAB and Backspace.

> Chapter 4 - The logical name LSL$DFAD_VERTICAL_HEIGHT corrected to LSL$DFAD_VERTICAL_ACCURACY.

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> Chapter 4 - Removed the logical names used for specifying FADT default values.

> Chapter 4 - Description of the function of the new FADT default values lookup file.

> Chapter 4 - Description of the new FAC range entry on the FADT form.

> Chapter 4 - Added the FADT defaults template file in the examples section.

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> Chapter 4 - Description of the facility for deleting multiple FACs specified by a FAC range.

> Chapter 4 - Added the FADT defaults template file in the examples section.

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> Chapter 7 - The description section of the reference manual explains that the LEV field in the sheet identity can now hold a value of 3 to represent level 3-C and a value of 4 to level 1-C.

Version 2.2 12 December 1993 J.M.Cadogan

> Chapter 6 - New qualifier /CHANGE2 for I2DFAD.

Version 2.3 29 September 1995 J.M.Cadogan

      Chapter 7 - New error message '*** ERROR *** Number or NA expected'

Version 2.3 29 September 1995 J.M.Cadogan

      Chapter 7 - New error message '*** ERROR *** Number or NA expected'

PREFACE

Intended audience

This manual is intended for all users of the Laser-Scan DFAD package
running under the VAX/VMS operating system.

Structure of this document

This document consists of 2 major sections. The first section
comprises an introduction to the package. The second section provides
comprehensive details of each package module.

The Introduction is an overview of the DFAD package and is intended as
a quick reference guide to the purposes of the different package
modules. Package initialisation is outlined.

The Introduction also contains details on how a DFAD feature record is
held within a Laser Scan Internal Feature Format (IFF) file, and
sections on the structure of the FADT file, and DLMS Rules file.

The second sections consists of a Reference Guide for each of the
individual modules that comprise DFAD. A chapter is devoted to each
module. Each chapter contains the same basic categories of
information. These are:

MODULE   - the name of the DFAD module.

REPLACES   - which existing Laser-Scan program it replaces.

FUNCTION   - a synopsis of what the module does

FORMAT   - a summary of the module 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.

DESCRIPTION   - the definitive description of the module action.

EXAMPLES   - annotated examples of module usage.

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.

Where applicable, additional categories are available for some
modules. Some modules, for example, have a "RESTRICTIONS" category.

Associated documents

For full details of the components of the Digital Landmass System, and
in particular Digital Feature Analysis Data (DFAD), the user is
referred to the 'Defense Mapping Agency Product Specification.'
Details of the DFAD offline magnetic tape format, are included in this
document.

Conventions used in this document

Convention	Meaning
<CR>	The user should press the carriage return 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>.
$ **DFAD2I JIM<CR>**	Command examples show all user entered commands in **bold** type.
$ **DFAD2I JIM<CR>** . . .	Vertical series of periods, or ellipsis, mean either that not all the data that a module 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 ellipsis 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 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).

Command line data types

>   All DFAD utilities, with the exception of FADTINPUT, use the VMS
>   Command Line Interpreter (CLI) to get and parse the program command
>   line. DFAD 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 DFAD 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.

CHAPTER 1

INTRODUCTION

DFAD and DLMS

        The Digital Landmass System (DLMS) is a multi-national database
        project.   Each participating nation is involved in the production of
        data covering a given area of responsibility and conforming to a
        common specification. The specification for the project is published
        by the U.S. Defense Mapping Agency (DMA).

        The primary aim of the DLMS project is to provide data for radar
        simulation in aircrew mission training equipment, such as Tornado
        strike aircraft simulators. In order to provide radar simulation
        capability, DLMS comprises two complementary data products. DTED
        (Digital Terrain Elevation Data) defines the altitude (above mean sea
        level) of the basic terrain surface, taking no account of the
        character of the surface, while DFAD (Digital Feature Analysis Data)
        gives specific information about the characteristics of the surface,
        and in particular those characteristics affecting radar. Included in
        DFAD is information on such aspects as the relative height of
        significant features (eg. buildings and woods) above the terrain
        surface, and surface material composition.

        DTED is commonly referred to as 'terrain', while DFAD is referred to
        as 'culture'.   The terrain data is held as a regular matrix of
        elevation values, and is classified as a DTM, while the culture is
        held as a vector dataset consisting of a set of individual features
        recorded as points, lines or areas.

        Both DTED and DFAD are defined in the DMA specification as 'off-line
        formats', since their primary use is for the exchange of data on
        magnetic tape between production agencies. The data is transformed
        from these 'off-line formats' to a suitable 'on-line format' prior to
        use in radar simulation applications.   Transformation involves the
        simplification and compression of the DLMS data by the removal of all
        information not relevant to radar display, so that the online radar
        database can meet the data volume and speed constraints of the DRLMS
        (Digital Radar Landmass Simulation) system of the simulators.

DFAD Package Utilities

        DFAD is a Laser-Scan package containing a number of modules that have
        been designed specifically to handle DLMS Digital Feature Analysis
        Data. Utilities are provided to create, examine and validate DFAD
        data held within a Laser Scan Internal Feature Format (IFF) file,
        along with utilities to read and write a DLMS DFAD format magnetic
        tape.   In addition modules are provided to create and modify a Feature
        Analysis Data Table (FADT); to merge a FADT with DFAD coordinate
        information, and to access an on-line DLMS Rules file.

        A summary of the function of each module, along with a brief
        description of all module qualifiers and prompts, is provided in this
        introductory chapter. For a fuller description of each module and its
        associated qualifiers; example runs, and details of all messages
        associated with a module, the user should consult the relevant chapter
        in the DFAD Reference Manual.

DFAD Package Initialisation

Before use, the DFAD package must be initialised. Package
intialisation involves assigning DCL symbols and logical names which
allow the user to successfully run the modules. This is done using a
command procedure DFADINI.COM which is supplied as part of the DFAD
package. DFADINI itself will be defined as a DCL symbol at your site
and may be invoked by typing:

$ **DFADINI<CR>**

The DFADINI command procedure will define a DCL symbol (the module
name) for each of the DFAD modules, so that after its execution, the
user need only type the symbol name to activate the module of his
choice.

After intialisation the following symbols will be defined:

DFAD2I   **DFADVAL**   **FADTINPUT**   **FADTMERGE**
I2DFAD   **MCEHED**

In addition the following logical names are defined:

LSL$FADT   **LSL$DFAD_RULE**

The logical name **LSL$FADT** will point to a directory where existing
FADT files are to be found, and where new FADT files will be created
by default.

The logical name **LSL$DFAD_RULE** will point to a directory containing a
DLMS Rule file.

As an alternative to explicitly typing the DFADINI command, the
DFADINI command may be placed in the users login file, or in the site
dependent default login file.

DFAD and IFF

All the package utilities (with the exception of FADTINPUT) read and
write DFAD data in an IFF file. The DFAD manuscript and associated
header information is held in IFF within a MCE (customer type 1) Map
Header Record. DFAD area, line and point features are held as IFF
features in layers 1 2 and 3 respectively. Accuracy region data is
held in Layer 0 of the IFF file.
DFAD Header Information

DFAD Manuscript and Data Set Indentification (DSI) information is held
in a MCE Map Header (MH) record. Data relating to the generation of
the manuscript by the producing agency, eg. the compilation data,
mode of data capture and level of processing; information on the
projection and datum, and details of the geographical origin and

extent of the manuscript are recorded.

The header fields are created as part of the tape output operation
(DFAD2I), or transferred from FADT file records during the merging of
IFF and FADT files (FADTMERGE).   The header data may be examined and
modified using the DFAD utility MCEHED, and may be validated using the
module DFADVAL.   Data is read from the IFF map header, and transferred
to manuscript header and DSI records on a DFAD tape, by the module
I2DFAD.

DFAD Accuracy Data

The DFAD Accuracy Description (ACC) Record holds information on the
vertical and horizontal accuracy of the manuscript. Accuracy values
for the whole of the manuscript, and possibly for up to 9 sub-regions
may be defined.

Within IFF, the accuracy data is to be found in Layer 0 of the IFF
file.   Data for each region is stored as a separate IFF feature.   The
coordinates of the feature define the boundary of a closed area.
Conventionally accuracy regions are assigned a feature code of 301.
Associated with each accuracy feature is an AC type 8 - the text field
of the AC holds the relative and absolute accuracy values. The
following is an example of the format of the AC entry:

AC 8 0 "absh 50 absv   0 relh 25 relv 0"

The accuracy region features are created when a DFAD manuscript is
read from tape using DFAD2I, while new accuracy features may be
created or modified using the IFF interactive editor LITES2, or using
the FADTINPUT module.   The IFF accuracy features may be validated
using DFADVAL, and if present will be transferred to an ACC DFAD tape
record by the utility I2DFAD.

DFAD Point, Line and Area Features

A DFAD point, line or area feature is held in the IFF file as an IFF
feature.   The following important points about the IFF representation
of a feature should be noted:

1.   The Feature Serial Number (FSN) assigned to a feature   is
     equivalent to the DFAD Feature Analysis Code.

2.   The FS entry stores the feature code of the feature.   The nature
     of the feature code may vary depending on the processing that has
     been applied to the DFAD data.   It may simply be used to classify
     the features into points, lines or areas, or may be used to
     identify uniquely the class of feature. In the former case the
     feature codes 100, 101 and 102 should be used to distinguish a
     point, line or area.   In the latter case, the feature code is
     constructed from the DFAD Feature Indentifier (FID) and Feature
     Type entry, using the formula:

     FC = FID + (TYPE + 1) * 1000))

The module will apply this formula by default.

3. The attributes associated with a DFAD feature (eg. the height of
    the feature) are held in the text field of an AC type 7 entry.
    The format of the text field will vary depending on whether the
    feature is a point, line or area. The following are examples of
    AC 7 entries:

    Area feature:
    AC 7 0 "typ2 hgt 0 fid 902 sec 0 rel 0 smc10 den 0 rof 0 tre 0"

    Line feature:
    AC 7 0 "typ1 hgt 44 fid 902 sec 0 rel 0 smc 3 wid 52 dir 2   "

    Point feature:
    AC 7 0 "typ0 hgt 14 fid 902 sec 0 rel 0 smc 3 wid 40 lth 70 ori 5"

    Note that security (sec) and releasability (rel) codes are held
    for each feature.   This is not a requirement of the DLMS
    Specification, and the values are unlikely to be set in a normal
    production environment.

4. The coordinates of a feature are held in one or more ST entries.
    The coordinates are stored relative to the SW corner of the
    manuscript.

FADT Files

A FADT file is created using the DFAD module FADTINPUT. The FADT file
holds attribute data for each DFAD feature. On input the attribute
data is validated against the DLMS specification, and against a DLMS
Rules file on input.   FADT data is transferred to an IFF file and
associated with feature coordinate data using FADTMERGE.   The FADT
file cannot be edited or listed except from within the FADTINPUT
module.

To enable the user to distinguish a FADT file from a file of another
type, FADT files have by default the file extension '.FADT'. The
files are to be found in a directory referenced by the logical name
LSL$FADT.

DLMS Rule Files

A DLMS Rule file is used by the module FADTINPUT to validate attribute
data input into a FADT, and optionally by the module DFADVAL to
validate feature attribute data held in an IFF file.

The rule file contains similar data to that held in a standard MCE
VALTAB rule table, in which allowable ranges for certain FADT record
fields are specified. The rules to be applied to a feature are
determined from a combination of DFAD level, Feature Identifier (FID)
and feature type. For further details on the content and application
of validation rules, the user is referred to the validation table
documentation.

To enable the user to distinguish a rule file from a file of another
type, rule files have by default the file extension '.RULE'. The
files are to be found in a directory referenced by the logical name
LSL$DFAD_RULE.

MODULE   DFAD2I

REPLACES existing DFAD2I utility.

FUNCTION

DFAD2I transfers a manuscript from a DLMS DFAD format magnetic tape to
an IFF disk file.

FORMAT

$ DFAD2I file-spec

Command qualifiers	**Defaults**
/DEVICE = device-name	/DEVICE = MTA0:
/[NO]DIAGNOSTICS='BRIEF' or 'FULL'	/NODIAGNOSTICS
/[NO]DUMP = file-spec	/NODUMP
/[NO]FC	/NOFC
/LATITUDE = DDMMSS.SH	/see text
/LONGITUDE = DDDMMSS.SH	/see text
/MANUSCRIPT = integer	/next manuscript; see text
/RELEASABILITY = integer	/RELEASABILITY = 0
/[NO]REWIND	/NOREWIND
/SECURITY = integer	/SECURITY = 0

PROMPTS

Output IFF-file: Output-IFF-file-spec

PARAMETERS

Output-IFF-file-spec

- Specifies the output IFF file. Any part of the file specification
  which is not supplied will be taken from the default specification:
  'LSL$IF:IFF.IFF'.

COMMAND QUALIFIERS

/DEVICE = device-name (default MTA0:)

     - Specifies the tape device on which the DFAD tape is loaded.

/DIAGNOSTICS='BRIEF'
/DIAGNOSTICS='FULL'
/NODIAGNOSTICS (default)

     - Selects the output of diagnostic messages, describing the progress of
       the DFAD tape to IFF file conversion.

       If the keyword BRIEF is specified, or no keyword is supplied with the
       /DIAGNOSTICS qualifier, only diagnostic messages describing the blocks
       read, and the total number of features created in the IFF file are
       produced.

       If the keyword FULL is specified, information is output on each
       feature created in the IFF file.

/DUMP = file-spec
/NODUMP (default)

     - If specified a dump of each tape block is output to the specified
       file, or to SYS$OUTPUT if no file specification is supplied. The data
       records are output as a series of hexadecimal longword values.   The
       qualifier is used to verify the tape structure.

/FC
/NOFC (default)

     - If /FC is specified, then DFAD2I will assign a feature code to each
       IFF feature that is dependent on the feature's Feature Identifier
       (FID) and feature type. The formula used to generated the feature
       code is:

            $FC = FID + ((type + 1) * 1000)$

       If /NOFC is specified, or the qualifier is not present on the command
       line, DFAD2I will assign a feature code which is dependent on the type
       of DFAD feature. Points, lines and areas will be assigned feature
       code values of 100, 101 and 102 respectively.

/LATITUDE = string

        - Specifies that DFAD2I is to search for a manuscript on the tape with
          the required latitude origin, or a manuscript with the required
          latitude and longitude origin if the /LONGITUDE qualifier has also
          been specified. The latitude value is specified in the form DDMMSS.SH
          where DD is the number of degrees, MM is the number of minutes, SS.S
          is the number of seconds, and H is the hemisphere (either N or S).

          The /LATITUDE qualifier must not be specified with the /MANUSCRIPT
          qualifier.

/LONGITUDE = string

        - Specifies that DFAD2I is to search for a manuscript on the tape with
          the required longitude origin, or a manuscript with the required
          latitude and longitude origin if the /LATITUDE qualifier has also been
          specified.   The longitude value is specified in the form DDDMMSS.SH
          where DDD is the number of degrees, MM is the number of minutes, SS.S
          is the number of seconds, and H is the hemisphere (either E or W).

          The /LONGITUDE qualifier must not be specified with the /MANUSCRIPT
          qualifier.

/MANUSCRIPT = integer

        - If specified the tape is searched for the required manuscript.   By
          default the next manuscript on the tape will be transferred. If
          /REWIND is not specified the program will search forward for the (n)th
          manuscript from the current tape position, rather than for the (n)th
          manuscript from the beginning of tape.

         If a negative integer value is supplied with the /MANUSCRIPT qualifier,
          DFAD2I will search backwards from the current tape position for the
          (n)th previous manuscript. For example, to transfer the manuscript
          immediately preceding the current tape position, a manuscript value of
          -1 should be supplied. If the BOT is encountered before the required
          manuscript is found, then an error will result.

          This qualifier must not be specified with either the /LATITUDE or
          /LONGITUDE qualifiers.

/RELEASABILITY = integer (0-99) (default 0)

        - If the qualifier is present, all features in the IFF file are created
          with the specified releasability value. If the qualifier is not
          supplied, features are created with a releasability value of 0.

/REWIND
/NOREWIND (default)

> - If present, the tape is rewound prior to reading. Any manuscript
>   search will therefore start from the BOT. By default no tape rewind
>   is performed, and manuscript search begins from the current tape
>   position.

/SECURITY = integer (0-99) (default 0)

> - If the qualifier is present, all features in the IFF file are created
>   with the specified security value. If the qualifier is not supplied,
>   features are created with a security value of 0.

RESTRICTIONS

> o /MANUSCRIPT and /LATITUDE is not allowed
>
> o /MANUSCRIPT and /LONGTIUDE is not allowed

MODULE   DFADVAL

REPLACES Existing DFADVAL. The new module validates DFAD attribute data held
            in an AC 7 entry against a DLMS Rule file, and has an option to
            produce a LITES2 guidance file.

FUNCTION

            DFADVAL validates an IFF file containing DFAD data. It performs
            validation on feature geometry, DFAD accuracy region attributes (AC8
            entries in layer zero features), and DFAD point, line and area
            attribute records (AC7 entries in features in layers other than zero).
            The module also validates entries in the MCE map header.

            Optionally, a LITES2 command file may be produced, which may be used
            with the Laser-Scan cartographic editor LITES2, to aid the correction
            of any features that fail validation.

FORMAT

            $ DFADVAL file-spec

            Command qualifiers   **Defaults**

            /[NO]AC   /AC
            /[NO]BOUNDS   /BOUNDS
            /[NO]DUPLICATES   /DUPLICATES
            /[NO]INFORMATION   /INFORMATION
            /LIST=file-spec   Default output to SYS$OUTPUT
            /LITES2=file-spec   No LITES2 file produced
            /[NO]LOOPCHECK   /LOOPCHECK
            /[NO]PRINTER   /NOPRINTER
            /RULES=file-spec   No rules file used
            /TOLERANCE=real   /TOLERANCE=1.0
            /TYPE='AC' or 'FS'   /TYPE='FS'
            /[NO]WARNINGS   /WARNINGS

PROMPTS

            Input IFF-file: input IFF file to be validated

PARAMETERS

Input IFF-file

        - specifies the IFF file to be validated.   Any part of the file
          specification which is not supplied will be taken from the default
          'LSL$IF:IFF.IFF;0'.

COMMAND QUALIFIERS

/AC (default)
/NOAC

        - If this qualifier is present, the utility will validate the attribute
          data held in the AC text field of an accuracy region, or DFAD point,
          line or area feature. The text field is checked to ensure that all
          attributes are present and valid for the type of feature, and that the
          values conform to the DLMS format Specification.   If the /RULES
          qualifier is present, the attribute values are also validated against
          a DLMS Rules File.

          If /NOAC is specified, the attributes held in the AC entry are not
          validated.

/BOUNDS (default)
/NOBOUNDS

        - if this qualifier is present, the utility checks that all coordinates
          in the IFF file are within the manuscript area as defined by the
          latitude and longitude corner values in the map header. Any features
          found with coordinates outside the manuscript limits are reported. If
          /NOBOUNDS is specified, no checks are carried out on the range of the
          coordinates in the file.

/DUPLICATES(default)
/NODUPLICATES

        - If this qualifier is present, the utility checks the coordinate
          strings for duplicate points. Any duplicate points are reported in
          the validation report. Note that the coordinate values are converted
          to the nearest integer value before comparison.

          If /NODUPLICATES is specified, no checks are carried out for duplicate
          coordinate points.

/INFORMATION (default)
/NOINFORMATION

        - specifies that informational messages be produced. Such messages do
          not signal invalid entries in the IFF file, but give information about
          what it contains.

/LIST=file-spec (default /LIST=SYS$OUTPUT:)

        - allows the user to specify a list file to which the validation report
          will be directed.   If this qualifier is not supplied, output is
          directed to SYS$OUTPUT.

/LITES2=file-spec

        - If /LITES2 is specified, a LITES2 guidance file will be created, with
          the supplied file specification.   This file may be used to aid the
          subsequent editing of features that have failed validation, using the
          LITES2 cartographic editor.

/LOOPCHECK (default)
/NOLOOPCHECK

        - If /LOOPCHECK is specified, then DFADVAL will perform a check for
          crossing or touching line segments in linear or areal features. Any
          crossing or touching segments will be reported to the user by means of
          validation failure warning messages.

/PRINTER
/NOPRINTER (default)

        - If this qualifier is specified, then the validation report will be
          written to a temporary file.   The contents of this file will be
          spooled to SYS$PRINT and the disk file will be deleted on program
          completion.   This qualifier cannot be present with the /LIST
          qualifier.

/RULES=file-spec (optional)

        - This qualifier allows the user to specify a DLMS rules file, against
          which any DFAD attribute data, held in the text field of an AC7 entry
          will be checked. If a feature fails validation, warning messages are
          generated indicating the fields which may have caused the failure of
          the feature record. The attribute data is in addition, validated
          against the DLMS format specification.
          If this qualifier is not used, then the DFAD attribute data are only
          checked against the DLMS format specification.

/TOLERANCE=real (default /TOLERANCE=1.0)

> - this qualifier allows the user to specify the tolerance within which
> two line segments, in linear or areal features, must lie of each other
> to be detected as touching or crossing.

/TYPE='AC'
/TYPE='FS' (default)

> - /The TYPE qualifier is used to specify whether the feature type
> (point, line or area) should be derived from a feature's AC or FS
> entry. If /TYPE=FS is specified (or the qualifier is absent) the
> feature type is derived from the feature code (first word of the FS
> entry), with feature codes of 102, 101 and 100 indicating a DFAD area,
> line and point feature respectively.
> If /TYPE=AC is specified, then the feature type is derived from the
> the 'typ' field of the text part of the AC7 entry.

/WARNINGS (default)
/NOWARNINGS

> - if present, this qualifier will cause DFADVAL to output validation
> failure warnings.   These are similar to the validation errors which
> are always output, except that they relate to less serious failures.
> For example, DFAD attribute records which do not obey the DLMS
> specification are reported by means of error messages, whereas a
> failure to obey an entry in the DLMS rules file is reported with a
> warning message.

RESTRICTIONS

> o /PRINTER and /LIST is not allowed

> o /RULES and /NOAC is not allowed

> o /TYPE=AC and /TYPE=FS is not allowed

MODULE   FADTINPUT

REPLACES FADTINPUT is a new utility

FUNCTION

FADTINPUT allows a user to create, edit and list a DLMS Feature
Analysis Data Table (FADT) file. It also performs validation on the
FADT records entered against the Digital Landmass System (DLMS)
Specification and optionally against a set of validation rules in a
user specified DLMS rule file.

FORMAT

$ FADTINPUT

Command qualifiers

None - the utility is completely form driven.

Command and data entry forms

The user may control the operation of the FADTINPUT utility by
means of the following screen forms:

COMMAND OPTIONS FORM
FILE SPECIFICATION FORM
OUTPUT LIST FILE SPECIFICATION FORM
RECORD TYPE OPTION FORM

The user may enter or modify data in an FADT file by means of the
following screen entry forms:

ACCURACY RECORD FORM
ACCURACY REGION RECORD FORM
DATA SET IDENTIFICATION (DSI) RECORD FORM
DLMS HEADER RECORD FORM
FADT RECORD FORM

Full details on the forms are to be found in the FADTINPUT chapter of
the DFAD Reference Manual.

MODULE   FADTMERGE

REPLACES FADTMERGE is a new utility

FUNCTION

> FADTMERGE merges a FADT file created by the utility FADTINPUT with
> coordinate data contained in an IFF file. Merging is performed on the
> basis of feature analysis code (FAC) for the FADT file and feature
> serial number (FSN) for the IFF file. Header data contained in the
> FADT file may in addition be transferred to the map header of the
> output file.

FORMAT

> $ FADTMERGE file-spec file-spec

> **Command qualifiers**   **Defaults**

> /[NO]ACCURACY   /NOACCURACY
> /FADT=file-spec   /FADT=LSL$FADT:FADT.FADT
> /[NO]FC   /FC
> /[NO]HEADER   /HEADER
> /[NO]LIST=file-spec   /NOLIST
> /[NO]MERGE   /MERGE

PROMPTS

> Input IFF-file: unmerged-file-spec
> Output IFF-file: merged-file-spec

PARAMETERS

Input IFF-file

> - specifies the IFF file to be merged with the FADT file. Any part of
>   the file specification which is not supplied will be taken from the
>   default specification 'LSL$IF:IFF.IFF;0'.

