

## Chapter 14

### Pointer Usage

Within PDS labels, pointers are used to indicate the locations of objects within the same file or references to external files. A pointer statement is indicated in a PDS label or catalog object by an ASCII caret (^).

#### 14.1 Types of Pointers

Pointer statements fall into three main categories: data location pointers, include pointers, and related information pointers.

##### 14.1.1 Data Location Pointers (Data Object Pointers)

The most common use of pointers occurs in PDS labels to link together data object descriptions with the actual data. The syntax for the values of these pointers depends on whether the label is attached or detached from the data it describes. Examples of these data location pointer statements are:

- (1)     ^IMAGE           = 12
- (2)     ^IMAGE           = 600 <BYTES>
  
- (3)     ^INDEX\_TABLE = "INDEX.TAB"
- (4)     ^SERIES         = ("C100306.DAT", 2)
- (5)     ^SERIES         = ("C100306.DAT", 700 <BYTES>)

The first and second examples illustrate pointers in attached labels. This type of pointer allows reading software to scan the label for the appropriate pointer, and then skip right to the data at its location elsewhere in the file. In the first example, the data begin at record 12 of the labeled file. In the second example, the data begin at byte 600 of the labeled file.

In examples 3 through 5, external data files are referenced. As these pointers occur in detached labels, they must identify a file name, and if the data do not begin at record 1 of the data file, a location as well. In example 3, the data begin at record 1 of the data file "INDEX.TAB". In example 4, the data begin at record 2 of the data file, "C100306.DAT". In example 5, the data begin at byte 700 of the data file.

##### 14.1.2 Include Pointers

Another common use of pointers occurs in PDS labels or completed catalog templates that reference external files to be included directly at the location of the pointer statement. These are classified as 'include' type pointers since they act like #INCLUDE statements in C program

source files. Pointers with the class names of STRUCTURE, CATALOG, and MAP\_PROJECTION fall into this category. As illustrated below, include files contain only PDS data object definitions or completed catalog object templates.

Examples of include pointer statements are:

- (1)     ^STRUCTURE = "ENGTAB.FMT"
- (2)     ^STRUCTURE = "IMAGE.FMT"
- (3)     ^CATALOG = "CATALOG.CAT"
- (4)     ^DATA\_SET\_MAP\_PROJECTION = "DSMAPDIM.CAT"

In the first example, an external structure file is referenced from a TABLE object. The file ENGTAB.FMT contains the column object definitions needed to complete the TABLE object. In cases such as this, column objects would be stored in a separate file if the table is especially large (with many columns), making its label unwieldy, or if the file containing column objects can be referenced by more than one label through the use of the pointer.

In the second example, the structure of an image (i.e., all statements beginning with the OBJECT = IMAGE statement and ending with the END\_OBJECT = IMAGE statement) is defined in an external file called IMAGE.FMT.

In the third example, the external file, CATALOG.CAT, is pointed to from the VOLUME object in order to provide a full set of catalog information associated with the volume.

In the fourth example, the external file, DSMAPDIM.CAT, is referenced in the IMAGE\_MAP\_PROJECTION object to complete the map projection information associated with the image.

### 14.1.3     **Related Information Pointers (Description Pointers)**

The last type of use of pointer statements occurs in PDS labels that reference external files that provide additional documentation that may be of special use to a human reader of the label. These files are indicated by the DESCRIPTION or DESC class words, and reference text files that are not written in ODL. This pointer is not meant to refer to software tools.

An example of a description pointer statement is:

```
^DESCRIPTION = "TRK_2_25.ASC"
```

In this example, the pointer references a PDS-labeled external ASCII document file, TRK\_2\_25.ASC, which provides a detailed description of the data.

## 14.2     **Rules for Resolving Pointers**

The following set of rules exist for resolving pointer statements that reference external files:

For any pointer statement in FILE\_A,

- (1) Look in the same directory as FILE\_A
- (2a) For a single physical volume (no logical volumes), look in the following top level directory:

Pointer	Directory
^STRUCTURE	LABEL
^CATALOG	CATALOG
^DATA_SET_MAP_PROJECTION	CATALOG*
^INDEX_TABLE	INDEX
^DESCRIPTION or ^TEXT	DOCUMENT

- (2b) Within a logical volume, look in the top level subdirectory specified by the LOGICAL\_VOLUME\_PATH\_NAME keyword:

Pointer	LOGICAL_VOLUME_PATH_NAME / Directory
^STRUCTURE	LABEL
^CATALOG	CATALOG
^DATA_SET_MAP_PROJECTION	CATALOG*
^INDEX_TABLE	INDEX
^DESCRIPTION or ^TEXT	DOCUMENT

\* Note: For volumes using PDS Version 1 or 2 standards, the MAP\_PROJECTION files may be located in the LABEL directory

All pointers to data objects should be resolved in step (1), since these files are always required to be located in the same directory as the label file.