UNISYS

PUBLICATIONS UPDATE

System 80

OS/3
Report Program
Generator II (RPG II)
Programming
Reference Manual

UP-8044 Rev. 3-F

This Library Memo announces the release and availability of Update F to *System 80 OS/3 Report Program Generator II (RPG II) Programming Reference Manual,* UP-8044 Rev. 3.

This manual is a standard library item (SLI). It is part of the standard library provided automatically with the purchase of the product.

RPG II is a software component of Unisys Operating System/3 (OS/3). It provides an easy-to-use language for writing program applications. You can run RPG II interactively or use it with the card reader in a batch environment.

This manual summarizes the entries for each type of RPG II specification. It uses tables and alphabetical listings for quick access to information.

Changes to this guide for Release 12.0 include

- UNPKDS, a new parameter in the // PARAM job control statement that allows you to specify unpacked numeric fields in data structures
- FNAME8, a new parameter in the // PARAM job control statement that allows you to specify 8-character file names in your program
- SORTA, a new calculations operation that allows you to sort array elements in ascending or descending order
- /COPY, a new compiler directive that allows you to include RPG II source specifications from an external user-specified module at any point in your program

All other changes in this manual are corrections, deletions, or expanded descriptions applicable to items present in the software prior to this release.

Copies of Update F are now available. You can order the update only, or the complete manual with all updates, through your local Unisys representative. To receive only the update, order UP-8044 Rev. 3-F. To receive the complete manual, order UP-8044 Rev. 3.

LIBRARY MEMO ONLY	LIBRARY MEMO AND ATTACHMENTS	THIS SHEET IS
Mailing Lists MBZ, MCZ, and MMZ,	Mailing Lists MB00, MB01, MBW, M28U, and M29U (30 pages plus Memo)	Library Memo for UP-8044 Rev. 3-F
		RELEASE DATE: October 1988

Horst.

SPERRY

PUBLICATIONS UPDATE

Operating System/3 (OS/3)

Report Program Generator II (RPG II) Programmer Reference

UP-8044 Rev. 3-D

This Library Memo announces the release and availability of Update D to "SPERRY® Operating System/3 (OS/3) Report Program Generator II (RPG II) Programmer Reference", UP-8044 Rev. 3.

This manual is one of a series describing the SPERRY Report Program Generator II. Other manuals that describe RPG II are:

- Report Program Generator II (RPG II) User Guide, UP-8067
- Report Program Generator II (RPG II) Summary, UP-8253
- Report Program Generator II (RPG II) Editor User Guide/Programmer Reference, UP-9981
- Information Management System (IMS) Action Programming in RPG II User Guide, UP-9206

RPG II is a programming language used in business data processing applications. You code programs on preprinted forms and enter these statements at a workstation. The type and number of forms you use depends on the application.

This manual summarizes the entries for each type of RPG II specification. It uses tables and alphabetical listings for quick access to information.

This update for release 10.0 provides instructions on using the figurative constants *BLANK, *BLANKS, *ZERO, and *ZEROS in the calculations specifications.

Copies of Update D are now available. You can order the update only or the complete manual with the update through your local Sperry representative. To receive only the update, order UP-8044-D. To receive the complete manual, order UP-8044 Rev. 3.

LIBRARY MEMO ONLY	LIBRARY MEMO AND ATTACHMENTS	THIS SHEET IS
Mailing Lists BZ, CZ, and MZ	Mailing Lists A00, A10, B00, B10, MBW, 18, 18U, 19, 19U, 20, 20U, 21, 21U, 28U, 29U, 75, 75U, 76, and 76U (Package D to UP-8044 Rev. 3, 29 pages plus Memo)	Library Memo for UP-8044 Rev. 3-D RELEASE DATE: May 1986

Horst.

SPERRY

PUBLICATIONS UPDATE

Operating System/3 (OS/3)

Report Program Generator II (RPG II)

Programmer Reference

UP-8044 Rev. 3-C

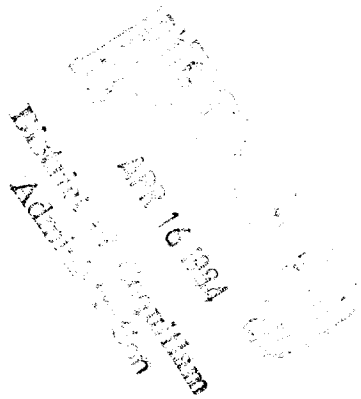
This Library Memo announces the release and availability of Updating Package C to "SPERRY Operating System/3 (OS/3) Report Program Generator II (RPG II) Programmer Reference", UP-8044 Rev. 3.

This update incorporates additional information about RPG II for release 8.2:

- Field location description
- Keyword parameter PROGID
- Change and expansion of diagnostic messages

All other changes are corrections or expanded descriptions applicable to RPG II prior to the 8.2 release.

Copies of Updating Package C are now available for requisitioning. Either the updating package only or the complete manual with the updating package may be requisitioned by your local Sperry representative. To receive only the updating package, order UP-8044 Rev. 3-C. To receive the complete manual, order UP-8044 Rev. 3.



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Mailing Lists BZ, CZ and MZ	Mailing Lists A00, A10, B00, B10, 18, 18U, 19, 19U, 20, 20U, 21, 21U, 28U, 29U, 75, 75U, 76 and 76U (Package C to UP-8044 Rev. 3, 23 pages plus Memo)	Library Memo for UP-8044 Rev. 3-C
		RELEASE DATE: February, 1984

SPERRY UNIVAC

PUBLICATIONS UPDATE

Operating System/3 (OS/3)

Report Program Generator II (RPG II)

Programmer Reference

UP-8044 Rev. 3-B

This Library Memo announces the release and availability of Updating Package B to "SPERRY Operating System/3 (OS/3) Report Program Generator II (RPG II) Programmer Reference", UP-8044 Rev. 3.

This update includes:

- a correction of the number of continuation lines permitted for each file (five);
- an expanded explanation of the AR068 diagnostic message; and
- data structures that begin on a double-word boundary in main storage.

All other changes are connections or expanded descriptions.

Copies of Updating Package B are now available for requisitioning. Either the updating package only or the complete manual with the updating package may be requisitioned by your local Sperry representative. To receive only the updating package, order UP-8044 Rev. 3-B. To receive the complete manual, order UP-8044 Rev. 3.

LIBRARY MEMO ONLY	LIBRARY MEMO AND ATTACHMENTS	THIS SHEET IS
Mailing Lists BZ, CZ and MZ	Mailing Lists A00, A10, B00, B10, 18, 18U, 19, 19U, 20, 20U, 21, 21U, 28U, 29U, 75, 75U, 76 and 76U (Package B to UP-8044 Rev. 3, 9 pages plus Memo)	Library Memo for UP-8044 Rev. 3-B
		RELEASE DATE: May, 1983

SPERRY UNIVAC COMPUTER SYSTEMS

Horst.

PUBLICATIONS UPDATE

Operating System/3 (OS/3)

Report Program Generator II (RPG II)

Programmer Reference

UP-8044 Rev. 3-A

This Library Memo announces the release and availability of Updating Package A to "SPERRY UNIVAC Operating System/3 (OS/3) Report Program Generator II (RPG II) Programmer Reference", UP-8044 Rev. 3.

This update incorporates additional information about RPG II for release 8.0:

- Using RPG II interactively
- /SPACE n directive
- Error messages
- Defining a PAGE field
- SETK operation
- RCB continuation line for MIRAM files
- File retrieval
- Adding/deleting records
- MIRAM parameter

All other changes are corrections or expanded descriptions applicable to features present in RPG II prior to the 8.0 release.

Copies of Updating Package A are now available for requisitioning. Either the updating package only or the complete manual with the updating package may be requisitioned by your local Sperry Univac representative. To receive only the updating package, order UP-8044 Rev. 3–A. To receive the complete manual, order UP-8044 Rev. 3.

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		RELEASE DATE: February, 1983

SPERRY UNIVAC
COMPUTER SYSTEMS

PUBLICATIONS REVISION

Operating System/3 (OS/3)

Report Program Generator II (RPG II)

Programmer Reference

UP-8044 Rev. 3

This Library Memo announces the release and availability of "SPERRY UNIVAC® Operating System/3 (OS/3) Report Program Generator II (RPG II) Programmer Reference", UP-8044 Rev. 3.

This revision describes the following RPG II features for release 8.0:

- ERRFIL parameter
- CONSOLE parameter
- AUTO, AUTRPG, AUTRPGL, and AUTRPGLG jprocs
- SHTDN, SETK, and NEXT operations
- /EJECT, /SPACE, and /TITLE directives
- Function Key indicators
- Error file processing
- MIRAM multikey support
- Interactive data entry
- Currency sign other than dollar sign
- Error log access
- Data structures
- Multiple workstation support
- Workstation file continuation statements

Destruction Notice: If you are going to OS/3 release 8.0, use this revision and destroy all previous copies. If you are not going to OS/3 release 8.0, retain the copy you are now using and store this revision for future use.

Copies of UP-8044 Rev. 2 and UP-8044 Rev. 2-A will be available for 6 months after the release of 8.0. Should you need additional copies of this edition, you should order them within 90 days of the release of 8.0. When ordering the previous edition of a manual, be sure to identify the exact revision and update packages desired and indicate that they are needed to support an earlier release.

Additional copies may be ordered by your local Sperry Univac representative.

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Mailing Lists BZ, CZ and MZ	Mailing Lists A00, A10, B00, B10, 18, 18U, 19, 19U, 20, 20U, 21, 21U, 28U, 29U, 75, 75U, 76, and 76U (Cover and 252 pages)	Library Memo for UP-8044 Rev. 3
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UNISYS

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All the technical changes are denoted by an arrow (⟹) in the margin. A downward pointing arrow (⇓) next to a line indicates that technical changes begin at this line and continue until an upward pointing arrow (⇑) is found. A horizontal arrow (⟹) pointing to a line indicates a technical change in only that line. A horizontal arrow located between two consecutive lines indicates technical changes in both lines or deletions.

Preface

This programmer reference manual is one in a series designed to be used as a quick-reference document for programmers familiar with the SPERRY UNIVAC Operating System/3 (OS/3). This particular manual describes RPG II specifications forms, indicators, and automatic services for printed reports.

The information presented here is limited to facts; no introductory information or examples of use are provided. This type of information is presented in two other RPG II manuals: An introduction to RPG II, UP-8004 (current version); and the RPG II user guide, UP-8067 (current version). Information on writing RPG II action programs is contained in information management system (IMS) action programming in RPG II user guide, UP-9206 (current version).

The information contained in this manual is presented as follows:

- Section 1. General Information

  Provides an overview of RPG II programming concepts and shows the job control stream considerations that you must observe when you use RPG II.

- Section 2. RPG II Specifications Forms

  Describes each of the RPG II specifications forms and the entries for the individual fields on these forms. The forms are presented in the order that you would use them when you write your RPG II program.

- Section 3. RPG II Indicators

  Describes where the indicators are defined, how they are used, and when they are set on and off.

- Section 4. Edit Codes, Edit Words, and Special Field Names

  Describes the edit codes, edit words, and special field names that provide automatic editing, page numbering, dating, and duplication of fields on printed reports.

- Section 5. Alternate Collating Sequence and File Translation

  Describes how you specify an alternate collating sequence and file translation for your RPG II program.

- Section 6. RPG II PF Key Subroutine - SUBR89 and Unsolicited Inquiry Request Subroutine - SUBR95

  Describes how to include these subroutines in your program.

- Section 7. RPG II - IMS Action Programs

  Describes how to write an IMS action program in RPG II.

- Section 8. Executing RPG II

  Lists and describes the keyword parameters that may be specified with procedure call statements and the PARAM statement to generate a control stream.

- Section 9. Auto Report

  Describes how to use auto report to produce formatted printed reports.

- Appendix A. RPG II Compilation Time Messages

  Contains additional information pertaining to RPG II.

- Appendix B. Auto Report Error Messages

  Contains additional information pertaining to auto report.

Contents

4. EDIT CODES, EDIT WORDS, AND SPECIAL FIELD NAMES

5. ALTERNATE COLLATING SEQUENCE AND FILE TRANSLATION

6. RPG II PF KEY SUBROUTINE - SUBR89 AND UNSOLICITED INQUIRY REQUEST SUBROUTINE - SUBR95

7. RPG II - IMS ACTION PROGRAMS

8. EXECUTING RPG II

9. AUTO REPORT

APPENDIXES

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1. General Information

RPG II OVERVIEW

RPG II is a source language that allows you to write your programs by making entries in specified positions on preprinted forms or on a workstation. These entries are then used as the source language statements for the RPG II compiler.

You control program execution by using 2-character indicators that work with the RPG II program processing logic. You define these indicators (specify what conditions set them on) by placing them in the appropriate fields on the RPG II specifications forms, or you define them externally. Once defined, you use the indicators to specify the program step or steps that are to be executed when they are set on.

In addition, you can automatically edit numeric fields, number and date each page, and duplicate fields on any printed report that your program produces. You can edit a numeric field by specifying one of the series of 1-character edit codes that perform predefined editing functions, or you can specify your own edit word that edits the field according to your special requirements. If you want automatic page numbering, dating, or field duplication on your report, you specify a special field name in your program that provides the service.

JOB CONTROL STREAM CONSIDERATIONS

Figure 1-1 shows the input sequence of job control statements, RPG II source statement specifications, and source input data.

WORKSTATION CONSIDERATIONS

The following example illustrates an interactive session at the workstation to create, compile, correct, and execute an RPG II program:

```
 1. LOGON MAB
 2. EDT @RPG
       .
       .        Enter RPG II source program.
       .
 3. @WRITE MO=SFIL,FIL=FIL1,VSN=PUBDSK,SIZE=2,SAT=Y
 4. @RPG END
 5. @DELETE
 6. // JOB JCLFIL
    // SFIL RPG IN=(PUBDSK,FIL1)
       ,ERRFIL=(PUBDSK,PROG1,MERRFIL)
    /&
 7. @WRITE MO=JCLFIL,FIL=FIL2,VSN=PUBDSK,SIZE=2,SAT=Y
 8. @HALT
 9. AL MI,FIL=PROG1,VSN=PUBDSK,SIZE=2
10. RV JCLFIL:(FIL2,PUBDSK)
11. EDT @EFP
       MERRFIL,PROG1,PUBDSK        Enter module name, file name (lblname),
    .                              and volume serial number of the error file.
    .          The screen displays
    .          the number of errors in your program.
12. @EFP
    .          Correct RPG II source program using EDT commands.
    .
    .
```

```
13. @WRITE MO=SFIL,FIL=FIL1,VSN=PUBDSK
14. @EFP END
15. @DELETE
16. .
    .          Enter data.
    .
17. @WRITE FIL=MFIL,VSN=PUBDSK,SIZE=2,RCSZ=80
18. @DELETE
19. // JOB BAB
    // DVC 20
    // LFD LIST
    // DVC 50
    // VOL PUBDSK
    // LBL MFIL
    // LFD INDATA
    // SFIL RPGLG IN=(PUBDSK,FIL1)
    /&
20. @WRITE MO=BAB,FIL=FIL3,VSN=PUBDSK,SIZE=2,SAT=Y
21. @HALT
22. RV BAB:(FIL3,PUBDSK)
23. LOGOFF
```

Explanation:

1. The LOGON command, plus the identification, connects the workstation to the operating system.
2. Activates the general editor (EDT) and the RPG II editor
3. Stores the RPG II program in a file
4. Terminates the RPG II editor
5. Deletes all lines in the EDT work space so no statements carry over into the next session
6. Job control stream that compiles the program and creates an error file
7. Stores the job control stream in a file
8. Terminates the general editor
9. Allocates the error file used by the error file processor
10. Compiles the program
11. Activates the general editor and the error file processor so you can correct compilation errors. A screen prompts you to enter the module name, file name, and volume serial number of the error file.
12. Displays the error and the statement so you can correct the errors using EDT
13. Stores the corrected program back to its original file

14. Terminates the error file processor
15. Deletes all lines in the EDT work space
16. Data for the RPG II program
17. Stores the data in a MIRAM file
18. Deletes all lines in the EDT work space
19. Job control stream that executes the program
20. Stores the job control stream in a file
21. Terminates the general editor
22. Executes the program
23. Disconnects the workstation from the operating system

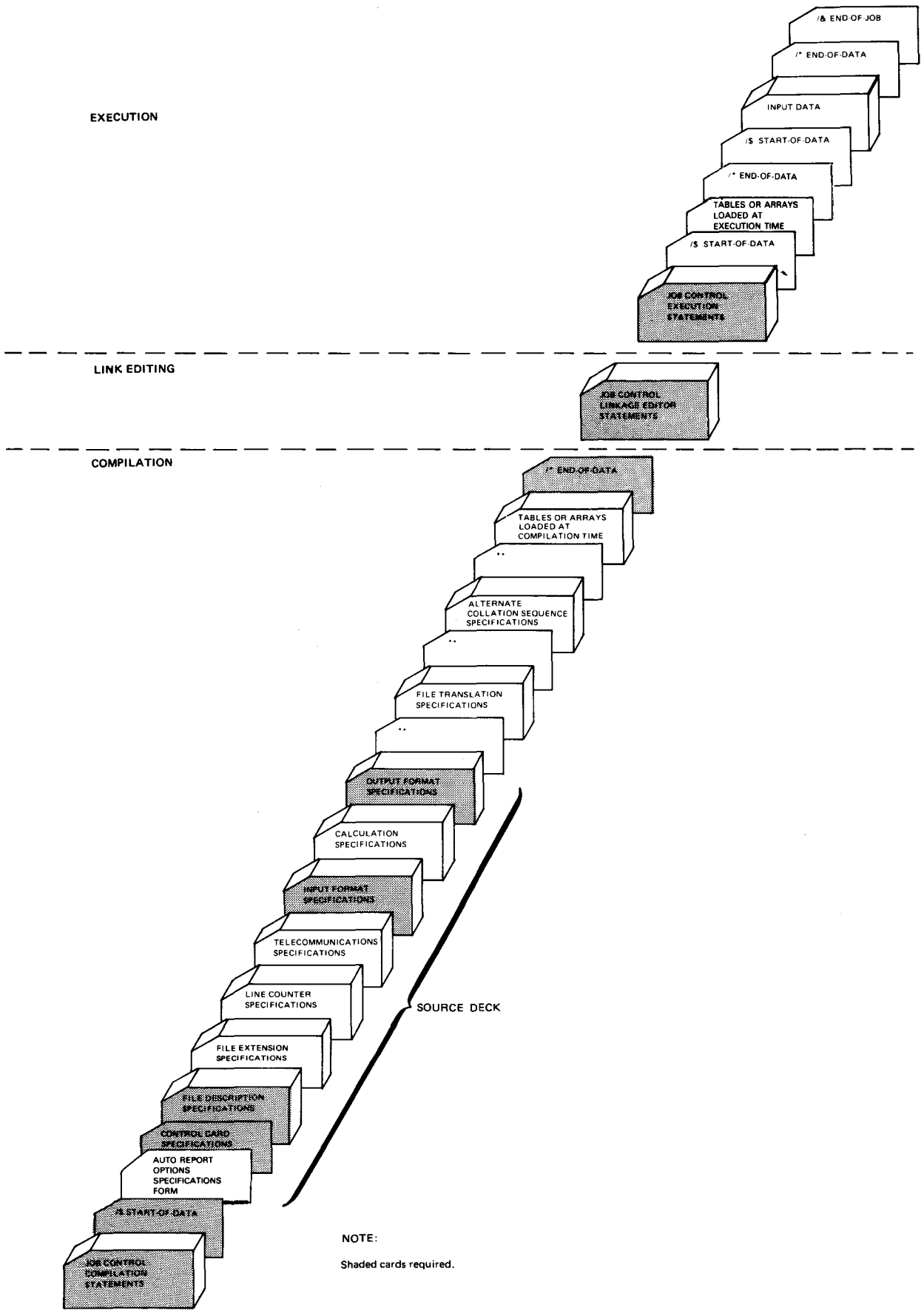


Figure 1—1. Deck Arrangement for Compiling, Link Editing, and Executing

2. RPG II Specifications Forms

COMMON FIELDS

The RPG II specifications forms contain common fields that appear in the same columns on each form. These common fields are:

- Page No. (Columns 1 and 2)

  Used to number the specifications forms. The specifications forms should be numbered in ascending order from 01 through 99. An entry in this field is optional and has no effect on the operation of the RPG II compiler.

- Line No. (Columns 3 through 5)

  Used to number the individual lines on a specifications form. Columns 3 and 4 are preprinted. Column 5 should contain a zero; that is, the lines on the specifications forms should be numbered 010, 020, 030, and so on. By numbering the lines in this manner you can insert up to nine lines between any two previously written lines. Line insertion is indicated by numbering the lines to be inserted so that their line numbers are in ascending sequence within the preceding and succeeding lines.

- Form Type (Column 6)

  Preprinted on all RPG II specifications forms. The form type consists of a letter that identifies the type of specification. This information must be punched on all source program cards. The form type identifiers are:

  H
  Control Card Specifications

  F
  File Description Specifications

  I
  Input Format Specifications

  C
  Calculation Specifications

  O
  Output Format Specifications

  E
  File Extension Specifications

  L
  Line Counter Specifications

  T
  Telecommunications Specifications

  U
  Auto Report Options Specifications

COMMON FIELDS

- Compiler Directives (Columns 7 through 74)

  Three directives control the source listing produced by the compiler:

  - /EJECT
  - /SPACEn
  - /TITLE

  They can be placed anywhere in the RPG II program.

  1. /EJECT (Columns 7 through 12)

     This directive prints all specifications after this entry on a new page. The /EJECT directive itself is not printed in the compilation listing.

  2. /SPACE n (Columns 7 through 14)

     The /SPACEn directive causes blank lines to appear immediately following the directive on the compilation listing. This spacing occurs only at the point where the /SPACEn directive appears. The n indicates the number of lines to be spaced and can be from 1 to 3. A blank is required in column 13 and an n is required in column 14. If n is greater than the number of lines remaining on the current page, then the next RPG II specification is printed on the next page. The default is a single blank line. The /SPACEn directive itself is not printed on the compilation listing.

  3. /TITLE (Columns 7 through 74)

     The /TITLE directive specifies the heading information that is printed at the top of each page of the compilation listing. Compiler heading information is printed before the /TITLE heading information on the first page. Enter the /TITLE heading information in columns 14 through 74. A blank is required in column 13. /TITLE ejects to the top of the next page before printing the title information. If a title is specified on the first page, /TITLE must be the first program statement. You can use more than one /TITLE directive in a program. The heading information stays in effect until a new /TITLE directive is used. The /TITLE directive itself is not printed on the compilation listing.

  4. /COPY (columns 7 through 74)

     The /COPY directive allows the inclusion of RPGII source specifications from an external specified module at any point in the program. The format for this directive is:

     ```
     /COPY LFD file-name,module-name
     ```

     The file-name must be the name of a SAT library file and the module specified must contain RPG II specifications in the required order.

     If you include the /COPY directive in a program, a 4-digit increment is added to the line number where the /COPY directive appears in the source listing and also to the line numbers of RPG II source specifications that were included by the /COPY directive.

- Comments (Columns 7 through 74)

  Can be inserted at any point by placing an asterisk (*) in column 7 and entering the comment text in columns 8 through 74. The asterisk indicates that the associated text is a comment rather than a specification statement.

  When the program is compiled, comment lines are not included in the object program. However, the comment lines are printed on the source program listing.

- Program Identification (Columns 75 through 80)

  Used on all specifications forms except the control card specifications form as an identifier for a specific section of your program. An entry in these columns is treated as a comment and is printed opposite the associated specification line on the source program listing.

  On the control card specifications form, these columns may be used to provide a unique name for your program. If an entry is made, it is the name assigned to the object program. If no entry is made, RPG II assigns RPGOBJ as the object program name.

  The entry in columns 75 through 80 may consist of any combination of alphanumeric characters.

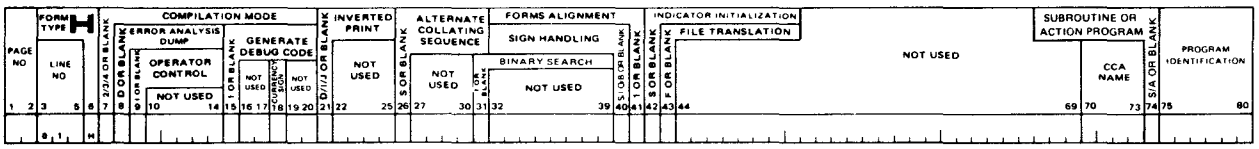
CONTROL CARD SPECIFICATIONS

Function:

This form is required. It specifies the compilation mode and supplies other control information.

Format:

CONTROL CARD SPECIFICATIONS



Entries:

- Compilation Mode (Column 7)

  Specifies the compilation mode.

  Blank

  OS/3 RPG II mode. This is the normal compilation mode that should be used for all new programs. Also, leave this field blank for IBM 360 or 370 systems.

  2

  IBM 360/20 mode; permits compilation of IBM 360/20 RPG source programs.

  3

  SPERRY UNIVAC 9200/9300 mode; permits compilation 9200/9300 RPG source programs.

  4

  IBM System/3 - System/34 mode; permits compilation of IBM System/3 source programs.

- Error Analysis Dump (Column 8)

  Specifies the printing of a formatted error analysis dump of main storage when errors occur during program execution.

  Blank

  Do not print a formatted error analysis when an error occurs during program execution. If this field is blank, an unformatted cancel is printed when a //△OPTION△DUMP statement is included in the job control stream for the program execution job step.

  D

  Print a formatted error analysis dump when an error occurs during program execution. The error analysis dump uses the file PRNTR; therefore, include a // LFD PRNTR statement in the job stream used to execute your program.

  The following rules apply:

  1. This field must be blank if 1 is specified in column 9.

  2. This field is ignored for information management system (IMS) action programs.

CONTROL CARD SPECIFICATIONS

- Operator Control (Column 9)

  Used to control program termination when a halt indicator is set on during program execution. A halt indicator can be one that you specified in your program (H1-H9) or it can be the H0 indicator, which is set on as a result of an error condition.

  Blank
  Operator control is not wanted.

  1
  Operator control is wanted.

  If a halt indicator (H0 through H9) specified in your program is set on, the following message is displayed on the system console:

  RPG028 USER SET HALT INDICATORS ARE: Hn,Hn,...,Hn

  If the H0 indicator is set on as a result of an error condition, the following message is displayed on the system console:

  RPGnnn explanatory text (execution time error message for particular error)

  In both instances, the message is followed by the operator control message which requires a typed message in reply.

  RPG031 RPGII OPERATOR CONTROL, TYPE IN AVAILABLE OPTION (0, 1, 2, 3)

  The operator should then type in the appropriate option:

  0 = continue

  1 = bypass

  2 = controlled termination

  3 = program terminates immediately

  The following rules apply:

  1. Only option 0, 2, or 3 should be used in reply to the RPG028 message. The operator control options that can be used with the individual execution time error messages are shown in the system messages programmer/operator reference, UP-8076 (current version).

  2. This field must be blank if D is specified in column 8.

  3. This field is ignored for IMS action programs.

  The // SET COMREG statement may be used to override the operator control request specified at compilation time.

This format sets the operator control feature on.

```
1         10    16
// SET COMREG,C'RPGOP'
```

This format sets the operator control feature off.

```
// SET COMREG,C'RPGNOP'
```

This format sets the operator control feature on and automatically selects default processing. Error messages requiring no continue action are displayed. All other messages automatically default to the continue action and are not displayed. For those messages that are displayed, the messages are paired as stated previously, depending on how the halt indicators were set.

```
// SET COMREG,'RPGAUTOP'
```

- Generate Debug Code (Column 15)

Specifies whether an output record is printed when the DEBUG operation is used.

Blank
Do not print output record.

1
Print output record.

- Currency Sign (Column 18)

Specifies a currency sign other than the dollar sign ($) in edit words.

Blank
Use the dollar sign ($) as the currency symbol.

Character
Use a different symbol as the currency sign. Enter any character except:

- 0
- *
- ,
- &
- .
- -
- C
- R

These characters have a special meaning when used in edit codes and words. They can be used as fixed or floating currency symbols when output data is edited.

CONTROL CARD SPECIFICATIONS

- Inverted Print (Column 21)

  Specifies system date format and use of commas and decimal points in numeric literals and edit codes.

  Blank
  System date format is mm/dd/yy (mm=month, dd=day, and yy=year). Commas and decimal points punctuate numeric fields in the normal manner.

  D
  System date format is dd/mm/yy. Commas and decimal points punctuate fields in the normal manner.

  I
  System date format is dd.mm.yy. The use of the commas and decimal points is reversed with this format; that is, the comma is used as a decimal point and the decimal point as a comma.

  J
  This is the same as I except that all zero balances or balances with a zero to the left of the decimal comma are printed with one leading zero. For example, 0,00 or 0,79.

- Alternate Collating Sequence (Column 26)

  Specifies whether a collating sequence other than the normal EBCDIC collating sequence is used.

  Blank
  Use normal EBCDIC collating sequence.

  S
  Use alternate collating sequence supplied at compilation time by means of ALTSEQ records.

- Binary Search (Column 31)

  Specifies a binary search on sequenced tables and arrays for LOKUP operations.

  Blank
  Use a sequential search for LOKUP operations.

  1
  Use a binary search.

  All rules for LOKUP operations apply. In addition, sequenced tables and arrays must remain sequenced during program execution and at least two elements must be searched. For a subscripted array, the subscript must be at least one less than the array size.

- Sign Handling (Column 40)

  Specifies sign handling when data is moved to or from numeric fields.

CONTROL CARD SPECIFICATIONS

S or Blank

The sign of the data that is read from an input field or written in an output field is checked to see whether it is a positive or negative sign. For both input and output, a hexadecimal D is the negative sign. If a hexadecimal 6 is used to indicate a negative sign in an input field, it is automatically changed to a hexadecimal D when the data is read from the field. The positive sign for input is a hexadecimal C and for output is a hexadecimal F. If the signs are not present, RPG II inserts them when this field contains an S or blank. You must ensure that signs of packed numeric input fields (P in column 43 of input format specifications form) are valid.