Output IFF-file

> - specifies the IFF file which is to be created. Any part of the file
>   name   which   is   not explicitly given will be taken from
>   'LSL$IF:IFF.IFF'. Note that a version number must **not** be specified
>   for the output file. If a file with the specified name already exists
>   a new file will be created with the version number incremented by one.

COMMAND QUALIFIERS

/ACCURACY
/NOACCURACY (default)

>   - If present, specifies that accuracy regions should be created in layer
>   0 of the output IFF file, from the accuracy region records held in the
>   input FADT file. Any accuracy features already present in layer 0 of
>   the input file will be discarded. If no accuracy region records are
>   found in the FADT file, no accuracy regions will be constructed in the
>   output file.
>   If the /NOACCURACY qualifier is specified, then the whole of layer 0
>   in the input file, will be copied unchanged to the output file. If no
>   layer 0 is present in the input IFF file, none will be constructed in
>   the output file.

/FADT=file-spec

>   - specifies the name of the input FADT file.   Any part of the file
>   specification which is not present will be taken from the file
>   specification 'LSL$FADT:FADT.FADT'. **This qualifier must be supplied.**

/FC (default)
/NOFC

>   - If this qualifier is present, then FADTMERGE will set up the Feature
>   Code (FC) word of the Feature Status (FS) entry of all IFF features
>   written to the output file. The FC is calculated from the Feature
>   Identifier (FID) and feature type recorded in the FADT record. The
>   formula used to generate the output FC is:
>
>   FC = FID + ((type + 1) * 1000)
>
>   If /NOFC is specified, then the existing FS entry in the input IFF
>   file is copied to the output file without change.
>
>   The feature code of features in layer 0 is transferred unchanged.

/HEADER (default)
/NOHEADER

>   - specifies that FADTMERGE should update the MCE map header of the input
>   IFF file with the contents of the DLMS header, Accuracy and DSI
>   records in the FADT file. If any of these records are missing from
>   the FADT file, this fact will be reported in the diagnostic printout.
>   If /NOHEADER is specified, the map header in the input IFF file will
>   be copied directly to the output file without change.

/NOLIST (default)
/LIST=file-spec

        - If /LIST=file-spec is present, it specifies a file to which diagnostic
          messages describing the progress of the merge are directed. Any parts
          of the file specification which are missing will be taken from the
          specification 'FADTMERGE.LIS'.   If no /LIST is specified, or /NOLIST
          is present, then all diagnostics messages are directed to SYS$OUTPUT.

/MERGE (default)
/NOMERGE

        - If /MERGE is specified, the FADT feature records in the FADT file are
          merged with features in the input IFF file. Merging is performed on
          the basis of feature analysis code (FAC) and feature serial number
          (FSN).   If /NOMERGE is specified, then the FADT feature records will
          not be merged with the IFF features, and any input IFF features will
          be written unaltered to the output file.

MODULE   I2DFAD

REPLACES existing I2DFAD utility.

FUNCTION

        I2DFAD transfers data held in an IFF file to magnetic tape in Digital
        LandMass System (DLMS) Digital Feature Analysis Data (DFAD) format.

FORMAT

        $ I2DFAD file-spec

        Command qualifiers   **Defaults**

        /[NO]APPEND   /NOAPPEND
        /DEVICE=device-name   /DEVICE=MTA0:
        /[NO]DIAGNOSTICS   /NODIAGNOSTICS
        /[NO]RELEASABILITY=integer   /NORELEASABILITY
        /[NO]REWIND   /NOREWIND
        /[NO]SECURITY=integer   /NOSECURITY

PROMPTS

        Input IFF-file: IFF-file-spec

PARAMETERS

Input IFF-file

        - specifies the IFF file to be converted to a DFAD format tape.   Any
          part of the file specification which is not supplied will be taken
          from the default specification 'LSL$IF:DFAD.IFF;0'

COMMAND QUALIFIERS

/APPEND
/NOAPPEND (default)

        - /APPEND specifies that the output data be appended to any DFAD
          manuscripts already on the magnetic tape. This qualifier cannot be
          present on the same command line as /REWIND (q.v.).
          If /NOAPPEND is used, then the data are written to the tape, either
          starting at the current tape position (if /NOREWIND is specified), or
          at the start of the tape (if /REWIND is specified).

/DEVICE=device-name (default MTA0:)

        - Specifies the tape device on which the DFAD tape is loaded.

/DIAGNOSTICS
/NODIAGNOSTICS (default)

        - if specified, this causes diagnostic messages to be   produced,
          describing the progress of the IFF to DFAD conversion.

/RELEASABILITY=integer (0-99)
/NORELEASABILITY (default)

        - if this qualifier is used, then the releasibility value of a DFAD
          feature (held in an AC 7 entry) will will be compared with the integer
          specified. Any differences found will result in the production of a
          suitable message.   If this qualifier is not present, then no checks
          will be carried out on the releasability.

/REWIND
/NOREWIND (default)

        - if /REWIND is specified, the IFF file will be written as the first
          manuscript on the tape.   Any existing data on the tape will be
          overwritten.
          If /NOREWIND is used, then data are appended to any existing
          manuscripts on the tape, either starting at the current tape position
          (if /NOAPPEND is specified) or after the last manuscript (if /APPEND
          is specified).

/SECURITY=integer (0-99)
/NOSECURITY (default)

        - if this qualifier is used, then the security value of a DFAD feature
          (held in an AC 7 entry) will will be compared with the integer
          specified. Any differences found will result in the production of a
          suitable message.   If this qualifier is not present, then no checks
          will be carried out on the security.

MODULE   MCEHED

REPLACES Existing MCEHED utility.

FUNCTION

 MCEHED is a utility to allow a Map Header entry in the IFF file to be
 edited or examined. **The map header must be a MCE (customer type 1)
 header.**

FORMAT

 $ MCEHED file-spec

 Command qualifiers   **Defaults**

 /[NO]READONLY   /NOREADONLY

 Editing and examining the map header with MCEHED is command driven.
 Full details on the commands that may be gien are to be found in the
 MCEHED chapter of the DFAD Reference Manual.

PROMPTS

 Input IFF-file: file-spec of IFF file to be examined/altered

----
PARAMETERS

Input IFF-file

 - specifies the IFF file to be merged with the FADT file. Any part of
 the file specification which is not supplied will be taken from the
 default specification 'LSL$IF:IFF.IFF;0'.

COMMAND QUALIFIERS

/READONLY
/NOREADONLY (default)

 - if /READONLY is specified, then MCEHED will only allow the map header
 to be examined, and not edited. Any attempt to edit an entry will be
 prevented and an error message generated.

CHAPTER 2

MODULE DFAD2I

MODULE   DFAD2I

REPLACES existing DFAD2I utility.

FUNCTION

        DFAD2I transfers a manuscript from a DLMS DFAD format magnetic tape to
        an IFF disk file.

FORMAT

        $ DFAD2I file-spec

        Command qualifiers   **Defaults**
        /DEVICE = device-name   /DEVICE = MTA0:
        /[NO]DIAGNOSTICS='BRIEF' or 'FULL'   /NODIAGNOSTICS
        /[NO]DUMP = file-spec   /NODUMP
        /[NO]FC   /NOFC
        /LATITUDE = DDMMSS.SH   /see text
        /LONGITUDE = DDDMMSS.SH   /see text
        /MANUSCRIPT = integer   /next manuscript; see text
        /RELEASABILITY = integer   /RELEASABILITY = 0
        /[NO]REWIND   /NOREWIND
        /SECURITY = integer   /SECURITY = 0

PROMPTS

        Output IFF-file: Output-IFF-file-spec

PARAMETERS

Output-IFF-file-spec

        - specifies the output IFF file. Any part of the file specification
          which is not supplied will be taken from the default specification:
          'LSL$IF:IFF.IFF'.

COMMAND QUALIFIERS

/DEVICE = device-name (default MTA0:)

        - Specifies the tape device on which the DFAD tape is loaded.

/DIAGNOSTICS='BRIEF'
/DIAGNOSTICS='FULL'
/NODIAGNOSTICS (default)

          - Selects the output of diagnostic messages, describing the progress of
            the DFAD tape to IFF file conversion.

            If the keyword BRIEF is specified, or no keyword is supplied with the
            /DIAGNOSTICS qualifier, only diagnostic messages describing the blocks
            read, and the total number of features created in the IFF file are
            produced.

            If the keyword FULL is specified, information is output on each
            feature created in the IFF file.

/DUMP = file-spec
/NODUMP (default)

          - If specified a dump of each tape block is output to the specified
            file, or to SYS$OUTPUT if no file specification is supplied. The data
            records are output as a series of hexadecimal longword values.   The
            qualifier is used to verify the tape structure.

/FC
/NOFC (default)

          - If /FC is specified, then DFAD2I will assign a feature code to each
            IFF feature that is dependent on the feature's Feature Identifier
            (FID) and feature type. The formula used to generated the feature
            code is:

                  FC = FID + ((type + 1) * 1000)

            If /NOFC is specified, or the qualifier is not present on the command
            line, DFAD2I will assign a feature code which is dependent on the type
            of DFAD feature. Points, lines and areas will be assigned feature
            code values of 100, 101 and 102 respectively.

/LATITUDE = string

          - Specifies that DFAD2I is to search for a manuscript on the tape with
            the required latitude origin, or a manuscript with the required
            latitude and longitude origin if the /LONGITUDE qualifier has also
            been specified. The latitude value is specified in the form DDMMSS.SH
            where DD is the number of degrees, MM is the number of minutes, SS.S
            is the number of seconds, and H is the hemisphere (either N or S).

The /LATITUDE qualifier must not be specified with the /MANUSCRIPT qualifier.

/LONGITUDE = string

   - Specifies that DFAD2I is to search for a manuscript on the tape with the required longitude origin, or a manuscript with the required latitude and longitude origin if the /LATITUDE qualifier has also been specified. The longitude value is specified in the form DDDMMSS.SH where DDD is the number of degrees, MM is the number of minutes, SS.S is the number of seconds, and H is the hemisphere (either E or W).

   The /LONGITUDE qualifier must not be specified with the /MANUSCRIPT qualifier.

/MANUSCRIPT = integer

   - If specified the tape is searched for the required manuscript. By default the next manuscript on the tape will be transferred. If /REWIND is not specified the program will search forward for the (n)th manuscript from the current tape position, rather than for the (n)th manuscript from the beginning of tape.

   If a negative integer value is supplied with the /MANUSCRIPT qualifier, DFAD2I will search backwards from the current tape position for the (n)th previous manuscript. For example, to transfer the manuscript starting immediately before the current tape position, a manuscript value of -1 should be supplied. If the BOT is encountered before the required manuscript is found, then an error will result, or the first manuscript on the tape transferred.

   It makes no sense to request /MANUSCRIPT = 0.

   This qualifier must not be specified with either the /LATITUDE or /LONGITUDE qualifiers.

/RELEASABILITY = integer (0-99) (default 0)

   - If the qualifier is present, all features in the IFF file are created with the specified releasability value. If the qualifier is not supplied, features are created with a releasability value of 0.

/REWIND
/NOREWIND (default)

   - If present, the tape is rewound prior to reading. Any manuscript search will therefore start from the BOT. By default no tape rewind is performed, and manuscript search begins from the current tape

      position.

/SECURITY = integer (0-99) (default 0)

     - If the qualifier is present, all features in the IFF file are created
       with the specified security value. If the qualifier is not supplied,
       features are created with a security value of 0.

RESTRICTIONS

      o /MANUSCRIPT and /LATITUDE is not allowed

      o /MANUSCRIPT and /LONGITUDE is not allowed

DESCRIPTION

DFAD2I is a utility to transfer a manuscript from a Digital LandMass
System (DLMS) Digital Feature Analysis Data (DFAD) format magnetic
tape to an Internal Feature Format (IFF) disk file.

The user may specify which manuscript to transfer by means of the
/MANUSCRIPT qualifier or by using the /LATITUDE and/or /LONGITUDE
qualifiers. In the case of the /LATITUDE and /LONGITUDE qualifiers,
the program will search the tape for a manuscript with the specified
latitude or longitude origin. The search for a manuscript will begin
from the current tape position, unless the /REWIND qualifier is
supplied on the command line. If the /MANUSCRIPT /LATITUDE or
/LONGITUDE qualifiers are not supplied, the next manuscript on the
tape will be transferred to disk.

If the tape read fails because the tape is at some unexpected position
(because of a previous failure, or a user specified escape), the
/MANUSCRIPT qualifier must be specified to start again, with a value
of -1 to restart the current (failed) map, 1 for the next, or another
value (with REWIND if necessary) as required.

Note that only a single manuscript may be transferred during a single
run of the program.

The program produces messages giving information about the manuscripts
and blocks being read from the tape, and any errors or difficulties
that may be encountered. If the /DIAGNOSTICS qualifier is supplied,
more detailed information on the tape records will be produced. The
/DUMP qualifier may be used to produce a hexadecimal dump of the
manuscript records. This option allows the structure of the DFAD tape
to be verified.

The program checks that the DFAD tape corresponds to the DLMS
specification. Any discrepancies on the tape are reported, and will
in most cases cause the program to abandon the transfer of data to
disc.

A valid DFAD tape containing just two manuscripts will have the
following format:

        BOT

        Manuscript Header Record
        Data Set Identification (DSI) Record
        Accuracy (ACC) Record

        Area Feature Records
        Linear Feature Records
        Point Feature records

        Manuscript Header Record
        Data Set Identification (DSI) Record
        Accuracy (ACC) Record

             Area Feature Records
             Linear Feature Records
             Point Feature records

             Trailer Record

             * Tape Mark
             * Tape Mark

             EOT

A Manuscript Header record indicates the start of a new manuscript.
The Manuscript record contains information on the DFAD level, the WAC
and WAG values, and the latitude and longitude origin of the
manuscript. This record is followed by a DSI and ACC record. The DSI
record contains information relating to the generation of   the
manuscript by the producing agency; projection and datum codes, and
geographical origin, corner and grid interval values. The ACC record
contains information on the vertical and horizontal accuracy of the
data.

DFAD2I transfers information from the Manuscript and DSI records to
the Map Header (MH) entry of the output IFF file. Accuracy region
data read from the ACC record is output to layer 0 of the IFF file.

The header records on the tape are followed by a series of feature
records containing information on the coordinates and attributes of
DFAD features. The feature records are ordered so that area features
are encountered first, followed by linear and point features.

DFAD2I translates DFAD feature data into a series of IFF feature
records in the output file. Area features are created in layer 1;
linear features in layer 2 and point features in layer 3.   These 3
different types of feature are assigned a feature code of 102, 101 and
100 respectively. Attribute data is transferred to an AC 7 entry
associated with each feature.

A Trailer Record and 2 tape marks indicate the end of the DFAD tape.

Note that DFAD2I recalculates the checksums stored at the end of each
block as it processes the data, and checks that it derives the same
value as on the tape. If the two values differ, a warning message is
output. Transfer of data to the IFF file, however, continues.

Full details of the structure of each tape record, and   the
characteristics of a magnetic tape holding DFAD data, are to be found
in the Digital Landmass Specification published by the U.S. Defense
Mapping Agency. Further details on how DFAD is held within IFF are to
be found in the introduction of the DFAD Reference Manual.

It is essential that the tape is mounted as a foreign volume prior to
running DFAD2I. This is achieved using the DCL command MOUNT with the
/FOREIGN qualifier eg. MOUNT MT0:/FOREIGN

EXAMPLES

$ **DFAD2I/DEVICE=MSA0:/MANUSCRIPT=2/RELEASABILITY=4/SECURITY=5 <CR>**
_Output-IFF-File: **test<CR>**

Reading from mag tape unit MSA0:
Searching tape to find manuscript 2
Outputting manuscript 2 to IFF file LSL$DATAROOT:[LSL.IFF]TEST.IFF;1

Manuscript 2, type 0, level 1
WAG(WAC) number 150, WAG(WAC) cell 14, WAG cell 5
origin at lat   57 59 0.0 (02087400N), long   -4 1 0.0 (00144600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Will use SECURITY 5 and RELEASABILITY 4

Total of   3193 points in   292 features
There were no points going external

%DFAD2I-S-NORMAL, DFAD2I successful completion
%DFAD2I-W-ENDOFDSS, end of datasets on tape encountered
 ELAPSED: 0 00:01:17.34 CPU: 0:00:34.96 BUFIO: 28 DIRIO: 761 FAULTS: 169

        This example illustrates the use of the /MANUSCRIPT qualifier to
        select the second manuscript on the tape.   /REWIND has not been
        specified because this is the first read command after mounting the
        tape, and the search for the manuscript will begin from the current
        tape position (in this case the BOT).   Because there are only two
        manuscripts on the tape, the End Of Tape was encountered and a message
        given. The security and releasability values specified with the
        /SECURITY and /RELEASABILITY qualifiers are used. Since no output
        file was given on the command line, it was prompted for.

$ **DFAD2I/DEVICE=MSA0:/REWIND/LATITUDE=575900.0N/LONGITUDE=0050100W-**
/DIAGNOSTICS=FULL TEST1 <CR>

Reading from mag tape unit MSA0:
Tape now rewound to BOT
Outputting manuscript 1 to IFF file LSL$DATAROOT:[LSL.IFF]TEST1.IFF;1

Manuscript 1, type 0, level 1
WAG(WAC) number 150, WAG(WAC) cell 13, WAG cell 7
origin at lat   57 59 0.0 (02087400N), long   -5 1 0.0 (00180600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Will use SECURITY 0 and RELEASABILITY 0

Security code descriptor   'U'

Security/release control   'DS'
Security handling descriptor   'ACCEPTANCE DATA'
Series designator - task   'DFAD'
Series designator - level   1
Unique reference code   'UK SQUARE 79   '
Data edition number   0
Match/merge version   'A'
Maintenance date   unset
Match/merge date   unset
Maintenance description code   '0000'
Producer code   'UKMODMCE'
Product spec stock number   'SPECXDLMS'
Product spec change number   0
roduct spec date   1-Jul-1977
Vertical datum   '   '
Horizontal datum   'WGS84'
Digitising collection system   'FREESCAN '
Compilation date   1-Oct-1978
Manuscript origin (lat)   57 59 0.0
Manuscript origin (long)   -5 1 0.0
South west corner (lat)   58 0 0.0
South west corner (long)   -5 0 0.0
North east corner (lat)   59 0 0.0
North east corner (long)   -4 0 0.0

Absolute horizontal accuracy   50
Relative horizontal accuracy   25
Vertical heighting accuracy   10
Number of accuracy subregions   2
Reading polygon 1
Angle 1(2) of region 1   58 0 0.0
 offset   600
Angle 1(1) of region 1   -5 0 0.0
 offset   600
Angle 2(2) of region 1   58 0 0.0
 offset   600
Angle 2(1) of region 1   -4 30 0.0
 offset   18600
Angle 3(2) of region 1   59 0 0.0
 offset   36600
Angle 3(1) of region 1   -4 30 0.0
 offset   18600
Angle 4(2) of region 1   59 0 0.0
 offset   36600
Angle 4(1) of region 1   -5 0 0.0
 offset   600
absh 50 absv 0 relh 25 relv   0
Reading polygon 2
Angle 1(2) of region 2   58 0 0.0
 offset   600
Angle 1(1) of region 2   -4 30 0.0
 offset   18600
Angle 2(2) of region 2   58 0 0.0
 offset   600
Angle 2(1) of region 2   -4 0 0.0
 offset   36600

```
Angle 3(2) of region 2   59  0  0.0
 offset    36600
Angle 3(1) of region 2   -4  0  0.0
 offset    36600
Angle 4(2) of region 2   59  0  0.0
 offset    36600
Angle 4(1) of region 2   -4 30  0.0
 offset    18600
absh  40 absv   0 relh  20 relv   0

Feature :    1
Type    :    2 (AREA )
Number of coordinates : 5
typ2 hgt    0 fid 902 sec 0 rel 0 smc10 den 0 rof  0 tre  0

Feature :    2
Type    :    2 (AREA )
Number of coordinates : 5
typ2 hgt    0 fid 902 sec 0 rel 0 smc10 den 0 rof  0 tre  0

Feature :    3
Type    :    2 (AREA )
Number of coordinates : 5
typ2 hgt    0 fid 931 sec 0 rel 0 smc 6 den 0 rof  0 tre  0

Feature :    4
Type    :    2 (AREA )
Number of coordinates : 5
typ2 hgt    0 fid 931 sec 0 rel 0 smc 6 den 0 rof  0 tre  0

Feature :    5
Type    :    2 (AREA )
Number of coordinates : 5
typ2 hgt    0 fid 902 sec 0 rel 0 smc10 den 0 rof  0 tre  0

Feature :    4001
Type    :    1 (LINEAR)
Number of coordinates : 8
typ1 hgt   44 fid 902 sec 0 rel 0 smc 3 wid 52 dir 2

Feature :    4002
Type    :    1 (LINEAR)
Number of coordinates : 10
typ1 hgt    0 fid 902 sec 0 rel 0 smc 3 wid  1 dir 1

Feature :    4003
Type    :    1 (LINEAR)
Number of coordinates : 23
typ1 hgt    0 fid 924 sec 0 rel 0 smc 3 wid  1 dir 1

Feature :    6001
Type    :    1 (POINT )
Number of coordinates : 1
typ0 hgt   12 fid 902 sec 0 rel 0 smc 3 wid  2 lth 38 ori 7

Feature :    6002
```

```
Type     :     1 (POINT )
Number of coordinates : 1
typ0 hgt    14 fid 902 sec 0 rel 0 smc 3 wid 40 lth 70 ori 5


Feature :     6003
Type     :     1 (POINT )
Number of coordinates : 1
typ0 hgt    30 fid 902 sec 0 rel 0 smc 3 wid 40 lth 70 ori 7


Feature :     6004
Type     :     1 (POINT )
Number of coordinates : 1
typ0 hgt     6 fid 902 sec 0 rel 0 smc 3 wid 20 lth 50 ori 5


Total of        70 points in       12 features
There were no points going external

ELPASED:      0 00:00:23.02  CPU: 0:00:05.69  BUFIO: 202  DIRIO: 288 FAULTS: 97
```


          In this example, the /REWIND qualifier caused the tape to be rewound
          to the BOT before searching. The /LATITUDE and /LONGITUDE qualifiers
          were used to search for a manuscript with the required latitude and
          longitude origin.   In the example, this proved to be the first
          manuscript on the tape. /DIAGNOSTICS = FULL has been specified, so
          that details are output about each DFAD feature as it read from tape.
          The default values for releasability and security are used.

$ **DFAD2I/DEVICE=MSA0:/MANUSCRIPT=1/DUMP/REWIND TEST3 <CR>**

Reading from mag tape unit MSA0:
Tape now rewound to BOT
Searching tape to find manuscript 1

Outputting manuscript 1 to IFF file LSL$DATAROOT:[LSL.IFF]TEST3.IFF;2
Dumping manuscript 1 to file SYS$OUTPUT

Manuscript 1, type 0, level 1
WAG(WAC) number 150, WAG(WAC) cell 13, WAG cell 7
Hexadecimal dump of DFAD tape

origin at lat   57 59 0.0 (02087400N), long   -5 1 0.0 (00180600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Will use SECURITY 0 and RELEASABILITY 0

.Block 2, 162 longwords of data

```
52495344    414C2020    53524553    204E4143
53455945    4C4E4F20    20202059    20202020
20202020    20202020    20202020    20202020
20202020    20202020    44202020    31444146
53204B55    52415551    39372045    20202020
20202020    30202020    30204130    30203020
30303020    4B553030    4D444F4D    20204543
20202020    20202020    20202020    50532020
44584345    30534D4C    20373730    20202037
37534757    45524632    41435345    3720204E
20303138    20202020    20202020    20202020
20202020    20202020    35373520    2E302039
20204E30    20312035    57302E30    30203835
302E3020    3520204E    30203020    3557302E
20302039    4E302E30    20342020    2E302030
20205730    20202020    20202020    20202020
20202020    20202020    20202020    20202020
20202020    20202020    20202020    20202020
20202020    20202020    20202020    20202020
20202020    20202020    20202020    20202020
```


        In this example the tape is rewound to BOT and the first map read
        again, this time with the /DUMP qualifier to give information on the
        blocks of data being transferred. No filename was given for the dump
        and hence the default SYS$OUTPUT used. Only a small part of the DUMP
        output is shown in this example. The default security and
        releasability values were used.

