

Express Hints

Version 2.1

User's Guide



HLS Technologies, Inc.

3322 Sturbridge Lane
Sugar Land, Texas 77479-2223

Phone (281) 265-3004
Toll-free (888) 494-9019
Fax (281) 265-3006

sales@hlstechnologies.com
<http://www.hlstechnologies.com/>

Note: Before using this document, read the general information under “Notices” on page 68.

Express Hints User’s Guide, Version 2 Release 1

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Reader comments on this document are welcomed and encouraged. Comments may be sent to:

HLS Technologies, Inc.
Technical Publications Group
3322 Sturbridge Lane
Sugar Land, Texas 77479-2223

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Preface

This book describes how to install and use Express Hints. Express Hints is a software product that allows you to create, verify, and assign optimization hints for the purpose of controlling access path selection for SQL queries in DB2 for OS/390 and z/OS.

Who Should Use This Book

This book is for data base administrators (DBA's) and application programmers who need to use the optimization hints facility to influence the determination of access paths by the DB2 optimizer, and for DBA's or system programmers responsible for installing and supporting the Express Hints product.

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Introduction

Why You Need Express Hints

The Optimization Hints feature was introduced in DB2 Version 6. This facility allows the user to override the default access paths chosen by the DB2 optimizer. As implemented, however, the feature is far from easy to use: it requires the user to manually update the PLAN_TABLE and then rebind the plan or package just to determine whether the intended access path is even valid.

Using Optimization Hints is therefore a difficult exercise, because of the skill level required to perform the table updates successfully as well as the inherently error-prone nature of the (essentially manual) process. Even the most experienced DBA's may not have each of the many parameter settings that need to be changed at their fingertips. The percentage of application programmers possessing the requisite skill is even smaller. On top of this, the only method provided for validating a hint is to do an actual bind!

Express Hints resolves these problems.

What Express Hints Does

Express Hints gives DBA's and Application programmers the ability to easily manipulate the PLAN_TABLE settings that influence the access path choices for a given SQL Statement.

Express Hints makes it a simple matter to generate the correct PLAN_TABLE entry to direct DB2 to a desired access path. It then verifies the validity of the selected access path *without* forcing the user to actually bind the plan or package.

Using a straightforward ISPF dialog, the programmer or DBA selects the plan or package to be manipulated from a displayed list. The individual SQL statements are then displayed. The user selects an SQL statement and is shown the current access path setting, based on the most recent Explain data from the PLAN_TABLE. Various options are offered for changing the access path. When a new access path has been selected, it is then verified to see whether DB2 will accept it; only then is the Hint actually added to the PLAN_TABLE.

With Express Hints, changing access paths becomes a simple, direct process instead of a technical tour de force. For the first time, you can actually specify an access path for DB2 to use, instead of being at the mercy of the choices made by the Optimizer.

Express Hints also includes a feature that permits you to turn the Optimization Hints feature on (or off) at the subsystem level *without* manipulating DSNZPARM and *without* taking an outage.

Requirements

Express Hints requires the following:

- DB2 Version 6 or later
- For Version 6, the optional REXX/DB2 interface must be installed (this is a standard feature in Version 7)
- Plan tables to be used with Express Hints requires must have *at least* 49 columns

Restrictions

Express Hints supports static SQL only.

Installing Express Hints

Planning for Installation

There are two things you must decide before beginning the installation process:

- Which libraries to install the product into
- Whether or not APF authorization is required

Each of these will be discussed in turn.

Which Libraries to Use

The Express Hints product consists of various types of components including CLISTs, ISPF panels, load modules, etc. Before the product can be used, the components must be copied into libraries that are accessible to the users who will be using the product. There are essentially two ways this can be done.

- Option 1** Allocate new libraries specifically for Express Hints, copy the product components into the new libraries, and execute the product directly from the new libraries
- Option 2** Copy the product components into preexisting libraries, *i.e.*, libraries that are already in use for other products, and execute the product from there

Which option you choose will depend on what makes the most sense in your environment. This decision will need to be based on the data management policies in effect at your installation, how your installation configures its TSO logon procs, and many other factors. This is a decision you will need to make based on local circumstances.

The reason this matters is that it affects the installation procedure you must use to implement Express Hints.

Two batch jobs are used to install Express Hints. They are named SETUP1 and SETUP2. If you choose option 1 (install into new libraries), you will need to run both jobs. If you choose option 2 (install into preexisting libraries), you will only run the SETUP2 job.

APF Authorization

Express Hints includes a feature that allows you to turn the Optimization Hints feature on (or off) at the subsystem level dynamically, *i.e.*, without requiring an outage. If you elect to use this feature, you need to make sure that the load library into which the Express Hints modules are installed (whether new or preexisting) is an APF-authorized library. For installation option 1, this means that you must have your system programmer and/or security administrator authorize the library you create. For option 2, it means you must make sure that the load library you install Express Hints into is indeed authorized.

If you do not intend to use this feature, APF authorization is not required.

Uploading and Unpacking The Product Files

The remainder of this chapter describes the procedures for installing Express Hints on your system. This information is also provided in the README file described below.

Express Hints is shipped in two files named FILE001 and FILE002; both are required for installation. The files are provided in TSO Transmit format.

The first thing you must do is upload the two product files to your MVS system. You can use any valid file transfer program: FTP, IND\$FILE, etc. Whichever mechanism you use to do the transfer, you *must* do the following:

- Preallocate two data sets on the MVS system to receive the transferred files; do not allow the receiving data sets to be automatically allocated by the file transfer program. Allocate the data sets with the attributes RECFM=FB, LRECL=80, and any valid blocksize.
- Transfer the files in *binary* mode.

You may use any valid data set names for the two uploaded files. For the remainder of this discussion, the uploaded files will be referred to as File 1 and File 2, respectively.

Once File 1 and File 2 have been uploaded to your MVS host, they must be unpacked, *i.e.*, converted back to their original format (partitioned data set). Use the TSO *Receive* command to do this. The format of this command is

```
TSO RECEIVE INDA( 'data.set.name' )
```

You must issue this command once for each file. In the command format shown above, *data.set.name* would be replaced by the actual data set names you assigned to the uploaded files. For example, if the files were named USER55.EXHINTS.FILE1 and USER55.EXHINTS.FILE2, then you would issue the commands shown below (one at a time, of course):

```
TSO RECEIVE INDA( 'USER55.EXHINTS.FILE1' )  
TSO RECEIVE INDA( 'USER55.EXHINTS.FILE2' )
```

Each time you issue the *Receive* command, you will be prompted with message INMR906A. At this time you can just press ENTER, which will cause the reconstituted PDS library to be created using your TSO ID as the high level qualifier, or you can enter the subcommand

```
DA('data.set.name')
```

...which will cause the PDS to be generated using the name you specified.

Once the receive commands have been executed successfully, you should have a pair of PDS libraries corresponding to File 1 and File 2. File 1 contains a member named README, which contains essentially the same information as the remainder of this chapter.

Running the Installation Jobs

Once the two installation files have been uploaded and received, you are ready to run the installation job(s).

There are two installation jobs. JCL for both jobs is provided in File 1; the member names are SETUP1 and SETUP2. Whether you need to run both jobs or just SETUP2 depends on whether you are using new or preexisting libraries. (See the discussion of installation options under *Which Libraries to Use*, above.)

Before submitting either of the setup jobs, you will need to modify the supplied JCL to conform to the environment into which you are installing Express Hints. You will need to add a valid JOB statement as well as specifying the actual data set names being used, the unit name (if new data sets are being created), and so forth. Each job contains comments that give specific instructions on what to modify.

If you are using Option 1 (new libraries), customize and submit job SETUP1. Once this job has run successfully, customize and submit SETUP2. If you are using Option 2 (existing libraries), skip SETUP1 and run only SETUP2.

Once the setup job(s) have run successfully (condition code zero on all job steps), you are ready to perform final customization of the product.

Required Customization

Before Express Hints is ready to use, there are two customizations that need to be taken care of.

