

SEARCH2000 for AS/400



# User's Guide

*Version 3 Release 1 Modification Level 1*



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*Version 3 Release 1 Modification Level 1*

**Note!**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page vii.

**Edition Notices (June 1998)**

This edition applies to Version 3 Release 1 Modification Level 1 of IBM SEARCH2000 for AS/400 (Program 5697-C72) and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure that you are using the correct edition for the level of the product.

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## About This Book

This book describes how to use the IBM SEARCH2000 for AS/400 product (hereafter called SEARCH2000) on the Application System/400. SEARCH2000 is a tool that can help you decide whether to convert or replace an application before the year 2000. It assists in finding dates in the data files of existing applications that are not yet Year 2000-enabled, and provides an analysis of how these dates impact the application code. Reports show which programs use files that contain dates, how many lines of code are in these programs, and which lines of COBOL or RPG code are impacted by dates.

The information that SEARCH2000 gathers can also be used to automate the field-assignment phase of the IBM BYPASS2000 product. BYPASS2000 is a tool that converts COBOL and RPG application code on the AS/400 to handle 4-digit year information in dates.

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## Who Should Read This Book

This book is written for application developers and programmers who are responsible for determining the changes that are required to accommodate 4-digit year information in AS/400 applications.

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## How to Use This Book

This book provides information about concepts and tasks that are related to analyzing an application with the SEARCH2000 product.

- The chapters in “Part 1. SEARCH2000 Concepts” on page 1 describe the SEARCH2000 product and its processing flow. They list the supported date formats, introduce the concept of candidate date fields, and discuss limitations of the product.
- The chapters in “Part 2. SEARCH2000 Tasks” on page 15 guide you in detail through the various steps of analyzing an application’s database files, Copybooks, and programs with SEARCH2000.
- The chapters in “Part 3. SEARCH2000 Reference Information” on page 81 show each major SEARCH2000 display, describe its information content, and list the tasks that you can perform.
- “Appendix. Interfacing with BYPASS2000” on page 113 explains how to use the output of SEARCH2000 as input into the BYPASS2000 product.

---

## What’s New in Version 3 Release 1 Modification Level 1?

In Version 3 Release 1 Modification Level 1, SEARCH2000 has been enhanced to scan RPG and COBOL source code and identify the lines of code that contain instructions that involve date-sensitive fields. Additional reports show the date-impacted lines of codes in user programs, as well as the date-impacted program areas and fields.

---

## Changes to this User's Guide Since V3R1M0

This manual differs in some places from the SEARCH2000 for AS/400 User's Guide V3R1, SC09-2598-00. Most of the changes are related to the enhancements that have been made, others reflect minor technical corrections. To assist you in using this manual, changes and enhancements are noted with a vertical bar (|).

---

## How to Get Help

You can get contextual help for any SEARCH2000 display, field, or parameter. Simply highlight the element in the product interface and press F1.

**Note:** Index Search is not enabled for the SEARCH2000 product.

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## Where to Find More Information

See the following web page for more information about SEARCH2000:

<http://www.software.ibm.com/ad/as400/search2000>

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# Part 1. SEARCH2000 Concepts



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## Chapter 1. SEARCH2000 Overview

As you prepare for the year 2000, SEARCH2000 helps evaluate the potential "Year 2000" conversion effort for an application that is not enabled to handle 4-digit year information in dates. Before you decide what to do with existing applications that use 2-digit year information, you need answers to the following questions:

- How many dates does your application use?
- What is the formats of these dates?
- How many of these dates are ambiguous (that is, contain 2-digit year data)?
- How many programs potentially use those dates, or at least use files containing those dates?
- How many lines of code are in those programs?
- Which lines in RPG and COBOL programs are probably impacted by dates?

SEARCH2000 provides these answers.

1. It browses the database files that an application uses, searching for fields that contain date data. The results are presented in reports that list files and candidate fields that most likely contain dates.
2. It browses the application's program libraries, searching for programs that reference database files that have been found to contain dates. It then scans the corresponding source code to identify the lines of code that contain operations that involve date-sensitive fields. The results are presented in reports that shows the impact that these dates have on the application source code.

The analysis results help you determine how large the conversion task may be, and can form the basis for your decision whether to convert, replace, or upgrade the application.

If the conversion task is large, you may decide to use an automated conversion tool such as IBM BYPASS2000. See "Appendix. Interfacing with BYPASS2000" on page 113 to find out how you can use SEARCH2000 output to export information to BYPASS2000.

---

## SEARCH2000 Information Flow

Figure 1 on page 4 illustrates how SEARCH2000 uses information from your application's database files and programs to evaluate the required effort for your Year2000 conversion.

1. SEARCH2000 analyzes the data in your physical files and searches for fields that contain dates.  
It uses this information as input into the subsequent program analysis phase. It can also format and export the information as a BYPASS2000 interface file, if you plan to convert your application with the BYPASS2000 product.
2. SEARCH2000 analyzes all application programs to determine which database files they reference.  
It relates this information to the user-validated results of the database analysis, and creates various reports. These reports provide information about how dates in database files may impact the programs that contain references to these files.

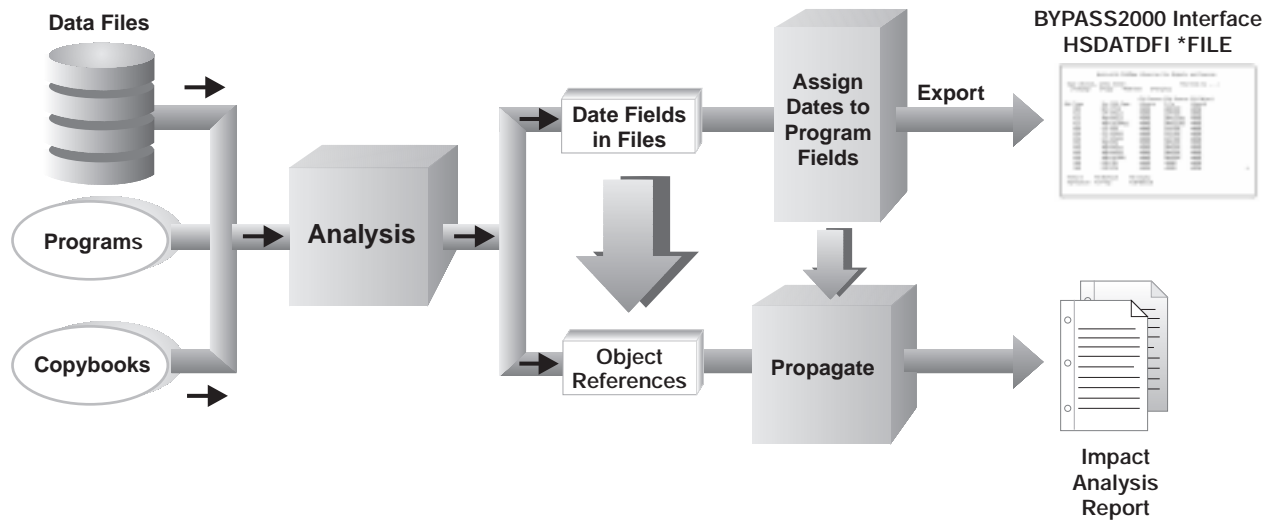


Figure 1. SEARCH2000 Information Flow

## Supported Date Formats

SEARCH2000 supports the date formats and numeric types that are listed in the following table.

Table 1. Date Formats supported by SEARCH2000

Date Format	Numeric Type	Description
<ul style="list-style-type: none"> <li>• YYMD</li> <li>• YYDM</li> <li>• DMY</li> <li>• MDYY</li> </ul>	N,A* P**	Complete 4-digit year. Each date field is 8 digits long.
<ul style="list-style-type: none"> <li>• YYM</li> <li>• MYY</li> </ul>	N,A P	A portion of the formats mentioned above (a month and 4-digit year). Each date field is 6 digits long.
<ul style="list-style-type: none"> <li>• DMY</li> <li>• MDY</li> <li>• YMD</li> <li>• YDM</li> </ul>	N,A P	2-digit year, plus month and day in any of the orders shown. Each date field is 6 digits long.
<ul style="list-style-type: none"> <li>• MY</li> <li>• YM</li> </ul>	N,A P	A portion of the formats mentioned above. Each date field is 4 digits long.
<ul style="list-style-type: none"> <li>• YY</li> </ul>	N,A P	4-digit year (2-digit century and 2-digit year). Each date field is 4 digits long.



Table 1. Date Formats supported by SEARCH2000 (continued)

Date Format	Numeric Type	Description
<ul style="list-style-type: none"> <li>• YJ</li> <li>• YYJ</li> </ul>	N,A P	2- or 4-digit year and Julian day (ordinal number starting from the first day of the year, max. 366). Each date field is 5 or 7 digits long. <b>Note:</b> Date formats in which the Julian day precedes the year, such as JY or JYY, are not supported.
<ul style="list-style-type: none"> <li>• Y</li> </ul>	N,A P	2-digit year. Each date field is 2 digits long.
<ul style="list-style-type: none"> <li>• *DATE</li> </ul>		Date data type.
<ul style="list-style-type: none"> <li>• *TIMESTAMP</li> </ul>		Timestamp data type.
N,A = zoned decimal, alphanumeric P = packed decimal		

SEARCH2000 identifies the date and timestamp data types in files with or without data. However it does not include them in the BYPASS2000 interface file HSDATDFI. BYPASS2000 automatically identifies these types.

SEARCH2000 does not support date formats that contain any separators, such as D-M-Y or Y/M/D. However, it does identify the year portion of such dates correctly. This information is sufficient for both the impact analysis and for exporting date information to BYPASS2000, because the Year information alone is essential for assessing and converting your application.

When searching for dates in fields, SEARCH2000 is able to recognize the following fillers and treat them as nonsignificant values:

- '...0000...' (all zeros)
- '...9999...' (all nines)
- '... ..' (blanks)

You may selectively switch off supported date formats when SEARCH2000 analyzes your files, as described in "Switch Valid Date Formats On or Off" on page 42 .

---

## Supported Database File Formats

SEARCH2000 can find dates in any externally described database file, via Data Description Specifications (DDS), Structured Query Language (SQL), or the CRTPF command, if the following is true:

- The file contains a single record format if it is a physical file. (Logical files can contain multiple record formats.)
- The file contains data.

---

## SEARCH2000 Processing Flow

Processing an application with SEARCH2000 requires the following steps, illustrated in Figure 2 on page 7:

1. Start SEARCH2000.  
See “Chapter 5. Start SEARCH2000” on page 19 for details.
2. Create one or more environments for your application’s databases and programs.  
See “Chapter 6. Create a New SEARCH2000 Environment” on page 21 for details.
3. Load the libraries that contain your application’s database files into the environment.  
See “Chapter 7. Load Database Files and Programs” on page 25 for details.
4. Load the libraries that contain your application’s program objects into the environment.  
See “Chapter 7. Load Database Files and Programs” on page 25 for details.
5. Analyze database files to identify any date fields.  
See “Chapter 9. Analyze Database Files” on page 39 for details.

**Note:** SEARCH2000 can format this information so that you can use it as an import into the BYPASS2000 product to automate the field-assignment phase. See “Appendix. Interfacing with BYPASS2000” on page 113 for details.

6. Analyze Copybooks, if your programs include Copybook declarations.  
See “Analyze Copybooks Globally” on page 55 for details.
8. Analyze program objects to determine which programs use which files, and how many of these files contain date fields, based on the results of 6.  
See “Analyze Programs Globally” on page 56 for details.
9. Optionally, export date-field information to BYPASS2000.  
See “Appendix. Interfacing with BYPASS2000” on page 113 for details.

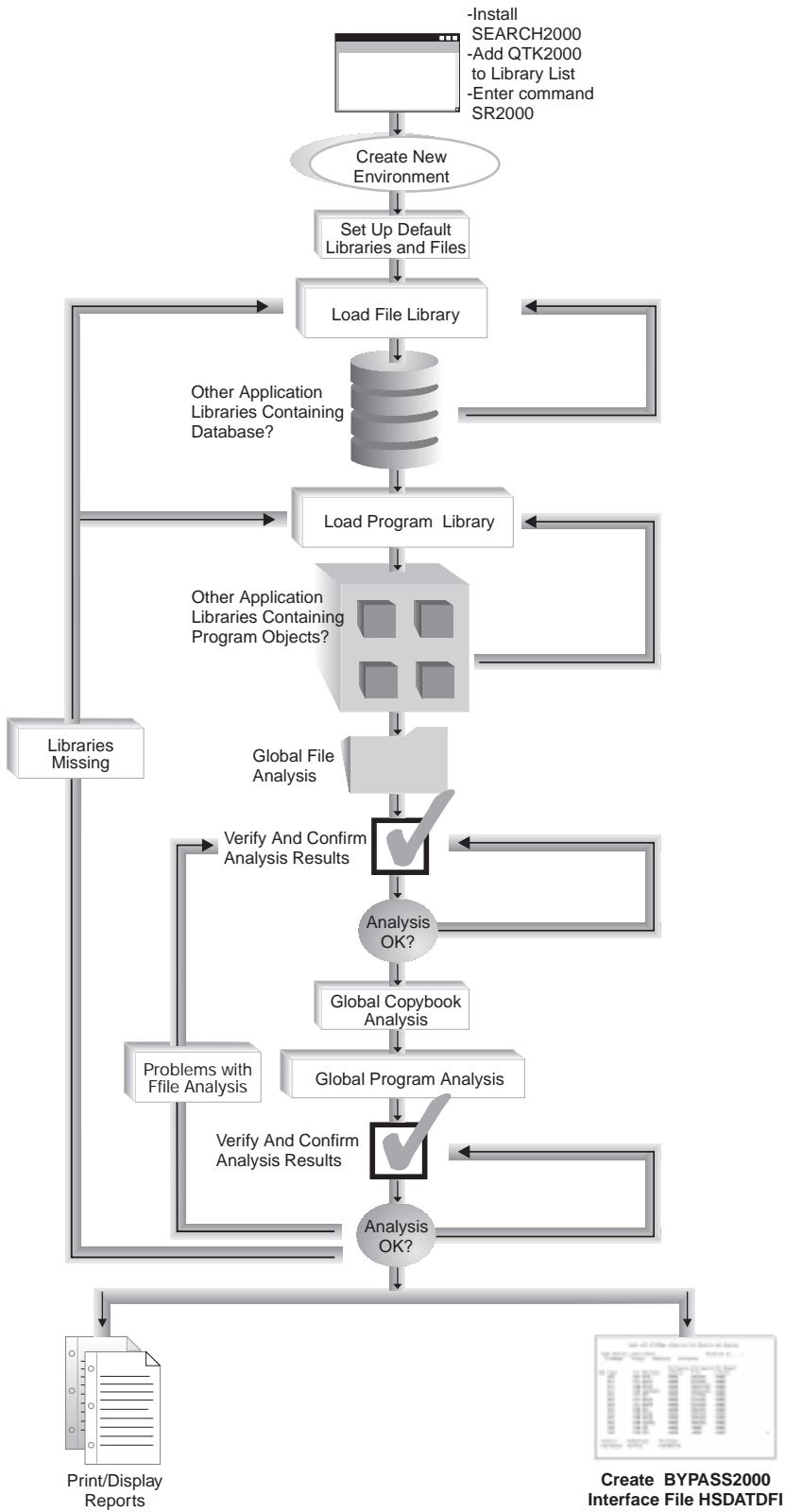


Figure 2. SEARCH2000 Processing Flow



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## Chapter 2. Finding Date Fields

SEARCH2000 browses the data in data files and searches for possible date fields of alphanumeric, zoned decimal, packed decimal, \*DATE, or \*TIMESTAMP type. It can find most common date formats, as listed in "Supported Date Formats" on page 4 .

SEARCH2000 works with externally described files (through DDS or SQL) as well as with internally described files. It can find date fields that are explicitly defined; for example in the DDS of a file. It also detects dates that are nested inside larger fields and dates that span multiple fields (for example, dates defined by one field for the day, one for the month, and one for the year).

SEARCH2000 browses the actual data in each file to find *candidate* date fields whose content suggests that they might be date fields. If an external field-level description is available for the file, SEARCH2000 matches the candidate fields to that description for further analysis.

You must validate the results of the database file analysis, as discussed in "Adding and Removing Dates Manually" on page 11.

---

### Identifying Candidate Date Fields

SEARCH2000 analyzes each record field to determine which values it contains. (It analyzes alphanumeric and zoned data by bytes and packed data by half bytes.) It does this for all records in a file, or for a subset only, depending on your specifications.

SEARCH2000 expects to find homogeneous values for all records in a particular file. For example, in order for two digits in a field to be considered month data, the corresponding values in all records must always be in the range between 1 and 12. As soon as SEARCH2000 encounters a different value, it no longer considers the field to contain month data. However, you can use one of the customizable analysis parameters to allow a certain amount of invalid data, depending on the nature of your data.

SEARCH2000 first examines couples of consecutive digits. It checks whether the values they assume throughout an entire table column are consistent with month, day or year information. It then assembles the collected information into "patterns" (date formats).

To facilitate the search, you may "switch off" certain date formats that you know are not present in your data. In this case, SEARCH2000 takes only the remaining supported date formats into consideration while it analyzes your files. If you limit the number of date formats to search for, you may be able to increase the speed of the analysis and reduce the number of "false positive" findings.

### Rules for Selecting Candidate Date Fields

SEARCH2000 uses the following rules to determine which fields are candidate date fields:

- SEARCH2000 identifies a field as a candidate date field if the date format falls into the "valid" category, unless another rule rejects the field.

Valid values are:

- 1-12 for Month
- User-defined range for Year, or any 4-digit Year value, or any 4-digit Year value in combination with valid Month and Day value
- 1-366 for Julian day
- Fields containing data that is not considered "valid" for a category are rejected, with the exception of special values, which include 'zero' values, '9' values, and blanks for the entire date field.
- If a piece of data seems to fit more than one date format, SEARCH2000 selects the format that supplies the most information, as described in "Selecting the Date Format that Carries More Information".
- Based on the user-defined parameters that are described in "Customizable Search Parameters" on page 33, SEARCH2000 may reject fields as candidate date fields.

## Selecting the Date Format that Carries More Information

Because there may be different combinations of date formats in the same position, SEARCH2000 implicitly ignores the shorter formats as compared to longer ones. Consider the following examples:

- SEARCH2000 could interpret a sequence of digits such as 0198501 in the following ways:
  - As a month that is followed by a 2-digit year and by a 3-digit code (January 98, with 501 as a code)
  - As a 4-digit year, followed by a month, and preceded by zero (0 followed by January 1985).

SEARCH2000 automatically selects the format that carries the biggest amount of information. In this case, it selects the 4-digit year followed by a month, rather than the 2-digit year followed by a month.

- SEARCH2000 could interpret a sequence of digits such as 061996 in the following ways:
  - As a month that is followed by a 4-digit year (June 1996)
  - As a month that is followed by a day and by a 2-digit year (June 19, 96).

SEARCH2000 would automatically select the format of the month and of the 4-digit year, because it carries more information.

For example, if the value 19 has been found on all records that have been scanned, it is more likely that it represents Century information rather than Day information. This is because valid values for Day are 1 through 31, while the only valid values for Century are 19 and 20.

---

## Limitations of SEARCH2000's Ability to Find Dates

SEARCH2000's date-finding ability has the following limitations:

- Empty files do not supply candidate fields.

SEARCH2000 does not base itself on field names or text to identify dates. Instead, it scans the actual data in the files. Therefore, it can only find dates in files that contain data, and does not scan empty files, such as reference files, for example.

You can manually add any dates that SEARCH2000 cannot find, as described in “Add Dates” on page 47.

- Fields that contain inconsistent date formats most likely are not candidate fields. For example, if a field contains data in MDY format for some records and in YMD format for others, SEARCH2000 is not likely to select that field as a date.
- Fields that contain data of a date format that is not supported by SEARCH2000 are not likely to be selected as candidate date fields. This is the case, for example, for the formatted date Y/M/D.

However, Y (“year only”) is a supported date format. Therefore, in many cases, SEARCH2000 detects at least the year portion of such dates.

- SEARCH2000 does not support multiple-format physical files.
- SEARCH2000 does not search logical files for dates. However, it considers them when it determines which programs contain references to which files.

---

## Adding and Removing Dates Manually

Once SEARCH2000 has analyzed all physical files, you can work with the results of the analysis to determine whether the candidate date fields are in fact dates. Figure 3 illustrates this validation process. See “Chapter 10. Validate Candidate Dates” on page 45 for a description of the required steps.

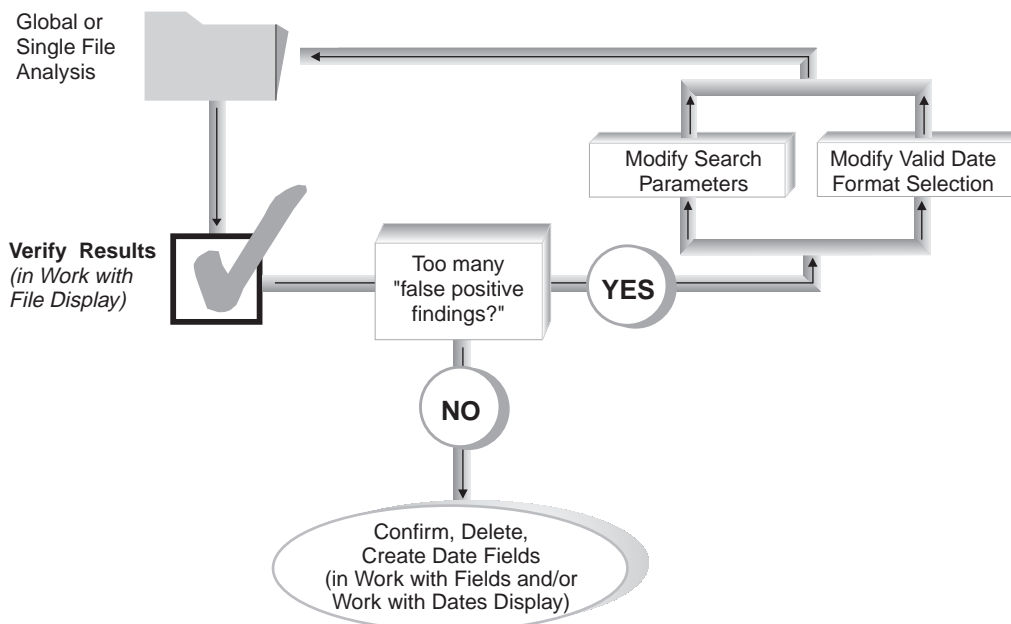


Figure 3. Verifying Results of SEARCH2000 Database File Analysis

It is important to adjust the list of dates, to ensure accurate and complete input into the subsequent program analysis phase:

- Depending on their content, SEARCH2000 may incorrectly identify fields as date fields. These findings are called “false positives”. You must remove any false positive dates, as described in “Remove Dates” on page 46.
- Conversely, SEARCH2000 may miss date fields. For example, SEARCH2000 does not search files that do not contain any records, such as a field reference

file. However, you may know that some of these files contain date fields. In this case, you must add these dates manually, as described in “Add Dates” on page 47 .