$ **DFAD2I/DEVICE=MSA0:/REWIND/DIAGNOSTICS=BRIEF TEST4 <CR>**

Reading from mag tape unit MSA0:
Tape now rewound to BOT
Reading Header Block 1
Outputting manuscript 1 to IFF file LSL$DATAROOT:[LSL.IFF]TEST4.IFF;3

Manuscript 1, type 0, level 1
WAG(WAC) number 150, WAG(WAC) cell 13, WAG cell 7
origin at lat   57 59 0.0 (02087400N), long   -5 1 0.0 (00180600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Will use SECURITY 0 and RELEASABILITY 0

Reading DSI Block   2
Reading ACC Block   3
Reading Feature Block 4
Reading Header Block 5

Total of   70 points in   12 features
There were no points going external

 ELAPSED: 0 00:01:28.54 CPU: 0:01:08.57 BUFIO: 50 DIRIO: 853 FAULTS: 192

          In this example no search has been requested and so the default (next)
          manuscript is transferred.   With REWIND specified this is the first
          map on the tape.   /DIAGNOSTICS=BRIEF has been specified so that
          message is output as each tape record (block) is read. This gives an
          indication of the progress of the tape to IFF file conversion

----

MESSAGES (SUCCESS)

These messages are used to indicate that the program has succeeded in performing
some action, and do not require any user action.

NORMAL, DFAD2I successful completion.

   Explanation: DFAD2I terminated successfully, with no errors.

   User action: None

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.

ACCPUT0, ACC - outputting zero

> **Explanation:** An error in the reading of the ACC block has forced the output
> of zero to the IFF file.

> **User action:** As for ACCBLKERR.

ACCRDERR, reading of ACC block abandoned

> **Explanation:** The ACC block in the manuscript was abandoned, the reason
> being one of the previously given error messages.

> **User action:** Check the data on the tape for corruption or an incorrect
> writing, or other faults.

BLKIGNORE, block ignored

> **Explanation:** An unprocessable block has been found and ignored. If an IFF
> file is open it will be closed and processing stopped.

> **User action:** As for MANBLKERR; check the tape for data errors arising from
> previous writing sessions or subsequent corruption, and proceed if certain
> that no further errors in the files written to disc will result from
> ignoring the block(s).

CHKWORDS, 1/2 words are: recorded **integer/integer** calc **integer/integer**

> **Explanation:** There was a checksum error; the recorded and calculated values
> are given for comparison.

> **User action:** As for CHKSUMERR.

CONTINUE, attempting to continue

> **Explanation:** There are less than 4 coordinate points to the feature, ie.
> it is not closed, and continuation is attempted with maybe unexpected
> results. See STPTRERR.

> **User action:** As for STPTRERR.

CONTMANUS, continuing with this manuscript

> **Explanation:** The processing is continuing after a wrong first feature was
> encountered - see FACNUMERR.

> **User action:** As for FACNUMERR.

CONTSERCH, block ignored - attempting to continue search

Explanation: An unprocessable block has been found and ignored, and any search for a required manuscript continued

User action: As for MANBLKERR; check the tape for data errors arising from previous writing sessions or subsequent corruption, and proceed if certain that no further errors in the files written to disc will result from ignoring the block(s).

CRPTWORDS, 1/2 words are **integer/integer**

Explanation: The corrupt half-words in the trailer that has just been signalled are given.

User action: As for CRPTRAILER.

DSIBLKERR, DSI - unable to read field in DSI block: **string**

Explanation: Unable to read the field in the DSI block.

User action: Check the data on the tape for corruption or a writing error; the data will be replaced either with spaces or zero where signalled.

DSIPUT0, DSI - outputting zero

Explanation: An error in the reading of the DSI block has forced the output of zero to the IFF file.

User action: As for DSIBLKERR.

DSIPUTSP, DSI - filling with spaces

Explanation: An error in the reading of the DSI block has forced the output of spaces to the IFF file.

User action: As for DSIBLKERR.

DSIRDERR, reading of DSI block abandoned

Explanation: The DSI block in the manuscript was abandoned, the reason given being one of the previous given error messages.

User action: Check the data on the tape for corruption or an incorrect writing, or other faults.

ENDIFF, attempting to end IFF file neatly

Explanation: An unprocessable block has forced the closure of the current IFF file.

User action: As for MANBLKERR; check that the file has been written correctly, and if not go back to the tape to find out what caused the subsequent errors.

ENDOFDSS, end of datasets on tape encountered

   Explanation: Either the two tapemarks at the end of all datasets on the
   tape have been encountered, or the BOT has been encountered, and there are
   no more sensible datablocks to read.

   User action: Rewind the tape and finish, or start again.

NOTEXTERN, feature not counted as going external

   Explanation: See LONGNEGTIV.

   User action: See LONGNEGTIV.

NXTMANUS, attempting to go to next manuscript header

   Explanation: An unprocessable block has caused the forcible closure of the
   current IFF file, and an attempt made to find the next manuscript header in
   preparation for the next run.

   User action: Submit command line for next set of instructions

OUTFTR, forcing output of feature **integer**

   Explanation: An unprocessable block has forced the output to disc of the
   current feature and subsequent closure of the IFF file.

   User action: As for MANBLKERR; check that the data written to disc is
   sensible, and if not go back to the tape to find out what caused the
   subsequent errors.

RDICLHDR, ICL header encountered and ignored

   Explanation: An ICL header was found at the beginning of the tape, and will
   be ignored.

   User action: None, apart from checking if it should have been there in the
   first place.

RECOVER, attempting to recover and continue

   Explanation: Attempting to recover and continue after the error in the
   attempt to reposition to the NO entry - see NOLPOSERR.

   User action: See NOLPOSERR.

UNEXPTMK, block **integer** is an unexpected tapemark

   Explanation: The block just read from tape is an unexpected tapemark and
   should not be there (the only tapemarks should be the two at the end of the
   tape.)

   User action: Check the tape for mistakes arising from an incorrect writing
   session, and if necessary rewrite. Proceed when satisfied that the block's
   existence will not cause problems in any subsequent processing.   The block
   will either be ignored (if searching for a particular manuscript), or cause

the end of reading and closure of the IFF file (if not).

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.

ACCABANDON, abandoning ACC region reading

   Explanation: There was an error reading the ACCuracy region and it has been
   abandoned, the reason being one of the previously given error messages.

   User action: Check the data on the tape as appropriate.

ACCANGERR, ACC region **integer** - error in angle **integer**(**integer**)

   Explanation: There is an error in an angle in the ACCuracy subregion
   polygon given in the error message, and the ACC region is abandoned.

   User action: Check the data on the tape as appropriate.

ACCBLKERR, ACC - unable to read field in ACC block: **string**

   Explanation: Unable to read the field in the ACC block.

   User action: Check the data on the tape for corruption or a writing error;
   the data will be replaced with zero where signalled.

ACCHARERR, ACC region reading - error around char **integer**

   Explanation: There was an error in the reading of the ACCuracy region, the
   reason being one of the previous error messages already given, and the ACC
   region is abandoned.

   User action: Check the data on the tape as appropriate.

ACCHNOERR, ACC region **integer** - incorrect no. of characters read

   Explanation: There were an incorrect number of characters read from the
   ACCuracy subregion polygon given in the error message, and the ACC region is
   abandoned.

   User action: Check the data on the tape as appropriate.

ACCLARGE, ACC - value **integer** too large for **string**

   Explanation: The value of the number of subregions is too large, ie.   >9,
   and the ACC region abandoned.

   User action: Check the data on the tape where appropriate.

ACCNUMERR, ACC - incorrect number of characters read

  Explanation: An incorrect number of characters has been read from the ACC
  block on the tape, and the ACC region abandoned.

  User action: Check the data on the tape for corruption or a writing error.

ACCPTSERR, ACC region **integer**, **integer** points cannot define a region

  Explanation: The number of points to define this ACCuracy subregion polygon
  is <3, and therefore the region cannot be defined, and the ACC region is
  abandoned.

  User action: Check the data on the tape as appropriate.

ACCSENTERR, ACC - unable to read 'ACC' sentinel

  Explanation: There was an error while trying to read the ACC block
  sentinel, and the ACC region abandoned.

  User action: Check the data on the tape for corruption or a writing error.

ACCTOOMNY, ACC region **integer** - too many points: (**integer**)

  Explanation: The number of points used to define this ACCuracy subregion
  polygon is >14, ie. too many, and the ACC region is abandoned.

  User action: Check the data on the tape as appropriate.

ACCUNEXPC, ACC - unexpected **string** at start of ACC block

  Explanation: There was an unexpected character at the start of the ACC
  block ie. not ACC, and the ACC region abandoned.

  User action: Check the data on the tape for corruption or a writing error.

BCKSPERR, failed to backspace one block **integer**

  Explanation: There was an error while attempting to backspace over the
  latest read datablock on tape, the block number being given in the error
  message. Further information is given in the accompanying error messages.

  User action: Either try again, or check tape for data errors or corruption.

BLKLENERR, unrecognised block length **integer**

  Explanation: The block just read from tape has an unrecognised length (byte
  number given) and therefore cannot be processed any further.

  User action: Check the data on the tape for mistakes from the tape writing
  session, or subsequent corruption, and/or rerun the reading session(s) when
  satisfied that the block is unimportant and will not cause problems in any
  further processing. The block will either be ignored (if searching for a
  particular manuscript), or cause the end of reading and closure of the IFF
  file (if not).

CHKSUMERR, checksum incorrect in block **integer**

>**Explanation:** The checksum in the block number given is incorrect.

>**User action:** Check the data on the tape for corruption or a writing error.

CRPTRAILER, word **integer** of trailer label corrupt (manuscript **integer**);

>**Explanation:** The trailer label (in the manuscript given) at the end of datasets on the tape has been corrupted.

>**User action:** Check the data on the tape for an error in the original writing to tape. The block is known to be a trailer and can be processed as such.

DSINUMERR, DSI - incorrect number of characters read

>**Explanation:** An incorrect number of characters have been read from the DSI block on tape, and the DSI block abandoned.

>**User action:** Check the data on the tape for corruption or a writing error.

DSISENTERR, DSI - unable to read 'DSI' sentinel

>**Explanation:** Unable to read the DSI sentinel from tape, and the DSI block is abandoned.

>**User action:** Check data on the tape for corruption or a writing error.

DSIUNEXPC, DSI - unexpected **string** at start of DSI block

>**Explanation:** Unexpected character at the start of the DSI block, ie not DSI, and the DSI block is abandoned.

>**User action:** Check the data on the tape for corruption or a writing error.

DUMPFILERR, error opening hexadecimal dump file **string**

>**Explanation:** An error has occurred in the opening of the dump file on disc.

>**Useraction:** Resubmit the command line with a valid file specification, or check user status.

FACNUMERR, first feature is not FAC 1, but FAC **integer**

>**Explanation:** The first feature encountered is not a first feature specifying the range of the map, but the feature given in the error message.

>**User action:** Check data on the tape as appropriate.

IFFILERR, IFF error opening file **string**

   Explanation: An error has occurred in the opening of the IFF file on disc.
   The most likely reasons for the failure are an incorrectly specified file
   specification in the DCL command line parameter, or invalid file creation
   status. The accompanying error messages give further information about the
   failure.

   User action: Resubmit the command line with a valid file specification, or
   check user status.

INVALIDEW, unrecognised longitude hemisphere character

   Explanation: The character after the seconds field of the longitude
   qualifier is not E,W or e,w.

   User action: Respecify the value in the command line and start again. Note
   that none of the commands specified on the command line will have been
   obeyed, and the tape not moved.

INVALIDMIN, minutes field **integer** invalid in latitude/longitude

   Explanation: The value for the minutes in the latitude or longitude
   specified in the command line is invalid, ie. >60 or <0.

   User action: Respecify the values in the command line and start again.
   Note that none of the commands specified on the command line will have been
   obeyed, and the tape not moved.

INVALIDNS, unrecognised latitude hemisphere character

   Explanation: The character after the seconds field of the latitude
   qualifier is not N,S or n,s.

   User action: Respecify the value in the command line and start again. Note
   that none of the commands specified on the command line will have been
   obeyed, and the tape not moved.

INVALIDSEC, seconds field **real** invalid in latitude/longitude

   Explanation: The value for the seconds in the latitude or longitude
   specified in the command line is invalid, ie. >60 or <0.

   User action: Respecify the values in the command line and start again.
   Note that none of the commands specified on the command line will have been
   obeyed, and the tape not moved.

LATDEGERR, latitude degrees field invalid

   Explanation: The value for the degrees in the latitude specified in the
   command line is invalid, ie. >90 or <0.

   User action: Respecify the values in the command line and start again.
   Note that none of the commands specified on the command line will have been
   obeyed, and the tape not moved.

LATLARGE, latitude **integer** (Y) in feature **integer** is too large

   Explanation: The latitude in the feature is too large, ie. out of range.

   User action: Check the data on the tape as appropriate.

LATNOTFND, manuscript with required latitude not found

   Explanation: The manuscript with the required latitude was not found in the
   datasets left on the tape after the position at which the search was
   initiated.

   User action: Either check that the manuscript actually exists on the tape
   or rewind and start searching again

LATSMALL, latitude **integer** (Y) in feature **integer** is too small

   Explanation: The latitude in the feature is too small, ie. out of range.

   User action: Check the data on the tape as appropriate.

LLNOTFND, manuscript with required lat & longitude not found

   Explanation: The manuscript with the required latitude and longitude was
   not found in the datasets left on the tape after the position at which the
   search was initiated.

   User action: Either rewind the tape and start searching again or check that
   the dataset actually exists on the tape.

LONGDEGERR, longitude degrees field invalid

   Explanation: The value for the degrees in the longitude specified in the
   command line is invalid, ie. >180 or <0.

   User action: Respecify the values in the command line and start again.
   Note that none of the commands specified on the command line will have been
   obeyed, and the tape not moved.

LONGLARGE, longitude **integer** (X) in feature **integer** is too large

   Explanation: The longitude in the feature is too large, ie. out of range

   User action: Check the data on the tape as appropriate.

LONGNEGTIV, longitude **integer** (X) in feature **integer** is negative;

   Explanation: The longitude in the feature given is negative, ie.   it is
   going external to the map boundary. Conventionally only the latitude values
   are set negative, and if so are noted as external, counted and processing
   continues. If the longitude is set negative, it is ignored as an edge
   marker and an error warning given.

   User action: Check data on the tape as appropriate.

LONGNTFND, manuscript with required longitude not found

Explanation: The manuscript with the required longitude was not found in
the datasets left on the tape after the position at which the search was
initiated.

User action: Either check that the manuscript actually exists on the tape
or rewind and start searching again

LONGSMALL, longitude **integer** (X) in feature **integer** is too small

Explanation: The longitude in the feature is too small, ie. out of range

User action: Check the data on the tape as appropriate.

MANBLKERR, error in block **integer** , manuscript **integer**

Explanation: The block just read from tape is either of an unknown type, or
an unexpected tapemark, and cannot be processed further (the block number
and manuscript number are given)

User action: As for BLKLENERR or UNEXPTMK; check the tape for mistakes
arising from an incorrect writing session, and if necessary rewrite.
Proceed when satisfied that the block's existence is unimportant and will
not cause problems in any subsequent processing. The block will either be
ignored (if searching for a particular manuscript), or cause the end of
reading and closure of the IFF file (if not).

NOENTERR, found **char** entry

Explanation: An unexpected entry (given in the error message) was found
instead of an NO entry while attempting to reposition to the NO entry - see
NOLPOSERR.

User action: Please submit an SPR to Laserscan.

NOLPOSERR, error repositioning to NO (pos'n **integer**)

Explanation: There was an error repositioning to the NO (New Overlay) after
outputting the EO (End of Overlay) entry in order to there add a pointer to
the EO address.

User action: Please submit an SPR to Laserscan.

RDDEGERR, unable to read degrees field

Explanation: The value for the degrees in the latitude or longitude
specified in the command line is missing or not recognised by the program.

User action: Respecify the values in the command line and start again.
Note that none of the commands specified on the command line will have been
obeyed, and the tape not moved.

RDMINERR, unable to read minutes field

Explanation: The value for the minutes in the latitude or longitude specified in the command line is missing or not recognised by the program.

User action: Respecify the values in the command line and start again. Note that none of the commands specified on the command line will have been obeyed, and the tape not moved.

RDNSEWERR, hemisphere character not present

Explanation: A hemisphere character (N,S,E,W or n,s,e,w) has not been specified after the seconds field in the latitude or longitude qualifier in the command line.

User action: Respecify the value in the command line and start again. Note that none of the commands specified on the command line will have been obeyed, and the tape not moved.

RDSECERR, seconds field missing

Explanation: The value for the seconds in the latitude or longitude specified on the command line is missing or not recognised by the program.

User action: Respecify the values in the command line and start again. Note that none of the commands specified on the command line will have been obeyed, and the tape not moved.

RELEASERR, releasability **integer** is out of range - must be 0 to 99

Explanation: The releasability specified in the command line is invalid; only values between 0 and 99 are acceptable.

User action: Resubmit the command with an acceptable value for the releasability. Note that none of the commands specified on the command line will have been obeyed, and the tape not moved.

SECURERR, security **integer** is out of range - must be 0 to 99

Explanation: The security specified in the command line is invalid; only values between 0 and 99 are acceptable.

User action: Resubmit the command with an acceptable value for the security. Note that none of the commands specified on the command line will have been obeyed, and the tape not moved.

SKIPTOERR, manuscript **integer** not found; only **integer** mss left on the tape

Explanation: The required manuscript specified using the /MANUSCRIPT qualifier does not exist on the tape (the actual number of manuscripts on the tape is given in the error message), or the search has started past it without a rewind.

User action: Either rewind the tape and search again, or check that the dataset required actually exists and check the number of datasets on the tape.

STPTRERR, first feature has **integer** points

> **Explanation:** The first feature does not have 5 points to ensure closure.
> If 4 points are given, the fifth is assumed to be equal to the first, but
> with any less continuation is attempted but may not succeed.

> **User action:** Check data on tape as appropriate.

STRTIFERR, unable to open output IFF file

> **Explanation:** An error has occurred in the opening of the IFF file. Further
> information is given in the accompanying error messages. The most likely
> cause of failure is an invalid file specification, or invalid system status
> for the creation of disc files.

> **User action:** Check that the file specification used in the parameter of the
> DCL command line is valid for your local system, and that there are no
> access or protection violation problems. Resubmit the command line with a
> valid file specification.

TAPINTERR, error initialising mag tape unit **string**

> **Explanation:** An error has occurred in the attempt to initialise the tape
> device before the first read. The accompanying error messages will give
> further information relating to the failure. The most likely reasons for
> failure are that the tape device specified with the qualifier /DEVICE or the
> default device MTA0: does not exist on the system, the tape device has been
> allocated to another user, or the tape has not been MOUNTed correctly with
> the /FOREIGN qualifier.

> **User action:** Check whether the tape device MTA0: or the specified device
> exists, has been MOUNTED correctly or has not been allocated to another user
> and use the command SHOW DEVICE/FULL <TAPE DEVICE>

TAPRDBERR, error reading new block (no. **integer**) from tape

> **Explanation:** An error has occurred in the reading of a block of data (block
> number given) from the tape. Further information relating to the failure is
> given in the accompanying error messages. The most likely reasons are an
> error in the writing of data to the tape, or subsequent corruption, or
> confusion as to the current position on the tape and trying to read a
> non-existent block.

> **User action:** Check the tape for data errors having arisen from the initial
> writing session or subsequent corruption, or rerun the tape reading commands
> to check the current position on the tape.

TAPRWDERR, error rewinding tape

> **Explanation:** An error has occurred while attempting to rewind the tape to
> the Beginning Of Tape (BOT) while searching for the required manuscript.
> Further information relating to the failure is given in the accompanying
> error messages.

> **User action:** Check the tape drive or tape and resubmit tape reading
> commands.

UNEXPEOF, unexpected end of IFF file found

> **Explanation:** An unexpected end of data was encountered while attempting to
> reposition to the NO entry - see NOLPOSERR.

> **User action:** As for NOLPOSERR.

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 output 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.

CHAPTER 3

MODULE DFADVAL

MODULE   DFADVAL

REPLACES Existing DFADVAL. The new module validates DFAD attribute data held
             in an AC 7 entry against a DLMS Rule file, and has an option to
             produce a LITES2 guidance file.

FUNCTION

             DFADVAL validates an IFF file containing DFAD data.   It performs
             validation on feature geometry, DFAD accuracy region attributes (AC8
             entries in layer zero features), and DFAD point, line and area
             attribute records (AC7 entries in features in layers other than zero).
             The module also validates entries in the MCE map header.

             Optionally, a LITES2 command file may be produced, which may be used
             with the Laser-Scan cartographic editor LITES2, to aid the correction
             of any features that fail validation.

FORMAT

             $ DFADVAL file-spec

             Command qualifiers   Defaults

             /[NO]AC   /AC
             /[NO]BOUNDS   /BOUNDS
             /[NO]DUPLICATES   /DUPLICATES
             /[NO]INFORMATION   /INFORMATION
             /LAYER=(integer[,...])   No default
             /LIST=file-spec   Default output to SYS$OUTPUT
             /LITES2=[file-spec]   No LITES2 file produced
             /[NO]LOOPCHECK   /LOOPCHECK
             /[NO]PRINTER   /NOPRINTER
             /RULES=file-spec   No rules file used
             /TOLERANCE=real   /TOLERANCE=1.0
             /TYPE='AC' or 'FS'   /TYPE='FS'
             /[NO]WARNINGS   /WARNINGS

PROMPTS

             Input IFF-file: input IFF file to be validated

PARAMETERS

Input IFF-file

>   - specifies the IFF file to be validated.   Any part of the file
>   specification which is not supplied will be taken from the default
>   'LSL$IF:IFF.IFF;0'.

COMMAND QUALIFIERS

/AC (default)
/NOAC

>   - If this qualifier is present, the utility will validate the attribute
>   data held in the AC text field of an accuracy region, or DFAD point,
>   line or area feature. The text field is checked to ensure that all
>   attributes are present and valid for the type of feature, and that the
>   values conform to the DLMS format Specification.   If the /RULES
>   qualifier is present, the attribute values are also validated against
>   a DLMS Rules File.
>
>   If /NOAC is specified, the attributes held in the AC entry are not
>   validated.

/BOUNDS (default)
/NOBOUNDS

>   - if this qualifier is present, the utility checks that all coordinates
>   in the IFF file are within the manuscript area as defined by the
>   latitude and longitude corner values in the map header. Any features
>   found with coordinates outside the manuscript limits are reported. If
>   /NOBOUNDS is specified, no checks are carried out on the range of the
>   coordinates in the file.

/DUPLICATES(default)
/NODUPLICATES

>   - If this qualifier is present, the utility checks the coordinate
>   strings for duplicate points. Any duplicate points are reported in
>   the validation report. Note that the coordinate values are converted
>   to the nearest integer value before comparison.
>
>   If /NODUPLICATES is specified, no checks are carried out for duplicate
>   coordinate points.

/INFORMATION (default)
/NOINFORMATION

>   - specifies that informational messages be produced. Such messages do
>   not signal invalid entries in the IFF file, but give information about
>   what it contains.

/LAYER=(integer[,...]) No default

>   - allows the user to specify a list of specific layers to be reported,
>   eg /LAYER=(1,2).   If this qualifier is not specified then all layers
>   are reported.

/LIST=file-spec (default /LIST=SYS$OUTPUT:)

>   - allows the user to specify a list file to which the validation report
>   will be directed.   If this qualifier is not supplied, output is
>   directed to SYS$OUTPUT.

/LITES2=[file-spec]

>   - If /LITES2 is specified, a LITES2 guidance file will be created, with
>   the supplied file specification. The file-spec is parsed against the
>   default template LSL$LITES2CMD:DFADVAL.LCM. This file may be used to
>   aid the subsequent editing of features that have failed validation,
>   using the LITES2 cartographic editor.

/LOOPCHECK (default)
/NOLOOPCHECK

>   - if /LOOPCHECK is specified, then DFADVAL will perform a check for
>   crossing or touching line segments in linear or areal features. Any
>   crossing or touching segments will be reported to the user by means of
>   validation failure warning messages.

/PRINTER
/NOPRINTER (default)

>   - if this qualifier is specified, then the validation report will be
>   written to a temporary file.   The contents of this file will be
>   spooled to SYS$PRINT and the disk file will be deleted on program
>   completion.   This   qualifier cannot be present with the /LIST
>   qualifier.

