Defining Derived Fields

Note:
Derived field is a generic term in Predict for fields and descriptors defined on the basis of one or more source fields. This term should not be confused with field type DV applicable to SQL views (see Field Type).

Defining derived fields and keeping the definitions consistent is a complex task. Predict offers a variety of functions to help with it. General rules applying to the definition of derived fields are described in the following sections:

- General Rules for Defining Derived Fields
- Rules Applying to Format Changes
  The format of derived fields is determined by Predict or can be defined manually. The sections contains a description of the rules applying.
- Validation of Derived Field Definitions
  If the format of derived fields is changed manually, Predict performs validation checks. These checks are described in this section.
- Defining Derived Fields of Special Types

General Rules for Defining Derived Fields

If a derived field is modified, a table containing the source fields appears when ENTER is pressed in the Modify Field screen. The size and format of this table varies with the type of derived field.

The table in the screen below is for a superfield. Editor functions and a selection mechanism help when defining derived fields.

```
13:24:29            *****  P R E D I C T  4.3.1  *****            2003-05-31
                             - Modify Field -
Field ID ........ ARH_SP                        Modified 2003-05-31 at 13:14
File ID ......... ARH-D1


Ty L Field name                      F  Length   Occ   D U DB N NAT-l
-- - -------------------------------- -- -------- ----- - - -- - -----
SP 1 ARH_SP                                           D U AB

           Index Name .... ARH-ARH_SP
           Source field name *               A/D
         1   ARH1                             A
         2   ARH3                             D
         3   ARH2                             A
         4   ARH4                             A
         5   ARH5                             A
         6   ARH6                             A
         7   ARH7                             A
         8   ARH8                             A
         9   ARH9                             A
         10  ARH10                            A
 Additional attributes ..* N          Associations ..* N        Scroll to: __
```

General Attributes of Definitions of Derived Fields

The following attributes are contained in most definitions of derived fields. Attributes specific to certain types of derived fields are described in the respective sections.

Editor Functions

Deleting Source fields

Source fields can be deleted from the definition by overwriting their name with blanks. The remaining lines will be reorganized automatically.

Moving Source fields

Source fields can be moved with the .m command. Enter .m at the beginning of the line to be moved, position the cursor in the line where the moved line is to appear, and press ENTER. The table of source fields is automatically reorganized.

Scrolling

If a definition of a derived field contains more source fields than can be displayed in one screen, the source field to be displayed on top of the list can be specified in the field Scroll to. See General Rules for Defining Derived Fields.

Selection Mechanism

New source fields can be added to the definition of a field by selecting them from a list of all fields contained in the file. This list is displayed in a Source field window if a name with asterisk notation (*) is entered as selection criterion in the list of the current definitions (as shown in the screen below).

```
13:09:01            *****  P R E D I C T  4.3.1  *****              2003-05-31
                              - Modify Field -
Field ID ........ ARH_SP               +Top---------Source field------------+
File ID ......... ARH-D1               ! _ ARH1                              !
                                       ! _ ARH2                              !
                                       ! _ ARH3                              !
Ty L Field name                     F  ! _ ARH4                              !
-- - -------------------------------- -  ! _ ARH5                              !
SP 1 ARH_SP                            ! _ ARH6                              !
                                       ! _ ARH7                              !
           Index Name .... ARH-ARH_SP  ! _ ARH8                              !
           Source field name *         ! _ ARH9                              !
         1   ARH1                      ! _ ARH10                             !
         2   ARH3                      ! _ ARH11                             !
         3   ARH2                      ! _ ARH12                             !
         4   ARH4                      ! _ ARH13                             !
         5   ARH5                      ! _ ARH14                             !
         6   *RH6                      ! _ ARH15                             !
         7   ARH7                      ! _ ARH16                             !
         8   ARH8                      ! _ ARH17                             !
         9   ARH9                      ! _ ARH18                             !
         10  ARH10                     !Command ==> +______                  !
 Additional attributes ..* N           +More--------------------------------+
```

A source field is selected by marking it in the left column or by positioning the cursor in the respective line and pressing ENTER. One field can be selected at a time.