APF authorization This is optional. If you do not plan to use HXH003 and HXH004 (the programs that turn optimization hints on and off dynamically), then no authorization is needed and you may skip this step.

If you do intend to use the feature, then these programs must be executed from an APF-authorized library. If you have installed the programs into new libraries (option 1), then you must make sure your new library is authorized before you try to run the HXH003 or HXH004 job. Otherwise these jobs will fail. In most shops, authorizing of libraries is handled by the system programmer(s) and/or the security administrator(s). You will need to find out who handles this in your shop and request that person to authorize the new library.

If you use installation option 2 (using existing libraries), you should have copied the load modules into an authorized library when you ran the SETUP2 job.

Initial CLIST In order to invoke Express Hints, the user executes a CLIST named EXHINTS. This CLIST must be customized slightly before being used. See the comments in the CLIST for details. Also, in order for users to be able to access Express

Hints, the modified CLIST must be copied into a library that is included in the SYSPROC concatenations of the users' TSO logon procs.

Security

If you have installed Express Hints into new libraries (option 1), then the libraries created by the SETUP1 job will contain the Express Hints product components. The users of Express Hints will require READ access to those libraries in order to use the product. Have your security administrator grant the appropriate level of access to the libraries created by SETUP1 to all users who need to run Express Hints.

Using Express Hints

DB2's optimization hints facility is designed to let you insert a row in your PLAN_TABLE with the access path and hint name you specify, so that you can use that hint when rebinding the plan or package. In this way you can direct DB2 to use the access path you request and not one of its own choosing.

The remainder of this chapter is a narrative, with examples, illustrating how to accomplish this task using Express Hints.

Specifying the Basic Parameters

To activate Express Hints, you enter the command TSO EXHINTS in the command field of any ISPF panel, as illustrated by the example in Figure 1. (The systems programmers at your installation may have arranged another way for you to invoke the program; in this case they will tell you what it is.)

```
Menu Utilities Compilers Options Status Help
-----
                                ISPF Primary Option Menu
Option ==> tso exhints

0 Settings      Terminal and user parameters      User ID . : DNS3
1 View          Display source data or listings    Time. . . : 12:36
2 Edit          Create or change source data       Terminal. : 3278
3 Utilities     Perform utility functions         Screen. . : 1
4 Foreground    Interactive language processing    Language. : ENGLISH
5 Batch         Submit job for language processing  Appl ID . : ISR
6 Command       Enter TSO or Workstation commands  TSO logon : DNS3C
7 Dialog Test   Perform dialog testing            TSO prefix: DNS3
8 LM Facility   Library administrator functions    System ID : P390
9 IBM Products  IBM program development products   MVS acct. : ACCT#
10 SCLM        SW Configuration Library Manager   Release . : ISPF 5.0
11 Workplace    ISPF Object/Action Workplace
12 Xhints       Express Hints

      Enter X to Terminate using log/list defaults
```

Figure 1. Initial command to invoke Express Hints

The TSO EXHINTS command causes Express Hints to begin execution and display the main panel as shown in Figure 2.

```
Menu Utilities Options Help
-----
Express Hints for DB2
COMMAND ==>
Select the entity to be processed:
    Subsystem ID . . . . .
    PLAN_TABLE owner . . . .
    DBRM/package name . . . .
Enter "/" to select option
    Process packages only
Press ENTER to proceed.
```

Figure 2. Express Hints Main Panel

The main panel requires you to enter three values:

- The **subsystem ID** (SSID) of the DB2 subsystem containing the plans and/or packages you wish to manipulate
- The **user ID** (authid) of the owner of the PLAN_TABLE containing the Explain data for your plans and/or packages
- The **name of the DBRM or package** that contains the SQL statement(s) whose access paths you wish to manipulate

Figure 3 shows the main panel with these values filled in. (Note: the values shown in Figure 3 are examples only; you will need to supply values that are appropriate for your installation.)

```

Menu Utilities Options Help
-----
                                Express Hints for DB2
COMMAND ===>

Select the entity to be processed:

      Subsystem ID . . . . . dsn1
      PLAN_TABLE owner . . . . . dns1
      DBRM/package name . . . . . dbrm01

Enter "/" to select option
      Process packages only

                                Press ENTER to proceed.

```

Figure 3. Express Hints Main Panel filled in

Once you have entered appropriate values on the main panel, press ENTER. This causes Express Hints to search the DB2 catalog for all occurrences of the specified DBRM. In our example, the 'DBRM01' DBRM is used by three plans and two collections. The results of the search are displayed in a list; see Figure 4.

```

Menu Utilities Options Help
-----
                                Express Hints - Item Selection
                                Row 1 to 5 of 5
COMMAND ===>                                Scroll ===> CSR

Target DBRM . . . . . : DBRM01

                                Choose an item to process:

      Type  Plan or Collection
      ----  -
      .  PLAN  ALT01
      .  PLAN  DBRM01
      .  PLAN  TEST01
      .  PKG   DBRPK01
      .  PKG   DBRPK06
***** Bottom of data *****

```

Figure 4. Results of catalog search

Now, go back and take another look at Figure 2. The Express Hints main panel offers you the option of searching for both plans and packages, or just packages only. In our example, the

Process packages only option is not selected, so the search returned both plans and packages that contain the requested DBRM.

Let's try it the other way. Figure 5 shows the main panel, filled in as before, but with the *Process packages only* option selected. This produces the search results shown in Figure 6. As you can see, this time only packages were displayed. So you have a choice!

```

  Menu  Utilities  Options  Help
  -----
                                Express Hints for DB2
COMMAND ==>

Select the entity to be processed:

  Subsystem ID . . . . . DSN1
  PLAN_TABLE owner . . . . DSN1
  DBRM/package name . . . . DBRM01

Enter "/" to select option
  / Process packages only

                                Press ENTER to proceed.

```

Figure 5. Main panel with Process packages only option selected

```

  Menu  Utilities  Options  Help
  -----
                                Express Hints - Item Selection
                                Row 1 to 2 of 2
COMMAND ==>                                Scroll ==> CSR

Target DBRM . . . . . : DBRM01

                                Choose an item to process:

  Type  Plan or Collection
  ----  -
.  PKG  DBRPK01
.  PKG  DBRPK06
***** Bottom of data *****

```

Figure 6. Search results with Process packages only option selected

Selecting a Plan or Package

Figure 7 again shows the original catalog search results. This panel lists the plans and/or packages that contain the specified DBRM and allows you to select one for detailed processing. We will use package 'DBRPK01'. Figure 8 shows the search results screen with this package selected.

```
Menu Utilities Options Help
Express Hints - Item Selection      Row 1 to 5 of 5
COMMAND ==>                        Scroll ==> CSR
Target DBRM . . . . . : DBRM01

Choose an item to process:

Type Plan or Collection
-----
. PLAN ALT01
. PLAN DBRM01
. PLAN TEST01
. PKG DBRPK01
. PKG DBRPK06
***** Bottom of data *****
```

Figure 7. Results of catalog search

```
Menu Utilities Options Help
Express Hints - Item Selection      Row 1 to 5 of 5
COMMAND ==>                        Scroll ==> CSR
Target DBRM . . . . . : DBRM01

Choose an item to process:

Type Plan or Collection
-----
. PLAN ALT01
. PLAN DBRM01
. PLAN TEST01
s PKG DBRPK01
. PKG DBRPK06
***** Bottom of data *****
```

Figure 8. Search results with package DBRPK01 selected

Once you have selected a package and pressed ENTER, Express Hints checks to see how many versions of that package exist in the DB2 subsystem. If multiple versions exist, a list of the available versions is displayed so you can specify which one to process; Figure 9 shows this. Figure 10 shows the same panel with a specific version selected for processing.

```

Menu  Utilities  Options  Help
-----
Express Hints - Version List          Row 1 to 3 of 3
COMMAND ===>                          Scroll ===> CSR

Package (DBRM) . . . : DBRM01
Collection . . . . : DBRPK01

                Choose the version to process:

----- Version -----
.  2004-09-09-18.41.33.635232
.  2004-09-09-18.41.51.447962
.  VERSION15
***** Bottom of data *****

```

Figure 9. Package version selection panel

```

Menu  Utilities  Options  Help
-----
Express Hints - Version List          Row 1 to 3 of 3
COMMAND ===>                          Scroll ===> CSR

Package (DBRM) . . . : DBRM01
Collection . . . . : DBRPK01

                Choose the version to process:

----- Version -----
.  2004-09-09-18.41.33.635232
.  2004-09-09-18.41.51.447962
s  VERSION15
***** Bottom of data *****

```

Figure 10. Package version selection panel with a version selected

Note: If you select a plan instead of a package, no version information is retrieved (plans do not have versions).