B

Do not check signs for either input or output fields. No program check island code is generated.

I

Do not check input field signs. No program check island code is generated.

O

Do not check field signs.

CONTROL CARD SPECIFICATIONS

- Forms Alignment (Column 41)

  Allows you to specify first page forms alignment for your program.

  Blank
  Do not use first page forms alignment.

  1
  Use first page forms alignment. The first detail line that is conditioned by the 1P (first page) indicator for the printer file is printed. A message that asks the operator to reply if the form is aligned is then displayed on the system console. If the form is aligned, the operator types in Y on the system console, and program processing is resumed. If the form is not aligned, the operator can adjust the form and then type in N to have the line printed again.

  The following rule applies:

  The field is ignored for IMS action programs.

- Indicator Initialization (Column 42)

  Specifies that the 1P (first page) indicator or the zero or blank indicators specified on the input format specifications form and calculation specifications form are to be set on at the beginning of program execution.

  Blank
  Set on 1P (first page) at the beginning of program execution.

  S
  The zero or blank indicators specified on the input format specifications form and the calculation specifications form are set on at the beginning of program execution. In addition, when the output format specifications form specifies that a field is to be blanked after it is placed in the output record, the first zero or blank indicator that is specified for this field will be set on after the field is placed in the output record.

- File Translation (Column 43)

  Specifies that all data in specified input and/or output files is translated in accordance with the translation table that you supplied at compilation time.

  Blank
  No file translation.

  F
  Translate specified input and/or output files.

- CCA Name (Columns 70 through 73)

  Specifies the name of the ICAM communications control area (CCA) when telecommunications are used in your program.

CONTROL CARD SPECIFICATIONS

- Subroutine or Action Program (Column 74)

  Specifies whether the program is to be compiled as a subroutine, a main program, or an IMS action program.

  Blank
  The program is compiled as a main program.

  A
  The program is compiled as an IMS action program.

  S
  The program is compiled as a subroutine.

- Program Identification (Columns 75 through 80)

  Specifies a unique name for your program; the name specified is assigned to the object program.

  Blank
  RPG II assigns the name RPGOBJ to the object program.

  program name
  The name of your program. This name may be any combination of alphanumeric characters.

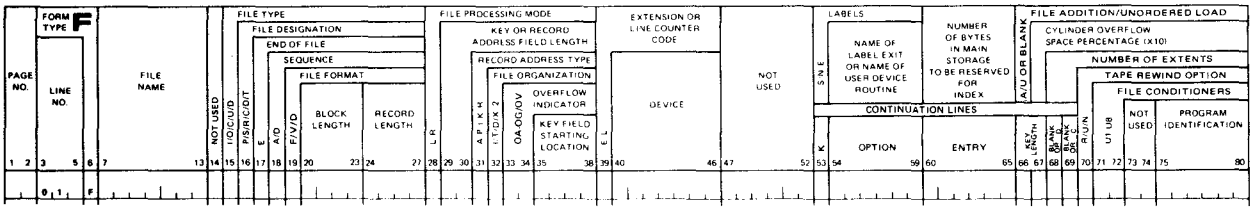
FILE DESCRIPTION SPECIFICATIONS

Function:

This form is required. It defines every file associated with the program. Each file must be defined on a separate line.

Format:

FILE DESCRIPTION SPECIFICATIONS



Entries:

- File Name (Columns 7 through 13)

  Specifies a unique name.

  f i l e n a m e
  The name of the file being defined.

  The following rules apply:

  1. The file name must be left-justified within the field.

  2. The first character in the file name must be an alphabetic character, A through Z, or the special characters $, #, @, /, %, +, or &. $ must not be the first character in a console output file name. The remaining characters may be alphabetic, A through Z; numeric, 0 through 9; or the special characters $, #, @, /, %, +, or &. Other special characters and the space character are not permitted.

  3. The file name for a table file or array file that is loaded at compilation time must not be entered in this field. These files are identified only on the file extension specifications form.

  4. The file name for a table or array file that is loaded at execution time must be entered in this field and also on the file extension specifications form.

  5. The file name may consist of from one to seven alphanumeric characters. For IBM System/3, IBM 360/20, or Unisys 9200/9300, or if FNAME=8 is specified, the file name may be eight characters.

FILE DESCRIPTION SPECIFICATIONS

- File Type (Column 15)

Specifies the type of file. An entry must be made for each file.

C

Combined file. A combined file is a file used for both input and output. A combined file can be only a communications file, a diskette, a workstation terminal, or a file that resides on a card unit that contains the read/punch feature. This specification may not be used for IMS action programs.

D

Display file. A display file is a file that contains data for display on the system console. The system operator may modify the data that has been displayed by making a reply. This specification may not be used for IMS action programs.

I

Input file. An input file is a file containing data records, a record address file, an array file, a table file, or a tag file (a file created by using the ADDROUT option of sort/merge).

O

Output file. An output file is any data, table, or array file that is written, punched, or printed during program execution.

U

Update file. An update file is a disk file in which the data records may be read, updated, and written back onto the file in the locations from which they were read. The updating process must not alter the record characteristics in any way; that is, the field length, record length, and field location must remain the same.

The following rules apply:

1. Every program must have at least one input, combined, or update file and an output file (output, update, or combined).

2. Files of different types can be listed in any order.

3. The maximum number of files that may be used in one program is 20; however, certain restrictions (Table 2-1) apply as to the number of files that may perform certain functions.

FILE DESCRIPTION SPECIFICATIONS

Table 2—1. File Use

File Type (Column 15)	File Designation (Column 16)	File Use	Maximum Number of Files Allowed
I (input) or C (combined) or U (update)	P	Primary file	1
	S	Secondary file with matching fields	8
	S	Secondary file without matching fields	18
	D	Demand file	18
I (input)	R	Record address or tag file	1
I (input) or U (update)	C	Chained file using input chaining (C1-C9)	9
I (input) or U (update) or O (output)	C	Chained file using CHAIN operation	18
I (input) or C (combined)	T	Table or array file	18
D (display)	Blank	Console input/output file	1
O (output)	Blank	Report files	8
	Blank	Other output files	18

- File Designation (Column 16)

Specifies the function of an input, combined, or update file. An entry must be made for all files except output or display files.

C

Chained file. A chained file is a disk file that is processed randomly. It may be an input or update file that is processed by chaining indicators or the CHAIN operation, or a direct output file that is being created using the CHAIN operation.

D

Demand file. A demand file is a file that is processed by the READ operation. The file may be an input, update, or combined file.

FILE DESCRIPTION SPECIFICATIONS

P

Primary file. A primary file is the main file from which records are read during program execution. When there is more than one input file for a program (multifile processing), the primary file controls the order in which records are selected for processing. If you don't specify a primary file, the first secondary file is assumed primary. If there are no primary or secondary files, you are responsible for terminating your program by setting on the LR indicator.

R

Record address or tag file. A record address file is an input file that supplies the parameters by which an indexed sequential disk file is processed. This file contains upper and lower address limits when only a certain portion of the indexed sequential file is to be processed (sequential processing between limits) or it contains record keys when the indexed sequential file is to be processed randomly.

A tag file is an input file that supplies the required processing sequence for a sequential disk file that is processed randomly. The tag file is created by using the ADDROUT option of the sort/merge. The tag file is made up of the addresses of the records on the sequential file. The order that the addresses are written on the tag file reflects the processing sequence for the sequential file.

S

Secondary file. In multifile processing, all the files involved except the primary file are secondary files. A secondary file can be an input, combined, or update file. Secondary files are processed in the order in which they appear on this form.

T

Table or array file. A table or array file is a file that contains table or array records. An entry in this field is made only for a table or array file that was loaded at execution time. An entry is not made in this field for table or array output files. This entry can be used only with nonindexed sequential IRAM files; it must not be used with SAM output files.

The following rules apply:

1. There must be at least one primary file in each program.

2. This field is left blank for nondirect output files and display files. C must be specified for a direct output file that is being created by the CHAIN operation.

3. There may be only one record address or tag file in a program.

4. Secondary files are processed in the order in which they appear on this form.

5. Record address files, tag files, chaining files (C1 through C9 chaining) and table or array files loaded at execution time must also be defined on the file extension specifications form.

   NOTE:

   If choosing a workstation, you can designate it as a primary file or a demand file. If you designate it as a primary file, secondary files are prohibited. If you designate a workstation file as a demand file, then a primary file is not required.

FILE DESCRIPTION SPECIFICATIONS

- End of File (Column 17)

Specifies which input, update, or combined files are to be completely processed before the last record indicator, LR, is turned on. This entry applies only to input, update, or combined files used as primary or secondary files.

Blank

If this field is not blank for all files, all records from this file may or may not be processed before the last record indicator, LR, is turned on. If this field is blank for all files, all the records from each file will be processed before the last record indicator, LR, is turned on.

E

Indicates that all records from the file must be processed before the last record indicator, LR, is turned on.

The following rules apply:

1. If only one file contains an E entry in this field, the last record indicator, LR, is turned on when all records from that file have been processed regardless of whether all records in the other files in the program have been processed.

2. If more than one file contains an E entry in this field, the last record indicator, LR, is turned on when all records from those files have been processed.

3. If all files contain an E entry in this field, it is equivalent to leaving this field blank for all files; that is, all records in all files are processed before the last record indicator, LR, is turned on.

4. Leave this field blank for all output, display, table, or array files.

- Sequence (Column 18)

Specifies the sequence of data records within an input, update, or combined file and that RPG II is to check to see whether the records are in the sequence specified. If an entry is made in this field, columns 61 and 62 of the input specifications form must contain a matching field entry for each input field that contains sequencing information. If more than one file with matching fields is specified, an entry in this field causes RPG II to check the sequence of the matching fields and to process the files using the matching record technique.

Blank

Ascending sequence is assumed. Sequence checking is not performed in the IBM System/3 mode if this field is left blank.

A

Matching fields are in ascending sequence.

D

Matching fields are in descending sequence.

FILE DESCRIPTION SPECIFICATIONS

The following rules apply:

1. An entry in this field is invalid unless matching fields are specified in columns 61 and 62 of the input specifications form.

2. If more than one file is processed, each file must have the same sequence specified in this field.

3. This field must be blank for demand files, output files, record address files, display files, and for any file processed randomly.

- File Format (Column 19)

Specifies data record format. Entries in this field are used in conjunction with entries in the block length field (columns 20 through 23) and the record length field (columns 24 through 27). These entries are summarized in Table 2-2.

Blank
: Interpreted as F or V, depending upon file involved.

F
: Fixed-length records.

V
: Variable-length records.

D
: Variable-length ASCII (American Standard Code for Information Interchange) records.

The following rules apply:

1. F must be specified for table, array, workstation, or special files.

2. V must be specified for line counter files.

3. F must be specified for all disk files in the IBM System/3 mode.

4. An entry is not required for card, printer, display, or direct files.

- Block Length (Columns 20 through 23)

Specifies the number of data characters contained in each block of a blocked file. If the file contains variable-length records, enter length of the largest block in this field. Entries in this field are used with entries in the file format field (column 19) and the record length field (columns 24 through 27). These entries are summarized in Table 2-2.

Blank
: Indicates that the file is unblocked (block length is equal to the record length).

FILE DESCRIPTION SPECIFICATIONS

nnnn

Specifies the logical number of bytes in a block. This number must be an even multiple of the logical record length. If an uneven multiple is specified, it is rounded up to the next even multiple.

Allowable block length range:

Device	Minimum Block Length	Maximum Block Length
UNISERVO VI-C Magnetic Tape Subsystem	18	8191
UNISERVO 12/16 or 20 Magnetic Tape Subsystem	18	9999
8411 disk subsystem	6	3618
8413 diskette subsystem	1	1023
8414 disk subsystem	6	7287
8415 disk subsystem	6	9999
8416 disk subsystem	6	9999
8417 disk subsystem	6	9999
8418 disk subsystem	6	9999
8419 disk subsystem	6	9999
8424 disk subsystem	6	9999
8425 disk subsystem	6	9999
8430 disk subsystem	6	9999
8433 disk subsystem	6	9999
0768 printer subsystem	3	132
0770 printer subsystem	3	132 or 160*
0773 printer subsystem	3	120, 132* or 144*
0776 printer subsystem	3	120 or 136*
0778 printer subsystem	3	120 or 136*

Requires a printer subsystem equipped with special features

FILE DESCRIPTION SPECIFICATIONS

The following rules apply:

1. The entry must be right-justified; leading zeros may be omitted.
2. This field must be blank for card, printer, console, workstation terminal, and special files.
3. For fixed-format files (F in column 19) on tape or on disk, the block length must be a multiple of the record length. If it is not, the block length is increased to the nearest multiple.
4. Fixed-format files in programs that are to be run in the SPERRY UNIVAC 9200/9300 or IBM 360/20 mode must have block lengths specified that are multiples of their record lengths.
5. In the IBM System/3 mode, the block length does not affect the way records are written on a disk file. Its function is to specify the amount of main storage to use for the input/output area.
6. A block length specification is ignored for IMS action programs. However, a block length must be specified during IMS configuration.

- Record Length (Columns 24 through 27)

Specifies the number of data characters contained in the records in a file. If the file contains variable-length records, the length of the largest record should be entered in this field. Entries in this field are used in conjunction with entries in the file format field (column 19) and the block length field (columns 20 through 23). A summary of the entries in these three fields is provided in Table 2-2.

`Blank`
The default record length for the input/output device is assumed.

`0001` through `9999`
The length of the largest data record in the file.

Allowable record length range:

Device	Maximum Record Length	Default Record Length
0716, 0717, or 0719 card reader subsystem	80	80
0716, 0717, or 0719 card reader subsystem with 51-column read feature	51	51
0716, 0717, or 0719 card reader subsystem with 66-column read feature	66	66

FILE DESCRIPTION SPECIFICATIONS

Device	Maximum Record Length	Default Record Length
0716 card reader subsystem with 96-column read feature	96	80
0768 printer subsystem	132	120
0770 printer subsystem	132 or 160*	120
0773 printer subsystem	120, 132* or 144*	120
0776 printer subsystem	120 or 136*	120
0778 printer subsystem	120 or 136*	120
UNISCOPE 100 Display Terminal (system console)	60	60
UNISERVO VI-C Magnetic Tape Subsystem	8191	246
UNISERVO 12/16 or 20 Magnetic Tape Subsystem	9999	246
8411 disk subsystem	3618	-
8413 diskette subsystem	128	80
8414 disk subsystem	7287	-
8415 disk subsystem	9999	-
8416 disk subsystem	9999	-
8418 disk subsystem	9999	-
8424 disk subsystem	9999	-
8425 disk subsystem	9999	-

**Requires a printer subsystem equipped with special features*

FILE DESCRIPTION SPECIFICATIONS

Device	Maximum Record Length	Default Record Length
8430 disk subsystem	9999	-
8433 disk subsystem	9999	-
User-Supported Device (SPECIAL)	9999	-
Workstation terminal	1920	-

The following rules apply:

1. The entry must be right-justified; leading zeros may be omitted.
2. An entry is required for all user-supported devices.
3. The record length for printer files recorded in device independent format should be 120 bytes or less.
4. An entry is required for all tape, workstation, or disk files.

Table 2—2. Summary of File Format, Block Length, and Record Length Entries

Record Format	Entries		
	Column 19 File Format	**Columns 20 through 23 Block Length**	**Columns 24 through 27 Record Length**
Fixed, unblocked	F	Blank or same as record length	Required
Fixed, blocked	F	Required	Required
Variable, unblocked	V	Blank or same as record length	Required
Variable, blocked	V	Required	Required
Variable, ASCII	D	Required	Required

FILE DESCRIPTION SPECIFICATIONS

- File Processing Mode (Column 28)

Specifies disk file processing mode. Entries in this field are used with the record address type field (column 31) and the file organization field (column 32). These entries are summarized in Table 2-3.

Blank
Sequential processing of a sequential, indexed, or direct file.

Consecutive processing of a sequential, indexed, or direct file in the IBM System/3 mode only. Records are processed in the same order that they physically appear in the file.

L
Sequential processing within limits of an indexed disk file. The upper and lower limits for this mode of processing are supplied by a record address file or a SETLL operation specified on the calculation specifications form.

R
Random processing of:

- an indexed file by using a record address file, a chaining file, a tag file, or the CHAIN operation;
- a sequential file by using a tag file; or
- a direct file by using a record address file or the chain operation to supply relative record numbers.

Creation of a direct file using the CHAIN operation.

The following rules apply:

1. Applies only to disk files; leave blank for all other file types.
2. If a file is being created, leave blank.
3. When a direct file is created, spaces are left for missing records; consequently, the program that subsequently processes this file must provide for the processing of blank records.

- Key or Record Address Field Length (Columns 29 and 30)

Specifies the length of the entries in a record address or tag file or the length of the key field when the record address type (column 31) is specified as alphanumeric (A) or packed decimal (P).

01 through 99
The length of the key field or the length of the entries in the record address or tag file. Specify the packed length for a packed indexed sequential key.

FILE DESCRIPTION SPECIFICATIONS

The following rules apply:

1. The entry in this field must be right-justified. The leading zero may be omitted.
2. An entry must be made in this field for all indexed sequential files that are processed randomly or sequentially between limits by using a record address file or the SETLL operation.
3. An entry of 10 must be made for a tag file.
4. The minimum key length for an indexed file is three bytes.
5. The minimum key length for a MIRAM file is 1.
6. The maximum key length for IRAM, MIRAM, and IBM System/3 mode files is 80.

- Record Address Type (Column 31)

Specifies how records are retrieved from a file. Entries in this field are used with the file processing mode field (column 28) and the file organization field (column 32). These entries are summarized in Table 2-3.

Blank
Process sequential file sequentially.

IBM System/3 mode: indexed file processed consecutively.

A
Process indexed file by using an alphanumeric record key.

I
A tag file used in processing a sequential file randomly.

IBM System/3 mode: a tag file used to process an indexed, direct, or sequential file.

K
OS/3 mode: If this entry is specified for an indexed file, it is treated as if a P entry were made.

9200/9300 mode: an indexed sequential file that has an associated record address file to supply record keys or limits.

P
Process indexed file by using a packed decimal record key.

R
Process input or update direct file by using relative record numbers.

The following rules apply:

1. This field must be blank for a sequential file. If an entry is made in this field for sequential file, it is ignored and treated as if it were blank.
2. This field must be left blank when creating a direct file using the CHAIN operation.

FILE DESCRIPTION SPECIFICATIONS

- File Organization (Column 32)

Specifies type of file organization for a nonsequential disk file or that dual input/output areas are requested for a sequential file. Entries in this field are used with the file processing mode field (column 28) and the record address type field (column 31). These entries are summarized in Table 2-3.

Blank
: A sequential file with only one input/output area requested.

2
: A sequential file with two input/output areas requested.

I
: An indexed file.

D
: A direct file processed randomly by using relative record numbers supplied by a chaining file or by using a tag (ADDROUT) file.

T
: A tag file that was created by using the ADDROUT option of sort/merge.

X
: Double-buffered indexed file retrieval.

The following rules apply:

1. If 2 is specified for a nonsequential file, it is ignored.
2. If 2 is specified for a card input or output file, stacker selection may not be used.
3. If 1 or 3 through 9 is specified, it is treated as if 2 were specified.
4. A 2 may not be specified for combined, table, array, display, chained, or special files.
5. For IMS action programs, a tag (ADDROUT) or a record address file may not be a SAM file. However, either file may be a nonindexed, sequential IRAM file. Tape or disk input files may not be sequential access (SAM) files; they may be nonindexed, sequential IRAM files.
6. Additional I/O areas may not be specified for an IMS action program. They must be specified, however, during IMS configuration.
7. An X is not allowed in IBM System/3 or System/34 mode. ←

FILE DESCRIPTION SPECIFICATIONS

Table 2—3. Summary of File Processing Mode, Record Address Type, and File Organization Entries (Part 1 of 2)

File Retrieval	Entries		
	Column 28 File Processing Mode	**Column 31 Record Address Type**	**Column 32 File Organization**
Sequential file processed sequentially or record address file	Blank	Blank	Blank
Tag (ADDROUT) file	Blank	Blank	T
IBM System/3 mode. Tag (ADDROUT) file	Blank	I	T
Sequential file processsed sequentially with additional I/O areas requested	Blank	Blank	2
Sequential file processed randomly by using a tag (ADDROUT) file to supply addresses	R	I	D
Indexed file processed sequentially	Blank	A or P	I
Indexed file processed sequentially with additional I/O areas requested	Blank	A or P	X
Indexed file processed sequentially between limits by using a record address (RA) file or SETLL operation to supply upper and lower limits	L	A or P	I
Indexed file processed sequentially between limits by using a record address (RA) file or SETLL operation to supply upper and lower limits with additional I/O areas requested	L	A or P	X
Indexed file processed randomly by using a record address (RA) file, C1-C9 chaining or CHAIN operation code	R	A or P	I
Direct file processed randomly by relative record numbers supplied with CHAIN operation	R	R	D
Direct file being created with relative record numbers supplied with CHAIN operation	R	Blank	Blank
SPERRY UNIVAC 9200/9300 mode. Indexed file processed sequentially between limits by using a record address (RA) file to supply upper and lower limits	L	K	I
IBM System/3 mode. Sequential file processed randomly by using a tag (ADDROUT) file to supply addresses	R	I	Blank
IBM System/3 mode. File processed consecutively	Blank	Blank	Blank

FILE DESCRIPTION SPECIFICATIONS

Table 2–3. Summary of File Procesing Mode, Record Address Type, and File Organization Entries (Part 2 of 2)

File Retrieval	Entries		
	Column 28 File Processing Mode	**Column 31 Record Address Type**	**Column 32 File Organization**
IBM System/3 mode. Direct file processed randomly by relative record number.	R	Blank	Blank
IBM System/3 mode. Indexed file processed randomly by a tag file.	R	I	I

FILE DESCRIPTION SPECIFICATIONS

- Overflow Indicator (Columns 33 and 34)

Specifies the overflow indicator that designates the page overflow condition for this particular file if a printer or line counter file is defined. Entries in this field are used with the output indicators fields of the output format specifications form to control when page overflow and any associated processing are to take place during the printing of a file. The interaction of these fields is summarized in Table 2-4.

`Blank`
An overflow indicator has not been specified for this file.

`OA` through `OG`, or `OV`
Specifies the overflow indicator for this file.

The following rules apply:

1. If this field is blank, the first unused indicator is used.
2. If RPG II is operating in the 9200/9300 mode, the overflow indicator OF is assumed.
3. A unique overflow indicator must be specified for each printer or line counter file that is defined.

Table 2—4. Summary of Interaction between Overflow and Output Indicators

Entries		Action
File Description Specifications Form Columns 33 and 34 Overflow Indicator	**Output Format Specifications Form Columns 23 through 31 Output Indicator**	
Blank	Blank	Automatic skip to the top of the next page when the overflow condition occurs
Blank	OA-OG, OV	An error will be noted at compilation time. An automatic skip will be made to the top of the next page when the overflow condition occurs
OA-OG, OV	Same entry as file description specifications form	Sets overflow indicator on and performs overflow processing
OA-OG, OV	Blank	Sets overflow indicator on and continues printing (overflow processing is ignored) without skipping to the top of the next page

FILE DESCRIPTION SPECIFICATIONS

- Key Field Starting Location (Columns 35 through 38)

Specifies the starting position of the key field in the data records of an indexed file.

0001 through 9999
The starting location of the key field in the data records of an indexed file.

The following rules apply:

1. An entry must be made in this field for all indexed sequential files.

2. The entries in this field must be right-justified. Leading zeros may be omitted.

- Extension or Line Counter Code (Column 39)

Each table file, array file, chaining file record address file, tag file, or sequential output file (a print image file that is to be stored on tape or disk) requires an entry in this field. The entry is used to indicate to the RPG II compiler that additional information about the file is provided on the file extension specifications form (table, array, chaining, record address, or tag files) or on the line counter specifications form (print image files).

Blank
Additional information about this file is not provided on the file extension specifications or line counter specifications form.

E
Additional information about this file is provided on the file extension specifications form (a table, array, chaining, record address, or tag file).

L
Additional information about this file is provided on the line counter specifications form (print image files only).

- Device (Columns 40 through 46)

Relates the file defined on this line to a specific input/output device when the program is compiled. An entry is required in this field for each file that is defined.

Table 2-5 lists the entries permitted in this field.

FILE DESCRIPTION SPECIFICATIONS

Table 2—5. Summary of Device Field Entries

Entry				Input/Output Devices
SPERRY UNIVAC OS/3	SPERRY UNIVAC 9200/9300 Mode	IBM 360/20 Mode	IBM System/3 Mode	
CTLRDR*				Job control stream reader
READER*	READER	READ01, 2501	READ01 MFCU1	Series 90: 0716 or 0717 card reader System 80: 0719 card reader
STUB51				0716, 0717, or 0719 card reader with 51-column read feature
STUB66				0716, 0717, or 0719 card reader with 66-column read feature
PUNCH*	PUNCH ROWPNCH	PUNCH20, PUNCH42, READ40, READ42, MFCM1	READ42 MFCU1 MFCU2 MFCM1 MFCM2	Series 90: 0604 or 0605 card punch System 80: 0608 card punch
CRP*	CRP,RRP	CRP20 READ20 READ40, READ42, MFCM1, MFCM2	READ42 MFCU2 MFCU1 MFCM1 MFCM2	Series 90: 0604 or 0605 card punch with prepunch read feature, or 8413 diskette subsystem System 80: 0608 card punch
PRINTER*	PRINT16, PRINT48, PRINT63, PRINTDR	PRINTER, PRINTLF, PRINTUF,	PRINTER PRINTR2 PRINT84	Series 90: 0768, 0770, 0773, 0776, or 0778 printer System 80: 0776 or 0789 printer
TAPE	TAPE, TAPE7	TAPE	TAPE	Series 90: UNISERVO V1-C, UNISERVO 12/16, UNISERVO 10, UNISERVO 14, or UNISERVO 20 magnetic tape subsystem
DISC DISK	DISC	DISK, DISK11, DISK11F, DISK14	DISK DISK40 DISK45	Series 90: 8411, 8414, 8415, 8416, 8418, 8424, 8425, 8430, or 8433 disk System 80: 8417 or 8419 disk
DISCVS				Series 90: 8411, 8414, or 8430 disk
DISKET	DISKET	DISKET	DISKET	Series 90: 8413 diskette subsystem System 80: 8420 or 8422 diskette subsystem
CONSOLE*			CONSOLE CRT77	UNISCOPE 100 display terminal or workstation
REMOTE			BSCA	Remote communications terminal
SPECIAL			SPECIAL	Any user-supported input/output device
WORKSTN	WORKSTN	WORKSTN	WORKSTN	SPERRY UNIVAC Type I or Type II workstation

*These devices may not be specified for an IMS action program.

FILE DESCRIPTION SPECIFICATIONS

The following rules apply:

1. All entries in this field must be left-justified. Entries valid for one mode are valid in any other mode that has an entry for a particular device. For example, READ01 is valid in all modes.

2. DISCVS may be specified when variable-sector disks are used whose sector sizes are not 256-byte multiples.

3. If SPECIAL is specified, you must supply your own device handling subroutine. SPECIAL files must adhere to the following conditions:

   a. The file must be in fixed unblocked format.

   b. Columns 28 through 32, 35 through 38, and 60 through 70 must be blank.

   c. Columns 54 through 59 must contain the name of the device handling subroutine.

4. If CONSOLE is specified and the file is specified as a display file (D in column 15), the DSPLY operation must be used with this file. Note that only those characters in the basic UNISCOPE 100 Display Terminal character set will be displayed and that nondisplayable characters in an output record will be displayed as blanks. The internal representation of the nondisplayable characters remains unchanged.

   If CONSOLE is specified and the file is specified as an input file (I in column 15) this will allow you to enter input records via the system console. If this is done, the message

   ```
   RPGII REQUESTS INPUT FOR file name
   ```

   is displayed with the appropriate job message identification number. Input records can then be entered via the system console beginning with the appropriate job identification number.

   The records that are entered will be treated as any other input records. Each character must be typed in. The characters must be typed in as you would punch a card; that is, the fields of the record must be left- or right-justified as required and you must space where blanks are required in the record. When all of the characters in the record have been typed in, press the TRANSMIT key. If more characters have been typed in than are specified in columns 24 through 27, the excess characters are truncated.

   If you specify CONSOLE and also enter the CONSOLE=filename parameter on the // PARAM job control statement, the operator can enter input to an executing RPG II program from a workstation in a manner that is compatible with IBM System/32 and IBM System/34. Workstation prompts generated from the field name on the input format specifications form prompt the operator to enter data.

- Labels (Column 53)

Specifies the type of labels contained on tape or disk files and how to process these labels.

Blank
Unlabeled

FILE DESCRIPTION SPECIFICATIONS

E

Standard labels followed by user labels. RPG II processes the standard labels and then transfers control to a user label processing subroutine. You must supply an external label processing subroutine for an output file and enter the name of this subroutine in columns 54 through 59 of this form. There is no need to supply a subroutine for an input file.

N

Nonstandard labels. You must supply an external label processing subroutine for an output file and enter the name of this subroutine in columns 54 through 59 of this form. There is no need to supply a subroutine for an input file if the data is separated from the header labels by a tape mark.

S

Standard labels. RPG II provides all necessary processing.

The following rules apply:

1. The label processing that is specified in this field is directly related to information supplied via the execution time job control stream; consequently, it is your responsibility to see that the required information is supplied.

2. This field must be blank if SPECIAL is specified in columns 40 through 46.

3. This field is ignored for IMS action programs.

- Continuation Lines (Columns 53 through 69)

Provide additional information about the tape file defined on the preceding line.