Defining Derived Fields of Special Types

Superfields/Descriptors for Files of Type A, C and Z

The screen for the definition of superfields/descriptors for files of type Adabas, Conceptual and Standard looks as follows.

```
19:13:06            *****  P R E D I C T  4.3.1  *****              2003-05-31
                              - Modify Field -
Field ID ........ SUPER-1                            Added 2003-05-31 at 13:39
File ID ......... PD-A2                           Modified 2003-05-31 at 14:53


Ty L Field name                      F  Cs Length   Occ   D U DB S NAT-l
-- - -------------------------------- *-  * -------- ----- * * -- * -----
SP 1 SUPER-1                         A     168.0              AJ N

           Source field name *                F  Length   Start  End  DB
         1   STD-EL1                          A  30.0       1     10   AA
         2   STD-EL2                          N  23.0       2     2    AB
         3   STD-EL2                          N  23.0       2     3    AB
         4   LOGICAL                          B  10.0                   AC
         5   LOGICAL                          B  10.0                   AC
         6   MAIG                             A  50.0                   BA
         7   TIME                             T                         BB
         8
         Start/End: Relative byte position in source field. Default
         .          is first and last byte of source field

  Additional attributes ..* N          Associations ..* N        Scroll to: __
```

Attributes	
Source field name	Name of the fields used by derived fields.
F, Cs, Length	Format, character set and length of the source field. These columns are read-only. Section Rules Applying to Format Changes, describes how the format of the derived field is determined by Predict.
Start	The relative byte position where the part of the source field to be used by the derived field starts (not applicable to phonetic descriptors). See also Specifying the Start and End Position below.
End	The relative byte position where the part of the source field to be used by the derived field ends (not applicable to phonetic descriptors and VSAM Primary Superdescriptors or Alternate Indices). See also Specifying the Start and End Position below.
DB	Field short name of the source field. This column is read-only.

Specifying the Start and End Position

The start and end values given in the definition of a derived field are always byte positions within the source fields (beginning with 1 and counting from left to right for alphanumeric fields and binary fields and from right to left for numeric fields).

The full length is used if no start and end values are specified.
In Adabas it is possible to address byte positions outside of the length of field. If this feature is used and a start byte outside of the source field specified, an end byte must be specified.

Note:
Special rules apply when specifying the length of subfields/descriptors. See Specifying the Length of Subfields.

The following rules apply:

- Superfields/descriptor definitions can be based on up to twenty source fields.
- Only formats A, B and N are possible for superfields/descriptors.
- Format N can be useful for Natural, but is not recommended because an alphanumeric or binary value cannot be converted to a numeric field.

Note:
See also General Rules for Defining Derived Fields.

Subfields/Descriptors for Files of Type A, C and Z

Subfields/Descriptors for files of type Adabas , Conceptual and Standard are defined in the screen below.

```
09:13:28            *****  P R E D I C T  4.3.1  *****              2003-05-31
                             - Add a Field -
Field ID ........ PHON-4                              Added 2003-05-31 at 09:11
File ID ......... HEB-FI                                 by HNO


Ty L Field name                       F  Cs Length   Occ   D U DB N NAT-l
-- - -------------------------------- --  - -------- ----- - - -- - -----
SB 1 PHON-4                                                SS N

           Source field name *               F  Length   Start  End   DB
         1   HEB-TEST                        A  1.0                   AF




         Start/End: relative byte position in source field. Default
         is first and last byte of source field.

   Additional attributes ..* N          Associations ..* N        Scroll to: __
```

With subfields/descriptors, only one source field can be entered in the window.

Specifying the Length of Subfields

If the source field of a subfield/descriptor has format P and the start byte is greater than 1, the length of the subfield/descriptor is normal length+1, because the sign of the source field is always included in the subfield/descriptor field (see Adabas Utilities documentation).

Example:

Given that

- the source field has format P and length 5,
- the subfield/descriptor definition is source field from 2 to 3,
- the length of the subfield is 3 bytes (2 bytes + 1 byte for sign),
- the 3 bytes packed are 5 digits,

then the subfield/descriptor has format P and length 5.

Note:
See also General Rules for Defining Derived Fields.

Rules Applying to Format Changes

Note:
To understand the following, some knowledge of the hierarchical data structures of Predict and the process of rippling is required. See Rippling in the section **File** for more information.

Determining the Format of Sub/Superfields/Descriptors

The format of sub/superfields/descriptors in files of type Adabas , Conceptual and Standard (codes A, C, Z) is generated automatically by Predict.
A format of a derived field that has been determined by Predict can, however, be overwritten manually.
This following sections describe the rules applying.

Subfield/Descriptor

Subfield/descriptors always have the same format than the source fields they are derived from. If the format of a source field is changed, the format of the subfield/descriptor is changed accordingly.