Selecting an SQL Statement

Once you have chosen a plan or package, Express Hints retrieves the SQL statements for the specified DBRM in the selected plan or package. The statements are displayed in a list like that shown in Figure 11.

```

Menu Utilities Options Help
-----
Express Hints - Statement Selection          Row 1 to 14 of 14
COMMAND ==>                               Scroll ==> CSR

Package . . . . . : DBRM01
Collection . . . . . : DBRPK01
Version . . . . . : VERSION15

          Choose a statement to process:

Queryno  Statement
-----
.      115  SELECT USBD_NAME , USBD_OWNER_ID INTO : H , : H FROM USER01
.      124  SELECT USBD_NAME INTO : H FROM USER01 . USER_BD WHERE USBD_N
.      129  SELECT USBD_NAME , USBD_SPECIAL , USBD_OWNER_ID INTO : H , :
.      134  DECLARE SELECT7A CURSOR FOR SELECT A . NAME , A . TBNAME , A
.      247  SELECT TIMESTAMP INTO : H FROM SYSIBM . SYSDBRM WHERE NAME =
.      263  SELECT USBD_OWNER_ID , USBD_SPECIAL , USBD_OPER , USBD_DEFGR
.      270  SELECT DSD_NAME , DSD_VOL INTO : H , : H FROM USER01 . DS_
.      301  DECLARE PKROW CURSOR FOR SELECT CONTOKEN , VERSION , COLLID
.      306  OPEN PKROW
.      315  FETCH PKROW INTO : H , : H , : H
.      319  CLOSE PKROW
.      325  FETCH PKROW INTO : H , : H , : H
.      330  CLOSE PKROW
.      335  CLOSE PKROW
***** Bottom of data *****

```

Figure 11. Statement Selection panel

When the list of statements is displayed, you can then select the particular statement whose access path you wish to modify. Figure 12 shows the same panel as Figure 11 with a statement selected for processing.

```

Menu Utilities Options Help
-----
Express Hints - Statement Selection      Row 1 to 14 of 14
COMMAND ==>                             Scroll ==> CSR

Package . . . . . : DBRM01
Collection . . . . : DBRPK01
Version . . . . . : VERSION15

Choose a statement to process:

Queryno Statement
-----
.      115 SELECT USBD_NAME , USBD_OWNER_ID INTO : H , : H FROM USER01
.      124 SELECT USBD_NAME INTO : H FROM USER01 . USER_BD WHERE USBD_N
s      129 SELECT USBD_NAME , USBD_SPECIAL , USBD_OWNER_ID INTO : H , :
.      134 DECLARE SELECT7A CURSOR FOR SELECT A . NAME , A . TBNAME , A
.      247 SELECT TIMESTAMP INTO : H FROM SYSIBM . SYSDBRM WHERE NAME =
.      263 SELECT USBD_OWNER_ID , USBD_SPECIAL , USBD_OPER , USBD_DEFGR
.      270 SELECT DSD_NAME , DSD_VOL INTO : H , : H FROM USER01 . DS_
.      301 DECLARE PKROW CURSOR FOR SELECT CONTOKEN , VERSION , COLLID
.      306 OPEN PKROW
.      315 FETCH PKROW INTO : H , : H , : H
.      319 CLOSE PKROW
.      325 FETCH PKROW INTO : H , : H , : H
.      330 CLOSE PKROW
.      335 CLOSE PKROW
***** Bottom of data *****

```

Figure 12. Statement Selection panel with a statement selected for hints processing

Specifying the Desired Access Path

Once an SQL statement has been selected, Express Hints displays the Access Path Control submenu. This is shown in Figure 13.

```

Menu Utilities Options Help
-----
Express Hints - Access Path Control
COMMAND ==>

DBRM . . . . . : DBRM01
Collection . . . . : DBRPK01
Version . . . . . : VERSION15

Queryno . . . . . : 129

Select one of the options below:

1 MODIFY Change access path
2 NAME Assign hint name
3 MAKE Create hint

```

Figure 13. Access path submenu

The Access Path Control submenu offers three choices; the first is MODIFY. Selecting this option causes the Query Elements panel to be displayed as shown in Figure 14.

```

Menu Utilities Options Help
-----
Express Hints - Query Elements          Row 1 to 2 of 2
COMMAND ==>                           Scroll ==> CSR

DBRM . . . . . : DBRM01
Collection . . . : DBRPK01
Version . . . . . : VERSION15

Queryno . . . . . : 129

      Choose a query element to edit, or specify a different sequence

Sequence  Table Accessed
-----
.         1      USER01.USER_BD
.         2      USER01.GROUP_BD
***** Bottom of data *****

```

Figure 14. Query Elements panel

This panel lists the query elements that comprise the selected SQL statement. If the statement involves a join, multiple query elements will be listed. If not, there will be only one.

If multiple query elements are present, they will be listed in the order in which DB2 uses them to perform the join (the "join sequence"). You can change the join sequence by entering new sequence numbers in the left hand column. Figure 15 shows an example of this.

```

Menu Utilities Options Help
-----
Express Hints - Query Elements          Row 1 to 2 of 2
COMMAND ==>                           Scroll ==> CSR

DBRM . . . . . : DBRM01
Collection . . . : DBRPK01
Version . . . . . : VERSION15

Queryno . . . . . : 129

      Choose a query element to edit, or specify a different sequence

Sequence  Table Accessed
-----
2         1      USER01.USER_BD
1         2      USER01.GROUP_BD
***** Bottom of data *****

```

Figure 15. Query Elements panel with modified join sequence

After you enter the new sequence numbers and press ENTER, the panel is redisplayed with the new join sequence as shown in Figure 16.

```

Menu Utilities Options Help
Express Hints - Query Elements          Row 1 to 2 of 2
COMMAND ==>                           Scroll ==> CSR

DBRM . . . . . : DBRM01
Collection . . . : DBRPK01
Version . . . . . : VERSION15

Queryno . . . . . : 129

      Choose a query element to edit, or specify a different sequence

Sequence Table Accessed
-----
.         1   USER01.GROUP_BD
.         2   USER01.USER_BD
***** Bottom of data *****

```

Figure 16. Query Elements panel with updated join sequence

The other thing you can do on the Query Elements panel is to select an individual query element in order to modify its access path specifications. Figure 17 shows the Query Elements panel with a query element selected.

```

Menu Utilities Options Help
Express Hints - Query Elements          Row 1 to 2 of 2
COMMAND ==>                           Scroll ==> CSR

DBRM . . . . . : DBRM01
Collection . . . : DBRPK01
Version . . . . . : VERSION15

Queryno . . . . . : 129

      Choose a query element to edit, or specify a different sequence

Sequence Table Accessed
-----
.         1   USER01.USER_BD
s         2   USER01.GROUP_BD
***** Bottom of data *****

```

Figure 17. Query Elements panel with a query element selected

Once you select a query element in this way, the Access Path Settings panel is displayed. This panel shows the current access path settings for that query element, as shown in Figure 18. Note that this panel is scrollable and only the top part is shown in the figure.

```

  Menu  Utilities  Options  Help
-----
HXHP023          Express Hints - Access Path Settings
COMMAND ==>>

Package . . : DBRM01          Query No. . . : 129
-----
Prefetch mode (PREFETCH)                                     More:  +
4  1.  S      Sequential prefetch
   2.  L      List prefetch
   3.  D      Dynamic (Version 8 only)
   4.  Blank  (no prefetch)

Type of Access (ACCESSTYPE)
1  1.  I      By the index named below
   2.  I1     1-fetch index scan
   3.  N      Index scan with 'IN' predicate
   4.  R      Table space scan
   5.  M      Multiple index scan
   6.  Blank  Not applicable

Index . . . . . USER01.GROUP_BD_IX1

Number of index keys (MATCHCOLS) . . . . 1

Enter "/" to select option
/  Data access not required (INDEXONLY)
   Attempt to use direct row access (PRIMARY_ACCESSTYPE)

```

Figure 18 Access Path Settings panel

This panel is where you change the Access Path for the selected query element. You do this by overtyping the values shown with new values. In our example, for instance, you might choose to change the “Prefetch” option to 1 to request DB2 to use sequential prefetch for this table.