- K (in column 3)
  Continuation line

For IBM System/3 mode or MIRAM files, these lines provide an additional amount of storage for the index buffer of the indexed sequential file defined on the preceding line. ←

For workstation files, the continuation line is used to name the field that contains the workstation identification or to handle multiple workstations and workstation error processing.

For multikey MIRAM files, the continuation line is used to specify the complete key structure of an existing file or a new file.

For MIRAM file sharing, the continuation line specifies a file sharing environment for the file.

For MIRAM files, the continuation line supports record control bytes.

The entries in these fields are summarized in Table 2–6.

FILE DESCRIPTION SPECIFICATIONS

Table 2—6. Summary of Continuation Line Entries

Type of File	Entries					
	Continuation Line Indicator (Column 53)	Option (Columns 54 through 59)	Entry (Columns 60 through 65)	Entry (Columns 66 and 67)	Entry (Column 68)	Entry (Column 69)
ASCII input or output tape file	K	ASCII	Blank	Blank	Blank	Blank
ASCII input file	K	ASCII	Blank (Line 1)	Blank	Blank	Blank
with block prefix	K	BUFOFF	0-99 (Line 2)	Blank	Blank	Blank
IBM System/3 mode or MIRAM disk file with index buffer	K	INDEX	1-9	Blank	Blank	Blank
Workstation	K	ID	Fieldname	Blank	Blank	Blank
	K	NUM	1-99*	Blank	Blank	Blank
	K	SAVDS	Data structure name	Blank	Blank	Blank
	K	INFDS	Data structure name	Blank	Blank	Blank
	K	IND	1-99	Blank	Blank	Blank
	K	INFSR	Subroutine name	Blank	Blank	Blank
Multikey MIRAM file	K	KEY1-KEY5	Starting location	1-80	Blank or D	Blank or C
MIRAM file sharing	K	ACCESS	EXC,EXCR, SRD,SRDD, SADD	Blank	Blank	Blank
MIRAM file	K	RCB	Blank	Blank	Blank	Blank

*If the ID field is not used, the number may range from 1 to 255.

FILE DESCRIPTION SPECIFICATIONS

The following rules apply:

1. One or two continuation lines may be specified for a tape file. For a disk file, only one line may be specified.

2. When a continuation line is specified, columns 7 through 52 must be blank, columns 54 through 59 (Option) must contain an entry, and columns 60 through 69 may require an entry.

– Option (Columns 54 through 59)

Specifies the option for ASCII tape files. For IBM System/3 mode or MIRAM files, it specifies that an additional amount of main storage is required for the index buffer of an indexed file.

ASCII
Tape file defined as ASCII file.

BUFOFF
Tape file contains a block prefix. This entry can only be used for ASCII tape input files. The length of the block prefix must be specified in columns 60 through 69.

INDEX
IBM System/3 mode only. The indexed file requires additional main storage for the index buffer. The amount of additional main storage must be specified in columns 60 through 65.

ID
Identification continuation line for workstation files.

NUM
The maximum number of workstations that can be attached to the file simultaneously. It is required for the SAVDS and IND options.

SAVDS
The data structure saved and restored for each workstation attached to the file. It requires the NUM option.

INFDS
The data structure that contains the identification of the error that occurred and the workstation operation that caused the error. It provides status and record information to the program.

IND
The number of indicators saved and restored for each workstation attached to the file. It requires the NUM option.

INFSR
The user-written calculation subroutine that receives control when a workstation error occurs during a NEXT, READ, primary input, EXCPT, or normal cycle output.

FILE DESCRIPTION SPECIFICATIONS

KEY1 through KEY5
Multikey MIRAM files.

ACCESS
File sharing.

RCB
MIRAM files containing a record control byte.

– Entry (Columns 60 through 65)

Specifies the length of the block prefix for ASCII tape input files. For IBM System/3 mode or MIRAM files, it specifies the amount of additional main storage required for the index buffer of an indexed file.

Ø through 99
Length of the block prefix for an ASCII tape input file when the BUFOFF option is specified in columns 54 through 59.

1 through 9
Amount of additional main storage required for an index buffer, in 256-byte increments, when INDEX option is specified in columns 54 through 59.

field name
Name of a 2-character alphanumeric field used with workstation identification continuation lines.

1 through 99
Maximum number of workstations (right-justified) used with NUM option that can be attached to the file simultaneously. 1 is the default. If the ID field is not used, the number can range from 1 to 255.

data structure name
Name of the data structure used with the SAVDS option to be saved and restored for each workstation attached to the file. If you didn't specify the SAVDS option or if you specified 1 for the NUM option, no saving and restoring is done.

data structure name
Name of the data structure used with the INFDS option that contains the identification of the error that occurred and the workstation operation that caused the error. The information in the data structure is updated for each workstation operation. If you didn't specify the INFDS option, the information is not available to the program. The INFDS data structure is defined on the input format specifications form.

1 through 99
The number of indicators used with the IND option to be saved and restored for each workstation attached to the file. All indicators from 01 up to and including the indicator you specify are swapped. If you didn't specify the IND option or if you specified 1 for NUM, indicator swapping isn't done.

subroutine name
Name of a user-written calculation subroutine used with the INFSR option that receives control when a workstation error occurs during a NEXT, READ, primary input, EXCPT, or a normal cycle output operation. If you didn't specify the INFSR option, RPG II handles error recovery. The INFSR subroutine is specified on the calculations specifications form.

FILE DESCRIPTION SPECIFICATIONS

starting location
The starting location used with the KEYn option of the key field in the data record. This number must be right-justified.

EXC
Indicates an exclusive file-sharing environment (ACCESS option). This is the default if you didn't specify ACCESS in columns 54 through 59. While using the file, your program can read from or write to it, but no other program can access it.

EXCR
Indicates a file-sharing environment (ACCESS option) where your program can read from to or write to the file and other programs can also read from it.

SRD
Indicates a file-sharing environment (ACCESS option) where your program can read from the file, but other programs can read from or write to it.

SRDO
Indicates a file-sharing read-only environment (ACCESS option) Your program and other programs can read from the file, but no program can write to it.

SADD
Indicates a file-sharing environment (ACCESS option) where both your programs and other programs can read from or write to the file.

Table 2–7 summarizes the file-sharing environment.

Table 2–7. Summary of File-Sharing Environments

Environment	Your Program	Other Programs
EXC	Read/Write	-
EXCR	Read/Write	Read
SRD	Read	Read/Write
SRDO	Read	Read
SADD	Read/Write	Read/Write

Blank
MIRAM files containing a record control byte.

The following rules apply:

1. The entry in this field must be right-justified.

2. This field must be blank for fixed-blocked or fixed-unblocked files.

3. If BUFOFF is specified for a variable-blocked or variable-unblocked ASCII tape file, 0 or 4 must be specified in this field.

FILE DESCRIPTION SPECIFICATIONS

- Key Length (Columns 66 and 67)

  Specifies the length of the key field for multikey MIRAM files.

  1-80
  Length of the key field.

- Duplicate Record (Column 68)

  Specifies that duplicate records are allowed for multikey MIRAM files.

  Blank
  No duplicate records. Duplicate records result in an error.

  D
  Duplicate records.

- Change Keys (Column 69)

  Specifies that keys are allowed to change during an update for MIRAM files.

  Blank
  Keys are not changed during update.

  C
  Keys are changed during update.

- Name of Label Exit or Name of User Device Routine (Columns 54 through 59)

Specifies the name of the external user label processing subroutine if E or N is specified in column 53 or specifies the name of the external user device handling routine for a nonstandard input/output device if SPECIAL is specified in columns 40 through 46.

Blank
External subroutine is not required.

cccccc
One to six alphanumeric or special characters that specify the name of the external user label processing or device handling subroutine.

The following rules apply:

1. This entry must be left-justified. The first character must be alphabetic; the rest of the characters may be alphabetic or numeric.

FILE DESCRIPTION SPECIFICATIONS

2. When SPECIAL is specified in columns 40 through 46, this entry must specify the name of an external user device handling routine that provides all the required input/output functions for the nonstandard input/output device. The user routine must open the device the first time it is called.

   During execution time, the RPG II input/output interface routine accesses the external user device-handling routine. The function of the interface routine is to determine the required operation and pass pertinent information to the user routine. The information is supplied through five registers known as linkage registers. The role of each linkage register is as follows:

Register	Contents
0	Type of operation to be performed: 0 = read a record 4 = write a record 8 = close the file
1	Address of I/O buffer area in the RPG II program
13	Address of the register save area in the RPG II program
14	Address of the location in the calling program (user program) to which control should return after the user routine is executed
15	Address of entry point in user routine Return codes from user routine are: 0 = normal 4 = EOF for input or terminate for output Other code = terminate the job

3. This field is ignored for IMS action programs.

■ Number of Bytes in Main Storage to be Reserved for Index (Columns 60 through 65)

Specifies the number of bytes in main storage that are reserved for the top index of an ISAM file. For IRAM or MIRAM files, use the INDEX continuation statement. ←

n

The number of bytes in main storage to be reserved for the top index. The minimum number is 256 and the maximum is 32767. The entry must be right-justified; leading zeros may be omitted. The indexed sequential file must be a file that is being processed randomly or an existing file to which records are being added.

The following rule applies:

This field is ignored for IMS action programs.

FILE DESCRIPTION SPECIFICATIONS

- File Addition/Unordered Load (Column 66)

Indicates that new records are to be added to an existing sequential output file or indexed sequential input, output, or update file. In the IBM System/3 mode it is used to indicate that records for an indexed output file are to be loaded in unordered sequence. Entries in this field are used in conjunction with the file type field (column 15). A summary of these entries and the function performed are shown in Table 2-8.

Blank
No new records are to be added to the file or unordered load is not used.

A
New records are to be added to the file

U
IBM System/3 mode: Records for an indexed file are to be loaded in unordered sequence. Unordered load is specified when an index file is to be built from records in an unordered sequence.

Table 2—8. Summary of File Addition Entries

Entries		Function Performed
File Description Specifications Form Column 15 File Type	**File Description Specifications Form Column 66 File Addition**	
I (input)	Blank	The existing file is processed without adding new records or updating existing records.
I (input)	A*	New records are added to the existing file without updating the existing records.
O (output)	Blank	A new file is created or an existing sequential file is extended. The extend option must be specified at job control time.
O (output)	A*	New records are added to the existing indexed file or an existing sequential file is extended. The job control extend option is not used. RPG II sets the extend option.
O (output)	U	IBM System/3 mode, IRAM file: Load records in unordered key sequence to an indexed sequential file.
U (update)	Blank	The existing file is processed and updated without adding new records.
U (update)	A*	The existing file is processed, existing records are updated, and new records are added.

*Requires an entry of ADD in columns 16 through 18 on the output format specifications form.

FILE DESCRIPTION SPECIFICATIONS

The following rules apply:

1. An indexed sequential file may be an input, output, or update file; that is, I, O, or U is specified in column 15.

2. A sequential file must be specified as an output file type, that is, O in column 15. All records added to a sequential file are added to the end of a file.

3. Leave blank when loading or creating an indexed sequential or sequential file.

4. The addition of new records to an existing indexed sequential file should be specified only when absolutely necessary because this function requires more main storage than any other indexed sequential function.

- Cylinder Overflow Space Percentage (X10) (Column 67)

Specifies the percentage of each cylinder that is reserved for cylinder overflow when a new indexed sequential file is created or new records are added to an existing indexed sequential file.

Blank
An indexed sequential file is not being created or having new records added to it.

0 through 9
The percentage in 10% increments that is reserved for cylinder overflow.

The following rule applies:

This field is ignored for IMS action programs.

- Number of Extents (Columns 68 and 69)

Specifies whether the disk file you are creating in the IBM System/3 mode will have to have all volumes of the file online (all volumes are mounted) or it can have some of the volumes offline (volumes are mounted one at a time) when the file is subsequently processed.

1 or blank
A single-volume file or a multivolume file with all volume online.

2 through 50
A multivolume file with some of the volumes offline.

The following rules apply:

1. Leave this field blank for all other compilation modes.

2. The entry in this field must be right-justified. The leading zero may be omitted.

FILE DESCRIPTION SPECIFICATIONS

3. Files created or processed by relative record number must have all volumes mounted.

4. Files processed consecutively, indexed sequentially, or randomly by key may be created with all volumes online or with some of the volumes offline.

5. A multivolume file created with all volumes online must be processed with all volumes online.

6. A multivolume file created with some of the volumes offline must be processed with only one volume online at a time.

7. This field is ignored for IMS action programs.

- Tape Rewind Option (Column 70)

  Specifies whether a magnetic tape file is rewound at initialization or termination time.

  The following entries are permitted:

Entry	Activity	
	Initialization Time	**Termination Time**
R or blank	Rewind without lock	Rewind without lock
N	No rewind	No rewind
U	Rewind with lock	Rewind with lock (Operator intervention will be required before the file on the tape drive can be accessed again.)

- File Conditioners (Columns 71 and 72)

  Specifies an external indicator that controls the opening of an input, output, update, or combined file. If an external indicator is specified for a file, the indicator must be set on at execution time by the UPSI job control statement. If this is not done, the file cannot be opened.

  `Blank`
  No external indicator has been specified for this file.

  `U1` through `U8`
  The file can be used only when the associated indicator is set on at execution time.

  The following rule applies:

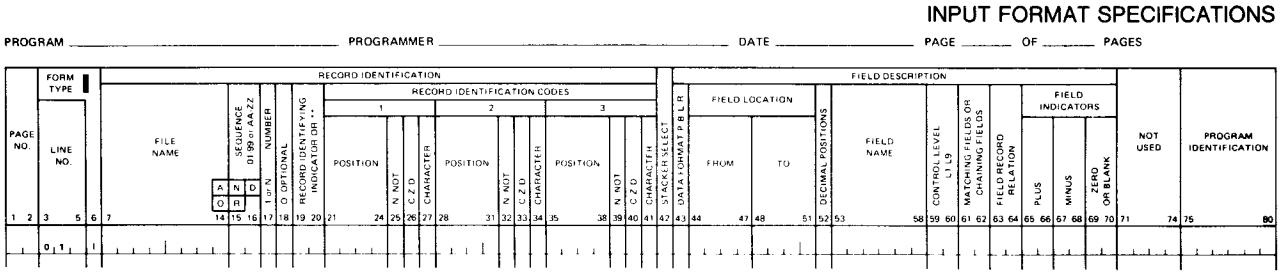
  This field is ignored for IMS action programs.

INPUT FORMAT SPECIFICATIONS

Function:

This form is required. It describes the characteristics of each input file associated with the program. The file characteristics are described by two types of entries: Record Identification and Field Description.

Format:



Record Identification Entries (Columns 7 through 42):

Identifies the input files, the types of records in each file, and the relationship of these records to the other records in the file.

NOTE:

When using a workstation, specify a blank record as the first record on the input format specifications form.

- File Name (Columns 7 through 13)

  Specifies the name of the file. The name must be the same name that is defined for this file on the file description specifications form. The file being described can be only an input, combined, or update file. A file name must be entered on the first record identification line for each file.

- Sequence (Columns 15 and 16)

  Specifies whether a specific sequence of input records is required within a given file. An entry is required in this field on the first specification line for every record type described for a given file. Entries in this field are used with the number field (column 71) and the optional field (column 18). These entries are summarized in Table 2-7.

  `AA` through `ZZ`
  The record type does not have to be in any specific sequence in relation to the rest of the record types in the file.

  `01` through `99`
  Specifies that the input sequence of the record type is to be checked in relation to the rest of the record types in the file as conditioned by the entries in the number and optional fields (columns 17 and 18). If numeric entries are used, the first entry must be 01, and all succeeding entries must be in ascending order.

INPUT FORMAT SPECIFICATIONS

The following rules apply:

1. If AND or OR lines are used, the sequence entry is made on the first line of the record identification group.

2. If alphabetic (AA through ZZ) and numeric (01 through 99) entries are made for different record types in the same file, the record types with the alphabetic entries must precede the record types with the numeric entries on the form.

3. When a record is out of sequence, the H0 indicator is set on, and the error code C (hexadecimal C3) is placed in the *ERROR field (a 1-byte used by RPG II to hold an error code). The H0 indicator remains on until the completion of the current operating cycle. If it is not set off before the next cycle begins, the LR (last record) indicator is set on, and the program goes through total time processing and terminates. This type of error can be provided for by including a subroutine on the calculation specifications form that tests the *ERROR field for error code C when the H0 indicator is set on and, if C is present, sets off the H0 indicator.

- Number (Column 17)

Specifies whether one or more of a given record type may appear in a file. An entry must be made in this field if the entry in the sequence field (columns 15 and 16) is numeric; if alphabetic, this field must be blank. Entries in this field are used in conjunction with the sequence field (columns 15 and 16) and the optional field (column 18). These entries are summarized in Table 2-9.

Blank
The sequence field (columns 15 and 16) contains alphabetics.

1
Specifies that only one record of this type may appear in the file before another type of record is encountered.

N
Specifies that one or more records of this type may appear together in the file.

- Optional (Column 18)

Specifies whether a specific type of record must be present in the file. If the entry in the sequence field (columns 15 and 16) is numeric, this field may contain an entry or blank; if alphabetic, this field must be blank. Entries in this field are used in conjunction with the sequence field (columns 15 and 16) and the number field (column 17). These entries are summarized in Table 2-9.

Blank
This record type must be present in the file, or the entry in the sequence field (columns 15 and 16) is alphabetic.

Ø
This record type is optional. It may or may not be present in the file.

Table 2—9. Summary of Sequence, Number, and Optional Field Entries

Entries			Interpretation
Columns 15 and 16 Sequence	Column 17 Number	Column 18 Optional	
AA-ZZ	Blank	Blank	The record type does not have to be in any specific sequence in relation to the rest of the record types in the file.
01-99	1	Blank	Only one record of this type may appear in the file before another type of record is encountered.
01-99	1	O	This type of record is optional; it may or may not appear in the file. If it does appear, only one record of this type may appear in the file before another type of record is encountered.
01-99	N	Blank	This type of record must be present in the file and one or more records of this type may appear together in the file.
01-99	N	O	This type of record is optional, it may or may not appear in the file. If this type of record appears in the file, one or more records of this type may appear together in the file.

- AND/OR Relationship (Columns 14 through 16)

  The AND relationship is used when more than three record identification codes (columns 21 through 41) are required to identify a record type. The OR relationship is used to identify two or more record types that have common fields.

  An AND relationship is established by placing the first three record identification entries on the first line and the additional entries on succeeding lines, with AND entered in columns 14 through 16 on each additional line that is used. Columns 17 through 20 and 42 (number, optional, record identifying indicator, and stacker select fields) must be left blank on AND lines.

  An OR relationship is established by placing OR in columns 14 and 15 and placing the alternate record identification entries in columns 21 through 41 on the next line after the first record identification line. If additional record identification entries are needed, these can be placed on succeeding OR lines. A record identifying indicator can be specified in columns 19 and 20 of an OR line. If this is done, this indicator is set on when the record identification entries on this line are satisfied. If a record identifying indicator is not specified on an OR line and the conditions for this line are satisfied, the indicator on the line immediately above is set on. Columns 16 through 18 (column 16 of the sequence field, and the number and optional fields) must be left blank on OR lines. Stacker selection, however, may be specified on OR lines (column 42, stacker select field).

INPUT FORMAT SPECIFICATIONS

- Record Identifying Indicator (Columns 19 and 20)

Specifies an indicator that identifies the record type. An entry in this field is required for each record type that is defined. When a record is selected for processing and it satisfies the record identification entries, the record identifying indicator in this field is set on. This indicator can then be used to condition calculation and output operations. If a record identifying indicator is set on, it remains on until it is set off by the user during the cycle or by RPG II at the end of the cycle.

When processing for a workstation file, each screen format or record, including the first screen format (which is always a blank), is identified on the input specification.

`Ø1` through `99`
General indicators. These are the usual entries in this field.

`H1` through `H9`
Halt indicators. These indicators can be used to stop processing.

`L1` through `L9` or `LR`
Control level indicators. These indicators can be used to cause total time processing.

`**`
Look-ahead feature.

`TR`
Spread-card feature.

`DS`
Data structure feature. Data structures begin on a double-word boundary in main storage.

The following rules apply:

1. The setting of one general indicator does not affect the setting of any of the others. These indicators can appear in any order; however, each record must have a unique indicator specified for it. Except for chaining and chained files, only one general indicator can be on at one time.

2. The halt and control level indicators may be used; however, care must be used when these indicators are specified because indiscriminate use can lead to unpredictable results.

3. A record identifying indicator is not always required in IBM System/3 mode. It is only necessary if you are concerned about different record types.

- Look-Ahead Feature

The look-ahead feature (*** entry) allows the program to look at records that are present in the program but have not yet been selected for processing. This feature is used in conjunction with the FORCE operation.

The following rules apply:

1. The look-ahead feature cannot be used with AND or OR lines.

2. The look-ahead feature cannot be used with chained files, demand files, files that require sequence checking (a numeric entry in columns 15 and 16), or workstation files.

INPUT FORMAT SPECIFICATIONS

- Spread-Card Feature

The spread-card feature (TR entry) allows you to reduce the number of input data cards by placing more than one detail record on a single punched card called a spread card. A spread card consists of a header portion followed by as many trailer portion (detail records) as are desired (within the space of a single card). Each trailer portion can contain several fields but all trailer portions must contain the same fields in the same order. A trailer portion cannot be split between two spread cards. The first and last positions of the trailer portion must be defined and referenced.

The header portion of a spread card record and one trailer portion are processed as one logical record in each program cycle; that is, the header portion and trailer portion 1 are processed during one program cycle, the header portion and trailer portion 2 are processed during the next program cycle, and so on. If no header portion is present, each trailer portion is treated as a logical record. The next spread card is read when all trailer portions in the current spread card have been processed or a blank trailer portion is encountered.

The following rules apply:

1. If the spread-card record contains a header portion, the fields in the header portion are described first.

2. Enter TR in columns 19 and 20 to identify the record as a spread-card record on the line immediately following the last line of the header portion field descriptions.

3. Describe the trailer portion fields on the lines immediately following the TR line. (Since all trailer portion fields are the same and are in the same order, only one set of field descriptions is required.)

4. Columns 7 through 18, and 21 through 74 on the TR specification line must be blank.

5. Only one TR specification can be made for a spread-card record.

6. Spread card records cannot be specified for a combined file or an input file that is not on a card device.

7. All record identification codes must be in the header portion.

8. Look-ahead fields cannot be specified for spread-card records.

9. If sequence checking is specified (a numeric entry in columns 15 and 16), column 17 must contain an N.

10. Header portion fields may be specified as control level fields (L1 through L9), input chaining fields (C1 through C9), and matching fields (M1 through M9).

11. Trailer portion fields may not be specified as control level or matching fields but may be specified as input chaining fields (C1–C9).

12. This feature may not be used in IMS action programs.

INPUT FORMAT SPECIFICATIONS

- Record Identification Codes (Columns 21 through 41)

  Identifies each record type used in the program. The fields in these columns allow for the entry of one to three identification codes per line. If additional identification codes are needed, they can be specified by using one or more AND or OR lines. If only one record type is present in the file, entries are not required in these fields; however, a sequence entry (columns 15 and 16, sequence field) and a record identifying entry (columns 19 and 20, record identifying indicator) are required. The identification codes entries consist of three groups, each of which contains the same four fields. These fields are:

  - Position (Columns 21 through 24, 28 through 31, and 35 through 38)

    Specifies the position in the data record that contains the record identification code, that is, the card column for punched cards or the position within a tape or disk record.

    Blank
    No record identifying code is present.

    1 through 9999
    The position in the data record that contains the identifying code. This entry must be right-justified; leading zeros may be omitted.

  - N = Not (columns 25, 32, and 39)

    Specifies whether the identification code (column 27, 34, or 41 - character field) must be present in order to set the record identifying indicator on.

    Blank
    The record identification code must be present.

    N
    The record identification code must not be present.

  - C/Z/D - Character, Zone, Digit (Columns 26, 33, and 40)

    Specifies which portion of the record identification code (column 27, 34, or 41 - character field) is to be checked for record identification; that is, the entire character, the zone portion of the character, or the digit portion of the character.

    C(character)
    The entire 8-bit EBCDIC character is to be checked. Only the specified character will satisfy the condition.

    Z(zone)
    The zone portion, the leftmost four bits of the character, is to be checked. Any character that has the same zone portion as the specified character will satisfy the condition.

    D(digit)
    The digit portion, the rightmost four bits of the character, is to be checked. Any character that has the same digit portion as the specified character will satisfy the condition.

The following rules apply:

1. When zone checking is specified, any character that has the same zone portion as the specified character will satisfy the condition except in those cases where &, - (minus), or blank is the specified character. In these cases, RPG II interprets their presence as indicated in Table 2-10.

   The interpretation in Table 2-10 is made to provide compatibility with Hollerith code.

2. When digit checking is specified, any character that has the same digit portion as the specified character will satisfy the condition.

Table 2—10. Interpretation of &, —, and Blank Characters

Entry		Character is Specified Position in Data Record That Satisfies Condition
Column 26 C/Z/D	Column 27 Character	
Z	&	A-1, &, or any character with an 1100_2 (X'C') zone
Z	-(minus)	J-R, -(minus), or any character with an 1101_2 (X'D') zone
Z	blank	0-9, blank, or any character with an 1111_2 (X'F') zone

- Character (Columns 27, 34, and 41)

Specifies the character (identification code) that is compared against the character contained in the position specified in the input data record.

c

Any EBCDIC character, including blank.

The following rules apply:

1. If more than one record type is specified for a file, the record identification codes for each record type should be different so that it is impossible for an input record to satisfy the condition for more than one type of record.

2. If a record satisfies the condition for more than one type of record, RPG II recognizes only the first type of record specified. As a result, the record identifying indicator for the first record type is the one that is always set on whenever either type of record is encountered. This means that the processing for the second type of record is never executed.

INPUT FORMAT SPECIFICATIONS

- Stacker Select (Column 42)

  Specifies the stacker into which the cards are stacked when the card device has more than one stacker.

  The following entries are permitted in this field:

  `Blank or 1`
  The normal stacker is selected.

  `2-n`
  The alternate stacker is selected.

  The following rules apply to this field:

  1. This entry must be blank if an 0605 card punch, 0716 card reader, or 0717 card reader is used.
  2. If the 0604 card punch is used, 1 may be entered in this field.
  3. An entry must be made for each line of an OR relationship. The entry need only be made once when records are defined in an AND relationship.
  4. If entries are made for record types in a combined file, the stacker select entries made on the output specifications form override those made on the input when output is performed.
  5. This field is ignored for IMS action programs.

Field Description Entries (Columns 43 through 70):

These entries define the individual fields of the input record, describe the kind of data in each field, set indicators based on the contents of the fields, and specify those fields used for matching records or chaining. The field description entries for a given record are always written on the lines immediately following the record identification entries. Columns 7 through 42 of a field description line are always blank.

- Data Format (Column 43)

  Specifies the data format of the input field.

  `Blank`
  Alphanumeric format or unpacked numeric format.

  `B (binary)`
  Binary format.

  `P (packed)`
  Packed decimal format.

INPUT FORMAT SPECIFICATIONS

L (left)
A numeric field that is preceded by a plus or minus sign.

R (right)
A numeric field that is followed by a plus or minus sign.

If L or R is specified, the entries in the field location field (columns 44 through 51) must be adjusted so as to include the sign position; that is, if a numeric field consists of five positions and L or R is specified, the field must be described as having six positions.

- Field Location (Columns 44 through 51)

Specifies the location and length of a field in the input record. It is divided into two areas: From and To. The From area specifies the starting position of the field, and the To area, the ending position. For workstation terminal fields, these values are the location on the input record, not on the screen. For workstation files with the INFDS option specified on the file description specifications form in columns 54 through 59, specify subfields prefixed with an asterisk.

0001 through 9999
The starting and ending position of the field. Entries must be right-justified. Leading zeros may be omitted.

*STATUS
Five-digit numeric subfield containing a code that identifies the error condition. The format of the field is 012nn, where nn is the error code from screen format services and corresponds to the screen format error message number (SFnn; see UP-8076).

*OPCODE
Five-character alphanumeric subfield containing a value that indicates which workstation operation was executing when the error occurred. The value READ, NEXT, or WRITE is placed in *OPCODE.

*RECORD
Eight-character slphanumeric subfield containing the format name when the *OPCODE subfield contains the value WRITE or containing blanks when the *OPCODE subfield doesn't contain the value WRITE.

*SIZE
Four-digit numeric subfield containing the character size of the display screen (1920 or 0960).

*MODE
Identifies a 2-digit numeric field that always contains the value zero. This word enables you to compile a System/34 program without getting an error.

*INP
Identifies a 2-digit numeric field that always contains the value zero. This word enables you to compile a System/34 program without getting an error.

*OUT
Identifies a 2-digit numeric field that always contains the value zero. This word enables you to compile a System/34 program without getting an error.

INPUT FORMAT SPECIFICATIONS

- Decimal Positions (Column 52)

  Specifies the number of decimal positions in a numeric field in an input file.

  Blank
  The field is an alphanumeric field.

  Ø through 9
  The number of decimal positions in the field.

- Field Name (Columns 53 through 58)

  Specifies the name of a field, or an array element. Once named, it may be referenced throughout the program by that name.

  cccccc
  One to six alphanumeric characters that specify the name of a field, array, or array element. The first character must be alphabetic.

  ***ERROR**
  Special field name that can be used for debugging.

  PAGE, PAGE1 - PAGE7
  Special field names; used for sequential page numbering on output reports.

  field name
  Field name that references the subfield specified in columns 44 through 50. Used in connection with the INFDS option specified on the file description specifications form.

  The following rules apply:

  1. This entry must be left-justified.

  2. When this field is used to specify an array name or array element, the control level field (columns 59 and 60), the matching fields or chaining fields (columns 61 and 62), and the field record relation field (columns 63 and 64) must be blank.