/RULES=file-spec (optional)

>   - this qualifier allows the user to specify a DLMS Rule file, against
>   which any DFAD attribute data, held in the text field of an AC7 entry
>   will be checked. If a feature fails validation, warning messages are
>   generated indicating the fields which may have caused the failure of
>   the feature record. The attribute data is in addition, validated
>   against the DLMS format specification.
>   If this qualifier is not used, then the DFAD attribute data are only
>   checked against the DLMS format specification.

/TOLERANCE=real (default /TOLERANCE=1.0)

>   - this qualifier allows the user to specify the tolerance within which
>   two line segments, in linear or areal features, must lie of each other
>   to be detected as touching or crossing.

/TYPE='AC'
/TYPE='FS' (default)

>   - /The TYPE qualifier is used to specify whether the feature type
>   (point, line or area) should be derived from a feature's AC or FS
>   entry. If /TYPE=FS is specified (or the qualifier is absent) the
>   feature type is derived from the feature code (first word of the FS
>   entry), with feature codes of 102, 101 and 100 indicating a DFAD area,
>   line and point feature respectively.
>   If /TYPE=AC is specified, then the feature type is derived from the
>   the 'typ' field of the text part of the AC7 entry.

/WARNINGS (default)
/NOWARNINGS

>   - if present, this qualifier will cause DFADVAL to output validation
>   failure warnings.   These are similar to the validation errors which
>   are always output, except that they relate to less serious failures.
>   For example, DFAD attribute records which do not obey the DLMS
>   specification are reported by means of error messages, whereas a
>   failure to obey an entry in the DLMS rules file is reported with a
>   warning message.

RESTRICTIONS

>   o /PRINTER and /LIST is not allowed
>
>   o /RULES and /NOAC is not allowed
>
>   o /TYPE=AC and /TYPE=FS is not allowed

DESCRIPTION

>   DFADVAL is a utility to validate the attribute content and geometry of
>   an IFF file containing DLMS DFAD data. It will generally be run
>   before the data is written to a DFAD format tape. A validation report
>   is produced at the terminal or sent to a user specified list file. A
>   LITES2 command file may also be generated.
>
>   By default, the coordinates of DFAD features are checked to ensure
>   that they are within the manuscript bounds. This check may be
>   suppressed using the /NOBOUNDS qualifier.

By default, line and area features are checked for crossing or touching line segments. This check may be suppressed using the /NOLOOPCHECK qualifier. Point, line and area features are checked that are not defined with too few or too many data points.

By default, the attributes attached to DFAD features are validated. Checks are performed to ensure that all attributes are present and valid for the type of feature, and the values conform to the DLMS format specification. If the /RULES qualifier is present, the attribute values are also validated against a DLMS Rules File. Checks on the attributes may be suppressed using the /NOAC qualifier.

Validation against entries in the Rule file takes into account not only the individual attribute values, but the combination of those values within a feature record. Hence, if more than one field in a record is reported as possibly being invalid, it may not be necessary to change all the fields mentioned to make the record obey the validation rules. Since the validation rules provide only a guide to the expected normal range of field values, certain exceptional features may lie outside these rules and yet still be correct. For this reason, rule validation failures are reported only as warnings, whereas failures to adhere to the DLMS specification are reported as errors.

The accuracy region records (held in AC8 entries in layer zero features) relating to absolute and relative accuracies are similarly validated against the DLMS specification. The utility assumes that accuracy region features have a feature code of 301.

If the /LITES2 qualifier is present on the command line, a LITES2 guidance will be produced. This file may be used with the LITES2 cartographic editor to aid the correction of any features that have failed validation. When obeyed by LITES2, messages describing the problem are produced, and the cursor is positioned on the feature. A 'RESPOND' in the command file allows the user to perform any required editing of the feature. Issuing the 'CONTINUE' command will cause LITES2 to read the next series of commands from the guidance file. For most validation failures, the cursor will be positioned over the first point in a feature. For failures relating to a particular point or line segment within a feature (e.g. crossing line segments), the cursor will be positioned on or near the offending point or segment.

The following should be noted when using DFADVAL:

o The map corners in the Map Header (MH) entry are used to define the manuscript bounds for all range checks.

o All coordinates are rounded to the nearest integer before checking for errors.

o "Point n" refers to the nth point in the point string (ST) entry or entries in a feature.

    o "Segment n" refers to the line segment from point n to point n+1.

    o In the line segment crossover check, every segment is checked for touching or crossing EVERY other, except its immediate neighbours. If the tolerance for this check is zero, only segments which actually cross each other will be detected, but if it is greater than zero, then all segments which come to within that tolerance of each other will be detected as 'touching'.

    o The check for crossing or touching segments will always take at least twice as long as a check for crossing segments alone.

VALIDATION REPORT

The validation report will contain informational messages if the /INFORMATION qualifier is specified, and warning messages if the /WARNINGS qualifier is specified. Error messages will always be written to the validation report.

Warning messages are prefixed with the letter 'W', and error messages with the letter 'E'. Any messages relating to specific features will contain:

       FSN fsn:

where 'fsn' is the Feature Serial Number of the feature.

INFORMATIONAL MESSAGES

Informational messages give details on the following topics:

HEADER INFORMATION

The manuscript's unique reference

The SW corner latitude and longitude coordinates

The SE corner latitude and longitude coordinates

The NE corner latitude and longitude coordinates

The NW corner latitude and longitude coordinates

The latitude and longitude extents of the manuscript

The manuscript latitude and longitude origin

LAYER INFORMATION

The layer number

The FSN of the first feature in the layer

The feature type of the first feature

FSN Sequence breaks (missing features)

The FSN of the last feature in the layer

The total number of features in the layer

SUMMARY INFORMATION

The total number of features in the IFF file

The total number of errors reported

The total number of warnings reported

WARNING MESSAGES

Warning messages are produced if the following are found:

FEATURE RECORDS

Segments in an areal feature that touch

Segments in a linear feature that touch or cross

A feature type change within a layer

A feature type greater than the last feature type

A point feature with more than 1 point

Repeated points are found in a feature

An attribute field that does not obey general rules in the Rule
file.

An attribute field that does not obey specific validation rules in
the Rule file.

ERROR MESSAGES

       Error messages are produced if:

           MAP HEADER ERRORS

           No MCE map header is found

           The manuscript corners are not square

           The manuscript corners are not correctly ordered

           The Latitude extent is incompatible with the latitude corner
values

           The Longitude extent is incompatible with the longitude corner
values

           The Latitude of the map origin is not 1 minute south of the SW map
corner

           The Longitude of the map origin is not 1 minute west of the SW map
corner

           The SW corner latitude is not between +/-90 degrees

           The SE corner latitude is not between +/-90 degrees

           The NW corner latitude is not between +/-90 degrees

           The NE corner latitude is not between +/-90 degrees

           The SW corner longitude is not between +/-180 degrees

           The SE corner longitude is not between +/-180 degrees

           The NW corner longitude is not between +/-180 degrees

           The NE corner longitude is not between +/-180 degrees

           The Map origin latitude is not between +/-90 degrees

           The Map origin longitude is not between +/-180 degrees

           The Map extent latitude is not between +/-90 degrees

           The Map extent longitude is not between +/-180 degrees

           The Absolute height accuracy is not in the range 0-9999m

           The Relative height accuracy is not in the range 0-9999m

           The Predominant height accuracy is not in the range 0-9999m

ACCURACY REGION ERRORS

An accuracy region does not contain an AC 8 entry

A coordinate of the accuracy region is outside the manuscript range

An accuracy region attribute field is found more than once

An accuracy region attribute field is not in the range 0-9999m

More than one value is found for an accuracy region attribute field

An accuracy region has less than 3 points

An accuracy region has more than 14 points

The points of an accuracy region are defined in the wrong order

There are too many accuracy regions. There should be at most 9.

There are too few accuracy regions. There should be at least 2 or none at all.

FEATURE 1 ERRORS

There is no feature 1 in the IFF file

The feature does not have an AC 7 entry

Feature 1 is not of type 2 (ie. not an area feature)

Feature 1 does not have a smc value of 6 or 10

Feature 1 is not defined with 5 points

Point 1 is not equal to the manuscript SW corner

Point 2 is not equal to the manuscript SE corner

Point 3 is not equal to the manuscript NE corner

Point 4 is not equal to the manuscript NW corner

Point 5 is not equal to the manuscript SW corner

OTHER FEATURE ERRORS

A feature has no AC 7 entry

A feature has no ST entry

Coordinate point is outside the range of the manuscript

The feature has an illegal feature serial number (greater than 16383)

The feature's FSN is out of sequence (FSN <= last FSN)

An attribute field does not obey the DLMS specification

An attribute field is not present

An attribute field is present more than once

An attribute field is present, but should not be for this type of feature

AREAL FEATURE ERRORS (TYPE = 2)

The feature is not closed

The feature is defined clockwise

The feature is defined with more than 8191 points

The feature is defined with less than 4 non-repeated points

Segments in the feature cross

LINEAR FEATURE ERRORS (TYPE = 1)

The feature is defined with more than 8191 points

The feature is defined with less than 2 non-repeated points

POINT FEATURE ERRORS (TYPE = 0)

The feature is define with more than 2047 points

EXAMPLES

$ **DFADVAL DFADTEST<CR>**

DFADVAL Validation Report

IFF file - LSL$DATAROOT:[LSL.IFF]DFAD1.IFF;54
Created on 22-FEB-1988 13:54:56.99
Updated on 23-FEB-1988 10:47:35.64 (2)

Include general information?   : YES
Include warnings?   : YES
Perform coord bounds check?   : YES
Perform areal crossover check? : YES, with tolerance   1.000
Perform duplicate point check? : YES
Perform AC validation?   : YES
Feature types taken from FS entries

Unique reference - 1

SW corner   Lat -33 33 33.3   Long -044 44 44.4
SE corner   Lat -33 33 33.3   Long 180 00 00.0
NE corner   Lat 90 00 00.0   Long 180 00 00.0
NW corner   Lat 90 00 00.0   Long -044 44 44.4
Map extents Lat 23 33 33.3   Long 224 44 44.4
Map origin Lat -12 34 56.7   Long -123 45 59.8
E   Lat of map origin not 1 min south of SW map corner
E   Long of map origin not 1 min west of SW map corner
E   Map extent latitude not between +/-90 deg
E   Map extent longitude not between +/-180 deg

LAYER 0
E   FSN   1: Accuracy region field RELV not in range 0-9999m.
E   FSN   1: Accuracy region field RELH not in range 0-9999m.
E   FSN   1: X coord of point 1 out of range
E   FSN   1: X coord of point 2 out of range
E   FSN   1: X coord of point 3 out of range
E   FSN   2: X coord of point 1 out of range
E   FSN   2: X coord of point 2 out of range
E   FSN   2: X coord of point 3 out of range
     2 features in layer

LAYER 1
E   Feature 1 must have smc 6 or 10
E   Feature 1 not type 2
     First feature 1 is type 0
E   FSN   1: X coord of point 1 out of range
E   FSN   2: X coord of point 1 out of range
     FSN 3 missing
E   FSN   4: X coord of point 1 out of range
     FSN 5 - 9 missing

```
E    FSN    10: X coord of point 1 out of range
E    FSN    11: X coord of point 1 out of range
E    FSN    12: X coord of point 1 out of range
     FSN 13 - 19 missing
E    FSN    20: X coord of point 1 out of range
     Last feature 20
     7 features in layer


Total number of features       9
Total number of errors        21
Total number of warnings       0


 ELAPSED:    0 00:00:03.06  CPU: 0:00:01.34  BUFIO: 64  DIRIO: 13  FAULTS: 159
$
```

This example shows the operation of DFADVAL without any qualifiers specified on the command line, so that the default settings are used. Output is to SYS$OUTPUT, with errors, warnings and informational messages being produced. No rules file is used. The loopcheck is performed with tolerance 1.0. Bounds checking is performed.

```
$ DFADVAL DFADTEST/NOBOUNDS/NODUPLICATES/NOLOOPCHECK<CR>


DFADVAL Validation Report
-------------------------------------------------------------

IFF file - LSL$DATAROOT:[LSL.IFF]DFAD1.IFF;54
Created on  22-FEB-1988 13:54:56.99
Updated on  23-FEB-1988 10:47:35.64 (2)

Include general information?   : YES
Include warnings?              : YES
Perform coord bounds check?    : NO
Perform areal crossover check? : NO
Perform duplicate point check? : NO
Perform AC validation?         : YES
Feature types taken from FS entries


-------------------------------------------------------------

Unique reference - 1


SW corner    Lat -33 33 33.3   Long -044 44 44.4
SE corner    Lat -33 33 33.3   Long  180 00 00.0
NE corner    Lat  90 00 00.0   Long  180 00 00.0
NW corner    Lat  90 00 00.0   Long -044 44 44.4
Map extents  Lat  23 33 33.3   Long  224 44 44.4
Map origin   Lat -12 34 56.7   Long -123 45 59.8
E    Lat of map origin not 1 min south of SW map corner
E    Long of map origin not 1 min west of SW map corner
E    Map extent latitude not between +/-90 deg
E    Map extent longitude not between +/-180 deg
```

```
LAYER 0
E    FSN      1: Accuracy region field RELV not in range 0-9999m.
E    FSN      1: Accuracy region field RELH not in range 0-9999m.
     2 features in layer

LAYER 1
E    Feature 1 must have smc 6 or 10
E    Feature 1 not type 2
     First feature 1 is type 0
     FSN 3 missing
     FSN 5 - 9 missing
     FSN 13 - 19 missing
     Last feature 20
     7 features in layer

Total number of features       9
Total number of errors         8
Total number of warnings       0

 ELAPSED:    0 00:00:03.06  CPU: 0:00:01.34  BUFIO: 64  DIRIO: 13  FAULTS: 159
$
```

> In this example all coordinate checks are disabled by means of the /NOBOUNDS /NODUPLICATES and /NOLOOPCHECK qualifiers. Checks are performed only on the AC fields of the DFAD features.

```
$ DFADVAL/RULES=[DFAD.VALTAB]VALTAB DFAD1<CR>

DFADVAL Validation Report
-------------------------------------------------------------

IFF file - DUA0:[MCE.IFF]DFAD1.IFF;1
Created on   9-NOV-1983 15:23:13.00
Updated on  20-JAN-1988 14:11:25.34 (7)

Include general information?   : YES
Include warnings?              : YES
Perform coord bounds check?    : YES
Perform areal crossover check? : YES, with tolerance   1.000
Perform duplicate point check? : YES
Perform AC validation          : YES
Feature types taken from FS entries


-------------------------------------------------------------


Unique reference - UK SQUARE 79

SW corner    Lat 58 00 00.0    Long -005 00 00.0
SE corner    Lat 58 00 00.0    Long -004 00 00.0
NE corner    Lat 59 00 00.0    Long -004 00 00.0
NW corner    Lat 59 00 00.0    Long -005 00 00.0
Map extents Lat  01 00 00.0    Long  001 00 00.0
```

Map origin Lat 57 59 00.0   Long -005 01 00.0

LAYER 0
     2 features in layer

LAYER 1
     First feature 1 is type 2
W   FSN   115: Segments   43 and   45 touch nr 29824 , 10289
W   FSN   158: Segments   1751 and   1753 touch nr 21325 , 18000
W   FSN   226: Segments   4 and   6 touch nr 19003 , 15224
W   FSN   233: Segments   1 and   22 touch nr 19651 , 13883
W   FSN   245: Segments   49 and   51 touch nr 16142 , 12403
W   FSN   381: Segments   546 and   548 touch nr 22123 ,   1504
W   FSN   406: Segments   195 and   197 touch nr 16287 ,   8751
W   FSN   467: Segments   1 and   39 touch nr 20235 ,   600
     Last feature 512
     512 features in layer

LAYER 2
     FSN 513 - 612 missing
     First feature 613 is type 1
W   FSN   624: Segments   16 and   18 touch nr 29649 , 20269
W   FSN   626: Segments   20 and   23 touch nr 32891 , 20802
W   FSN   626: Segments   21 and   23 touch nr 32892 , 20802
W   FSN   626: Segments   52 and   54 cross at 32413 , 21063
W   FSN   631: Segments   37 and   39 touch nr 35942 , 22220
W   FSN   731: Field hgt may not obey validation table specific rules.
W   FSN   733: Field hgt may not obey validation table specific rules.
     Last feature 736
     124 features in layer

LAYER 3
     FSN 737 - 2736 missing
     First feature 2737 is type 0
W   FSN   2844: Point feature with > 1 (33) points
W   FSN   3050: Point feature with > 1 (104) points
     Last feature 3050
     314 features in layer

Total number of features   952
Total number of errors   0
Total number of warnings   17

 ELAPSED: 0 00:13:28.81 CPU: 0:05:18.62 BUFIO: 71 DIRIO: 11047 FAULTS: 767
$

          In this example, the DFAD attribute data is is validated against the
          rules file in the specified DLMS Rule file. Two warnings are produced
          indicating that features 731 and 733 have failed validation.

$ **DFADVAL/TOLERANCE=0 DFAD1<CR>**

DFADVAL Validation Report

IFF file - DUA0:[MCE.IFF]DFAD1.IFF;1
Created on   9-NOV-1983 15:23:13.00
Updated on 20-JAN-1988 14:11:25.34 (7)

Include general information?   : YES
Include warnings?   : YES
Perform coord bounds check?   : YES
Perform areal crossover check? : YES, with tolerance   0.000
Perform duplicate point check? : YES
Perform AC validation?   : YES
Feature types taken from FS entries

Unique reference - UK SQUARE 79

SW corner   Lat 58 00 00.0   Long -005 00 00.0
SE corner   Lat 58 00 00.0   Long -004 00 00.0
NE corner   Lat 59 00 00.0   Long -004 00 00.0
NW corner   Lat 59 00 00.0   Long -005 00 00.0
Map extents Lat 01 00 00.0   Long 001 00 00.0
Map origin Lat 57 59 00.0   Long -005 01 00.0

LAYER 0
     2 features in layer

LAYER 1
     First feature 1 is type 2
     Last feature 512
     512 features in layer

LAYER 2
     FSN 513 - 612 missing
     First feature 613 is type 1
W   FSN   626: Segments   52 and   54 cross at 32413 , 21063
     Last feature 736
     124 features in layer

LAYER 3
     FSN 737 - 2736 missing
     First feature 2737 is type 0
W   FSN   2844: Point feature with > 1 (33) points
W   FSN   3050: Point feature with > 1 (104) points
     Last feature 3050
     314 features in layer

Total number of features   952
Total number of errors   0
Total number of warnings   15

 ELAPSED: 0 00:07:03.79 CPU: 0:02:21.71 BUFIO: 64 DIRIO: 512 FAULTS: 348

$

       This example shows the use of the /TOLERANCE qualifier to change the
default tolerance within which tests for touching and crossing line
segments are performed. Here, a zero tolerance is specified, so only
line segments in areal or linear features which actually cross, as
opposed to touch, are reported.

$ **DFADVAL/TYPE=AC/NOLOOPCHECK/NODUPLICATES DFAD1<CR>**

DFADVAL Validation Report

IFF file - DUA0:[MCE.IFF]DFAD1.IFF;1
Created on   9-NOV-1983 15:23:13.00
Updated on 20-JAN-1988 14:11:25.34 (7)

Include general information?   : YES
Include warnings?   : YES
Perform coord bounds check?   : YES
Perform areal crossover check? : NO
Perform duplicate point check? : NO
Perform AC validation?   : YES
Feature types taken from AC entries

Unique reference - UK SQUARE 79

SW corner   Lat 58 00 00.0   Long -005 00 00.0
SE corner   Lat 58 00 00.0   Long -004 00 00.0
NE corner   Lat 59 00 00.0   Long -004 00 00.0
NW corner   Lat 59 00 00.0   Long -005 00 00.0
Map extents Lat 01 00 00.0   Long 001 00 00.0
Map origin Lat 57 59 00.0   Long -005 01 00.0

LAYER 0
     2 features in layer

LAYER 1
     First feature 1 is type 2
     Last feature 512
     512 features in layer

LAYER 2
     FSN 513 - 612 missing
     First feature 613 is type 1
     Last feature 736
     124 features in layer

LAYER 3
     FSN 737 - 2736 missing
     First feature 2737 is type 0

```
W    FSN   2844: Point feature with > 1 (33) points
W    FSN   3050: Point feature with > 1 (104) points
     Last feature 3050
     314 features in layer

Total number of features       952
Total number of errors           0
Total number of warnings         2

 ELAPSED:    0 00:02:52.20  CPU: 0:00:54.96  BUFIO: 51  DIRIO: 512  FAULTS: 255
$
```

In the above case, the /NOLOOPCHECK qualifier specifies that no checking for touching or crossing line segments is performed, while the /NODUPLICATES qualifier disables checking for duplicate points.


```
$ DFADVAL/NOLOOPCHECK/NODUPLICATES/NOAC/NOWARNINGS/NOINFORMATION DFAD1<CR>

DFADVAL Validation Report
-------------------------------------------------------------

IFF file - DUA0:[MCE.IFF]DFAD1.IFF;1
Created on   9-NOV-1983 15:23:13.00
Updated on  20-JAN-1988 14:11:25.34 (7)

Include general information?   : NO
Include warnings?              : NO
Perform coord bounds check?    : YES
Perform areal crossover check? : NO
Perform duplicate point check? : NO
Perform AC validation?         : NO
Feature types taken from FS entries

-------------------------------------------------------------


 ELAPSED:    0 00:02:03.56  CPU: 0:00:54.23  BUFIO: 20  DIRIO: 516  FAULTS: 168
$
```

In this example, in addition to the /NOLOOPCHECK and /NODUPLICATES qualifier, the /NOWARNINGS and /NOINFORMATION qualifiers specify that no warning or informational messages should be generated. The /NOAC qualifier specifies the attributes held in a feature's AC entry should not be validated. Since no validation errors are found in the input file, only the validation report header is produced.

$ **DFADVAL/RULES=[DFAD.VALTAB]VALTAB/LITES2=DFAD1.LCM DFAD1<CR>**

DFADVAL Validation Report

IFF file - DUA0:[MCE.IFF]DFAD1.IFF;1
Created on   9-NOV-1983 15:23:13.00
Updated on 20-JAN-1988 14:11:25.34 (7)

Include general information?   : YES
Include warnings?   : YES
Perform coord bounds check?   : YES
Perform areal crossover check? : YES, with tolerance   1.000
Perform duplicate point check? : YES
Perform AC validation?   : YES
Feature types taken from FS entries

Unique reference - UK SQUARE 79

SW corner   Lat 58 00 00.0   Long -005 00 00.0
SE corner   Lat 58 00 00.0   Long -004 00 00.0
NE corner   Lat 59 00 00.0   Long -004 00 00.0
NW corner   Lat 59 00 00.0   Long -005 00 00.0
Map extents Lat 01 00 00.0   Long 001 00 00.0
Map origin Lat 57 59 00.0   Long -005 01 00.0

LAYER 0
     2 features in layer

LAYER 1
     First feature 1 is type 2
W   FSN   115: Segments   43 and   45 touch nr 29824 , 10289
W   FSN   158: Segments   1751 and   1753 touch nr 21325 , 18000
W   FSN   226: Segments   4 and   6 touch nr 19003 , 15224
     Last feature 512
     512 features in layer

LAYER 2
     FSN 513 - 612 missing
     First feature 613 is type 1
W   FSN   624: Segments   16 and   18 touch nr 29649 , 20269
W   FSN   626: Segments   20 and   23 touch nr 32891 , 20802
W   FSN   731: Field hgt may not obey validation table specific rules.
W   FSN   733: Field hgt may not obey validation table specific rules.
     Last feature 736
     124 features in layer

LAYER 3
     FSN 737 - 2736 missing
     First feature 2737 is type 0
W   FSN   2844: Point feature with > 1 (33) points
W   FSN   3050: Point feature with > 1 (104) points
     Last feature 3050
     314 features in layer

Total number of features   952
Total number of errors   0
Total number of warnings   9

 ELAPSED: 0 00:17:13.43 CPU: 0:05:24.59 BUFIO: 72 DIRIO: 11051 FAULTS: 717

          This example illustrates the production of a LITES2 command file which
          can be used to guide the user to invalid features using the LITES2
          cartographic editor. The validation is performed using a rules file
          specified with /RULES. The validation report output is directed to
          SYS$OUTPUT, and the LITES2 commands are written to a file specified
          with the /LITES2 qualifier. The contents of the LITES2 guidance file
          'DFAD1.LCM' are as follows:


```
%POSITION   600.000   600.000
%POSITION 36600.000 36600.000
%ABANDON
%MESSAGE
%MESSAGE                  L I T E S 2   C O M M A N D   F I L E
%MESSAGE
%MESSAGE                              created by
%MESSAGE
%MESSAGE ========================= D F A D V A L =========================
%MESSAGE
%MESSAGE DFADVAL invoked by JON using terminal RTA2: at 26-FEB-1988 11:07:45.36
%MESSAGE
%MESSAGE Command line:
%MESSAGE
%MESSAGE DFADVAL/RULES=[DFAD.VALTAB]VALTAB/LITES2=DFAD1.LCM DFAD1
%MESSAGE
%MESSAGE ====================================================================
%MESSAGE
%ABANDON
%ABANDON
%MESSAGE "Feature 115: segments 43 and 45 touch nr 29824 , 10289"
%POSITION      29824.000      10289.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 158: segments 1751 and 1753 touch nr 21325 , 18000"
%POSITION      21325.000      18000.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 226: segments 4 and 6 touch nr 19003 , 15224"
%POSITION      19003.000      15224.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 624: segments 16 and 18 touch nr 29649 , 20269"
```

```
%POSITION       29649.000      20269.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 626: segments 20 and 23 touch nr 32891 , 20802"
%POSITION       32891.000      20802.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 731: field hgt may not obey  validation table specific rules."
%POSITION       23180.000       1113.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 733: field hgt may not obey  validation table specific rules."
%POSITION       22786.000       1080.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 2844: point feature with > 1 (33) points"
%POSITION       36487.000       2833.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
%MESSAGE "Feature 3050: point feature with > 1 (104) points"
%POSITION       10452.000       7286.000
%TEST $CURSINWIN
%ELSE %ZOOM 1
%RESPOND
%ABANDON
$
```


$ **DFADVAL/RULES=[DFAD.VALTAB]VALTAB/LIST=DFAD1.LIS DFAD1<CR>**

```
%DFADVAL-I-LISTOUT, List output is being directed to DFAD1.LIS
 ELAPSED:   0 00:19:19.69  CPU: 0:05:24.09  BUFIO: 8  DIRIO: 11049  FAULTS: 802
```

$ **DFADVAL/RULES=[DFAD.VALTAB]VALTAB/PRINTER DFAD1<CR>**

```
%DFADVAL-I-PRINTOUT, List output is being directed to the printer
 ELAPSED:   0 00:14:16.52  CPU: 0:05:21.48  BUFIO: 9  DIRIO: 11053  FAULTS: 750
$
```

The two examples above illustrate the use of the /LIST and /PRINTER
qualifiers to direct the validation report to a file and the printer
respectively.

