Trigger Maintenance

Note:
The Trigger Maintenance subsystem is available only when the Adabas Online System (AOS) add-on product is installed. It is not available with the AOS demo version.

The Trigger Maintenance facility is a Natural application that allows you to

- add, delete, modify, and list trigger definitions;

- generate, modify, display, and delete file-field tables;

- display and modify profile information for the definition of the run-time triggers system;

- monitor trigger operations and permanently or temporarily activate or deactivate triggers.

▶ **To start Trigger Maintenance**

- Select "Trigger Maintenance" from the Adabas Online System (AOS) main menu or enter MENU at the Natural NEXT prompt in library SYSTRG.

   The Trigger Maintenance main menu appears:

```
 HH:MM:SS               ***** TRIGGER MAINTENANCE *****       YYYY-MM-DD
 User USR01                    - Main Menu -                  DBnr 105

                   Code   Function
                   ----   ----------------------------------
                    A     Administrator Functions
                    F     File-Field Table Definitions
                    R     Procedure Reports
                    T     Create/Modify Trigger Definitions
                    ?     Help
                    .     Exit
                   ----   ----------------------------------

              Code ...



 Command ==>
 Enter--PF1--PF2--PF3--PF4---PF5---PF6---PF7--PF8--PF9--PF10--PF11--PF12
        Help       Exit Field Trigr Admin Procs          FTRG  FDIC  Canc
```

   The main menu functions are described briefly in the following table:

Code	Function	Description
A	Administrator Functions	Display or modify the profile information, i.e., the run-time parameter settings of the triggers and stored procedures. Obtain Natural subsystem information. Monitor subsystem activity and trigger activity.
F	File-Field Table Definitions	Display, generate, modify, delete, or select a file-field table. View the origin of the file-field table.
R	Procedure Reports	Display a list of procedures for the defined triggers, sorted by file or by name.
T	Create/Modify Trigger Definitions	Add, display, modify, delete, or select a trigger definition.
?	Help	Display help information about the Trigger Maintenance facility.
.	Exit	Exit to the Natural NEXT screen. Enter TRIGGERS to return to the main menu.

Note:
The database ID and file number are required by the Trigger Maintenance facility. If these values were not specified by default using the NATPARM LFILE parameters or the NTFILE macro, they must be entered before the main menu functions can be used. You can enter these values by pressing PF10 on the main menu; otherwise, the system automatically prompts you for the information.

This chapter covers the following topics:

- Overview

- File-Field Tables

- Trigger Definitions

- Procedure Reports

- Administrator Functions

Overview

The Trigger Maintenance facility comprises a set of menus and submenus that lead to data screens and pop-up windows. Each menu contains a list of functions and function codes, a group of input fields, a command line, a set of PF keys, and a message area. Adabas Online System (AOS) must be installed in the same environment.

Wildcard Notation

Wildcard notation is allowed wherever possible. For example, most menus require that you specify a file name. If you do not know the file name, you can enter a wildcard character instead. A range of values will appear in a pop-up window, allowing you to select an item or entry from the range.

The term "wildcard" refers to the use of a special character as follows:

Char.	Example	Select any name . .
*	PERS*	beginning with "PERS"
>	PERS>	with a value greater than "PERS"
<	PERS<	with a value less than "PERS"

Input Fields

Each menu in the Trigger Maintenance facility includes the following input fields:

Field	Entry
Code	Enter the code for the function. For example, codes on the main menu are A administrator functions F file-field table definitions R procedure reports T create/modify trigger definitions Depending on the function, a submenu, a pop-up, or a data screen appears.
File Name	Enter the file name, or enter a wildcard to display a selection list of file names and numbers (for example, the entry "a*" returns a list of all files with names that begin with the letter "a").
File Number	Enter the file number. When generating a file-field table from an FDT, you may enter "99999" instead of the actual file number to get a list of valid files.

Other input fields vary. For example:

- The File-Field Table Definitions Menu includes a Generation Type input field. Generation Type identifies the source from which the file-field table is to be generated (Natural DDM, Adabas FDT, or Predict Adabas file definition).

- The Trigger Definitions Menu includes the Field Name and Command Type input fields. File Name, Command Type, and Field Name comprise the selection criteria that you specify when you create the trigger definition.

Messages

The message area at the top or bottom of the screen is used to display one-line error or action messages. Each message includes a message number and a brief explanation. For more information, see the *Adabas Messages and Codes* documentation.

Commands

The following table describes the commands that can be entered at the command line. Not all commands apply to all screens.

Commands are not case-sensitive and can be entered in upper-, lower-, or upper- and lower-case. Commands are converted to upper-case before being processed.

The underlined portion of the command indicates the minimum abbreviation allowed.

Command	Display...
ACTIVITY or DISPLAY ACTIVITY	the Current Trigger Activity screen, which contains information about currently executing triggers.
DISPLAY PROFILE	the Display Profile Information screen, which contains the Trigger Maintenance facility profile.
DISPLAY TASKS or DISPLAY SYSTEMS	the Subsystem Activity screen, which contains information about currently executing Natural subsystems.
MENU	the Main Menu.
EXIT, QUIT, or . (period)	the previous screen.
FIELD	the File-Field Table Definitions Menu.
TRIGGER	the Trigger Definitions Menu.
ADMIN	the Administrator Menu.
PROFILE	the Profile Information Menu.
SET FILE	the database and file assignments for the current trigger file. You can enter a different database and file, which must be a valid trigger file.
SET FDIC	the database and file assignments for the current Predict file. You can enter a different Predict system file.
FORWARD or +	the next screen.
TOP, or --	from the top (beginning); for example, the start of a file-field table list.
BACK, or -	the previous screen.

PF Keys

The following table describes the standard PF keys.

Key	Label	Description	Menu or Screen
PF1	Help	Display information about the current function.	All screens
PF2	Menu	Return to the Main Menu.	All screens
PF3	Exit	Return to the previous screen. In most cases, if the update option has not been selected, this results in any updates being ignored.	All screens
PF4	Field	Display the File-Field Table Definitions Menu.	Main, Profile Information, Procedure Reporting, and Trigger Definitions menus
PF5	Trigr	Display the Trigger Definitions Menu.	Main, File-Field Table Definitions, Profile Information, and Procedure Reporting menus; Define Trigger Info, Add Function pop-up
PF6	Admin	Display the Administrator Menu.	Main, File-Field Table Definitions, and Trigger Definitions menus
PF7	Procs	Display the Procedure Reporting Menu.	Main Menu
PF10	FTRG	Display the File Assignments for Triggers pop-up, where you can enter a database and file different from the one currently used.	Main Menu and File-Field Table Definitions Menu
PF11	FDIC	Change the setting of the Predict file (for triggers only) from one value to another.	Main Menu and File-Field Table Definitions Menu
PF12	Canc	Cancel the current process and return to the previous screen. If the update option has not been selected, this results in any updates being ignored.	All screens

File-Field Tables

Triggers require access to a file-field table that maps long file names to file numbers and field names to Adabas two-character field identifiers.

The file-field table should contain an entry for

- all fields used in trigger definitions;

- all fields that will be referenced by an access or update command in a triggered procedure;

- all fields that must be queried by the record buffer extraction routine (STPRBE).

File-field tables can be generated from an Adabas FDT, a Natural DDM, or a Predict Adabas file, with the following restrictions:

- Superdescriptors, subdescriptors, hyperdescriptors, and phonetic descriptors are supported for histograms (L9) only.

After the file-field table entries are defined, the external field names and the internal field names and numbers can be correlated, and a trigger can be defined for any of the fields in the file-field table. If, for example, you refer to the EMPLOYEES file and the SALARY field, Adabas will be able to identify this as file 1 and field AS.

Record Buffer Extraction

When the record buffer extraction routine (STPRBE) extracts the value of a field in the record buffer, it must extract the value from the correct position and length. In order to position to the correct place, STPRBE must step past each superfluous field and must therefore know the length of each field.

- If the field length is not explicitly specified in the format buffer, it must be obtained from the file-field table definitions.