  3. If an array name is specified, the field indicators (columns 65 through 70) must be blank.

- Control Level (Columns 59 and 60)

  Specifies that the associated input record field is used as a control field. When an input record field is specified as a control field, its contents are compared with the contents of the control field of the previously processed record with the same control (L) level. If the contents of the control fields are unequal, a control break occurs (normal processing is interrupted), the specified control level indicator is set on, and the program performs the processing associated with the specified control level (L) indicator. Control level indicators are prohibited when using workstation terminal files.

  Blank
  The associated field is not a control field.

  L1 through L9
  Specifies the control level indicator for the associated field. L1 is the lowest and L9 the highest.

INPUT FORMAT SPECIFICATIONS

The following rules apply:

1. The setting on of one control level indicator sets on all lower control level indicators.

2. When the last record (LR) indicator is set on, all control level indicators (L1 through L9) are set on.

3. Control level indicators may be specified in any sequence; that is, gaps may be left in the specification sequence.

4. Control level indicators cannot be specified for binary fields, look-ahead fields, chained files, or demand files.

5. A control break is most likely to occur after the first record containing a control field is read. This control field is compared to a storage area that contains no data. Total calculations and total output operation are bypassed for the first record containing a control field, because two control fields are not being compared.

6. Control fields are initially set to zero or to the lowest alternate collating sequence value specified.

7. If the same control level indicator is used in different files and record types, both the associated control fields must be the same alphabetic or numeric type and the same length.

INPUT FORMAT SPECIFICATIONS

8. In the same record type, record columns in control fields may overlap even though assigned different control level indicators. The total number of columns assigned as control fields must not be greater than 144, counting each control level only once.

9. Because field names are ignored in control operations, fields from different record types, assigned the same control level indicator, may have the same name.

10. When numeric control fields are compared to see if a control break has occurred:

    a. They are compared as if there were no decimal position; e.g., 3.95 is the same as 395.

    b. Only the digit portion is compared and is considered to be positive; e.g., plus one is the same as minus one.

    c. Only the digit portion of each character in numeric control fields is compared to see if the information has changed. This occurs when any one of several control fields with the same control level indicator is described as numeric.

11. Unwanted control breaks may occur if different record types in a file do not have the same number of control fields.

12. Two or more fields in an input record can be considered as one control field. This is accomplished by specifying the same control level indicator for each field that is to make up the composite control field. These fields do not have to occupy contiguous positions in the input record.

When split control fields are specified, the first field listed on the form is placed in the high-order position of the composite control field, the second field is placed immediately adjacent to the first field, the third field is placed immediately adjacent to the second field, and so on.

1. No other specifications may come between the lines that describe split control fields.

2. If one portion of a split control field is numeric, the whole field is considered numeric.

3. A split control field may be made up of either a packed decimal field or an unpacked decimal field. It cannot be made up of both.

4. If the control field names are different:

    a. For one control level indicator, a control field may be split in some record types and not in others. However, the length of the control field must be the same in all record types.

    b. The length of the portions of a split control field may vary for different record types. However, the total length of the portions must be the same.

5. A numeric split control field may have more than 15 characters, if any one portion does not exceed 15 characters and the sum of all control fields is not greater than 144 characters (counting each control level only once).

INPUT FORMAT SPECIFICATIONS

- Matching Fields or Chaining Fields (Columns 61 and 62)

  Specifies whether the records of one file are matched or chained with another. Matching fields are prohibited when using workstation terminal files.

  `Blank`
  The field is not a matching field or chaining field.

  `M1` through `M9`
  Specifies the matching field indicator. M1 is the lowest, and M9 the highest.

  `C1` through `C9`
  Specifies the chaining field indicator. There is no relationship between these indicators other than that nine chaining fields can be specified.

  - Matching Fields

    Matching fields are designated by entering a matching field indicator, M1 through M9, in this field on the line that contains the input record field description.

    Matching field entries can be used to sequence check a single sequential file (input, combined, or update) or to designate those fields in multiple input files that are to be used to match records from the primary file with those from the secondary files.

    If matching fields are specified for a single sequential file (input, combined, or update), sequence checking is performed upon the matching fields within the file. When a record is found to be out of sequence, the H0 indicator remains on until the completion of the current operating cycle. If it is not set off before the next cycle begins, the LR (last record) indicator is set on, and the programa goes through total time processing and terminates. This type of error can be provided for by including a subroutine on the calculation specifications form that tests the *ERROR field for error code B when the H0 indicator is set on and, if B is present, sets off the H0 indicator.

    When matching fields are used to match records from the primary file with those from secondary files, the MR (matching record) indicator is set on when a record from the primary file completely matches a record from a secondary file. The MR indicator remains on during detail processing of a matching record and through the total time processing that follows the record. The MR indicator can be used to condition calculation and output operations.

    When a record from a primary file completely matches records in more than one secondary file, the record from the primary file is processed first and the records from the secondary files are processed in the order that these files are specified on the file description form.

    Matching fields need not be specified in order. It should be noted that when more than one matching field indicator is specified, the record fields that the indicators are assigned to are considered as one composite field in which the field with the highest matching field indicator occupies the high-order position of the composite field and the one with the lowest matching field indicator occupies the low-order position.

The following rules apply:

1. The matching field indicators (M1 through M9) do not condition operations nor are they affected by nor do they affect control level operations (L1 through L9). They are used only to specify the fields that are to be used for matching records.

2. All record types that have matching fields specified must be in the same sequence, that is, all ascending or all descending. The sequence is specified in the sequence field of the file description form (column 18).

3. Matching fields cannot be specified for arrays, chained files, binary fields, or look-ahead fields.

4. The same series of matching field indicators must be used for all record types for which matching fields are specified. For example, if the matching fields in the first record type are defined by M2, M3, and M4, every record type with matching fields must use the M2, M3, and M4 entries.

5. The number of positions in a matching field for a given matching field indicator level must be the same for all record types.

6. When matching field indicators are used with and without field record indicators in the same record, the corresponding matching field indicators must be present in both cases. If all matching field indicators are not common to all record types in an OR relationship, dummy matching field indicators should be used. These dummy matching fields are ignored during processing.

7. In a record, if all matching fields are specified with field record relation indicators, each field record relation indicator must have a complete set of matching fields associated with it.

- Chaining Fields

RPG II provides for two methods of chaining: input chaining by using the C1 through C9 chaining indicators or by using the CHAIN operation code. Of the two methods, the CHAIN operation code is the preferred method since it is more efficient.

Since we are dealing with the input format specifications, the discussion that follows is concerned only with the chaining field indicators (C1 through C9).

A maximum of nine chaining fields may be specified in a record. To specify a chaining field, a chaining field indicator (C1 through C9) must be entered in columns 61 and 62 on the line where the field is defined. If a field is specified as a chaining field, the chaining field indicator must be entered in columns 9 and 10 of the file extension specifications form.

Split chaining fields (either contiguous or noncontiguous fields) can be specified by using the same chaining field indicator on each line where the fields are specified.

INPUT FORMAT SPECIFICATIONS

The following rules apply:

1. Arrays, binary fields, look-ahead fields, and numeric sign extension fields (L or R in column 43) may not be used as chaining fields.

2. Lines with split chaining fields specified cannot be interspersed with lines specified with other chaining fields.

3. When a no-record-found error occurs, the H0 indicator is set on and the error code R (hexadecimal D9) is placed in the *ERROR field if a direct file is involved, or the error code U (hexadecimal E4) is placed in the *ERROR field if an indexed sequential file is involved. The H0 indicator remains on until the completion of the current operating cycle. If it is not set off before the next cycle begins, the LR (last record) indicator is set on, and the program goes through total time processing and terminates. This type of eror can be provided for by including a subroutine on the calculation specifications form that tests the *ERROR field for either error code R or U and, if present, sets off the H0 indicator.

- Field Record Relation (Columns 63 and 64)

Normally used when there are records in an OR relationship (OR in columns 14 and 15) and the fields of these records are not in the same location. It identifies when a particular field is to be used by the program; that is, the field described on a line is used only when the indicator specified in columns 63 and 64 is on or when these columns are blank (the field is common to all record types in the OR relationship).

Blank
The field is common to all record types.

Ø1 through 99
General indicators. These are the usual entries in this field.

H1 through H9
Halt indicators. These indicators can be used to stop processing.

L1 through L9
Control level indicators. These indicators must not be used with matching or control level fields (columns 59 through 62).

MR
Matching record indicator. This indicator must not be used with matching or control level fields (columns 59 through 62).

U1 through U8
External indicators. These indicators must not be used with matching or control level fields (columns 59 through 62).

INPUT FORMAT SPECIFICATIONS

The following rules apply:

1. Control level fields (columns 59 and 60) and matching or chaining fields (columns 61 and 62) that have the same field record relation must be grouped together.

2. Fields used as control fields and matching or chaining fields that do not have a field record relation indicator specified must be on the input specifications form before those that have a field record relation indicator specified.

3. Control level and matching or chaining fields that have a field record relation indicator specified take precedence, when the indicator is on, over fields of the same type and level (control, matching or chaining) without a field record relation indicator.

4. The MR indicator can be used to reduce processing time when certain fields are required for processing during a matching condition.

- Field Indicators (Columns 65 through 70)

Specifies the indicators that are set on when a numeric field is plus (the value of the field is greater than zero), a numeric field is minus (the value of the field is less than zero), a numeric field is zero (the field contains all zeros), or an alphanumeric field is blank (the field contains blanks). These indicators can be used to condition later program operations.

An indicator may be specified in any field (plus, columns 65 and 66; minus, columns 67 and 68; or zero or blank, columns 69 or 70) or all fields. If the same indicator is specified in all fields, it will always be set on regardless of the contents of the input record field defined on the line.

`Blank`
No indicator is specified for the input record field defined on this line.

`Ø1` through `99`
General indicators. The indicator specified is set on if the input record field defined on this line meets the required conditions.

`H1` through `H9`
Halt indicators. The indicator that is specified is set on and the program halts if the input record field defined on this line meets the required conditions.

- Plus (Columns 65 and 66)

The indicator that is specified in these columns is set on if the numeric field defined on this line is greater than zero. If the field defined on this line is alphanumeric, this entry must be blank.

- Minus (Columns 67 and 68)

The indicator that is specified in these columns is set on if the numeric field defined on this line is less than zero. If the field defined on this line is alphanumeric, the entry in this field must be blank.

INPUT FORMAT SPECIFICATIONS

- Zero or Blank (Columns 69 and 70)

  The indicator that is specified in these columns is set on if the numeric field defined on this line is all zeros or the contents of the alphanumeric field is all blanks.

- Setting Field Indicators

  A field indicator is initially set on when an input record is read that contains the field defined on this line and whose contents meet the conditions specified (plus, minus, zero, or blank). The indicator remains on until the same type of record is read in again. At this time, the field from the new record is tested against the specified conditions, and the indicator is set on if the conditions are met or it is set off if the conditions are not met.

CALCULATION SPECIFICATIONS

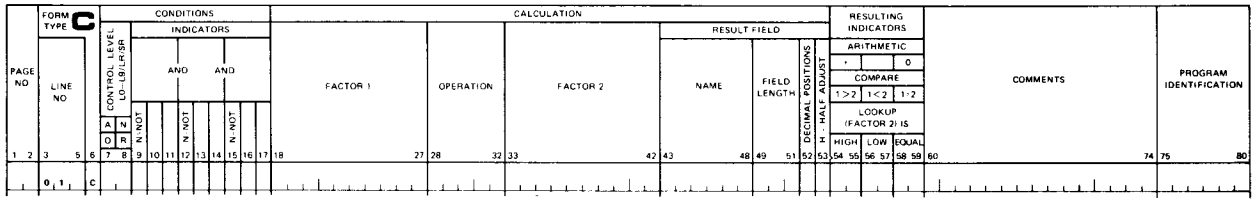
Function:

This form is required when the program is to perform operations upon input data or data that results from other calculations. The calculations that are required are described by three types of entries on the form: conditions, calculation, and resulting indicators.

Format:

CALCULATION SPECIFICATIONS

PROGRAM _____ PROGRAMMER _____ DATE _____ PAGE _____ OF _____ PAGES



Conditions Entries (Columns 7 through 17):

Tells when and under what conditions the calculations are performed.

- Control Level (Columns 7 and 8)

  Specifies when the calculation on this line is performed by the program.

  Blank
  Perform calculation at detail time.

  AN/OR
  The calculation is conditioned by indicators on more than one line.

  L0
  Perform calculation at total time. The indicator is generally used to specify total calculation to be performed when a control break has not occurred.

  L1 through L9
  Perform calculation at total time when the specified control break occurs.

  LR
  Perform calculation after the last record has been processed or when LR is set on during detail or total calculations.

  SR
  The calculation is part of an internal subroutine and is executed only when the subroutine is entered.

CALCULATION SPECIFICATIONS

The following rules apply:

1. The entries must appear in the following order:

   a. Detail calculations (blank)

   b. Total calculations (L0, L1 through L9)

   c. Subroutine calculations (SR)

2. The L0 indicator is on throughout the program and cannot be set on or off.

3. The LR (last record) indicator sets on the L1 through L9 indicators when it is conditioned except when it is set on by a SETON operation. In this case, the L1 through L9 indicators are not set on.

- AND /OR Relationships (Columns 7 and 8)

The AND relationship is used when more than three indicators (columns 9 through 17) are required to condition the calculation; that is, if all conditions are met, the calculation is performed. The OR relationship is used when the calculation can be conditioned by more than one combination of indicators; that is, if any of the conditions are met, the calculation is performed.

An AND relationship is established by placing the control level entry in columns 7 and 8 and the first three indicator entries in columns 9 through 17 on the first line of the group and then the additional indicator entries on succeeding lines, with AN entered in columns 7 and 8 on each additional line that is used.

An OR relationship is established by placing the control level entry in columns 7 and 8 and the first three indicator entries in columns 9 through 17 on the first line of the group and then the alternate indicator entries on succeeding lines, with OR entered in columns 7 and 8 on each line that is used.

AND and OR lines can be intermixed. In these cases, the control level entry is placed in columns 7 and 8 and the indicator entries are placed in columns 9 through 17 on the first line, and then the AN or OR lines are written on the succeeding lines.

The control level entry in columns 7 and 8 of the line immediately preceding the first AN or OR line applies to all AN or OR lines in the group. Columns 18 through 59 (calculation and resulting indicator fields) must be blank for all lines except the last in an AN/OR group. The last line in the group contains the entries for the calculation and resulting indicator fields. Note that seven AN/OR lines are the maximum that you can specify for an AN/OR group.

- Indicators (Columns 9 through 17)

Specifies indicators that are tested to determine whether the calculation specified is to be performed. Up to three indicators can be specified on a line. The indicators are specified in columns 10 and 11, 13 and 14, and 16 and 17. Whether the indicator is to be on or off is specified in columns 9, 12, and 15 (N=NOT).

Blank
The calculation is always performed.

CALCULATION SPECIFICATIONS

01 through 99
The general indicators. Perform calculation when the specified indicators are in the required state.

H0
RPG II internal indicator. Perform calculation when the H0 indicator is set on by an error condition detected in the input data or in a previous calculation.

H1 through H9
Halt indicator defined in the program. Perform calculation when the specified indicator is in the required state.

L0 through L9
Control level indicators. Perform calculation during the detail time processing of the record that caused the control break.

LR
The last record indicator. Perform calculation during the detail time processing of the record that caused the LR indicator to be set on.

MR
The matching record indicator. Perform calculation when a record in a secondary file with matching fields matches a record in the primary file.

N (NOT)
The indicator specified in the next two columns must not be on. If the indicator is on, the calculation is not performed.

OA through OG, OV
The overflow indicators. Perform calculation when page overflow occurs on the device defined as having the associated overflow indicator on the file description form (overflow indicator – columns 33 and 34).

U1 through U8
External indicators. Perform calculation when the specified indicator is set on. These indicators must not be used in an IMS action program.

KA through KN and KP through KW
Function key indicators. Perform calculation when one of the function keys and the transmit key are pressed, and the corresponding indicator is set on.

NOTE:

In RPG II IMS action programs, these function indicators are not set when the function keys are pressed. IMS may be configured to initiate transactions when these keys are pressed.

•
If the line that precedes the asterisk (*) line is performed, then the asterisk line is performed. The * must be placed in column 11.

CALCULATION SPECIFICATIONS

The following rules apply:

1. On and not on conditions may be intermixed on the same line.
2. An * may not be used on a total time line if the preceding is a detail time line.
3. If a total time line is followed by an * line, the conditions for the total time line also apply to the * line.

Calculation Entries (Columns 18 through 53):

Specifies the calculation operations to be performed, that is, the data upon which the operation is to be performed, the type of operation, and where the result of the operation is to be stored.

- Factor 1 and Factor 2 (Columns 18 through 27 and Columns 33 through 42)

Specifies the factors involved in the calculation specified on this line of the form.

`Blank`
Specified operation requires that either factor 1 or factor 2 must be blank.

`Alphanumeric literal`
A series of one to eight characters enclosed in apostrophes.

`Array name`
An array name defined on the file extension specifications.

`Array name, index`
An array element.

`Field name`
Any field name (one to six characters) defined on the input or calculation specifications.

`Figurative constant`
A figurative constant, such as *BLANK, *BLANKS, *ZERO, and *ZEROS.

`File name`
A file name (factor 2 only) for a CHAIN, DEBUG, DSPLY, FORCE, or READ operation.

`Hexadecimal literal`
A series of hexadecimal digits enclosed in apostrophes and preceded by an X.

`Label`
An operation label for TAG or ENDSR operations (factor 1 only) or GOTO operations (factor 2 only).

`Numeric literal`
A series of 1 to 10 digits that may be preceded by a sign and that may contain a decimal point if required.

CALCULATION SPECIFICATIONS

Special name
: An RPG II special name, such as PAGE,PAGE1 – PAGE7, UDATE, UMONTH, UDAY, UYEAR, D?TE, and * ERROR.

Subroutine name
: The name of a subroutine defined elsewhere in the program.

Table name
: A table name defined on the file extension specifications.

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The following rules apply:

1. All entries must be left-justified.

2. These fields must be blank in all lines except the last in an AN/OR group.

3. Destination names used as factor 1 with TAG and ENDSR operations and as factor 2 with GOTO operations must be from one to six characters long, and begin with an alphabetic character.

- Operation (Columns 28 through 32)

Specifies the operation to be performed by using factor 1, factor 2, and the result field. Each operation is described in terms of what it does and shows, in chart form, whether the entries in the other fields (conditions fields - columns 9 through 17, factor 1 and factor 2 fields - columns 18 through 27 and 33 through 42, result field - columns 43 through 48, and resulting indicators fields - columns 54 through 59) are optional, required, or blank. These entries are summarized in Table 2-11.

- Add (ADD)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**ADD**	**Required**	**Required**	**Optional**

The ADD operation algebraically adds the contents of factor 2 to factor 1 and stores the result in the result field.

- Begin Internal Subroutine (BEGSR)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Blank	**Required**	**BEGSR**	**Blank**	**Blank**	**Blank**

The BEGSR operation is the first statement in an internal subroutine (a subroutine that you have included in your program). It provides the name of the subroutine and indicates the point on the calculation specifications form where it begins. The subroutine name is specified in factor 1.

The BEGSR operation can be referenced only by an EXSR operation that specifies the same subroutine name in factor 2 as the one specified in the BEGSR operation.

All statements in an internal subroutine must have SR entered in the control level field (columns 7 and 8).

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- Set Bit Off (BITOF)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**BITOF**	**Required**	**Required**	**Blank**

The BITOF operation is used to set bits off in a 1-character alphanumeric field. It sets bits off in the same manner that the BITON operation sets bits on. As in the BITON operation, the field in which the bits are to be set off is specified in the result field and the bits that are involved are specified in factor 2 either by specifying a 1-character field or the numbers of the bits (0 through 7) enclosed in apostrophes.

- Set Bit On (BITON)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**BITON**	**Required**	**Required**	**Blank**

The BITON operation is used to set bits on in a 1-character alphanumeric field. This field is specified in the result field. Factor 2 is used to specify which bits in the result field are to be set on. The bits that are to be set on can be specified by a 1-character field or the numbers of the bits enclosed in apostrophes. The bits are numbered 0 through 7 from left to right. If a 1-character field is specified in factor 2, the bits that are set on in this field will cause the corresponding bits to be set on in the result field.

- Retrieve Record from a Chained File (CHAIN)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**CHAIN**	**Required**	**Blank**	**Optional**

→ The CHAIN operation is used to retrieve records from indexed or direct files or to write records to a direct output file. The file from which the records are retrieved is called a chained file.

→ Factor 2 contains the name of the chained indexed or direct file specified on the file description form.

If records are retrieved from an indexed file, factor 1 specifies the key of the record being sought. Factor 1 may be a field name, an array element, a table name, or a literal. The result field must be blank in this case.

If records are retrieved from a direct file by relative record number (R in column 31 of the file description specifications form) or written to a direct file being created by relative record number (blank in column 31 of the file description specifications form), factor 1 contains the relative record number of the record to be read/written. Factor 1 may be a field name, an array element, a table name, or a numeric literal.

The high field (columns 54 and 55) and low field (columns 56 and 57) of the resulting indicators can be used with the CHAIN operation to specify an indicator that is to be set on when a no-record-found condition occurs. If an indicator is not present in either the high field or the low field and a no-record-found condition occurs, the H0 (halt 0) indicator is set on, and the program terminates unless provision is made in the program to set this indicator off.

The equal field (columns 58 and 59) of the resulting indicators can be used to specify an indicator that is to be set on when a record is found. Every resulting indicator specified for a CHAIN operation is always set on or off, depending upon its significance and the success of the I/O operation; it is never left unaltered. If resulting indicators signifying no-record-found are set on, the indicator signifying record found is set off, and vice versa.

- Compare (COMP)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**COMP**	**Required**	**Blank**	**Required**

The COMP operation compares the contents of factor 1 with factor 2. The result of the operation is then checked for the condition that is specified in the resulting indicator field (columns 54 through 59); that is, factor 1 is greater than factor 2, factor 1 is less than factor 2, or factor 1 is equal to factor 2. If the condition is satisfied, the specified indicator is set on. Factor 1 and factor 2 may be alphanumeric or numeric fields or literals. Arrays cannot be specified in COMP operations.

If alphanumeric fields are compared, the comparison is based upon the internal EBCDIC collating sequence, except when an alternate collating sequence has been specified. When the fields are unequal in length, the leftmost character of the shorter field is aligned with the leftmost character of the longer field. The shorter field is then filled with blanks in as many character positions as are required to make it equal in length to the longer field.

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If numeric fields are compared, the comparison is algebraic. A field with a plus sign is always greater than a field with a minus sign. When the fields are unequal in length, they are aligned at the implied decimal point. The shorter field is then filled with zeros in as many character positions to the left or right of the decimal point as are required to make it equal in length to the longer field.

A hexadecimal literal is considered alphanumeric. Consequently, it may be compared only to an alphanumeric field.

- Debug (DEBUG)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Optional**	**DEBUG**	**Required**	**Optional**	**Blank**

If 1 is specified in column 15 of the control card specifications form, the DEBUG operation causes all indicators that are on and any field or literal that is specified to be printed when the operation is encountered. If 1 is not specified in column 15 of the control card specifications form, the DEBUG operation is ignored.

Factor 1 may contain a field name or literal. This entry is used to identify the DEBUG printout. It may not be more than eight characters. Factor 2 specifies the name of the output file for the DEBUG printouts. The record length for this file (specified in columns 24 through 27 of the file description specifications form) must be at least 80. The result field may specify a field name, table name, or array name that is to be printed as a second output line.

- Divide (DIV)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**DIV**	**Required**	**Required**	**Optional**

The DIV operation algebraically divides the contents of factor 1 (dividend) by factor 2 (divisor) and stores the result (quotient) in the result field. If there is a remainder, it is discarded unless the next operation is a move remainder (MVR) operation. If half adjust (column 53) is specified with a DIV operation, the result is rounded based on the value of the remainder, and the remainder is discarded. Half adjust cannot be specified if the next operation is an MVR operation. When the DIV operation is used, the field length restrictions are as shown in the following formulas:

$$fl_1 + (dp_2 - dp_1 + dp_r) \leqslant 15$$

$$fl_2 + (dp_2 - dp_1 + dp_r) \leqslant 15$$

where:

fl_1 = factor 1 (dividend) field length.

fl_2 = factor 2 (divisor) field length.

dp_1 = number of decimal positions in factor 1.

dp_2 = number of decimal positions in factor 2.

dp_r = number of decimal positions in result field.

If half adjust is specified, the following formula applies:

$$fl_1 + (dp_2 - dp_1 + dp_r) \leqslant 14$$

- Display (DSPLY)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Optional**	**DSPLY**	**Required**	**Optional**	**Blank**

The DSPLY operation permits you to enter information or have information displayed via the system console during the execution of your program. Factor 2 contains the name of the file that is specified for the CONSOLE entry on the file description specifications form. Factor 1 can specify a field name, table name, array element, or literal that is to be displayed on the system console. The result field can specify a field name, table name, or array element whose contents are to be altered by the operator. If factor 1 is specified and the result field is blank, the contents of factor 1 are displayed on the system console, and processing continues.

If the result field is specified and factor 1 is blank, the contents of the result field are displayed, and the program waits for the operator to alter the field or indicate that the program is to resume processing. If factor 1 and the result field are specified, the contents of factor 1 and the result field are displayed, and the program waits for the operator to alter the contents of the result field or indicate that the program is to resume processing.

When numeric data is entered, leading zeros are not required because RPG II automatically right-justified the data. Similarly, alphanumeric data is left-justified with automatic space fill (blanks) on the right.

Note that a $ is not permitted in the first character position of the data to be displayed.

The DSPLY operation may not be specified for IMS action programs.

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– End Internal Subroutine (ENDSR)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Blank	**Optional**	**ENDSR**	**Optional**	**Blank**	**Blank**

The ENDSR is the last statement in an internal subroutine. It indicates the point on the calculation specifications form where the subroutine ends. When the ENDSR operation is executed, it transfers control to the operation immediately following the EXSR operation that caused the subroutine to be executed.

The ENDSR operation can be branched to by a GOTO operation that is within the subroutine. In this case, factor 1 of the ENDSR operation must contain a label that can be used by the GOTO operation.

Factor 2 can contain the following entries that indicate a point to which control is returned if INFSR is specified in columns 54 through 59 of the file descriptions form:

1. blank

   If you leave factor 2 blank and the EXSR operation calls the subroutine, control returns to the operation following the EXSR operation. If control automatically passes to the subroutine because a workstation error occurs, the subroutine executes and control goes to the RPG II error handling routine, which normally stops the program and requires the operator to choose an option.

2. literal

   When you specify a literal, it must be enclosed in apostrophes. If you specify a literal and get an error from trying to read a file, you must issue an output operation to the workstation file before attempting to read the file again. You can't perform two consecutive reads from the same workstation file. You can specify the following literals:

   a. '*GETIN'

      Indicates control returns to the beginning of a new cycle.

   b. '*DETC '

      Indicates control returns to the beginning of detail calculations.

   c. '*CANCL'

      Indicates all files are closed and the program is cancelled.

   d. ' '

      Indicates the same as leaving factor 2 blank.

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3. array element or filed name

   When you specify an array element or field name, it indicates a 6-character alphanumeric field that contains *GETIN, *DETC, *CANCL, or blanks (left-justified and padded with blanks). This field is set to blanks with each exit from the subroutine and allows you to put in a return point, depending on the type of error.

- Exception Lines (EXCPT)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**EXCPT**	**Blank**	**Blank**	**Blank**

The EXCPT operation permits output to be written during the time when calculations are performed. When the EXCPT operation is encountered, all output lines on the output format specifications form that have an E in the type field (column 15) and whose output indicators (columns 23 through 31) are satisfied are written. When this is completed, the calculations continue with the next statement after the EXCPT operation.

- Exit to Linked Subroutine (EXIT)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**EXIT**	**Required**	**Blank**	**Blank**

The EXIT operation is used to specify a point in the calculations where control is transferred to an external subroutine that was linked to the program at linkage editor time. Factor 2 specifies the name of the external subroutine. When the EXIT operation is encountered, control is transferred to the external subroutine, the subroutine is executed, and control is returned to the program at the statement immediately following the EXIT operation.

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- Execute Internal Subroutine (EXSR)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**EXSR**	**Required**	**Blank**	**Blank**

The EXSR operation transfers control to an internal subroutine. Factor 2 specifies the name of the internal subroutine. This name must also appear in factor 1 of the BEGSR operation of the subroutine that is to be executed.

When the subroutine is completed, control is returned to the operation immediately following the EXSR operation that caused the subroutine to be executed unless a GOTO operation is encountered that transfers control to another point in the program.

- Override Normal Record Selection (FORCE)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**FORCE**	**Required**	**Blank**	**Blank**

The FORCE operation permits you to override the normal record selection process; that is, with this operation you specify from which file the next record is to be read rather than allow the RPG II program logic to do it for you. Factor 2 specifies the name of the primary or secondary input, combined, or update file from which the next record is to be selected for processing. The first record that is processed in your program cannot be forced. It must be selected by the normal process.

The FORCE operation can be used only at detail time. When it is executed, it will remain in effect only for the next input cycle.

If more than one FORCE operation is issued during a processing cycle, the last one that was executed is effective. All other FORCE operations are overridden. When a FORCE operation is specified for a file that has reached the end-of-file condition, the normal record selection process selects the next record.

When the FORCE operation is used to select a record, the record is treated as if it had no matching fields. As a result, the MR (matching record) indicator is always off when a forced record is being processed.

CALCULATION SPECIFICATIONS

- Branch (GOTO)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**GOTO**	**Required**	**Blank**	**Blank**

The GOTO operation is used to transfer control to a point in the program other than the next sequential operation. Factor 2 specifies the point to which the program is to branch. This point is specified in either a TAG or ENDSR operation.