Superfield/Descriptor without Format

If a superfield/descriptor is defined without a format, Predict assigns the format as follows:

- Format=A
  if at least one source field of the SP field is defined with format A, or
  if one of the source fields specified in the definition does not yet exist in the file.
- Format=B
  if no source field is defined with format A.

Superfield/Descriptor with Format

If the format of source fields has been changed, Predict checks if the new and the old format of the source field are compatible. If they are compatible, the change does not have any impact on the format of the superfield/descriptor.

The formats NS, US, N and U and the formats P and PS are compatible. So, if the format is changed from N to US, for example, the format of the superfield/descriptor will not change.

If the new and the old format of the source field are **not** compatible, a window appears in which a format change proposed by Predict can be confirmed or a new format can explicitly be assigned to the superfield/descriptor (see screen below).


```
13:51:16           *****  P R E D I C T  4.3.1  *****             2003-05-31
                              - Modify field -
Field ID ........ FELD5                              Added 2003-05-31 at 13:15
File ID ......... HNO-STA1                         Modified 2003-05-31 at 13:15

Ty L Field-name                      F  Cs Length   Occ   D U DB N NAT-l
-- - -------------------------------- --  - -------- ----- - - -- - -----
SP   FELD5                           B     25.0


             +-----------------------------------------------+
             !  Superdescriptor definition changed           !
             !  to the correct format.                       !
             !                                               !
             !   old format .. B    new format .. A          !
             !                                               !
             !  Hit 'ENTER' to continue or change format.    !
             +-----------------------------------------------+
```

Changing the Format of Superfield/Descriptors manually

The format of a superfield/descriptor can be changed manually (with the Modify Field function). If a source field of the superfield/descriptor is then changed again, Predict checks if the change affects the format of the superfield/descriptor.

Impact of Changes to Standard Fields - Rippling

Changes to sub/superfield/descriptors and fields used in sub/superfield/descriptors (source fields) are rippled as described in the sections below.

Changes to Sub/Superfield/Descriptors

It is not recommended to define sub/superfield/descriptors in standard files and to use these in real files. It is however possible to do it. The following rule then applies:

Note:
Changes to the format and length and changes to the definition of derived fields in standard files are not rippled from standard files to real files and userviews.
This is because the definition of derived fields is not coupled, and rippling format and length alone could lead to inconsistent data definitions in real files and userviews.

Changes to Source fields

Changes to the format of a standard field are rippled as normal to all fields in a file connected to this standard field.

If a field in an Adabas file is used in the definition of a sub/superfield/descriptor, the format of the sub/superfield/descriptor is also changed if one of the following conditions are met:

- the resulting format is A, or
- the resulting format is B and the old format was A.

Note:
In the case of superdescriptors, if the format in the Adabas file is set (manually) to N and the correct format were B, no change is made (unless the field length is greater than 29).

How the Rippling of Changes to Source fields is Indicated

If changes to standard fields are rippled to derived fields in real files and userviews, two screens are displayed indicating this process of rippling.

In the first screen the **changes of source fields** are indicated.

```
13:51:35            *****  P R E D I C T  4.3.1  *****              2003-05-31
                             - Modify file -                          Page:   1

                        list of field updates
                        ---------------------

FELD2                             *** upd ***
FELD2                             HNO-ADA1                        *** upd ***
FELD5                             HNO-ADA1                        *** upd ***
FELD5                             *** upd ***
```

In the second screen the **changes of the format and/or length** of derived fields are indicated.

```
SUB/SUPER/PHON/COLLATION- fields, -descriptors length are changed
-----------------------------------------------------------------

Ty Field name                     File name
-- ------------------------------ ------------------------------
SP FELD5                          HNO-STA1                          updated
```

Validation of Derived Field Definitions

Predict performs the following validations for derived fields:

- A superfield/descriptor can have only one source field which is a multiple-value field.
- Source fields with format D, T, or L must not have a start or end character.

The following rule applies for all file types except Conceptual and Standard:
All source fields must exist in the file. This check is performed when a CHECK or CAT command is entered in the field list editor or when the Add/Copy/Modify field function is executed from the Field Maintenance menu.

These validations can be executed differently:

- If a source field is changed with the list editor (function Link children in the Modify File menu with Related type set to EL), the validation can be executed explicitly with the CHECK command.
  The CAT command will also perform the validation.
- If a source field is changed with the function Modify Field, the validations are performed directly.

Phonetic Descriptors for Files of Type A, C and Z

The screen for defining phonetic descriptors for files of type Adabas , Conceptual and Standard is identical to that for subfields/descriptors. See Subfields/Descriptors for Files of Type A, C and Z.