---

## Chapter 3. Determining the Impact of Dates on Your Programs

Once you have validated all dates in an application's database files, SEARCH2000 can gather information that cross-references programs with files that contain dates. It presents the results to you through the Work with Programs display (described in "Chapter 18. Work with Programs" on page 101) and through reports (described in "Chapter 21. Work with Reports" on page 111.)

Dates may impact a program in the following cases:

- The program uses a physical file that contains dates.
- The program uses a logical file that is based on one or more physical files which contain dates.
- The program uses a system date.
- You have explicitly specified a program field as a date.

---

### Limitations When Analyzing ILE Programs

SEARCH2000 has the following limitations when analyzing Integrated Language Environment (ILE) programs:

- It provides impact information on a program basis. It does not specify the number of modules or service programs that you need to re-compile.
- It does not directly provide information about source members of the modules in a bound program. However, you can use the functionality that is described in "Display Program Information" on page 62 to view information about ILE modules and source members.
- It does not scan the source code to determine the number of impacted lines of code.

---

### Limitations When Analyzing CLP Programs

SEARCH2000 does not analyze CLP statements. However, the CLP programs are considered when SEARCH2000 calculates the total lines of code that are present in the CLP program sources.



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## Part 2. SEARCH2000 Tasks



## Chapter 4. Apply the SEARCH2000 Software Key

Before you can use the SEARCH2000 product, you must enable the software key that you should have received. (If you do not have a valid software key, see the SEARCH2000 Program Directory, GI10-4925-02, for more information about receiving the key.)

To enable your SEARCH2000 software key, enter the following commands on an AS/400 command line:

1. ADDLIBLE QTK2000

This command adds the SEARCH2000 product library to your library list.

2. SR2000KEY

This command accesses the Enable Software Key display that is shown in Figure 4. Type the software key in the entry field and press Enter.

```
Enable SEARCH2000 Software Key

Software key:      *****
                  * < XXXXXX XXXXX XXXXX XXXXXX > *
                  *****

F3=Exit  F5=Refresh  F12=Cancel
```

Figure 4. Applying the Software Key.

**Note:** Once the product has been enabled for one AS/400 you cannot use it on another AS/400. You need to reinstall it and request a software key that corresponds to the other AS/400.



## Chapter 5. Start SEARCH2000

To start SEARCH2000, the product library QTK2000 must appear in your library list. Enter the following commands on an AS/400 command line:

```
ADDLIBLE QTK2000
SR2000
```

The SEARCH2000 Main Menu appears.

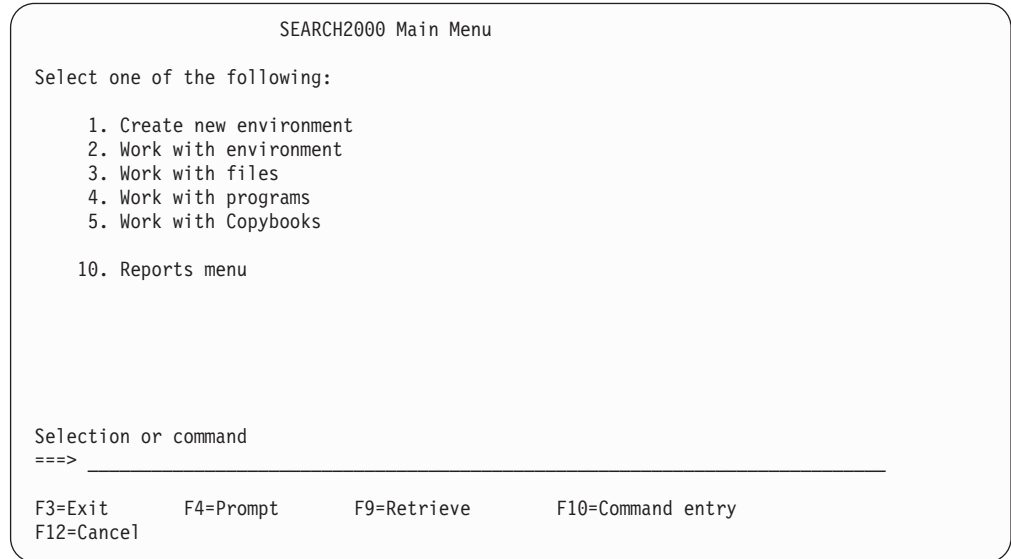


Figure 5. SEARCH2000 Main Menu

From this menu, you can perform the following tasks:

### Create a new environment

Select option 1. When you run SEARCH2000 for the first time, you need to create one or more environments in which to analyze your application's database files and programs. See "Chapter 6. Create a New SEARCH2000 Environment" on page 21 for detailed instructions.

### Work with an existing environment

Select option 2. See "Chapter 13. Work With Environments" on page 83 for detailed instructions.

### Work with files

Select option 3. See "Chapter 14. Work with Files" on page 87 for detailed instructions.

### Work with programs

Select option 4. See "Chapter 18. Work with Programs" on page 101 for detailed instructions.

### Work with Copybooks

Select option 5. See "Chapter 20. Work with Copybooks" on page 107 for detailed instructions.

### Access the Report menu

Select option 10. See "Chapter 21. Work with Reports" on page 111 for detailed instructions.





## Chapter 6. Create a New SEARCH2000 Environment

A SEARCH2000 environment represents a library that stores information about your application's database files and programs, as well as all collected data.

You can create several separate environments to analyze the parts of your application separately, or analyze the same system with different sets of analysis parameters.

To create a new environment, do the following:

1. Access the Create New Environment display in one of the following ways:
  - Select option 1 (Create new environment) from the SEARCH2000 Main Menu.
  - Type SR2000CRT on any AS/400 command line.
  - If you have already worked once with SEARCH2000 environments, press F6 (Create) in the Work with Environments display that is shown in Figure 7 on page 22 .

The Create New Environment display appears as shown below.

```
                Create New Environment

Type choices, press Enter.

New environment name . . . . . _____ Name
Text . . . . . Impact analysis environment library. _____

F3=Exit  F5=Refresh  F12=Cancel
```

Figure 6. Creating a New SEARCH2000 Environment

2. Specify a name for the environment.
3. Optionally, modify the text description of the new environment, then press Enter to see one of the following:
  - If you accessed the Create New Environment display from the SEARCH2000 Main Menu the Work with Environments display opens, listing only the new environment.
  - If you accessed the Create New Environment display from the Work with Environments display press F5 (Refresh) to see the new environment added to the list of environments.

4. Add the libraries that contain your application's database files and programs to the new environment, as described in "Chapter 7. Load Database Files and Programs" on page 25.

```

Work with Environments

Type choices, press Enter.                Position to environment
2=Add a file library    3=Add a program library    12=Work with files
13=Work with programs  15=Analyze files           16=Analyze programs

Opt Environment Text
— KMIAN          Impact analysis environment library
— SUSAN          Impact analysis environment library
— KTMT           Impact analysis environment library.

F3=Exit  F4=Prompt  F5=Refresh  F6=Create  F10=Command line  F12=Cancel
F17=Top  F18=Bottom F23=More options
Bottom

```

Figure 7. Working with Existing Environments

When you create an environment, SEARCH2000 creates a new library on your system. The name of this library is formed by the prefix QC2K followed by the environment name. For example, if you create an environment MYENV the corresponding library name is QC2KMYENV. (Note that the Work with Environments display shows the environment name, and not the library name.)

**Note:** If you create a new environment with authority \*PUBLIC \*EXCLUDE, users with a lower authority level will not be able to see this environment.

Table 2 lists the files that SEARCH2000 automatically creates in library QC2Kxxxxxx.

Table 2. Files Created in Library QC2Kxxxxxx

Filename	Description
HSDATDFI	Stores date information that can be exported to BYPASS2000.
QCKUANASS	Stores the information about the assigned fields.
QCKUANCST	Stores source code statements.
QCKUANDBK	Stores information about file keys.
QCKUANDBR	Stores relationships between physical and logical files.
QCKUANFFD	Stores detailed information about file fields.
QCKUANFLD	Stores the list of fields used in programs.
QCKUANFMT	Stores information about file record format.
QCKUANLIN	Stores lines of code statements that are impacted by dates.
QCKUANOLC	Stores information about date-sensitive fields in Copybooks.
QCKUANOLR	Stores information about date-sensitive fields in programs.
QCKUANPGM	Stores information about the files that contain dates and are referenced by programs.

Table 2. Files Created in Library QC2Kxxxxxx (continued)

Filename	Description
QCKUANPRO	Stores information used to perform the propagation analysis.
QCKUANREF	Stores information about program references.
QCKUANRFF	Stores information about the relationships between external and internal file-field names.
QCKUANRNM	Stores information about file-field RENAMES.
QCKUANRPC	Stores information about relationships between programs and Copybooks.
QCKUANRPF	Stores information about relationships between programs and files.
QCKUANSCN	Stores all information related to date fields.
QCKUANSQI	Stores certain SQL program statements (normally empty).
QCKUANVRC	Used to handle special types of Copybooks.
QCKUDEFAULT	Data area used for storing the names of the default library and files used when analyzing programs (*DTAARA).
QCKUERLOG	Contains messages issued during program analysis.
QCKUHIGH	Stores the settings for the highlighting of dates (*DTAARA).
QCKUHSDAT	Stores the valid date formats.
QCKUHSDB	Stores all information related to database files.
QCKUHSDFT	Stores the default analysis parameters for this environment.
QCKUHSPGM	Stores information related to program objects.

---

## Delete an Environment

When you no longer need a particular environment, you may want to delete it, to free up system resources. To delete an environment, delete the corresponding library QC2Kxxxxxx from your system with the command `DLTLIB QC2Kxxxxxx`.

You can simply remove the environment from view without actually deleting it, by listing only a subset of environments as described in “Access the Work with Environments Display” on page 83.



---

## Chapter 7. Load Database Files and Programs

Once you have created an environment, you must load the libraries that contain the database files and programs that your application uses. SEARCH2000 stores this information in the files that are listed in Table 2 on page 22.

**Note:** If you change the user authority while using SEARCH2000, you could lose authorization on some objects. This may cause unpredictable results. Please use the same user authority while working with a SEARCH2000 environment.

---

### Specifying Default Libraries

Before you load any program libraries, it is important that you specify the default libraries and files to let SEARCH2000 know where source libraries and Copybook files are located on your system.

**Note:** SEARCH2000 requires that the Copybook's sources are located in a source file that is different from the source file that contains the program sources. If both types of sources appear in source files with the same name, you must separate them before proceeding.

If you compile your sources from a given library and subsequently move them to another library, SEARCH2000 will not be able to track them. You must provide SEARCH2000 with the location of the source files to obtain information about source members and analyze source code.

To specify the source libraries and Copybook files for your application do the following:

1. Type option 11 (Set default libraries) next to the environment of your choice in the Work with Environments display, and press Enter.  
The Set Default Libraries and Files display appears.

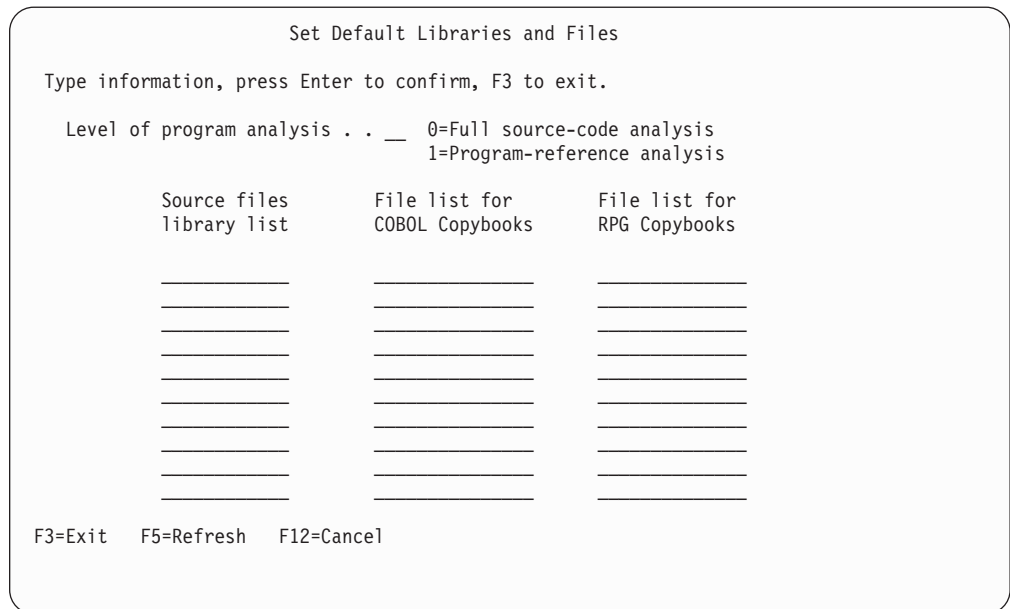


Figure 8. Specifying Default Libraries and Files

2. Specify the value that corresponds to the level of program analysis that SEARCH2000 should use as a default for this environment.
  - Specify 0 for a full analysis.
 

The full analysis cross-references programs with files that contain dates, provides information about these files, and identifies the lines of code that are impacted by dates.
  - Specify 1 for a partial analysis (program-reference analysis).
 

The partial analysis cross-references programs with files that contain dates, and provides information about the total number of lines of code, the number of files used, and how many dates were found in the used files.

While the partial analysis does not tell you which lines of code are impacted by dates, it will complete faster than the full analysis.
3. Enter up to ten library names each for source files, RPG Copybooks, and COBOL Copybooks.
4. Press enter to confirm your choices, and F3 to return to the previous display.

While loading program libraries, SEARCH2000 scans the source-file libraries to find source files and members. While loading the programs, SEARCH2000 uses the file names that are listed in the second and third columns of the Set Default Libraries and Files display. When it encounters a Copybook, SEARCH2000 will expect to find its source in the files listed here.

**Note:** It is very important to set default libraries and files before you start loading your application's program libraries. If you subsequently need to change a source-file library, you must make sure that this does not involve loading a set of Copybooks with the same name as an existing set of Copybooks. Otherwise, you must create a separate environment.

## Loading Database Libraries and Program Libraries

Once you have specified the default source libraries, you can start loading database libraries and program libraries. This consists of telling SEARCH2000 where the files are located that store the information that is used by your application, and where the program objects of your application are located.

To load a file library or a program library into an environment, do the following:

1. Select option 2 (Work with Environments) from the SEARCH2000 Main Menu. The Specify Environments to Work With display appears.

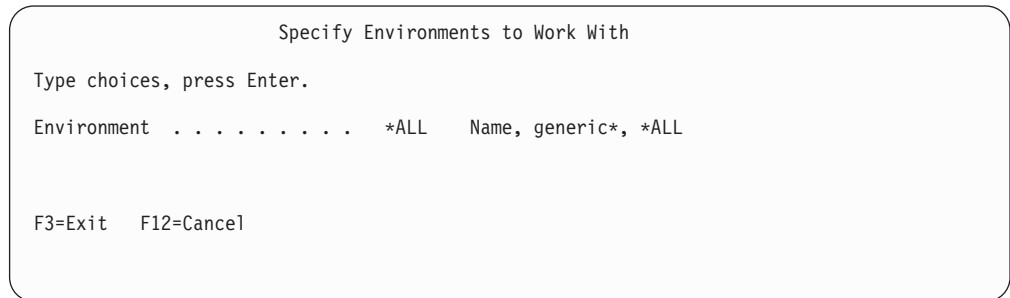


Figure 9. Choosing with Which Environments to Work

2. Specify whether you want to work with a single environment, a subset of environments, or all environments. Then press Enter.

The Work with Environments display appears. It lists all existing environments or a subset only, depending on the value that you have specified for the Environment parameter in the previous display.

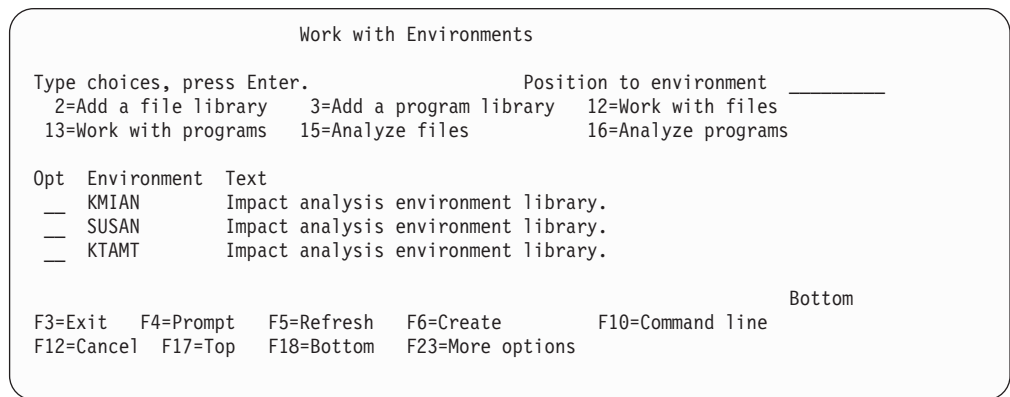


Figure 10. Working with SEARCH2000 Environments

For a detailed description of this display see “Tasks Performed from the Work with Environments Display” on page 84.

3. Specify option 2 (Add a file library) next to the environment of your choice. When you press Enter, the Add Library display appears.

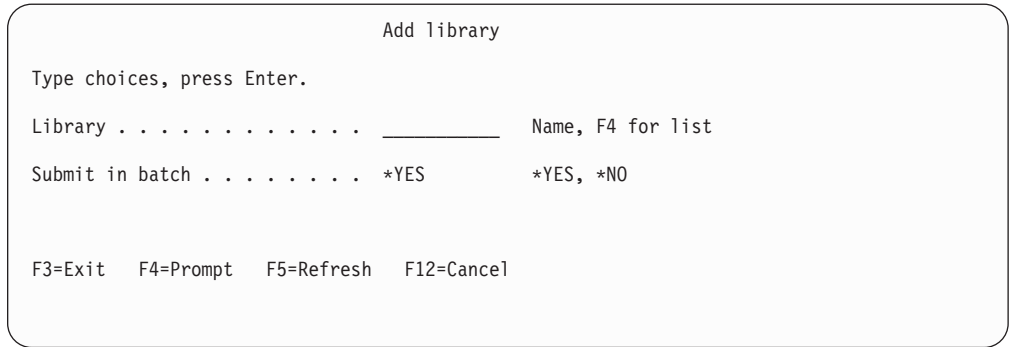


Figure 11. Loading Libraries that Contain Database Files and Programs

- a. Enter the name of the library that you want to add to the active environment. If you are not sure of the library name, do the following:
  - 1) From the Add Library display, press F4 (Prompt) to see the list of all libraries on the system, in the Select Library display.

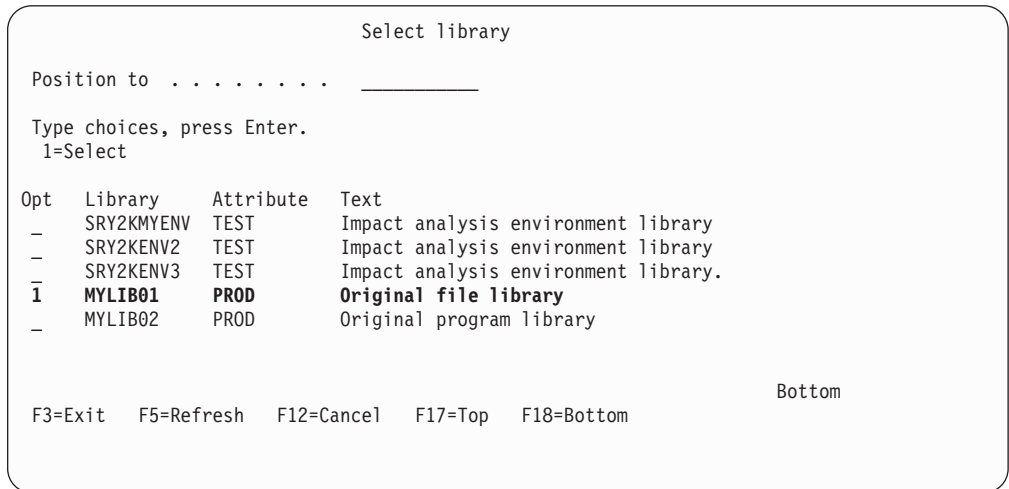


Figure 12. Listing all Libraries on the System

- 2) To select a library, type option 1 (Select) next to the library of your choice, and press Enter to return to the Add Library display.
- b. Specify whether to submit the job to batch, and press Enter to add the selected library to the environment.
- c. Repeat this process for each library that you want to add to the environment.
4. Specify option 3 (Add a program library) next to the environment of your choice. Then repeat step 3 on page 27 for all program libraries that you want to add to the active environment.

**Note:** If you need to work with different versions of the same source, you should create multiple environments (one for the standard version, and one for each customized version).



---

## Remove a Library from the Environment

From the Work with Environments display you can remove a file or program library from an environment, if you no longer need the information.

To remove a library from an environment, do the following:

1. Specify option 4 (Remove a file library) or option 5 (Remove a program library) next to the corresponding environment name, and press Enter. The Remove Library from Environment display appears.