- If the length of a field is always found in the format buffer, as in Natural, then there is no need to include the field in the file-field table.

If the field length is not in the format buffer and a definition does not exist on the trigger file, an error will occur. The procedure will be unable to continue processing and will terminate.

Group-Field Table

When the group name is specified in the format buffer, STPRBE uses the group-field table to locate the elementary fields belonging to the group. Each entry in the group-field table contains specific information about an elementary field and its offset within a group. Offsets are maintained for up to seven group levels. Up to 50 elementary fields may have entries in the group-field table for a specific file.

Entries for the group-field table can be generated from either the Generate File-Field Table function or the Modify File-Field Table function.

File-Field Table Definitions Menu

File-field tables are generated and maintained using the File-Field Table Definitions function of the Trigger Maintenance facility. Any combination of fields can be added or subsequently deleted from the file-field table.

▶ To access the File-Field Table Definitions function

- Enter F on the Main Menu.

  The screen that appears is similar to the example shown below:

```
HH:MM:SS              ***** TRIGGER MAINTENANCE *****        YYYY-MM-DD
 User USR01        - File-Field Table Definitions Menu -     DBnr 105

                  Code   Function
                  ----   ----------------------------------
                   D     Display File-Field Table
                   G     Generate File-Field Table
                   M     Modify File-Field Table
                   P     Delete File-Field Table
                   R     Rename File-Field Table
                   S     Select File-Field Table
                   V     View the Origin for File-Field Table
                   ?     Help
                   .     Exit
                  ----   ----------------------------------


      Code ......... _
      File Name .... _____
      File Number .. _____
      Gen. Type .... __

 Command ==>
 Enter-PF1--PF2--PF3--PF4--PF5---PF6---PF7---PF8--PF9--PF10--PF11--PF12
      Help Menu Exit    Trigr Admin Procs          FTRG  FDIC  Canc
```

The following table briefly describes each of the functions on the File-Field Table Definitions Menu:

Function	Description
Display File-Field Table	Display the table for a specified file.
Generate File-Field Table	Generate a new table by adding or deleting fields. Requires a generation type code.
Modify File-Field Table	Modify the table by deleting one or more individual fields. A field cannot be deleted if it is used in a trigger definition.
Delete File-Field Table	Delete an entire table. A table cannot be deleted if it contains one or more fields that are used in a trigger definition.
Rename File-Field Table	Rename a table. All fields and triggers for the specified table are renamed.
Select a File-Field Table	Select a table from a selection list.
View the Origin for File-Field Table	Display the FDT, DDM, or Predict file from which the table was generated. Allows you to add selected fields to the table.

Display a File-Field Table

▶ **To display a file-field table**

● Enter D on the File-Field Table Definitions Menu.

```
HH:MM:SS                  ***** TRIGGER MAINTENANCE *****       YYYY-MM-DD
  User USR01                  - Display File-Field Table -        DBnr 105

  File Name ... AUTOMOBILES                                    Fnr ... 4

 Field Name   Long Field Name                   Status  Message
 ---------    ------------------------------    ------  ------------------
     AC       BODY-TYPE                         Triggr
     CA       COLOR                             Triggr
     AA       MAKE                              Active
     FB       MILEAGE                           Triggr
     AB       MODEL                             Active
     BD       WEIGHT                            Active
     DA       YEAR                              Active




              Enter 'F'(Fwd), 'T'(Top), 'B'(Bck), '.'(Exit)
 Command==>
 Enter-PF1---PF2---PF3---PF4--PF5---PF6--PF7--PF8--PF9---PF10---PF11--PF12
       Help  Menu  Exit        Next  --   -    +   Grp   GFld         Canc
```

○ Press ENTER to scroll through the information on this screen.

○ Press PF9 or continue scrolling to display the group table. If a group table has been generated for the file, the table is displayed at the end of the file-field table.

○ Press PF10 to display the group-field table.

Display a Group Table

▶ **To display the group table**

● Press PF9 (Grp) or scroll to the end on the Display File-Field Table screen:

```
HH:MM:SS                  ***** TRIGGER MAINTENANCE *****       YYYY-MM-DD
 User USR01                    - Display Group Table -          DBnr 105

 File Name ... AUTOMOBILES                                    Fnr ... 4

 Name Level Type Length     Name Level Type Length     Name Level Type Length
 ---- ----- ---- ------     ---- ----- ---- ------     ---- ----- ---- ------
  AB    1    G      60
  A1    1    G      53
  A2    1    G      21
  AQ    1    P      13
  A3    1    G       4
  AW    1    P      12




             Enter 'F'(Fwd), 'T'(Top), 'B'(Bck), '.'(Exit)
 Command ===>
 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help  Menu  Exit             --    -     +          GFld  FFT   Canc
```

○ Press ENTER to scroll through the information on this screen.

○ Press PF10 or continue scrolling to display the group-field table. The group-field table is displayed at the end of the group table.

○ Press PF11 to return to the Display File-Field Table screen.

Each group field on the file is listed. A "G" in the Type column represents a simple group field; a "P" represents a periodic (PE) group. Group-field table entries can only be created for fields that are part of a group or a PE group.

The Length column displays

○ for a simple group, the total length of all fields included in the group

○ for a PE group, the total length for each occurrence.

Display a Group-Field Table

▶ **To display the group-field table**

● Press PF10 (GFld) on the Display File-Field Table screen;

Or:
scroll to the end on the Display Group Table screen

```
 HH:MM:SS                    ***** TRIGGER MAINTENANCE *****            YYY-MM-DD
  User USR01                     - Display Group-Field Table -            DBnr 105

  File Name ... AUTOMOBILES                                            Fnr ... 4

  Field                 Group Offsets                       Message
 ---------------        ----------------------------------- --------------------
  2,AS,5,P              AQ(3)
  2,AT,5,P              AQ(8)
  2,AU,2,U              A3(0)
  2,AV,2,U              A3(2)
  2,AX,6,U              AW(0)
  2,AY,6,U              AW(6)



            Enter 'F'(Fwd), 'T' (Top), 'B' (Bck), or '.'(Exit)

  Command ===>
  Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
```

○ Press ENTER to scroll through the information on this screen.

○ Press PF9 to display the group table.

○ Press PF11 to return to the Display File-Field Table screen.

Fields are shown in ADACMP FNDEF format: level, name, length, format [options]. See the *Adabas Utilities* documentation for more information.

The Group Offsets column names the group in which the field participates and the offset of the field within that group. If a field is a member of more than one group, the additional groups (and the field's offset within) are also listed.

For example, field AS belongs to group AQ and is located at offset 3. Field AT also belongs to group AQ but is located at offset 8.

Modify a File-Field Table

▶ **To modify a file-field table**

- Enter M on the File-Field Table Definitions Menu.

```
HH:MM:SS                    ***** TRIGGER MAINTENANCE *****      YYYY-MM-DD
User USR01                    - Modify File-Field Table -       DBnr 105

 File Name ... AUTOMOBILES                                      Fnr ...4

 Sel   Field Name  Long Field Name                    Status  Message
 ----  ----------  ------------------------------     ------  --------------
  __        AC      BODY-TYPE                          Triggr
  __        CA      COLOR                              Triggr
  __        AA      MAKE                               Active
  __        FB      MILEAGE                            Triggr
  __        AB      MODEL                              Active
  __        BD      WEIGHT                             Active
  __        DA      YEAR                               Active




Mark fields with 'A' Add, 'D' Delete, 'G' Generate, 'I' Info, or '.' Exit

Command==>
Enter-PF1---PF2---PF3---PF4--PF5---PF6--PF7--PF8--PF9---PF10---PF11--PF12
      Help  Menu  Exit       Next  --   -    +    Grp   GFld         Canc
```

   ○ Press ENTER to scroll through the information on this screen.

   ○ Press PF9 or scroll to the end to display the group table. The group table cannot be modified.

   ○ Press PF10 to modify the group-field table.

On the Modify File-Field Table screen, fields with a "Status" of

   ○ "Triggr" are used in a trigger definition.

   ○ "Active" are included in the file-field table but are not used in any trigger definition.