With phonetic descriptors, only one source field can be entered in the window.

The Start and End attributes do not apply to phonetic descriptors: Adabas always uses the first 20 bytes of this field to build a phonetic descriptor.

Further information on sub/superfields/descriptors and phonetic descriptors can be found in the section **ADACMP (COMPRESS-DECOMPRESS)** in the Adabas Utilities documentation.

Note:
See also General Rules for Defining Derived Fields.

Hyperdescriptors for Files of Type A, C and Z

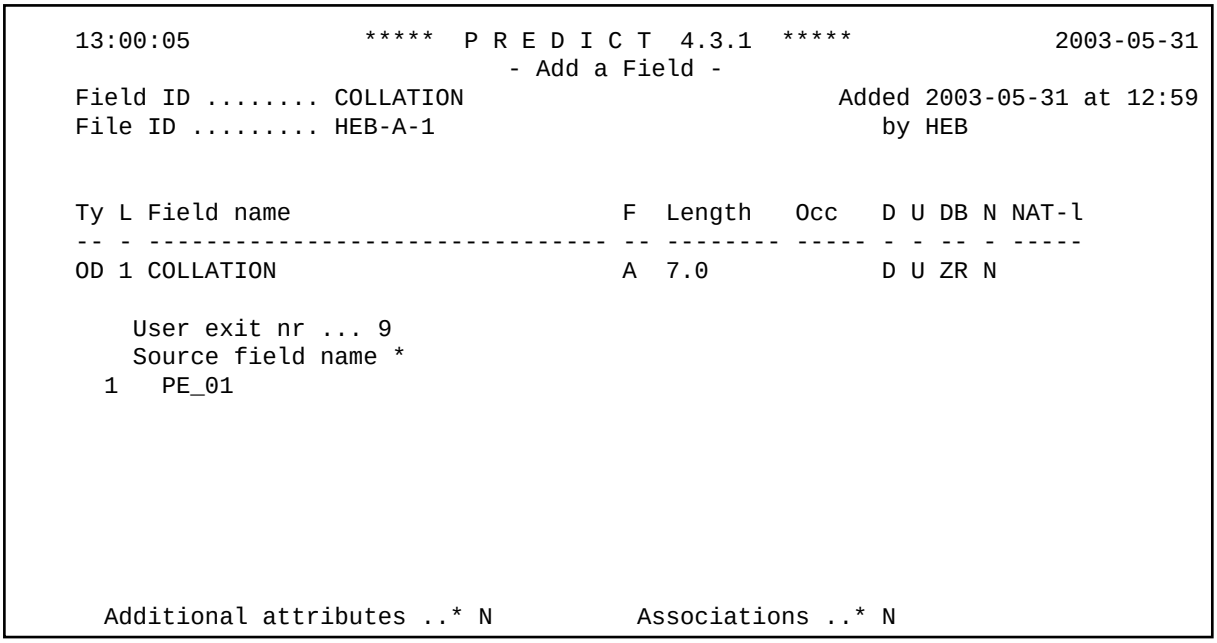
The screen for defining hyperdescriptors looks as follows:

```
13:00:05            *****  P R E D I C T  4.3.1  *****              2003-05-31
                             - Add a Field -
Field ID ........ FIELD3                              Added 2003-05-31 at 12:59
File ID ......... DEMO                                   by HNO


Ty L Field name                      F  Length   Occ   D U DB N NAT-l
-- - -------------------------------- -- -------- ----- - - -- - -----
HY 1 FIELD3                          A  20.0           D   XZ N

    User exit nr ...
    Source field name *                 Source field name *
  1                                    2
  3                                    4
  5                                    6
  7                                    8
  9                                    10
  11                                   12
  13                                   14
  15                                   16
  17                                   18
  19                                   20
  Additional attributes ..* N          Associations ..* N
```

Attributes	
User exit nr	A number between 1 and 31 identifying the user exit that defines the hyperdescriptor. See the section **User Exits** in the **Adabas DBA Reference documentation**.

Collation Descriptors for Files of Type A, C and Z

The screen for defining collation descriptors looks as follows:



Attributes	
User exit nr	A number between 1 and 8 identifying the user exit that defines the collation descriptor. See the **DBA Reference documentation** for further information.