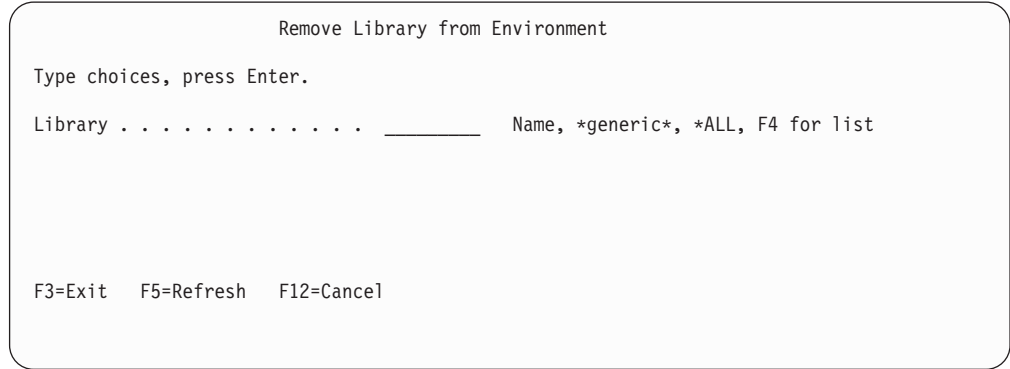


Figure 13. Removing a File or Program Library from the Active Environment

2. Type the name of a library, and press Enter.  
If you are not sure of the library name, press F4 to see the list of libraries. To select a library, type option 1 (Select) next to the library of your choice, in the Select Library display.

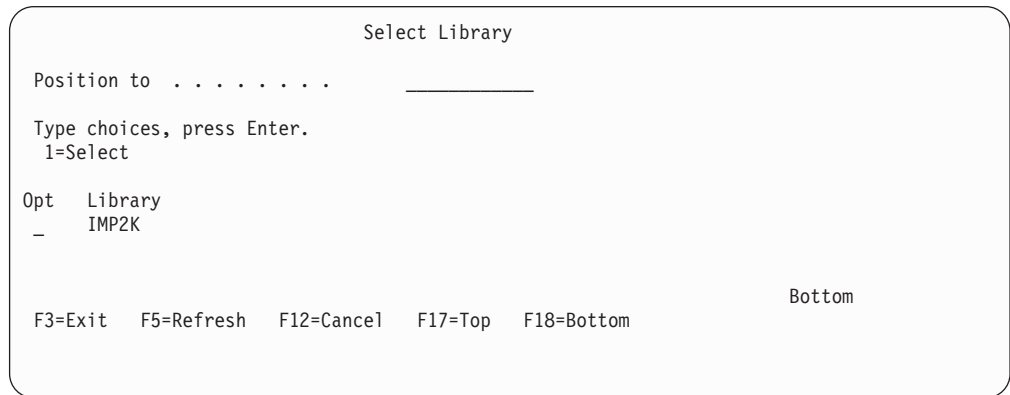


Figure 14. Listing All Libraries in the Active Environment

---

## Update Database Libraries

|  
|  
|

Every time you add files to, or remove files from a database library on your system, you must perform a library update in each environment to which you have added the library, in order to include the information for the new file in your environment.

To update a database library, do the following:

1. Access the Work with Files display (option 3 on the SEARCH2000 Main Menu).

Work with Files									
Type choices, press Enter.					Position to library				
1=Analyze			2=Select member		4=Delete			Position to file . .	
5=Work with dates			6=Work with fields		7=THF recal.			8=Display description	
Opt	Library	File	Record Length	Records Available	P	Found	Records Processed	Min Year	Max Year
-	IMP2K	DICT	329	0		3			
-	IMP2K	FILE01	28	2	Y	5	2	1980	1999
-	IMP2K	FILE02	54	1	Y	5	1	1980	1999
-	IMP2K	FILE03	43	11	Y	4	11	1980	1999
-	IMP2K	FILE04	243	31	Y	43	31	1960	1999
-	IMP2K	FILE05	243	3	Y	3	3	1980	1999
-	IMP2K	FILE06	20	500000	Y	2	50	1980	1999
-	IMP2K	FILE07	130	5	Y	0	5	1980	1999
-	IMP2K	FILE08	43	11	Y	4	11	1980	1999
-	IMP2K	FILE09	18	1	Y	4	1	1980	1999
-	IMP2K	FILE10	26	2	Y	0	2	1980	1999
-	IMP2K	FILE100	15999	0					
-	IMP2K	FILE101	16001	0					

More...

F3=Exit    F4=Prompt    F5=Refresh    F10=Command line    F11=Toggle  
 F17=Top    F18=Bottom    F19=Hide/show empty files    F24=More keys

Figure 15. Working With the Files Loaded Into an Environment

For a detailed description of this display see “Chapter 14. Work with Files” on page 87 .

2. Press F22 (Update library).  
The Update Library display appears.

Update Library	
Library . . . .	Name, F4 for list
Submit in batch *YES	*YES, *NO
F3=Exit    F5=Refresh    F12=Cancel	

Figure 16. Updating a Database Library After Adding or Removing Files

3. Specify the name of the database library you want to update, and whether you want to submit the job to batch.  
If you are not sure of the library name, do the following:
  - a. Press F4 (Prompt). The Select Library display appears.
  - b. Type option 1 (Select) next to the library that you want to update, and press Enter.

```
                                Select Library
Position to . . . . . _____
Type choices, press Enter.
1=Select

Opt  Library
-    IMP2K
-    IMP2KILE
-    QS36F
-    TAMMYTAM

F3=Exit  F5=Refresh  F12=Cancel  F17=Top  F18=Bottom

Bottom
```

*Figure 17. Selecting a Library to Update*

4. Press Enter to return to the Work with Files display.



---

## Chapter 8. Set Parameters for Analysis

SEARCH2000 ships a number of parameters that determine how it selects candidate date fields during the analysis of database files. All parameters are initially set to default values. You may change these defaults to more closely match the requirements of your application files.

If you change any default values, SEARCH2000 will use the new values as defaults for any future file analysis. However, you can always override these values. See "Override Default Parameters During Global File Analysis" on page 37 and "Override Default Parameters During Individual File Analysis" on page 37 for a description of the required steps.

---

### Customizable Search Parameters

The following table lists the customizable search parameters and their shipped default values.

*Table 3. Customizable Parameters for File Analysis*

Customizable Parameter	Default Value	Limits
Number of records	50	
Valid date range (from - to)	1980 - 1999	Maximum range is 99 years
Submit in batch	*YES	
Ignore packed dates with trailing non-zero digits	*NO	
Ignore packed dates with leading non-zero digits	*NO	
Ignore dates spanning multiple fields	*NO	
Ignore non-packed dates partially occupying a field	*NO	
Accept percentage of invalid data	0	Upper limit is 30

#### Number of records

SEARCH2000 does not need to analyze all the records in your application database in order to arrive at a conclusion about the date fields in the file. By default, it analyzes 50 records. These are not simply the first 50 records in the file, but a sample of 50 records from throughout the file.

You can customize this number for your particular database. If you specify a number that exceeds the total number of records in your file, SEARCH2000 defaults to analyzing all records in the file.

You should base the number of records to analyze in a file on two factors:

- The system time available to run the analysis job.

Selecting a large number of records increases the time SEARCH2000 needs to scan for date data, but may result in a more reliable result. You may start with a lower number of records, and increase this value if you feel that the results are not representative. This would be the case, for example, if SEARCH2000 finds too many candidate date fields that do not actually contain date data.

- The consistency of the files you want to analyze.

It is true that a smaller number of records shortens the analysis phase. However, it makes a difference whether your files are filled with real data in all significant fields or whether you have simply created some test data for trial purposes.

For example, you have a file that consists of 10,000 records, but only 10 records contain date data in a field XYZ. The number of records to be analyzed is 50. The statistical chance that analyzing 50 random records will actually spot XYZ as a candidate date field is very small.

On the other hand, if *all* records contain data in field XYZ, the analysis of 50 random records will spot the field. In this case, SEARCH2000 can determine whether the data is consistent with a date value.

### **Valid date range (from - to)**

SEARCH2000 will most likely come across sequences of digits that may look like dates, but are not dates. To avoid misinterpretation, you should provide a range of valid years for each file, for example 1990 through 1995. This means that you expect any dates in this file to fall between these years. By default, the valid date range is set from 1980 to 1999.

The purpose of the range is to avoid finding too many "false positive" date fields with 2-digit year values. It allows SEARCH2000 to report what percentage of records in a file show values outside of the specified range for a given date field.

Specifying a range of years does not cause SEARCH2000 to automatically reject any dates that do not fall within the range. Consider the following examples:

- A field contains more than just a 2-digit year value (for example, dates containing day, month and 2-digit year, or any date with a 4-digit year). SEARCH2000 identifies it as a candidate date, even if the year falls outside the range. The structure of these formats is particular enough that they most likely represent dates. SEARCH2000 leaves it up to you whether you want to accept or reject the candidate date.
- A field contains date types such as YM, MY, YJ, or Y. SEARCH2000 discards these date types as soon as it encounters a record for which the date value is out of range. It does so, because the structure of these formats is not necessarily indicative of a date, and may yield too many "false positive" findings. For example, you could interpret sequences such as 0123 or 0606 as MY date formats when they are not.

### **Submit in batch**

Specify whether you want run the program in batch mode.

Specify \*YES if you want to run the analysis job in batch mode. This is the default.

Specify \*NO if you want to run the analysis job interactively.

**Note:** If you specify \*YES, you will not see any messages on screen, in case the file you want to analyze is empty or not accessible. This situation may occur if you have removed files since the previous SEARCH2000 analysis.

### **Ignore packed dates with trailing non-zero digits**

A packed decimal field may store a date followed by non-date data. This is the case, for example, for dates that are part of timestamp fields which contain a date and a time in the same packed decimal field. The first 6 or 8 digits store the date, while the remaining digits store the time.

Specify \*YES to instruct SEARCH2000 to ignore dates with trailing non-zero digits in packed decimal fields.

Specify \*NO if you want SEARCH2000 to accept date fields with trailing non-zero digits. This is the default.

**Note:** You must specify \*NO for the analysis of program-described files, such as S/36 files.

#### **Keep only those with n digits**

If you have specified \*YES for the previous parameter to ignore packed dates with trailing non-zero digits as valid date fields, you can qualify this instruction. You can tell SEARCH2000 to accept packed fields with a specific number of trailing non-zero digits. You can specify up to three different numbers.

For example, if you specify 02 04 06, SEARCH2000 will discard all packed fields that look like dates, except those with exactly two, four, or six trailing non-zero digits.

#### **Ignore packed dates with leading non-zero digits**

Specify \*YES to instruct SEARCH2000 to ignore date values in packed decimal fields with leading non-zero digits.

Specify \*NO if you want SEARCH2000 to accept dates with leading non-zero digits. This is the default.

**Note:** You must specify \*NO when analyzing program-described files imported from systems such as S/36, MVS, or VSAM, in order to correctly interpret packed fields. Since DDS is not available for this type of file, it is not possible to retrieve the starting position of packed fields. Therefore, SEARCH2000 interprets any packed candidate dates as being preceded by a number of non-zero digits.

#### **Ignore dates spanning multiple fields**

Specify \*YES to instruct SEARCH2000 to ignore dates that span multiple field definitions as candidate dates.

Specify \*NO if you want SEARCH2000 to consider date values that are defined across multiple fields, such as separate fields for Year information and Month information. This is the default.

**Note:** Specify \*NO if the file's data is not externally described via DDS or SQL, for example in files imported from other systems, such as S/36, MVS, or VSAM.

Exporting dates that span multiple fields to BYPASS2000 requires special care. See "Appendix. Interfacing with BYPASS2000" on page 113 for details.

#### **Ignore non-packed dates partially occupying a field**

This parameter applies only to alphanumeric and zoned fields.

Specify \*YES to instruct SEARCH2000 to ignore non-packed dates that only partially occupy a field, such as a year value that appears in a 10-digit field.

Specify \*NO if you want SEARCH2000 to consider such dates as candidate dates. This is the default.

**Note:** Specify \*NO if the file's data is not externally described via DDS or SQL, for example in files imported from other systems, such as S/36,

MVS, or VSAM. Otherwise, if there is no external description for the field, SEARCH2000 treats the entire record as a single field.

**Accept percentage of invalid data**

Specify what percentage of invalid data SEARCH2000 should accept for a given field and still consider the field to be a candidate date field. The default value is 0 percent. The upper limit is 30 percent.

Invalid data is data that does not match the search criteria, such as dates that do not fall within the valid date range, or Month values greater than 12.

If you specify, for example, 20 as the acceptable percentage of invalid data, SEARCH2000 will accept a candidate date field if at least 80 percent of the analyzed records contain valid date data for this field.

---

## Customize Default Parameters for File Analysis

To customize the SEARCH2000 default parameters that are used during the global analysis of all files in a particular environment, do the following:

1. Specify option 10 (Set environment parameter defaults) next to the environment of your choice in the Work with Environments display; or press F16 (Set default parameters) in the Work with File display.

The Set Parameters for Analysis display appears.

Set Parameters for Analysis

Type choices, press Enter

Environment . . . . . > MYENV

Number of records . . . . . 50

Valid date range (from:) . . . . . 1980 (1901-1997)

Valid date range (to:) . . . . . 1999 (1997-2050)

Submit in batch . . . . . \*YES (\*YES, \*NO)

Additional Parameters

Ignore packed dates with trailing non-zero digits \*YES (\*YES, \*NO)  
     Keep only those with n digits . . . . . 00 00 00

Ignore packed dates with leading non-zero digits \*NO (\*YES, \*NO)

Ignore dates spanning multiple fields . . . . . \*NO (\*YES, \*NO)

Ignore non-packed dates partially occupying a field \*NO (\*YES, \*NO)

Accept percentage of invalid data . . . . . 0 (0-30)

F3=Exit F5=Refresh F10=Additional parameters F12=Cancel

Figure 18. Changing SEARCH2000 Default Parameters

2. Select the parameters of your choice. See “Customizable Search Parameters” on page 33 for a detailed description of the parameter values.

**Note:** If you make changes to the default parameters, these changes only apply to the currently active environment. They do not affect the parameter settings for any other environments on your system.



---

## Override Default Parameters During Global File Analysis

You can temporarily override the default parameters during the global analysis of all files in a given environment. The new parameter values only apply to the analysis you are about to start. For any subsequent analysis, SEARCH2000 will use the default parameters, unless you choose to override them again.

To override the default parameters, do the following:

1. Specify option 15 (Analyze files) next to the environment of your choice in the Work with Environments display, and press F4 (Prompt).

The Set Parameters for Analysis display appears.

```
Set Parameters for Analysis

Type choices, press Enter
Environment . . . . . > MYENV2
Library . . . . . *ALL      *generic*, *ALL
File . . . . . *ALL      *generic*, *ALL
Analyzed . . . . . *ALL      *ALL, *YES, *NO
Number of records . . . . . 50
Valid date range (from:) . . . . . 1980      (1901-1997)
Valid date range (to:) . . . . . 1999      (1997-2050)
Submit in batch . . . . . *YES      (*YES, *NO)

Additional Parameters

Ignore packed dates with trailing non-zero digits . . . *NO      (*YES, *NO)
Ignore packed dates with leading non-zero digits. . . *NO      (*YES, *NO)
Ignore dates spanning multiple fields . . . . . *NO      (*YES, *NO)
Ignore non-packed dates partially occupying a field . *NO      (*YES, *NO)
Accept percentage of invalid data. . . . . 0      (0-30)

F3=Exit  F5=Refresh  F10=Additional parameters  F12=Cancel
```

Figure 19. Overriding Default Parameters During Global File Analysis

2. Change the parameters of your choice.  
See “Customizable Search Parameters” on page 33 for a detailed description of the parameter values.

---

## Override Default Parameters During Individual File Analysis

To temporarily override the default parameter values for the analysis of a single file, or a group of files, do the following:

1. Access the Work with File display, described in “Chapter 14. Work with Files” on page 87 .
2. Type '1' next to one or more files that you want to analyze, and press F4 (Prompt). The Set Parameters for Analysis display appears.

```

Set Parameters for Analysis

Type choices, press Enter

File . . . . .> FILE02
Library . . . . .> IMP2K
Member . . . . . *FIRST      Name, *FIRST
Number of records . . . . . 50
Valid date range (from:) . . . . . 1980      (1901-1997)
Valid date range (to:) . . . . . 1999      (1997-2050)
Submit in batch . . . . . *YES      (*YES, *NO)

Additional Parameters

Ignore packed dates with trailing non-zero digits *YES      (*YES, *NO)
Keep only those with n digits . . . . . 00 00 00
Ignore packed dates with leading non-zero digits.. *NO      (*YES, *NO)
Ignore dates spanning multiple fields . . . . . *NO      (*YES, *NO)
Ignore non-packed dates partially occupying a field *NO      (*YES, *NO)
Accept percentage of invalid data . . . . . 0      (0-30)

F3=Exit  F5=Refresh  F10=Additional parameters  F12=Cancel

```

Figure 20. Overriding Default Parameters During Individual File Analysis

Note that the Set Parameters for Analysis display slightly differs from the one that is shown in “Customize Default Parameters for File Analysis” on page 36. It displays the file member, qualified by its library, for which the parameter settings will be changed.

3. Set the parameters to values of your choice, and press Enter to start analyzing the file.

**Note:** The changed parameter values only apply to the analysis you are about to start. For any subsequent file analysis, SEARCH2000 will use the default parameters, unless you choose to override them again.

---

## Chapter 9. Analyze Database Files

SEARCH2000 analyzes all physical files that contain data to find candidate dates. It can analyze the database files in a given environment either globally or individually.

---

### Analyze Files Globally

To analyze all database files in a given environment globally, do the following:

1. Access the Work with Environments display (option 2 on the SEARCH2000 Main Menu).

```
Work with Environments
Type choices, press Enter.                Position to environment _____
 2=Add a file library    3=Add a program library    12=Work with files
13=Work with programs    15=Analyze files            16=Analyze programs

Opt Environment Text
_ ENV1      Analysis environment library.
_ ENV2      Analysis environment library.
15 ENV3      Analysis environment library.

F3=Exit    F4=Prompt    F5=Refresh    F6=Create    F10=Command line
F12=Cancel F17=Top     F18=Bottom   F23=More options

Bottom
```

Figure 21. Working with SEARCH2000 Environments

For a detailed description of this display see “Tasks Performed from the Work with Environments Display” on page 84.

2. Specify option 15 (Analyze files) next to the environment of your choice, and press Enter.

**Note:** You can only analyze files in libraries that you have loaded into the environment, as described in “Chapter 7. Load Database Files and Programs” on page 25.

If you want to override the default parameters for this analysis, press F4 instead of Enter. Specify the parameters of your choice, then continue.

---

### Analyze Files Individually

To analyze individual database files in the active environment, do the following:

1. Access the Work with Files display (select option 3 on the SEARCH2000 Main Menu and specify the environment that contains the files).

**Note:** You can only work with files in libraries that you have loaded into the environment.

Work with Files									
Type choices, press Enter.					Position to library _____				
1=Analyze			2=Select member		4=Delete			Position to file . . . _____	
5=Work with dates			6=Work with fields		7=THF recal.		8=Display description		
Opt	Library	File	Record Length	Records Available	P	Found	Records Processed	Min Year	Max Year
-	ENV1	INPUTF	71	0					
-	ENV1	TESTF	60	3	Y	8	3	1980	1999
<b>1</b>	<b>ENV1</b>	<b>TESTF2</b>	<b>60</b>	<b>1</b>	<b>Y</b>	<b>8</b>	<b>1</b>	<b>1980</b>	<b>1999</b>
-	ENV1	TESTF3	60	2	Y	9	2	1980	1999
-	ENV1	TESTF4	62	2	Y	7	2	1980	1999
-	ENV1	TESTF5	18	2	Y	2	2	1980	1999
-	ENV1	TESTF6	20	2	Y	2	2	1980	1999

Bottom

F3=Exit    F4=Prompt    F5=Refresh    F10=Command line    F11=Toggle  
 F17=Top    F18=Bottom    F19=Hide/show empty files    F24=More keys

Figure 22. Working with Database Files in the Active Environment

For a detailed description of this display see “Chapter 14. Work with Files” on page 87 .

2. Specify option 1 (Analyze) next to one or more files, and press Enter. To modify the parameters for the current file analysis do the following:
  - a. Specify option 1 (Analyze) next to one or more selected files, and press F4 (Prompt).
  - b. Change the parameters that are listed in the Set Parameters for Analysis display (shown in 36), and press Enter.

If you have selected more than one file to analyze, SEARCH2000 prompts you to change the parameters for each file.

---

## Analyze a Specific File Member

By default, SEARCH2000 analyzes the file member that is identified by \*FIRST. You can change this default either permanently, or for the current job only.

### Change the Default File Member Permanently

To change the default file member permanently, do the following:

1. Specify option 2 (Select member) next to a file in the Work with Files display, and press Enter.
2. Specify the name of a file member in the Select Member dialog. Press F4 to see a list of all members in the file.

```

Work with Files

Type choices, press Enter.                Position to library _____
1=Analyze  2=Select member  4=Delete      Position to file . . _____
5=Work with dates  6=Work with fields  7=THF recal.  8=Display description

..... Max
Opt Library :          Select Member          : Year
-  HBPFDND :          :          : 1999
-  HBPFDND :          :          : 1999
-  HBPFDND :  Member  *FIRST      Name, *FIRST, F4 for list : 1999
-  HBPFDND :          :          : 1999
2  HBPFDND :          :          : 1999
-  HBPFDND :  F3=Exit  F5=Refresh  F12=Cancel          : 1999
-  HBPFDND :          :          : 1999
-  HBPFDND :          :          : 7 1980 1999
-  HBPFDND :          :          : 1 1980 1999
-  HBPFDND TLIN      1232      15 Y  0      15 1980 1999
-  HBPFDND TOPZ      1259      27 Y  0      27 1980 1999
-  HBPFDND TPIN      51        12 Y  0      12 1980 1999
-  HBPFDND TRIL      52        4 Y  0      4 1980 1999
More...

F3=Exit  F4=Prompt  F5=Refresh  F10=Command line  F11=Toggle
F17=Top  F18=Bottom  F19=Hide/show empty files  F24=More keys
Analysis of file has been submitted to batch.

```

Figure 23. Changing the Default File Member Permanently

## Change the Default File Member Temporarily

To change the file member for the current job only, do the following:

1. Specify option 1 (Analyze) next to a file in the Work with Files display, and press F4 (Prompt).

The Set Parameters for Analysis display that is shown in Figure 24 appears.