--
MESSAGES (INFORMATIONAL)

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

LISTOUT List output is being directed to list file **file-spec**

>   **Explanation:** List output is being directed to the file specified with the
>   /LIST qualifier.

>   **User action:** None.

PRINTOUT List output is being directed to the printer

>   **Explanation:** List output is being directed to the printer as specified by
>   the /PRINTER qualifier.

>   **User action:** None.

MESSAGES (ERROR)

These messages indicate an error in processing which has caused the program to
terminate.   If an error occurs, it is unlikely that any output file produced
will be correctly processed.

TOOMNYINTS, Too many intersections found

> **Explanation:** While performing the LOOPCHECK operation more than 50
> intersection points were found.   The remaining intersection
> points are ignored.

> **User action:** The fact that so many intersection points have been found for
> this feature, indicates a serious problem in the feature
> geometry. Correct the feature using the mechanisms you would
> normally use to correct other errors in feature geometry.

UNOPNRULE, Cannot open specified rule file

> **Explanation:** The rule file specified in the command line cannot be found or
> opened

> **User action:** Check that the rule file specification was correct and that the
> file exists.   Then respecify the command line with a corrected
> file specification.

UNCLORULE, Cannot close the rule file used

> **Explanation:** The rule file during the validation cannot be closed correctly.

> **User action:** Check that the rule file is not damaged.   If the problem
> persists, contact Laser-Scan.

MESSAGES (OTHER)

In addition to the above messages which are generated by DFADVAL 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.   These
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 input file should be preserved
to facilitate diagnosis.

CHAPTER 4

MODULE FADTINPUT

MODULE   FADTINPUT

REPLACES FADTINPUT is a new utility

FUNCTION

     FADTINPUT allows a user to create, edit and list a DLMS Feature
     Analysis Data Table (FADT) file. It performs validation on the FADT
     records entered against the Digital Landmass System (DLMS)
     Specification, and optionally against a set of validation rules in a
     user specified rule file.

FORMAT

     $ FADTINPUT

     Command qualifiers

     None - this utility is controlled by forms and optionally by logical
     names.

     Command and data entry forms

     The user may control the operation of the FADTINPUT utility by
     means of the following screen forms:

          COMMAND OPTIONS FORM
          FILE SPECIFICATION FORM
          OUTPUT LIST FILE SPECIFICATION FORM
          RECORD TYPE OPTION FORM

     The user may enter or modify data in an FADT file by means of the
     following screen entry forms:

          ACCURACY RECORD FORM
          ACCURACY REGION RECORD FORM
          DATA SET IDENTIFICATION (DSI) RECORD FORM
          DLMS HEADER RECORD FORM
          FADT RECORD FORM

Command and File Specification Logical Names

Optionally, the user may control the operation of FADTINPUT by means of the
following logical names:

```
LSL$FADTINPUT_ACTION
LSL$FADTINPUT_FADT
LSL$FADTINPUT_RULE
LSL$FADTINPUT_LIST
```

DEFAULT VALUES FOR DATA ENTRY FORMS

Default values for the ACC, DSI, FADT and HEADER (DLMS) forms can be
set by the system manager in a lookup file pointed to by the logical
name LSL$FADTINPUT_DEFAULTS, which must be defined in the system
table. If this logical name is not defined then FADTINPUT reads the
file LSL$LOOKUP:FADT_DEFAULTS.DAT which is supplied by Laser-Scan.
This file can be copied and used as a template for an alternative
lookup file.

The lookup file is an ASCII file of records consisting of commands,
sub-commands and parameters. Any text starting with the "!" character
is regarded as a comment, and is ignored. Comments can appear on the
same lines as commands, or on separate lines. Note that commands may
be in upper or lower case, but cannot be abbreviated.

Each record must begin with one of the commands ACC, DSI, DLMS, or
FADT. The ACC, DSI, and DLMS commands must be followed by a
sub-command which has a single parameter which must be a quoted string
with double quotes. The FADT command does not have a sub-command but
is followed by a set of parameters. The parameters for the FADT
command **must not** be a quoted string. The requirements for each of the
four commands are as follows:

ACC command
The sub-commands for ACC and their required values are a listed as
follows:

ABSOLUTE   - The absolute horizontal accuracy (0-9999).

RELATIVE   - The relative horizontal accuracy (0-9999).

VERTICAL   - The predominant height measuring accuracy (0-9999).

MULT_ACC   - The relative horizontal accuracy (0-9 metres).

DSI command
The sub-commands for DSI and their required values are a listed as
follows:

SEC_HAND_DESC   - Security handling description.

PRODUCT_LEVEL   - The product level (1 or 2).

MANU_REF_NUM   - Manuscript reference number.

DATA_ED_NUM   - Data edition number (01-99).

MAT_MER_VERS   - Match merge version (A-Z).

MAINT_DATE   - Maintenance date (YYMM).

MAT_MER_DATE   - Match merge date (YYMM).

MAINT_DESC   - Maintenance description code (0000-9999).

PRODUCER_CODE   - Country producer code.

PROD_SPEC_ID   - Product spec. identification.

PROD_SPEC_ED   - Product spec. edition (01-99).

PROD_SPEC_DATE - Product spec. date (YYMM).

HORIZ_DATUM   - Horizontal datum.

DIG_COLL_SYS   - Digitising collection system.

ORIG_COMP_DATE - Original comp date (YYMM).

DLMS command
The sub-commands for DLMS and their required values are a listed as
follows:

SQUARE_ID   - Square identifier (xxxxxxxn - (n = 1 or 2)).

ANALYSIS_DATE   - Analysis date (DDMMMYY or TODAY).

MANU_ORIG_LAT   - Manuscript origin latitude (DDMMSS,SH H=N,S,E,W).

MANU_ORIG_LON   - Manuscript origin longitude (DDDMMSS,SH H=N,S,E,W).

SW_CORNER_LAT   - Southwest corner latitude (DDMMSS,SH H=N,S,E,W).

SW_CORNER_LON   - Southwest corner longitude (DDDMMSS,SH H=N,S,E,W).

NE_CORNER_LAT   - Northeast corner latitude (DDMMSS,SH H=N,S,E,W).

NE_CORNER_LON   - Northeast corner longitude (DDDMMSS,SH H=N,S,E,W).

DIG_SCALE   - Digitising scale (0-999999).

WAC_NUM   - WAC number (1-9999).

WAC_CELL   - WAC cell (1-25).

WAG_CELL   - WAG cell (1-16).

SECURITY   - Security (0-99).

SECURITY_DESC   - Security descriptor (T,S,C,R or U).

RELEASABILITY   - Releasability (0-99).

VAL_RULES   - Validation rules.

FADT command
An FADT line has the form :-

FADT   Type   FID   Height   Sec   Rel   SMC
  OrDiDe   WidRof   LenTre

where the fields are :-

Type   - feature analysis type (0,1,2).

FID   - feature identification (100-999).

Hei   - height in metres (-1022 - +1022).

Sec   - Security (0-99).

Rel   - Releasability (0-99).

OrDiDe - Point, Orientation (0-31 or 63). Line, Directivity (1-3).
             Area, Density (0-15).

WidRof - Point and Line, Width (0-127). Area, % roof coverage (0-10).

LenTre - Point, Length (0-127). Line, not applicable. Area, % tree
             coverage (0-10).

LOGICAL NAMES

Optionally, the user may control the operation of FADTINPUT by
defining certain logical names before FADTINPUT is invoked. These
logical names will control the overall function carried out by
FADTINPUT, and the specifications of the files which the program uses.
The logical names are described below:

LSL$FADTINPUT_ACTION
The logical name LSL$FADTINPUT_ACTION controls the operation carried
out by FADTINPUT. LSL$FADTINPUT_ACTION may be defined to have the a
value of '1', '2' or '3'. These values are equivalent to selecting
options '1', '2' or '3' on the 'Command Options' form. The
specifications for files used by FADTINPUT will be taken from the
definitions of the other logical names, as described below.
The values of LSL$FADTINPUT_ACTION specify the following FADTINPUT
operations:

1. **Create a new FADT file**

2. **Edit an existing FADT file**

3. **List an existing FADT file**

If LSL$FADTINPUT_ACTION is not defined, then no other logical names
will be examined by FADTINPUT. If LSL$FADTINPUT_ACTION is defined,
but does not have a legal value ('1', '2' or '3') then an error
message will be produced and the execution of FADTINPUT will be
terminated.
The contents of any list file produced will not be sent to the printer
by FADTINPUT when it is operating under the control of logical names.

LSL$FADTINPUT_FADT
The logical name LSL$FADTINPUT_FADT is used to specify the FADT file
to be processed or created by FADTINPUT. The file specification will
be parsed against the default 'LSL$FADT:FADT.FADT'. If
LSL$FADTINPUT_FADT is not defined, the default specification
'LSL$FADT:FADT.FADT' will be used.

LSL$FADTINPUT_RULE
The logical name LSL$FADTINPUT_RULE is used to specify the optional
rule file against which FADT records will be validated by FADTINPUT
during the creation or editing of an FADT file. The rule file
specification will be parsed against 'LSL$DFAD_RULE:VALTAB.RULE'. If
LSL$FADTINPUT_RULE is not defined, then validation of FADT records
will only be performed against the DLMS specification, and not against
a rule file.
The logical name LSL$FADTINPUT_RULE will only be examined by FADTINPUT
if LSL$FADTINPUT_ACTION has the value '1' or '2'.

LSL$FADTINPUT_LIST
The logical name LSL$FADTINPUT_LIST is used to specify the output list
file to which the listing of the input FADT file will be directed when
the logical name LSL$FADTINPUT_ACTION is defined to have the value
'3'.   The file specification will be parsed against 'FADT.LIS'. If
LSL$FADTINPUT_LIST is not defined, a default list file specification
will be constructed from the input FADT file specification, with the
input FADT file specification's extension being replaced by '.LIS' for
the list file.
The logical name LSL$FADTINPUT_LIST will only be examined by FADTINPUT
if LSL$FADTINPUT_ACTION has the value '3'.

DESCRIPTION

        FADTINPUT is a utility to create, modify and list a DLMS FADT file.
This file may subsequently be merged with DFAD geometry data using the
utility FADTMERGE.

        FADTINPUT performs validation on the FADT records against the DLMS
Specification, and optionally against a set of validation rules in a
user specified rule file. Validation is performed as data are entered
using the FADT feature record form. Validation is carried out,
firstly on a field by field basis as each value is entered, with a
message displayed to indicate if a given field is possibly invalid.
Secondly, since this is only a partial check on compliance with the
validation rules, after the entry of each complete record, it is
rechecked in its entirety.   If the record fails validation, an
indication is given of each field which may be in error.

        Note that since the validation rules are only intended as a guide, the
program does not enforce compliance with the rules. The user may
choose to ignore the validation warning messages in order to enter
features with exceptional attribute values.

        FADTINPUT is form driven, using the DEC Form Management System (FMS).
A detailed description of each form is given below in the section on
'Command and Data Entry Forms'.

        The following keys may be used to control movement between, and entry
of data into, forms and fields:

    TAB and PF4 Advances the cursor to the next field in the form.
                   Attempting to advance forward from the last field on a
                   form will result in the message **'No next field on form'**
                   being displayed.

    BS and F17 Moves the cursor back to the previous field on the
                   form.   If an attempt is made to move back from the
                   first field on a form, the message **'No previous field
                   on form'** is displayed.

    Line Feed Deletes the contents of the current field.

    Return   Exits from a form. Any data entered will be saved by
                   the program.   It is not possible to exit from a form
                   unless data for all mandatory fields have been entered.

    GOLD(PF1)/7 This may be used on the command options, record type
                   option and in all record entry forms. In the case of
                   the two options forms, this command is equivalent to
                   exit.   On the data entry forms, the command discards
                   any data entered already, and returns the user to the
                   record type option form. No check is made on whether
                   data for mandatory fields have been entered.

      PF2   This is the help key. For most fields on the data entry forms, pressing the key will give details of the format and type of data required, on the bottom line of the screen.

      CTRL W   Refreshes (i.e. redisplays) the current form.

Movement within a field, for editing purposes, is controlled by the back arrow (to move to the right) and forward arrow (to move to the left) keys.

On most of the forms, default values will initially appear in some of the fields. These may be edited as required by the user and the numeric keys on the keypad may be used.

When a data entry form is displayed, if the record to which it relates already exists in the FADT file, then the contents of the record are displayed on the screen. This occurs immediately the form appears in the case of the DLMS header, accuracy, accuracy region and DSI records; and after the entry of a Feature Analysis Code (FAC) value in the case of the FADT record form.

Optionally, the user may control the operation of FADTINPUT by means of the logical names LSL$FADTINPUT_ACTION, LSL$FADTINPUT_FADT, LSL$FADTINPUT_RULE and LSL$FADTINPUT_LIST. These logical names should be defined to have the required values before FADTINPUT is invoked.

If the logical name LSL$FADTINPUT_ACTION is assigned a value of '1' or '2', specifying the creation of a new FADT file or the modification of an existing FADT file respectively, the first form displayed will be the 'Record Type Option' form.

If the logical name LSL$FADTINPUT_ACTION is assigned the value '3', specifying the listing of an existing FADT file, then the operation of FADTINPUT will proceed without any forms being displayed and without any user interaction being required. The list file produced will not be sent to the printer.

If the logical name LSL$FADTINPUT_ACTION is not defined, then the operation of FADTINPUT will proceed without reference to any other logical names. The first form displayed will be the 'Command Options' form.

COMMAND AND DATA ENTRY FORMS

       In each example of the forms below, the presence of underline
characters, '_', indicates an area into which the user is expected to
type a field value. This is also true of the forms displayed on the
screen. On the screen, the field into which any character typed will
be placed is indicated by the position of the cursor and will appear
in reverse video.

       Note that the dashed lines delimiting the form examples below do not
appear in the actual screen forms.

COMMAND OPTIONS FORM

                              Command Options

                          Option (1,2,3 or 4) : _

                       1 Create a new FADT file

                       2 Edit an existing FADT file

                       3 List an existing FADT file

                       4 Exit

DESCRIPTION:

        The 'Command Options' form is the first form which the user will see
        when   FADTINPUT   is   invoked   without   the   logical   name
        LSL$FADTINPUT_ACTION being defined. It controls the overall operation
        of the FADTINPUT utility.

        By entering the appropriate option number, the user may create a new
        FADT file, edit an existing FADT file, list an existing FADT file, or
        exit from FADTINPUT.

        The user is always returned to this form after completing any of the
        first three options.

--
MESSAGES:

        The following message is associated with this form

                Option must be 1,2,3 or 4
                User Action: The user should re-enter the option, which must be
                1,2,3 or 4

FILE SPECIFICATION FORM

```
--------------------------------------------------------------------------
                    FADTINPUT File Specifications

        FADT file : _____

        RULE file : _____
--------------------------------------------------------------------------
```

DESCRIPTION:

> This form appears if option 1 (create a FADT file) or option 2 (edit a
> FADT file) is selected on the 'Command Options' form.

> The form allows the user to specify the name of the FADT file to be
> created or edited, and the name of the Rule file to be used to
> validate the FADT records. If validation against a Rule file is not
> required, the Rule file specification field should be left blank.

> Any missing parts of the FADT file specification will be taken from
> the default 'LSL$FADT:FADT.FADT'. Any missing parts of the Rule file
> specification are taken from 'LSL$DFAD_RULE:VALTAB.RULE'.

MESSAGES:

> The following messages are associated with this form:

> > **Copying existing FADT file to new version of file for editing.
> > Please wait.**
> > **Explanation:** This message only appears when an existing FADT
> > file is being edited. It indicates that the contents of the FADT
> > file are being copied to a new version of the file. The old file
> > is preserved unaltered.
> > **User Action:** None, the user should wait.

> > **FADT file with that specification exists. Creating new file
> > anyway.**
> > **Explanation:** This message appears when a new FADT file is being
> > created, and the program finds an existing file with the same
> > name. The old file will be preserved, and the new one created
> > with a more recent version number. It is possible that the
> > intention was to edit the existing file, and that the 'Create'
> > option in the 'Command option' form was selected in error.
> > **User Action:** The user should check whether the existing file
> > should be preserved.

> > **Illegal FADT file specification, please re-enter.**
> > **Illegal Rule file specification, please re-enter.**
> > **User Action:** The user should check that the file specification
> > in question is correct.

> > **Unable to open Rule file**
> > **Unable to open FADT file**
> > **User Action:** The user should check that the specified files
> > exist.

OUTPUT LIST FILE SPECIFICATION FORM

```
--------------------------------------------------------------------------------
                    FADTINPUT Output List File Specification

            FADT file : _____

            List file : _____


                    Send output to printer? (Y/N) : _
--------------------------------------------------------------------------------
```

DESCRIPTION:

This form appears after option 3 (list a FADT file) is selected on the 'Command Options' form. The form allows the user to specify the input FADT file and the name of the output list file.

Any missing parts of the FADT file specification are taken from the default 'LSL$FADT:FADT.FADT'. The default list file specification is taken from the input FADT filename, and is given the extension '.LIS'.

The option to send output to the printer (defaults to 'Y' for Yes) allows the user to specify whether the list file is sent to SYS$PRINT. The list file will be completed and preserved regardless of whether this option is selected.

When the listing is complete, control returns to the 'Command Options' form.

MESSAGES:

The following messages are associated with this form:

Illegal FADT file specification, please re-enter.
Illegal list file specification, please re-enter.
User Action: The user should check that the name of the file has been correctly specified.

Unable to open FADT file
User Action: The user should check that the specified file exists.

FADT file is being formatted and output
User Action: None. The listing of the file is progressing normally.

RECORD TYPE OPTION FORM

                         FADTINPUT Record Type Option

            Record type to be entered next (1,2,3,4 or 5) : _

                              1 ACC record

                              2 DSI record

                              3 FADT record

                              4 Header record

                              5 Exit

DESCRIPTION:

        If the logical name LSL$FADTINPUT_ACTION is not defined, this form is
        displayed, after the FADT file and rule file specification form, if
        either option 1 or 2 on the command option form is selected.   If
        LSL$FADTINPUT_ACTION is defined to be either '1' or '2', then this
        form is the first to be displayed when FADTINPUT starts to execute.

        It allows the user to select which type of record to enter or modify
        next.   Selection of the exit option returns control to the 'Command
        Options' form, if the logical name LSL$FADTINPUT_ACTION was not
        defined before FADTINPUT was executed. Selecting the exit option when
        FADTINPUT is operating under control of logical names, that is when
        LSL$FADTINPUT_ACTION was defined to have the values '1' or '2', exits
        from FADTINPUT.

        The same option may be selected any number of times in a particular
        session.   This allows the user considerable flexibility in creating
        and altering new and existing records.

        On selecting an option, if the corresponding record already exists in
        the FADT file, then the existing values are displayed in the form's
        fields. If the record does not exist, default values set up for that
        form's fields will be displayed.

MESSAGES:

        The following messages are associated with this form:

            **No DSI found, so level of file unknown. Use DSI entry option to
            specify level.**
            Explanation: The FADT record entry option was selected before
            the DSI record has been entered in the current file. The DSI
            record is required because it contains the level (DFAD 1 or 2) of
            the file, which is needed for FADT record validation.
            User Action: The user should enter the DSI record by selecting
            option 2 on this form.

Option must be 1,2,3,4 or 5
User Action: The user should re-enter the option, ensuring that
it is 1,2,3,4 or 5.

ACCURACY RECORD FORM

                                 ACC Record

        Horizontal accuracy in metres :

                    absolute ____

                    relative ____

        Predominant height measuring accuracy :

                    vertical ____

        Multiple accuracy regions :

                    number   __

DESCRIPTION:

        This form allows the entry of the product accuracy record.

        The data entered on this form may be subsequently transferred to the
        map header of an IFF file using FADTMERGE, and to an ACC accuracy
        record on a DFAD tape using I2DFAD.

        The horizontal absolute and relative accuracies and the predominant
        height accuracy should be in the range 0-9999 metres. If any values
        are not available, then **NA** should be entered. The multiple accuracy
        region number specifies how many different accuracy regions are
        defined for the manuscript. This number must be either 0 or in the
        range 2-9.

        Before exiting from the form, all the fields must contain an entry.

        On exit from the form (with RETURN or GOLD/7) if a value of 0 has been
        entered for the number of multiple accuracy regions, control is
        returned to the 'Record type option' form.

        Otherwise, a series of region record forms will be displayed, allowing
        the user to define each region. The number of forms displayed is
        equal to the value entered for the number of multiple accuracy
        regions. were specified. This ensures the entry into the FADT of the
        correct number of accuracy region records.

MESSAGES:

        The following message is associated with this form:

                This entry is not valid, please try again
                User Action: The user should re-enter the field, ensuring that
                it obeys the DLMS specification.

ACCURACY REGION RECORD FORM

                        ACC Information (Region)

        Absolute horizontal accuracy of region _____

        Relative horizontal accuracy of region _____

        Number of points in region outline   _
        (implied closing from first to last)

        Latitude   Longitude   Latitude   Longitude
             H   H   H   H
        _____.__ _____.__   _____.__ _____.__
        _____.__ _____.__   _____.__ _____.__
        _____.__ _____.__   _____.__ _____.__
        _____.__ _____.__   _____.__ _____.__
        _____.__ _____.__   _____.__ _____.__
        _____.__ _____.__   _____.__ _____.__
        _____.__ _____.__   _____.__ _____.__

        Latitude = DDMMSS.SH   Longitude = DDDMMSS.SH

        H = N(north), S(south), E(east) or W(west)

DESCRIPTION:

        This form allows the entry of an accuracy region record. The number
        of accuracy region records is specified in the multiple accuracy
        outline number field in the product accuracy record. This form will
        be displayed repeatedly until all manuscript accuracy regions have
        been defined.

        The horizontal accuracy values should be specified as **NA** if data is
        not available, or should be in the range 0-9999 metres.