Branching may be executed either forward or backward from detail-to-detail calculations, total-to-total calculations, or detail-to-total calculations.

It is not permitted, however, to branch from total to detail calculations. The entry in the control level field (columns 7 and 8) determines the time of the calculations; that is, if blank, it is a detail time calculation and if L0 through L9, it is a total time operation.

A GOTO operation that is outside of an internal subroutine must not branch to a TAG or ENDSR operation within that subroutine. It is permissible, however, if the GOTO operation is within the same subroutine.

- Look Up (LOKUP)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**LOKUP**	**Required**	**Optional**	**Required**

The LOKUP operation is used to search a table or array in main storage and retrieve the required function or element that is to be used in subsequent calculations. The search argument is specified in factor 1. The table, array, or array element where the search is to begin is specified in factor 2. The result field can be used to specify a second table from which an element that corresponds to the element that satisfied the search condition can be retrieved. The result field must be blank if an array is specified in factor 2.

The resulting indicators are used to specify the type of search that is to be performed. The search can be made for an element that is higher (an entry in columns 54 and 55), lower (an entry in columns 56 and 57), equal (an entry in columns 58 and 59), higher or equal (an entry in columns 54 and 55 and in columns 58 and 59), or lower or equal (an entry in columns 56 and 57 and in columns 58 and 59). If the search condition is satisfied, the indicator that was used to specify the search condition is set on. If columns 54 and 55, or 56 and 57, are used, the tables or arrays must be in either ascending or descending order.

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- Move High Zone to High Zone (MHHZO)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MHHZO**	**Required**	**Required**	**Blank**

The MHHZO operation moves the zone portion of the leftmost byte of factor 2 to the leftmost byte of the result field. Both factor 2 and the result must be alphanumeric.

- Move High Zone to Low Zone (MHLZO)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MHLZO**	**Required**	**Required**	**Blank**

The MHLZO operation moves the zone portion of the leftmost byte of factor 2 to the rightmost byte of the result field. Factor 2 must be alphanumeric; however, the result field may be alphanumeric or numeric.

- Move Low Zone to High Zone (MLHZO)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MLHZO**	**Required**	**Required**	**Blank**

The MLHZO operation moves the zone portion of the rightmost byte of factor 2 to the leftmost byte of the result field. Factor 2 may be alphanumeric or numeric; however, the result field must be alphanumeric.

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- Move Low Zone to Low Zone (MLLZO)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MLLZO**	**Required**	**Required**	**Blank**

The MLLZO operation moves the zone portion of the rightmost byte of factor 2 to the rightmost byte of the result field. Factor 2 and the result field may be alphanumeric or numeric.

- Move (MOVE)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MOVE**	**Required**	**Required**	**Blank**

The MOVE operation moves the contents of factor 2, starting with the data characters in the rightmost positions, into the result field. If factor 2 is shorter than the result field, the leftmost characters in the result field are not disturbed. If factor 2 is longer than the result field, the leftmost characters in factor 2 in excess of the result field length are not moved.

An alphanumeric field can be converted to a numeric field and vice versa. This is accomplished by moving an alphanumeric field in factor 2 into a numeric result field in the former case and vice versa in the latter case.

If an alphanumeric field is converted to a numeric field, each character is converted to its corresponding numeric character and then moved to the numeric result field. In the case of the rightmost character in an alphanumeric field, the zone portion is converted to a + or - as applicable; that is, all characters with a hexadecimal C zone (A-I and S-Z) are positive (+), and all with a D zone (J-R) are negative (-). This sign is then used as the sign of the result field.

If a numeric field is converted to an alphanumeric field, all characters except the rightmost are moved without change into the alphanumeric result field. If the rightmost character of a numeric field is signed, it is converted to its alphanumeric equivalent, that is, +1=A, +2=B,...+9=I (hexadecimal 1C becomes hexadecimal C1) and -1=J, -2=K,...-9=R (hexadecimal 1D becomes hexadecimal D1). If it is unsigned, it is moved without change.

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- Move Array (MOVEA)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MOVEA**	**Required**	**Required**	**Blank**

The MOVEA operation moves data characters from factor 2 to the result field. The move proceeds from left to right, one character at a time. It begins with the first element of an array if only the array name is specified, or the first character if a field name or literal is specified. If an array name with an index is specified, it begins with the indicated element. The MOVEA operation terminates when the last position of factor 2 or the result field is reached regardless of the current position within the other; that is, it may end in the middle of an array element.

Both factor 2 and the result field must be alphanumeric and one or both must be arrays. If both factor 2 and the result field are arrays, they cannot be the same array.

- Move Left (MOVEL)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MOVEL**	**Required**	**Required**	**Blank**

The MOVEL operation moves the contents of factor 2, starting with the data characters in the leftmost positions, into the result field. If factor 2 is shorter than the result field, the rightmost characters in the result field are undisturbed. If factor 2 is longer than the result field, the rightmost characters in factor 2 in excess of the result field length are not moved.

If factor 2 is shorter than the result field, the sign of the result field remains the same when data is moved to a numeric field. If factor 2 is the same length or longer than the result field, the sign of factor 2 becomes the sign of the result field.

An alphanumeric field can be converted to a numeric field and vice versa. This is accomplished by moving an alphanumeric field in factor 2 into a numeric result field in the former case and vice versa in the latter case.

If an alphanumeric field is converted to a numeric field, each character is converted to its corresponding numeric equivalent and then moved to the numeric result field. In the case of the rightmost character in an alphanumeric field, the zone portion is converted to a + or –; that is, all characters with a hexadecimal C zone (A–I) are + and all with a D zone (J–R) are–. This sign is then used as the sign of the result field regardless of whether the rightmost character is moved to the result field.

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If a numeric field is converted to an alphanumeric field, all characters except the rightmost are moved without change into the alphanumeric result field. If the rightmost character is signed and it is to be moved to the alphanumeric result field, it is converted to its alphanumeric equivalent before it is moved; that is, +1=A, +2=B, ... +9=I and -1=J, -2=K, ... -9=R.

- Multiply (MULT)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**MULT**	**Required**	**Required**	**Optional**

The MULT operation algebraically multiplies the contents of factor 1 by the contents of factor 2 and stores the result in the result field. Note that when this operation is used, the result field must be large enough to hold the product; however, keep in mind the maximum size that can be specified for the result field for arithmetic operations is 15.

- Move Remainder (MVR)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**MVR**	**Blank**	**Required**	**Optional**

The MVR operation places zeros in the result field and moves the remainder of the immediately preceding DIV operation into the result field. If the DIV operation used factors with decimal positions, the result field for the MVR operation must be large enough to provide for the proper number of decimal positions for the remainder. The number of decimal positions required for the remainder is determined by the following formulas:

Whichever is greater. $\left\{ \begin{matrix} dp_2 + dp_r \\ \text{or} \\ dp_1 \end{matrix} \right\}$ = number of decimal positions required for remainder

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where:

dp_2
Is the number of decimal positions in factor 2 (divisor) of immediately preceding DIV operation.

dp_r
Is the number of decimal positions in result field (quotient) of immediately preceding DIV operation.

dp_1
Is the number of decimal positions in factor 1 (dividend) of immediately preceding DIV operation.

Note that the remainder will have the same sign as the dividend of the immediately preceding DIV operation.

- Next Workstation Input (NEXT)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**NEXT**	**Required**	**Blank**	**Optional**

The NEXT operation forces input from a particular workstation of a multiple workstation file. If you specify the NEXT operation more than once between input operations, only the last operation is in effect. Only use the NEXT operation with a workstation file (WORKSTN in columns 40 through 46 on the file description specifications form).

In factor 1, enter the name of a 2-character field that contains the device identification, or enter a 2-character alphanumeric literal that is the device identification. The next input to the program comes from this device. Input from all other workstations is held up.

In factor 2, enter the name of the WORKSTN file for which the operation is requested.

In the resulting indicator field, enter an indicator in columns 56 and 57. If an exception/error occurs on the NEXT operation, this indicator is set on. If you specify the INFSR subroutine and don't enter an indicator in columns 56 and 57, the subroutine automatically receives control when an exception/error occurs. If you don't specify the INFSR subroutine and also don't enter an indicator in columns 56 and 57, the program halts when an exception/error occurs.

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- Read Record (READ)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**READ**	**Required**	**Blank**	**Optional**

The READ operation immediately retrieves a record from a demand file. Factor 2 specifies the name of the demand file.

The equal field (columns 58 and 59) of the resulting indicators may be used with the READ operation to specify an indicator that is to be set on when the demand file reaches end-of-file. (Columns 54 through 57 must be blank.) If an indicator is not present in this field and the end-of-file is reached, the HO (halt O) indicator is set on.

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- External Subroutine Access to RPG II Program (RLABL)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Blank	**Blank**	**RLABL**	**Blank**	**Required**	**Blank**

The RLABL operation allows an external subroutine to access a field, table, array, or indicator that is used in your program. The result field specifies the field, table, array, or indicator that is to be accessed.

When the result field is a table or array name, the address plus 16 of the table linkage or array linkage field is supplied by the RPG II program. The formats of the linkage fields are shown in the system messages programmer/operator reference, UP-8076 (current version).

If an indicator is to be accessed by an external subroutine, the entry in the result field of the RLABL operation must be INnn (nn is any 2-character indicator except 1P or LO).

If more than one RPG external subroutine must access a field, table, array, or indicator, it is not necessary to provide an RLABL operation for each subroutine. One RLABL for each field, table, array, or indicator to be accessed is all that is needed.

To link your program to a FORTRAN or COBOL subroutine, every EXIT to the external subroutine must be followed immediately by the RLABL fields.

- Select Key Structure (SETK)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**SETK**	**Required**	**Blank**	**Blank**

The SETK operation selects the key structure that retrieves an indexed file. Factor 1 (column 18) must contain a number from 1 to 5. After the SETK operation selects the key structure, that structure is used until you change it.

Factor 2 contains the file name.

CALCULATION SPECIFICATIONS

- Set Off (SETOF)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**SETOF**	**Blank**	**Blank**	**Required**

The SETOF operation sets off the resulting indicators specified in columns 54 and 55, 56 and 57, and 58 and 59.

- Set On (SETON)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**SETON**	**Blank**	**Blank**	**Required**

The SETON operation sets on the resulting indicators specified in columns 54 and 55, 56 and 57, and 58 and 59.

- System Shutdown (SHTDN)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**SHTDN**	**Blank**	**Blank**	**Required**

The SHTDN operation sets on the resulting indicator if a system shutdown is requested by the operator. The indicator then conditions the termination of the program in an orderly fashion, such as printing some partial totals and going to normal end-of-job. The resulting indicator field (columns 54 through 59) must contain 01 through 99, L1 through L9, U1 through U8, H1 through H9, or LR in columns 54 and 55.

CALCULATION SPECIFICATIONS

- Sort an Array (SORTA)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9–17	18–27	28–32	33–42	43–48	54–59
	Optional	**Blank**	**SORTA**	**Required**	**Blank**	**Blank**

The SORTA operation is used to sort the elements of an array in ascending or descending sequence. Sorting is performed according to the sequence specified in column 44 of the file extension specifications for the array The standard EBCDIC collating sequence is used for the SORTA operation. If an alternating collating sequence is defined, it is not used.

- Square Root (SQRT)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**SQRT**	**Required**	**Required**	**Blank**

The SQRT operation determines the square root of the contents of factor 2 and stores it in the result field. If factor 2 is zero, the result will be zero. If factor 2 contains a negative value and the operation is executed, the HO indicator is set on and the program terminates. Half adjust (column 53) may be specified with this operation. Half adjust takes place after the square root has been computed and then the adjusted square root is placed in the result field.

- Subtract (SUB)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Required**	**SUB**	**Required**	**Required**	**Optional**

The SUB operation algebraically subtracts the contents of factor 2 from the contents of factor 1 and stores the result in the result field.

CALCULATION SPECIFICATIONS

- Tag (TAG)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Blank	**Required**	**TAG**	**Blank**	**Blank**	**Blank**

The TAG operation is used in conjunction with the GOTO operation to specify the name of the point to which the program may branch. This name is specified in factor 1. When the GOTO operation is used, factor 2 of that operation must specify the same name as the one specified in the TAG operation for the point to which the program is to branch. If a TAG operation is branched to by a total time GOTO operation, the control level field (columns 7 and 8) for that TAG operation must contain LO through LR.

- Test Bit (TESTB)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**TESTB**	**Required**	**Required**	**Required**

The TESTB operation is used to test which bits are on in a 1-character alphanumeric field. The field to be tested is specified in the result field. Factor 2 is used to specify which bits in the result field are to be tested. The bits that are to be tested can be specified by a 1-character field or the numbers of the bits (0 through 7) enclosed in apostrophes.

If a 1-character field is specified in factor 2, the bits that are set on in this field cause the corresponding bits in the result field to be tested.

If the bits specified by factor 2 are mixed (zeros and ones) in the result field, the resulting indicator specified in columns 56 and 57 is set on.

If the bits specified by factor 2 are all ones in the result field, the resulting indicator specified in columns 58 and 59 is set on.

Note that if a field containing all zeros is specified in factor 2, no resulting indicators will be set on. Note also that if only one bit is to be tested, a resulting indicator must not be specified in columns 56 and 57 (mixed).

- Test Numeric (TESTN)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9–17	18–27	28–32	33–42	43–48	54–59
	Optional	**Blank**	**TESTN**	**Blank**	**Required**	**Required**

The TESTN operation checks the result field for numeric characters. If all the characters are numeric, the indicator specified in columns 54 and 55 is set on. If the field contains leading blanks followed by numeric characters, the indicator specified in columns 56 and 57 is set on. If the field contains all blanks, the indicator in columns 58 and 59 is set on. Each character, except the low-order character, must contain a hexadecimal F in the zone portion and a digit (0 through 9) in the digit portion to be considered numeric. The low-order character may contain a hexadecimal C, D, or F in the zone portion and a digit in the digit portion.

The TESTN operation validates the data prior to moving it into a numeric field for arithmetic and editing operations.

- Test Zone (TESTZ)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9–17	18–27	28–32	33–42	43–48	54–59
	Optional	**Blank**	**TESTZ**	**Blank**	**Required**	**Required**

The TESTZ operation tests the zone portion of the leftmost position of the result field for the condition specified in the resulting indicator field (columns 54 through 59); that is, the zone portion is plus (hexadecimal C zone – includes A through I, &), the zone portion is minus (hexadecimal D zone – includes J through R, –), or the zone portion is zero (any zone other than hexadecimal C or D – includes S through Z, and all other characters). If the condition is satisfied, the specified indicator is set on. The result field must be alphanumeric.

CALCULATION SPECIFICATIONS

- Time (TIME)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**TIME**	**Blank**	**Required**	**Blank**

The TIME operation allows you to access the system time of day and date. The result field must specify the name of a numeric field with no decimal places. If you specify a 6-digit field, the system time of day in the form hhmmss is retrieved. If you specify a 12-digit field, the system time of day and date in the form hhmmssyymmdd is retrieved.

- RPG II Program to External Subroutine Access (ULABL)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Blank	**Blank**	**ULABL**	**Blank**	**Required**	**Blank**

The ULABL operation allows your program to access fields contained in an external subroutine. The result field specifies the name of the field that is to be accessed. The field length (number of digits if numeric) must be specified in columns 49 through 51 and the number of decimal positions in column 52. An array name, table name, or INxx must not be specified in the result field. The field is in packed decimal format.

- Cross-foot (XFOOT)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**XFOOT**	**Required**	**Required**	**Optional**

The XFOOT operation adds the contents of the elements of the array specified in factor 2 and places the sum in the result field. Half adjust (column 53) may be specified with this operation. Half adjust takes effect after the sum has been computed, and the adjusted sum is placed in the result field.

CALCULATION SPECIFICATIONS

- Zero and Add (Z-ADD)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**Z-ADD**	**Required**	**Required**	**Optional**

The Z-ADD operation adds the contents of factor 2 to a field of zeros and stores the result in the result field.

- Zero and Subtract (Z-SUB)

	CONDITIONS	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD	RESULTING INDICATORS
COLS.:	9-17	18-27	28-32	33-42	43-48	54-59
	Optional	**Blank**	**Z-SUB**	**Required**	**Required**	**Optional**

The Z-SUB operation subtracts the contents of factor 2 from a field of zeros and stores the result in the result field. This causes the sign of the field to be changed.

CALCULATION SPECIFICATIONS

Table 2—11. Summary of Operations (Part 1 of 2)

Conditions (Columns 9-17)	Factor 1 (Columns 18-27)	Operation (Columns 28-32)	Factor 2 (Columns 33-42)	Result Field (Columns 43-48)	Resulting Indicators (Columns 54-59)
Optional	Required	ADD	Required	Required	Optional
Blank	Required	BEGSR	Blank	Blank	Blank
Optional	Blank	BITOF	Required	Required	Blank
Optional	Blank	BITON	Required	Required	Blank
Optional	Required	CHAIN	Required	Blank	Optional
Optional	Required	COMP	Required	Blank	Required
Optional	Optional	DEBUG	Required	Optional	Blank
Optional	Required	DIV	Required	Required	Optional
Optional	Optional	DSPLY	Required	Optional	Blank
Blank	Optional	ENDSR	Optional	Blank	Blank
Optional	Blank	EXCPT	Blank	Blank	Blank
Optional	Blank	EXIT	Required	Blank	Blank
Optional	Blank	EXSR	Required	Blank	Blank
Optional	Blank	FORCE	Required	Blank	Blank
Optional	Blank	GOTO	Required	Blank	Blank
Optional	Required	LOKUP	Required	Optional	Required
Optional	Blank	MHHZO	Required	Required	Blank
Optional	Blank	MHLZO	Required	Required	Blank
Optional	Blank	MLHZO	Required	Required	Blank
Optional	Blank	MLLZO	Required	Required	Blank
Optional	Blank	MOVE	Required	Required	Blank
Optional	Blank	MOVEA	Required	Required	Blank
Optional	Blank	MOVEL	Required	Required	Blank
Optional	Required	MULT	Required	Required	Optional
Optional	Blank	MVR	Blank	Required	Optional
Optional	Required	NEXT	Required	Blank	Optional
Optional	Blank	READ	Required	Blank	Optional

CALCULATION SPECIFICATIONS

Table 2—11. Summary of Operations (Part 2 of 2)

Conditions (Columns 9-17)	Factor 1 (Columns 18-27)	Operation (Columns 28-32)	Factor 2 (Columns 33-42)	Result Field (Columns 43-48)	Resulting Indicators (Columns 54-59)
Blank	Blank	RLABL	Blank	Required	Blank
Optional	Required	SETK	Required	Blank	Blank
Optional	Required	SETLL	Required	Blank	Blank
Optional	Blank	SETOF	Blank	Blank	Required
Optional	Blank	SETON	Blank	Blank	Required
Optional	Blank	SHTDN	Blank	Blank	Required
Optional	Blank	SORTA	Required	Blank	Blank
Optional	Blank	SQRT	Required	Required	Blank
Optional	Required	SUB	Required	Required	Optional
Blank	Required	TAG	Blank	Blank	Blank
Optional	Blank	TESTB	Required	Required	Required
Optional	Blank	TESTN	Blank	Required	Required
Optional	Blank	TESTZ	Blank	Required	Required
Optional	Blank	TIME	Blank	Required	Blank
Blank	Blank	ULABL	Blank	Required	Blank
Optional	Blank	XFOOT	Required	Required	Optional
Optional	Blank	Z-ADD	Required	Required	Optional
Optional	Blank	Z-SUB	Required	Required	Optional

- Result Field (Columns 43 through 48)

  Specifies the storage area where the result of an operation is placed.

  r r r r r r

  One to six alphanumeric characters that specify the field name, table name, array name, or array element where the result of the operation is placed. The first character must be an alphabetic character.

  The following rules apply:

  1. The entry must be left-justified.

  2. Special RPG II names and look-ahead fields must not be specified in this field, but page field is permitted.

CALCULATION SPECIFICATIONS

- Field Length (Columns 49 through 51)

  Specifies the length of the result field. The length specified should be sufficient to hold the result. If it is not, truncation may occur. If the field is alphanumeric, the leftmost characters are truncated. If the field is numeric, truncation may occur on either or both ends, depending upon the number of decimal positions that have been specified in column 52.

  Blank
  The result field is defined elsewhere in the program.

  1 through **256**
  The maximum field length is 15 for numeric fields and 256 for alphanumeric fields.

  The following rules apply:

  1. The entry must be right-justified. Leading zeros may be omitted.

  2. If the result field is defined elsewhere in the program and an entry is made in this field, this entry must not contradict the previous entry.

- Decimal Positions (Column 52)

  Specifies the number of decimal places if the result field is numeric. If the result field is alphanumeric, this field must be blank.

  Blank
  The result field is alphanumeric or it has been defined elsewhere.

  Ø through **9**
  The number of decimal positions that are required in the result field.

  The following rules apply:

  1. If the result field is numeric and has no decimal places, a zero must be entered in this field.

  2. If the result field is defined elsewhere in the program and an entry is made in this field, this entry must not contradict the previous entry.

- Half Adjust (Column 53)

  Rounds the value in a numeric result field to the least significant decimal place. If the result field is alphanumeric, this field must be blank.

  Blank
  Do not round or the result field is alphanumeric.

  H
  Round.

  The following rules apply:

  1. Rounding can be specified only with arithmetic operations.

CALCULATION SPECIFICATIONS

2. If rounding is specified, the resulting indicators (columns 54 through 59) are set according to the value of the result field after rounding.

3. If rounding is specified for a divide operation (DIV), do not use a move remainder operation (MVR).

Resulting Indicator Entries (Columns 54 through 59):

Specifies the tests that are performed on the results of the operations and the indicators that are set on to condition subsequent operations if the conditions of the tests are met.

The resulting indicator entries are made in the +, 1>2, or high field (columns 54 and 55); the -, 1<2, or low field (columns 56 and 57); and the 0, 1=2, or equal field (columns 58 and 59).

The following entries are permitted:

`01` through `99`
General indicators.

`H0` through `H9`
Halt indicators.

`L1` through `L9`
Control level indicators.

`LR`
Last record indicator.

`0A` through `0G`, `0V`
Overflow indicators that have been specified in columns 33 and 34 of the file description specifications form.

`U1` through `U8`
External indicators. Upon program termination, U1 through U8 are written to the UPSI byte of the job preamble.

`KA` through `KN` and `KP` through `KW`
Function key indicators.

The following rules apply:

1. A resulting indicator must be specified if a COMP, LOKUP, SETON, SETOF, TESTB, or TESTZ operation is used.

2. Any indicator that is specified is set off if the test conditions are not met.

3. When a control level indicator (L1 through L9 and LR) is set on, the lower level control indicators are not set on.

4. When a halt indicator (H0 through H9) is set on, the program terminates unless the indicator is set off.

CALCULATION SPECIFICATIONS

- +, 1>2, or High (Columns 54 and 55)

  Specifies a test for any of the following conditions and specifies the indicator to be set on if the condition is satisfied.

  1. The bits tested in a TESTB operation are all zeros.
  2. Factor 1 is greater than factor 2 in a COMP operation.
  3. The result of an arithmetic operation is plus.
  4. The zone tested in a TESTZ operation is a plus zone (EBCDIC characters A–I, &, and hexadecimal CA–CF).
  5. A CHAIN operation was performed and the record was not found.
  6. To search for the element in the factor 2 table/array that is closest to yet is greater than factor 1 in a LOKUP operation.

- –, 1<2, or Low (Columns 56 and 57)

  Specifies a test for any of the following conditions and specifies the indicator to be set on if the condition is satisfied.

  1. The bits tested in a TESTB operation are mixed (zeros and ones).
  2. Factor 1 is less than factor 2 in a COMP operation.
  3. The result of an arithmetic operation is minus.
  4. To search for the element in the factor 2 table/array that is closest to yet is less than factor 1 in a LOKUP operation.
  5. The zone tested in a TESTZ operation is a minus zone (EBCDIC characters –, J–R, and hexadecimal DA–DF).
  6. A CHAIN operation was performed and the record was not found.

- 0, 1 = 2, or Equal (Columns 58 and 59)

  Specifies a test for any of the following conditions and specifies the indicator to be set on if the condition is satisfied.

  1. The bits tested in a TESTB operation are all ones.
  2. To search for the element in the factor 2 table/array that is equal to factor 1 in a LOKUP operation.

CALCULATION SPECIFICATIONS

3. The result of an arithmetic operation is zero. If the result field that is tested for zeros is an output field that is also reset to zero after it is placed in the output record (B in column 39 of the output format specifications form), the indicator specified on the calculation specification form is not set on after the field is reset to zeros. If, however, S is specified in column 42 of the control card, the first indicator in a test for zeros associated with this field is set on after the field is reset to zeros.

4. Factor 1 is equal to factor 2 in a COMP operation.

5. End-of-file was reached on a demand file during a READ operation.

6. The zone tested in a TESTZ operation is neither plus nor minus (EBCDIC characters other than those with a –, &, or hexadecimal C or D zone).

7. A CHAIN operation was performed and the record was found.

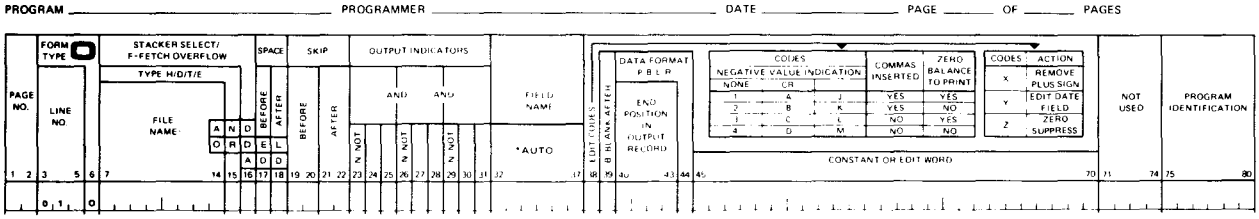
OUTPUT FORMAT SPECIFICATIONS

Function:

This form is required. It identifies the output files, describes the format of the fields in the output records, and specifies when these records are to be written. This information is supplied by two types of entries: output file identification and control, and field description and control.

Format:

OUTPUT FORMAT SPECIFICATIONS



Output File Identification and Control Entries (Columns 7 through 31):

Identifies the output files (printer, tape, disk, and punched card) and the record types in each file, controls the spacing on printed reports, controls the stacker selection for punched card output, and controls when the output records are produced.

- File Name (Columns 7 through 14)

  Specifies the name of the output file that receives the output records. The name must be the same name that is specified for this file on the file description specifications form. A file name must be entered on the first file identification line for each output file.

- Type (Column 15)

  Specifies the output record type with regard to what point in the processing cycle it is produced, that is, at detail time, total time, or calculation time. The record types in an output file can be specified in any sequence.

  H

  Heading record; processed at detail time and usually contains heading information for a printed report.

  D

  Detail record; processed at detail time and usually contains data from input records or calculations performed at detail time.

  T

  Total record; processed at total time (when a control break occurs) or when data is exhausted. It usually contains summaries or totals of data accumulated from detail time calculations.

  E

  Exception record; processed during calculation time when the EXCPT operation is encountered.

OUTPUT FORMAT SPECIFICATIONS

- Stacker Select/Fetch Overflow (Column 16)

Specifies the stacker for the punched card output or that the fetch overflow routine is to be used to cause overflow processing to occur at this point in the program rather than at the completion of the total cycle.

Blank
: Stacker select or fetch overflow is not used; the output file is other than a card, printer, or line counter file.

1 - n
: The number of the stacker in which the punched card output is to be placed. An entry of 1 puts the card into the normal stacker, and an entry of 2 through n places the card in an alternate stacker.

F
: Fetch overflow routine. When a line is encountered that requests the fetch overflow routine and all output conditions specified in columns 23 through 31 are satisfied, the overflow indicator specified for the output file (columns 33 and 34 of the file description specifications form) is checked to see whether it is set on. If it is on, all overflow output records associated with the output file are written, and the program returns to the line that requested the fetch overflow routine and writes the output record associated with it.

The following rules apply to this field:

1. An entry must be made for each entry of an OR relationship.
2. An entry made here overrides an entry made for the card type in a combined file on the input specifications form if the output operations for the card type are performed.
3. This field is ignored for IMS action programs.

- AND/OR Relationships (Columns 14 through 16)

Specifies indicators to condition the output. The AND relationship is used when more than three output indicators (columns 23 through 31) are required to condition the output when an output record is written. The OR relationship is used when any of two or more output indicators are required. AND/OR lines cannot be used to condition output fields. The maximum number of AND/OR relationships per record definition is 80.

An AND relationship is established by placing the first three output indicators on the first line and the additional entries on succeeding lines, and entering AND in columns 14 through 16 on each additional line that is used. Columns 17 through 22 (space and skip fields) must be left blank on AND lines.

An OR relationship is established by placing OR in columns 14 and 15 and placing the alternate output indicator entries in columns 23 through 31 on the next line after the first line. If additional output indicators are needed, these can be placed on succeeding OR lines. Entries may be made in columns 16 through 22 (stacker select/fetch overflow, space, and skip fields) on OR lines if required. If these fields are blank on an OR line, the entries on the preceding line apply to this line.

OUTPUT FORMAT SPECIFICATIONS

- Adding and Deleting Existing Indexed Sequential File Records and Deleting Transaction Buffers (Columns 16 through 18)

  Records can be added to an existing sequential output file or an indexed sequential input, output, or update file by placing A in column 66 of the file description specifications form on the line that defines the file to be added to and by placing ADD in columns 16 through 18 of this form on the line that contains the record type (D, T, or E in column 15). If an OR line follows an ADD line, record addition will also apply to that line.

  Records can be deleted from an existing IMS indexed file by placing DEL in columns 16 through 18. The deleted record is marked with an X'FF' in the first byte of data.

  To delete a transaction buffer area (TBA) from an IMS action program, place DEL in columns 16 through 18.