2. Specify the name of the file member you want to analyze.

```

Set Parameters for Analysis

Type choices, press Enter

File . . . . .> FILE05
Library . . . . .> IMP2K
Member . . . . . MYNAME      Name, *FIRST
Number of records . . . . . 100
Valid date range (from:) . . . . . 1901      (1901-1997)
Valid date range (to:) . . . . . 2000      (1997-2050)
Submit in batch . . . . . *YES      (*YES, *NO)

F3=Exit  F5=Refresh  F10=Additional parameters  F12=Cancel

```

Figure 24. Overriding the Default File Member for the Current Job

---

## Recalculate the Time-Horizon Failure (THF)

The dates that are closest to the year 2000 are the most likely ones to cause problems for your application. If you want to continuously monitor your production database files as dates approach the year 2000, you do not need to run a full analysis of your database files every time. Instead, you can specify option 7 (THF recalc.) next to a file in the Work with Files display. This calculation will show you the date in the file that is closest to the year 2000, provided you have discovered this date and its format during a prior full analysis of the file.

---

## Switch Valid Date Formats On or Off

You may selectively switch off valid date formats to reduce the time it takes to analyze the database files in a given environment. SEARCH2000 will ignore these formats while analyzing the files.

You should run at least one complete analysis of all database files *without* switching any date formats off. This ensures that SEARCH2000 finds all possible date formats present in your files. In subsequent analysis runs you can switch off the date formats that are not present.

Switching date formats on or off affects a single environment at a time. You can select different sets of valid date formats for each environment. See Table 1 on page 4 for the complete list of date formats that SEARCH2000 supports.

To switch valid date formats on or off do the following:

1. Press F15 (Valid date formats) in the Work with Files display to access the Valid Date Formats display.

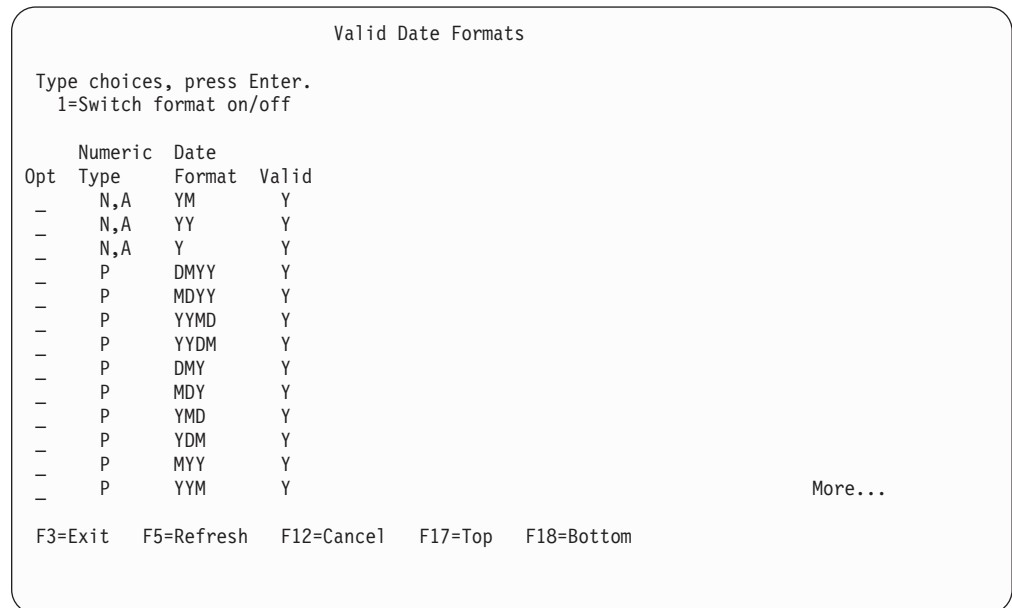


Figure 25. Selecting Date Formats

2. Use option 1 (Select) to switch date formats on or off.
  - The value 'Y' in the Valid column indicates that a format is switched on.

- The value 'N' in the Valid column indicates that a format is switched off.

This option acts as a toggle. If the value in the Valid column is 'Y', entering option 1 will set it to 'N', and vice versa.

SEARCH2000 will only look for date formats that are switched on when it analyzes the files in the active environment. It will ignore all date formats that are switched off.

**Note:** Each date format is switched on or off based on the combination of date format and date type for the field. Alphanumeric ('A') and zoned decimal ('N') type fields are grouped together. Packed decimal ('P') fields are a separate category. For example, if you want to switch off the DMY format for all types of data, you should switch off the format DMY for numeric type "N,A", as well as format DMY for numeric type "P".





---

## Chapter 10. Validate Candidate Dates

You must validate the results of the database file analysis, and remove candidate fields that SEARCH2000 has incorrectly identified as dates. Such fields are called "false positive" date fields. As well, you should add date fields that SEARCH2000 has failed to identify.

If you do not make these corrections, SEARCH2000 may not produce appropriate results during the subsequent program analysis, when it determines which programs reference files that contain dates.

To gain detailed information about candidate date fields, you can do the following:

- Work with candidate dates.  
See "Chapter 15. Work with Dates" on page 91 for detailed information about the corresponding display.
  - Work with fields.  
See "Chapter 16. Work with Fields" on page 95 for detailed information about the corresponding display.
  - Display the analysis results in report format.  
See "Chapter 12. Work with Reports" on page 69 for detailed information about the corresponding displays.
- See "Chapter 11. Analyze the Impact of Dates on an Application" on page 55 for detailed information on the program analysis phase.

---

### Detect False Positive Dates

To detect the false positive date fields that SEARCH2000 may have found, you can do the following:

1. Look at the Work with dates display that is shown in Figure 27 on page 48.  
The Min Date and Max Date columns show the lowest and highest actual dates that SEARCH2000 has found while sampling the data in the file. If these values seem out of range, the field may not actually contain a date.  
  
**Note:** This information is different from the Min Date and Max Date values on the Work with Files display that is shown in Figure 67 on page 87. They refer to the parameter values for the date range that SEARCH2000 uses during the file analysis.
2. Look at the Digits before (Be) and after (Aft) columns in the Work with Dates display.  
If SEARCH2000 has found digits before and after the date in a field, this might be indicative of a false positive date and might warrant a closer look.
3. Look at the actual data values for any ambiguous candidate field. Use function keys F16 (Show Contents - DSPPFM) and F21 (Show Contents - RUNQRY).
4. Look at any ambiguous field in the Work with Field display that is shown in Figure 74 on page 99.

---

## Prevent False Positive Dates

If you encounter a large number of false positive date fields, do the following:

1. Change the customizable analysis parameters that are described in “Customizable Search Parameters” on page 33.  
For example, increase the number of records that you want to search, or specify a range of valid dates.
2. Run the file analysis again.
3. Validate the new analysis results.

---

## Remove Dates

You must remove fields that do not actually contain date data from the analysis results. You can do so in one of two ways:

- From the Work with Dates display, you can remove a date from the list of dates that SEARCH2000 has found in the database files.
- From the Work with Field display, you can delete the assignment of a field as a date.

### Remove a Date from the List of Dates

To remove a date, specify option 4 (Delete/undelete) next to a date in the Work with Dates display, and press Enter.

Removing a date has the following implications:

1. If SEARCH2000 has found the date during the analysis of your database files, option 4 acts as a toggle switch:
  - a. Specifying the option for the first time sets the Deleted flag (D) to 'Y' for this date. However, this does not erase the date from the file.
  - b. When you specify the option for the second time, the Deleted flag 'Y' is removed for this date.

Press F19 (Show/Hide deleted) to display or hide the dates for which the Deleted flag is set to 'Y'.

2. If you have added the date manually, option 4 erases the date from the file. In this case, you cannot recover the date later by pressing F19 (Show/Hide deleted). Instead, you must add it again, as described in “Add Dates” on page 47 .

### Delete the Assignment of a Field as a Date

To delete the assignment (identification) of a field as a date, do the following:

1. Access the Work with Files display (option 3 on the SEARCH2000 Main Menu).
2. Specify option 6 (Work with fields) next to the file that contains the field, and press Enter. The Work with Fields display opens.

```

Work with Fields
File  STOCK
Library BP010LD

Type choices, press Enter.
1=Select 4=Delete assignment
Position to . . ____0

  Field      Field  Field  Field  Date  Inf
Opt Name      Displ  Type  Length Format  Pro  Exp
- PRDNBR      1  A      5
- PRDES       6  A      20
- PRDEXP     26  P(6,0)  4
- PRDPRC     30  P(7,2)  4
- PRDQTA     34  P(5,0)  3
- SPLNBR     37  A      5
- PRDCAT     42  A      4
- PRDQTM     46  P(5,0)  3

F3=Exit  F5=Refresh  F10=Command line  F11=More info  F12=Cancel
F17=Top  F18=Bottom  F20=Work with dates

Bottom

```

Figure 26. Working with All Fields in a File

- Specify option 4 (Delete assignment) next to the field for which you want to delete the assignment (identification as a date), and press Enter. The field is no longer considered to contain date data, and the display no longer shows date-related information for this field.

Alternately, you can specify option 1 (Select) to access the Work with Field display, and then specify option 4 (Delete assignment) from this display.

## Add Dates

Your physical database files may contain dates that SEARCH2000 has not identified as candidate dates during the file analysis. If you know of such dates, you can add them manually, in one of two ways:

- From the Work with Dates display, you can add a date to the list of dates.
- From the Work with Field display, you can identify a field as containing a date.

Both approaches are described below.

**Note:** You cannot add dates to logical files.

### Add a Date to the List of Dates

To add a date from the Work with Dates display, do the following:

- Access the Work with Dates display in one of the following ways:
  - To see the dates contained in a particular file, select option 5 (Work with dates) next to a file in the Work with Files display.
  - To see the dates contained in all files within a given environment, press F14 (Date summary) in the Work with Files display.

```

Work with Dates
File STOCK
Library BP010LD

Type choices, press Enter.
4=Delete/undelete 6=Expand/not expand      Position to . . . _____
  Num. Date Date      Out of Min      Max      Field      Digits      Inf
Opt Type Pos. Format      Range Date      Date      Name      Be Aft D Exp Pro
_   P   26 MDY              77 123102  123199  PRDEXP    01 00    0  PGM

F3=Exit  F5=Refresh  F6=Create  F12=Cancel  F16=Show contents (DSPPFM)
F17=Top  F18=Bottom   F19=Show/hide deleted  F24=More keys
Bottom

```

Figure 27. Working with All Dates in a File

For a detailed description of this display see “Chapter 15. Work with Dates” on page 91 .

2. Press F6 (Create) in the Work with Dates display. The Create a New Date display opens.

```

Create a New Date

File . . . . . STOCK
Library . . . . . BP010LD

Numeric type . . . . .
Position . . . . . 00000      48 max value
Date format . . . . . YYMD

F3=Exit  F5=Refresh  F12=Cancel

```

Figure 28. Adding a New Date to a File

3. Enter the following information, and press Enter:
  - The name of the file to which you want to add a date, qualified by the library name
  - The numeric type of the date
  - The starting position of the date, in bytes, from the beginning of the record
  - The date format

If the file has a DDS, the file field that is associated with the position of the date will automatically be updated with the date.

To add a date that is associated with a specific record format field, use the Work with Field display. It allows you to insert a date directly into a selected field, as described in “Assign a Field as a Date Field”.

## Assign a Field as a Date Field

To assign (identify) a field as a date field, do the following:

1. Access the Work with Files display (option 3 on the SEARCH2000 Main Menu).

- Specify option 6 (Work with fields) next to the file that contains the field, and press Enter. The Work with Fields display opens.

```

                                Work with Fields
                                File   STOCK
                                Library BP010LD

Type choices, press Enter.
1=Select  4=Delete assignment
                                Position to . . . ____0

  Field      Field  Field   Field   Date   Inf
Opt Name      Displ Type   Length Format  Pro  Exp
- PRDNBR      1  A       5
- PRDES       6  A       20
- PRDEXP     26  P(6,0)   4
- PRDPRC     30  P(7,2)   4
- PRDQTA     34  P(5,0)   3
- SPLNBR     37  A       5
- PRDCAT     42  A       4
- PRDQTM     46  P(5,0)   3

                                Bottom

F3=Exit  F5=Refresh  F10=Command line  F11=More info  F12=Cancel
F17=Top  F18=Bottom  F20=Work with dates

```

Figure 29. Working with All Fields in a File

For a detailed description of this display see “Chapter 16. Work with Fields” on page 95 .

- Specify option 1 (Select) next to the field that you want to identify as a date field, and press Enter. The Work with Field display opens.

```

                                Work with Field
                                Field PRDEXP      Length . . .   4
                                File   STOCK      Type   P(6,0)   Displacement   26
                                Library BP010LD

Type choices, press Enter.
4=Delete assignment
                                Position to . . . _____

  Date  Date   Inf
Opt Type Pos.  Format  Pro  Exp

F3=Exit  F5=Refresh  F6=Create  F10=Command line  F12=Cancel
F17=Top  F18=Bottom

```

Figure 30. Working with a Single Field

For a detailed description of this display see “Chapter 17. Work with a Single Field” on page 99.

- Press F6 (Create) to specify that an existing field is a date field, or contains a date.

**Note:** You cannot create a date in a logical file.



- Multiple dates that are found in a single field
- Dates with 4-digit year information
- Dates that were added to the list by the user instead of by SEARCH2000
- Dates that are out of range for a percentage of records.

The highlighted candidate dates may require additional checking to determine whether they really are date fields. For example, the percentage of records for which a date is out of range can help you decide whether this field truly contains a date.

To highlight dates, do the following:

1. Press F15 (Specify highlighting) to specify which dates to highlight.  
The Specify Highlighting display appears.

```

                                Work with Dates
                                File FILE04
.....
Type choices, : Specify Highlighting :
4=Delete/und : :
Num. Date : Type choices, press Enter :
Opt Type Pos. : :
- A 12 : :
- P 16 : Dates partially occupying field . . - Y=Yes :
- N 19 : Dates spanning multiple fields . . . - Y=Yes :
- A 23 : Multiple dates in one field . . . . - Y=Yes :
- P 27 : Dates with 4-digit year . . . . . - Y=Yes :
- N 30 : Dates inserted by user . . . . . - Y=Yes :
- P 38 : Dates out of range for a % of records - Y=Yes :
- N 41 : :
- A 45 : :
- P 51 : F3=Exit F5=Refresh F12=Cancel :
- N 56 : :
- A 77 : :
- P 85 : ..... :
- N 90 YYMD CYMD2 :
- A 98 YYDM * CYDM : More...
F3=Exit F5=Refresh F6=Create F12=Cancel F16=Show contents (DSPPFM)
F17=Top F18=Bottom F19=Show/hide deleted F24=More keys

```

Figure 32. Highlighting Dates that Satisfy Certain Criteria

2. Type 'Y' beside each highlighting option that you want to apply. Press Enter to return to the Work with Dates display.

---

## Show the Contents of a Physical File Member (DSPPFM)

When you need to verify whether a field is actually a date field, you can display the data in the file.

Press F16 (Show contents DSPPFM) in the Work with Dates display to show the contents of a physical file member. The Display Physical File Member display opens.

```

                                Display Physical File Member
File . . . . . : STOCK                Library . . . . . : BP010LD
Member . . . . . : STOCK                Record . . . . . : 1
Control . . . . . : _____          Column . . . . . : 1
Find . . . . . :
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
00001Marker                000010001
00002Eraser (10 pieces)    000010002
00003Highlighter - Red (10) 000030001
00004Fountain Pen          000020003
00005Pencil (10 pieces)    000030004
00006Mini Stapler          000010005
00008Binder                000040004
44551Notepad               000010001
66111Hole Punch            000010010
                                ***** END OF DATA *****

                                                                    Bottom

F3=Exit  F12=Cancel  F19=Left  F20=Right  F24=More keys

```

Figure 33. Showing the Unformatted Contents of A Physical File Member

The Display Physical File Member display presents the information in the selected file member and lets you look at the data. From this display, you can perform the following tasks:

- Press F10 to display the physical file member in hexadecimal format, as shown in Figure 34 on page 53.
- Press F14 to specify find options in the Find Options display shown in Figure 35 on page 53.

Valid search formats include:

- Characters that are enclosed by delimiters (;), apostrophes ('), or quotation marks (").
  - Characters that are not enclosed by delimiters. Removing the trailing blanks determines the length of the string.
  - An even number of hexadecimal characters (0-9, A-F) that contain the prefix X in the first position, and beginning and ending delimiters (;), apostrophes ('), or quotation marks (").
- Press F16 to find a string in the file.



```

                                Display Physical File Member
File . . . . . : STOCK          Library . . . . . : BP010LD
Member . . . . . : STOCK        Record . . . . . : 1
Control . . . . .                Column . . . . . : 1
Find . . . . .
* . . . . + . . . . . 1 . . . . + . . . . 2 *...+...1...+...2
F0F0F0F0 F1D48199 92859940 40404040 40404040 *00001Marker *
F0F0F0F0 F2C59981 A2859940 4DF1F040 97898583 *00002Eraser (10 piec*
F0F0F0F0 F3C88993 898788A3 85994060 40D98584 *00003Highlighter - R*
F0F0F0F0 F4C696A4 95A38189 9540D785 95404040 *00004Fountain Pen *
F0F0F0F0 F5C28193 9340D785 9540DF1 F0409789 *00005Pencil (10 piec*
F0F0F0F0 F6D48995 8940E2A3 81979385 99404040 *00006Mini Stapler *
F0F0F0F0 F8C28995 84859940 C3938997 A2404040 *00008Binder *
F4F4F5F5 F1D596A3 85978184 40404040 40404040 *44551Notepad *
F6F6F1F1 F1C89693 85A240D4 81838889 95854040 *66111Hole Punch *
                                ***** END OF DATA *****

                                Bottom

F10=Display hexadecimal F24=More keys

```

Figure 34. Showing the Contents of A Physical File Member in Hexadecimal Format

```

                                Specify Find Options
Type choices, press F16 to find.
String to find . . . . . _____
From column . . . . . 1          1-48
To column . . . . . 48          1-48
Kind of match . . . . . 2          1=Same case
                                       2=Ignore case

F3=Exit F12=Cancel F16=Find

```

Figure 35. Searching for a Text String in a File Member

## Show the Formatted Contents of a Physical File Member (RUNQRY)

To verify whether a field actually contains a date, you can also show the contents of a physical file member in table format.

Press F21 (Show contents RUNQRY) in the Work with Dates display to open the Display Report display.

```

                                Display Report
                                Report width . . . . . :    84
Position to line . . . . . _____ Shift to column . . . . . _____
Line  ....+....1....+....2....+....3....+....4....+....5....+....6....+....7..
      PRDNBR  PRDDES                PRDEXP  PRDPRC  PRDQTA  SPLNBR  PRD
000001 00001  Marker                123,199    2.50     10  00001  00
000002 00002  Eraser (10 pieces)  123,199    5.65     63  00001  00
000003 00003  Highlighter - Red (10) 123,102    6.00    131  00003  00
000004 00004  Fountain Pen          123,102   10.50     0  00002  00
000005 00005  Pencil (10 pieces)   123,102    7.00    396  00003  00
000006 00006  Mini Stapler         123,102    7.00     37  00001  00
000007 00008  Binder               123,102    4.00   1,000  00004  00
000008 44551  Notepad              123,102    3.50    500  00001  00
000009 66111  Hole Punch           123,102   13.50     50  00001  00
***** ***** End of report *****

                                Bottom
F3=Exit      F12=Cancel  F19=Left    F20=Right   F21=Split

```

Figure 36. Showing the Formatted Contents of A Physical File Member

## Expand a Date

You may plan to subsequently convert your application with the BYPASS2000 product. BYPASS2000 needs to know for each date whether to expand it or not, to accommodate 4-digit year information.

By default, SEARCH2000 marks all dates with 2-digit year information for expansion. It marks all dates with 4-digit year information for non-expansion. You can override this default, if required by your application. For example, you might not want to expand date fields that are used in printer or display files. See the BYPASS2000 User's Guide, SC09-2591-00 for a detailed discussion of date-field expansion.

Specify option 6 (Expand/not expand) in the Work with Dates display to mark a date for expansion. This option acts as a toggle. Expanding a date sets the Expanded flag (Exp) to '0'. Otherwise, the flag is set to '1'.

---

## Chapter 11. Analyze the Impact of Dates on an Application

Once you have verified that all dates have been correctly identified in your database files, you can proceed to analyze the programs and the Copybooks that your application uses.

The program analysis will establish the relationships that exist between programs and database files, and scan source code to identify all instructions where date-sensitive fields are involved. The result of this analysis helps you determine the impact of dates on your programs, or the total Year 2000 conversion effort for your application.

If your programs include Copybook declarations, you must correctly identify the Copybook filenames (as explained in "Specifying Default Libraries" on page 25) and analyze the Copybooks before you can analyze the programs.

---

### Analyze Copybooks Globally

To analyze all Copybooks in an environment globally, type option 17 (Analyze Copybooks) next to the environment of your choice in the Work with Environments display, and press Enter.

To analyze only a subset of the Copybooks in the environment, type option 17 next to the environment and press F4. Specify the parameters of your choice in the Analyze Copybooks display that appears, as shown below.

Analyze Copybooks

Type choices, press Enter

Library . . . . .	*ALL	*generic*, *ALL
COPY . . . . .	*ALL	*generic*, *ALL
Analyzed . . . . .	*ALL	*ALL, *YES, *NO
Submit in batch . . . .	*YES	*YES, *NO

F3=Exit   F5=Refresh   F12=Cancel

---

### Analyze Copybooks Individually

To analyze individual Copybooks in an environment, do the following:

1. Access the Work with Copybooks display, (option 5 on the SEARCH2000 Main Menu). The Work with Copybooks display appears, as shown in Figure 37 on page 56 .