One of the things you can do on this panel is to specify a different index to use. If you know the name of the new index you wish to use, you can enter it directly in the “Index” field. But let’s say you know (or suspect) that several indexes are available for this table, and you’re not sure which one suits your purposes best. You can obtain a display of the available indexes by entering a question mark (?) in the “Index” field, as shown in Figure 19.

```

Menu Utilities Options Help
-----
HXHP023          Express Hints - Access Path Settings
COMMAND ==>>

Package . . : DBRM01          Query No. . . : 129
-----
Prefetch mode (PREFETCH)
4  1. S      Sequential prefetch
   2. L      List prefetch
   3. D      Dynamic (Version 8 only)
   4. Blank  (no prefetch)

Type of Access (ACCESSTYPE)
1  1. I      By the index named below
   2. I1     1-fetch index scan
   3. N      Index scan with 'IN' predicate
   4. R      Table space scan
   5. M      Multiple index scan
   6. Blank  Not applicable

Index . . . . . ?

Number of index keys (MATCHCOLS) . . . . 1

```

Figure 19. Access Path Settings panel with index display requested

When ENTER is pressed, Express Hints retrieves the index information relevant to this query and presents a list of available indexes as shown in Figure 20.

```

Menu Utilities Options Help
-----
Available Indexes
-----
HXHP010          Row 1 to 4 of 4
COMMAND ==>>          Scroll ==>> CSR

The following indexes are defined for this table

----- Index Name ----- Index Key Columns -----
.  USER01.GROUP_BD_IX1      GPBD_NAME (A)
.  USER01.GROUP_BD_IX2      GPBD_SUPGRP_ID (A)
s  USER01.GROUP_BD_IX3      GPBD_OWNER_ID (A)
.  USER01.GROUP_BD_IX4      GPBD_MODEL (A)
***** Bottom of data *****

Index . . . . . ?

Number of index keys (MATCHCOLS) . . . . 1

Enter "/" to select option
/  Data access not required (INDEXONLY)
   Attempt to use direct row access (PRIMARY_ACCESSTYPE)

```

Figure 20. Available Indexes Panel with selection

The index information is shown one index per line. Each line displays the name of the index as well as the list of key columns, in order from major to minor, with ascending/descending sequence indicators.

Since the space available for listing index keys is limited, the complete list of keys for an index may not fit on one line. This does not occur in our example, but it often does. If the number of keys is too large to fit the display, there is a way to display the complete list. See the topic *Displaying the complete list of key columns for an index* later in this chapter.

When the list of indexes is displayed, you can select one, as shown in Figure 20. Express Hints then returns you to the access path selection panel, with the name of your selected index automatically inserted into the *Requested index* field. Figure 21 shows the result.

```

  Menu  Utilities  Options  Help
-----
HXHP023          Express Hints - Access Path Settings
COMMAND ==>

Package . . : DBRM01          Query No. . . : 129
-----
Prefetch mode (PREFETCH)                                     More:  +
4  1. S          Sequential prefetch
   2. L          List prefetch
   3. D          Dynamic (Version 8 only)
   4. Blank     (no prefetch)

Type of Access (ACCESSTYPE)
1  1. I          By the index named below
   2. I1        1-fetch index scan
   3. N          Index scan with 'IN' predicate
   4. R          Table space scan
   5. M          Multiple index scan
   6. Blank     Not applicable

Index . . . . . USER01.GROUP_BD_IX3

Number of index keys (MATCHCOLS) . . . . 1

Enter "/" to select option
/ Data access not required (INDEXONLY)
  Attempt to use direct row access (PRIMARY_ACCESSTYPE)

```

Figure 21. Access Path Settings panel with index inserted automatically

Creating the Hint

At this point we have specified the details of the new access path for the SQL statement. The only thing left is to create the hint entry in the PLAN_TABLE.

First, we need to give the hint a name. To do this, we use the hint name panel which is accessed by selection option 2 on the Access Path submenu, as shown in Figure 22.

```
Menu Utilities Options Help
Express Hints - Access Path Control
COMMAND ==> 2
DBRM . . . . . : DBRM01
Collection . . . . : DBRPK01
Version . . . . . : 2004-09-09-18.41.33.635232
Queryno . . . . . : 129
Select one of the options below:
1 MODIFY Change access path
2 NAME Assign hint name
3 MAKE Create hint
```

Figure 22. Access Path Control submenu with option 2 selected

This brings up the Hint Name panel, shown in Figure 23.

```
Menu Utilities Options Help
Express Hints - Hint Name
COMMAND ==>
Current hint name:          New hint name:
(none)
```

Figure 23. Hint Name panel

The Hint Name panel shows the existing hint name (if any) on the left, and has an entry field on the right where you can specify the new hint name. Figure 24 shows the panel with hint name “newhint” entered.

```
Menu Utilities Options Help
Express Hints - Hint Name
COMMAND ===>
Current hint name:      New hint name:
  (none)                newhint
```

Figure 24. Hint Name panel with hint name entered

After pressing PF3 to get back to the Access Path submenu, we select option 3 (“Make”). See Figure 25.

```
Menu Utilities Options Help
Express Hints - Access Path Control
COMMAND ===> 3
DBRM . . . . . : DBRM01
Collection . . . . : DBRPK01
Version . . . . . : 2004-09-09-18.41.33.635232
Queryno . . . . . : 129
Select one of the options below:
  1 MODIFY Change access path
  2 NAME  Assign hint name
  3 MAKE  Create hint
```

Figure 25. Access Path Control submenu with option 3 selected

When option 3 is selected and ENTER is pressed, Express Hints dynamically invokes DB2 to determine whether the hint is acceptable, *i.e.*, whether the access path is logically valid. If the hint is acceptable, you will see the popup message shown in Figure 26.

```
Menu Utilities Options Help
-----
Express Hints - Access Path Control

COMMAND ==>
  DBRM  COMMAND ==>
  Coll
  Vers  This hint has been validated and accepted by
  Quer  DB2.  If you wish, the hint can be saved in
  Sele  the plan table so that it may be used to bind
        with in the future.
        Press ENTER to save the hint in the plan
        table.
        Press END to return to the previous panel
        without saving the hint.
```

Figure 26. Hint confirmation prompt

At this point you may either press END (to quit without saving the hint) or ENTER (to update the PLAN_TABLE). If you press ENTER, Express Hints will insert a row in the PLAN_TABLE containing the access path and hint name you specified. Figure 27 shows the message indicating that this has been done.

```
Menu Utilities Options Help
Express Hints - Access Path Control
COMMAND ==>
DBRM . . . . . : DBRM01
Collection . . . . : DBRPK01
Version . . . . . : VERSION15
Queryno . . . . . : 129
Select one of the options below:
1 MODIFY Change access path
2 NAME Assign hint name
3 MAKE Create hint
HXH189I Hint 'NEWHINT' has been added to DNS1.PLAN_TABLE and is now
available for use when rebinding the plan or package
```

Figure 27. Access Path Control submenu with message

Once your hint has been added to the PLAN_TABLE, you can then bind the plan or package, specifying the new hint name on the BIND command. This will cause DB2 to use the access path you have specified.

Other Features

This section briefly describes several features of Express Hints that were not previously discussed in this chapter.