- Space (Columns 17 and 18)

  Controls the spacing of printed reports (printer or line counter files). The before field (column 17) specifies the number of lines to be spaced before printing. The after field (column 18) specifies the number of lines to be spaced after printing.

  `0` or `Blank`
  No spacing. If columns 17 through 22 are left blank, one line will be spaced after printing.

  `1` through `n`
  Number of lines to be spaced (before or after printing). The maximum number of lines to be spaced is dependent upon the type of printer subsystem that is being used.

  The following rules apply:

  1. If both spacing and skipping are specified for the same line, the operations are performed in the following order:

     a. Skip before

     b. Space before

     c. Print

     d. Skip after

     e. Space after

  2. If possible, space after should be specified rather than space before because space before tends to slow printing.

- Skip (Columns 19 through 22)

  Used with the space fields to control the spacing of printed reports. The before field (columns 19 and 20) specifies the number of the channel of the printer form control tape to be skipped to before printing. The after field (columns 21 and 22) specifies the number of the channel to be skipped to after printing.

OUTPUT FORMAT SPECIFICATIONS

Blank
No skipping.

01 through 13
Specifies the number of the channel of the printer form control tape to be skipped to.

01 through 112
IBM System/3 mode. This field specifies the specific line number on a printable form to be skipped to. Since this field is a 2-digit entry, the following convention is used for line numbers greater than 99: A0 through A9 is equivalent to lines 100 through 109, and B0 through B2 is equivalent to lines 110 through 112.

The following rules apply:

1. If both spacing and skipping are specified for the same line, the operations are performed in the following order:

   a. Skip before

   b. Space before

   c. Print

   d. Skip after

   e. Space after

2. Since more than one type of printer subsystem can be used, the following conventions should be used to maintain device independence for programs that are to be compiled in the OS/3 mode: only channels 01 through 07 should be entered in these fields and, of these, channel 01 should be used for forms overflow and channel 07 for home paper. The channel numbers that are specified will be automatically translated to the appropriate channel numbers for the particular printer subsystem. Channels 8 through 13 may be used; however, their use is not recommended. If they are used, they will also be automatically translated. This translation will also take place for programs that are to be compiled in the SPERRY UNIVAC 9200/9300 mode or the IBM 360/20 mode.

   Table 2-12 shows the channel numbers for each compilation mode and the channel numbers that they are translated to for the various printer subsystems.

   Note that if you specify a channel number in this field, the equivalent channel number or the one that it is translated to must be specified in a //△VFB statement in your job control stream or punched on the carriage control tape for the printer subsystem that is being used.

3. If the skip code entry is less than the previous entry in the IBM System/3 mode, the result is a skip to a new page without setting the overflow indicator on.

   If the entry is greater than the overflow line but less than the total number of lines specified, the overflow indicator is turned on and remains on until all overflow lines are printed.

OUTPUT FORMAT SPECIFICATIONS

Table 2—12. Skip Channel Number Translation

Channel Number Specified			Channel Number Used		
SPERRY UNIVAC OS/3 Mode	**SPERRY UNIVAC 9200/9300 Mode**	**IBM 360/20 Mode**	**0768 Printer**	**0770 Printer**	**0773 Printer**
01	01	12	09 (forms overflow)	09② (forms overflow)	01 (forms overflow)
02	02	02	02	02	02
03	03	03	03	03	03
04	04	04	04	04	04
05	05	05	05	05	05
06	06	06	06	06	06
07	07	01	14① (home paper) 15① (home paper)	07② (home paper)	07 (home paper)
08	-	08.09	08	02	02
09	-	-	09	09 (forms overflow)	01 (forms overflow)
10	-	10	10	10	03
11	-	11	11	11	04
12	-	07	12	12	01 (forms overflow)
13	-	-	13	13	05

① There are two home paper channels for the 0768 printer. If channel 14 is used, the line spacing is six lines per inch; if channel 15 is used, the line spacing is eight lines per inch. If channel 07 is specified for a SPERRY UNIVAC OS/3 or 9200/9300 mode program or channel 01 for an IBM 360/20 mode program, the printer skips to whichever channel (14 or 15) is punched on the carriage control tape or specified in the //△VFB statement in the job control stream.

② Channel 07 must always be punched for home paper and channel 09 must always be punched for forms overflow on the carriage control tape for the 0770 printer.

OUTPUT FORMAT SPECIFICATIONS

- Output Indicators - Records (Columns 23 through 31)

Specifies the indicators that are tested to determine whether the record is to be written. Up to three indicators may be specified on a line. The indicators are specified in columns 24 and 25, 27 and 28, and 30 and 31. Whether an indicator is to be on or off is specified in columns 23, 26, or 29 (N=NOT).

If two or more fields have the same condition, you can use an asterisk (*) in column 25. Do not use an asterisk with the field names PAGE or PAGE1 through PAGE7. For more information, see 14.4.2.

`Blank`
The record is always written.

`01` through `99`
General indicators.

`L0` through `L9`
Control level indicators.

`LR`
Last record indicator.

`H0` through `H9`
Halt indicators.

`MR`
Matching record indicator.

`1P`
First page indicator, which is prohibited for workstation terminal files.

`0A` through `0G`, `0V`
Overflow indicators.

`U1` through `U8`
External indicators.

`KA` through `KN` and `KP` through `KW`
Function key indicators. ←

`N (NOT)`
The indicator specified in the next two columns must not be on. If the indicator is on, the record is not written.

`*`
The record on this line will be written each time the record on the preceding line is written. The asterisk (*) must be placed in column 25.

OUTPUT FORMAT SPECIFICATIONS

The following rules apply:

1. On and not on conditions may be intermixed on the same line.
2. The 1P indicator must not be specified for a total or exception record (T or E in column 15).
3. An overflow indicator (OA–OG, OV) must not be specified on an AND line.
4. Stacker and fetch overflow (column 16) cannot be specified on an AND line.
5. An overflow indicator must not condition an exception record (E in column 15) but may condition a field within the exception record.

Field Description and Control Entries (Columns 23 through 70):

Defines the individual fields of the output record, describes the kind of data in each field, and controls when the field is to be produced. The field description entries for a given record are always written on the lines immediately following the output file identification and control entries.

- Output Indicators – Fields (Columns 23 through 31)

Specifies the indicators that are tested to determine whether the field described on this line is to be written. The indicators are specified in columns 24 and 25, 27 and 28, and 30 and 31. Whether an indicator is to be on or off is specified in columns 23, 26, or 29 (N=NOT).

`Blank`
The field is always written.

`Ø1` through `99`
General indicators.

`L1` through `L9`
Control level indicators.

`LR`
Last record indicator.

`HØ` through `H9`
Halt indicators.

`MR`
Matching record indicator.

`1P`
First page indicator, which is prohibited for workstation terminal files.

`OA` through `OG`, `OV`
Overflow indicators.

`U1` through `U8`
External indicators.

OUTPUT FORMAT SPECIFICATIONS

KA through KN and KP through KW
Function key indicators.

N (NOT)
The indicator specified in the next two columns must not be on. If the indicator is on, the field is not written.

*
The field on this line is written each time the field on the preceding line is written. The asterisk must be placed in column 25.

The following rules apply:

1. On and not on entries may be intermixed on the same line.

2. The 1P indicator must not be specified for a field that is associated with a total or exception record.

- Field Name (Columns 32 through 37)

Identifies the field in the output record that is to be written, punched, or printed. The conditions for both the field and the record it is contained in must be met before output can take place.

Blank
The field to be written is a constant or literal that is specified in columns 45 through 70.

cccccc
One to six alphanumeric characters that specify the name of the field, table, array, or array element. The name must be one that was previously defined on the input format specifications form or calculation specifications form. If a table or array name is specified, it must have been previously defined on the file extension specifications form. When an array name is specified, the entire array is written. When an array element is specified, that element is written. When a table name is specified, the element last found in a LOKUP operation is written. If no LOKUP operation was performed, the first element of the table is written. If an unsuccessful LOKUP operation follows a successful one, the element found in the successful operation is written.

*ERROR
RPG II special name. This is the name of a 1-byte field that contains a specific error code whenever an error condition sets the H0 indicator on. This field may be interrogated to determine the cause of the error.

PAGE, PAGE1 through PAGE7
RPG II special names that are used to cause automatic sequential page numbering on printed reports. For further information, see Section 4.

*PLACE
RPG II special name that causes the previously defined fields in an output record to be repeated in that output record. When *PLACE is entered in this field, all data between position 1 and the highest end position specified (columns 40 through 43) for the output record is repeated in that record in the positions ending with the end position specified for the *PLACE line. The end position for the *PLACE line must be no greater than 256.

OUTPUT FORMAT SPECIFICATIONS

UPDATE or D?TE
RPG II special name that places the system date in an output record in the positions specified. The system date consists of six numeric characters in the form:

mmddyy

where:

mm=month
dd=day
yy=year

UDAY
RPG II special name that places the day (dd) from the system date in an output record in the positions specified.

UMONTH
RPG II special name that places the month (mm) from the system date in an output record in the positions specified.

UYEAR
RPG II special name that places the year (yy) from the system date in an output record in the positions specified.

The following rules apply:

1. The entry must be left-justified.

2. The fields may be listed in any sequence.

- Edit Codes (Column 38)

Specifies edit codes that automatically suppress leading zeros and/or punctuate (insert commas or slashes) or place a negative value indicator (- or CR) in a numeric field.

Blank
The field is an alphanumeric field, or a constant or edit word has been specified in columns 45 through 70.

1 through 4, A through D, J through M, X through Z
The various edit codes. For further information, see Section 4.

- Blank After (Column 39)

Resets the contents of a field to zeros or blanks after the field is placed in the output record. If the field is numeric, zeros are placed in the field. If the field is alphanumeric, blanks are placed in the field.

Blank
The field is not reset.

B
The field is reset to zeros or blanks.

The following rules apply:

1. This entry must be blank for constants and RPG II special names.

2. When blank-after is specified and column 42 of the control card specifications form contains an S, the first indicator that was tested for zeros or blanks for the field (in columns 69 and 70 on either the input format specifications form or the calculation specifications form) is set on after the field is placed in the output record.

- End Position in Output Record (Columns 40 through 43)

Specifies the location in the output record where the rightmost character of a field, constant, or literal is to be placed.

0001 through 9999
The end position of the field.

The following rules apply:

1. The entry in this field must be right-justified. Leading zeros may be omitted.

2. If the field is to be edited, the end position that is specified must take into consideration the additional characters that are added by the edit operation. If this is not done, the output fields may overlap.

3. For workstation terminal fields, this refers to the end position of the field, not the end position of the field as shown on the screen.

- Length of Screen Format Name (Columns 42 and 43)

To use screen formats, name the format and determine the length of this name. The length is marked in these two columns with a Kn, where n is the length of the name. These two columns are used in conjunction with columns 45 through 54, where the format name for each record within a workstation terminal file is written.

- Data Format (Column 44)

Specifies the data format of the field.

Blank
Alphanumeric format.

B (binary)
Binary format.

P (packed)
Packed decimal format.

OUTPUT FORMAT SPECIFICATIONS

L (left)
A numeric field with a preceding plus or minus sign.

R (right)
A numeric field with a following plus or minus sign.

The following rules apply:

1. If L or R is specified, an additional position must be provided for the preceding or following plus or minus sign when the end position is specified in columns 40 through 43.

2. This entry must be blank if the field is to be edited or a constant is specified in columns 45 through 70.

- Constant (Columns 45 through 70)

Specifies alphanumeric or hexadecimal constants or literal values that are to be placed in the output record. Any unspecified bytes of the field are set to blanks. An apostrophe in a constant must be represented by two apostrophes.

'alphanumeric characters'
An alphanumeric constant. A maximum of 24 alphanumeric characters, including blank, may be specified.

X 'hexadecimal digits'
A hexadecimal constant. A maximum of 22 hexadecimal digits may be specified. Since each hexadecimal digit represents one-half byte of information, the constant should consist of an even number of digits so that full bytes of information are produced. If the constant consists of an odd number of digits, full bytes of information are produced; however, the byte that the leftmost digit in the constant is placed in will contain zeros in the high-order bit positions.

- Edit Word (Columns 45 through 70)

The editing of a numeric field can usually be handled by one of the edit codes. Special editing is handled by specifying an edit word in this field.

Blank
The field is an alphanumeric field, or an edit code is specified in column 38.

'edit word'
An edit word consisting of 1 to 24 characters enclosed in apostrophes that specify the required editing. For further information, see Section 4.

- Format Name (Columns 45 through 54)

A screen format name must be given to each record within a workstation terminal file. The name is written in columns 45 through 54. The entire 10 columns need not be filled, but all entries must be left-justified. Whatever name you choose, the number of characters used must be recorded in columns 42 and 43. Indicators cannot condition the line containing the format name.

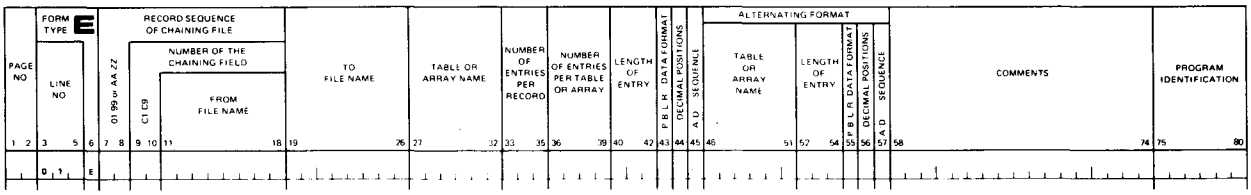
FILE EXTENSION SPECIFICATIONS

Function:

This form is required when chaining files, record address files, tag (ADDROUT) files, tables, or arrays are used in your program. The entries on this form provide additional information about these files to the RPG II compiler.

Format:

FILE EXTENSION SPECIFICATIONS



Entries:

- Record Sequence of Chaining File (Columns 7 and 8)

  Specifies the sequence of the records in the chaining file when chaining is performed by using the C1 through C9 chaining indicators.

  Blank
  : 9200/9300 and IBM 360/20 mode.

  AA through ZZ, Ø1 through 99
  : The record sequence of the chaining file as specified in columns 15 and 16 of the input format specifications form.

- Number of the Chaining Field (Columns 9 and 10)

  Specifies the number of the chaining field when chaining is performed by using the C1 through C9 chaining indicators.

  C1 through C9
  : The number of the chaining field as specified in columns 61 and 62 of the input format specifications form.

- From File Name (Columns 11 through 18)

  Used with the to file name field in columns 19 through 26 to specify the relationship between the various files in the program. These entries are summarized in Table 2–11.

  Blank
  : The table or array is loaded at compilation time, or the array is created by the input format calculation specifications form.

  Array file name
  : The name of the array file that is loaded at execution time.

FILE EXTENSION SPECIFICATIONS

Chaining file name
The name of the chaining file that contains the chaining field.

Record address file name
The name of the record address file that contains the keys or record addresses.

Table file name
The name of the table file that is loaded at execution time.

Tag (ADDROUT) file name
The name of the tag (ADDROUT) file that contains the record addresses.

The following rules apply:

1. The entry in this field must be left-justified.

2. The file name that is entered in this field must be the same as that specified in columns 7 through 13 of the file description specifications form.

- To File Name (Columns 19 through 26)

Used with the from file name field in columns 11 through 18 to specify the name of the data file that is processed by a chaining, record address, or tag (ADDROUT) file or to specify the name of the output file that the table or array is written on at the end-of-job. These entries are summarized in Table 2-13.

Blank
The table or array is not written at end-of-job, or the array is created by the input format or calculation specifications form.

Data file name
The name of the data file that is processed by the chaining, record address, or tag (ADDROUT) file.

Output file name
The name of the output file that the table or array is written on at end-of-job.

The following rules apply:

1. The entry in this field must be left-justified.

2. The file name in this field must be the same as that in columns 7 through 13 of the file description specifications form.

3. A table or array output file must be specified as a fixed format file.

FILE EXTENSION SPECIFICATIONS

Table 2—13. Summary of From File Name and To File Name Entries

File Type	From File Name (Columns 11 through 18)	To File Name (Columns 19 through 26)
Array created by input format or calculation specifications form	Blank	Blank
Table or array loaded at execution time	The name of the file that contains the table or array	The name of the output file that the table is written on at end-of-job. If the table or array is not to be written, this entry must be blank.
Table or array loaded at compilation time	Blank	The name of the output file that the table or is written on at end-of-job. If the table or array is not to be written, this entry must be blank.
Chaining file	The name of the chaining file that contains the chaining field	The name of the data file (chained file) that is processed by the chaining file
Record address file	The name of the record address file that contains the keys or record addresses	The name of the data file that is processed by the record address file
Tag (ADDROUT) file	The name of the tag file that contains the record address	The name of the data file that is processed by the tag (ADDROUT) file

- Table or Array Name (Columns 27 through 32)

Specifies the name of a table or array that is used in the program. The table or array file can consist of a single table or array (solitary format) or two tables or arrays (alternating format). The input records in solitary format contain a single table or array element. In alternating format, they contain one element from the first table or array and one element from the second table or array.

If solitary format is used, this field specifies the name of a single table or array. If alternating format is used, this field specifies the name of the first table or array. The name of the second table or array is specified in columns 46 through 51.

Blank
A table or array is not specified.

FILE EXTENSION SPECIFICATIONS

Array name
One to six alphanumeric characters that specify the name of an array in solitary format or the name of the first array in alternating format.

TABaaa
The name of a table in solitary format or the name of the first table in alternating format, where aaa is any combination of alphanumeric characters.

The following rules apply:

1. The entry must be left-justified.
2. An array name must not begin with TAB.
3. The total number of tables and/or arrays (including alternate tables and arrays) in each program cannot exceed 325.

- Number of Entries per Record (Columns 33 through 35)

Specifies the number of table or array elements that are contained in each record.

Blank
An array created by the input format or calculation specifications form.

1 through 999
The number of table or array elements that are contained in each record.

The following rules apply:

1. The entry must be right-justified. Leading zeros may be omitted.
2. Each record except the last must contain exactly the number of table or array entries specified.
3. If this field is blank, the array cannot be automatically written on an output file at end-of-job; consequently, the to file name field (columns 19 through 26) must also be blank in this case.

- Number of Entries per Table or Array (Columns 36 through 39)

Specifies the maximum number of elements that can be contained in a table or array. If expansion is anticipated, a greater number of elements than is actually required can be specified. When fewer elements than the maximum are placed in a table or array, the remaining space is filled with blanks or zeros as appropriate.

1 through 9999
The maximum number of elements that can be contained in the table or array.

- Length of Entry (Columns 40 through 42)

Specifies the length of each table or array element.

1 through 256
The length of each table or array element. The maximum length for alphanumeric elements is 256 characters, and the maximum length for numeric elements is 15 digits.

FILE EXTENSION SPECIFICATIONS

The following rules apply:

1. The entry must be right-justified. Leading zeros may be omitted.
2. If L or R is specified in column 43, the length must include one additional position for the sign.
3. For binary fields, the length must be either four or nine digits.

- Data Format (Column 43)

Specifies the data format of the table or array elements.

`Blank`
The table or array elements are in alphanumeric format or unpacked decimal format, or the array is created by the input format or calculations specifications form.

`B (binary)`
Binary format.

`P (packed)`
Packed decimal format.

`L (left)`
Numeric; preceded by a plus or minus sign.

`R (right)`
Numeric; followed by a plus or a minus sign.

The following rule applies:

This entry must be blank for arrays created by the input format or calculation specifications.

- Decimal Positions (Column 44)

Specifies the number of decimal positions in numeric table or array elements. If the table or array is alphanumeric, this field must be blank.

`Blank`
The table or array is alphanumeric.

`Ø through 9`
The number of decimal positions in the numeric table or array elements.

FILE EXTENSION SPECIFICATIONS

The following rules apply:

1. If the element is numeric (B, P, L, or R specified in column 43), an entry must be made in this field, even if the element does not contain any decimal positions.

2. The number of decimal positions specified must be less than or equal to the length specified in columns 40 through 42.

- Sequence (Column 45)

Specifies the data sequence in a table or array.

Blank
No sequence.

A
Ascending sequence.

D
Descending sequence.

The following rules apply:

1. If A or D is specified, sequence checking is performed when the table or array is loaded. Arrays that are created by the input format or calculation specifications form are not sequence-checked.

2. A or D must be specified if a LOKUP operation with high or low resulting indicators is specified on the calculation specifications form for the table or array.

- Table or Array Name (Columns 46 through 51)

Specifies the name of the second table or array when alternating format is used. The name of the first table or array is specified in columns 27 through 32.

Blank
A table or array is not specified or the table or array that is specified is in solitary format.

Array name
One to six alphanumeric characters that specify the name of the second array.

TABaaa
The name of the second table, where aaa is any combination of alphanumeric characters.

The following rules apply:

1. The entry must be left-justified.

2. An array name must not begin with TAB.

FILE EXTENSION SPECIFICATIONS

- Length of Entry (Columns 52 through 54)

  Specifies the length of each element in the second table or array when alternating format is used.

  1 through 256
  : The length of each element in the second table or array. The maximum length for alphanumeric elements is 256 characters, and the maximum length for numeric elements is 15 digits.

  The following rules apply:

  1. The entry must be right-justified. Leading zeros may be omitted.
  2. If L or R is specified in column 55, the length must include one additional position for the sign.
  3. For binary fields, the length must be either four or nine digits.

- Data Format (Column 55)

  Specifies the data format of the elements in the second table or array when alternating format is used.

  Blank
  : The table or array elements are in alphanumeric format or unpacked numeric format, or the array is created by the input format or calculation specifications.

  B (binary)
  : Binary format.

  P (packed)
  : Packed decimal format.

  L (left)
  : Numeric; preceded by a plus or minus sign.

  R (right)
  : Numeric; followed by a plus or minus sign.

  The following rule applies:

  This entry must be blank for arrays created by the input format or calculation specifications.

- Decimal Positions (Column 56)

  Specifies the number of decimal positions in the elements in the second numeric table or array when alternating format is used.

FILE EXTENSION SPECIFICATIONS

Blank
The table or array is alphanumeric.

Ø through 9
The number of decimal positions in the numeric table or array elements.

The following rules apply:

1. If the element is numeric (P, B, L, or R specified in column 55), an entry must be made in this field, even if the element does not contain any decimal positions.

2. The number of decimal positions specified must be less than or equal to the length specified in columns 52 through 54.

- Sequence (Column 57)

Specifies the data sequence in the second table or array when alternating format is used.

Blank
No sequence.

A
Ascending sequence.

D
Descending sequence.

The following rules apply:

1. If A or D is specified, sequence checking is performed when the table or array is loaded. Arrays that are created by the input format or calculation specifications form are not sequence-checked.

2. A or D must be specified if a LOKUP operation with high or low resulting indicators is specified on the calculation specifications form.

3. This entry must be the same as that specified in column 45.

- Comments (Columns 58 through 74)

Used for comments that relate to the entries on the individual lines of this form. When the program is compiled, these comments will have no effect on the compilation process; however, they will appear on the source program listing that is produced.

LINE COUNTER SPECIFICATIONS

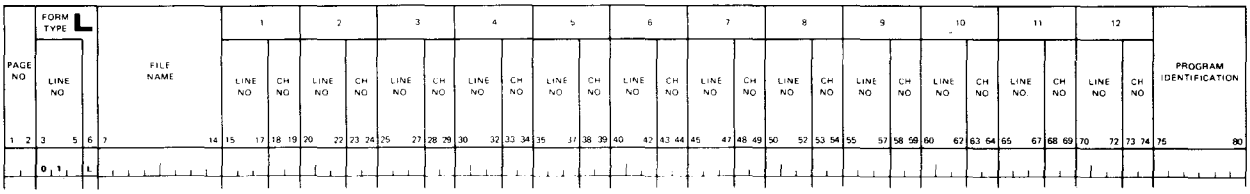
Function:

This form is required if you want to store a report on an intermediate tape or disk file so that it can be printed when your system is not being utilized to its fullest capacity. It is used to cause printer carriage control information (home paper, forms overflow, spacing, and line skipping information related to the lines of the printed page of the report) to be placed in the intermediate output file. When the intermediate output file is ultimately printed (using either the disk-to-printer or tape-to-printer routine as described in the data utilities user guide, UP-8069), the carriage control information that was included causes the printer carriage to perform in the same manner as if the report were being printed at the time that your program produced it.

In the IBM System/3 mode, this form is used to indicate the length of the printed output form and at what line on the form overflow occurs for printer output files.

Format:

LINE COUNTER SPECIFICATIONS



Entries for all modes other than the IBM System/3 mode:

- File Name (Columns 7 through 14)

  Specifies the name of the intermediate output file that the report is written on.

  `intermediate output file name`
  Specifies the name of the intermediate output file. This name must be the same as that specified for this file in columns 7 through 13 of the file description specifications form. This entry must be left-justified.

- Line Number (Columns 15 through 17, 20 through 22, 25 through 27, ..., 70 through 72)

  Relates the line number on the printed page of the report, as it appears on the printer format chart, to a channel number that causes the printer carriage to perform a line skipping, forms overflow, or home paper function for the report.

  `ØØ` through `999`
  Specifies the number of the line associated with the channel number. This entry must be left-justified. Leading zeros may be omitted.

LINE COUNTER SPECIFICATIONS

- Channel Number (Columns 18 and 19, 23 and 24, 28 and 29, ..., 73 and 74)

  Specifies the channel number that is associated with the line number specified in the related line number field (columns 15 through 17, 20 through 22, etc).

  Ø1 through 13
  Specifies the channel number associated with a particular line. This entry must be the same as that specified in columns 19 through 22 of the output format specifications form.

  The following rules apply:

  1. The entry must be right-justified. The leading zero may be omitted.

  2. Channel 1 must be specified for the forms overflow function and channel 7 for the home paper function.

Entries for the IBM System/3 mode:

- File Name (Columns 7 through 14)

  Specifies the name of the printer output file.

  printer output file name
  Specifies the name of the printer output file. This name must be the same as that specified for this file in columns 7 through 14 of the file description specifications form. This entry must be left-justified.

- Line Number - Number of Lines per Page (Columns 15 through 17)

  Specifies the exact number of lines per page on the printed report.

  12 through 112
  Number of printing lines.

  The following rules apply:

  1. This entry must be right-justified. Leading zeros may be omitted.

  2. If less than 12 lines or more than 112 lines are specified, the minimum limit (12 lines) will be assumed.

- Channel Number - Form Length Indicator (Columns 18 and 19)

  Specifies that the preceding entry (Columns 15 through 17) is the form length.

  FL
  The preceding entry is the form length.

LINE COUNTER SPECIFICATIONS

- Line Number - Overflow Line (Columns 20 through 22)

  Specifies the line number associated with forms overflow; that is, the line on the printed page where forms overflow is to occur.

  1 through 112
  The line number associated with forms overflow.

- Channel Number - Overflow Line Indicator (Columns 23 and 24)

  Specifies that the preceding entry (columns 20 through 22) is the overflow line.

  OL
  The preceding entry is the overflow line.

- Line Number (Columns 25 through 27, ..., 70 through 72) and Channel Number (Columns 28 and 29, ..., 73 and 74)

  These columns are not used in the IBM System/3 mode.

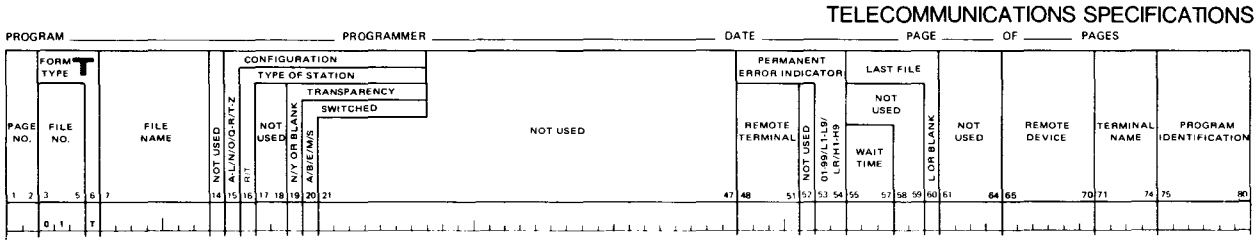
TELECOMMUNICATIONS SPECIFICATIONS

Function:

This form is required when your program is to receive data from or send data to a remote terminal. It supplies information about those files in your program that you have defined as data communications files by specifying REMOTE in columns 40 through 46 of the file description specifications form.

This form should not be used for an IMS action program. IMS will process all telecommunications.

Format:



Entries:

- File Name (Columns 7 through 14)

  Specifies the name of the data communications file your program receives data from or transmits data to.

  `Data communications file name`
  Specifies the name of the data communications file. This name must be the same as that specified in columns 7 through 13 of the file description specifications form.

  The following rules apply:

  1. This entry must be left-justified.
  2. If more than one interactive terminal is associated with the same file, the file name must be repeated on successive contiguous lines for each terminal. An asterisk (*) can be placed in column 14 to indicate that the file name is being repeated. If file names are repeated, columns 15 through 47 and columns 55 through 70 must be blank for all lines following the line that specifies the file name for the first time.
  3. The file name must be unique for batch terminals, auxiliary devices, and output files.

- Configuration (Column 15)

  Specifies whether or not a UNISCOPE 100 or UNISCOPE 200 Display Terminal is attached to a multiplexer.

  `Blank`
  The remote terminal is not attached to a multiplexer.

  `A through L, N, O, Q through R, and T through Z`
  The remote terminal is attached to a multiplexer.

TELECOMMUNICATIONS SPECIFICATIONS

The following rules apply:

1. A unique character must be used for each multiplexer.

2. If more than one terminal is associated with the same file, the file name must be repeated on successive contiguous lines for each terminal and this character must appear on each line.

- Type of Station (Column 16)

Specifies whether data on the file is received from or transmitted to a remote terminal.