        Between three and fourteen points may be entered to define a region's
        outline. These are specified as latitude/longitude coordinates, which
        will be validated to ensure that the degree, minute, second and
        hemisphere values are allowable. Invalid latitudes and longitudes
        will not be accepted.

        Exiting from one accuracy region form (using RETURN or GOLD/7) moves
        the user on to the next accuracy region form, or back to the record
        type option form if there are no more.

MESSAGES:

        The following messages are associated with this form:

                This entry is not valid, please try again
                User Action: The user should re-enter the field, ensuring that
                it obeys the DLMS specification.

Maximum number of region points is 14
Minimum number of region points is 3
User Action: The user should re-enter the number of points in
the region outline, ensuring that it lies between three and
fourteen.

Attempt to enter too many points
User Action: The user may only enter as many points as specified
in the number of points in region outline field.

**A number of messages reporting why latitudes or longitudes are
invalid.**
User Action: The user should re-enter the latitude or longitude,
ensuring that it is valid.

DATA SET IDENTIFICATION (DSI) RECORD FORM

                                DSI Record

        Security Handling Description   _____
        Product Level (DFAD 1 or 2)   _
        Manuscript Reference Number   _____
        Data Edition Number (01-99)   __
        Match/Merge Version   _
        Maintenance Date (YYMM)   ____
        Match/Merge Date (YYMM)   ____
        Maintenance Description Code   ____
        Country Producer Code   _____
        Product Spec. Identification   _____
        Product Spec. Edition (01-99)   __
        Product Spec. Date (YYMM)   ____
        Horizontal Datum   _____
        Digitising Collection System   _____
        Original comp. date (YYMM)   ____

DESCRIPTION:

        This form allows entry of the Data Set Identification (DSI) record.

        The data entered on this form may be subsequently transferred to the
        map header of an IFF file using FADTMERGE, and to a DSI record on a
        DFAD tape using I2DFAD.

        Only the date entries, in format 'YYMM', are validated, to ensure that
        the month lies between 1 and 12 inclusive. An unspecified date should
        be entered as '0000'.

        On exit from the form, either with RETURN or GOLD/7, control is
        returned to the record type option form.

MESSAGES:

        The following message is associated with this form:

            Month less than 1.
            Month exceeds 12.
            User Action: The user should reenter the date, ensuring that the
            month lies between 1 and 12 inclusive.

DLMS HEADER RECORD FORM

```
-------------------------------------------------------------------------------
                            DLMS FADT Header Page

        Square Identifier    _____      (8th character denotes level 1 or 2)

        Analysis Date        __-___-__     (DD-MMM-YY e.g. 09-FEB-80)


                            Latitude    Longitude
                                 H            H
        Manuscript Origin    _____.__   _____.__    (Latitude  = DDMMSS.SH)
        SW Corner            _____.__   _____.__    (Longitude = DDDMMSS.SH)
        NE Corner            _____.__   _____.__    (H         = N,S,E,W)

        Digitising Scale     _____

        WAC Number           ____
        WAC Cell             __
        WAG Cell             __

        Security             __
        Security Desc        _
        Releasability        __

        Validation Rules     __-__
-------------------------------------------------------------------------------
```

DESCRIPTION:

> This form allows entry of data into the DLMS header record.
>
> The data entered on this form may be subsequently transferred to the
> map header of an IFF file using FADTMERGE, and to a Manuscript and DSI
> record on a DFAD tape using I2DFAD.
>
> The longitude and latitude values entered on this form are validated,
> and will not be accepted if invalid.
>
> On exit from this form, either with RETURN or GOLD/7, control returns
> to the record type option form.

```
-------------------------------------------------------------------------------
```

MESSAGES:

> The following messages are associated with this form:
>
> > **Illegal integer for 'field-name', please re-enter**
> > **WAC cell must be in range 1-25, please re-enter**
> > **WAG cell must be in range 1-6, please re-enter**
> > **Last digit of square identifier must be level, i.e. 1 or 2**
> > **User Action:** The relevant field should be re-entered, ensuring
> > that it obeys the constraints placed on it.
> >
> > **Day less than 1.**
> > **Day too large, maximum 'number' for this month.**
> > **Month unrecognised.**

User Action: The user should reenter the analysis date, ensuring that it is valid.

A number of messages reporting why latitudes or longitudes are invalid.
User Action: The user should re-enter the latitude or longitude, ensuring that it is valid.

FADT RECORD FORM

```
-------------------------------------------------------------------------------
                              FADT Record

                    FAC       From:  _____      To:  _____

                    Type               _

                    FID               ____

                    Height            ____

                    Security           __

                    Releasability      __

                    SMC                __

                    Ori/Dir/Den        __

                    Width/%-roof       ___

                    Length/%-tree      ___
-------------------------------------------------------------------------------
```

DESCRIPTION:

>   This form is used to enter the FADT records. Each field and record
> will be validated as it is entered, against the DLMS specification and
> optionally against entries in a DLMS Rule file.

>   When the form is first displayed, the user is required to enter a FAC
> range by entering a starting value in the 'From:' field and an ending
> value in the 'To:' field. The ending value must always be greater
> than or equal to the starting value. A starting value must always be
> specified but and ending value need not be specified, so that a single
> FAC can be entered. The ending value can be be left blank, by
> skipping over the 'To' field with TAB. Pressing RETURN at this stage
> will cause control to return to the record type option form.

>   If a single FAC value is entered, the program will search the FADT
> file for a corresponding record, and will display its contents on the
> form if a match is found. If a FAC range is entered, the program will
> check the FADT file for any records in the range which already exist.
> If any are found then an error message is displayed and the user is
> prompted to re-enter the range.

>   After entry of a FAC the user is required to enter an FID. The
> program then checks to see if the FID entered had an entry in the FADT
> defaults file. If so then the default values are displayed in the
> rest of the fields on the form. The user must enter values into any
> fields that do not have defaults.

>   If a FAC range had been specified then the data values entered either
> by default or by the user will apply to all records in the range.

When the user completes entry of a field, it will be checked against
the DLMS specification and optionally against entries in a Rule file.
If validation fails, the following messages may be displayed:

'field-name' does not obey DLMS specification. Please check.

**'field-name' may not obey validation table general rules. Please
check.**

**'field-name' may not obey validation table specific rules.
Please check.**

Where 'field-name' indicates a field on the FADT form.

When validating with a Rule file, general rules are applied to all
FADT records regardless of Feature Identifier (FID), whereas the
specific rules are only applied to records with a particular FID.

It is not possible to say whether a particular field taken in
isolation is definitely valid or invalid, because the validation rules
are designed to be applied to complete records and take into account
valid and invalid combinations of values of fields, as well as
individual permissible values. The rules provide only a guide to
normal, expected values, and some exceptional real features may lie
outside them.

In the case of the FAC, type and FID fields, invalid entries will not
be accepted, and the user will not be allowed to move to another field
until a valid value is supplied. In the case of other fields (e.g.
height) found to be possibly invalid an advisory message is given, and
the cursor remains on the field until a key to move on to another
field is pressed. This allows the user to alter the field contents if
they were genuinely erroneous or to force acceptance of the entered
value.

When the user has completed the entry for an entire record, (ie. all
fields have been given a value), and exits from the form using RETURN,
the complete record is validated. If it, as a whole, fails, the user
is told about each field which may have caused this failure, working
from the top of the form to the bottom. For each such field, the
cursor is positioned on it, and the user may accept it by pressing
RETURN, edit it and accept the change by pressing RETURN, or move to
other fields using the normal keys for this purpose. In the final
case, a subsequent RETURN to exit from the form will restart the
validation of the entire record.

Once a record has been accepted, a new empty FADT record entry form
will be displayed, and the user may enter another FAC, or press RETURN
to go back to the record type option form.

Once a single record has been accepted and entered into the FADT file,
following validation, it can be deleted by entering its FAC into the
'From:' field of a new, blank FADT screen form and tabbing past the
'To:' field, then typing 'GOLD D' ('PF1' followed by 'D' or 'd'). A
multiple record can be deleted by entering the start of the FAC range
in the 'From:' field and the end of the FAC range in the 'To:' field,

then without tabbing any further type 'GOLD D' as for a single FAC.

MESSAGES:

The following messages are associated with this form:

The FADT record for FAC 'number' already exists.
User Action: The user should start editing the record as
required.

Not recognisable as a number, please check it.
User Action: The user should check and re-enter the field value.

'field-name' does not obey DLMS specification. Please check.
**'field-name' may not obey validation table general rules. Please
check.**
'field-name' may not obey validation table specific rules.
Please check.
User Action: The user should consider whether the field is
valid, and re-enter it if it is not.

Validating entire record, please wait
User Action: The user should wait.

'field-name' may be invalid. Press RETURN to accept   it.
Otherwise alter it.
User Action: The user should check the field value, and alter it
if it is wrong. Otherwise, RETURN should be pressed to force its
acceptance by the program.

FADT record with FAC 'number' deleted ,I0;**User Action:** The FADT
record with the specified FAC has been deleted, so the user
should continue with the entry of the next record as required.

Unable to delete FADT record with specified FAC
User Action: The attempt to delete the FADT record with the
specified FAC has failed, probably because no record with that
FAC existed in the FADT file. The user should check that the FAC
was correctly specified before again attempting to delete the
record.

EXAMPLES

    1. DLMS FADT Header Page for File LSL$FADT:DAVECTEST.FADT;0

Square identifier 00000001

Analysis Date   27-JAN-88

                   Latitude Longitude
                      H   H
Manuscript Origin 123456.7S 1234559.8W
SW corner   333333.3S 0444444.4W
NE corner   900000.0N 1800000.0E

Digitising Scale 250000

WAC Number   1
WAC cell   18
WAG cell   16

Security   00
Security Desc   U
Releasability   00

Validation Rules 77-11

Data Set Identification Record.

Security Handling Description   NONE

Product Level   DFAD 1

Product manuscript reference number 1

Data Edition Number   11

Match/Merge Version   A

Maintenance date of current edition 0000

Match/Merge date   0000

Maintenance description code   0000

Country producer code   UKMODMCE

Product identification   SPECXDLMS

Product Edition   01

Product Date   7707

Horizontal datum   WGS84

Digitising collection system   NONE

Date of original compilation   8801

Accuracy Description Record.

Absolute horizontal accuracy of product   NA

Relative horizontal accuracy of product   NA

Vertical measuring accuracy of predominant   NA

Multiple accuracy outline flag   02

Accuracy Region 1 Description Record.

Absolute horizontal accuracy NA

Relative horizontal accuracy 123

Number of points in outline   3

          Points in region outline
            Latitude Longitude
                  H   H
          000000.0S 0000002.0E
          000000.0N 0000020.0W
          000000.0S 1432916.0W

Accuracy Region 2 Description Record.

Absolute horizontal accuracy NA

Relative horizontal accuracy NA

Number of points in outline   3

        Points in region outline
          Latitude Longitude
                 H   H
          123456.3S 0000002.1W
          000004.0S 0000005.0W
          000009.0N 0000009.0E

FADT record contents

FAC	Type	FID	Height	Sec	Rel	SMC	OrDiDe	WidRof	LenTre
	0						Ori	Width	Length
	1						Dir	Width	–
	2						Den	%-roof	%-tree
1	1	1	1	1	1	1	1	1	1
2	0	123	10	0	0	31	0	0	0
3	0	68	6	0	0	2	0	0	0
30	2	102	511	1	22	11	0	0	0
43	1	1	1	1	1	1	1	1	1
45	0	123	10	0	0	31	0	0	0
99	2	1	0	10	10	9	10	9	1
100	1	0	0	0	0	0	0	0	0
200	1	1	1	1	1	1	1	1	1
201	0	123	10	0	0	31	0	0	0

        The above is an example of the output produced by the option to list
        an existing FADT file. This is obtained by entering '3' followed by
        RETURN on the 'Command Options' form.   The 'Output List File
        Specification' form is then displayed, with default   file
        specifications, which the user should alter as required to specify the
        input FADT file and output list file wanted. Pressing RETURN causes
        exit from this form, and the output list is prepared.

      2. FADT default values lookup file LSL$LOOKUP:FADT_DEFAULTS.DAT

```
! Defaults file for FADTINPUT                          JMC     17-JUN-1992
!
! This file is distributed as an example of the lookup file
! needed to specify the default values displayed on the ACC,
! DSI, FADT, AND Header forms.
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
! ACC defaults.
!
ACC       ABSOLUTE        "130"           ! Absolute (0-9999)
ACC       RELATIVE        "25"            ! Relative (0-9999)
ACC       VERTICAL        "10"            ! Vertical (0-9999)
ACC       MULT_ACC        "0"             ! Number (0-9)
!
! DSI defaults
!
DSI       SEC_HAND_DESC   "NONE"          ! Security handling description
DSI       PRODUCT_LEVEL   "1"             ! Product level (1 or 2)
DSI       MANU_REF_NUM                    ! Manuscript reference number
DSI       DATA_ED_NUM     "01"            ! Data edition number (01-99)
DSI       MAT_MER_VERS    "A"             | Match merge version (A-Z)
DSI       MAINT_DATE      "0000"          ! Maintenance date (YYMM)
DSI       MAT_MER_DATE    "0000"          ! Match merge date (YYMM)
DSI       MAINT_DESC      "0000"          ! Maintenance description code
                                          ! (0000 - 9999)
DSI       PRODUCER_CODE   "KSA"           ! Country producer code
DSI       PROD_SPEC_ID    "SPECXDLMS"     ! Product spec. identification
DSI       PROD_SPEC_ED    "06"            ! Product spec. edition (01-99)
DSI       PROD_SPEC_DATE  "7707"          ! Product spec. date (YYMM)
DSI       HORIZ_DATUM     "WGS84"         ! Horizontal datum
DSI       DIG_COLL_SYS    "LAMPS"         ! Digitising collection system
DSI       ORIG_COMP_DATE                  ! Original comp date (YYMM)
!
! Header defaults.
!
DLMS      SQUARE_ID       "       1"      ! Square identifier (8th character
                                          ! denotes level 1 or 2)
DLMS      ANALYSIS_DATE                   ! Analysis date (DDMMMYY or TODAY)
DLMS      MANU_ORIG_LAT   "       N"      ! Manuscript origin latitude
                                          ! (DDMMSS,SH H=N,S,E,W)
DLMS      MANU_ORIG_LON   "        E"     ! Manuscript origin longitude
                                          ! (DDDMMSS,SH H=N,S,E,W)
DLMS      SW_CORNER_LAT   "       N"      ! Southwest corner latitude
                                          ! (DDMMSS,SH H=N,S,E,W)
DLMS      SW_CORNER_LON   "        E"     ! Southwest corner longitude
                                          ! (DDDMMSS,SH H=N,S,E,W)
DLMS      NE_CORNER_LAT   "       N"      ! Northeast corner latitude
                                          ! (DDMMSS,SH H=N,S,E,W)
DLMS      NE_CORNER_LON   "        E"     ! Northeast corner longitude
                                          ! (DDDMMSS,SH H=N,S,E,W)
DLMS      DIG_SCALE                       ! Digitising scale (0-999999)
DLMS      WAC_NUM         "1"             ! WAC number (1-9999)
DLMS      WAC_CELL        "1"             ! WAC cell (1-25)
```

```
DLMS    WAG_CELL          "1"              ! WAG cell (1-16)
DLMS    SECURITY          "0"              ! Security (0-99)
DLMS    SECURITY_DESC     "U"              ! Security descriptor (T,S,C,R or U)
DLMS    RELEASABILITY     "0"              ! Releasability (0-99)
DLMS    VAL_RULES         "7760"           ! Validation rules
!
! FADT defaults
!
!        Type    FID  Height    Sec    Rel    SMC   OrDiDe  WidRof  LenTre
!                                                   Ori     Width   Length
!                                                   Dir     Width      -
!                                                   Den     %-roof  %-tree
FADT    NULL    102  NULL      NULL   NULL   3     NULL    NULL    NULL
FADT    2       103  NULL      NULL   NULL   NULL  NULL    NULL    NULL
FADT    2       114  NULL      NULL   NULL   6     NULL    NULL    NULL
FADT    0       122  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    NULL    137  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    NULL    135  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    2       171  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    2       172  NULL      NULL   NULL   2     NULL    NULL    NULL
FADT    2       173  NULL      NULL   NULL   5     NULL    NULL    NULL
FADT    2       174  NULL      NULL   NULL   5     NULL    NULL    NULL
FADT    0       182  NULL      NULL   NULL   NULL  NULL    NULL    NULL
FADT    0       186  NULL      NULL   NULL   NULL  NULL    NULL    NULL
FADT    0       187  NULL      NULL   NULL   NULL  NULL    NULL    NULL
FADT    1       203  NULL      NULL   NULL   2     2       NULL    0
FADT    1       204  NULL      NULL   NULL   2     2       NULL    0
FADT    1       205  NULL      NULL   NULL   2     2       NULL    0
FADT    1       245  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       260  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       261  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       262  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       263  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       264  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       265  NULL      NULL   NULL   NULL  2       NULL    0
FADT    0       266  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       267  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       280  NULL      NULL   NULL   NULL  2       NULL    0
FADT    1       281  2         NULL   NULL   2     2       1       0
FADT    1       283  NULL      NULL   NULL   NULL  2       NULL    0
FADT    2       325  0         NULL   NULL   10    NULL    NULL    NULL
FADT    NULL    421  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    2       433  NULL      NULL   NULL   NULL  NULL    NULL    NULL
FADT    0       501  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       511  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       512  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       520  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       521  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       530  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       531  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       532  NULL      NULL   NULL   1     63      NULL    NULL
FADT    0       535  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    0       536  NULL      NULL   NULL   1     NULL    NULL    NULL
FADT    0       540  NULL      NULL   NULL   1     63      3       3
FADT    0       541  NULL      NULL   NULL   1     63      3       3
FADT    0       542  NULL      NULL   NULL   1     63      3       3
```

FADT	0	543	NULL	NULL	NULL	1	63	3	3
FADT	0	544	NULL	NULL	NULL	1	63	3	3
FADT	1	706	0	NULL	NULL	9	3	NULL	0
FADT	2	707	0	NULL	NULL	9	NULL	NULL	NULL
FADT	0	710	NULL	NULL	NULL	NULL	NULL	NULL	NULL
FADT	0	711	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	0	712	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	0	713	NULL	NULL	NULL	1	63	NULL	NULL
FADT	0	714	NULL	NULL	NULL	NULL	NULL	NULL	NULL
FADT	0	715	NULL	NULL	NULL	NULL	63	NULL	NULL
FADT	0	716	NULL	NULL	NULL	NULL	63	NULL	NULL
FADT	0	717	NULL	NULL	NULL	NULL	63	NULL	NULL
FADT	0	718	NULL	NULL	NULL	NULL	63	NULL	NULL
FADT	0	719	NULL	NULL	NULL	NULL	63	NULL	NULL
FADT	0	720	NULL	NULL	NULL	NULL	NULL	NULL	NULL
FADT	0	721	NULL	NULL	NULL	NULL	NULL	NULL	NULL
FADT	0	725	NULL	NULL	NULL	NULL	NULL	NULL	NULL
FADT	1	751	NULL	NULL	NULL	3	2	NULL	0
FADT	1	752	NULL	NULL	NULL	NULL	2	NULL	0
FADT	0	761	NULL	NULL	NULL	1	63	NULL	NULL
FADT	NULL	806	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	NULL	807	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	NULL	810	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	NULL	811	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	NULL	812	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	2	825	NULL	NULL	NULL	5	NULL	NULL	NULL
FADT	2	862	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	2	864	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	2	865	NULL	NULL	NULL	1	NULL	NULL	NULL
FADT	2	902	0	NULL	NULL	10	0	0	0
FADT	2	906	0	NULL	NULL	7	0	0	0
FADT	2	907	0	NULL	NULL	7	0	0	0
FADT	2	908	0	NULL	NULL	11	0	0	0
FADT	2	909	0	NULL	NULL	11	0	0	0
FADT	2	910	0	NULL	NULL	8	0	0	0
FADT	2	911	0	NULL	NULL	8	0	0	0
FADT	2	912	0	NULL	NULL	8	0	0	0
FADT	2	913	0	NULL	NULL	6	0	0	0
FADT	2	914	0	NULL	NULL	7	0	0	0
FADT	1	915	NULL	NULL	NULL	3	NULL	NULL	NULL
FADT	1	921	NULL	NULL	NULL	5	2	NULL	0
FADT	1	922	NULL	NULL	NULL	NULL	2	NULL	0
FADT	1	923	NULL	NULL	NULL	5	2	NULL	0
FADT	1	924	0	NULL	NULL	NULL	1	NULL	0
FADT	1	925	NULL	NULL	NULL	NULL	1	NULL	0
FADT	1	927	NULL	NULL	NULL	1	2	NULL	0
FADT	2	930	0	NULL	NULL	6	0	0	0
FADT	2	931	0	NULL	NULL	6	0	0	0
FADT	2	934	0	NULL	NULL	6	0	0	0
FADT	2	940	0	NULL	NULL	6	0	0	0
FADT	2	941	0	NULL	NULL	6	0	0	0

The above is the FADT default values lookup file supplied by
Laser-Scan. This file can copied and edited to produce alternative
default values. The pathname of the new file should be assigned to
the logical name LSL$FADTINPUT_DEFAULTS.

MESSAGES (ON FORMS)

These messages appear on the last line of the terminal screen when a form is
currently displayed. They are all accompanied by an audible warning. They are
designed to:

  - Tell the user what to do next.

  - Inform the user of any invalid or potentially invalid field entries.

  - Inform the user of what the FADTINPUT utility is doing.

  - Describe any errors which the FADTINPUT utility has encountered.

The messages associated with each form have been described earlier.

Other messages are generated by FMS, the most significant being :

   Numeric required
   Alphabetic required
   In most of the forms, there are fields, or sub-fields, which can only
   contain numeric characters or can only contain alphabetic characters. In
   such cases, an attempt to enter a character of the wrong type will result
   in an error message being displayed.

   Field full
   An attempt was made to enter more than the allowed number of characters in
   the current field.

   Input required
   An attempt was made to exit from a form using RETURN before data for a
   mandatory field was entered.

   Full field required
   An attempt was made to move onto another field before the required number
   of characters had been entered in the current field.

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.

LISTOUT, List output is being directed to 'file-spec'

> **Explanation:** A listing of the specified FADT file is being directed to the
> specified file or device.

> **User action:** None.

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.

ILLEGLNM, Logical name 'name' has an illegal value or no translation

   Explanation: The specified logical name, which is one of those used to
   control FADTINPUT, has an illegal translation. If the logical name is used
   to specify a file, the specification is probably invalid.   If the logical
   name is used to specify a command, the command is probably not recognised.
   Other error messages indicating the specific nature of the problem may be
   displayed following this message.

   User action: The user should check the translation of the logical name, and
   ensure that it is valid.

UNOPNFADT, Unable to open FADT file

   Explanation: It has not been possible to open the specified FADT file for
   input or output.

   User action: The user should check the input FADT file specification to
   ensure that it is a legal and accurate specification. Also, the user should
   examine any other messages generated to determine the reason for the
   failure.

UNOPNLIST, Unable to open list file

   Explanation: It has not been possible to open the specified list file for
   output.

   User action: The user should check the input LIST file specification to
   ensure that it is a legal and accurate specification. Also, the user should
   examine any other messages generated to determine the reason for the
   failure.

UNOPNRULE, Unable to open rule file

   Explanation: It has not been possible to open the specified rule file for
   reading.

   User action: The user should check the input rule file specification to
   ensure that it is a legal and accurate specification for a file which
   exists. Also, the user should examine any other messages generated to
   determine the reason for the failure.

MESSAGES (OTHER)

In addition to the above messages which are generated by FMS and FADTINPUT itself, other messages may be produced by Laser-Scan libraries. If the cause of such errors cannot be traced by the user and Laser-Scan are consulted, then the input files should be preserved to facilitate diagnosis.

CHAPTER 5

MODULE FADTMERGE

MODULE   FADTMERGE

REPLACES FADTMERGE is a new utility

FUNCTION

        FADTMERGE merges a FADT file created by the utility FADTINPUT with
        coordinate data contained in an IFF file. Merging is performed on the
        basis of feature analysis code (FAC) for the FADT file and feature
        serial number (FSN) for the IFF file. Header data contained in the
        FADT file may in addition be transferred to the map header of the
        output file.