Modifying Fields

From the Modify File-Field Table screen, you can generate group-field table entries, display field attributes, or delete fields from the file-field table.

▶ **To generate group-field table entries**

● Mark each field for which an entry is to be generated by typing a G in the Sel column next to the field name. Then press ENTER.

   Group-field table entries can only be created for fields that are part of a group or a PE group.

▶ **To display the attributes for an individual field**

● Mark the field by typing an I in the Sel column next to the field name. Then press ENTER.

   The resulting window displays the field name, format, length, type (SP for superdescriptor; SB for subdescriptor), and an indicator if a group-field entry has been generated for the field.

▶ **To delete one or more fields**

● Mark each field to be deleted by typing a D in the Sel column next to the field name. Then press ENTER.

   The following rules apply:

   ○ You can cancel a field deletion by typing an A in the Sel column next to the field name *before* pressing ENTER.

   ○ Only "Active" fields can be deleted.

   ○ "Triggr" fields cannot be deleted unless the trigger definition is deleted first.

Modifying the Group-Field Table

▶ **To modify the group-field table**

● Press PF10 (GFld) on the Modify File-Field Table screen;

   Or:
   scroll to the end on the Display Group Table screen

```
HH:MM:SS                     ***** TRIGGER MAINTENANCE *****                YYY-MM-DD
User USR01                     - Modify Group-Field Table -                 DBnr 105

 File Name ... AUTOMOBILES                                           Fnr ... 4

 Sel Field                Group Offsets                          Message
 --- ---------------      ----------------------------------- ---------------
  _    2,AS,5,P             AQ(3)
  _    2,AT,5,P             AQ(8)
  _    2,AU,2,U             A3(0)
  _    2,AV,2,U             A3(2)
  _    2,AX,6,U             AW(0)
  _    2,AY,6,U             AW(6)




          Mark Fields with 'D'(Delete) or '.'(Exit)

 Command ===>
 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help  Menu  Exit                 --    -     +    Grp        FFT   Canc
```

○ Press ENTER to scroll through the information on this screen.

○ Press PF9 to display the group table. The group table cannot be modified.

○ Press PF11 to return to the Modify File-Field Table screen.

Fields are shown in ADACMP FNDEF format: level, name, length, format [options]. See the *Adabas Utilities* documentation for more information.

The Group Offsets column names the group in which the field participates and the offset of the field within that group. If a field is a member of more than one group, the additional groups (and the field's offset within) are also listed.

For example, field AS belongs to group AQ and is located at offset 3. Field AT also belongs to group AQ but is located at offset 8.

▶ **To delete one or more entries**

- Mark each entry to be deleted by typing a D in the Sel column next to the field name. Then press ENTER

Delete a File-Field Table

Use the delete function on the File-Field Table Definitions Menu only if the *entire* file-field table is to be deleted. Deleting the file-field table also deletes any associated group-field table for that file.

▶ **To delete an entire file-field table**

- Enter P for Delete File-Field Table on the File-Field Table Definitions Menu.

If a TRG0109 error occurs, it indicates that the table cannot be deleted until all triggers are removed. Display the file-field table and determine whether any of the fields in the table are marked "Triggr" (used in a trigger definition). If not, then the trigger definitions should be checked. It is likely that a trigger with the "all fields" option (i.e., field name **) has been defined for this file.

Generate a File-Field Table

▶ **To generate a file-field table**

- Enter G on the File-Field Table Definitions Menu as well as the file name and a generation type code as shown in the following table:

Code	Source
F	Adabas FDT
D	Natural DDM
P	Predict file

- ○ FDT generations always originate from the DBID of the database for the current setting of the Trigger File.

- ○ DDM and Predict generations always originate from the database and file number of the Predict file. This may be taken from the current setting of FDIC; or it may be overwritten using PF10 or by issuing the command SET FDIC from the command line of the Trigger Maintenance facility.

Note:
Wildcard notation cannot be used for the FDT file name. However, for the generate function only, "99999" can be entered for file number to display a list of all files loaded to the database.

The screen that appears contains the source (FDT, DDM, or Predict file) from which the file-field table will be generated. You can select fields to be added to or deleted from the file-field table. See the *sample FDT*.

When the file-field table is generated, a check is done to see if the field name (long) changed for a field (determined by the Adabas short name). If so, the status field contains the value "Alias" and the name of the new field is placed in the message field, preceded by a colon (:). Type an A in the Sel column next to the field name to update the entry with the new name.

In the case of FDT generations, the field name is always generated as the Adabas short name followed by "-FIELD". When the Trigger Maintenance facility finds a name that was not generated, it is used as the long field name with the "xx-FIELD" name in the message. Again, type an "A" in the Sel column to confirm the change. The *sample FDT* includes the status for each field. Fields marked "Active" are already contained in the file-field table.

If the generation type is "F" (Adabas FDT), field names are generated as "xx-FIELD", where "xx" is the Adabas field name. Subsequently, if a DDM or Predict Adabas file has the same file number and file name as that given for the FDT definition, these fields may be updated with the user-defined names of the DDM or Adabas file.

Note:
Fields in the Field Definition column are shown in ADACMP FNDEF format where type "U" stands
for unpacked numeric and field lengths are in bytes, not digits.

```
 HH:MM:SS                   ***** TRIGGER MAINTENANCE *****         YYYY-MM-DD
  User USR01          - Generate/Modify File-Field Table -        DBnr 105

   FDT File Name .. AUTOMOBILES                            FDT Fnr ... 4

   Sel Field Definition      Long Field Name    Status     Message
   --- ----------------      ---------------    ------     --------------
    _  01,AA,020,A,DE,NU      MAKE               Active
    _  01,AB,020,A,DE,NU      MODEL              Active
    _  01,AC,015,A,DE,NU      BODY-TYPE          Active
    _  01,BA,002,U,DE,NU      BA-FIELD
    _  01,BB,003,U,DE,NU      BB-FIELD
    _  01,BC,005,U,NU         BC-FIELD
    _  01,BD,005,U,NU         WEIGHT             Active
    _  01,CA,010,A,DE,NU      COLOR              Active
    _  01,DA,002,U,DE,NU      YEAR               Active
    _  01,DB,016,A,NU         DB-FIELD
    _  01,FA,006,U,DE,NU      FA-FIELD
    _  01,FB,006,U,DE,NU      MILEAGE            Active

   Mark Fields with 'A' Add, 'D' Delete, 'G'Generate, 'I' Info, or '.' Exit

 Command==>
 Enter-PF1---PF2---PF3---PF4--PF5---PF6--PF7--PF8--PF9--PF10--PF11--PF12
       Help  Menu  Exit       Next  --    -    +                    Canc
```

▶ **To add one or more fields**

● Mark each field to be added by typing an A in the Sel column next to the field name. Then press
  ENTER.

  If you want to add all fields to the file-field table, enter ALL at the command line.

▶ **To delete one or more fields**

● Mark each field to be deleted by typing a D in the Sel column next to the field name. Then press
  ENTER.

▶ **To generate group-field table entries**

● Mark each field for which an entry is to be generated by typing a G in the Sel column next to the
  field name. Then press ENTER.

  Group-field table entries can only be created for fields that are part of a group or a PE group.

▶ **To display the attributes for an individual field**

● Mark the field by typing an I in the Sel column next to the field name. Then press ENTER.

  The resulting window displays the field name, format, length, type (SP for superdescriptor; SB for
  subdescriptor), and an indicator if a group-field entry has been generated for the field.

Trigger Definitions

Note:
For information about TRGMAIN, and API for maintaining triggers from a user program, see *TRGMAIN: An API To Maintain Triggers*.

Conceptually, a trigger has two parts: the triggering event and the triggered procedure. The triggering event is defined by a set of selection criteria. When the criteria are fulfilled, the triggered procedure is executed in response.

The selection criteria, i.e., file name, command type, and field name, are stored in the target database as part of the trigger definition. The file-field table maps them to the corresponding physical Adabas file number and two-character field ID. The file name and the field name are meaningful names of up to 32 characters.