R

The data on the file is received from a remote terminal. If this entry is used, the file must be specified as an input or combined file in column 16 of the file description specifications form, and the file name must appear on the input format specifications form.

T

The data on the file is transmitted to a remote terminal. If this entry is used, the file must be specified as an output or combined file in column 15 of the file description specifications form, and the file name must appear on the output format specifications form.

- Transparency (Column 19)

Specifies whether or not the transparent mode, which allows any hexadecimal value to be transmitted as data, is used.

N or Blank

Transparent mode is not used. The data must not contain control characters.

Y

Transparent mode is used. Any hexadecimal value can be transmitted as data.

- Switched (Column 20)

Specifies how the connection is to be made when the remote terminal is connected on a switched line. In this situation, the central processor and the remote terminal have to be connected before data can be transmitted or received. One of these is the calling station and the other is the called station that accepts calls from the calling station.

Blank

The remote terminal is not connected on a switched line.

A

Autoanswer. The called station automatically accepts calls from the calling station. This entry is required for interactive terminals.

B

Manual answer. The operator at the called station must answer the call.

TELECOMMUNICATIONS SPECIFICATIONS

E or S
Autocall. The program automatically dials the number of the station.

M
Manual call. The operator dials the number of the station.

- Remote Terminal (Columns 48 through 51)

Specifies the type of remote terminal being used.

TTY
Teletypewriter.

100
UNISCOPE 100 Display Terminal.

200
UNISCOPE 200 Display Terminal.

500
SPERRY UNIVAC DCT 500 Data Communications Terminal.

524
SPERRY UNIVAC DCT 524 Data Communications Terminal.

1000
SPERRY UNIVAC DCT 1000 Data Communications Terminal (batch mode only).

1004
SPERRY UNIVAC 1004 Card Processor System.

2000
SPERRY UNIVAC DCT 2000 Data Communications Terminal.

2780
IBM 2780 Data Transmission Terminal.

9300
SPERRY UNIVAC 9200/9300 Series.

TELECOMMUNICATIONS SPECIFICATIONS

- Permanent Error Indicator (Columns 53 and 54)

  Specifies a program indicator that is set on when a permanent error occurs during the reception or transmission of a data record. The setting on of the indicator can be used to cause an error handling routine (such as controlled program termination or message display) to be executed.

  Blank
  The program will be terminated if a permanent error occurs.

  01 through 99
  General indicators.

  H1 through H9
  Halt indicators.

  L1 through L9
  Control level indicators.

  LR
  Last record indicator.

- Wait Time (Columns 55 through 57)

  Specifies the amount of time in seconds allowed between terminal messages for your program to complete a program cycle.

  001 through 999
  The amount of time in seconds.

  The following rules apply:

  1. This field must be right-justified. Leading zeros may be omitted.

  2. The permanent error indicator will be set on if the time is not set high enough to allow the program to complete all record processing.

  3. The time limit does not apply between file transmissions.

- Last File (Column 60)

  When a data communications file is specified as a secondary file on the file description specifiifations form, it is normally processed in the order in which it appears on that form. This field can be used to specify that the data communication file be processed only after the primary and all secondary files have been processed.

  Blank
  The file is processed in the order in which it appears on the file description specifications form.

  L
  The file is processed after the primary and all secondary file have been processed.

TELECOMMUNICATIONS SPECIFICATIONS

- Remote Device (Columns 65 through 70)

  Specifies the selection of an auxiliary device that is attached to a remote terminal. Entries in this field are used in conjunction with the remote terminal field (columns 48 through 51). These entries are summarized in Table 2-14.

  Blank
  The primary terminal device is used.

  PCH
  Auxiliary card punch.

  PRNTR
  Auxiliary printer.

  RDR
  Auxiliary card reader.

  If 2780 (IBM 2780 Data Transmission Terminal) is specified in columns 48 through 51, 1442-1, 1442-2, and 1443 can be substituted for RDR, PCH, and PRNTR respectively.

Table 2—14. Summary of Remote Terminal and Remote Device Entries

Remote Terminal	Entries		
	Auxiliary Device	Remote Terminal (Columns 48 through 51)	Remote Device (Columns 65 through 70)
SPERRY UNIVAC DCT 1000 Data Communications Terminal	Card punch	1000	PCH
SPERRY UNIVAC DCT 2000 Data Communications Terminal	Card punch	2000	PCH
SPERRY UNIVAC 1004 Card Processor	Card punch	1004	PCH
SPERRY UNIVAC 9200/9300 Series	Card punch	9300	PCH
IBM 2780 Data Transmission Terminal	Card punch	2780	PCH or 1442-2
	Card reader	2780 1442-1	RDR
	Printer	2780	PRNTR or 1443

TELECOMMUNICATIONS SPECIFICATIONS

- Terminal Name (Columns 71 through 74)

  Specifies the remote terminal name to be associated with the data communication file. This name must be the name that was specified for the terminal in the communications control area (CCA) at system generation.

  terminal name
  The name of the remote terminal.

  The following rules apply:

  1. The entry must be left-justified.

  2. The first character must be an alphabetic character.

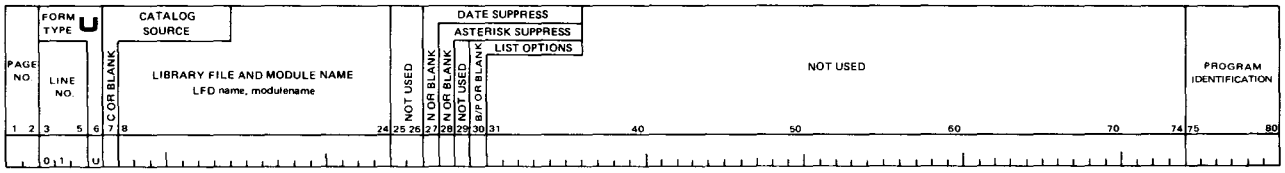
AUTO REPORT OPTIONS SPECIFICATIONS

Function:

This form is not required. You use it to specify the options you want to use with the output from auto report. If you use this form, it must be the first specification form in the program. You can't place auto report options specifications in a library module that is copied by a /COPY statement.

Format:

AUTO REPORT OPTIONS SPECIFICATIONS



Entries:

- Catalog Source Program in Library File (Column 7)

Indicates whether or not the generated source program is written in a library file. In addition, the generated source program is also written in the system resident YSRC disk file using the specified module name.

Blank
Write the generated source program into the system resident YSRC disk file using the module name RPGSRC.

C
Catalog the generated source program in a library file on disk.

- Library File and Module Name (Columns 8 through 24)

Identifies the disk on which the library file resides and the name under which the generated source program is cataloged.

[LFDname],modulename
The disk on which the library file resides and the name under which the source program is cataloged. If these columns aren't used, the generated source is always output to element RPGSRC and file YSRC if there are no serious errors.

- Date Suppress (Column 27)

Suppresses the generated date and page number so that they are not printed on the first H-*AUTO page heading line.

Blank
Page number and date are printed on the first H-*AUTO page heading line.

N
No page number and date printed on the first H-*AUTO page heading line.

AUTO REPORT OPTIONS SPECIFICATIONS

- Asterisks Suppress (Column 28)

  Suppresses asterisks so that they are not printed beside totals generated by D/T-*AUTO (A in column 39).

  Blank
  Print asterisks beside generated totals. The asterisks are printed to the right of the highest end position on a generated total line as specified in the D/T-*AUTO specifications.

  N
  No asterisks printed beside generated totals.

- List Options (Column 30)

  Controls an auto report listing when auto report generates RPG II source specifications. A complete listing contains RPG II specifications copied from the library, RPG II specifications that are the original input to auto report, the RPG II specifications generated by auto report, and error messages.

  Blank
  Print the complete source listing with headings and diagnostics.

  B
  The complete generated source listing is not printed.

  P
  Print only a partial source listing with headings and diagnostics.

  Auto report prints the original specifications and the specifications copied from a library file into the following format:

  1. Columns 1–4 – Sequence number of the specification.
  2. Column 5 – Code that identifies the specification:

     Blank
     Standard RPG II specifications present in the auto report program.

     C
     Specifications copied from the library file by the /COPY statement.

  3. Columns 6–80 – Standard RPG II specifications.

AUTO REPORT OPTIONS SPECIFICATIONS

Auto Report prints the generated source listing in the following format:

1. Columns 1-4 - Sequence number of the specification.

2. Column 5 - Code that identifies the specification:

   Blank
   Standard RPG II specifications present in the auto report program.

   C
   Specifications copied from the library file by the /COPY statement.

   E
   Specifications generated by H/D/T-*AUTO specifications.

   M
   File description and input specifications copied from the library file and modified by /COPY modifier statements.

3. Columns 6-74 - Standard RPG II specifications.

4. Columns 75-80 - Same characters that are present in columns 75 through 80 of the RPG II control specification.

3. RPG II Indicators

DEFINITION, USE, AND THE SETTING ON AND OFF OF INDICATORS

Indicator definition and use, as well as the setting on and off of the indicators, are summarized in Tables 3-1, 3-2, and 3-3, respectively.

Table 3—1. Indicator Definition (Part 1 of 2)

Indicator Definition		Permissible Entries										
Type	**Where Defined**	**01-99**	**1P**	**L0**	**L1-L9**	**LR**	**MR**	**H0**	**H1-H9**	**OA-OG, OV**	**U1-U8**	**KA-KN KP-KW**
Record identification indicator	Input format specification form columns 19-20	X			X	X			X			
Field indicator	Input format specifications form columns 65-70	X							X			
Control level indicator	Input format specifications form columns 59-60				X							
Resulting indicator	Calculation specifications form columns 54-59	X			X	X		X	X	X	X	X
Overflow indicator	File description specifications form columns 33-34									X		
Internal indicators	Internally by RPG II		X	X		X	X	X				
External indicator	Internally by RPG II										X	

Table 3—1. Indicator Definition (Part 2 of 2)

Indicator Definition		Permissible Entries										
Type	**Where Defined**	**01-99**	**1P**	**L0**	**L1-L9**	**LR**	**MR**	**H0**	**H1-H9**	**OA-OG, OV**	**U1-U8**	**KA-KN KP-KW**
Function key indicator	Calculations specifications form, columns 9-17 and Output format specifications form columns 23-31											X

Table 3—2. Indicator Use

Indicator		Permissible Entries										
How Used	**Where Defined**	**01-99**	**1P**	**L0**	**L1-L9**	**LR**	**MR**	**H0**	**H1-H9**	**OA-OG, OV**	**U1-U8**	**KA-KN KP-KW**
File conditioning	File description specifications form columns 71-72										X	
Field record relation	Input format specifications form columns 63-64	X			X		X		X		X	
Control level	Calculation specifications form columns 7-8			X	X	X						
Calculation conditioning	Calculation specifications form columns 9-17	X		X	X	X	X	X	X	X	X	X
Output conditioning	Output format specifications form columns 23-31	X	X	X	X	X	X	X	X	X	X	X

Table 3—3. Setting Indicators On and Off

Indicator Type	When Set On	When Set Off
Record identification indicator	When the specified record is read and prior to the execution of total calculations.	After the current processing cycle is completed and before the next record is read during the next cycle.
Field indicator	When the condition the indicator represents is present in the specified field.	Prior to the next time the field is to be tested for the condition.
Control level indicator	When the value in the specified control field changes. (All lower level indicators are also set on.)	When the following detail cycle is completed.
Resulting indicator	When the calculation is performed and the condition that the indicator represents is present.	The next time the calculation is performed and the condition that the indicator represents is not present.
Overflow indicator	When a line is printed on the form on or past the forms overflow channel or if the form is spaced past that point.	After the following heading and detail lines are printed.
U1-U8 external indicators (correspond to UPSI bits 0 through 7)	By a // △ SET △ UPSI job control statement prior to the execution of your program or by a SETON operation within your program or when used as a resulting indicator in calculations.	By a SETOF operation within your program.
1P (first page) internal indicator	At the beginning of program execution.	By a SETOF operation within your program.
H0-H9 internal indicators	By an error condition (H0) or by a SETON operation within your program.	By a SETOF operation within your program.
L0 internal indicator	Always on.	Never.
LR (last record) internal indicator	After the last record in the last file is processed or by a SETON operation in your program.	Never.
MR (matching record) internal indicator	When all matching fields in a record of a secondary file match all the matching fields in the primary file.	When all total calculations, output, and overflow for the records have been executed.
KA-KN KP-KW function key indicator	When function key is pressed.	Before a read from a workstation is issued or by a SETOF operation.

4. Edit Codes, Edit Words, and Special Field Names

EDIT CODES

A series of 1-character codes provided to edit a field in a predefined way. These edit codes consist of the simple edit codes (X, Y, and Z) and the combined edit codes (1, 2, 3, 4, A, B, C, D, J, K, L, and M).

An edit code is used by entering it in column 38 of the output format specifications form on the line that contains the field to be edited. Note that the end position specified for the output must allow for the insertion of data into the field by the edit code.

If an entire array is to be printed using an edit code, two blanks are inserted to the right of every element in the array before any other editing takes place. In this case, the end position specified for the output must allow for the added blanks.

Simple Edit Codes (X, Y, and Z)

Performs editing as follows:

X

Removes the plus from the rightmost character position in the field. A negative sign is not removed and leading zeros are not suppressed. If S is specified in column 40 of the control card specifications form, the plus sign is removed automatically without the use of this edit code.

Y

Inserts slashes in 3- to 6-character fields as follows:

Field Length	Edited Result
3	xx/x
4	xx/xx
5	xx/xx/x
6	xx/xx/xx

The leading zero is always suppressed when this edit code is used.

Z

Suppresses zeros to the left of the most significant digit of the field and removes the sign from the rightmost character position.

EDIT CODES

Combined Edit Codes (1, 2, 3, 4, A, B, C, D, J, K, L, and M)

The editing performed by the combined edit codes is shown in Table 4-1.

All of the combined edit codes shown in Table 4-1 suppress leading zeros. The number of decimal positions specified for a field determines where the decimal point is printed. In these cases, the last digit to be zero-suppressed is the one immediately to the left of the decimal point. If decimal positions are specified for a field and a zero balance is not to be printed, the decimal point is printed if the field contains a nonzero balance. If decimal positions are specified and a zero balance is to be printed, the decimal point is printed and the zero balance is printed to the right of the decimal point.

If J is specified in column 21 of the control card specifications form, the commas replace decimal points and vice versa in the edited fields. The last digit to be zero-suppressed is the second one to the left of the decimal point.

Asterisk protection or a floating dollar sign can be used with any of the combined edit codes. This is accomplished by specifying '*' or '$' in columns 45 through 47 along with a combined edit code in column 38 of the output format specifications form on the line that contains the field to be edited. The dollar sign will appear to the left of the most significant nonzero digit. An asterisk will appear in place of each zero that is suppressed.

Table 4—1. Combined Edit Codes

Combined Edit Codes			Editing Performed
Negative Value Indication			
None	CR	-	
1	A	J	Commas are inserted in the field; a a zero balance is printed.
2	B	K	Commas are inserted in the field; a zero balance is not printed.
3	C	L	Commas are not inserted in the field; a zero balance is printed.
4	D	M	Commas are not inserted in the field; a zero balance is not printed.

Used when special or unusual editing is required that cannot be handled by using one of the edit codes. In these situations, you must specify an edit word enclosed in apostrophes in columns 45 through 70 of the output format specifications form on the line that contains the field to be edited.

Edit Word Format

An edit word consists of three parts: the body, sign status, and expansion. The body is the portion of the edit word that provides space for the digits that are to be transferred from the field to be edited and the punctuation that is to appear in the edited field. The body begins at the leftmost position of the edit word and ends at the rightmost position that is to contain a digit from the field to be edited. The sign status is the portion of the edit word that is used to specify whether the field is positive or negative and/or to specify constant information. The sign status begins at the first position to the right of the body. CR, –, or & is used to indicate sign status. If any of these is specified and a field is positive, blank spaces will be substituted in the edited field. If CR or – is specified and a field is negative, the specified indicator will be printed. The expansion consists of characters that will be printed regardless of sign status. Figure 4–1 shows examples of the format of typical edit words.

OUTPUT FORMAT SPECIFICATIONS

CODES			COMMAS INSERTED	ZERO BALANCE TO PRINT
NEGATIVE VALUE INDICATION				
NONE	CR			
1	A	J	YES	YES
2	B	K	YES	NO
3	C	L	NO	YES
4	D	M	NO	NO

CODES	ACTION
X	REMOVE PLUS SIGN
Y	EDIT DATE FIELD
Z	ZERO SUPPRESS

11	FIELD NAME 32–37	EDIT CODES 38	B BLANK AFTER 39	DATA FORMAT P/B/L/R; END POSITION IN OUTPUT RECORD 40–43	CONSTANT OR EDIT WORD 45–70	NOT USED 71–74	IDE 75
	FLAGB			39	'$, 0. &CR**'		
					BODY SIGN STATUS EXPANSION		
	FLAGB			39	'$, 0. &&CR&BALANCE'		
					BODY SIGN STATUS EXPANSION		
	FLAGB			39	'$, 0. &&-'		
					BODY SIGN STATUS		
	FLAGB			39	' , *DOLLARS CENTS'		
					BODY EXPANSION		
	FLAGB			39	'$, 0. '		
					BODY		

Figure 4—1. Edit Word Formats

EDIT WORDS

Edit Word Rules

1. An edit word must be enclosed in apostrophes.

2. A blank in the body of the edit word indicates that this position in the edited field is to contain the character from the same position in the data field.

3. A zero in the body of the edit word indicates that the field is to be zero-suppressed. It should be placed in the rightmost position where zero suppression is to stop. Each zero that appears to the left of the stop position in the data is replaced with a blank space in the edited field. Zero suppression begins at the leftmost position in the data and continues up through the stop position, unless a nonzero digit is encountered to the left of the stop position. In the latter case, zero suppression stops at the position where the nonzero digit is encountered and that digit and all following are printed.

4. An asterisk (*) in the body of the edit word indicates that the field is to be edited by using asterisk protection. It should be placed in the rightmost position where zero suppression is to stop. Each zero that appears to the left of the stop position in the data is replaced by an asterisk.

5. An ampersand (&) in either the body or the status portion of the edit word indicates that the position in the edited field is to be a blank space.

6. A dollar sign ($) in the body of the edit word immediately to the left of the zero suppression code (0) indicates that the dollar sign is to appear immediately to the left of the first significant digit in the edited field. This is called the floating dollar sign. A dollar sign in the leftmost position of the edit word indicates that the dollar sign is to appear in that position in the edited field. This is called the fixed dollar sign.

7. Decimal points and commas in the body of the edit word indicate the position in the edited field where they are to be printed. They will be printed in the indicated positions unless they are to the left of the most significant digit. In that case, they will be replaced by blank spaces or asterisks if asterisk protection is used.

8. CR or a minus (–) in the status portion of the edit word indicates that the specified symbol is to be printed in the edited field if the data is negative. If the data is positive, the symbol is not printed.

9. Any character, other than $, &, –, *, or comma, that appears in the body of the edit word is printed in the edited field, provided that its relative position is to the right of the most significant digit in the data. If it is to the left, a blank space replaces it.

10. Any character other than an ampersand (&) that is included in the status portion of the edit word will be printed in the edited field. If an ampersand is specified, it will be replaced by a blank space.

11. If leading zeros are desired, the edit word should be increased by one position on the left and a zero should be placed in that position.

SPECIAL FIELD NAMES

Accomplish automatic dating, page numbering, and duplication of fields on your report by specifying certain special RPG II field names in columns 32 through 37 of the output format specifications form. These special field names are D?TE, UDATE, UDAY, UMONTH, UYEAR, PAGE, PAGE 1-7, and *PLACE.

D?TE, UDATE, UDAY, UMONTH, and UYEAR

Allow you to have the date printed automatically on your report in the format you choose. The date that will appear is the system date unless you have specified a different date at execution time through the use of a //△SET△DATE job control statement.

D?TE or UDATE
The date in the format mmddyy (mm = 2-digit month, dd = 2-digit day, and yy = 2 digit year) is printed. If D, I, or J is specified in column 21 of the control card specifications form, the format is ddmmyy when this field is specified. When UDATE is specified, the Y edit code can be used in column 38 of the output format specifications form to edit the format so that it appears as mm/dd/yy or dd.mm.yy if D, I, or J is specified in column 21 of the control card specifications form.

UDAY
Only the 2-digit day (dd) is printed.

UMONTH
Only the 2-digit month (mm) is printed.

UYEAR
Only the 2-digit year (yy) is printed.

PAGE, PAGE1-7

Allows you to have the pages of your report automatically numbered starting with 1. Eight field names are provided so that if your program is to produce more than one report, each of the reports can have automatic page numbering by specifying a different field name on the output format specifications form for each report.

A page field is a 4-digit numeric field with no decimal positions. At the beginning of the program, the specified page field is set to zero, and then each time before it is written the value of the field is increased by 1.

If page numbering is not to commence with 1, the page field that is used for your report can be set to commence numbering with the page number you require by specifying the page field in columns 53 through 58 on the input format specifications form or by specifying it as a result field in columns 43 through 48 on the calculation specifications form. In the former case, the page field is defined as an input record field that contains a value and in the latter as a field that has had a value placed in it as a result of an operation performed on the calculation specifications form. Note that if either of these methods is used, the value in the field must be 1 less than the required starting page number because the field value is increased by 1 before it is written.

If you must reset a page field, do so by:

- specifying the field as a result field with no decimal positions (0 in column 52) on the calculations specifications form, and using one of the available operations to place zeros in the field;
- specifying B (blank after) in column 39 of the output format specifications form on the line where the page field is specified; and

SPECIAL FIELD NAMES

- specifying an indicator (columns 24–25, 27–28, 30–31) for PAGE in the output format specifications form. If the indicator is on, PAGE is set to zero, and one is added before it is written. If the indicator is off, PAGE is not reset.

The page field is automatically zero-suppressed when it is written unless you specified an edit code other than Z or an edit word. In this case, the edit code or edit word overrides the zero suppression.

To define a page field:

- Specify the field as a field name in columns 53 through 58 on the input format specifications.
- Specify the field as a result field with no decimal positions (0 in column 52) on the calculation specifications form.
- Referencing PAGE on the output format specifications defines the field as a 4-digit numeric field with no decimal positions.

*PLACE

This special field name allows you to duplicate (repeat) fields or constants in additional positions in an output record without having to repeat the field name or constant on the output format specifications form.

When *PLACE is specified in columns 32 through 37 on the output format specifications form, all previously specified data between position 1 and the highest end position is repeated in the output record ending in the end position specified in columns 40 thrugh 43 on the *PLACE line. The end position specified for the *PLACE line must be no greater than 256.

5. Alternate Collating Sequence and File Translation

PROCESSING WITH ALTERNATING SEQUENCE

A collating sequence is the order of values represented by a data processing system character set. Specifically, a value is assigned to each character in the set so that comparisons between characters show higher or lower relationships in value.

RPG II Collating Sequence

The normal collating sequence for RPG II is the EBCDIC collating sequence shown in Table 5-1. If the normal collating sequence does not meet the user's specific requirements, it can be changed by defining an alternate collating sequence.

Table 5—1. RPG II Collating Sequence (Part 1 of 4)

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
0	00	0000 0000	NUL	12-0-9-8-1
1	01	0000 0001	SOH	12-9-1
2	02	0000 0010	STX	12-9-2
3	03	0000 0011	ETX	12-9-3
4	04	0000 0100		12-9-4
5	05	0000 0101		12-9-5
6	06	0000 0110		12-9-6
7	07	0000 0111		12-9-7
8	08	0000 1000		12-9-8
9	09	0000 1001		12-9-8-1
10	0A	0000 1010		12-9-8-2
11	0B	0000 1011	VT	12-9-8-3
12	0C	0000 1100	FF	12-9-8-4
13	0D	0000 1101	CR	12-9-8-5
14	0E	0000 1110	SO	12-9-8-6
15	0F	0000 1111	SI	12-9-8-7
16	10	0001 0000	DLE	12-11-9-8-1
17	11	0001 0001	DC1	11-9-1
18	12	0001 0010	DC2	11-9-2
19	13	0001 0011	DC3	11-9-3
20	14	0001 0100	DC4	11-9-4
21	15	0001 0101		11-9-5
22	16	0001 0110		11-9-6
23	17	0001 0111		11-9-7
24	18	0001 1000	CAN	11-9-8
25	19	0001 1001	EM	11-9-8-1
26	1A	0001 1010		11-9-8-2
27	1B	0001 1011		11-9-8-3
28	1C	0001 1100	FS	11-9-8-4
29	1D	0001 1101	GS	11-9-8-5

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
30	1E	0001 1110	RS	11-9-8-6
31	1F	0001 1111	US	11-9-8-7
32	20	0010 0000		11-0-9-8-1
33	21	0010 0001		0-9-1
34	22	0010 0010		0-9-2
35	23	0010 0011		0-9-3
36	24	0010 0100		0-9-4
37	25	0010 0101	LF	0-9-5
38	26	0010 0110	ETB	0-9-6
39	27	0010 0111	ESC	0-9-7
40	28	0010 1000		0-9-8
41	29	0010 1001		0-9-8-1
42	2A	0010 1010		0-9-8-2
43	2B	0010 1011		0-9-8-3
44	2C	0010 1100		0-9-8-4
45	2D	0010 1101	ENQ	0-9-8-5
46	2E	0010 1110	ACK	0-9-8-6
47	2F	0010 1111	BEL	0-9-8-7
48	30	0011 0000		12-11-0-9-8-1
49	31	0011 0001		9-1
50	32	0011 0010	SYN	9-2
51	33	0011 0011		9-3
52	34	0011 0100		9-4
53	35	0011 0101		9-5
54	36	0011 0110		9-6
55	37	0011 0111	EOT	9-7
56	38	0011 1000		9-8
57	39	0011 1001		9-8-1
58	3A	0011 1010		9-8-2
59	3B	0011 1011		9-8-3

PROCESSING WITH ALTERNATING SEQUENCE

Table 5—1. RPG II Collating Sequence (Part 2 of 4)

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
60	3C	0011 1100		9-8-4
61	3D	0011 1101	NAK	9-8-5
62	3E	0011 1110		9-8-6
63	3F	0011 1111	SUB	9-8-7
64	40	0100 0000	SP	No punches
65	41	0100 0001		12-0-9-1
66	42	0100 0010		12-0-9-2
67	43	0100 0011		12-0-9-3
68	44	0100 0100		12-0-9-4
69	45	0100 0101		12-0-9-5
70	46	0100 0110		12-0-9-6
71	47	0100 0111		12-0-9-7
72	48	0100 1000		12-0-9-8
73	49	0100 1001		12-8-1
74	4A	0100 1010	[	12-8-2
75	4B	0100 1011	.	12-8-3
76	4C	0100 1100	<	12-8-4
77	4D	0100 1101	(	12-8-5
78	4E	0100 1110	+	12-8-6
79	4F	0100 1111	!	12-8-7
80	50	0101 0000	&	12
81	51	0101 0001		12-11-9-1
82	52	0101 0010		12-11-9-2
83	53	0101 0011		12-11-9-3
84	54	0101 0100		12-11-9-4
85	55	0101 0101		12-11-9-5
86	56	0101 0110		12-11-9-6
87	57	0101 0111		12-11-9-7
88	58	0101 1000		12-11-9-8
89	59	0101 1001		11-8-1
90	5A	0101 1010	]	11-8-2
91	5B	0101 1011	$	11-8-3
92	5C	0101 1100	*	11-8-4
93	5D	0101 1101	)	11-8-5
94	5E	0101 1110	;	11-8-6
95	5F	0101 1111	△	11-8-7
96	60	0110 0000	-	11
97	61	0110 0001	/	0-1
98	62	0110 0010		11-0-9-2
99	63	0110 0011		11-0-9-3
100	64	0110 0100		11-0-9-4
101	65	0110 0101		11-0-9-5
102	66	0110 0110		11-0-9-6
103	67	0110 0111		11-0-9-7
104	68	0110 1000		11-0-9-8

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
105	69	0110 1001		0-8-1
106	6A	0110 1010	|	12-11
107	6B	0110 1011	,	0-8-3
108	6C	0110 1100	%	0-8-4
109	6D	0110 1101	_	0-8-5
110	6E	0110 1110	>	0-8-6
111	6F	0110 1111	?	0-8-7
112	70	0111 0000		12-11-0
113	71	0111 0001		12-11-0-9-1
114	72	0111 0010		12-11-0-9-2
115	73	0111 0011		12-11-0-9-3
116	74	0111 0100		12-11-0-9-4
117	75	0111 0101		12-11-0-9-5
118	76	0111 0110		12-11-0-9-6
119	77	0111 0111		12-11-0-9-7
120	78	0111 1000		12-11-0-9-8
121	79	0111 1001	`	8-1
122	7A	0111 1010	:	8-2
123	7B	0111 1011	#	8-3
124	7C	0111 1100	@	8-4
125	7D	0111 1101	'	8-5
126	7E	0111 1110	=	8-6
127	7F	0111 1111	"	8-7
128	80	1000 0000		12-0-8-1
129	81	1000 0001	a	12-0-1
130	82	1000 0010	b	12-0-2
131	83	1000 0011	c	12-0-3
132	84	1000 0100	d	12-0-4
133	85	1000 0101	e	12-0-5
134	86	1000 0110	f	12-0-6
135	87	1000 0111	g	12-0-7
136	88	1000 1000	h	12-0-8
137	89	1000 1001	i	12-0-9
138	8A	1000 1010		12-0-8-2
139	8B	1000 1011		12-0-8-3
140	8C	1000 1100		12-0-8-4
141	8D	1000 1101		12-0-8-5
142	8E	1000 1110		12-0-8-6
143	8F	1000 1111		12-0-8-7
144	90	1001 0000		12-11-8-1
145	91	1001 0001	j	12-11-1
146	92	1001 0010	k	12-11-2
147	93	1001 0011	l	12-11-3
148	94	1001 0100	m	12-11-4
149	95	1001 0101	n	12-11-5