2. Specify option 1 (Analyze) next to an entry of your choice and press Enter.

```

Work with Copybooks

Type choices, press Enter.                Position to library
1=Analyze  2=Assign date to program area  Position to COPY . .
4=Delete   5=Browse source  6=Display impacted LOC  7=Display dates found

Source      Source      Source      Lines      LOC      --File Inf--
Opt COPY    File      Library    Member     of Code P  Impact  Used  Dates
---
--- CPYCONS  QCPYSRC  TK2000TST1 CPYCONS    15 Y
--- CPYCONT  QCPYSRC  TK2000TST1 CPYCONT    8 Y
--- CPY00209 QCPYSRC  TK2000TST1 CPY00209   3 Y
--- CPY00226 QCPYSRC  TK2000TST1 CPY00226   8 Y
--- CPY1     QCPYSRC  TK2000TST1 CPY1       7 Y
--- CPY70077 QCPYSRC  TK2000TST1 CPY70077   3 Y
--- CPY71330 QCPYSRC  TK2000TST1 CPY71330  16 Y
--- GEPH09PA QCPYSRC  TK2000TST1 GEPH09PA  19 Y
--- GEPH10PA QCPYSRC  TK2000TST1 GEPH10PA  16 Y
--- GEZA15BA QCPYSRC  TK2000TST1 GEZA15BA  20 Y
--- LIKE1   QCPYSRC  TK2000TST1 LIKE1     8 Y
--- MULT1   QCPYSRC  TK2000TST1 MULT1    7 Y
--- MULT2   QCPYSRC  TK2000TST1 MULT2    6 Y

More...

F3=Exit      F4=Prompt    F5=Refresh    F10=Command line  F11=Toggle
F12=Cancel   F17=Top      F18=Bottom    F20=Subset list   F23=More options

```

Figure 37. Working with Copybooks

See “Chapter 20. Work with Copybooks” on page 107 for a detailed description of this display.

**Note:** You must analyze any Copybooks included in your program sources before you proceed with the analysis of the program.

## Analyze Programs Globally

To analyze programs in an environment globally, specify option 16 (Analyze programs) next to the environment of your choice in the Work with Environments display, and press Enter. SEARCH2000 will use the default analysis level for this environment, as described in “Specifying Default Libraries” on page 25.

If you want to analyze only a subset of programs in the environment, do the following:

1. Specify option 16 (Analyze programs) next to the environment of your choice in the Work with Environments display, and press F4. The Analyze Programs display shown below appears.

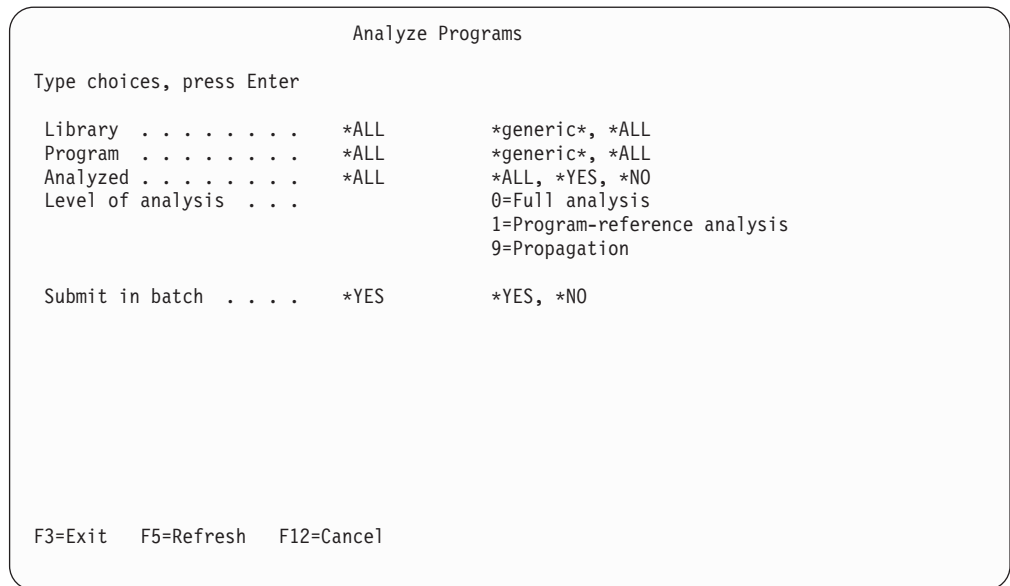


Figure 38. Specifying a Subset of Programs to Analyze

2. Specify the corresponding parameter values to subset the list of programs.
3. Specify the value that corresponds to the level of program analysis that SEARCH2000 should perform for these programs.
  - Specify 0 for a full analysis.  
The full analysis cross-references programs with files that contain dates, provides information about these files, and identifies the lines of code that are impacted by dates.
  - Specify 1 for a partial analysis (program-reference analysis).  
The partial analysis cross-references programs with files that contain dates, and provides information about the total number of lines of code, the number of files used, and how many dates were found in the used files.  
The partial analysis does not search which lines of code are impacted by dates. Therefore, it will complete faster than the full analysis.
  - Specify 9 to start the propagation analysis of the program.  
If you have already analyzed programs and are not satisfied with the results, you can use this option after having assigned dates to program areas and fields (option 2 in the Work with Programs display), as described in “Assign Dates to Program Areas and Fields” on page 58.

---

## Analyze Programs Individually

To analyze individual programs in an environment, specify option 1 (Analyze) next to a program of your choice in the Work with Programs display, and press Enter. See “Chapter 18. Work with Programs” on page 101 for a detailed description of this display.

```

Work with Programs

Type choices, press Enter.
1=Analyze 2=Assign date to program area 3=Propagate
5=Browse source 6=Display impacted LOC 7=Display dates found
Position to library
Position to program
Source Source Source
Lines LOC --File Inf--
Opt Program File Library Member of Code P Impact Used Dates
ABC QCLSRC IMP2K ABC 10 Y 2
CL101 QCLSRC IMP2K CL101 16 Y 2
CL102 QCLSRC IMP2K CL102 9 Y 1 39

F3=Exit F4=Prompt F5=Refresh F10=Command line F11=Toggle
F12=Cancel F17=Top F18=Bottom F20=Subset list F23=More options
Bottom

```

Figure 39. Working with Programs in the Active Environment

If you want to specify a different level of analysis, press F4 instead of Enter. Specify the corresponding parameter values in the Analyze Program Object display that appears. See “Analyze Programs Globally” on page 56 for a detailed description of the parameters.

## Assign Dates to Program Areas and Fields

It is possible that SEARCH2000 does not find all date sensitive-fields during the analysis of your programs. In this case you can manually assign program fields as date-sensitive before you run the analysis again, in order to obtain more accurate information about the lines of code that are impacted by dates.

To assign a program field as a date, do the following.

1. Specify option 2 (Assign date to program area) next to a program in the Work with Programs display or in the Work with Copybooks display, and press Enter. The Work with List of Program-Area Fields display appears, showing the lists of fields defined in you programs or Copybooks.

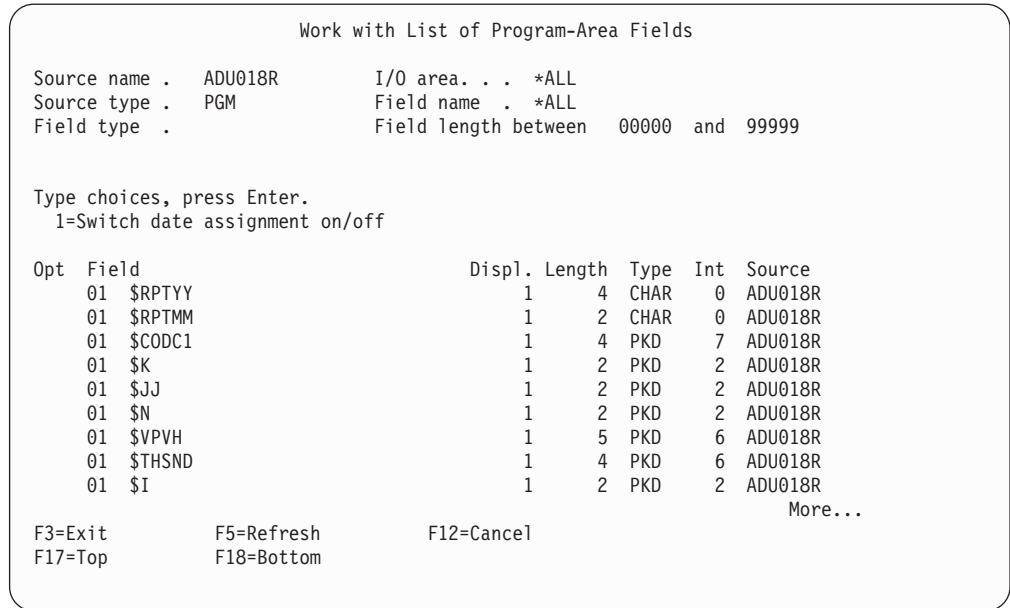


Figure 40. Displaying Fields Defined in Programs or Copybooks

- Specify option 1 (Switch date assignment on/off) next to one or more fields, to assign a field as being date-sensitive, and press Enter.  
The assigned field will be highlighted

If you want to remove the date assignment of one or more highlighted fields, specify option 1 (Switch date assignment on/off) next to the field and press Enter.

Press F3 to go back to the previous display.

---

## Start the Propagation Analysis

Once you have performed a program analysis, you can manually assign date fields that SEARCH2000 has not found, before running the analysis again to obtain information about the lines of code that are affected by the new date fields.

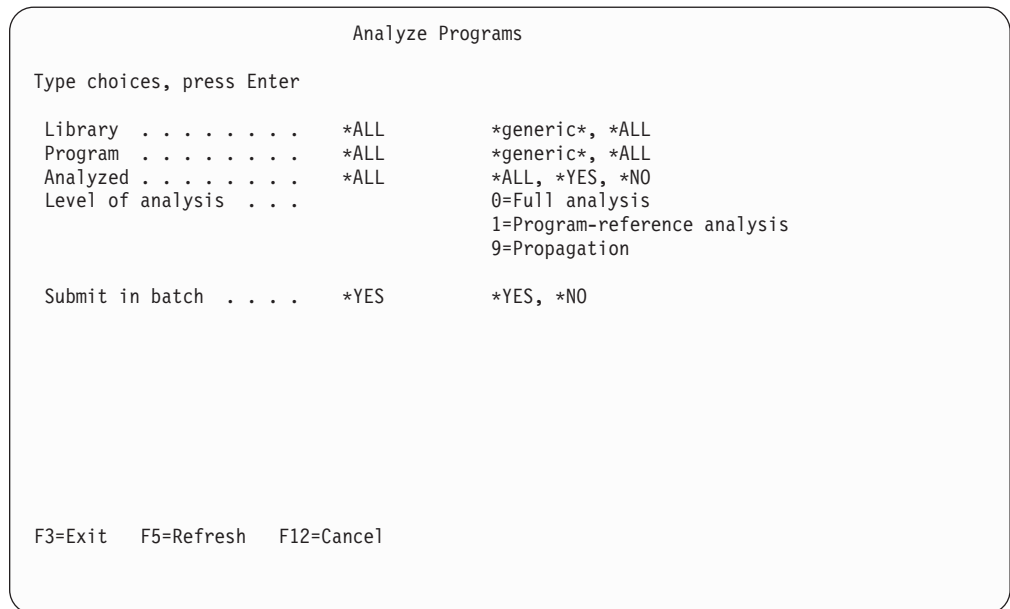
In this case, it is not necessary to run a full program analysis. You only need to run the last part of the program analysis, called propagation.

---

## Propagate Dates Globally

To propagate dates for all programs in an environment globally, do the following:

- Specify option 16 (Analyze programs) next to an environment in the Work with Environments display, and press F4.  
The Analyze Programs display appears.



2. Specify the subset of programs that you want to analyze, and specify 9 (Propagation) for the level of analysis.

---

## Propagate Dates Individually

To propagate dates for individual programs in an environment, specify option 3 (Propagation) next to a program of your choice in the Work with Programs display, and press Enter.

See “Chapter 18. Work with Programs” on page 101 for a detailed description of this display.

---

## Display Impacted Lines of Code

Once you have analyzed a program, you can display the lines of code that are impacted by dates.

To display the impacted lines of code, specify option 6 (Display impacted LOC) next to one or more programs in the Work with Programs display.

The Display Lines of Code Impacted by Dates screen appears, as shown in Figure 41 on page 61.



```

                                Display Lines of Code Impacted by Dates
Source name . . . CENDS3
SQNBR *...+...1...+...2...+...3...+...4...+...5...+...6...+...7
00004      C                MOVELYMD1      YY      20
00008      C                MOVELYMD2      YY
00023      C                YY              IFLT 40

F3=Exit      F5=Refresh      F12=Cancel      Bottom
F17=Top      F18=Bottom

```

Figure 41. Displaying Lines of Code that are Impacted by Dates

To see the list of impacted lines of code for another source, simply enter a new value for the source-name parameter and press Enter.

## Display Impacted Program Areas and Fields

Specify option 7 (Display dates found) for a program in the Work with Programs display, to view a list of program areas and fields that are impacted by dates.

The Display Candidate Date Fields in Program Areas screen appears, as shown in Figure 42.

```

                                Display Candidate Date Fields in Program Areas
Source name . . . CENDS3
Field                Area name
YMD1                 YMD1
YMD2                 YMD2
YY                   YY

F3=Exit      F5=Refresh      F12=Cancel      Bottom
F17=Top      F18=Bottom

```

Figure 42. Displaying Candidate Date Fields in Program Areas

To display similar information for another source file, simply specify a new value for the source-name parameter in this display and press Enter.

---

## Display Object Description

Specify option 8 (Display description) in the Work with Program display to view the full object description of a program.

```
Display Object Description - Full
Library 1 of 1
Object . . . . . : RPG100      Attribute . . . . . : RPG
Library . . . . . : IMP2K      Owner . . . . . : ABCD
Type . . . . . : *PGM         Primary group . . . . : *NONE

User-defined information:
Attribute . . . . . :
Text . . . . . : Max# of files (
SR2F051)

Creation information:
Creation date/time . . . . . : 97/11/10 15:04:51
Created by user . . . . . : ABCD
System created on . . . . . : MYAS400
Object domain . . . . . : *USER

More...

Press Enter to continue.

F3=Exit F12=Cancel
```

Figure 43. Displaying the Full Object Description of a Program

---

## Display Program Information

Specify option 9 (Display program information) in the Work with Program display to view the full attributes of a selected program. For an ILE program, you see the information at the \*MODULE level. For any non-ILE program, you see the information at the \*BASIC level.

```
Display Program Information
Display 1 of 1
Program . . . . . : ILEPGM      Library . . . . . : IMP2KILE
Owner . . . . . : QDFTOWN
Program attribute . . . : RPGLE
Detail . . . . . : *MODULE

Type options, press Enter.
5=Display description 6=Print description

Opt Module Library Attribute Creation Optimization Debug
Date Level Data
- RPGLE200 ABC RPGLE 97/11/27 *NONE *YES
- RPGLE201 ABC RPGLE 97/11/27 *NONE *YES
- RPGLE202 ABC RPGLE 97/11/27 *NONE *YES

Bottom

F3=Exit F12=Cancel F17=Top F18=Bottom
(C) COPYRIGHT IBM CORP. 1980, 1997.
```

Figure 44. Displaying Program Information for an ILE Program

```

                                Display Program Information
Program . . . . . : RPG100      Library . . . . . : IMP2K
Owner . . . . . : TEST
Program attribute . . : RPG

Program creation information:
Program creation date/time . . . . . : 97/11/10 15:04:51
Type of program . . . . . : OPM
Source file . . . . . : QRPGSRC
Library . . . . . : IMP2K
Source member . . . . . : RPG100
Source file change date/time . . . . . : 97/11/10 15:04:45
Observable information . . . . . : *ALL
User profile . . . . . : *USER
Use adopted authority . . . . . : *YES
Fix decimal data . . . . . : *NO
Text description . . . . . : Max# of files
                               (SR2F051)

Press Enter to continue.

F3=Exit  F12=Cancel
(C) COPYRIGHT IBM CORP. 1980, 1996.
More...

```

Figure 45. Displaying Program Information for a Non-ILE Program

## Remove a Program from the Environment

If you do not want to analyze all the programs that were loaded into an environment, you can selectively remove one or more programs.

**Note:** When you remove a program, you simply remove the reference to the program from the environment. You do not actually delete the program from the system.

To remove a program from the active environment, do the following:

1. Specify option 4 (Remove) next to the program in the Work with Programs display, and press Enter.

The Confirm Removal of Program display appears.

```

                                Confirm Removal of Program

The following program will be removed

Program . . . . . : RPG100
Library . . . . . : IMP2K

Type choice, press Enter.

Press F12 to return and not perform the remove operation.
Continue . . . . . : N  Y=Yes, N=No

F12=Cancel

```

Figure 46. Removing a Program from the Active Environment

2. Confirm the removal of the program.

---

## Remove a COPY from the Environment

If you do not want to analyze all the COPYs that were loaded into an environment, you can selectively remove one or more of them.

**Note:** When you remove a COPY, you simply remove the reference to the COPY from the environment. You do not actually delete the COPY from the system.

To remove a COPY from the active environment, do the following:

1. Specify option 4 (Delete) next to the COPY in the Work with Copybooks display, and press Enter.

The Confirm Removal of Program display appears.

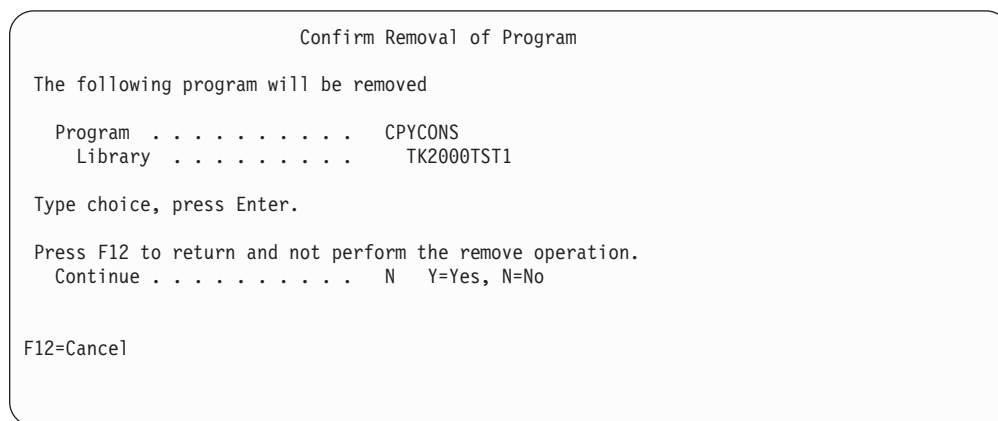


Figure 47. Removing a COPY from the Active Environment

2. Confirm the removal of the COPY.

---

## Add a Program to the Environment

If you want to add an object to a program library ABC that you have already loaded into a SEARCH2000 environment, do the following:

1. Copy the program into a temporary program library XYZ (where XYZ can be any valid library name).
2. Load library XYZ into the environment that contains ABC, as described in “Chapter 7. Load Database Files and Programs” on page 25.
3. Analyze the program as described in “Analyze Programs Individually” on page 57 .

If you have unintentionally removed a program from an environment, this approach preserves any existing analysis results for the remaining programs in the environment when you add the program again.

Alternately, you could remove library ABC from the environment, and then load it again into the environment. However, you would lose any program analysis results in the process.

---

## Add a COPY to the Environment

If you want to add a COPY to a library ABC that you have already loaded into a SEARCH2000 environment, do the following:

1. Copy the COPY into a temporary library XYZ (where XYZ can be any valid library name).
2. Load library XYZ into the environment that contains ABC, as described in “Chapter 7. Load Database Files and Programs” on page 25.
3. Analyze the COPY as described in “Analyze Copybooks Individually” on page 55

If you have unintentionally removed a COPY from an environment, this approach preserves any existing analysis results for the remaining COPYs in the environment when you add the COPY again.

Alternately, you could remove library ABC from the environment, and then load it again into the environment. However, you would lose any COPY analysis results in the process.

---

## Work with Files that Are Referenced by a Program

Use the Work with Referenced Files display to get and work with information about the files that are referenced by a particular program.

Select option 5 (Work with referenced files) next to a program in the Work with Programs display, and press Enter.

```
Work with Referenced Files
Library BP010LD
Program CINS
Type choices, press Enter.                Position to . . .
1=Analyze 5=Work with dates 6=Work with fields
Rec. Records
Opt File      Library  Len. Available  P Found File text  File
- CUS01L     ABFINDTEST  0           0 Y    0           LF
- OHRD       ABFINDTEST  0           0     0           DSPF
- ORDH01L    ABFINDTEST  0           0 Y    0           LF

Bottom

F3=Exit  F4=Prompt  F5=Refresh  F10=Command line  F12=Cancel
F17=Top  F18=Bottom
```

Figure 48. Working with Files that Are Referenced by a Program

For a detailed description of this display see “Chapter 19. Work with Referenced Files” on page 105.

## Work with Message Log

During program and Copybook analysis, SEARCH2000 may issue messages. These messages are placed in a message log. To work with these messages, do the following:

1. Specify option 13 (Work with log file) next to one or more selected programs in the Work with Programs display. The Work with Program-Analysis Message Log display will appear, as shown in Figure 49.

```
Work with Program-Analysis Message Log

                                From date (YYMMDD) :

Type choices, press Enter.
 4=Delete   5=Display

Opt Sender      Source      Type Message description
QCKUAR021      CENDS3      PGM File CENDSP1 not available.   ...
QCKUAR021      CENDS3      PGM File CENDSP1 not available.   ...

F3=Exit      F5=Refresh  F11=Display date,time,object      Bottom
F12=Cancel   F17=Top     F18=Bottom   F23=Clear log      F13=Repeat option
```

Figure 49. Working with Messages in the Message Log

Each message displays the following information:

- Which SEARCH2000 program issued it
  - For which sources it was issued
  - When it was issued
  - Its severity.
2. To display additional information about a message, press F11.
  3. To view message details, specify option 5 next to one or more selected messages, and press Enter.

**Note:** Not all messages contain second-level message text.

```
Display Message Information

Press Enter to continue.

Sender . . . . . : QCKUAR021

Source:
Name/Type . . . . . : CENDS3      PGM

Message:
Message ID/Type . . :          WRC0083  W
Date/Time . . . . . : 16/05/98  12:47:26

Text      File CENDSP1 not available.

F3=Exit   F12=Cancel   F10=Display second-level message text
```

Figure 50. Viewing Message Details





---

## Chapter 12. Work with Reports

Use the Reports Menu to generate six types of reports that provide information about the impact of date fields on your application.