Note:
Database commands from the procedure that is executed as a result of a trigger are not limited to the database against which the initiating Adabas command is executed.

File Name

File name specifies the file against which the initiating Adabas command operates. A trigger is defined for one and only one Adabas file. If you want a trigger to apply to more than one file, define multiple triggers (one for each file) that are identical except for the file name.

Command Type

Command type specifies the command class of the initiating Adabas command. Triggers are defined to execute based on the presence of the specified command type.

One or all of the following Adabas command classes can be specified for a single trigger definition:

Command Class	Command Code
FIND	S1, S2, S4
READ	L1, L2, L3, L4, L5, L6, L9
UPDATE	A1, A4
INSERT	N1, N2
DELETE	E1, E4

If you want a trigger to apply to all command classes, leave the command type field blank. It defaults to "All" (all commands).

If you want a trigger to apply to more than one but not all command classes, define multiple triggers (one for each class) that are identical except for the command class.

Field Name

A trigger can be associated with a command that operates on a single field in the file or all fields in the file. It is possible, for example, to define a trigger that fires every time an UPDATE command is executed against the SALARY field in the EMPLOYEES File.

It is not always appropriate to specify a field. For example:

- It does not make sense to associate a specific field with a DELETE command, because the DELETE command does not require a format buffer.

- In the case of a pre-command trigger read command, the field will contain no data. Therefore, there is no need to specify a field unless you want to validate either the fields to be read or the user ID of the user issuing the request.

If you want a trigger to apply to more than one but not all fields, define multiple triggers (one for each field) that are identical except for the field name.

A trigger will be fired for only one field, i.e., the field that is specified in the format buffer, depending on the event selection criteria. However, if triggers need to be fired for multiple fields, it is possible to define the trigger file for a specific command and field, then have the procedure itself check for the existence of other fields. See the section *Implementing Support for Multi-Triggers*.

The procedure can verify whether additional procedures should be invoked and, if so, for what fields. This mechanism also allows the "main" procedure to handle errors and decide whether another procedure should be invoked even if the previously executed procedure resulted in an error. The user therefore has the flexibility to control situations where a precise set of rules is needed to determine whether a procedure should or should not be fired.

Trigger Definitions Menu

The Trigger Definitions Menu (shown below) contains the functions that allow you to create and maintain trigger definitions.

▶ **To access the Trigger Definitions Menu**

- Enter T for Create/Modify Trigger Definitions on the main menu.

```
 HH:MM:SS                 ***** TRIGGER MAINTENANCE *****        YYYY-MM-DD
  User USR01                  - Trigger Definitions Menu -          DBnr 105

                            Code  Function
                            ----  -------------------------
                             A    Add Trigger Definition
                             D    Display Trigger Definition
                             M    Modify Trigger Definition
                             P    Delete Trigger Definition
                             S    Select Trigger Definition
                             ?    Help
                             .    Exit
                            ----  ------------------------
                   Code ........ _        Active/Deactive Opt... _
                   File Name ... _____
                   Cmd Type .... _
                   Field Name .. _____

 Command ==>
 Enter PF1---PF2---PF3---PF4---PF5---PF6---PF7--PF8--PF9--PF10--PF11--PF12--
       Help  Menu  Exit  Field       Admin Procs        FTRG  FDIC  Canc
```

The functions on the Trigger Definitions Menu allow you to add, display, modify, or delete trigger
definitions. You can display a screen that contains multiple trigger definitions for the same file, or a
pop-up window that contains a single trigger definition for a specific field within the file.

▶ To access all trigger definitions for a particular file

● Enter the function code (A for add, D for display, M for modify, or P for purge/delete) and the file
  name. Enter a wild card value for command type and field name.

  A screen containing all trigger definitions for the file appears. Depending on the function code
  entered to access the screen (A, D, M, or P), you can add, display, modify, or delete one or more
  trigger definitions. See the section *Multiple Trigger Definitions*.

▶ To access a specific trigger definition

● Enter the function code (A, D, M, or P), the file name, and the field name.

  A pop-up window containing the trigger definition appears. Depending on the function (A, D, M, or
  P), you can add, display, modify, or delete the trigger definition. See the section *Single Trigger
  Definition*.

You can also use the Trigger Definitions Menu to select one or more triggers.

▶ To select a trigger or triggers

1. Enter function code S and a file name or a wildcard value for file name, e.g., >G.

   The screen that appears is similar to the following example:

   Note:
   If a specific file name is selected, the screen contains the long field names and not the file names.

```
HH:MM:SS              ***** TRIGGER MAINTENANCE *****              YYYY-MM-DD
User USR01            - List Trigger Definitions -                DBnr 105

Sel File Name / Long Field Name     Commnd  Type       ProcName Para   RecB
--- ---------------------------     ------- ----       -------- ------ ----
_   MISCELLANEOUS                   Delete  Pre Non-P  SYMP0003 Cont   None
    ** Any Field **
_   VEHICLES-FILE                   Delete  Pre Non-P  SYMP0003 Cont   None
    ** Any Field **
_   VEHICLES-FILE                   Read    Pre Async  ANYONE   Contrl None
    ** Any Field **
_   VEHICLES-FILE                   Read    Pre Async  MAKE0001 Cont   None
    MAKE
_   VEHICLES-FILE                   Read    Pre Async  MODEL001 Cont   None
    MODEL
_   VEHICLES-FILE                   Read    Pre Async  COLOR001 Contrl None
    COLOR
_   VEHICLES-FILE                   Read    Pre Async  CLASS001 Contrl None
    CLASS
_   GDMUSIC                         (All)   Pre Async  PROC008  Contrl None
    ** Any Field **


Command ==>
Enter PF1---PF2---PF3---PF4---PF5---PF6---PF7--PF8---PF9---PF10--PF11--PF12
          Menu  Exit                 --    -    +                       Canc
```

2. In the Sel field next to the file name, enter D for display, M for modify, S for select, or P for purge.

   If you enter D, P, or M, a pop-up window containing the trigger definition appears. See the section *Single Trigger Definition*.

   If you enter S, the trigger is selected and the Trigger Definitions Menu appears.

Multiple Trigger Definitions

▶ To add, display, modify, or delete one or more trigger definitions

1. On the Trigger Definitions Menu, enter the code (A, D, M, or P) and the file name. The command type is optional; if you leave it blank, it defaults to "All" (all commands).

   Depending on the code entered, one of the following screens appears:

   ● Add Trigger Definitions

   ● Display Trigger Definitions

   ● Modify Trigger Definitions

   ● Delete Trigger Definitions

   These screens contain the trigger definitions for the specified file. For example, the Modify Trigger Definitions screen is similar to the following:

```
 HH:MM:SS                 ***** TRIGGER MAINTENANCE *****        YYYY-MM-DD
 User USR01               - Modify Trigger Definitions -        DBnr 105

                                                     Pre-Post .. Pre
 File ... VEHICLES-FILE (3)                          Command ... Read

 Prty Long Field Name             Fld Type    ProcName Params RecBuff Msg
 ---- -------------------------------- --- ----- -------- ------ -------
 010  COLOR_____ AF  Async  COLOR001 Contrl None___
 020  CLASS_____ AH  Async  CLASS001 Contrl None___
 030  MAKE_____ AD  Async  MAKE0001 Contrl None___
 040  MODEL_____ AE  Async  MODEL001 Contrl None___
 050  ** Any Field **_____ **  Async  SAMP0002 Contrl None___
 ___  _____ __  _____  _____ _____ _____
 ___  _____ __  _____  _____ _____ _____
 ___  _____ __  _____  _____ _____ _____
 ___  _____ __  _____  _____ _____ _____
 ___  _____ __  _____  _____ _____ _____
 ___  _____ __  _____  _____ _____ _____
 Modify Entries, or enter '.'(Exit), or '?'(Help) to see options ... _

 Command ==>
 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12
      Help  Menu  Exit        Updat        -     +          Reseq Post  Canc
```

2. After entering the appropriate information, press PF5 to update the trigger table.

   A message informs you that the update has been confirmed. An error message appears if you enter information that is invalid or incomplete.