Displaying the complete list of key columns for an index

When you enter a question mark (?) in the *Requested index* field of the Access Path Selection Panel, Express Hints displays a list of the available indexes. An example is shown in Figure 28.

```
Menu  Utilities  Options  Help
----- Available Indexes -----
COMMAND ==>                               Row 1 to 7 of 7
                                           Scroll ==> CSR

          The following indexes are defined for this table

----- Index Name -----   ----- Index Key Columns -----
.  USER01.DS_BD_IX1          DSB_D_NAME (A), DSB_D_VOL (A)
.  USER01.DS_BD_IX2          DSB_D_OWNER_ID (A)
.  USER01.DS_BD_IX3          DSB_D_GRP_ID (A)
.  USER01.DS_BD_IX4          DSB_D_SECLEVEL (A)
.  USER01.DS_BD_IX5          DSB_D_NOTIFY_ID (A)
.  USER01.DS_BD_IX6          DSB_D_SECLABEL (A)
.  USER01.DS_BD_IX99         DSB_D_NAME (A), DSB_D_VOL (A), DSB_D_OWNER+
***** Bottom of data *****
```

Figure 28. List of available indexes

In the example, notice that the last index listed (DS_BD_IX99) has more key columns than will fit on the display. This is indicated by the plus sign (+) at the end of the line, signifying that there is more data than can be shown on the screen.

In a case like this, you can enter a *C* (“Columns”) selection character to see all of the fields. Figure 29 shows the same panel as Figure 21 with the last index selected in this way. Figure 30 shows the resulting display; notice the popup window containing a scrollable list of the index key columns. In the display, the keys are listed in order from major to minor. Each key column name is listed under the *Column* heading, with a corresponding entry in the *Order* column indicating whether the keys in that column are accessed in ascending or descending order (“A” or “D”, respectively).

```

Menu Utilities Options Help
----- Available Indexes -----
COMMAND ===>                                Row 1 to 7 of 7
                                           Scroll ===> CSR

The following indexes are defined for this table

----- Index Name -----      ----- Index Key Columns -----
. USER01.DS_BD_IX1              DSB_D_NAME (A), DSB_D_VOL (A)
. USER01.DS_BD_IX2              DSB_D_OWNER_ID (A)
. USER01.DS_BD_IX3              DSB_D_GRP_ID (A)
. USER01.DS_BD_IX4              DSB_D_SECLEVEL (A)
. USER01.DS_BD_IX5              DSB_D_NOTIFY_ID (A)
. USER01.DS_BD_IX6              DSB_D_SECLABEL (A)
c USER01.DS_BD_IX99            DSB_D_NAME (A), DSB_D_VOL (A), DSB_D_OWNER+
***** Bottom of data *****

```

Figure 29. List of available indexes with "c" selection

```

Menu Utilities Options Help
----- Available Indexes -----
COMMAND ===>                                Row 1 to 7 of 7
                                           Scroll ===> CSR

----- Index key columns -----
. USER01.D
. USER01.D
. USER01.D
. USER01.D
. USER01.D
c USER01.D
*****

COMMAND ===>                                Row 1 to 5 of 5
                                           Scroll ===> CSR

Seq  Order  Column
1    A      DSB_D_NAME
2    A      DSB_D_VOL
3    A      DSB_D_OWNER_ID
4    A      DSB_D_DEVICE_NAME
5    A      DSB_D_NOTIFY_ID
***** Bottom of data *****
DSB_D_OWNER+
*****

```

Figure 30. List of index key columns

Displaying plan or package summary information

Figure 31 shows an example of the Item Selection panel. (This panel displays the results of the DB2 catalog search performed based on the values specified on the Express Hints main panel.) Earlier in this chapter you saw how this panel is used to select the plan or package containing the SQL statements whose access paths are to have hints associated with them.

In addition to its main purpose, the Item Selection panel can also be used to display summary information about a plan or package. In Figure 31, an *I* (“Information”) selection character has been entered to request summary information for package DNSNC1. Figure 32 shows the resulting display.

This feature works the same way for both plans and packages, although the displays are slightly different owing to the way the associated information is stored in DB2.

```
Menu Utilities Options Help
-----
Express Hints - Item Selection          Row 1 to 8 of 8
COMMAND ==>                           Scroll ==> CSR
Target DBRM . . . . . : NULLPROG

                Choose an item to process:

Type  Plan or Collection
-----
. PLAN FLEEBERS
. PLAN GADZOOKS
. PLAN NULLPLN
. PLAN PLAN301
i PKG  DNSNC1
. PKG  DNSNC2
. PKG  DNSNC3
. PKG  DNSNC5
***** Bottom of data *****
```

Figure 31. Item selection panel with “I” selection

```
Menu Utilities Options Help
DBRM - Package (Detail)

COMMAND ==>

DBRM . . . . . : NULLPROG
PDS Name . . . . . : DEV.DEVX.DBRM
Collection . . . . . : DNSNC1
Version: (blank)

Created by . . . . . : DNS2
Owner . . . . . :
Host Language . . . . . : Assembler
Timestamp . . . . . : 16F2BF5D 1D4ED06C (hex)

String delimiter . . . . . : Apostrophe
Decimal point . . . . . : Period
DEC31 in effect . . . . . : No
Katakana charset . . . . . : No
Mixed data . . . . . : No

Valid? . . . . . : Yes
Operative? . . . . . : Yes

More: +
```

Figure 32. Package summary information display

Online Help

Express Hints provides two forms of online documentation.

You can enter the `HELP` command at any time to see Help information specific to the current panel. An example of this is shown in Figure 26; the `HELP` command has been entered on the Statement Selection panel. Figure 33 shows the resulting `HELP` display.

In addition, Express Hints provides an online tutorial that is accessible from the Help pulldown menu on most Express Hints panels.

```
Menu Utilities Options Help
Express Hints -- Statement Selection

This panel displays the SQL statements from a plan-bound DBRM.
Each statement's query number (QUERYNO) is listed along with the
first sixty bytes of the bound form of the statement.

When the list is displayed, you may select exactly one entry using
the action characters 'S' and '/'. Either selection character may
be used; they are synonymous.

Once a statement is selected, the access path characteristics of
the statement will be retrieved and displayed on a subsequent panel
where you may specify a new access path and an associated hint
name.
```

Figure 33. Online help display

Activating and Deactivating Optimization Hints

Express Hints provides a facility that you can use to turn the optimization hints feature of DB2 on or off dynamically, *i.e.*, without the need to modify `DSNZPARM` or restart DB2. Two batch jobs are provided in `SAMPLIB`:

- Job `HXH003` turns optimization hints *on*
- Job `HXH004` turns optimization hints *off*

Each job will require minor customization before being submitted for execution; each contains comments describing the necessary modifications.

Appendices

Appendix A – Messages

Express Hints messages are of the form HXHnnnt, where *nnn* is the message number and *t* is a one-character suffix indicating the type and severity of the message. The suffix values and their meanings are as follows:

I	(Informational)	Routine notification; no action required.
W	(Warning)	Notifies the user of an anomalous circumstance that may or may not reflect an error.
E	(Error)	Processing cannot continue for the reason given in the message; probable user error.
S	(Severe)	Environmental problem or logic error; continued execution is impossible.

Each message is listed below along with its corresponding explanation.

HXH000S **Express Hints - logic error - symptom=*nnn***

Explanation: Express Hints has detected an internal logic error in the program. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH001S **Express Hints failed during initialization, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH002S **Express Hints failed to update variables during termination, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: : Contact HLS Technical Support.

HXH003E **Unable to connect to subsystem 'NNNN'**

Explanation: Express Hints was not able to establish a connection to subsystem *NNNN*.

User Action: Verify that the correct subsystem name was entered on the Express Hints panel and that the subsystem is up and available. If this appears to be the case, contact HLS Technical Support.

HXH004S Unable to disconnect from subsystem 'NNNN'

Explanation: Express Hints was not able to cleanly sever the connection to subsystem *NNNN*.