Select option 10 (Reports Menu) from the SEARCH2000 Main Menu to access the Reports Menu. You will be prompted for the name of an existing SEARCH2000 environment. You can press F4 to display the list of available environments.

```
QWRCQMNU                Reports Menu

Select one of the following:

  1. Date fields found in user files/libraries
  2. Impacted files in user libraries
  3. Impacted files referenced in user programs
  4. Impacted programs in user libraries
  5. Impacted lines of code in user programs
  6. Impacted program areas and fields

Selection or command

F3=Exit  F12=Cancel
```

*Figure 51. Selecting One of the Reports that SEARCH2000 Generates*

---

### Select Output for Reports

After selecting a report from the Report menu, you must specify where to send the output:

- Select \*PRINTER to send the report to a printer.
- Select \*DISPLAY to display the report on your screen.

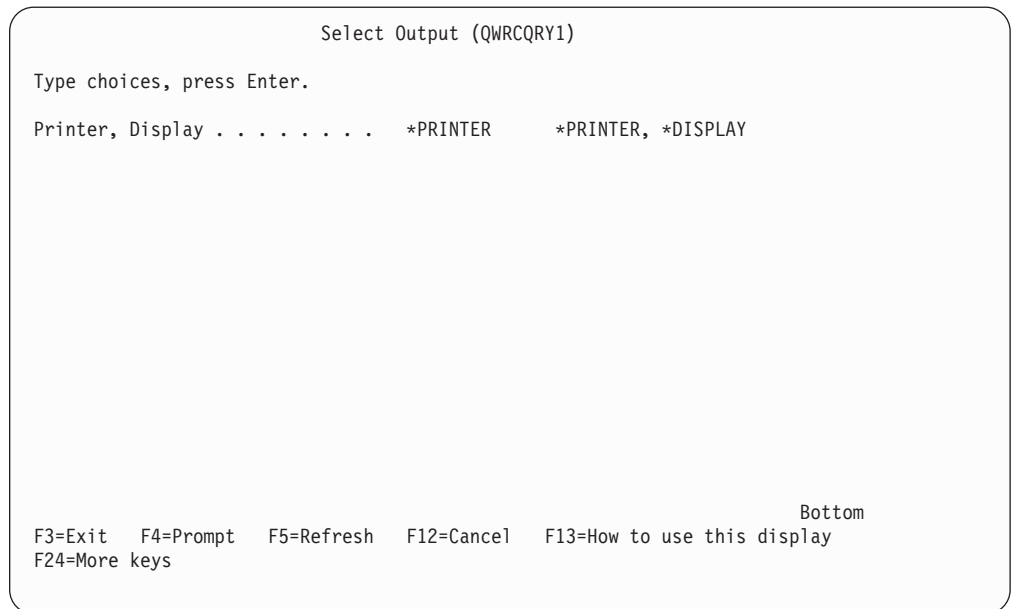


Figure 52. Directing a Report to a Printer or to the Screen

## Show Date Fields in User Files and Libraries

You can generate a report that shows the complete list of the date fields that are contained in all user files and libraries in a given environment. This list contains the dates that SEARCH2000 has found during the file analysis, as well as the dates that you may have added manually. It does not include the dates that you may have removed manually.

The report provides the information that is shown in the following table.

Table 4. Information Provided in Report 1

Heading	Description
Library	Name of the library that contains the database file.
File name	Name of the database file.
Field name	Name of the field containing a date
Date format	Format of the date (for example, DMY).
Date type	Numeric type of the date (for example, packed).
Date position	Starting position of the date within the field.
Digits before	Number of digits that precede the date in the field.
Digits after	Number of digits trailing the date in the field.

Select option 1 (Date fields found in user files/libraries) from the Reports Menu to display or print the report that is shown in the figures below.

```

                                Display Report
Query . . . : QTK2000/QCKUQRY1      Report width . . . . . : 80
Position to line . . . . .          Shift to column . . . . .
Line  . . .+...1...+...2...+...3...+...4...+...5...+...6...+...7...
      Library   File name  Field name  Date       Date       Date       Digits
      format    type      position   before
000001 HBPFDN   ANPS       PSWDCR     YMD        P         113        1
000002 HBPFDN   ANPS       PSWDUM     YMD        P         117        1
000003
000004      Total dates in file ANPS
000005      COUNT 2
000006
000007 HBPFDN   IDIN       DTAINI     DMY        P         272        3
000008 HBPFDN   IDIN       DTAFIN     DMY        P         277        3
000009
000010      Total dates in file IDIN
000011      COUNT 2
000012
000013 HBPFDN   PSIM       IMPDTA     YMD        P          43        1
000014 HBPFDN   PSIM       DTRDTA     YMD        P          47        1
000015
                                                    More...
F3=Exit      F12=Cancel  F19=Left   F20=Right   F21=Split
Beginning of report.

```

Figure 53. Report Showing Date Fields in User Files

Press F20 (Right) to display additional columns of information.

```

                                Display Report
Query . . . : QSTK000/QCKUQRY1      Report width . . . . . : 80
Position to line . . . . .          Shift to column . . . . .
Line  .1...+...2...+...3...+...4...+...5...+...6...+...7...+...8
      File name  Field name  Date       Date       Date       Digits   Digits
      format    type      position   before    after
000001 ANPS       PSWDCR     YMD        P         113        1         0
000002 ANPS       PSWDUM     YMD        P         117        1         0
000003
000004 tal dates in file ANPS
000005 UNT 2
000006
000007 IDIN       DTAINI     DMY        P         272        3         0
000008 IDIN       DTAFIN     DMY        P         277        3         0
000009
000010 tal dates in file IDIN
000011 UNT 2
000012
000013 PSIM       IMPDTA     YMD        P          43        1         0
000014 PSIM       DTRDTA     YMD        P          47        1         0
000015
                                                    More...
F3=Exit      F12=Cancel  F19=Left   F20=Right   F21=Split
Last column of report.

```

Figure 54. Report Showing Date Fields in User Files — Additional Columns of Information

Scroll down to display additional lines of information.

```

                                Display Report
Query . . . : QTK2000/QCKUQRY1      Report width . . . . . :    80
Position to line . . . . .          Shift to column . . . . .
Line  . . .+...1...+...2...+...3...+...4...+...5...+...6...+...7..
      Library   File name  Field name  Date       Date       Date       Digits
                        format   type      position  before

000045
000046      Total dates in library HBPFD
000047      COUNT 17
000048
000049 TAMTEST   TESTFX    CYMMDD    YMD        P          1          1
000050
000051      Total dates in file TESTFX
000052      COUNT 1
000053
000054      Total dates in library TAMTEST
000055      COUNT 1
000056
000057      Total dates in user libraries
000058      COUNT 18
***** ***** End of report *****
                                                    Bottom
F3=Exit   F12=Cancel   F19=Left   F20=Right   F21=Split
First column of report.

```

Figure 55. Report Showing Date Fields in User Files — Additional Lines of Information

## Show Files that Contain Date Fields

You can generate a report that shows the complete list of the files that contain dates, for a given environment. This list shows all files that contain dates that SEARCH2000 has found during the file analysis, as well as dates that you may have added manually.

The report provides the information that is shown in the table below.

Table 5. Information Provided in Report 2

Heading	Description
Library name	Name of the library that contains the database file.
File name	Name of the database file.
Analyzed	Flag indicating whether the file has been analyzed.
Number of dates	Number of dates found in the file.
Impact	Flag indicating whether there are programs that reference this database file. Valid values are '1' (YES), and '0' (NO).
Empty	Flag indicating whether the file is empty. Valid values are '1' (YES), and '0' (NO).
Total number of files	Summary of the number of files found in each individual library, and in all user libraries.

Select option 2 (Impacted files in user libraries) from the Reports Menu to display or print the report that is shown in the figure below.

```

Display Report
Query . . . : QTK2000/QCKUQRY2      Report width . . . . . : 72
Position to line . . . . .          Shift to column . . . . .
Line  . . .+...1...+...2...+...3...+...4...+...5...+...6...+...7..
      Library name File name Analyzed Number Impact Empty Total
                               of dates                               number
                               of files

000015 MYIMP2K      IREF                0      0      1
000016 MYIMP2K      ISPLHST             0      0      1
000017 MYIMP2K      ISTATUS             Y      1      1      0
000018 MYIMP2K      IVLDALC             0      0      1
000019 MYIMP2K      PCFILE.DTA         0      0      1
000020 MYIMP2K      PCSRC               0      0      1
000021 MYIMP2K      SAVED              0      0      1
000022 MYIMP2K      W000000990        0      0      1
000023 MYIMP2K      W000001219        0      0      1
000024 MYIMP2K      X000000990        0      0      1
000025 MYIMP2K      X000001219        Y      0      0      1
000026 MYIMP2K      Y000000990        Y      0      0      1
000027 MYIMP2K      Y000001219        Y      0      0      1
000028 MYIMP2K      Z000000990        0      0      1

More...

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split

```

Figure 56. Report Showing Files that Contain Date Fields

Scroll down to display additional lines of information.

```

Display Report
Query . . . : QTK2000/QCKUQRY2      Report width . . . . . : 72
Position to line . . . . .          Shift to column . . . . .
Line  . . .+...1...+...2...+...3...+...4...+...5...+...6...+...7..
      Library name File name Analyzed Number Impact Empty Total
                               of dates                               number
                               of files

000029 MYIMP2K      Z000001219        0      0      1
000030
000031                Impacted files in library MYIMP2K
000032                TOTAL      11      16
000033                COUNT                29
000034
000035                Impacted files in user libraries
000036                TOTAL      11      16
000037                COUNT                29
***** ***** End of report *****

Bottom

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split

```

Figure 57. Report Showing Files that Contain Date Fields — Additional Lines of Information

## Show Files that Are Referenced by Programs and Contain Dates

You can generate a report that shows a complete list of the files in a given environment that are referenced by programs and contain dates.

The report provides the information that is shown in the table below.

Table 6. Information Provided in Report 3

Heading	Description
Library name	Name of the library that contains the program.
Program name	Name of the program that references a file that contains dates.
Referenced file name	Name of the database file that contains dates and is referenced by the program.
Referenced file library	Name of the library that contains the referenced file.
File attribute	Attribute of the referenced file.
Number of dates	Number of dates found in the file.

Select option 3 (Files with dates referenced in user programs) from the Reports Menu to display or print the report that is shown in the figure below.

```

Display Report
Query . . . : QTK2000/QCKUQRY3      Report width . . . . . : 77
Position to line . . . . .          Shift to column . . . . .
Line  . . .+ . . .1 . . .+ . . .2 . . .+ . . .3 . . .+ . . .4 . . .+ . . .5 . . .+ . . .6 . . .+ . . .7 . .
      Library name Program name Referenced Referenced File      Number
      file name   file library attr.   of dates
000001 MYIMP2K      IAUDMF      IMEDMF4     MYIMP2K     3
000002
000003      Total files with dates used by IAUDMF
000004      TOTAL                                           3
000005      COUNT 1
000006
000007 MYIMP2K      MYCKMAN     ILMYHDR     MYIMP2K     1
000008 MYIMP2K      MYCKMAN     IMEDMF      MYIMP2K     6
000009
000010      Total files with dates used by MYCKMAN
000011      TOTAL                                           7
000012      COUNT 2
000013
000014 MYIMP2K      MYCKVL      ILMYHDR     MYIMP2K     1
000015
More...
F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
First column of report.

```

Figure 58. Report Showing Files that Are Referenced by Programs and Contain Dates

## Show Programs that Are Impacted by Dates

You can generate a report that shows the complete list of the programs in a given environment that reference files that contain dates.

The report provides the information that is shown in the table below.

Table 7. Information Provided in Report 4

Heading	Description
Library name	Name of the library that contains the program.
Program name	Name of the program that references a file that contains dates.
Language	Language of the program.

Table 7. Information Provided in Report 4 (continued)

Heading	Description
Number of files used	Number of files that are referenced by the program.
Number of dates in files	Number of date fields found in all the files referenced by the program.
LOC (lines of code) impacted	Number of lines of code in the source member involving operations with one or more date sensitive fields.
Total LOC number	Total number of lines of code in the program source member.
Impact	Flag indicating whether this program references database files that contain dates. Valid values are '1' (YES), and '0' (NO).
LOC in impacted programs	Total number of lines of code in all programs that reference files that contain dates.

Select option 4 (Impacted programs in user libraries) from the Reports Menu to display or print the report that is shown in the figures below.

Display Report						
Query . . . : QTK2000/QCKUQRY4			Report width . . . . . : 125			
Position to line . . . . .			Shift to column . . . . .			
Line	.....1.....	.....2.....	.....3.....	.....4.....	.....5.....	.....6.....7..
	Library name	Program name	Language	Number of files used	Number of dates in files	LOC impacted
000001	TK2000TST1	CENDS3	RPG	1	2	3
000002	TK2000TST1	CPY1CAL	CBL	0	0	0
000003	TK2000TST1	I00230	CLP	5	0	0
000004	TK2000TST1	I00232	CBL	0	0	0
000005	TK2000TST1	RLIB	CLP	0	0	0
000006	TK2000TST1	RLIB1	CLP	0	0	0
000007	TK2000TST1	RPGCOPY	UNK	0	0	0
000008	TK2000TST1	SA00001	CBL	1	0	0
000009	TK2000TST1	SA69298	RPG	2	7	6
000010	TK2000TST1	SA69298A	RPG	2	7	6
000011	TK2000TST1	SA69714	CBL	1	8	0
000012	TK2000TST1	SA69714A	UNK	1	8	0
000013	TK2000TST1	SA69900	CBL	1	0	0
000014	TK2000TST1	SA71008	CBL	0	0	0
						More...
F3=Exit	F12=Cancel	F19=Left	F20=Right	F21=Split		

Figure 59. Report Showing Programs that Reference Files that Contain Dates

Additional Columns of Information.

Press F20 (Right) to display additional columns of information.

```

Display Report
Query . . . : QTK2000/QCKUQRY4      Report width . . . . . : 125
Position to line . . . . .      Shift to column . . . . .
Line  .+...6...+...7...+...8...+...9...+...10...+...11...+...12...+
      LOC          Total LOC      Impact      Total LOC
      impacted      number          in impacted
                                programs
000001          3          28          1          28
000002          0          33          0          0
000003          0          28          0          0
000004          0          57          0          0
000005          0          38          0          0
000006          0          23          0          0
000007          0           2          0          0
000008          0          58          0          0
000009          6          35          1          35
000010          6          36          1          36
000011          0          37          0          0
000012          0          37          0          0
000013          0          38          0          0
000014          0          38          0          0
                                More...
F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
Last column of report.

```

Figure 60. Report Showing Programs that Reference Files that Contain Dates — Additional Columns of Information

Scroll down to display additional lines of information, including totals for the various columns.

## Show Impacted Lines of Code in User Programs

You can generate a report that shows the complete list of the impacted lines of code in your programs, for any given environment.

The report provides the information that is shown in the table below.

Table 8. Information Provided in Report 5

Heading	Description
Library name	Name of the library that contains the program.
Program name	Name of the program that contains lines of code that are impacted by dates.
Source file	Name of file that contains the source member.
Source library	Name of library that contains the source member.
Source name	Name of the source member of the program.
Statement number	The statement number in the source member that identifies the impacted line of code.
Instruction	Code for the impacted line.



```

                                Display Report
Query . . . : QTK2000/QCKUQRY5      Report width . . . . . : 166
Position to line . . . . .          Shift to column . . . . .
Line  . . .+ . . .1 . . .+ . . .2 . . .+ . . .3 . . .+ . . .4 . . .+ . . .5 . . .+ . . .6 . . .+ . . .7 . .
      Library   Program   Source   Source   Source   Statement   Instru
      name      name      file     Library  name      number      number
000001 TK2000TST1 CENDS3   QRPGSRC  BP100LD  CENDS3      4          C
000002 TK2000TST1 CENDS3   QRPGSRC  BP100LD  CENDS3      8          C
000003 TK2000TST1 CENDS3   QRPGSRC  BP100LD  CENDS3     23          C
000004
000005
000006                                COUNT 3
000007 TK2000TST1 SA69298   QRPGSRC  BP100LD  SA69298    17          C
000008 TK2000TST1 SA69298   QRPGSRC  BP100LD  SA69298    18          C
000009 TK2000TST1 SA69298   QRPGSRC  BP100LD  SA69298    19          C
000010 TK2000TST1 SA69298   QRPGSRC  BP100LD  SA69298    20          C
000011 TK2000TST1 SA69298   QRPGSRC  BP100LD  SA69298    21          C
000012 TK2000TST1 SA69298   QRPGSRC  BP100LD  SA69298    23          C
000013
000014                                COUNT 6
000015
More...
F3=Exit      F12=Cancel   F19=Left    F20=Right   F21=Split

```

Figure 61. Report Showing Impacted Lines of Code in User Programs

Press F20 (Right) to display additional columns of information.

```

                                Display Report
Query . . . : QTK2000/QCKUQRY5      Report width . . . . . : 166
Position to line . . . . .          Shift to column . . . . .
Line  ..+...8...+...9...+...10...+...11...+...12...+...13...+...14...
      ction

000001          MOVELYMD1      YY      20
000002          MOVELYMD2      YY
000003          YY          IFLT 40
000004
000005
000006
000007          MOVE YY          SYY
000008          MOVE YMD        SYMD
000009          MOVE DMY        SDMY
000010          MOVE DMYA       SDMYA
000011          MOVE YJ         SYJ
000012          MOVE YM         SYM
000013
000014
000015

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split      More...

```

```

                                Display Report
Query . . . : QTK2000/QCKUQRY5      Report width . . . . . : 166
Position to line . . . . .          Shift to column . . . . .
Line  +...10...+...11...+...12...+...13...+...14...+...15...+...16...+
      ction

000001 OVELYMD1      YY      20
000002 OVELYMD2      YY
000003 FLT 40
000004
000005
000006
000007 OVE YY          SYY
000008 OVE YMD        SYMD
000009 OVE DMY        SDMY
000010 OVE DMYA       SDMYA
000011 OVE YJ         SYJ
000012 OVE YM         SYM
000013
000014
000015

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split      More...
Last column of report.

```

Figure 62. Report Showing Impacted Lines of Code in User Programs — Additional Information

Scroll down to display additional lines of information, including various totals.

---

## Show Impacted Program Areas and Fields

You can generate a report that shows the complete list of the impacted program areas and fields in your programs, for any given environment.

The report provides the information that is shown in the table below.

Table 9. Information Provided in Report 6

Heading	Description
Library name	Name of the library that contains the program.
Program name	Name of the program that contains impacted program areas and fields.
Source file	Name of the file that contains the source member.
Source library	Name of library that contains the source member.
Source name	Name of the source member of the program.
I/O Area name	Name of the I/O area that contains the date-sensitive field.
Field name	Name of the date-sensitive field in the program.

```

Display Report
Query . . . : QTK2000/QCKUQRY6      Report width . . . . . : 122
Position to line . . . . .      Shift to column . . . . .
Line  . . .+ . . .1 . . .+ . . .2 . . .+ . . .3 . . .+ . . .4 . . .+ . . .5 . . .+ . . .6 . . .+ . . .7 . .
      Library   Program   Source   Source   Source   I/O Area
      name      name      file     library  name
000001 TK2000TST1 CENDS3   QRPGSRC  BP100LD  CENDS3   YMD1
000002 TK2000TST1 CENDS3   QRPGSRC  BP100LD  CENDS3   YMD2
000003 TK2000TST1 CENDS3   QRPGSRC  BP100LD  CENDS3   YY
000004
000005
000006
000007 TK2000TST1 CPY1CAL   QCBLSRC   TK2000TST1 CPY1CAL   ASSUMED-IOAR
000008
000009
000010
000011 TK2000TST1 I00232   QCBLSRC   TK2000TST1 I00232   ASSUMED-IOAR
000012
000013
000014
000015 TK2000TST1 RPGCOPY   QRPGSRC   BP100LD   RPGCOPY   ASSUMED-IOAR
More...
F3=Exit      F12=Cancel  F19=Left   F20=Right  F21=Split

```

Figure 63. Report Showing Impacted Program Areas and Fields

Press F20 (Right) to display additional columns of information.

```

                                Display Report
Query . . . : QTK2000/QCKUQRY6      Report width . . . . . : 122
Position to line . . . . .          Shift to column . . . . .
Line  ....+....6....+....7....+....8....+....9....+....10....+....11....+....12..
      urce      I/O Area      Field
      me      name
000001 NDS3      YMD1      YMD1
000002 NDS3      YMD2      YMD2
000003 NDS3      YY      YY
000004
000005      COUNT 3
000006
000007 Y1CAL      ASSUMED-IOAREA      DATE
000008
000009      COUNT 1
000010
000011 0232      ASSUMED-IOAREA      DATE
000012
000013      COUNT 1
000014
000015 GCOPY      ASSUMED-IOAREA      DATE
More...
F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
Last column of report.

```

Figure 64. Report Showing Impacted Program Areas and Fields — Additional Information

Scroll down to display additional lines of information, including various totals.

---

## Part 3. SEARCH2000 Reference Information



---

## Chapter 13. Work With Environments

The Work with Environments display lists the environments that have been created on the system.

```
Work with Environments

Type choices, press Enter.                Position to environment _____
  2=Add a file library    3=Add a program library    12=Work with files
 13=Work with programs   15=Analyze files           16=Analyze programs

Opt Environment Text
—  ENV1      Analysis environment library.
—  ENV2      Analysis environment library.
—  ENV3      Analysis environment library.

Bottom
F3=Exit  F4=Prompt  F5=Refresh  F6=Create  F10=Command line  F12=Cancel
F17=Top  F18=Bottom  F23=More options
```

Figure 65. Working with SEARCH2000 Environments

---

### Access the Work with Environments Display

You can access the Work with Environments display in one of two ways:

- Select option 2 (Work with Environments) from the SEARCH2000 Main Menu.
- Type SR2000WRK on any AS/400 command line.

The Specify Environments to Work With display appears.

```
Specify Environments to Work With

Type choices, press Enter.

Environment . . . . . *ALL  Name, generic*, *ALL

F3=Exit  F12=Cancel
```

Figure 66. Choosing with Which Environments to Work

In the Specify Environments to Work With display, specify the name of the environment with which you want to work. You can choose to work with a single environment, a subset of environments, or all environments. The Work with Environments display will list all existing environments, or a subset only, depending on the parameter you specify.

## Information Provided in the Work with Environments Display

The Work with Environments display provides information about existing environments. See the following table for details.

Table 10. Information Provided in Work with Environments Display

Heading	Description
Opt.	Option selected from those listed at the top of the display.
Environment	Name of the environment to which you add the file and program libraries to be analyzed by Search2000 .
Text	Description of the library.