Entry Fields

The following paragraphs describe the entry fields in the Trigger Definitions screens.

Note:
You are not required to enter both the long field name and the Fld (short field name). If either is entered, the other is derived from the file-field table entry.

Prty (priority)

The Adabas trigger driver scans the format buffer for a match with the selection criteria defined for each trigger. When multiple field names are specified for the same file and command, the priority assigned to each field determines the order in which it is processed. When a match is found, the trigger is fired. The Prty field allows you to set or modify the sequence.

The highest priority is 1. Priorities are represented, however, in steps of ten from 10-900. Other values are entered to change the sequence or "priority" of the fields. Values entered between the steps of ten are resequenced (using the RESEQ command; see the section *Commands*) to the next higher 10s values; for example, entering priorities of 11 and 12 for fields resequences them to represented values 20 and 30, respectively.

To change a field's priority, specify a value between 1 and 9

● higher than the represented value of the field you want it to follow; or

- lower than the represented value of the field you want it to precede.

Example:

To change the priority of MAKE on the List Trigger Definitions screen from the represented value 30 to 10 with the other fields changing priority accordingly, assign MAKE a value between 1 and 9.

When the RESEQ command is used, the priorities of all fields are changed to 10-900 with MAKE as 10, COLOR as 20, CLASS as 30, etc.

Long Field Name

The Adabas long field name for the field. Enter a wildcard to display a selection list of field names. If the long field name is not known, it can be derived from the Fld (short field name).

Fld (short field name)

The Adabas short field name, that is, the unique name used by the DBMS to identify a particular field for a particular file. It must correspond to the long field name for the field. If the short field name is not known, it can be derived from the long field name.

Type

Type is asynchronous, participating, or non-participating. The default value is asynchronous.

ProcName

The name of the Natural subprogram that should be invoked when the selection criteria for the trigger are met. The value must be a valid Natural subprogram name of 1-8 characters. There is no default value.

Important:
The name of the user job that calls the trigger must be different from the trigger's ProcName.

Params

When the trigger procedure is invoked, the parameters passed may be:

Contrl	Using the ACB interface, control parameters are used to pass information about the trigger request as well as the trigger command and a modifiable response code field. Contrl is the default value.
Contrx	Using either the ACB or ACBX interface, control parameters are used to pass information about the trigger request as well as the trigger command and a modifiable response code field.
Resp	A modifiable response code field is used to prevent the execution of a command in the case of a pre-command trigger. Response code is used with synchronous triggers only; it has no value or meaning with asynchronous triggers, which may already have completed.
None	No parameters are passed.

RecBuff

Value may be access (read only), update (read and write), or none.

Msg

An error message text may be displayed in this field when an error occurs. An explanation of the error is displayed at the bottom of the screen.

Commands

The following table describes the commands that can be entered at the command line in the Trigger Definitions screens:

Note:
Commands can be entered in upper-, lower-, or mixed-case.

Command	Description
PRTY	Display the Modify Trigger Definitions screen, where you can modify the priority assigned to a trigger.
UPDATE	Update the trigger file with the values entered.
BACK, -	Display the previous screen.
FWD, +	Display the next screen.
RESEQ	Resequence the list of trigger definitions, in order by priority.
POST	Display the post-command triggers for this file and command.
PRE	Display the pre-command triggers for this file and command.
ACTIVATE	Activate pre-command triggers or post-command triggers.
DEACTIVATE	Deactivate pre-command triggers or post-command triggers.
DELETE	Delete selected trigger definitions from the trigger file.
MODIFY	Modify the trigger definitions.

Single Trigger Definition

▶ **To add, display, modify, or delete a single trigger definition**

● Enter the code (A, D, M, or P), the file name, and the field name on the Trigger Definitions Menu.

The command type is optional; if you leave it blank, it defaults to "All" (all commands).

Depending on the code entered, an add, display, modify, or delete function pop-up window appears. These windows contain trigger information and procedure information about the specified trigger definition (see the example Modify Function Screen):

○ Trigger information includes the file name and number, command type (read, update, etc.), the long field name and the Adabas field name. Also displayed is the current status of the trigger, as shown in the following table:

Status	Description
Active	The trigger is currently active on the trigger file and for the currently active nucleus.
Inactive	A permanent deactivation of the trigger was requested; the trigger will remain in this state until activated.
Temp Inactive	The trigger is inactive for the running nucleus only. A temporary "deactivate" was requested; the trigger remains in this state until an "activate" is issued.
File Not Used	The file number specified in the trigger definition is greater than the maximum file number for the database (highest file number used plus 10). See *Creating the Trigger Table*.
Not Loaded	A trigger has been added to the file since the last time the nucleus was activated. The trigger will become active the next time a REFRESH command is issued or the nucleus is restarted.
Not Checked	The Trigger Maintenance facility is not active in the nucleus; therefore, no checking for the status of a trigger can be done.
Inaccessible	The Adabas nucleus is not accepting any requests for trigger status.

○ Procedure information includes the procedure name, pre-command or post-command status, the trigger type (asynchronous, participating or non-participating), the CALLNAT parameters type (cntrl, resp, or none) and the record buffer option (access, update, or none).

▶ **To add a trigger definition**

1. Enter the name of the procedure.

2. Modify options as required.

3. Press PF5 to confirm the addition.

▶ **To modify a trigger definition**

1. The Modify Function pop-up is similar to the following:

```
Modify Details and press 'PF5' to Confirm Update.

   HH:MM:SS   *** Define Trigger Info ***   YYYY-MM-DD
                  - Modify Function -

   Trigger Information   ** Active **
     File Number ....... 4
     File Name ......... AUTOMOBILES
     Command Type ...... Read
     Long Field Name ... BODY-TYPE
     Adabas Field ...... AC
     Field Prty/Seq .... 010
   Procedure Information
     Name (Subpgm)...... _____
     Pre Cmd Select .... N  (Post)
     Trigger Type ...... N  (Non-Participating)
     CALLNAT Params .... C  (Cntl Info + Resp)
     RecBuffer Access .. A  (May be Accessed)

   Command ==>
   Enter-PF1--PF2--PF3--PF4--PF5--PF6--PF7--PF8--
         Help Menu Exit Prty Updat     Act  Deact
```

2. Modify the Field Prty/Seq (priority or sequence) and/or any of the fields under Procedure Information.

3. If you want to activate or deactivate the trigger, enter ACTIVATE or DEACTIVATE at the command line. Then choose whether the trigger's status should be changed temporarily or permanently:

Command		**means...**
Activate	temporarily	activate the trigger in the nucleus but retain its inactive status in the trigger file.
	permanently	activate the trigger in the nucleus and remove its inactive status from the trigger file.
Deactivate	temporarily	ignore the trigger for any checking of event criteria for any command issued to the database; that is, no trigger can be fired for this definition.
	permanently	store the trigger on the trigger file with the status "deactive"; do not activate when the nucleus is started. The trigger may, however, be started at a later time. An active Adabas session is deactivated immediately.

4. Press PF5 to confirm the update.

▶ **To delete a trigger definition**

● Press PF5 to confirm the deletion.

To display all fields for the file in sequence by priority

• Press PF4 or enter PRTY at the command line.

   Note:
   If the trigger specifies the command type "Delete", the screen that appears allows the user to define a
   pre- and/or post-trigger definition at the same time.

Procedure Reports

The Procedure Reporting Menu shown below allows you to obtain an alphabetic list of triggered
procedures sorted by file or by procedure name. You can limit the report to a specific file or include all
files. Procedure reports can be used, for example, to locate duplicate procedures or identify each instance
where a particular procedure is used.