FORMAT

        $ FADTMERGE file-spec file-spec

        Command qualifiers   **Defaults**

        /[NO]ACCURACY   /NOACCURACY
        /FADT=file-spec   /FADT=LSL$FADT:FADT.FADT
        /[NO]FC   /FC
        /[NO]HEADER   /HEADER
        /[NO]LIST=file-spec   /NOLIST
        /[NO]MERGE   /MERGE

PROMPTS

        Input IFF-file: unmerged-file-spec
        Output IFF-file: merged-file-spec

PARAMETERS

Input IFF-file

        - specifies the IFF file to be merged with the FADT file. Any part of
          the file specification which is not supplied will be taken from the
          default specification 'LSL$IF:IFF.IFF;0'.

Output IFF-file

        - specifies the IFF file which is to be created. Any part of the file
          name   which   is   not   explicitly   given   will   be   taken from
          'LSL$IF:IFF.IFF'. Note that a version number must **not** be specified
          for the output file. If a file with the specified name already exists
          a new file will be created with the version number incremented by one.

COMMAND QUALIFIERS

/ACCURACY
/NOACCURACY (default)

> - If present, specifies that accuracy regions should be created in layer
>   0 of the output IFF file, from the accuracy region records held in the
>   input FADT file. Any accuracy features already present in layer 0 of
>   the input file will be discarded. If no accuracy region records are
>   found in the FADT file, no accuracy regions will be constructed in the
>   output file.
>   If the /NOACCURACY qualifier is specified, then the whole of layer 0
>   in the input file, will be copied unchanged to the output file. If no
>   layer 0 is present in the input IFF file, none will be constructed in
>   the output file.

/FADT=file-spec

> - specifies the name of the input FADT file.   Any part of the file
>   specification which is not present will be taken from the file
>   specification 'LSL$FADT:FADT.FADT'. **This qualifier must be supplied.**

/FC (default)
/NOFC

> - If this qualifier is present, then FADTMERGE will set up the Feature
>   Code (FC) word of the Feature Status (FS) entry of all IFF features
>   written to the output file. The FC is calculated from the Feature
>   Identifier (FID) and feature type recorded in the FADT record. The
>   formula used to generate the output FC is:
>
>   FC = FID + ((type + 1) * 1000)
>
>   If /NOFC is specified, then the existing FS entry in the input IFF
>   file is copied to the output file without change.
>
>   The feature code of features in layer 0 is transferred unchanged.

/HEADER (default)
/NOHEADER

> - specifies that FADTMERGE should update the MCE map header of the input
>   IFF file with the contents of the DLMS header, Accuracy and DSI
>   records in the FADT file. If any of these records are missing from
>   the FADT file, this fact will be reported in the diagnostic printout.
>   If /NOHEADER is specified, the map header in the input IFF file will
>   be copied directly to the output file without change.

/NOLIST (default)
/LIST=file-spec

> - If /LIST=file-spec is present, it specifies a file to which diagnostic
>   messages describing the progress of the merge are directed. Any parts
>   of the file specification which are missing will be taken from the
>   specification 'FADTMERGE.LIS'.   If no /LIST is specified, or /NOLIST
>   is present, then all diagnostics messages are directed to SYS$OUTPUT.

/MERGE (default)
/NOMERGE

> - If /MERGE is specified, the FADT feature records in the FADT file are
>   merged with features in the input IFF file. Merging is performed on
>   the basis of feature analysis code (FAC) and feature serial number
>   (FSN).   If /NOMERGE is specified, then the FADT feature records will
>   not be merged with the IFF features, and any input IFF features will
>   be written unaltered to the output file.

DESCRIPTION

> FADTMERGE is a utility to combine feature records in a FADT file, with
> geometry data in an IFF file. Features are merged on the basis of
> feature attribute code (FAC) and feature serial number (FSN).   The
> utility will also construct the map header and accuracy region
> descriptions (layer zero features) in the output file by combining and
> copying from the FADT and IFF input files if the /HEADER and /ACCURACY
> qualifiers are supplied on the command line.

> FADTMERGE checks and reports on any feature records in either input
> file which cannot be merged because there is no matching feature in
> the other.

> FADTMERGE also checks that the feature code (FC) in an IFF feature is
> compatible with the feature attribute type (FAT) of the FADT feature
> with which it is to be merged. That is, they must obey the formula :

> FC = 100 + FAT

> Any features found which do not follow this rule are reported to the
> user with a suitable message. The features will still be merged, and,
> if it was specified, the action of the /FC qualifier will be
> performed.

> FADTMERGE does not perform any other validation on the FADT or IFF
> data.   For example, it does not check that the map header is of MCE
> type, it will not check that features of the same type are in the same
> IFF file layer, and it will not check that the IFF feature already
> contains an AC7 entry.

> The diagnostic output is by default directed to SYS$OUTPUT, but may be
> sent to a specified file by use of the /LIST qualifier.

With the default command line qualifiers in operation, FADTMERGE will
combine the input FADT and IFF files to produce the output IFF file as
follows:

- The MCE map header will be read from the input IFF file and
  updated with appropriate fields from the DLMS header, accuracy
  and data set identification records, if these are present, in the
  FADT file.   If any or all of these records are absent, this is
  reported in the diagnostic printout, and the corresponding fields
  in the map header are copied unchanged from the input IFF file.

- Layer zero in the input file will be copied without change to the
  output file.

- The feature records in the FADT file are merged with features in
  the input IFF file, on the basis of FAC and FSN, and are then
  written to the output file. The FADT feature record information
  is held in the IFF file in the text field on a AC7 entry.

  The feature codes in the output features are derived from the
  input FID and type values as described above.

  Any features in the input IFF file which do not have a matching
  record in the FADT file, and vice versa, are reported in the
  diagnostic printout and discarded.

- All other entries are copied directly from the input IFF file to
  the output file.

EXAMPLES

$ **FADTMERGE DFAD DFAD1/FADT=FADT<CR>**
Updating IFF map header from FADT file records.

 ELAPSED: 00:02:03.15 CPU: 0:00:56.12 BUFIO: 8362 DIRIO: 3230 FAULTS: 1379
$

This is a typical run of FADTMERGE using the default qualifiers.
Input IFF file 'DFAD' and FADT file 'FADT' have been successfully
merged to produce output IFF file DFAD1.   No qualifiers other than
/FADT have been specified.   Only minimal diagnostic messages are
produced, since no merge mismatches are encountered. The diagnostics
message reports that the IFF map header has been updated.

$ **FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/ACCURACY<CR>**
Updating IFF map header from FADT file records.

Constructing layer zero accuracy region features from FADT file.

Unmatched feature with FSN (FAC)   1
Unmatched feature with FSN (FAC)   2

Unmatched FADT record with FAC (FSN)   3
Unmatched FADT record with FAC (FSN)   5
Unmatched FADT record with FAC (FSN)   6
 ELAPSED: 0 00:00:07.38 CPU: 0:00:02.94 BUFIO: 81 DIRIO: 45 FAULTS: 227
$

        In this case, the map header has been dealt with successfully.   The
        /ACCURACY qualifier causes the construction of the output IFF file's
        layer zero features from the accuracy region records in the FADT file.
        FADTMERGE has encountered two features in the input IFF file with no
        matching records in the FADT file, as well as three records in the
        input FADT file with no matching features in the input IFF file.

$ **FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/LIST=DFMERGE<CR>**
%FADTMERGE-I-LISTOUT, Log output is being directed to list file DFMERGE.LIS
 ELAPSED: 0 00:00:09.10 CPU: 0:00:02.51 BUFIO: 11 DIRIO: 44 FAULTS: 272
$

        A list output file has been specified in the above command line.   All
        merge diagnostic messages are directed to file 'DFMERGE.LIS'. An
        informational message is output informing the user that this file is
        being used.

$ **FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/LIST=TT:<CR>**
%FADTMERGE-I-LISTOUT, Log output is being directed to list file TT:
Command Line : FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/LIST=TT:

Input IFF-file : LSL$IF:AREA12.IFF;0

Output IFF-file : LSL$IF:MERGEAREA12.IFF

Input FADT-file : LSL$FADT:AREA12.FADT

Updating IFF map header from FADT file records.

Unmatched feature with FSN (FAC)   1
Unmatched feature with FSN (FAC)   2

Unmatched FADT record with FAC (FSN)   3
Unmatched FADT record with FAC (FSN)   5
Unmatched FADT record with FAC (FSN)   6
 ELAPSED: 0 00:00:09.81 CPU: 0:00:02.75 BUFIO: 87 DIRIO: 34 FAULTS: 314
$

        This command is similar to the previous example, except that the
        output list file specified is TT:, which signifies that the output be

directed to the terminal. Hence the user sees first the informational
message stating that a list file TT: is being used, and then the
diagnostic output directed to TT:, the terminal.

$ **FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/NOHEADER<CR>**
Unmatched feature with FSN (FAC)   1
Unmatched feature with FSN (FAC)   2

Unmatched FADT record with FAC (FSN)   3
Unmatched FADT record with FAC (FSN)   5
Unmatched FADT record with FAC (FSN)   6
 ELAPSED: 0 00:00:11.77 CPU: 0:00:02.59 BUFIO: 75 DIRIO: 30 FAULTS: 208
$

$ **FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/NOHEADER/NOMERGE<CR>**
 ELAPSED: 0 00:00:05.93 CPU: 0:00:01.25 BUFIO: 6 DIRIO: 15 FAULTS: 156
$

$ **FADTMERGE AREA12 MERGEAREA12/FADT=AREA12.FADT/NOMERGE<CR>**
Updating IFF map header from FADT file records.

 ELAPSED: 0 00:00:04.30 CPU: 0:00:01.56 BUFIO: 10 DIRIO: 28 FAULTS: 214
$

The above examples illustrate the use of the /NOHEADER, /NOACCURACY,
and /NOMERGE qualifiers to suppress the action of the header, accuracy
region and feature stages of the merge. If one of the merge stages is
suppressed, then the relevant section of the input IFF file is copied
directly to the output file without being modified with data from the
FADT file.

$ **FADTMERGE AREA12 MERGEAREA12/FADT=DFG<CR>**
Updating IFF map header from FADT file records.
   No DLMS FADT header record found.
   No FADT accuracy record found.
   No FADT DSI record found.

Unmatched feature with FSN (FAC)   1
Unmatched feature with FSN (FAC)   2
Unmatched feature with FSN (FAC)   4
Incompatible FC (1) and FAT (100) in feature with FSN (FAC) 8
Unmatched feature with FSN (FAC)   10
Unmatched feature with FSN (FAC)   11
Unmatched feature with FSN (FAC)   12
Unmatched feature with FSN (FAC)   20
 ELAPSED: 0 00:00:06.55 CPU: 0:00:02.60 BUFIO: 11 DIRIO: 23 FAULTS: 217

The above example shows the diagnostics produced when an attempt is
made to incorporate the map header data from the FADT file in the
output file when the relevant records are not present in the input
FADT file.

The input files also contain a feature pairing (FSN or FAC 8) with
incompatible feature code (FC) in the IFF file and feature attribute
code (FAT) in the FADT file. A diagnostic message is produced to
indicate this.

MESSAGES (INFORMATIONAL)

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

LISTOUT Log output is being directed to list file **file-spec**

    Explanation: Log output is being directed to the file specified with the
                /LIST qualifier.

    User action: None.

MESSAGES (ERROR)

These messages indicate an error in processing which has caused the program to
terminate.   The most likely causes are a corrupt or otherwise invalid input IFF
file, or an error related to command line processing and file manipulation.   It
is most unlikely that any output file produced will be correctly processed.

NOFADT, No FADT file was specified in the command line

   Explanation: An FADT file must be specified.

   User action: Respecify the command line, this time including a /FADT
               qualifier and associated file specification.

UNOPNFADT, Unable to open FADT file for input

   Explanation: FADTMERGE failed to open the input FADT file, possibly because
               it was corrupted or because the specified file did not exist.

   User action: The user should check that the file specification is correct
               and that it refers to a file which exists and is uncorrupted.

UNRECFAT, Unknown feature attribute type

   Explanation: The FAT found in the input FADT record is not known.

   User action: Check the input FADT file to ensure that all records contain
               FATs of a permitted value (0,1 or 2).

MESSAGES (OTHER)

In addition to the above messages which are generated by FADTMERGE 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. These
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, or a problem with the
output 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
input and output files should be preserved to facilitate diagnosis.

CHAPTER 6

MODULE I2DFAD

MODULE   I2DFAD

REPLACES existing I2DFAD utility.

FUNCTION

        I2DFAD transfers data held in an IFF file to magnetic tape in Digital
        LandMass System (DLMS) Digital Feature Analysis Data (DFAD) format.

FORMAT

        $ I2DFAD file-spec

        Command qualifiers   **Defaults**

        /[NO]APPEND   /NOAPPEND
        /[NO]CHANGE2   /NOCHANGE2
        /DEVICE=device-name   /DEVICE=MTA0:
        /[NO]DIAGNOSTICS   /NODIAGNOSTICS
        /[NO]RELEASABILITY=integer   /NORELEASABILITY
        /[NO]REWIND   /NOREWIND
        /[NO]SECURITY=integer   /NOSECURITY

PROMPTS

        Input IFF-file: IFF-file-spec

PARAMETERS

Input IFF-file

        - specifies the IFF file to be converted to a DFAD format tape. Any
          part of the file specification which is not supplied will be taken
          from the default specification 'LSL$IF:DFAD.IFF;0'

COMMAND QUALIFIERS

/APPEND
/NOAPPEND (default)

        - /APPEND specifies that the output data be appended to any DFAD
          manuscripts already on the magnetic tape. This qualifier cannot be
          present on the same command line as /REWIND (q.v.).
          If /NOAPPEND is used, then the data are written to the tape, either
          starting at the current tape position (if /NOREWIND is specified), or
          at the start of the tape (if /REWIND is specified).

/CHANGE2
/NOCHANGE2 (default)

        - /CHANGE2 specifies that the data being translated is 'CHANGE2' so
          headers will be ommited from the output.

/DEVICE=device-name (default MTA0:)

        - Specifies the tape device on which the DFAD tape is loaded.

/DIAGNOSTICS
/NODIAGNOSTICS (default)

        - if specified, this causes diagnostic messages to be   produced,
          describing the progress of the IFF to DFAD conversion.

/RELEASABILITY=integer (0-99)
/NORELEASABILITY (default)

        - if this qualifier is used, then the releasibility value of a DFAD
          feature (held in an AC 7 entry) will be compared with the integer
          specified. Any differences found will result in the production of a
          suitable message.   If this qualifier is not present, then no checks
          will be carried out on the releasability.

/REWIND
/NOREWIND (default)

        - if /REWIND is specified, the IFF file will be written as the first
          manuscript on the tape.   Any existing data on the tape will be
          overwritten.
          If /NOREWIND is used, then data are appended to any existing
          manuscripts on the tape, either starting at the current tape position
          (if /NOAPPEND is specified) or after the last manuscript (if /APPEND
          is specified).

/SECURITY=integer (0-99)
/NOSECURITY (default)

        - if this qualifier is used, then the security value of a DFAD feature
          (held in an AC 7 entry) will will be compared with the integer
          specified. Any differences found will result in the production of a
          suitable message.   If this qualifier is not present, then no checks
          will be carried out on the security.

RESTRICTIONS

      o /APPEND and /REWIND is not allowed

DESCRIPTION

I2DFAD is a utility for transferring data from an IFF file to a
Digital LandMass System (DLMS) Digital Feature Analysis Data (DFAD)
magnetic tape.

The user may select whether to append a manuscript to any existing
manuscripts on the tape, or to write the data as the first manuscript
on the tape, using the /APPEND and /REWIND qualifiers. If the option
to append a manuscript to a tape is selected, the program checks that
the origin of the new manuscript is valid relative to previous
manuscripts. The DLMS specification requires manuscripts to be in
ascending order of latitude and longitude (more southerly and westerly
first), and in ascending order of data analysis level. Any problems
will be reported to the user, and file transfer will be abandoned.

The program produces messages giving information about the manuscript,
and on errors encountered during data transfer. If the /DIAGNOSTICS
qualifier is supplied, more detailed information is produced.

I2DFAD takes coordinate values relative to the origin from the IFF
file and outputs them as absolute coordinates.

The extent of the map is output in the 4th 36-bit Univac word of the
manuscript header. This extent is usually present in the map header
of the IFF file, but if these entries are empty then the extent will
be calculated from the Range entry.

The first feature of the manuscript is expected to be FAC (FSN) 1 in
layer 1, and it is expected to circumscribe the manuscript area. If
this is not the case then the program will inform the user and
continue.

Any accuracy region data in layer 0 of the IFF file will be
transferred to an ACC record on the DFAD tape.

The position on the magnetic tape at which I2DFAD writes the DFAD
manuscript is dependent on the combination of /[NO]APPEND and
/[NO]REWIND qualifiers used:

/NOAPPEND and /NOREWIND - The manuscript is written starting at the
current tape position. This method should
only be used if an IFF file has just been
output to magnetic tape using I2DFAD and no
other operation involving the tape has been
carried out.

/APPEND and /NOREWIND   - The manuscript is appended to the tape after
the last existing manuscript. The tape is
rewound, and the program searches for a
trailer block and two tapemarks. It then
appends by overwriting these three blocks.
If there are no manuscripts on the tape, a
message will be generated indicating that
the tape is not in DFAD format and file
transfer will be abandoned.
During the search for the last manuscript,
the program will check that the origins and
corners of successive manuscripts lie in the
correct relative positions as described in
the DLMS specification. Messages are
produced describing any errors encountered.

/NOAPPEND and /REWIND   - The data are written as the first manuscript
on the tape. That is, the tape is rewound,
and writing starts immediately following
BOT. This method is normally used when
starting a new tape.

/APPEND and /REWIND   - This combination is **NOT ALLOWED**.

It is essential that the tape is mounted as a foreign volume prior to running
I2DFAD. This is achieved using the DCL command MOUNT with the /FOREIGN
qualifier eg. MOUNT MT0:/FOREIGN

EXAMPLES

$**I2DFAD/REWIND/DIAGNOSTICS/DEVICE=MS: DFAD <CR>**

%I2D-I-WRTDEV, Writing to magnetic tape device MS:

%LSLLIB-I-IFFOPENED, DUA0:[MCE.IFF]DFAD.IFF;5 opened for read

File statistics are as follows:
origin at lat   51 59 0.0 (01871400N), long   -0 1 0.0 (00000600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Level Type = 1

Outputting manuscript header
Outputting DSI block
Outputting ACC block
Outputting feature block 1
Outputting feature block 2
Outputting feature block 3
Outputting feature block 4
Outputting feature block 5
Outputting feature block 6
Outputting feature block 7
Outputting feature block 8
Outputting feature block 9
Outputting feature block 10
Outputting feature block 11
Outputting feature block 12
Outputting feature block 13
Outputting feature block 14
Outputting feature block 15
Outputting feature block 16
Outputting feature block 17
Outputting feature block 18
Outputting feature block 19
Outputting feature block 20
Outputting feature block 21
Outputting feature block 22
Outputting feature block 23
Outputting feature block 24
Outputting feature block 25
Outputting feature block 26
Outputting feature block 27
Outputting feature block 28
Outputting feature block 29
Outputting feature block 30
Outputting trailer block
 ELAPSED: 0 00:04:36.37 CPU: 0:03:15.00 BUFIO: 120 DIRIO: 1572 FAULTS:
233
$

This example illustrates the use of I2DFAD with the /REWIND qualifier.
The magnetic tape is rewound and the specified IFF file is written as
the first manuscript.

The /DIAGNOSTICS qualifier was also used, so the user is informed
whenever a block is written to tape.

The /DEVICE qualifier selects output to tape device 'MS:'.

$**I2DFAD/SECURITY=0/RELEASABILITY=0/DEVICE=MS: DFAD1 <CR>**

%I2D-I-WRTDEV, Writing to magnetic tape device MS:

%LSLLIB-I-IFFOPENED, DUA0:[MCE.IFF]DFAD1.IFF;1 opened for read

Checking for SECURITY 0
Checking for RELEASABILITY 0

File statistics are as follows:
origin at lat   57 59 0.0 (02087400N), long   -5 1 0.0 (00180600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Level Type = 1

Feature 1: Security code 1 does not match that specified
Feature 1: Releasability code 1 does not match that specified
Feature 10: Security code 4 does not match that specified
Feature 27: Releasability code 2 does not match that specified

 ELAPSED: 0 00:01:54.89 CPU: 0:00:56.48 BUFIO: 28 DIRIO: 656 FAULTS: 251
$

In the above example, the /SECURITY and /RELEASABILITY qualifiers were
used. The program will check that all features have a security and
releasability value of 0.   Three features having security   or
releasability values not matching those specified on the command line
were found and reported by the program.

Since no /DIAGNOSTICS qualifier is present on the command line, no
reporting of individual blocks written is carried out.

Neither /APPEND nor /REWIND was used, so the tape writing will
commence at the current tape position. This should generally only be
used following the writing of another manuscript to tape with I2DFAD,
when there have been no other intervening tape operations.

$**I2DFAD/APPEND/DIAGNOSTICS/DEVICE=MS: DFAD2 <CR>**

%I2D-I-WRTDEV, Writing to magnetic tape device MS:

.Block 1, 4 'words' of data
.First few words are:
 00000 / 2AF0E,   00007 / 08E28
 3FFFF / 3FDA7,   09150 / 09150
 00000 / 00000,   00000 / 00000

.Block 99, 4 'words' of data
.First few words are:
 00000 / 259A7,   00007 / 3D9E8
 3FFFF / 13E87,   09150 / 09150
 00000 / 00000,   00000 / 00000

%LSLLIB-I-IFFOPENED, DUA0:[MCE.IFF]DFAD2.IFF;1 opened for read

File statistics are as follows:
origin at lat   57 59 0.0 (02087400N), long   -4 1 0.0 (00144600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Level Type = 1

Outputting manuscript header
Outputting DSI block
Outputting ACC block
Outputting feature block 1
Outputting feature block 2
Outputting feature block 3
Outputting feature block 4
Outputting feature block 5
Outputting feature block 6
Outputting feature block 7
Outputting feature block 8
Outputting feature block 9
Outputting feature block 10
Outputting feature block 11
Outputting feature block 12
Outputting feature block 13
Outputting feature block 14
Outputting feature block 15
Outputting feature block 16
Outputting feature block 17
Outputting feature block 18
Outputting feature block 19
Outputting feature block 20
Outputting trailer block
 ELAPSED: 0 00:02:05.95 CPU: 0:00:44.02 BUFIO: 63 DIRIO: 490 FAULTS: 158
$

         In this example, the /APPEND qualifier is specified so that any data
         will be appended to any existing manuscripts on the tape. I2DFAD will
         rewind the magnetic tape, and read any existing manuscripts on the

tape until two tapemarks indicating the end of tape are found. Because the /DIAGNOSTICS qualifier was present on the command line, the first few words of the first block of each manuscript read are displayed. A message indicated the successful writing of each block in the manuscript is output by I2DFAD.

$**I2DFAD/APPEND/DIAGNOSTICS/DEVICE=MS: DFADSW <CR>**

%I2D-I-WRTDEV, Writing to magnetic tape device MS:

.Block 1, 4 'words' of data
.First few words are:
 00000 / 259C5,   00007 / 3D9E8
 3FFFF / 1CB27,   09150 / 09150
 00000 / 00000,   00000 / 00000

%LSLLIB-I-IFFOPENED, DUA0:[MCE.IFF]DFAD.IFF;5 opened for read

File statistics are as follows:
origin at lat   51 59 0.0 (01871400N), long   -0 1 0.0 (00000600W)
extent is lat   1 2 0.0 (00037200N), long   1 2 0.0 (00037200E)

Level Type = 1

Last manuscript on map more Northerly than current map
%I2D-E-INPOSMAN, The current and previous manuscripts are in incorrect relative
positions
 ELAPSED: 0 00:00:13.00 CPU: 0:00:00.85 BUFIO: 28 DIRIO: 34 FAULTS: 133
$

In this example, the attempt to append a manuscript to the end of a DFAD tape fails because the previous manuscript has a more Northerly origin than the current manuscript.