## Tasks Performed from the Work with Environments Display

From the Work with Environments display, you can perform the tasks that are listed in Table 11.

Table 11. Tasks Performed from the Work with Environments Display

Task	Option/Key	Detailed Instructions
Add a file library	Option 2	See "Chapter 7. Load Database Files and Programs" on page 25
Add a program library	Option 3	See "Chapter 7. Load Database Files and Programs" on page 25
Remove a file library	Option 4	See "Remove a Library from the Environment" on page 29
Remove a program library	Option 5	See "Remove a Library from the Environment" on page 29
Set global environment parameter defaults	Option 10	See "Chapter 8. Set Parameters for Analysis" on page 33
Set default libraries	Option 11	See "Specifying Default Libraries" on page 25
Work with files	Option 12	See "Chapter 14. Work with Files" on page 87
Work with a subset of files	Option 12 + F4	
Work with programs	Option 13	See "Chapter 18. Work with Programs" on page 101
Work with a subset of programs	Option 13 + F4	
Work with COPYs	Option 14	See "Chapter 20. Work with Copybooks" on page 107
Work with a subset of COPYs	Option 14 + F4	
Analyze files	Option 15	See "Chapter 9. Analyze Database Files" on page 39
Analyze a subset of files and override the default parameters	Option 15 + F4	See "Override Default Parameters During Individual File Analysis" on page 37
Analyze programs	Option 16	See "Analyze Programs Globally" on page 56



Table 11. Tasks Performed from the Work with Environments Display (continued)

<b>Task</b>	<b>Option/Key</b>	<b>Detailed Instructions</b>
Analyze a subset of programs	Option 16 + F4	
Analyze Copybooks	Option 17	See "Analyze Copybooks Globally" on page 55 and "Analyze Copybooks Individually" on page 55
Analyze a subset of Copybooks	Option 17 + F4	
Generate default BYPASS2000 interface	Option 18	See "Appendix. Interfacing with BYPASS2000" on page 113
Generate customized BYPASS2000 interface	Option 18 + F4	See "Appendix. Interfacing with BYPASS2000" on page 113
Work with Fields	Option 19	See "Chapter 16. Work with Fields" on page 95
Create a new environment	F6	See "Chapter 6. Create a New SEARCH2000 Environment" on page 21



## Chapter 14. Work with Files

Use the Work with Files display to view and work with information about database files.

```

Work with Files

Type choices, press Enter.
1=Analyze 2=Select member 4=Delete          Position to library
5=Work with dates 6=Work with fields 7=THF recal. 8=Display description
                                     Position to file . .
                                     Records Min Max
Opt Library File Length Available P Found Processed Year Year
IMP2K DICT 329 0 3
IMP2K FILE01 28 2 Y 5 2 1980 1999
IMP2K FILE02 54 1 Y 5 1 1980 1999
IMP2K FILE03 43 11 Y 4 11 1980 1999
IMP2K FILE04 243 31 Y 43 31 1960 1999
IMP2K FILE05 243 3 Y 3 3 1980 1999
IMP2K FILE06 20 500000 Y 2 50 1980 1999
IMP2K FILE07 130 5 Y 0 5 1980 1999
IMP2K FILE08 43 11 Y 4 11 1980 1999
IMP2K FILE09 18 1 Y 4 1 1980 1999
IMP2K FILE10 26 2 Y 0 2 1980 1999
IMP2K FILE100 15999 0
IMP2K FILE101 16001 0

More...

F3=Exit F4=Prompt F5=Refresh F10=Command line F11=Toggle
F17=Top F18=Bottom F19=Hide/show empty files F24=More keys

```

Figure 67. Working with the Database Files in the Active SEARCH2000 Environment

### Access the Work with Files Display

You can access the Work with Files display in one of the following ways:

- Specify option 12 (Work with Files) next to an environment in the Work with Environments display.
- Select option 3 (Work with Files) from the SEARCH2000 Main Menu, or type SR2000FIL on any AS/400 command line.

In the Specify Files to Work With display, specify the name of the environment with which you want to work. You can also select a subset of libraries and files. Press F4 to see a list of all existing environments.

```

Specify Files to Work With

Type choices, press Enter.

Environment . . . . . MYENV          Name, F4 for list

Library . . . . . *ALL              Name, *generic*, *ALL
File . . . . . *ALL                Name, *generic*, *ALL
Analyzed . . . . . *ALL            *YES, *NO, *ALL

F3=Exit F5=Refresh F12=Cancel

```

Figure 68. Selecting a SEARCH2000 Environment and a Subset of Database Files

## Information Provided in the Work with Files Display

The Work with Files display provides information about data in all database files of the selected environment. See the following table for details.

Table 12. Information Provided in the Work with Files Display

Heading	Description
Opt	Option selected from those listed at the top of the display.
Library	Name of the library that contains the database file.
File	Name of the database file. Only files with the PF-DTA attribute are listed.
Record Length	Specifies the length (in bytes) of the records in the file.
Records Available	The number of records currently in the file.
P (=Processed)	Flag indicating whether the file has been previously analyzed by SEARCH2000.  Valid values are: <ul style="list-style-type: none"> <li>• ' ' (blank) - Not analyzed In case of logical files this means that the corresponding physical file has not been analyzed.</li> <li>• S - Analysis submitted to batch</li> <li>• W - Analysis in progress</li> <li>• Y - Analysis completed</li> <li>• * - The file is a logical file that is the result of a join between physical files; some, but not all, of these physical files have been analyzed.</li> </ul>
Found	Specifies how many candidate date fields are in the file. (This number includes dates found by SEARCH2000, as well as dates added by the user.)
Records Processed	Number of records processed by SEARCH2000 during the most recent analysis of the file.
Min Year	Lower limit of the date range used during file analysis.
Max Year	Upper limit of the date range used during file analysis.
File Text	Description of the file content.

## Tasks Performed from the Work with Files Display

From the Work with Files display, you can perform the tasks that are listed in Table 13.

Table 13. Tasks Performed from the Work with Files Display

Task	Option/Key	Detailed Instructions
Analyze a file using default parameters	Option 1	See "Chapter 9. Analyze Database Files" on page 39
Analyze a file using customized parameters	Option 1 + F4	See "Override Default Parameters During Individual File Analysis" on page 37
Analyze a specific file member	Option 2	See "Analyze a Specific File Member" on page 40

Table 13. Tasks Performed from the Work with Files Display (continued)

Task	Option/Key	Detailed Instructions
Remove a file from the list	Option 4	
Work with the dates found by SEARCH2000 during the analysis	Option 5	See "Chapter 15. Work with Dates" on page 91
Work with fields	Option 6	See "Chapter 16. Work with Fields" on page 95
Calculate the Time Horizon Failure (THF)	Option 7	See "Recalculate the Time-Horizon Failure (THF)" on page 42
Display the full object description of a file	Option 8	
Display summary of date fields found in all files of the active environment, or in a subset of these files	F14	
Specify date formats to be searched for during file analysis	F15	See "Switch Valid Date Formats On or Off" on page 42
Set default parameters	F16	See "Chapter 8. Set Parameters for Analysis" on page 33
Toggle between hiding or displaying files for which no records are currently available	F19	
Modify the subset of files to work with	F20	
Update information about files added to, or removed from the active environment	F22	See "Update Database Libraries" on page 29



## Chapter 15. Work with Dates

Use the Work with Dates display to view information about candidate date fields found by SEARCH2000, add dates to a file, delete dates from a file, or prepare date fields for any future conversion of the application.

```

Work with dates
File   STOCK
Library BP010LD

Type choices, press Enter.
4=Delete/undelete 6=Expand/not expand      Position to . . .
  Num. Date Date      Out of Min      Max      Field      Digits      Inf
Opt Type Pos. Format      Range Date      Date      Name      Be Aft D Exp Pro
-   P   26 MDY              77 123102  123199  PRDEXP   01 00   0  PGM

More...
F3=Exit   F5=Refresh  F6=Create  F12=Cancel  F16=Show contents (DSPPFM)
F17=Top   F18=Bottom  F19=Show/hide deleted  F24=More keys
  
```

Figure 69. Working with the Dates in a Given File in the Active SEARCH2000 Environment

Press F11 (More info) in the Work with Dates display to see additional information for the current file. This displays additional field names for dates that span several fields, and the percentage of records that do not contain valid date data for a particular field.

```

Work with dates
File   STOCK
Library BP010LD

Type choices, press Enter.
4=Delete/undelete 6=Expand/not expand      Position to . . .
  Num. Date Date      Field names:      Num Inv
Opt Type Pos. Format      1st      2nd      3rd      4th      D Occ Dta
-   P   26 MDY              PRDEXP
                                           Bottom

F10=Command line      F11=More info      F15=Specify highlighting
F20=Work with fields  F21=Show contents (RUNQRY)  F24=More keys
  
```

Figure 70. Working with Dates — Additional Columns of Information

### Access the Work with Dates Display

You can access the Work with Dates display in one of the following ways:

- Select option 5 (Work with dates) next to a file in the Work with Files display to see the dates contained in that file.
- Press F14 (Date summary) in the Work with Files display to see the dates contained in all files (or in a subset of files) in the active environment, ordered by date type.
- Press F20 (Work with dates) in the Work with Fields display to see the dates contained in the corresponding file.

---

## Information Provided in the Work with Dates Display

The Work with Dates display provides information about the dates that were found in a selected file. See Table 14 for details.

*Table 14. Information Provided in the Work with Dates Display*

Heading		Description
Opt.		Option selected from those listed at the top of the display.
File		Name of the file in which the date was found.  This column is shown if you display dates at the environment level instead of at the file level.
Num. Type		Date-field type, such as alphanumeric ('A'), zoned ('N'), packed decimal ('P'), *DATE ('L'), or *TIMESTAMP ('Z').
Date Pos.		Relative position (in bytes) of the date field from the beginning of the record.
Date Format		Date format, such as YYMD, YYDM, DMY, or MDYY. (See "Information Provided in the Date Format Column" on page 93 for details.)
Out of Range		Percentage of records for which the date in this position does not fall within the specified range of years.
Min Date		Lowest date value found in this position.
Max Date		Highest date value found in this position.
Field Name		Name of the field, according to the file specifications, where the date was found.  A '+' sign at the end of a field name indicates that the date spans more than one field. Press F11 to display the names of the other fields.  If no field name is available for the position in which the date was found, the first field name available to the left of the field is shown.
Digits	Be	Number of digits (bytes for alpha and numeric fields, half-bytes for packed-type fields) contained between the beginning of the field and the start of the date.  A double asterisk (**) in this column indicates that the number of digits exceeds 99.
	Aft	Number of digits contained between the the end of the date and the end of the last field spanned by the date.  A double asterisk (**) in this column indicates that the number of digits exceeds 99.



Table 14. Information Provided in the Work with Dates Display (continued)

Heading		Description
(Flags)	D	Flag indicating whether you have removed a date from view.  To redisplay deleted dates, press F19 (=Show/hide deleted).
	Exp	Flag indicating whether the date has been marked for expansion.  The default is 0 (expand) for date fields with 2-digit years, and 1 (not expand) for date fields with 4-digit years.
Inf Pro		The value PGM in this column indicates that a date has been added to the list by SEARCH2000.  USR indicates that the date has been added by the user.
Num Occ		This column shows the percentage of analyzed records for which the content of this field seems consistent with a date value.  Press F11 to see this information.
Inv Dta		This column shows the percentage of analyzed records for which the content of this field seems inconsistent with a date value.  Press F11 to see this information.

## Information Provided in the Date Format Column

The Date Format column indicates the date format that was found for a particular date field. SEARCH2000 presents this information in the following way:

- A slash (/) may separate two different formats (for example: DMY/MDY) to indicate that SEARCH2000 has been unable to decide between them.
- An asterisk (\*) at the end indicates that SEARCH2000 has found a date in the 21st century.

This could be a date with 2-digit year information that falls within a specified range. For example, if the valid range includes dates between 1995 and 2005, 01 would be interpreted as 2001.

It could also be a 4-digit date with the century value 20, such as 2001.

See “Supported Date Formats” on page 4 for the complete list of date formats that SEARCH2000 can recognize in your database files.

---

## Tasks Performed from the Work with Dates Display

From the Work with Dates display, you can perform the tasks that are listed in Table 15.

Table 15. Tasks Performed from the Work with Dates Display

Task	Option/Key	Detailed Instructions
Remove date fields	Option 4	See “Remove Dates” on page 46

*Table 15. Tasks Performed from the Work with Dates Display (continued)*

<b>Task</b>	<b>Option/Key</b>	<b>Detailed Instructions</b>
Specify whether to expand a date field	Option 6	See "Expand a Date" on page 54  Only required if you plan to convert your application with BYPASS2000.
Add date fields not found by SEARCH2000	F6	See "Add Dates" on page 47
Set highlighting rules	F15	See "Specify Dates to Highlight" on page 50
Display the content of a file (DSPPFM)	F16	See "Show the Contents of a Physical File Member (DSPPFM)" on page 51
Show or hide removed dates from view	F19	See "Remove Dates" on page 46
Work with fields	F20	See "Chapter 16. Work with Fields" on page 95
Show contents (RUNQRY)	F21	See "Show the Formatted Contents of a Physical File Member (RUNQRY)" on page 53

## Chapter 16. Work with Fields

Use the Work with Fields display to view information about fields in a selected file. The field listing that is displayed reflects the DDS of the file.

```

Work with Fields
File FILE01
Library IMP2K

Type choices, press Enter.
1=Select 4=Delete assignment
Position to . . ____0

Field      Field  Field  Field  Date  Inf
Opt Name    Displ Type  Length Format Pro Exp
- YMDP01    1  P(6,0)  4
- YMDZ01    5  N(6,0)  6
- YMDA01    11 A      6
- YYA01     17 A      2
- GEN       19 L      10

F3=Exit  F5=Refresh  F10=Command line  F11=More info  F12=Cancel
F17=Top  F18=Bottom  F20=Work with dates
Bottom

```

```

Work with fields
File STOCK
Library BP010LD

Type choices, press Enter.
1=Select 4=Delete assignment
Position to . . ____0

Field      Field  Field  Field  Date  Inf
Opt Name    Displ Type  Length Format Pro Exp
- PRDNBR    1  A      5
- PRDES     6  A      20
- PRDEXP    26 P(6,0)  4
- PRDPRC    30 P(7,2)  4
- PRDQTA    34 P(5,0)  3
- SPLNBR    37 A      5
- PRDCAT    42 A      4
- PRDQTM    46 P(5,0)  3

F3=Exit  F5=Refresh  F10=Command line  F11=More info  F12=Cancel
F17=Top  F18=Bottom  F20=Work with dates
Bottom

```

Figure 71. Working with the Fields in a Given File

Press F11 (More info) in the Work with Fields display to see additional information for the current file. This displays column headings for the fields, as well as field text.

```

Work with Fields
File FILE01
Library IMP2K

Type choices, press Enter.
1=Select 4=Delete assignment
Position to . . ____0

Field Field Field Column heading:
Opt Name Displ Type 1st 2nd 3rd
- YMDP01 1 P(6,0) YMD6P
- YMDZ01 5 N(6,0) YMD6Z
- YMDA01 11 A YMD6A
- YYA01 17 A YEAR2A
- GEN 19 L FIELD1

F3=Exit F5=Refresh F10=Command line F11=More info F12=Cancel
F17=Top F18=Bottom F20=Work with dates
Bottom

```

Figure 72. Working with Dates — Additional Columns of Information

```

Work with Fields
File FILE01
Library IMP2K

Type choices, press Enter.
1=Select 4=Delete assignment
Position to . . ____0

Field Field Field
Opt Name Displ Type Text
- YMDP01 1 P(6,0)
- YMDZ01 5 N(6,0)
- YMDA01 11 A
- YYA01 17 A
- GEN 19 L

F3=Exit F5=Refresh F10=Command line F11=More info F12=Cancel
F17=Top F18=Bottom F20=Work with dates
Bottom

```

Figure 73. Working with Dates — Additional Columns of Information

## Access the Work with Fields Display

You can access the Work with Fields display in one of two ways:

- Select option 6 (Work with fields) next to a file in the Work with Files display to see the fields contained in that file.
- Press F20 (Work with fields) in the Work with Dates display to see the dates contained in the corresponding file.

---

## Information Provided in the Work with Fields Display

The Work with Fields display provides information about the fields in a selected file. See the following table for details.

*Table 16. Information Provided in the Work with Fields Display*

Heading	Description
Opt.	Option selected from those listed at the top of the display.
Field Name	Name of the field in the record format of the file.
Field Displ.	Position (in bytes) of the field, starting from the first byte of the record.
Field Type	Numeric type of the field.  Valid values are: <ul style="list-style-type: none"><li>• A - Alphanumeric</li><li>• N(x,y) - Zoned decimal, x digits, y decimal positions</li><li>• P(x,y) -Packed decimal, x digits, y decimal positions</li><li>• L - date data type</li><li>• Z - timestamp data type</li></ul>
Field Length	Length of the field in bytes.
Date Format	Date format, such as YYMD, YYDM, DMY, or MDYY. (See “Supported Date Formats” on page 4 for a complete list.)
Inf Pro	Indication whether a date has been added to the list by SEARCH2000, or by the user.
Exp	Flag indicating whether the date has been marked for expansion. Valid values are: <ul style="list-style-type: none"><li>• '0' - Expand the date</li><li>• '1' - Do not expand the date</li></ul>
Column Headings	Column headings used as labels for this field.
Field Text	User-supplied description of the field.

---

## Tasks Performed from the Work with Fields Display

From the Work with Fields display, you can perform the tasks that are listed in Table 17.

*Table 17. Tasks Performed from the Work with Fields Display*

Task	Option/Key	Detailed Instructions
Select a field	Option 1	
Delete the assignment of a field as a date	Option 4	See “Delete the Assignment of a Field as a Date” on page 46
Work with dates	F20	See “Chapter 15. Work with Dates” on page 91



# Chapter 17. Work with a Single Field

Use the Work with Field display to work with a single field.

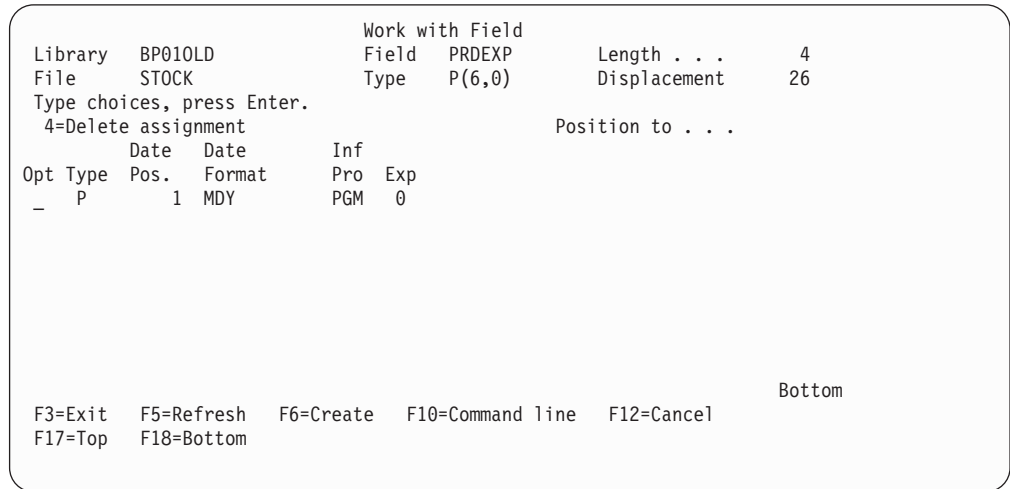


Figure 74. Working with a Single Field

## Access the Work with Field Display

Specify option 1 (Select) next to a field in the Work with Fields display to access the Work with Field display.

## Information Provided in the Work with Field Display

The Work with Field display provides information about a single field that is found in a given file. See Table 18 for details.

Table 18. Information Provided in the Work with Field Display

Heading	Description
File and Library.	Name of the file and library that contain the field.
Field	Name of the field you are working with in this display.
Type	Numeric type of the field.  Valid values are: <ul style="list-style-type: none"> <li>A - Alphanumeric</li> <li>N(x,y) - Zoned decimal, x digits, y decimal positions</li> <li>P(x,y) -Packed decimal, x digits, y decimal positions</li> <li>L - date data type</li> <li>Z - timestamp data type</li> </ul>
Length	Length of the field in bytes.
Displacement	Displacement from the beginning of the record.
Opt.	Option selected from those listed at the top of the display.

Table 18. Information Provided in the Work with Field Display (continued)

Heading	Description
Date Type	Numeric type of the date contained in the field. Valid values are: <ul style="list-style-type: none"> <li>• A - Alphanumeric</li> <li>• N - Zoned decimal</li> <li>• P - Packed decimal</li> </ul>
Date Pos.	Starting position of the date within the field.
Date Format	Date format, such as YYMD, YYDM, DMY, or MDYY. (See "Supported Date Formats" on page 4 for a complete list.)
Inf Pro	Indication whether a date has been added to the list by SEARCH2000 or by the user.
Exp	Flag indicating whether the date has been marked for expansion. <p>Valid values are:</p> <ul style="list-style-type: none"> <li>• '0' - Expand the date</li> <li>• '1' - Do not expand the date</li> </ul>

## Tasks Performed from the Work with Field Display

From the Work with Field display, you can perform the tasks that are listed in Table 19.