Key or Index Fields in SQL Files - Superfields

The screen below is used for defining Keys or Indexes in fields of the following file types:

A	Adabas file (with parameter Adabas SQL usage set to Y)
BT	Adabas D table
D	DB2 table
JT	Ingres table
OT	Oracle table
X	General SQL
XT	Informix table
YT	Sybase table

The following rules apply:

- If the field type is blank (normal field), the key or index is based on one field
- if the field type is SP (superfield), the key or index includes more than one field.

```
13:10:07            *****  P R E D I C T  4.3.1  *****              2003-05-31
                             - Modify Field -
Field ID ........ ARHSP                            Modified 2003-05-31 at 13:04
File ID ......... ARH-DB2                                by ARH


Ty L Field name                        F  Length   Occ   D U DB N NAT-l
-- - ------------------------------- -- -------- ----- - - -- - -----
SP 1 ARHSP                                                D   AM

           Index Name .... ARH-ARHSP
           Source field name *                A/D
         1   ARH7                              A
         2   ARH8                              D
         3
         4
         5
         6
         7
         8
         9
         10
  Additional attributes ..* N          Associations ..* N        Scroll to: __
```

Attributes	
Index name	The name of the key or index. Must be entered in qualified form: creator/schema name followed by key or index name, separated by a hyphen. The creator/schema and key or index name are subject to SQL naming conventions. Creator name and field name are concatenated and proposed as index name.
Source field name	The name of a column (source field) from which the key or index is derived. If the key or index is based on one field (field type blank), the name of that field is displayed and cannot be changed. If the key or index includes more than one field (Field type SP), up to 20 column names can be entered. Each must name a column of the table. **Note:** For fields in files of type X (General SQL), you can enter up to 16 column names. Enter a value in the Scroll field to define source fields greater than 10.
A/D	**A** Puts key or index entries in ascending order by source fields (column). Default. **D** Puts key or index entries in descending order by source fields (column).

VSAM Primary Superindex or Alternate Superindex

VSAM superdescriptors (Field type SP) in a file of type V (physical VSAM) and L (logical VSAM) are defined in the following screen.


```
13:45:57           *****  P R E D I C T  4.3.1  *****             2003-05-31
                            - Modify Field -
Field ID ........ KEY                               Added 2002-07-05 at 13:01
File ID ......... PD-V1                           Modified 2003-05-31 at 13:42


Ty L Field name                       F  Cs Length   Occ   D U DB N NAT-l
-- - -------------------------------- --  - -------- ----- - - -- - -----
SP 1 KEY                                    30.0           A   AE N

           Source field name *               F  Length   Start  End   DB
         1




         Start/End: relative byte position in source field. Default
         is first and last byte of source field.

   Additional attributes ..* N          Associations ..* N        Scroll to: __
```

Attributes	
Start	The starting position (offset plus one) of the superdescriptor within the source field. An end position cannot be specified.

If a VSAM field on an alternate index (descriptor A) in a file of type V (physical VSAM), L (logical VSAM), or C (conceptual) is defined (the descriptor type is A), a second screen is displayed for defining additional attributes: upgrade flag, sort flag, null flag and DD name (see below).

Additional Attributes for VSAM Alternate Fields

```
13:44:37           *****  P R E D I C T  4.3.1  *****             2003-05-31
                            - Modify Field -
Field ID ........ KEY                               Added 2002-07-05 at 13:01
File ID ......... PD-V1                           Modified 2003-05-31 at 13:42
Keys ..                                                            Zoom: N

Ty L Field name                       F  Length   Occ   D U DB N NAT-l
*- - -------------------------------- *- -------- ----- * * -- * -----
   1 KEY                              A  30.0           A   AE N


                                        +- VSAM descriptor attributes -+
Natural attributes                      !                              !
  Header1 ....                          !  Upgrade flag ... Y (Y,N)    !
  Header2 ....                          !  Sort flag ...... N (Y,N)    !
  Header3 ....                          !  Null flag ...... N (Y,N)    !
  Edit mask ..                          !  DD name ........ DDNAME     !
Comments     Zoom: N                    !                              !
                                        +------------------------------+



   Additional attributes ..* N          Associations ..* N
```

Additional Descriptor Attributes	
Upgrade Flag	**Y** Alternate index is updated by Natural. **N** Alternate index is updated by VSAM.
Sort Flag	**Y** If the upgrade flag is also Y, the alternate index is read in ascending order. Otherwise, the alternate index is read in the order in which the values were entered during field update.
Null Flag	**Y** Records with a null value in this index field are suppressed.
DD Name	The DD name associated with this alternate index file. In CICS, the FCT name of the VSAM file.