User Action: Normally this is a singular occurrence related to some kind of environmental glitch in your system. If it happens consistently, contact HLS Technical Support.

HXH005S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH006S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH007S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH009S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH010S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH011S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH013S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH014S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH015S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH016S TBADD failed for plan entry, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH017S TBADD failed for package entry, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH018I No catalog entries were found that matched your specified criteria

Explanation: No plans or packages using the named DBRM are known to the specified DB2 subsystem.

User Action: Specify the correct DBRM and/or subsystem name(s) and retry.

HXH019E More than one item was selected (only one item at a time can be processed)

Explanation: Only one DBRM or package may be processed at a time. You attempted to select more than one entry from the displayed list.

User Action: Select a single entry and retry.

HXH020E **Invalid selection - the only valid selection characters are '/', 'S', and 'I'**

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH021S **DECLARE CURSOR failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH022S **PREPARE failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH023S **OPEN CURSOR failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH024S **SQL FETCH failed - symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH025S **TBCREATE FAILED, symptom=nnn**

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH026S **TBADD failed for package entry, symptom=nnn**

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH027S **DECLARE CURSOR failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH028S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH029S OPEN CURSOR failed, SQLCODE=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH030S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH031S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH032S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH033S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH034S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH035S **TBCREATE FAILED, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support..

HXH036S **TBADD failed for package entry, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH037S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH038S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH039E **More than one version was selected (only one item at a time can be processed)**

Explanation: Only one version of a package may be processed at a time. You attempted to select more than one entry from the displayed list.

User Action: Select a single version and retry.

HXH040E **Invalid selection - the only valid selection characters are '/' and 'S'**

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH041S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH042S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH043S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH044S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH045S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH046S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH047S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH048S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH049S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH050E userid.PLAN_TABLE does not exist

Explanation: No PLAN_TABLE exists in the specified DB2 subsystem for the user named *userid*.

User Action: Make sure that the correct user ID was entered. If the user ID is correct, then there is no PLAN_TABLE for that user. You will need to create and populate the PLAN_TABLE before using Express Hints. See the *Application Programming and SQL Guide* for detailed information on creating a PLAN_TABLE.

HXH051S PREPARE failed, symptom=nnn

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH052S OPEN CURSOR failed, symptom=nnn

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH053S SQL FETCH failed - symptom=nnn

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH054E 'NNNNN' is not a valid command

Explanation: DEBUG is the only command that is valid on this panel. No other command is acceptable.

User Action: Enter the correct command or blanks (as appropriate) and retry.

HXH055S DECLARE CURSOR failed, symptom=nnn

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH056S PREPARE failed, symptom=nnn

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH057S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH058S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH059E **More than one item was selected (only one item at a time can be processed)**

Explanation: Only one SQL statement may be processed at a time. You attempted to select more than one entry from the displayed list.

User Action: Select a single statement and retry.

HXH060E **Invalid selection - the only valid selection characters are '/' and 'S'**

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH061E *userid*.PLAN_TABLE is empty (contains no rows)

Explanation: The specified PLAN_TABLE contains no data.

User Action: **User Action:** Make sure that the correct user ID was entered. If the user ID is correct, then the PLAN_TABLE for that user contains no entries. You will need to populate the PLAN_TABLE (by binding with the Explain option) before using Express Hints.

HXH062S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH063S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH064S	OPEN CURSOR failed, symptom=<i>nnn</i>
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.
<hr/>	
HXH065S	SQL FETCH failed - symptom=<i>nnn</i>
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.
<hr/>	
HXH066I	Zero or negative QUERYNO, unable to process
	Explanation: The selected statement is not explainable and is therefore not subject to the optimization hints facility.
	User Action: Select a different statement to process.
<hr/>	
HXH067I	Unsupported access type, unable to process
	Explanation: The selected statement uses a type of access path not supported by this release of Express Hints.
	User Action: Select a different statement to process.
<hr/>	
HXH068I	userid.PLAN_TABLE contains no entry for this SQL statement; the statement has not been explained or is not explainable
	Explanation: The specified PLAN_TABLE does not contain any rows corresponding to the selected SQL statement. Either the statement is not explainable (and therefore not subject to the optimization hints facility), or a bind with the Explain option has not been performed.
	User Action: If the statement is explainable, re-bind the plan with the Explain option before attempting to process this statement with Express Hints. If the statement is not an explainable type, select a different statement to process.
<hr/>	
HXH070E	<i>userid.PLAN_TABLE</i> format is incorrect -- Express Hints requires at least a 49-column plan table
	Explanation: PLAN_TABLEs can be created in various formats with different numbers of columns. In order to use Express Hints, your PLAN_TABLE must have 49 columns or more; PLAN_TABLEs with fewer than 49 columns lack some of the data needed for Express Hints processing.
	User Action: (1) Recreate the PLAN_TABLE with at least 49 columns and repopulate it with Explain output, or (2) use a different PLAN_TABLE.

- HXH0711** **Unable to process: optimization hints not enabled for subsystem NNNN**
- Explanation:** The optimization hints facility has not been activated for this subsystem. Express Hints requires the use of this facility.
- User Action:** Either (1) modify DSNZPARM to enable the optimization hints facility and recycle the subsystem, (2) run program HXH003 to enable optimization hints dynamically, or (3) use a different subsystem.
-
- HXH072S** **DECLARE CURSOR failed, symptom=nnn**
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH073S** **PREPARE failed, symptom=nnn**
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH074S** **OPEN CURSOR failed, symptom=nnn**
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH075E** **Plan table retrieval error**
- Explanation:** An error occurred accessing the PLAN_TABLE.
- User Action:** Contact HLS Technical Support.
-
- HXH076S** **SQL FETCH failed - symptom=nnn**
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH077E** **A hint name must be specified**
- Explanation:** Each optimization hint requires an assigned name.
- User Action:** Enter a valid 1 to 8 character hint name.
-
- HXH079E** **An index name is required for the requested access path**

Explanation: The type of access path you specified requires the use of an index; you did not specify one.

User Action: Enter a valid index name.

HXH081S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH082S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH083S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH084S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH086E Syntax error: '*indexname*' is not a valid index name. Correct syntax is owner.name, e.g., 'BOB.INDEX_ONE'

Explanation: Self-explanatory. The value represented by *indexname* is not a valid index name, *i.e.*, has incorrect syntax.

User Action: Correct the invalid index name and retry.

HXH087S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH088S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support..

HXH090S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH091S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH092S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH093S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH094S INSERT failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH095S TBADD failed for plan table, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH096E More than one entry was selected

Explanation: Only one instance of the SQL statement may be processed at a time. You attempted to select more than one entry from the displayed list.

User Action: Select a single instance and retry.

HXH097E **Invalid selection - the only valid selection characters are '/' and 'S'**

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH098S **COMMIT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH099S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH100S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH101S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH102S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH103S **Unable to locate SQL statement in DB2 catalog**

Explanation: A processing error occurred while attempting to retrieve SQL statement information from the DB2 catalog. Although the statement was referenced by the PLAN_TABLE, it was not found in the catalog. Usually this is caused by obsolete information in the PLAN_TABLE.

User Action: Verify that the plan referenced in the PLAN_TABLE (the one you are trying to create a hint for) really exists in the subsystem and that the SQL statements in the plan have not changed since the PLAN_TABLE entry was created.

HXH104S **An error occurred retrieving the SQL statement (premature end of data)**

Explanation: A processing error occurred while retrieving SQL statement information from the DB2 catalog. The actual number of bytes retrieved did not match the predicted statement length. Usually this is caused by corrupted data in SYSIBM.SYSSTMT.

User Action: If possible, rebind the plan and retry. Otherwise contact HLS Technical Support.

HXH105S **Unable to set current optimization hint, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH106S **Unable to acquire SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH107S **Unable to set SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH108S **Unable to restore SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH109S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH110S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH111S **Unable to set or reset opthint, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH112W Optimization hint not accepted by DB2

Explanation: DB2 could not validate the access path you specified (the access path is not valid for this SQL statement).