Table 19. Tasks Performed from the Work with Field Display

Task	Option/Key	Detailed Description
Delete the assignment of a field as a date	Option 4	See "Delete the Assignment of a Field as a Date" on page 46
Specify that the selected field contains a date	F6	See "Assign a Field as a Date Field" on page 48



# Chapter 18. Work with Programs

Use the Work with Programs display to get information about all the programs in an environment and work with individual programs.

```

Work with Programs

Type choices, press Enter.
1=Analyze 2=Assign date to program area 3=Propagate
5=Browse source 6=Display impacted LOC 7=Display dates found
Position to library
Position to program

Source Source Source Lines LOC --File Inf--
Opt Program File Library Member of Code P Impact Used Dates
CENDS3 QRPGRSRC BP100LD CENDS3 28 Y 3 1 2
CPY1CAL QCBLSRC TK2000TST1 CPY1CAL 33 Y
I00230 QCLSRC TK2000TST1 I00230 28 Y 5
I00232 QCBLSRC TK2000TST1 I00232 57 Y
RLIB QCLSRC TK2000TST2 RLIB 38 Y
RLIB1 QCLSRC TK2000TST2 RLIB1 23 Y
RPGCOPY QRPGRSRC BP100LD RPGCOPY 2 Y
SAIFOR QCBLSRC TK2000TST1 SAIFOR 41 Y
SANOTVAL QCBLSRC TK2000TST1 SANOTVAL 50 Y 1
SA00001 QCBLSRC TK2000TST1 SA00001 58 Y 1
SA69298 QRPGRSRC BP100LD SA69298 35 Y 6 2 7
SA69298A QRPGRSRC BP100LD SA69298A 36 Y 6 2 7
SA69714 QCBLSRC TK2000TST1 SA69714 37 Y 1 8
More...

F3=Exit F4=Prompt F5=Refresh F10=Command line F11=Toggle
F12=Cancel F17=Top F18=Bottom F20=Subset list F23=More options

```

Figure 75. Working with the Programs in the Currently Active SEARCH2000 Environment

Press F11 (More info) in the Work with Programs display to see additional information for the programs you are working with, as shown in the following display.

```

Work with Programs

Type choices, press Enter.
1=Analyze 2=Assign date to program area 3=Propagate
5=Browse source 6=Display impacted LOC 7=Display dates found
Position to library
Position to program

Library Attribute Size Text
Opt Program Library Attribute Size Text
CENDS3 TK2000TST1 RPG 65536
CPY1CAL TK2000TST1 CBL 32768
I00230 TK2000TST1 CLP 28672
I00232 TK2000TST1 CBL 40960
RLIB TK2000TST1 CLP 36864
RLIB1 TK2000TST1 CLP 28672
RPGCOPY TK2000TST1 RPG38 36864
SAIFOR TK2000TST1 CBL 32768
SANOTVAL TK2000TST1 CBL38 61440 Reserve word NOT, INVALID
SA00001 TK2000TST1 CBL 65536
SA69298 TK2000TST1 RPG 86016 Move
SA69298A TK2000TST1 RPG 86016 Move1
SA69714 TK2000TST1 CBL 61440
More...

F3=Exit F4=Prompt F5=Refresh F10=Command line F11=Toggle
F12=Cancel F17=Top F18=Bottom F20=Subset list F23=More options

```

Figure 76. Working with Programs — Additional Columns of Information

## Access the Work with Programs Display

You can access the Work with Programs display in one of the following ways:

- Specify option 13 (Work with Programs) next to the environment of your choice in the Work with Environments display.
- Select option 4 (Work with Programs) from the SEARCH2000 Main Menu, or type SR2000PGM on any AS/400 command line.

In the Specify Programs to Work With display, specify the name of the environment with which you want to work. You can also select a subset of libraries and objects. Press F4 to see a list of all existing environments.

Specify Programs to Work With

Type choices, press Enter.

Environment	. . . . . MYENV	Name, F4 for list
Library	. . . . . *ALL	Name, *generic*, *ALL
Program	. . . . . *ALL	Name, *generic*, *ALL
Analyzed	. . . . . *ALL	*YES, *NO, *ALL

F3=Exit   F5=Refresh   F12=Cancel

Figure 77. Selecting a SEARCH2000 Environment and a Subset of Programs

## Information Provided in the Work with Programs Display

The Work with Programs display that is shown in Table 20 provides information about your program objects.

Table 20. Information Provided in the Work with Programs Display

Heading	Description
Opt	Option selected from those listed at the top of the display.
Program	Names of the programs in the library.
Source File	Name of the source file for the program.
Source Library	Name of the library in which the source file for the program was located at compilation.
Source Member	Name of the source member for the program.
Lines of Code	Number of lines of code contained in the source member.  This information is only accurate if the source member is still located in the library and file indicated in the Source File and Source Library columns.

Table 20. Information Provided in the Work with Programs Display (continued)

Heading		Description
P (=Processed)		Flag indicating whether the file has been analyzed by SEARCH2000.  Valid values are: <ul style="list-style-type: none"> <li>• ' ' (blank) - Not analyzed</li> <li>• S - Submitted for analysis</li> <li>• W - Analysis in progress</li> <li>• Y - Analysis completed</li> </ul>
LOC impact		Number of lines of code impacted.
Number of Files	Used	Number of files referenced by the program.
	Dates	Number of date fields found by SEARCH2000 or added by the user.
Library		Name of the library that contains the program.
Attribute		Attribute or type of program.
Size		Size of the program object, in bytes.
Text		Description of the program.

## Tasks Performed from the Work with Programs Display

From the Work with Programs display, you can perform the tasks that are listed in Table 21.

Table 21. Tasks Performed from the Work with Programs Display

Task	Option/Key	Detailed Description
Analyze a program object in batch mode to retrieve information about referenced files containing date fields	Option 1	See "Analyze Programs Globally" on page 56
Analyze a program object interactively or in batch mode, and specify a job queue	Option 1 + F4	See "Analyze Programs Globally" on page 56
Assign dates to program-described areas and fields.	Option 2	See "Assign Dates to Program Areas and Fields" on page 58
Start propagation analysis	Option 3	See "Start the Propagation Analysis" on page 59
Remove a program from the list	Option 4	See "Remove a Program from the Environment" on page 63
Browse source member with Source Entry Utility (SEU)	Option 5	
Display impacted lines of code.	Option 6	See "Display Impacted Lines of Code" on page 60
Display impacted program areas and fields.	Option 7	See "Display Impacted Program Areas and Fields" on page 61
Display full object description	Option 8	See "Display Object Description" on page 62

Table 21. Tasks Performed from the Work with Programs Display (continued)

<b>Task</b>	<b>Option/Key</b>	<b>Detailed Description</b>
Display program information (at the module level, if available)	Option 9	See "Display Program Information" on page 62
Work with the files that are referenced by a program	Option 12	See "Work with Files that Are Referenced by a Program" on page 65
Work with messages issued during program analysis.	Option 13	See "Work with Message Log" on page 66
Work with a subset of the listed programs	F20	See "Chapter 18. Work with Programs" on page 101

## Chapter 19. Work with Referenced Files

Use the Work with Referenced Files display to work with information about the files that are referenced by a particular program.

```

Work with Referenced Files
Library BP010LD
Program CINS
Type choices, press Enter.
1=Analyze 5=Work with dates 6=Work with fields
Position to . . .
Rec. Records
Opt File Library Len. Available P Found File text File
Attr.
- CUS01L ABFINDTEST 0 0 Y 0 LF
- OHRD ABFINDTEST 0 0 0 DSPF
- ORDH01L ABFINDTEST 0 0 Y 0 LF

F3=Exit F4=Prompt F5=Refresh F10=Command line F12=Cancel Bottom
F17=Top F18=Bottom

```

Figure 78. Working with Database Files that Are Referenced by a Program

### Access the Work with Referenced Files Display

Select option 12 (Work with referenced files) next to a program in the Work with Programs display, and press Enter.

### Information Provided in the Work with Referenced Files Display

The Work with Referenced Files display provides information about all files that a particular program references. See Table 22 for details.

Table 22. Information Provided in the Work with Referenced Files Display

Heading	Description
Library	Name of the library that contains the program.
Program	Name of the program with which you are currently working.
Opt	Option selected from those listed at the top of the display.
File	Name of the referenced file.
Library	Name of the library that contains the referenced file.
Record Length	Length (in bytes) of the records in the file.
Records Available	Number of records currently in the file.

Table 22. Information Provided in the Work with Referenced Files Display (continued)

Heading	Description
P (=Processed)	Flag indicating whether the file has been previously analyzed by SEARCH2000.  Valid values are: <ul style="list-style-type: none"> <li>• ' ' (blank) - Not analyzed</li> <li>• S - Submitted for analysis</li> <li>• W - Analysis in progress</li> <li>• Y - Analysis completed</li> </ul>
Found	Specifies how many date fields are in the file. (This number includes dates found by SEARCH2000, as well as dates added by the user.)
File Text	Description of the referenced file.
File Attribute	File type(PF, LF, DSPF, PRTF)

## Tasks Performed from the Work with Referenced Files Display

From the Work with Referenced Files display, you can perform the tasks that are listed in Table 23.

Table 23. Tasks Performed from the Work with Referenced Files Display

Task	Option/Key	Detailed Description
Analyze a file using default parameters	Option 1 + Enter	See "Chapter 9. Analyze Database Files" on page 39
Analyze a file using customized parameters	Option 1 + F4	See "Override Default Parameters During Individual File Analysis" on page 37
Work with dates found by SEARCH2000	Option 5	See "Chapter 15. Work with Dates" on page 91
Work with fields in a selected file	Option 6	See "Chapter 16. Work with Fields" on page 95

## Chapter 20. Work with Copybooks

Use the Work with Copybooks display to get information about all the Copybooks in an environment, and to work with individual Copybooks.

```

Work with Copybooks

Type choices, press Enter.                Position to library _____
1=Analyze  2=Assign date to program area  Position to COPY . . _____
4=Delete   5=Browse source  6=Display impacted LOC  7=Display dates found

Source      Source      Source      Lines      LOC      --File Inf--
Opt  COPY    File      Library    Member     of Code P  Impact  Used  Dates
---  ---
---  CPYCONS  QCPYSRC  TK2000TST1  CPYCONS    15  Y
---  CPYCONT  QCPYSRC  TK2000TST1  CPYCONT    8  Y
---  CPY00209 QCPYSRC  TK2000TST1  CPY00209   3  Y
---  CPY00226 QCPYSRC  TK2000TST1  CPY00226   8  Y
---  CPY1     QCPYSRC  TK2000TST1  CPY1        7  Y
---  CPY70077 QCPYSRC  TK2000TST1  CPY70077   3  Y
---  CPY71330 QCPYSRC  TK2000TST1  CPY71330  16  Y
---  GEPH09PA QCPYSRC  TK2000TST1  GEPH09PA   19  Y
---  GEPH10PA QCPYSRC  TK2000TST1  GEPH10PA   16  Y
---  GEZA15BA QCPYSRC  TK2000TST1  GEZA15BA   20  Y
---  LIKE1    QCPYSRC  TK2000TST1  LIKE1       8  Y
---  MULT1    QCPYSRC  TK2000TST1  MULT1       7  Y
---  MULT2    QCPYSRC  TK2000TST1  MULT2       6  Y

More...

F3=Exit      F4=Prompt    F5=Refresh    F10=Command line  F11=Toggle
F12=Cancel   F17=Top      F18=Bottom    F20=Subset list   F23=More options
  
```

Figure 79. Working with the Copybooks in the Currently Active SEARCH2000 Environment

Press F11 (Toggle) in the Work with Copybooks display to see additional information for the Copybooks you are working with, as shown in the following display.

```

Work with Copybooks

Type choices, press Enter.                Position to library _____
1=Analyze  2=Assign date to program area  Position to COPY . . _____
4=Delete   5=Browse source  6=Display impacted LOC  7=Display dates found

Library  Attribute  Size  Text
Opt  COPY
---  ---
---  CPYCONS  TK2000TST1
---  CPYCONT  TK2000TST1
---  CPY00209 TK2000TST1
---  CPY00226 TK2000TST1
---  CPY1     TK2000TST1
---  CPY70077 TK2000TST1
---  CPY71330 TK2000TST1
---  GEPH09PA TK2000TST1
---  GEPH10PA TK2000TST1
---  GEZA15BA TK2000TST1
---  LIKE1    TK2000TST1
---  MULT1    TK2000TST1
---  MULT2    TK2000TST1

More...

F3=Exit      F4=Prompt    F5=Refresh    F10=Command line  F11=Toggle
F12=Cancel   F17=Top      F18=Bottom    F20=Subset list   F23=More options
  
```

Figure 80. Working with Copybooks — Additional Columns of Information

## Access the Work with Copybooks Display

You can access the Work with Copybooks display in one of the following ways:

- Specify option 14 (Work with COPYS) next to the environment of your choice in the Work with Environments display.
- Select option 5 (Work with Copybooks) from the SEARCH2000 Main Menu, or type SR2000CPY on any AS/400 command line.

In the Specify COPYs to Work With display, specify the name of the environment with which you want to work. You can also select a subset of libraries and COPYs. Press F4 to see a list of all existing environments.

Specify COPYs to Work With

Type choices, press Enter.

Environment . . . . .	MYENV	Name, F4 for list
Library . . . . .	*ALL	Name, *generic*, *ALL
COPY . . . . .	*ALL	Name, *generic*, *ALL
Analyzed . . . . .	*ALL	*YES, *NO, *ALL

F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel

Figure 81. Selecting a SEARCH2000 Environment and a Subset of Copybooks

## Information Provided in the Work with Copybooks Display

The Work with Copybooks display provides information about your Copybooks shown in Table 24

Table 24. Information Provided in the Work with Copybooks Display

Heading	Description
Opt	Option selected from those listed at the top of the display.
COPY	Names of the Copybooks in the library.
Source File	Name of the source file for the Copybook.
Source Library	Name of the library in which the source file for the Copybook was located at compilation.
Source Member	Name of the source member for the Copybook.
Lines of Code	Number of lines of code contained in the source member.  This information is only accurate if the source member is still located in the library and file indicated in the Source File and Source Library columns.



Table 24. Information Provided in the Work with Copybooks Display (continued)

Heading		Description
P (=Processed)		Flag indicating whether the file has been analyzed by SEARCH2000.  Valid values are: <ul style="list-style-type: none"> <li>• ' ' (blank) - Not analyzed</li> <li>• S - Submitted for analysis</li> <li>• W - Analysis in progress</li> <li>• Y - Analysis completed</li> </ul>
LOC impact		Number of lines of code impacted.
Number of Files		
File Inf	Used	Number of files referenced by the Copybook.
	Dates	Number of date fields found by SEARCH2000 or added by the user.
Library		Name of the library containing the Copybook
Attribute		Attribute or type of Copybook.
Size		Size of the Copybook, in bytes.
Text		Description of the Copybook.

## Tasks Performed from the Work with Copybooks Display

From the Work with Copybooks display, you can perform the tasks that are listed in Table 25.

Table 25. Tasks Performed from the Work with Programs Display

Task	Option/Key	Detailed Description
Analyze a Copybook in batch mode to retrieve information about date fields	Option 1	See "Analyze Programs Globally" on page 56
Analyze a Copybook interactively or in batch mode, and specify a job queue	Option 1 + F4	See "Analyze Programs Globally" on page 56
Assign a date to a program areas or fields.  SEARCH2000 uses this information during the propagation phase to determine the lines of code that include operations involving date-sensitive areas.	Option 2	See "Assign Dates to Program Areas and Fields" on page 58
Remove a COPY from the list	Option 4	See "Remove a COPY from the Environment" on page 64
Browse the source	Option 5	See "Work with Files that Are Referenced by a Program" on page 65

Table 25. Tasks Performed from the Work with Programs Display (continued)

<b>Task</b>	<b>Option/Key</b>	<b>Detailed Description</b>
Display impacted lines of code.	Option 6	See "Show Impacted Lines of Code in User Programs" on page 76
Display candidate dates found in program areas	Option 7	See "Show Date Fields in User Files and Libraries" on page 70
Work with messages issued during program analysis.	Option 13	See "Work with Message Log" on page 66
Work with a subset of the listed Copybooks	F20	See "Chapter 18. Work with Programs" on page 101

---

## Chapter 21. Work with Reports

Use the Reports Menu to generate four types of reports that provide information about the impact of date fields on your application.



```
QWRCQMNU                Reports Menu

Select one of the following:

  1. Date fields found in user files/libraries
  2. Impacted files in user libraries
  3. Impacted files referenced in user programs
  4. Impacted programs in user libraries
  5. Impacted lines of code in user programs
  6. Impacted program areas and fields

Selection or command

F3=Exit  F12=Cancel
```

*Figure 82. Selecting One of the Reports that SEARCH2000 Generates*

---

### Access the Reports Menu

You can access the Reports Menu in one of two ways:

- Select option 10 (Reports Menu) from the SEARCH2000 Main Menu.
- Type SR2000RPT on any AS/400 command line.

---

### Select Output for Reports

After selecting a report from the Report menu, you must specify where to send the output:

- Select \*PRINTER to send the report to a printer.
- Select \*DISPLAY to display the report on your screen.

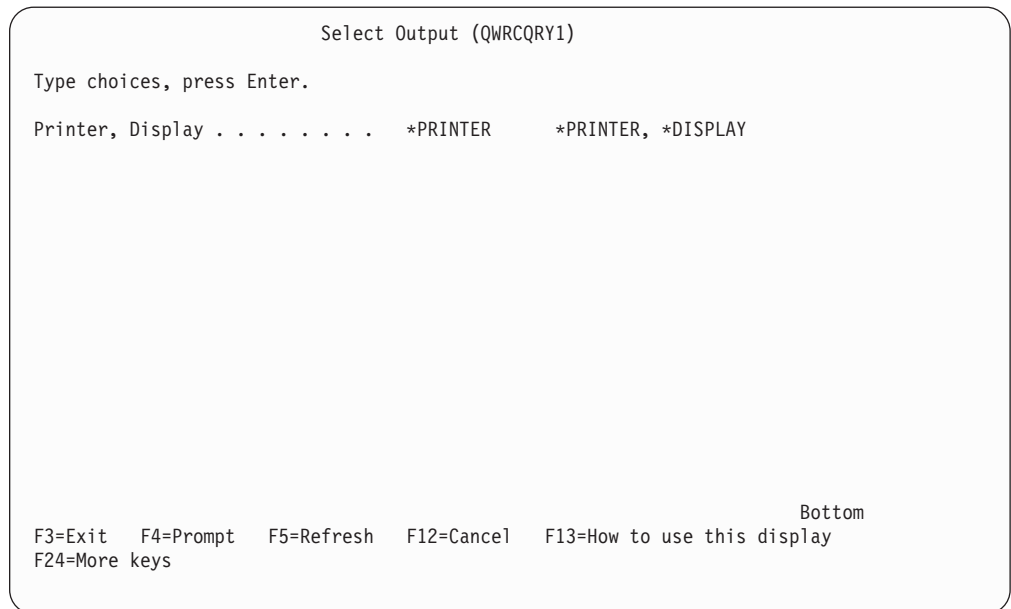


Figure 83. Directing a Report to a Printer or to the Screen

## Tasks Performed from the Report Menu

From the Report Menu, you can perform the tasks that are listed in Table 26.

Table 26. Tasks Performed from the Report Menu

Task	Option/Key	Detailed Description
Create a report showing all date fields in user files and libraries	Option 1	See "Show Date Fields in User Files and Libraries" on page 70
Create a report showing all user files that contain date fields	Option 2	See "Show Files that Contain Date Fields" on page 72
Create a report showing which files are referenced by user programs and contain dates	Option 3	See "Show Files that Are Referenced by Programs and Contain Dates" on page 73
Create a report showing user programs that are impacted by dates.	Option 4	See "Show Programs that Are Impacted by Dates" on page 74
Create a report showing lines of code in user programs that are impacted by dates.	Option 5	See "Show Impacted Lines of Code in User Programs" on page 76
Create a report showing program-described areas and fields in user programs that are impacted by dates.	Option 6	See "Show Impacted Program Areas and Fields" on page 78

---

## Appendix. Interfacing with BYPASS2000

Once you have analyzed all database files in an environment, you can instruct SEARCH2000 to generate a file HSDATDFI that the BYPASS2000 product can use to import date information.

BYPASS2000 needs to know whether any fields that were found during its memory analysis phase are date fields or not. For each date field, BYPASS2000 needs the following information:

- The date format for this field.
- Whether the field should be expanded during the conversion of the application to accommodate 4-digit year information.

This information is contained in the file HSDATDFI that SEARCH2000 generates. The successful use of this file by BYPASS2000 depends on your accuracy while working with dates. (See "Chapter 15. Work with Dates" on page 91 for details). The more time you spend validating the date fields in your database files, the more satisfactory your BYPASS2000 conversion results will be.

---

### Generate the File HSDATDFI

To create the file HSDATDFI, select option 18 (Generate BYPASS2000 interface) in the Work with Environments display and press Enter.

SEARCH2000 creates the file in the library QC2Kxxxxxx that corresponds to the currently active environment.

### Limitation with Packed Date Fields in Program-Described Files

If your application uses program-described files that contain dates in packed fields, SEARCH2000 recognizes and displays these dates, but does **not** currently add them to the file HSDATDFI.

You must assign these dates manually, during the BYPASS2000 field-assignment phase, as described in the BYPASS2000 User's Guide, SC09-2591-00.

---

### Import External Seeding into BYPASS2000

You can export the file HSDATDFI that SEARCH2000 generates and import it into the BYPASS2000 Conversion Repository:

1. Copy the file HSDATDFI, which contains the date information for field assignment (seeding), into the BYPASS2000 xxxxDB library.
2. Select option 11 (Import external seeding) of the BYPASS2000 Field Assignment menu.
3. Specify whether you want to run this job in batch mode or interactively.
4. Once the job has completed, check the conversion log to see if BYPASS2000 has encountered any errors while importing the seeding.
5. Review the imported date-field assignment.

---

## Modify Dates that Span Multiple Fields

SEARCH2000 can correctly identify dates that span multiple fields. However, it is not possible to consistently import such fields into BYPASS2000. If you have dates that span multiple fields:

1. Remove these dates from the list of dates, as described in “Remove Dates” on page 46 .
2. Create your own dates, identifying only the field that contains the Year portion of the date, as described in “Add Dates” on page 47.

You can ignore the fields that contain information about Month and Day, because BYPASS2000 only needs to know which fields contain Year information.

Consider the example of a date field YYMD that spans three fields. The first contains the two century digits, the second contains the two year digits, and the third contains month and day values.

- If SEARCH2000 has correctly identified the date, you must make the following modifications to export the date to BYPASS2000:
  1. Remove the date from the list of dates.
  2. Create a new date for the field that contains the year value.
  3. Inside of BYPASS2000, work with the Assign Date Fields to I/O Area Related to File display. Locate the field to the left of the Year field, and assign it as a century.
- If SEARCH2000 has incorrectly identified the date, and the first field does not actually contain a century value, do the following:
  1. Remove the date from the list of dates.
  2. Create a new date for the field that contains the year value.

If the first field contains century and year information, while the second and third fields contain the month and day values, do the following:

1. Remove the date from the list of dates.
2. Create a new date for the field that contains the value of the century and of the year, and specify YY as the date format for the field.

---

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