To access the Procedure Reporting Menu

• Enter R for Procedure Reports on the Main Menu.

```
HH:MM:SS                ***** TRIGGER MAINTENANCE *****        YYYY-MM-DD
User USR01               - Procedure Reporting Menu -          DBnr 105

                        Code   Function
                        ----   -------------------------
                         F     Display Procedures by File
                         N     Display Procedures by Name
                         ?     Help
                         .     Exit
                        ----   -------------------------

               Code ........ N
               File Number .. _____
               Procedure .... PROC0001




 Command ==>
 Enter PF1---PF2--PF3--PF4---PF5---PF6---PF7---PF8--PF9--PF10--PF11--PF12
       Help  Menu Exit Field Trigr Admin                            Canc
```

To list the procedures for a particular file only

• Enter code F for Display Procedures by File and the file number.

To list procedures beginning with a particular name

• Enter code N for Display Procedures by Name, and the procedure name.

In either case, the screen displayed contains the type of information shown in the following example.

```
HH:MM:SS                 ***** TRIGGER MAINTENANCE *****      YYYY-MM-DD
User USR01                   - List Procedure Names -         DBnr 105

 File Name ... AUTOMOBILES                                    Fnr ... 4


 Sel  ProcName  Command  Field Name                 When  Type   ParmTy
 ---  --------  -------  -------------------------- ----  -----  ------
  _   PROC0001  Read     BODY-TYPE                  Post  NonP   Cntrl
  _   PROC0001  Update   ** Any Field **            Pre   Async  Cntrl
      PRO001    (All)    MILEAGE                     Pre   Async  Cntrl
  _   SUBPGM    Read     COLOR                      Pre   Async  Cntrl




 Select 'D' to Display, or enter 'F'(Fwd), 'T'(Top), 'B'(Bck), '.'(Exit)
 Command ==>
Enter-PF1---PF2---PF3---PF4---PF5---PF6--PF7--PF8---PF9--PF10--PF11--PF12
      Help  Menu  Exit                   --    -    +                Canc
```

The procedure report contains the database number, the file number, the file name, and the following information for each procedure:

Field	Description
ProcName	The name of the triggered procedure.
Command	The Adabas command that initiates the trigger.
Field Name	The trigger field name.
When	When the procedure executes: ● "pre-command": The procedure executes before the initiating Adabas command. ● "post-command": The procedure executes after the initiating Adabas command.
Type	The type of trigger: ● "non-participating": The triggered procedure does not participate in the initiating Adabas command's transaction logic. ● "participating": The triggered procedure may participate in the initiating Adabas command's transaction logic. ● "asynchronous": The Adabas command and the triggered procedure execute separately and do not affect each other. The triggered procedure's transaction logic does not participate in the Adabas command transaction logic.
ParmTy	The type of parameters passed when the procedure is invoked: ● "control": ACB-style control parameters are used to pass information about the trigger request as well as the trigger command and a modifiable response code field. This is the default value. ● "controlx": ACB- or ACBX-style control parameters are used to pass information about the trigger request as well as the trigger command and a modifiable response code field. ● "response": A modifiable response code field is used to prevent the execution of a command in the case of a pre-command trigger. Response code is used with synchronous triggers only; it has no value or meaning with asynchronous triggers, which may already have completed. ● "none": No parameters are passed.

▶ **To obtain more information about a specific procedure**

● Enter D in the Sel column next to the procedure name.

A pop-up window displays information about the trigger definition as well as the procedure, and is similar to the following example:

```
Trigger Information currently displayed

                  HH:MM:SS   *** Define Trigger Info ***   YYYY-MM-DD
                             - Display  Function -
                  Trigger Information
                    File Number ....... 4
                    File Name ........ AUTOMOBILES
                    Command Type ...... Read
                    Long Field Name ... BODY-TYPE
                    Adabas Field ...... AC
                    Field Prty/Seq .... ____
                  Procedure Information
                    Name (Subpgm)...... PROC0001
                    Pre Cmd Select .... N  (Post)
                    Trigger Type ...... N  (Non-Participating)
                    CALLNAT Params .... C  (Cntl Info + Resp)
                    RecBuffer Access .. A  (May be Accessed)

                  Command ==>
                  Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8-
                        Help  Menu  Exit  Prty
```

○ Trigger information includes the trigger event criteria, i.e., file name and number, command type, long field name and the Adabas field name.

○ Procedure information includes the Natural subprogram name, whether the procedure is pre-command or post-command, the trigger type (asynchronous, participating or non-participating), the CALLNAT parameters category (cntrl, resp, none) and the RecBuffer access status (A=access, N=no access, U=access/update).

Administrator Functions

The Administrator Functions allow you to monitor trigger activity, display and modify the profile, and maintain job status settings and buffer sizes.

▶ **To access the Administrator Functions Menu**

● Enter A for Administrator on the Main Menu.

```
HH:MM:SS                ***** TRIGGER MAINTENANCE *****           YYYY-MM-DD
User USR01              - Administrator Functions Menu -          DBnr 105


                       Code  Function
                       ----  --------------------------
                        A    Active Session Settings
                        D    Display Profile Information
                        M    Modify Profile Information
                        S    Subsystem Activity
                        T    Trigger Activity
                        ?    Help
                        .    Exit
                       ----  --------------------------

               Code ... D

Command ==>
Enter PF1---PF2---PF3---PF4---PF5---PF6--PF7--PF8---PF9---PF10--PF11--PF12--
      Help  Menu  Exit  Field Trigr      Procs           FTRG        Canc
```

Active Session Settings

Active session settings includes job status settings and buffer sizes.

▶ To modify the active session settings

1. On the Administrator Functions Menu, enter A for Active Session Settings.

2. Modify the field values and press PF5 to update the settings.

In a nucleus cluster environment, any changes to the active session settings are populated to all active nuclei in the cluster.

The Active Session Settings screen is similar to the example shown below:

```
HH:MM:SS                ***** TRIGGER MAINTENANCE *****            YYYY-MM-DD
User USR01                  - Active Session Settings -            DBnr 105

 Job Name ..........SAGDT077            Trigger File Number ......12


 SVC Number ........217                Max File to be accepted...60
 Nucleus .......... Active__
 Triggers ......... Active__           Session Buffer Sizes in Bytes
 Stored Proc. ..... Active__             Trigger Table Buffer....8192
 Error Action ..... Halt                 Pre Trigger Queue......15244
 Trigger Logging .. Active__             Post Trigger Queue.....2960
 Activity Timeout.. 600                  Waiting Subsys Queue....80
 Subsystems                             Acquired Storage.......31232
   Maximum .......5                     Used Storage...........31232
   Active ........5
   Inactive ...... 0
   Waiting .......5
   In Progress ....0

Change Parameters as required or press 'PF3' to Exit


Command ==>
Enter PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12-
     Help  Menu  Exit  Sact  Updat                                    Canc
```

Note:
Press PF4 to display the Subsystem Activity screen.

The following table describes the Active Session Settings fields:

Field	Description
Job Name	The job name for the Adabas nucleus.
SVC Number	The SVC number being used by the database.
Nucleus	Indicates when Adabas Triggers and Stored Procedures is active for the current database.
Triggers	If "active" (the default), triggers can be executed for this database; if "inactive", they cannot. This field can be modified. You may enter "refresh" to update the trigger table (see the section *Updating the Trigger Table*).
Stored Procedures	If "active" (the default), stored procedures can be executed for this database; if "inactive", they cannot. This field can be modified.
Error Action	The action ("reject", "halt", or "ignore") to be taken by Trigger Maintenance when a processing error occurs. This field can be modified.
Trigger Logging	The logging function is "active" or "inactive".
Activity Timeout	The number of seconds before a task is cancelled. The default value is 60; the maximum value is 9999. This field can be modified. If set to zero, it will default to the Adabas TT parameter value.