User Action: Specify a different access path and retry.

HXH113I Optimization hint accepted by DB2

Explanation: DB2 successfully validated the access path you specified (the access path is acceptable).

User Action: None. Informational message.

HXH114S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support

HXH115S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH116S TBADD failed for package entry, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH117S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH118S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH119S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH120S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH121S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH122S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH123S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH124S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH125S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

- HXH126S** **PREPARE failed, symptom=*nnn***
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH127S** **OPEN CURSOR failed, symptom=*nnn***
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH128S** **SQL FETCH failed - symptom=*nnn***
- Explanation:** A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH129S** **TBADD failed for package entry, symptom=*nnn***
- Explanation:** A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.
- User Action:** Contact HLS Technical Support.
-
- HXH130I** **No current SQL statements were found in the catalog for this package**
- Explanation:** Self-explanatory. The DB2 catalog does not contain any bound statement information for this package.
- User Action:** Verify that the application contains executable SQL statements. If this is the case, rebind the package and retry. If this fails, contact HLS Technical Support.
-
- HXH131E** **More than one item was selected (only one item at a time can be processed)**
- Explanation:** Only one SQL statement may be processed at a time. You attempted to select more than one entry from the displayed list.
- User Action:** Select a single statement and retry.
-
- HXH132I** **Zero or negative QUERYNO, unable to process**
- Explanation:** The selected statement is not explainable and is therefore not subject to the optimization hints facility.
- User Action:** Select a different statement to process.
-

HXH133E **Invalid selection - the only valid selection characters are '/' and 'S'**

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH142I **Unsupported access type, unable to process**

Explanation: The selected statement uses a type of access path not supported by this release of Express Hints.

User Action: Select a different statement to process.

HXH143S **COMMIT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH144S **COMMIT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH145S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH146S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH147S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH148S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH149S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH150S TBADD failed for plan entry, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH151E No indexes are defined for *tablename*

Explanation: Self-explanatory. No indexes are available for accessing the indicated table. Therefore, access paths requiring an index are not valid for this SQL statement.

User Action: Specify a different access path and retry.

HXH152E More than one item was selected (only one item at a time can be processed)

Explanation: Only one index may be selected. You attempted to select more than one entry from the displayed list.

User Action: Select a single index and retry.

HXH153E Invalid selection - the only valid selection characters are '/', 'S', and 'C'

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH154E An index name is not valid for the requested access path

Explanation: You entered an index name, but the type of access path you specified does not allow for the use of an index.

User Action: Do not specify an index name (blank out the index name field).

HXH155E An index name is required

Explanation: The type of access path you specified requires the use of an index; you did not specify one.

User Action: Enter a valid index name.

HXH156E **Syntax error: 'indexname' is not a valid index name. Correct syntax is owner.name, e.g., 'HAROLD.INDEX_ONE'**

Explanation: Self-explanatory. The value represented by *indexname* is not a valid index name, *i.e.*, has incorrect syntax.

User Action: Correct the invalid index name and retry.

HXH157E **Program logic error -- contact Technical Support**

Explanation: Express Hints has detected an internal logic error in the program.

User Action: Contact HLS Technical Support.

HXH158E **A hint name must be specified**

Explanation: Each optimization hint requires an assigned name.

User Action: Enter a valid 1 to 8 character hint name.

HXH159I **Unable to process: Optimization hints not enabled for subsystem NNNN**

Explanation: The optimization hints facility has not been activated for this subsystem. Express Hints requires the use of this facility.

User Action: Either (1) modify DSNZPARM to enable the optimization hints facility and recycle the subsystem, (2) run program HXH003 to enable optimization hints dynamically, or (3) use a different subsystem.

HXH161S **PREPARE failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH162S **OPEN CURSOR failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH163E **userid.PLAN_TABLE is empty (contains no rows)**

Explanation: The specified PLAN_TABLE contains no data.

User Action: **User Action:** Make sure that the correct user ID was entered. If the user ID is correct, then the PLAN_TABLE for that user contains no entries. You will need to populate the PLAN_TABLE (by binding with the Explain option) before using Express Hints.

HXH164S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH167E *indexname* **does not exist or is not a valid index for table *tablename***

Explanation: Self-explanatory. The specified index either does not exist or is not associated with the indicated table (the table accessed by this SQL statement).

User Action: Enter the name of a valid index and retry.

HXH168S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH172S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH173S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH174S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH175S **Unable to locate SQL statement in DB2 catalog**

Explanation: A processing error occurred while attempting to retrieve SQL statement information from the DB2 catalog. Although the statement was referenced by the PLAN_TABLE, it was not found in the catalog. Usually this is caused by obsolete information in the PLAN_TABLE.

User Action: Verify that the package referenced in the PLAN_TABLE (the one you are trying to create a hint for) really exists in the subsystem and that the SQL statements in the package have not changed since the PLAN_TABLE entry was created.

HXH176S **An error occurred retrieving the SQL statement (premature end of data)**

Explanation: A processing error occurred while retrieving SQL statement information from the DB2 catalog. The actual number of bytes retrieved did not match the predicted statement length. Usually this is caused by corrupted data in SYSIBM.SYSPACKSTMT.

User Action: If possible, rebind the plan and retry. Otherwise contact HLS Technical Support.

HXH177S **Unable to acquire SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH178S **Unable to set SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH179S **Unable to set ophint, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH180S **Unable to restore SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH181S **COMMIT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH183W **Optimization hint not accepted by DB2**

Explanation: DB2 could not validate the access path you specified (the access path is not valid for this SQL statement).

User Action: Specify a different access path and retry.

HXH184S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH185S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH186S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH187S **INSERT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH188S **COMMIT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH189I **Hint '*hintname*' has been added to *userid*.PLAN_TABLE and is now available for use when rebinding the plan or package**

Explanation: Self-explanatory. The hint has been created and is available for your use.

User Action: None required.

HXH190S **Logic error, contact technical support**

Explanation: Express Hints has detected an internal logic error in the program.

User Action: Contact HLS Technical Support.

HXH192S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH193S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH194S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH195S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH196S DECLARE CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH197S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH198S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH199S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH200S **TBADD failed, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH201S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH202S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH203S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH204S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH205S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH206S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH207S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH208S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH209S LOGIC ERROR - plan mode - unable to set queryno - Contact Technical Support

Explanation: Express Hints has detected an internal logic error in the program.

User Action: Contact HLS Technical Support.

HXH210S TBADD failed for package entry, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH211S DBRM contains no statements

Explanation: Self-explanatory. The DBRM exists in the DB2 catalog, but there are no SQL statements to process.

User Action: Verify that the correct DBRM was specified and that it is nonempty, *i.e.*, does contain executable SQL statements.

HXH212S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH213S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH214S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH215S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH216S TBADD failed for plan table, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH217I userid.PLAN_TABLE contains no entry for this SQL statement; the statement has not been explained or is not explainable

Explanation: The specified PLAN_TABLE does not contain any rows corresponding to the selected SQL statement. Either the statement is not explainable (and therefore not subject to the optimization hints facility), or a bind with the Explain option has not been performed.

User Action: If the statement is explainable, re-bind the plan with the Explain option before attempting to process this statement with Express Hints. If the statement is not an explainable type, select a different statement to process.

HXH218E More than one entry was selected

Explanation: Only one instance of the SQL statement may be processed at a time. You attempted to select more than one entry from the displayed list.

User Action: Select a single instance and retry.

HXH219E Invalid selection - the only valid selection characters are '/' and 'S'

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH220I Unsupported access type, unable to process

Explanation: The selected statement uses a type of access path not supported by this release of Express Hints.

User Action: Select a different statement to process.

HXH221S **TBCREATE FAILED, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH222S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH223S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH224S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH225S **SQL FETCH failed - symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH226S **TBADD failed for package entry, symptom=*nnn***

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH227S **LOGIC ERROR - plan mode - unable to set queryno - Contact Technical Support**

Explanation: Express Hints has detected an internal logic error in the program.

User Action: Contact HLS Technical Support.