$**I2DFAD/REWIND/DIAGNOSTICS/DEVICE=MS: DFADEMPTYMH <CR>**

%I2D-I-WRTDEV, Writing to magnetic tape device MS:

%LSLLIB-I-IFFOPENED, LSL$DATAROOT:[LSL.IFF]DFAD.IFF;1 opened for read

File statistics are as follows:
origin at lat   0 0 0.0 (00000000N), long   0 0 0.0 (00000000E)
extent is lat   0 0 0.0 (00000000N), long   0 0 0.0 (00000000E)

Level Type = 0

Outputting manuscript header from IFF file LSL$DATAROOT:[LSL.IFF]DFAD.IFF;1
Unexpected level number 0
Error reading WAGNUM from MHWAC
%I2D-E-UNWRBLK, Unable to write header block
 ELAPSED: 0 00:00:07.21 CPU: 0:00:00.88 BUFIO: 20 DIRIO: 6 FAULTS: 203
$

          In this case, the attempt to append a new manuscript fails because the
          Map Header (MH) entry in the input IFF file has not been correctly
          set. The program is therefore unable to write the header block and
          abandons file transfer.

MESSAGES (INFORMATIONAL)

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

WRTDEV Writing to magnetic tape device **'tape-dev'**

    Explanation: The DFAD tape written will be on the specified device.

    User action: None.

MESSAGES (ERROR)

These messages indicate an error in processing which has caused the program to
terminate.   The most likely causes are a corrupt or otherwise invalid input IFF
file, an error related to command line processing and file manipulation, or a
problem relating to the output magnetic tape. Following such an error, it is
most unlikely that any output file produced will be correctly processed.

INVALSEC Security specified not between 0 and 99

   Explanation: A command line was specified with a /SECURITY qualifier
                    with a value not between 0 and 99.

   User action: Respecify the command line, ensuring that the security
                    value is valid.

INVALREL Releasability specified not between 0 and 99

   Explanation: A command line was specified with a /RELEASABILITY
                    qualifier with a value not between 0 and 99.

   User action: Respecify the command line, ensuring that the
                    releasability value is valid.

INPOSMAN The current and previous manuscripts are in incorrect
         relative positions.

   Explanation: The origin or corners of the current manuscript are not
                    in allowable positions given the positioning of the previous
                    manuscript.

   User action: Check the corner and origin latitude and longitude
                    values of the current and previous manuscripts.

NOTDFAD Tape is not DFAD format

    Explanation: An attempt has been made to write to a
                 magnetic tape which is not DFAD format.

    User action: Retry the command, ensuring that the tape used is in
                 the DFAD format.

UNRDBLK Unable to read **'block-type'** block

    Explanation: An error has occurred whilst reading the specified
                 block from tape.

    User action: Check the tape and device and then retry the command.

UNWRBLK Unable to write **'block-type'** block

    Explanation: An error has occurred whilst writing the specified
                 block to tape.

    User action: Check the tape and device and then retry the command.

UN2TAPEMK Unable to read second tapemark.

    Explanation: The second tapemark cannot be successfully found and
                 read.

    User action: Check the tape and device and then retry the command.

UNBCKSP Unable to space back three blocks

   Explanation: The attempt before appending to the tape, to space
                    back three blocks failed.

   User action: Check the tape and device and then retry the command.

UNOPNIFF Unable to open IFF file **'file-spec'**

   Explanation: The attempt to open the input IFF file failed.

   User action: Check the file and then retry the command.

UNRDIFF Unable to read IFF entry at **'file-position'**

   Explanation: An unsuccessful attempt was made to read the entry in
                    the input IFF file at the specified position.

   User action: Check the file and then retry the command.

UNRDAC Unable to read AC entry at **'file-position'**

   Explanation: An unsuccessful attempt was made to read an AC entry
                    in the input IFF file at the specified position.

   User action: Check the file and then retry the command.

UNWRFIN Unsuccessful finish to writing session

    Explanation: An error occurred in the completion of the tape
                writing session.

    User action: Check the tape and device and retry the command.

UNEXPEOF Unexpected end of IFF file encountered.

    Explanation: The end of the IFF file was encountered prematurely.

    User action: Check the file and then retry the command.

--
MESSAGES (OTHER)

In addition to the above messages which are generated by I2DFAD 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.   These
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 input file should be preserved
to facilitate diagnosis.

CHAPTER 7

MODULE MCEHED

MODULE   MCEHED

REPLACES Existing MCEHED utility.

FUNCTION

        MCEHED is a utility to allow a Map Header entry in the IFF file to be
        edited or examined.   **The map header must be a MCE (customer type 1)
        header.**

FORMAT

        $ MCEHED file-spec

        Command qualifiers   **Defaults**

        /[NO]READONLY   /NOREADONLY

        Editing and examining the map header with MCEHED is command driven as
        described below.

PROMPTS

        Input IFF-file: file-spec of IFF file to be examined or edited

----
PARAMETERS

Input IFF-file

        - specifies the input IFF file. Any part of the file specification
          which is not supplied will be taken from the default specification
          'LSL$IF:IFF.IFF;0'.

COMMAND QUALIFIERS

/READONLY
/NOREADONLY (default)

        - if /READONLY is specified, then MCEHED will only allow the map header
          to be examined, and not edited. Any attempt to edit an entry will be
          prevented and an error message generated.

By default the IFF file is opened for both reading and editing.

DESCRIPTION

MCEHED is a utility to allow fields in an IFF MCE map header to be examined and edited. **The utility will only operate on an IFF file that contains a MCE (customer type 1) map header.**

MCEHED operates in situ ie. it does not create a new output IFF file. All edits are performed on a copy of the map header, which is written back to the input file when the EXIT command is given. If required, the command QUIT may be used to abandon any edits, and terminate the program without updating the map header.

The IFF file may be opened for editing (the default) or with the /READONLY qualifier. If /READONLY is specified, only the SHOW and QUIT commands may be used.

In order to comply with November 1988 amendment of the DLMS specification, the LEV field in the sheet identity can hold a value of 3 to represent level 3-C or a value of 4 to level 1-C.

Detailed descriptions of all available MCEHED commands are given below.

EXIT

>   This command is used to exit from MCEHED, and close the input IFF
>   file.   If any edit operations have been performed, the header of the
>   file is updated before closing.

FORMAT: EXIT

COMMAND PARAMETERS:

>   None.

DESCRIPTION:

>   The EXIT command is used to exit from MCEHED. If any edit operations
>   have been performed, the header of the input IFF file is updated
>   before closing. **This command is only valid if the file was opened for
>   edit.**

>   <CTRL/Z> (pressing the Ctrl and Z keys together) may also be used to
>   exit from the program.

MESSAGES:

The following error messages are specific to the EXIT command:

*** ERROR *** File opened read only - EXIT not allowed

*** ERROR *** Unexpected "character" after EXIT

EXAMPLES:

$ **MCEHED DFAD1<CR>**
File DUA0:[MCE.IFF]DFAD1.IFF;1 opened for edit
mcehed> **SHOW SECURITY<CR>**
S E C U R I T Y

SEC - Security classification   0
SECD - Security descriptor   U
REL - Releasability code   0
SHD - Sheet handling descriptor   LASERSCAN EYES ONLY

mcehed> **SECD "R"<CR>**
SECD - Security descriptor   R
mcehed> **EXIT<CR>**
Map header updated
 ELAPSED: 0 00:00:36.96 CPU: 0:00:01.08 BUFIO: 18 DIRIO: 9 FAULTS: 125
$

----
field-name

        Allows the editing of the specified Map Header field.

FORMAT: field-name [edit_value]

COMMAND PARAMETERS:

edit_value

        The value to which the field is to be edited. Edit_value may be an
        integer, string, date or angle depending on the contents of the field.
        If the edit_value is invalid (eg. in the wrong format), the user will
        be prompted for an alternative value.

        Similarly if the edit_value parameter is not supplied, the user will
        be prompted for a value.

DESCRIPTION:

        The field-name command is used to edit the specified field in the Map
        Header. The command is only valid if the file is opened for edit.

        The field-name may be abbreviated, as long as ambiguity is not
        produced.   It is recommended however that the full 3 or 4 letter
        mnemonic for the field is used to prevent confusion.

        If no edit_value is specified, or if the supplied value is invalid,
        the program will prompt the user for a value.

        The prompt first displays the contents of the field in the same format
        as SHOW:

            field-name - Descriptive comment   value

        and then prompts with the type of data required.

        The four types of prompts produced are:

        [Integer min-max] :

                indicating that an integer between 'min' and 'max' is required.

        [String len] :

                indicating that a quoted string of maximum   length   'len'
                characters is required.   Both single and double quotes are
                acceptable, and <CR> may also be used to terminate a string.

A null string may only be set by using the UNSET response (see
below).

[Date day month year] :

indicating that a date is required. This may be given with the
month as a number or as a name, and the year is assumed to be of
this century (20th) if the value given is less than 100.   Fields
within the date may be separated by spaces, or by a '/' or '-'.
Separators must be consistent within any one date.   Leap years
are checked, and all dates must be after 1 Jan 1900.

[Angle +/- ddd mm ss.s] :

indicating that an angle is required.   The degree and minute
fields must always be provided; the seconds field is optional.
The angle may never be greater than 360 degrees. The sign may be
omitted for a positive angle.   Note that most of the angular
fields have a further restriction on the values allowed.

If an incorrect or invalid response is given, the prompt will be
repeated.   An answer of <CR> will leave the prompt sequence, without
altering the field. Once the field has been altered, the new value is
echoed on the terminal.

Note that the keyword UNSET (synonyms are NULL and ZERO) may be
supplied in response to all prompts. This causes the field to be
edited to its null value.

The Digital UPdate fields (DUP1 to DUP6) are the only fields which may
affect each other directly, so that changing the value of one may
change the values of others.

Within the editor it is arranged that updating DUP1 will cause a
scrolling effect, whereby DUP6 will become a copy of DUP5, DUP5 a copy
of DUP4, ..., DUP2 a copy of DUP1, and then the new value will be
entered into DUP1.

If any of DUP2 to DUP6 is updated, this scrolling will not occur (and
a message will be output noting either case). Thus erroneous dates
may be corrected even when they are not at the 'top' of the stack.

MESSAGES:

The following errors are associated with field editing:

For entry of fields of all types:

*** ERROR *** File was opened read only - editing not allowed
*** ERROR *** Reading response to prompt

For entry of Accuracy fields only:

```
        *** ERROR *** Number or NA expected


    For entry of angles:

    *** ERROR *** Unexpected "character" found after unset command
    *** ERROR *** Unexpected "character" found after angle
    *** ERROR *** Angle is too large - maximum is 'number' degrees
    *** ERROR *** No angle found in origin spec
    *** ERROR *** No degree part in origin spec
    *** ERROR *** Degree part too large in origin spec
    *** ERROR *** No minute part in origin spec
    *** ERROR *** Minute field too large in origin spec
    *** ERROR *** Minute field may not be negative
    *** ERROR *** Seconds field too large in origin spec
    *** ERROR *** Seconds field may not be negative


    For entry of dates:

    *** ERROR *** Unexpected "character" found after date
    *** ERROR *** Unexpected "character" found where separator "character"
    was expected
    *** ERROR *** Trying to read day number
    *** ERROR *** Day 'number' is too large
    *** ERROR *** Day 'number' is too small
    *** ERROR *** Unexpected end of line - no month
    *** ERROR *** Month 'number' is out of range
    *** ERROR *** There are only 'number' days in month 'number'
    *** ERROR *** The year 'number' is not a leap year - only 28 days in
    Feb
    *** ERROR *** Unexpected end of line - no year
    *** ERROR *** Cannot read year
    *** ERROR *** Negative year not allowed
    *** ERROR *** Year 'number' is too large
    *** ERROR *** Date may not be before 1-Jan-1900


    For entry of integers:

    *** ERROR *** Unexpected "character" found after unset command
    *** ERROR *** Unexpected "character" found after number
    *** ERROR *** Number expected
    *** ERROR *** Number out of range
    *** ERROR *** Value 'number' too small (range is 'number'-'number')
    *** ERROR *** Value 'number' too large (range is 'number'-'number')


    For entry of strings:

    *** ERROR *** Unexpected "character" found after unset command
    *** ERROR *** Unexpected "character" - string must be in quotes
    *** ERROR *** Unexpected "character" found after string
    *** ERROR *** String should be 'number' chars - 'number' is too many
```

EXAMPLES:

$ **MCEHED DFAD1<CR>**
File DUA0:[MCE.IFF]DFAD1.IFF;1 opened for edit
mcehed> **SHOW SECURITY<CR>**
S E C U R I T Y

SEC - Security classification   0
SECD - Security descriptor   U
REL - Releasability code   0
SHD - Sheet handling descriptor   LASERSCAN EYES ONLY

mcehed> **SHD "NONE"<CR>**
SHD - Sheet handling descriptor   NONE
mcehed> **SHOW SECURITY<CR>**
S E C U R I T Y

SEC - Security classification   0
SECD - Security descriptor   U
REL - Releasability code   0
SHD - Sheet handling descriptor   NONE

mcehed> **SECD R<CR>**
*** ERROR *** Unexpected "R" - string must be in quotes
SECD - Security descriptor   U
[String 1] : **"R"<CR>**
SECD - Security descriptor   R
mcehed> **EXIT<CR>**
Map header updated
 ELAPSED: 0 00:00:36.96 CPU: 0:00:01.08 BUFIO: 18 DIRIO: 9 FAULTS: 125
$

HELP

> Displays a summary of the commands available in MCEHED and their
> function.

FORMAT: **HELP**

COMMAND PARAMETERS: None

DESCRIPTION:

> If the HELP command is given, a summary of all valid MCEHED commands
> and their function, is displayed on the terminal.

MESSAGES: None

EXAMPLES:

$ **MCEHED DFAD1<CR>**
File DUA0:[MCE.IFF]DFAD1.IFF;1 opened for edit
mcehed> **HELP<CR>**
MCE map header editor program.
Files may be opened for edit (the default) or /READONLY

```
SHOW                                tells the user what arguments SHOW may take
SHOW      <section name>            show a section of data in the map header - for
                                    each field, shows field name, description, value

<field name>                        edit the given field - the program will prompt
                                    for the appropriate data type
<field name>     <value>            edit the given field - no prompt given

QUIT                                leave the program, ignore any changes
EXIT                                leave the program, update the mapheader (thus
                                    only legal if the file was opened for edit)
<control>Z                          leave the program as EXIT or QUIT, depending on
                                    whether the file was open for edit or not
```

Note that <value> may always be the special quantity UNSET (synonyms ZERO,NULL)
which will unset the field - ie the field will be uninitialised.

STRINGs must be surrounded by quote marks, ANGLEs must always contain at least
degree & minute fields, DATEs may have month as digit or name, and use space,
slash (/) or hyphen (-) as separators.
mcehed>

QUIT

>   The QUIT command is used to exit from MCEHED if the input IFF file was
>   opened for read only, or if the user wishes to discard any edits made
>   to the map header during the current session.

FORMAT: QUIT

COMMAND PARAMETERS: None

DESCRIPTION:

>   The QUIT command causes MCEHED execution to terminate, and close the
>   input IFF file. Any edits made to the program's copy of the map
>   header are not written to the header of the IFF file. The input IFF
>   map header remains unchanged.

>   The command may not be abbreviated in order to prevent accidentally
>   termination of the program.

>   The QUIT command, rather than the EXIT command, should be used to
>   terminate MCEHED, if the input file was opened for read only.

>   <CTRL/Z> (pressing the Ctrl and Z keys together) may also be used to
>   quit from the program if the file was opened using the /READONLY
>   qualifier.

MESSAGES:

>   If the QUIT command is used to finish a session, and the IFF file was
>   opened for edit, the following messages are generated:

>   *** WARNING *** Not writing out map header
>   Edits have been ignored

>   The following message is also associated with the QUIT command:

>   *** ERROR *** Please type the whole command QUIT
>   *** ERROR *** Unexpected "character" after QUIT

SHOW

> Allows the user to examine the contents of all the map header fields
> or a named group of fields.

FORMAT: SHOW section_name

COMMAND PARAMETERS:

section_name

> This determines which of the map header fields are displayed.   It
> should be one of the following:

> ALL   - show all of the following sections.

> Sheet, Identity - show the sheet identity fields.

> Security   - show the security fields.

> Coverage   - show the coverage of the manuscript.

> Projection   - show the projection information.

> Digitising   - show the digitising information.

> Specification   - show the specification fields.

> History, Dates   - show the sheet history & dates.

> Accuracy   - show the manuscript accuracy information.

> Processing   - show the manuscript processing dates.

> Status   - show the status flag fields.

> Terrain   - show the terrain information.

Each section name may be abbreviated, as long as it does not become
ambiguous.

If no parameter is specified, SHOW reminds the user of the names of
the parameters it may take.

DESCRIPTION:

This command allows the user to examine the current contents of all of
the Map Header fields, or a group of fields. When displayed, the
fields are grouped into sections according to their meanings.

The information output for each feature is of the form:

field-name - Descriptive comment   value

where 'field-name' is the 3 or 4 letter field identifier that is used
to edit the field as described above.

MESSAGES:

The only program generated error message relevant to SHOW is:

*** ERROR *** Unexpected "character" after SHOW section-name

This occurs if the user has typed an extra character after a legal
'section-name'. The command should be re-entered.

EXAMPLES:

```
$ MCEHED DFAD1<CR>
File DUA0:[MCE.IFF]DFAD1.IFF;1 opened for edit
mcehed> SHOW<CR>
SHOW what? - SHOW ALL, or sections are:
          IDentity,      SECurity, COVERage, PROJection, DIG info,
          SPECification, HISTory,  ACCuracy, PROC dates, STATus, TERRain
mcehed> SHOW ALL<CR>
S H E E T    I D E N T I T Y

TASK - Task (series) name        DFAD
SHT  - Sheet name/number
EDN  - Edition number            0
TYPE - File type
LEV  - Level of this data        1
WAC  - World Aeronautical Codes  01501307
COCO - Country coverage
REFN - Unique reference          UK SQUARE 79
MANU - Manuscript type           0
COOR - Coordinate type           0

S E C U R I T Y

SEC  - Security classification   0
```

```
SECD - Security descriptor        U
REL  - Releasability code         0
SHD  - Sheet handling descriptor  LASERSCAN EYES ONLY
```

C O V E R A G E

```
MSWE - Map SW corner (E)           0
MSWN - Map SW corner (N)           0
MLEW - Map limit, E-W              0
MLNS - Map limit, N-S              0
LASW - SW corner  (lat)            58 00 00.0
LOSW - SW corner  (long)           -5 00 00.0
LASE - SE corner  (lat)            58 00 00.0
LOSE - SE corner  (long)           -4 00 00.0
LANE - NE corner  (lat)            59 00 00.0
LONE - NE corner  (long)           -4 00 00.0
LANW - NW corner  (lat)            59 00 00.0
LONW - NW corner  (long)           -5 00 00.0
LAMO - Map origin (lat)            57 59 00.0
LOMO - Map origin (long)           -5 01 00.0
LAEX - Map extent (lat)             1 00 00.0
LOEX - Map extent (long)            1 00 00.0
```

P R O J E C T I O N

```
PROJ - Projection used
SPH  - Spheroid used
CMER - Central Meridian            0 00 00.0
LAFO - Latitude of false origin    0 00 00.0
NPAR - North standard parallel     0 00 00.0
SPAR - South standard parallel     0 00 00.0
```

D I G I T I S I N G   I N F O R M A T I O N

```
MENU - Menu for this map
DGSC - Digitised scale             0
DBSC - Database scale              0
DSYS - Digitising system           FREESCAN
```

S P E C I F I C A T I O N

```
PCDE - Producer code               UKMODMCE
PSSN - Product spec stock   number SPECXDLMS
PSCN - Product spec change number  0
PSDT - Product spec date            1-Jul-1977
VAL  - Validation table            0
```

S H E E T   H I S T O R Y

```
CDTE - Compilation/analysis date    1-Oct-1978
CTYP - Compilation type
MDTE - Maintenance date            unset
MCDE - Maintenance desc code       0000
MMD  - Match/merge date            unset
MMV  - Match/merge version         A
MCD  - Map currency date           unset
```

REV - Revision cut-off date   unset

A C C U R A C Y   I N F O R M A T I O N

HDTM - Horizontal datum   WGS72
VDTM - Vertical   datum
AHAC - Abs horizontal accuracy   50
AVAC - Abs vertical   accuracy   0
RHAC - Rel horizontal accuracy   25
RVAC - Rel vertical   accuracy   0
VHAC - Vertical heighting accuracy 10

P R O C E S S I N G   D A T E S

DUP1 - Digital update 1   unset
DUP2 - Digital update 2   unset
DUP3 - Digital update 3   unset
DUP4 - Digital update 4   unset
DUP5 - Digital update 5   unset
DUP6 - Digital update 6   unset
DLH - Date last handled   unset

S T A T U S   F L A G S

EMSN - Edge match status North   0
EMSE - Edge match status East   0
EMSS - Edge match status South   0
EMSW - Edge match status West   0
FLAG - Processing flag   0

T E R R A I N   I N F O R M A T I O N

CLOD - Clockwise orient'n of data   0 00 00.0
LAIN - Latitude interval   0
LOIN - Longitude interval   0
LALI - Number of lines of lat   0
LOLI - Number of lines of long   0
PCIN - Partial cell indicator   0

mcehed> **SHOW SECURITY<CR>**
S E C U R I T Y

SEC - Security classification   0
SECD - Security descriptor   U
REL - Releasability code   0
SHD - Sheet handling descriptor   LASERSCAN EYES ONLY

mcehed>

EXAMPLES:

$ **MCEHED DFAD1<CR>**
File DUA0:[MCE.IFF]DFAD1.IFF;1 opened for edit
mcehed> **SHD "LASERSCAN EYES ONLY"<CR>**
SHD - Sheet handling descriptor   LASERSCAN EYES ONLY
mcehed> **SHOW SECURITY<CR>**
S E C U R I T Y

SEC - Security classification   0
SECD - Security descriptor   U
REL - Releasability code   0
SHD - Sheet handling descriptor   LASERSCAN EYES ONLY

mcehed> **QUIT<CR>**
*** WARNING *** Not writing out map header
Edits have been ignored
 ELAPSED: 0 00:02:35.66 CPU: 0:00:02.13 BUFIO: 186 DIRIO: 13 FAULTS: 178

$ **MCEHED DFAD1/READONLY<CR>**
File DUA0:[MCE.IFF]DFAD1.IFF;1 opened for reading only
mcehed> **SHOW SECURITY<CR>**
S E C U R I T Y

SEC - Security classification   0
SECD - Security descriptor   U
REL - Releasability code   0
SHD - Sheet handling descriptor   LASERSCAN EYES ONLY

mcehed> **SHD<CR>**
*** ERROR *** File was opened read only - editing not allowed
mcehed> **EXIT<CR>**
*** ERROR *** File opened read only - EXIT not allowed
mcehed> **QUIT<CR>**
 ELAPSED: 0 00:00:51.84 CPU: 0:00:00.94 BUFIO: 16 DIRIO: 5 FAULTS: 180
$

MESSAGES (Other MCEHED Messages)

Apart from those messages described above, which relate to specific
commands, the following messages may also be generated by MCEHED:

*** ERROR *** Can't find map header

This error indicates that the MH entry is missing from the
specified input IFF file. The program will terminate, since
there is no map header to edit or examine. The user should check
that the correct IFF file was specified in the command line.

*** WARNING *** Map header has unexpected length 'num', expected 'num'
                Attempting to continue with length 'num'

*** ERROR *** Map header has unexpected length 'num', expected 'num'
              Unable to edit map header

These messages indicate that the MH entry in the IFF file does
not have the same actual length as is specified in the length
field of the MH entry. If the file was opened for read only, the
program attempts to continue, although the values displayed for
some fields may not be meaningful. If the file was opened for
edit, the execution terminates. These warnings may indicate that
the IFF file has been corrupted in some way. The user should
check this, and possibly corrected the MH entry length field.

*** ERROR *** Reading command line
*** ERROR *** Reading command qualifiers
*** ERROR *** Reading filename

The above errors are associated with interpreting the initial DCL
command line. The user should check that this was correctly
specified. If the problem persists, Laser-Scan should be
consulted.

*** ERROR *** Opening IFF file 'file-spec'

This error is associated with problems opening the input IFF
file. It will normally appear in conjunction with other
messages, usually generated by LSLLIB (see below), which will
describe the exact nature of the problem.

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, IFFLIB, or by the Laser-Scan I/O
library, LSLLIB. IFF library messages are introduced by '%IFF' and
are documented in the IFFLIB reference manual. LSLLIB messages are
introduced by '%LSLLIB' and are generally self-explanatory. They are
often used to explain the details of program generated errors.

If the cause of the error cannot be traced by the user, then
Laser-Scan should be consulted.

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