Field	Description	
Subsystems	Maximum	The number of assigned Natural subsystems. The value can be 01-10.
	Active	The number of Natural subsystems initiated. The value may be less than the maximum allowed if an error from which the system cannot recover occurs and the subsystem becomes inactive.
	Inactive	The number of Natural subsystems currently terminated or shut down due to the occurrence of errors from which the system could not recover.
	Waiting	The number of subsystems currently waiting for work.
	In Progress	The number of subsystems currently processing triggers.
Trigger File Number	The file number of the trigger file for the database.	
Max File to be accepted	The maximum file number that Adabas Triggers and Stored Procedures will accept. This is set as the highest file loaded plus 10 when the database comes up and/or is initialized. If a higher file number is subsequently added to the database, any triggers found for the file are ignored. To activate triggers beyond the Max File value, the database must be shut down and restarted.	
Session Buffer Sizes in Bytes	Trigger Table Buffer	The size of the trigger table buffer. This field can be modified using the Modify Profile function.
	Pre-Trigger Queue	The size of the queue for all pre-command triggers being processed at any given time.
	Post-Trigger Queue	The size of the queue for all post-command triggers being processed at any given time.
	Waiting Subsys Queue	The size of the queue for tasks waiting to process triggers; currently fixed at 80 bytes.
	Acquired Storage	The total amount of storage to be acquired for use by Adabas Triggers and Stored Procedures.
	Used Storage	The actual amount of storage used by Adabas Triggers and Stored Procedures during processing.

Updating the Trigger Table

By using the REFRESH command, you can add new triggers to the trigger table without shutting down the database. In nucleus cluster environments, the REFRESH command updates the trigger table on all cluster nuclei.

If the number of additional triggers to be loaded is far greater than the number loaded initially, manually allocate enough additional space to handle the increased number of triggers. If the trigger table buffer is not large enough, an inconsistency may occur that terminates Adabas Triggers and Stored Procedures based on the value of the error action field in the Adabas triggers profile.

The need to update the trigger table can be avoided by preloading the required triggers before the applications that use them are implemented.

▶ To update the trigger table,

- Enter REFRESH at the command line, or enter "refresh" in the triggers field.

Buffer Size Calculations

Buffers are required for the trigger table, the pre-trigger queue, and the post-trigger queue:

Trigger Table

The trigger table buffer size is calculated as follows:

```
  ((TOT TRG + TOT FILE)) * TRG ELEMENT) + 4096 = TOTAL  SIZE
```

where

TOT TRG	is the total number of triggers defined on the trigger table
TOT FILE	is the total number of files for which triggers exist
TRG ELEMENT	is the size of the trigger element (28 bytes)

When the Adabas trigger driver calculates the TOTAL SIZE, the result is rounded down to a multiple of 256.

Pre-Trigger Queue and Post-Trigger Queue

Depending on how many commands per second are passed to the database, how long the actual procedures run, and whether the triggers are synchronous or asynchronous, queuing may or may not occur. Each buffer is set up to independently queue the pre- and post-triggers. If the queues become full, subsequent commands that would result in triggers being fired receive a response code 154 (ADARSP154). After the queuing has eased, the DBA should consider increasing the queue size.

In setting up the buffer sizes, consideration must also be given to the ratio of pre-triggers to post-triggers. For instance, if no pre-triggers are used, the pre-trigger queue is not required; all buffer space should be allocated to the post-trigger queue.

- The pre-trigger queue is required only if pre-command triggers are defined on the trigger file. Its buffer size is calculated as follows:

```
(NC / 2) * 148 = TOTAL SIZE
```

where "NC" is the value of the ADARUN parameter NC.

This calculation is valid if all triggers are synchronous. If asynchronous triggers are used, commands may be issued continuously before the procedure resulting from the previous command has completed. This results in queuing, which requires a larger buffer size.

Whether the amount the buffer should be increased depends on the number of commands being issued and the speed at which they are issued (i.e., the amount of time between the response from one command and the issue of the next command), and the amount of time required for each trigger's procedure to complete. For example, a batch job issuing thousands of commands that fire asynchronous triggers would require a very large buffer.

- The post-trigger queue is required only if post-command triggers are defined on the trigger file. Buffer size is calculated exactly the same as the pre-trigger queue buffer size, and the same size considerations apply.

Display/ Modify Profile Information

The profile contains system information required by Adabas Triggers and Stored Procedures and is generated from the database ID and file number that you specify. After the profile is generated, you can display it and modify the values it contains.

▶ **To access the profile,**

- Enter D for Display Profile Information on the Administrator Functions Menu.

The Display Profile Information screen appears, and is similar to the following example:

```
 HH:MM:SS                 ***** TRIGGER MAINTENANCE *****         YYYY-MM-DD
 User USR01               - Display Profile Information -         DBnr 105

  Triggers Status .......... Active__                   Total Triggers ..34
  Stored Proc. Status ...... Active__

  Natural Subsystem Parameters
    Batch Natural Name ..... NATAPT
    Maximum Subsystems ..... 6_
    Activity Timeout ....... 600/80
    NATPARM Parameters ..... DU=OFF,INTENS=1,ETID='  ' _____
                             _____

    Fixed NATPARM Parm ..... STACK=(LOGON:SYSSPT;STP),PROGRAM=STPEND
    CMPRINT Assignment ..... TSPRT

  Required .. N     UserID ... USER**__  Password .. PSWD**__

  Adabas Session Parameters
    Error Action .......... Halt__   Trigger Table Size ....... __10K
    Log Trigger Activity ... Active__ Pre Trigger Queue Size ... __35K
                                     Post Trigger Queue Size .. __50K


 Command ==>
 Enter PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12-
       Help  Menu  Exit        Mod                                      Canc
```

Adabas Triggers and Stored Procedures assigns default values to the fields in the profile and uses these values at initialization time. This information is valid only at initialization time, i.e., when the Adabas nucleus is started. If the profile is modified, the new values take effect the next time the nucleus is bounced.

▶ **To modify the profile**

1. On the Display Profile Information screen, press PF5. On the Administrator Functions Menu, enter M for Modify Profile Information.

   The Modify Profile Information screen appears.

2. Enter the new values and press PF5 or enter UPDATE at the command line.

   A message informs you that the profile has been updated successfully.

Profile Fields

The following table describes the fields in the profile:

Field	Description
DBnr	The database ID of the trigger file to which this profile applies. The value is entered using the NTFILE, LFILE, or PF10 (FTRG).