HXH228I **No current SQL statements were found in the catalog for this package**

Explanation: Self-explanatory. The DB2 catalog does not contain any bound statement information for this package.

User Action: Verify that the application contains executable SQL statements. If this is the case, rebind the package and retry. If this fails, contact HLS Technical Support.

HXH238S **SQL error -- unable to determine status of Hints facility for subsystem NNNN**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH239I **DBRM contains no statements**

Explanation: Self-explanatory. The DBRM exists in the DB2 catalog, but there are no SQL statements to process.

User Action: Verify that the correct DBRM was specified and that it is nonempty, *i.e.*, does contain executable SQL statements.

HXH240S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH241S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH242S **DECLARE CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH243S **Unable to acquire SQLID, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH244S Unable to set SQLID, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH245S Unable to restore SQLID, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH246S COMMIT failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH247S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH248S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH249S Unable to determine service level, symptom=*nnn*

Explanation: An error occurred while attempting to determine the current PTF level of the REXX/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH250S EXPLAIN failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH252E **No hint name has been assigned (a name is required for a new hint)**

Explanation: Self explanatory.

User Action: Use option 2 (NAME) on the Access Path Control submenu to assign a name to the new hint.

HXH254S **PREPARE failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH255S **TBCREATE FAILED, symptom=nnn**

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH256S **OPEN CURSOR failed, symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH257S **SQL FETCH failed - symptom=nnn**

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH258S **TBADD failed for plan table, symptom=nnn**

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH259I **Statement type not supported; complexity limit exceeded**

Explanation: The selected SQL statement is of a type or complexity not supported by this release of Express Hints. Statements containing subselects, for instance, are not presently supported.

User Action: None.

HXH260E **Invalid selection - the only valid selection characters are '/', 'S', and 'E'**

Explanation: An invalid selection character was entered.

User Action: Retry using one of the selection characters listed.

HXH261ES **Invalid entry - you must either select one item or else enter new sequence numbers for all**

Explanation: On the query elements screen, an invalid number of rows was selected, or incorrect action characters were entered.

User Action: Either select one single row for access path alterations, or else resequence the elements by entering all new sequence numbers.

HXH262E **Invalid sequence numbers; sequence number *nnn* is missing**

Explanation: When changing the join sequence, the sequence numbers you enter must begin with one and must be contiguous, *i.e.*, no gaps (missing numbers) are permitted. You omitted sequence number *nnn*.

User Action: Retry using a valid range of sequence numbers.

HXH263E **Invalid sequence numbers; sequence number *nnn* is duplicated**

Explanation: When changing the join sequence, the sequence numbers you enter must begin with one and must be contiguous, *i.e.*, no gaps (missing numbers) are permitted. You used sequence number *nnn* twice.

User Action: Retry using a valid range of sequence numbers.

HXH264E **Zero is not a valid sequence number**

Explanation: Join sequence numbers must begin with 1.

User Action: Retry using a valid range of sequence numbers.

HXH265E **No hint name specified (you must assign a name)**

Explanation: Self explanatory.

User Action: Use option 2 (NAME) on the Access Path Control submenu to assign a name to the new hint.

HXH267E **Sequence numbers must be numeric**

Explanation: When changing the join sequence, the sequence numbers you enter must be numeric.

User Action: Retry using a valid range of sequence numbers.

HXH268W * Express Hints trial has expired *****

Explanation: Self-explanatory. Your trial copy of Express Hints has reached or passed its assigned expiration date.

User Action: Contact HLS.

HXH270S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH271S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH272S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH273S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH274S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH275S TBADD failed for plan table, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH277E More than one entry was selected

Explanation: Only one entry may be selected on this panel. Multiple selection is not allowed.

User Action: Retry with a single selection.

HXH279S PREPARE failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH280S TBCREATE FAILED, symptom=*nnn*

Explanation: A failure has occurred in ISPF, or in the Express Hints/ISPF interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH281S OPEN CURSOR failed, symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH282S SQL FETCH failed - symptom=*nnn*

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH283I Statement type not supported; complexity limit exceeded

Explanation: The selected SQL statement is of a type or complexity not supported by this release of Express Hints. Statements containing subselects, for instance, are not presently supported.

User Action: None.

HXH284E No hint name has been assigned (a name is required for a new hint)

Explanation: Self explanatory.

User Action: Use option 2 (NAME) on the Access Path Control submenu to assign a name to the new hint.

HXH285I	Unable to process: optimization hints not enabled for subsystem NNNN
	Explanation: The optimization hints facility has not been activated for this subsystem. Express Hints requires the use of this facility.
	User Action: Either (1) modify DSNZPARM to enable the optimization hints facility and recycle the subsystem, (2) run program HXH003 to enable optimization hints dynamically, or (3) use a different subsystem.
HXH286S	COMMIT failed, symptom=nnn
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.
HXH287S	PREPARE failed, symptom=nnn
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.
HXH288S	OPEN CURSOR failed, symptom=nnn
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.
HXH289E	Plan table retrieval error
	Explanation: An error occurred accessing the PLAN_TABLE.
	User Action: Contact HLS Technical Support.
HXH290S	SQL FETCH failed - symptom=nnn
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.
HXH292S	PREPARE failed, symptom=nnn
	Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. <i>nnn</i> represents an internal return code and is provided for diagnostic purposes.
	User Action: Contact HLS Technical Support.

HXH293S **INSERT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH294S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH295S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH296S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH297E **Plan table retrieval error**

Explanation: An error occurred accessing the PLAN_TABLE.

User Action: Contact HLS Technical Support.

HXH299S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH300S **INSERT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH301S **PREPARE failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH302S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH303S **OPEN CURSOR failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH304I **userid.PLAN_TABLE contains no entry for this SQL statement; the statement has not been explained or is not explainable**

Explanation: The specified PLAN_TABLE does not contain any rows corresponding to the selected SQL statement. Either the statement is not explainable (and therefore not subject to the optimization hints facility), or a bind with the Explain option has not been performed.

User Action: If the statement is explainable, re-bind the plan with the Explain option before attempting to process this statement with Express Hints. If the statement is not an explainable type, select a different statement to process.

HXH306S **TBPUT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH307S **TBPUT failed, symptom=*nnn***

Explanation: A failure has occurred in DB2, or in the Express Hints/DB2 interface. *nnn* represents an internal return code and is provided for diagnostic purposes.

User Action: Contact HLS Technical Support.

HXH309E **This access type does not use an index; index name should not be specified.**

Explanation: You have specified an index name for a non-indexing access type.

User Action: Remove the index name and retry.

HXH310E **Multiple indexes are not supported; choose a different access type.**

Explanation: Access types M, MX, MI, and MU are not supported by this release of Express Hints.

User Action: Select a different access type and retry.

HXH311E An index is required for this access type

Explanation: You specified an access type that requires an index, but did not provide an index name.

User Action: Enter a valid index name and retry.

HXH312E Syntax error: 'nnnnn' is not a valid index name. Correct syntax is owner.name, e.g., 'BOB.INDEX_ONE'

Explanation: The name you entered (*nnnnn*) does not have the correct syntax for an index name.

User Action: Enter a valid index name and retry.

HXH313E Dynamic prefetch is not supported by this release of DB2

Explanation: Dynamic prefetch is supported only by DB2 Version 8 and later. Your release of DB2 does not support this feature.

User Action: Enter a valid prefetch mode and retry.

HXH800S Unable to deallocate work file

Explanation: Dynamic allocation failure in program HXH001.

User Action: Contact HLS Technical Support.

HXH801S Unable to allocate work file

Explanation: Dynamic allocation failure in program HXH001.

User Action: Contact HLS Technical Support.

HXH802S Unable to deallocate work file

Explanation: Dynamic allocation failure in program HXH001.

User Action: Contact HLS Technical Support.

HXH803S The Express Hints trial authorization has expired -- contact HLS Technical Support

Explanation: Self-explanatory. Your trial copy of Express Hints has reached or passed its assigned expiration date.

User Action: : Contact HLS.

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