Field	Description
Trigger Status	This field can be modified. active (the default) triggers can be executed for this database. inactive triggers cannot be executed for this database.
Stored Proc. Status	This field can be modified. active (the default) stored procedures can be executed for this database. inactive stored procedures cannot be executed for this database.
Total Triggers	The total number of triggers defined for this database ID. May be used, by default, to calculate the size of the trigger table buffer. Value is derived from the trigger definitions added to the trigger file. As a safety mechanism, this number is verified as correct when the NUMBER command is issued.
Batch Natural Name	The Natural nucleus that will be started by the Adabas trigger driver to run the 1-10 Natural subsystems that are responsible for the actual execution of the procedures. The name is assigned to the Natural nucleus component during the installation procedure.
Maximum Subsystems	This field can be modified.
	The number of Natural subsystems that should be activated for a given Adabas session. The value may be 01-10.
Activity Timeout	This field can be modified. The number of seconds before a task is cancelled. The default is 60; the maximum value is 9999. If set to zero, it defaults to the Adabas TT parameter value.
NATPARM Parameters	Dynamic parameter overrides for the NATPARM module linked to the Natural nucleus (the NATPARM module specifies the options to be in effect for the Natural session). See the section *NATPARM Considerations*.
| Fixed NATPARM | This value is generated by Adabas Triggers and Stored Procedures.<br><br>```
STACK=(LOGON:SYSSPT;STP)
```<br><br>where SYSSPT is the library where the procedures are executed and STP is used to invoke the Natural driver. |
| CMPRINT Assignment | This field can be modified. Dynamic assignment for the CMPRINT label. The default value is TSPRT. Printing from any procedure within a specific subsystem must be directed to this label unless the specific printer number notation is used in Natural syntax; for example, PRINT(01), DISPLAY(02), or WRITE(03). |

Field	Description
NATSEC LOGON Required	This field applies only if the Natural subsystems are running under Natural Security. It indicates whether logon to Natural Security is required (Y) or not (N). Pertains to AUTO=OFF, AUTO=ON, respectively.
UserID	This field can be modified. This field applies only if the Natural subsystems are running under Natural Security. This is the Natural Security user ID. The default value is USER**. The ** is replaced by the dynamic task number or subsystem number (value 01-10). Although the default uses ** as a suffix, it may occur anywhere in the user ID provided that at least one nonblank character is specified as well.
Password	This field can be modified. This field applies only if the Natural subsystems are running under Natural Security. This is the Natural Security password. The default value is PSWD**. The ** is replaced by the dynamic task number or subsystem number. Although the default uses ** as a suffix, it may occur anywhere in the password provided that at least one nonblank character is specified as well.
Error Action	This field can be modified. This is the action to be taken by Adabas Triggers and Stored Procedures after a processing error from which the system cannot recover. Halt — (the default) terminates the Adabas nucleus as if ADAEND were issued for both cluster and noncluster nuclei. Reject — keeps Adabas Triggers and Stored Procedures active, but any command for which a trigger is fired receives a response code 157 (ADARSP157); In a cluster environment, if one nucleus switches to "reject", all other nuclei also switch. However, if there is a problem during a refresh and the error action is "reject", the nucleus shuts down: it cannot reject commands if it has a damaged or incomplete trigger table. Ignore — shuts down Adabas Triggers and Stored Procedures, but keep the nucleus active as if Adabas Triggers and Stored Procedures had never been activated. In a cluster environment, if one nucleus switches to "ignore", all other nuclei also switch. If there is a problem during a refresh and the error action is "ignore", then all nuclei switch to "ignore". **Note:** The "ignore" option may cause application integrity problems.

Field	Description
Log Trigger Activity	This field can be modified. active trigger activity is recorded in the log. inactive (the default) trigger activity is not recorded in the log. Whenever a trigger or a stored procedure is invoked, information about the procedure can be printed to the print spool, as defined by the user. This information may be useful for auditing or debugging purposes.
Trigger Table Size	This field can be modified. This is the size (in bytes) of the trigger table buffer. If additional triggers are loaded to the trigger table, you may need to increase the buffer size (see the section *Updating the Trigger Table*). The default value is calculated based on the number of triggers defined in the trigger file. (See the section *Buffer Size Calculations*.)
Pre-Trigger Queue Size	This field can be modified. This is the size (in bytes) of the pre-trigger queue buffer, that contains pre-command triggers prior to selection for processing. The default value is calculated (see the section *Buffer Size Calculations*.)
Post-Trigger Queue Size	This field can be modified. This is the size (in bytes) of the post-trigger queue buffer that contains post-command triggers prior to selection for processing. The default value is calculated (see the section *Buffer Size Calculations*.)

Subsystem Activity

Subsystem activity provides information about currently executing Natural subsystems.

▶ **To access subsystem activity information**

- Enter S for Subsystem Activity on the Administrator Functions Menu.

  The Subsystem Activity screen is similar to the example shown below:

```
HH:MM:SS                  - Subsystem Activity -          YYYY-MM-DD

 Nmbr  Started Status Type  Start  / TimeOut of Trigger  Trig Count
 ----  ------- ------ ----- ----------------------------- ----------
 01   09:25:57 Busy   Sync  09:41:37 09:46:37                   350
 02   09:25:57 Busy   Async 09:41:39 09:46:39                   280
 03   09:25:57 Wait                                             212
 04   09:25:57 Wait                                             156
 05   09:25:57 Wait                                              51




 Subsystems . .  5 of  5
 Command ==>
```

The following table describes the information in the Subsystem Activity screen:

Field	Description
Nmbr	The number of the Natural subsystem.
Started	The time that the subsystem was initialized. If different from the Started time for the other subsystems listed, it indicates that a timeout, cancellation, or termination occurred. This should be cross-checked.
Status	The current status of the subsystem: busy, active, wait (waiting for work), shutdown, cancelled, or abended (if an error occurred).
Type	The type of trigger: sync (synchronous) or async (asynchronous).
Start	The time when the procedure started executing.
Timeout	The time when a procedure will be cancelled if it executes beyond the maximum time limit. If an error occurs prior to the timeout, the error is displayed.
Trig Count	The number of triggers that have been executed by the subsystem since initialization.
Command	The DBA may cancel any active or waiting subsystem by first entering the CANCEL command and then entering a C in the cursor position under "Status" for the subsystem that should be cancelled.

▶ To cancel an active or waiting subsystem

1. Enter CANCEL at the command line.

2. Enter C (for cancel) in the Status field of the subsystem that is to be cancelled.

3. Press PF3 to exit.

Trigger Activity

Trigger activity provides information about currently executing triggers.

▶ To access trigger activity information

- Enter "T" for Trigger Activity on the Administrator Functions Menu.

  The Current Trigger Activity screen is similar to the example shown below:

```
 HH:MM:SS                ***** TRIGGER MAINTENANCE *****          YYYY-MM-DD
 User USR01                - Current Trigger Activity -           DBnr 105

 Nmbr Status   Cmd  Fnr   Field  ProcName Type        RecBu  UserID (hex)
 ---- ------   ---  ---   -----  -------- ----------  -----  -------------
  01  Active                     PROC0002 Pre Non-P   None   ABD6EA375DE96A01
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  L3   11    **     SYMP0002 Pre Async   None
      Waiting  S4   11    **     SYMP0002 Pre Async   None
      Waiting  N1   11    LE     SYMP0001 Pre Non-P   Upd


 Command ==>
 Enter PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12-
           Menu  Exit  Sact  Refr  --    -     +               >          Canc
```

The following table describes the information in the Current Trigger Activity screen:

Field	Description
Nmbr	The number of the Natural subsystem executing the trigger. Valid values are 01-10.
Status	The current status of the subsystem: active or waiting.
Cmd	The Adabas command that initiated the trigger.
Fnr	The file number against which the command is invoked. If the value of this field is the same as the trigger file, then this is a stored procedure.
Field	The name of the field that resulted in the trigger being fired.
ProcName	The name of the triggered procedure.
Type	The type of trigger: pre (pre-command) or post (post-command), non-P (non-participating), part (participating), or async (asynchronous).
RecBu	The RecBuff setting for the trigger: access (read only), update (read and write), or none.
UserID	The (hexadecimal) ID of the user who issued the actual Adabas command.

▶ **To display additional information**

● Press PF10.

The screen scrolls to the right, as shown below:

```
HH:MM:SS                 ***** TRIGGER MAINTENANCE *****              YYYY-MM-DD
User USR01                  - Current Trigger Activity -              DBnr 105

Nmbr Status   Cmd  Fnr   Field   ProcName CID  CID (hex) ISN in ACB Timeout
---- ------   ---  ---   -----   -------- ---  --------- ---------- ---------
 01  Active               **     PROC0002      00000000             11:30:41
     Waiting  L3   11     **     SYMP0002 ???  00200101
     Waiting  L3   11     **     SYMP0002 ???  00200101  1
     Waiting  L3   11     **     SYMP0002 ???  00200101  16
     Waiting  L3   11     **     SYMP0002 ???  00200101  15
     Waiting  L3   11     **     SYMP0002 ???  00200101  14
     Waiting  L3   11     **     SYMP0002 ???  00200101  20
     Waiting  L3   11     **     SYMP0002 ???  00200101  23
     Waiting  L3   11     **     SYMP0002 ???  00200101  2
     Waiting  S4   11     **     SYMP0002 ???? 02100101
     Waiting  N1   11     LE     SYMP0001      00000000


Command ==>
Enter PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12-
          Menu  Exit  Sact  Refr  --    -     +           <          Canc
```

Field	Description
Nmbr	The number of the Natural subsystem executing the trigger. Valid values are 01-10.
Status	The current status of the subsystem: active or waiting.
Cmd	The Adabas command that initiated the trigger.
Fnr	The file number against which the command is invoked. If the value of this field is the same as the trigger file, then this is a stored procedure.
Field	The name of the field that resulted in the trigger being fired.
ProcName	The name of the triggered procedure.
CID	The command ID in the Adabas control block (ACB).
CID (hex)	The command ID repeated in hexadecimal format.
ISN in ACB	The ISN from the Adabas control block (ACB).
Timeout	The time when a procedure will be cancelled if it executes beyond the maximum time limit.