PROCESSING WITH ALTERNATING SEQUENCE

Table 5—1. RPG II Collating Sequence (Part 3 of 4)

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
150	96	1001 0110	o	12-11-6
151	97	1001 0111	p	12-11-7
152	98	1001 1000	q	12-11-8
153	99	1001 1001	r	12-11-9
154	9A	1001 1010		12-11-8-2
155	9B	1001 1011		12-11-8-3
156	9C	1001 1100		12-11-8-4
157	9D	1001 1101		12-11-8-5
158	9E	1001 1110		12-11-8-6
159	9F	1001 1111		12-11-8-7
160	A0	1010 0000		11-0-8-1
161	A1	1010 0001	~	11-0-1
162	A2	1010 0010	s	11-0-2
163	A3	1010 0011	t	11-0-3
164	A4	1010 0100	u	11-0-4
165	A5	1010 0101	v	11-0-5
166	A6	1010 0110	w	11-0-6
167	A7	1010 0111	x	11-0-7
168	A8	1010 1000	y	11-0-8
169	A9	1010 1001	z	11-0-9
170	AA	1010 1010		11-0-8-2
171	AB	1010 1011		11-0-8-3
172	AC	1010 1100		11-0-8-4
173	AD	1010 1101		11-0-8-5
174	AE	1010 1110		11-0-8-6
175	AF	1010 1111		11-0-8-7
176	B0	1011 0000		12-11-0-8-1
177	B1	1011 0001		12-11-0-1
178	B2	1011 0010		12-11-0-2
179	B3	1011 0011		12-11-0-3
180	B4	1011 0100		12-11-0-4
181	B5	1011 0101		12-11-0-5
182	B6	1011 0110		12-11-0-6
183	B7	1011 0111		12-11-0-7
184	B8	1011 1000		12-11-0-8
185	B9	1011 1001		12-11-0-9
186	BA	1011 1010		12-11-0-8-2
187	BB	1011 1011		12-11-0-8-3
188	BC	1011 1100		12-11-0-8-4
189	BD	1011 1101		12-11-0-8-5
190	BE	1011 1110		12-11-0-8-6
191	BF	1011 1111		12-11-0-8-7
192	C0	1100 0000	{	12-0
193	C1	1100 0001	A	12-1
194	C2	1100 0010	B	12-2

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
195	C3	1100 0011	C	12-3
196	C4	1100 0100	D	12-4
197	C5	1100 0101	E	12-5
198	C6	1100 0110	F	12-6
199	C7	1100 0111	G	12-7
200	C8	1100 1000	H	12-8
201	C9	1100 1001	I	12-9
202	CA	1100 1010		12-0-9-8-2
203	CB	1100 1011		12-0-9-8-3
204	CC	1100 1100		12-0-9-8-4
205	CD	1100 1101		12-0-9-8-5
206	CE	1100 1110		12-0-9-8-6
207	CF	1100 1111		12-0-9-8-7
208	D0	1101 0000	}	11-0
209	D1	1101 0001	J	11-1
210	D2	1101 0010	K	11-2
211	D3	1101 0011	L	11-3
212	D4	1101 0100	M	11-4
213	D5	1101 0101	N	11-5
214	D6	1101 0110	O	11-6
215	D7	1101 0111	P	11-7
216	D8	1101 1000	Q	11-8
217	D9	1101 1001	R	11-9
218	DA	1101 1010		12-11-9-8-2
219	DB	1101 1011		12-11-9-8-3
220	DC	1101 1100		12-11-9-8-4
221	DD	1101 1101		12-11-9-8-5
222	DE	1101 1110		12-11-9-8-6
223	DF	1101 1111		12-11-9-8-7
224	E0	1110 0000	\	0-8-2
225	E1	1110 0001		11-0-9-1
226	E2	1110 0010	S	0-2
227	E3	1110 0011	T	0-3
228	E4	1110 0100	U	0-4
229	E5	1110 0101	V	0-5
230	E6	1110 0110	W	0-6
231	E7	1110 0111	X	0-7
232	E8	1110 1000	Y	0-8
233	E9	1110 1001	Z	0-9
234	EA	1110 1010		11-0-9-8-2
235	EB	1110 1011		11-0-9-8-3
236	EC	1110 1100		11-0-9-8-4
237	ED	1110 1101		11-0-9-8-5
238	EE	1110 1110		11-0-9-8-6
239	EF	1110 1111		11-0-9-8-7

PROCESSING WITH ALTERNATING SEQUENCE

Table 5—1. RPG II Collating Sequence (Part 4 of 4)

Numeric Values			EBCDIC	
Dec.	Hex.	Binary	EBCDIC Char.	Hollerith Code
240	F0	1111 0000	0	0
241	F1	1111 0001	1	1
242	F2	1111 0010	2	2
243	F3	1111 0011	3	3
244	F4	1111 0100	4	4
245	F5	1111 0101	5	5
246	F6	1111 0110	6	6
247	F7	1111 0111	7	7
248	F8	1111 1000	8	8
249	F9	1111 1001	9	9
250	FA	1111 1010		12-11-0-9-8-2
251	FB	1111 1011		12-11-0-9-8-3
252	FC	1111 1100		12-11-0-9-8-4
253	FD	1111 1101		12-11-0-9-8-5
254	FE	1111 1110		12-11-0-9-8-6
255	FF	1111 1111		12-11-0-9-8-7

Defining an Alternate Collating Sequence

If an alternate collating sequence is needed in the user program, it can be indicated by entering an S in column 26 of the control card specifications form. Then, at compilation time, the user includes in the compilation deck one or more records that contain the changes to be made in the normal collating sequence. The records that contain these changes must be in the following format:

Position	Entry
1 through 6	ALTSEQ. This indicates an alternate collating sequence record.
7 and 8	Blank
9 and 10	Enter the hexadecimal value corresponding to the character to be replaced in the normal collating sequence. (See Table 5-1.)
11 and 12	Enter the hexadecimal value corresponding to the character replacing the character specified in columns 9 and 10.
13 through 80	These positions can be used in the same manner as columns 9-10 and 11-12 to specify additional changes to the normal collating sequence. Each 4-position set defines an additional change. As with positions 9-10 and 11-12, the first two positions specify the character to be replaced and the second two positions specify the character that is to replace it.

PROCESSING WITH ALTERNATING SEQUENCE

The entire record can be used to specify collating sequence changes. If there is more than one change in a record, the 4-position change sets must be contiguous. If a blank position appears between two change sets, the changes following the blank position are ignored. Use as many change records as needed but make sure they are in the proper format.

When alternate collating sequence records are included in the compilation input deck, precede these records with a record that contains ** and blank in positions 1 through 3. The record, plus the alternate collating sequence records, must be placed in the deck following any file translation records. A record with ** and blank in positions 1 through 3 or /* in positions 1 and 2 must follow the last alternate collating sequence record.

If an alternate collating sequence is defined, the performance of sequence checking, matching field operations, and alphanumeric comparison operations is affected. Numeric comparison operations, look-up operations, and table or array sequence checking are not affected and no date is altered.

PROCESSING WITH FILE TRANSLATION

File translation converts one character to another. This means that by defining a file translation table, the user can cause a specific character to be automatically changed to any other chosen character.

Defining a File Translation Table

If file translation is necessary in the user program, an F in column 43 of the control card specifications form indicates this. Then, at compilation time, the user includes one or more records containing the file translation table.

Whether the table applies to all files in the user program or only to selected files determines the format of records containing the file translation table. If the table applies to all files in the user program, the format of the translation table record is:

Position	Entry
1 through 8	Enter *FILES△△ if the translation table applies to all files in the program.
9 and 10	Enter the hexadecimal value corresponding to the character to be translated on input or translated on output. (See Table 5-1.)
11 and 12	Enter the hexadecimal value corresponding to the internal character tht RPG II will use. This character replaces the character in positions 9 and 10 on input and is replaced by the character in positions 9 and 10 on output.
13 through 80	These positions can be used in the same manner as columns 9-10 and 11-12 to specify additional character translations. Each 4-position set defines an additional character translation. As with positions 9-10 and 11-12, the first two positions specify the chracter to be translated on input or translated on output; the second two positions specify the internal character RPG II works with. This character replaces the character in the first two positions on input and is replaced by the character in the first two positions on output.

The entire record can be used to specify character translations. If more than one character translation is needed in a record, the 4-position translation sets must be contiguous. If a blank position appears between two translation sets, the translation sets following the blank position are ignored. Use as many translation table records, in proper format, as needed.

If the table should apply to one or more selected files in the user program, two types of translation table records are required. The first type specifies the files that are involved, and the second specifies the characters to be translated. The format of a record that specifies which files are involved is:

Position	Entry
1 through 8	*EQUATE△
9 through 80	Enter the file names (from columns 7 through 13 of the file description specifications form) to be translated. If more than one file is involved, a comma must separate each file name.

PROCESSING WITH FILE TRANSLATION

The entire record may be used to specify file names that are associated with the translation table. A file name not followed by a comma identifies the last file to be associated with the translation table. A file name cannot be split between records. It must be specified completely in one record. Use as many file specification records, in proper format, as needed.

After specifying the files that are involved, specify the characters to be translated by preparing one or more records in the following format:

Position	Entry
1 through 8	*EQUATE△
9 and 10	Enter the hexadecimal value corresponding to the character to be translated on input or translated on output. (See Table 5-1.)
11 and 12	Enter the hexadecimal value corresponding to the internal character RPG II will use. This character replaces the character in positions 9-10 on input and is replaced by the character in positions 9-10 on output.
13 through 80	These positions can be used in the same manner as columns 9-10 and 11-12 to specify additional character translations. Each 4-position set defines an additional character translation. As with positions 9-10 and 11-12, the first two positions specify the characters to be translated on input or translated to output and the second two positions specify the internal character RPG II will use. This is the replacement character for the character specified by the first two positions on input and for the character specified by the first two positions on output.

The entire record can be used to specify character translations. If there is more than one character translation in a record, the 4-position translation sets must be contiguous. If a blank position appears between two translation sets, the translation sets following the blank position are ignored. Use as many translation table records, in proper format, as needed.

When including file translation table records in the compilation input deck, the user must precede these records by a record containing **blank in columns 1 through 3. This record, plus the file translation table records, must be placed in the deck immediately following the last source program statement. A record with **blank in columns 1 through 3 or /* in columns 1 and 2 must follow the last file translation table record. If // PARAM COL=7 is specified, the compile time tables begin in position 7 and the **blank are also in positions 7 through 9.

If a file translation table is defined, a character from each record in a file is replaced internally by the translation character, whether it is an input, output, update, or combined file. This includes tables and arrays loaded at execution time.

When the file is a combined or update file, it is translated both at input and output time. If the file is an update file, each record must be written before the next record is read. When a file translation table is used with a chaining or record address file, the translated data must be the data to be retrieved.

6. RPG II PF Key Subroutine - SUBR89 and Unsolicited Inquiry Request Subroutine - SUBR95

PF KEY SUBROUTINE - SUBR89

The PF key subroutine, SUBR89, allows you to control the execution of your program by using from one to nine unsolicited type-ins called PF keys (PF1 through PF9). The way you specify the PF key numbers (positive or negative) in your program determines how you can use the PF keys to control program execution.

Using a PF Key With a Positive Number

To use a PF key with a positive number you must allocate it to your program by including the statements shown in Figure 6-1.

CALCULATION SPECIFICATIONS

PAGE NO.	LINE NO.	FORM TYPE	CONDITIONS: CONTROL LEVEL (A O / N R)	INDICATORS: AND	AND	CALCULATION: FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD: NAME	FIELD LENGTH	DECIMAL POSITIONS	H - HALF ADJUST
1 2	3 5	6	7 8	9 10 11 N=NOT 12 13 14 N=NOT 15 16 17		18 27	28 32	33 42	43 48	49 51	52	53 54
	010	C		1P			MOVE	+n	PFKEY	1	C	
	020	C		1P			EXIT	SUBR89				
	030	C					RLABL		PFKEY			
	040	C					RLABL		INnn			

Figure 6—1. Allocating a PF Key with a Positive Number

The statements shown in Figure 6-1 will only be executed at the beginning of your program (1P indicator in columns 10 and 11). The number (1 through 9) that you enter for n on line 010 specifies which PF key you want allocated to your program and the number (01 through 99) that you enter for nn or line 040 specifies the indicator to be set on if the allocated PF key is activated. After you have included the statements to allocate a PF key to your program you must include a test to see if the allocated PF key has been activated (an unsolicited PFn type-in has been made) and, if so, set on an indicator that conditions calculation or output operations. This is done by including the statements shown in Figure 6-2 at another point in your program.

PF KEY SUBROUTINE - SUBR89

CALCULATION SPECIFICATIONS

PAGE NO.	FORM TYPE	LINE NO.	CONDITIONS: CONTROL LEVEL L0-L9/LR/SR	AND	AND	CALCULATION: FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD: NAME	FIELD LENGTH	DECIMAL POSITIONS	HALF ADJUST
1 2	3 5	6	7 8	9 10 11 12 13 14 15 16 17		18 27	28 32	33 42	43 48	49 51	52	53 54
	C	010					MOVE	+n	PFKEY	1	0	
	C	020					EXIT	SUBR89				
	C	030					RLABL		PFKEY			
	C	040					RLABL		INnn			

Figure 6—2. Testing PF Key Activation Status

The statements shown in Figure 6-2 are the same as those in Figure 6-1 except that line 010 and line 020 must be specified with columns 9 through 17 left blank or specified with indicators other than 1P. This is necessary so that these statements will be executed during a regular program cycle rather than only at the beginning of program execution.

If you specify a PF key with a positive number, the message

```
RPGØ38 JOB IS NOW ABLE TO ACCEPT UNSOLICITED KEY-IN-'PFn'
```

will be displayed on the system console at the beginning of program execution to inform you that your program will accept the unsolicited PF key type-in indicated in the message. The program will then halt. To continue, type in

GO△your program name.

From this point on, the program will test during each cycle to see if the allocated PF key has been activated by an unsolicited type-in. If so, the specified indicator is set on and the conditioned calculation or output operations will be performed. These operations will also be performed thereafter in each program cycle because if the PF key is activated the test will always indicate that it is activated. If the PF key is not activated, the indicator is set off and the program continues.

If you want to activate a PF key, type in SOE job number (supplied by system) 0 PFn.

PF KEY SUBROUTINE - SUBR89

Using a PF Key With a Negative Number

To use a PF key with a negative number you must include the statements shown in Figure 6-3 in your program.

CALCULATION SPECIFICATIONS

PAGE NO	LINE NO	FORM TYPE	CONDITIONS: CONTROL LEVEL L0-L9/LR/SR	CONDITIONS: INDICATORS AND/AND	FACTOR 1	OPERATION	FACTOR 2	RESULT FIELD: NAME	RESULT FIELD: FIELD LENGTH	RESULT FIELD: DECIMAL POSITIONS	RESULT FIELD: HALF ADJUST
	010	C				MOVE	-n	PFKEY	1	0	
	020	C				EXIT	SUBR89				
	030	C				RLABL		PFKEY			
	040	C				RLABL		INnn			
	050	C									

Figure 6—3. Allocating a PF Key with a Negative Number and Testing Its Activation Status

The statements shown in Figure 6-3 are the same as those shown in Figure 6-2 except that they specify a PF key with a negative number (- in column 33 on line 010). The negative specification will also cause these statements to perform a dual function, that is, to allocate the PF key to your program and to test its activation status. As with Figure 6-2, these statements must be specified with columns 9 through 17 left blank or specified with indicators other than 1P. This is necessary so that they will be executed during a regular program cycle rather than only at the beginning of program execution.

When you specify a PF key with a negative number, the PF key is allocated to your program and its activation status is tested. The message

```
RPG039 PFn MUST BE ENTERED BEFORE JOB CAN CONTINUE
```

will be displayed on the system console and the program will then halt. To continue, type in

SOE job number (supplied by system) message number (supplied by system) PFn

At this point the program will set on the specified indicator and the conditioned calculation or output operations will be performed. These operations will also be performed thereafter in each program cycle because the test to see if the PF key is activated will always indicate that it is activated.

UNSOLICITED INQUIRY REQUEST SUBROUTINE - SUBR95

The unsolicited inquiry request subroutine, SUBR95, is similar to the PF key subroutine because it also allows you to control the execution of your program by making unsolicited type-ins. It differs from the PF key subroutine in that when an unsolicited inquiry request type-in is made it only affects the program at the time it is made rather than having a continuing effect as with the PF key subroutine.

Using the Unsolicited Inquiry Request Subroutine

To use the unsolicited inquiry request subroutine you must first allocate the subroutine to your program by including the statements shown in Figure 6-4.

CALCULATION SPECIFICATIONS

PAGE NO	LINE NO	FORM TYPE	CONDITIONS: CONTROL LEVEL L0-L9/LR/SR	CONDITIONS: INDICATORS AND	CONDITIONS: INDICATORS AND	CALCULATION: FACTOR 1	CALCULATION: OPERATION	CALCULATION: FACTOR 2	RESULT FIELD: NAME	RESULT FIELD: FIELD LENGTH	RESULT FIELD: DECIMAL POSITIONS	RESULT FIELD: HALF ADJUST
	010	C		1P			EXIT	SUBR95				
	020	C					RLABL		INnn			

Figure 6—4. Allocating the Unsolicited Inquiry Request Subroutine

The statements shown in Figure 6-4 will only be executed at the beginning of your program (1P indicator in columns 10 and 11). The number (01 through 99) that you enter for nn on line 020 specifies the indicator to be set on if an unsolicited inquiry request is made.

After you have included the statements to allocate the unsolicited inquiry request subroutine, you must include a test to see if an unsolicited inquiry request has been made (an unsolicited IR type-in) and, if so, set on an indicator that conditions calculation or output operations. This is done by including the statements shown in Figure 6-5 at another point in your program.

UNSOLICITED INQUIRY REQUEST SUBROUTINE - SUBR95

CALCULATION SPECIFICATIONS

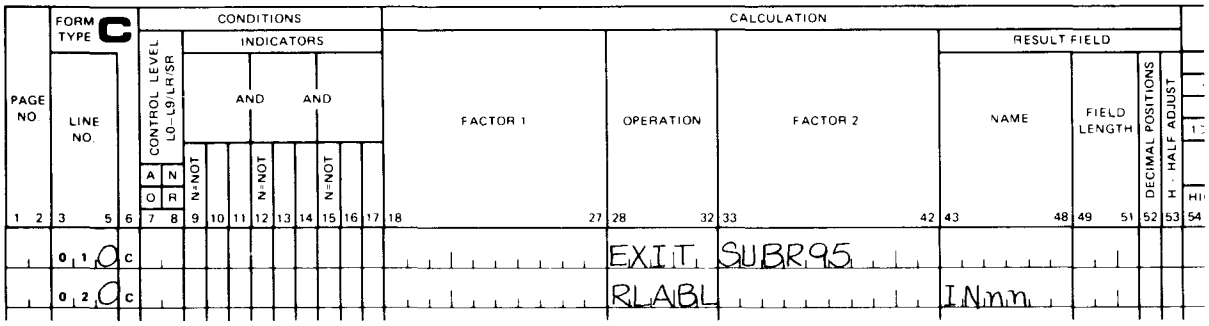


Figure 6—5. Testing the Unsolicited Inquiry Request Status

The statements shown in Figure 6-5 are the same as those in Figure 6-4 except that line 010 must be specified with columns 9 through 17 left blank or specified with an indicator other than 1P. This is necessary so that these statements will be executed during a regular program cycle rather than only at the beginning of program execution.

If you specify the unsolicited inquiry request subroutine, the message

```
RPGØ38 JOB IS NOW ABLE TO ACCEPT UNSOLICITED KEY-IN 'IR'
```

will be displayed on the system console at the beginning of program execution to inform you that your program will accept unsolicited IR type-ins. The program will then halt. To continue, type in

GO△your program name

From this point on, the program will test during each cycle to see if an unsolicited inquiry request has been made. If so, the specified indicator is set on, the conditioned calculation or output operations are performed and the inquiry request is reset. If not, the indicator is set off and the program continues.

If you want to make an unsolicited inquiry request, type in

SOE job number (supplied by system) 0 IR

Note that because an inquiry request is reset after the IR type-in is made, you must make a new type-in each time you want to have the associated indicator set on and the conditioned calculation or output operations performed.

INCORRECT TYPE-INS

If you have allocated a PF key or the unsolicited inquiry request subroutine to your program and you make an incorrect type-in when you attempt to activate either one, the message

```
RPG040 LAST KEY INVALID OR INACTIVE. VALID KEYS = IR, PF1-PF9
```

will be displayed on the system console. To continue, repeat the appropriate type-in with the correct information.

7. RPG II - IMS Action Programs

RPG II SPECIFICATIONS FORMS

The following RPG II specifications forms must be used to define and describe user files and the IMS communications and data control areas.

- Control Card Specifications Form

  Requires an A in column 74 and the action program name in columns 75 through 80.

- File Description Specifications Form

  Describes the users' logical files and the IMS-defined communications and data control areas.

- Input Format Specifications Form

  Describes the fields within each input file and must be described in the same order as the files.

- Calculation Specifications Form

  The coding of the action program.

- Output Format Specifications Form

  Describes the fields within each output file.

No other RPG II specifications forms are required.

RESTRICTIONS

Table 7-1 lists those RPG II language features that are restricted from use in an action program.

Table 7—1. RPG II Language Features with Restricted Use (Part 1 of 2)

Specifications Form/Column/Description			Restriction
Control Card Specifications:			
Column 8	-	Error Analysis Dump	NA
Column 9	-	Operator Control	NA
Column 41	-	First Page Forms Alignment	NA
File Description Specifications:			
Column 15	-	File Type (C and D)	NA
Column 16	-	Table and Array File Designation (T)	S
Columns 20-23	-	Block Length	C
Column 32	-	File Organization:	
		ADDROUT (D)	S
		Record address (blank)	S
		Additional I/O areas	NA
		SAM tape/disk input files	S
		ISAM and indexed IRAM output files	NA
Columns 40-46	-	Device:	
		CTLRDR READER CRP PUNCH CONSOLE PRINTER	NA
Column 53	-	Labels	NA
Columns 54-59	-	Name of Label Exit	NA
	-	Options	NA
Columns 60-65	-	Size of ISAM Index	C
Column 66	-	Unordered Load	NA
Column 67	-	Cylinder Overflow Space Percentage	NA
Columns 68-69	-	Number of Extents	NA
Column 70	-	Tape Rewind	C
Columns 71-72	-	File Conditioners (U1-U8)	NA

RESTRICTIONS

Table 7—1. RPG II Language Features with Restricted Use (Part 2 of 2)

Specifications Form/Column/Description	Restriction
Input Form Specifications:	
Columns 19-20 - Spread Card Feature (TR)	NA
Column 42 - Stacker Select	NA
Calculation Specifications:	
Columns 28-32 - Display Operation (DSPLY)	NA
Output Format Specifications:	
Column 16 - Stacker Select	NA
Telecommunications Specifications	NA

LEGEND:

C Ignored by RPG II compiler; must be specified in IMS configuration.

S Used only with nonindexed sequential IRAM files; must not be used with SAM input files.

NA Not allowed in an action program.

RPG II - IMS INTERFACE AREAS

The IMS main storage areas that serve as interfaces must be initially defined by IMS; to be accessed, they must also be defined on the appropriate RPG II specifications forms.

- Input Message Area (IMA)

  Contains the input message received from a terminal.

- Program Information Block (PIB)

  Used to pass control information between IMS and the action program. The format and position of each field in the block is defined by IMS, and the RPG II specifications must agree with those definitions. Any name may be assigned to a field.

- Output Message Area (OMA)

  Contains the output message to be transmitted to a terminal in response to the input message that originated the action. May also be used for multiple output messages or for transmitting output messages to a terminal other than the initiating terminal. Disk queueing must be included in the IMS configuration.

- Continuity Data Area (CDA)

  Used, optionally, to pass data from one action program to another while processing a dialog transaction. Can be described as an input, update, or output file.

- Transaction Buffer Area (TBA)

  Used by the action program to acquire and release main storage on a transactional basis. Like the CDA, the TBA can be used in the action program as an input, update, or output file. To define the TBA as a file, add it to the file description form. Then use the appropriate RPG format specification to describe the fields. To release the transaction buffer from an action program, use the delete option in columns 16 through 18 of the output specifications form.

The appropriate RPG II specifications forms are given in Table 7–2.

Table 7–2. Required RPG II Specifications Forms

Interface Area	Specifications Forms			Remarks
	Input Format	File Description	Output Format	
IMA	X	X		
PIB	[X]	X	[X]	Either input or output, depending on use
OMA		X	X	
CDA	[X]	X	[X]	Either input or output, depending on use
TBA	[X]	X	[X]	Either input or output, depending on use

A summary of the required entries on the file description specifications form for these four areas is given in Table 7–3.

RPG II - IMS INTERFACE AREAS

Table 7—3. Summary of Required Entries — File Description Specifications Form

Area	File Type (Column 15)	File Designation (Column 16)	Format (Column 19)	Record Length (Columns 24-27)	Device Name (Columns 40-46)
PIB	I or U(1)	D(1)	F	136	*PIB
IMA	I or U	P, S, or D	F	16 + message size(2)	*IMA
OMA(3)	U or O	D or blank	F	16 + message size(2)	*OMA
CDA	I, U, or O	P, S, D or blank	F	data size	*CDA
TBA(4)	I, U, or O	P, S, D or blank	F	data size	*TBA

NOTES:

(1) Entry selection depends on the way action program uses the PIB: 1 in column 15 and D in column 16 indicate that action program accesses the data in the PIB, but makes no changes to the data. U in column 15 and D in column 16 indicate action program accesses the data in the PIB and then updates the data file.

(2) IMS header information occupies the first 16 bytes of the record. The record length for the IMA must include the 16-byte header information, the transaction code, one blank, and the message text.

(3) If OMA is used for multiple output messages during an action program execution or if the output message is transmitted to a terminal other than the initiating terminal, disk queueing must be configured.

(4) The record length specified for TBA is restricted to a maximum size of 8192.

Normal input format specifications form rules apply to the IMA, PIB, CDA, and TBA definitions. Only those fields used by the action program need to be defined. The same applies to defining the OMA, CDA, and TBA fields on the output format specifications form.

Table 7-4 gives a summary of the file organization, related access methods, and file types that may be used in an IMS action program written in RPG II.

Table 7—4. Summary of File Organization, Access Methods, and File Types

File Organization	Related Access Method	File Type
IMS Defined		Input/Update
ISAM	Random	Input/Update
	Sequential, by key	Input/Update
IRAM	Indexed	Input/Update/Output
	Nonindexed	Input/Update/Output
SAM	Sequential	Output
DAM	Direct	Input/Update/Output

For further information, details, and requirements for the IMS-RPG II action program interface, refer to the IMS action programming in RPG II user guide, UP-9206 (current version) and the OS/3 IMS system support functions user guide, UP-11907 (current version).

8. Executing RPG II

RPG II JPROCS

Format:

```
//[symbol] {RPG  } [ PRNTR={lun[,dest]}]
           {RPGL }       {N[,dest]   }
           {RPGLG}       {20[,dest]  }
                [,IN={(vol-ser-no,lbiname)}]
                     {(RES)               }
                     {(RES,lbiname)       }
                     {(RUN,lbiname)       }
                     {(*,lbiname)         }
                [,OUT={(vol-ser-no,lbiname)}]
                      {(RES,lbiname)       }
                      {(RUN,lbiname)       }
                      {(*,lbiname)         }
                      {N                   }
                      {(RUN,$YSRUN)        }
                [,LST={K}] [,SCR1={vol-ser-no}]
                      {M}        {RES       }
                      {N}  [,SCR2={vol-ser-no}]
                      {S}         {RUN       }
                [,EMB={YES}] [,MOD={3    }] [,COL=7]
                      {NO }        {4    }
                                   {5    }
                                   {IRAM }
                [,ALTLOD={(vol-ser-no,lbiname)}]
                         {(RES,lbiname)       }
                         {(RUN,lbiname)       }
                         {(*,lbiname)         }
                         {(RES,$YSRUN)        }
                [,ERRFIL=(vol-ser-no,lbiname,module-name)]
                [,CONSOLE=lfdname]
                [,MIRAM=ALL]
                [,UNPKDS={YES}] [,FNAME8={YES}]
                         {NO }          {NO }
```

Label:

symbol
Specifies the 1- to 6-character source module name; only needed when the IN parameter is used.

Operation:

RPG
A procedure call statement used to compile an RPG II source program.

RPGL
A procedure call statement used to compile an RPG II source program and link-edit the generated object module to create a load module.

RPG II JPROCS

RPGLG

A procedure call statement used to compile an RPG II source program, link-edit the generated object module to create a load module, and immediately execute the load module.

Keyword Parameter PRNTR:

Specifies the logical unit number of the printer. The options are:

PRNTR=lun[,dest]

The logical unit number of the printer. The identifier, dest, is a destination identifier of 1 to 6 alphanumeric characters for the remote destination for spooling.

PRNTR=N[,dest]

Specifies that a DVC-LFD sequence of job control statements is not to be generated for a printer. If you use this option, you must supply your own printer definition. Note that this option also allows you to use the // LCB and // VFB job control statements. The identifier, dest, is a destination identifier of 1 to 6 alphanumeric characters for the remote destination for spooling.

If omitted, the logical unit number of the printer is 20.

Keyword Parameter IN:

Specifies the input file definition and generates a PARAM IN control statement. The options are:

IN=(vol-ser-no,lblname)

Specifies the file identifier and the volume serial number (vol-ser-no) where the source input is located.

IN=(RES)

Specifies that the source input is located on the SYSRES device in YSRC.

IN=(RES,lblname)

This is used if your source input is located on the SYSRES device, but the file identifier is of your own specification, not YSRC.

IN=(RUN,lblname)

Specifies that the source input is located on job's YRUN file, with the file identifier of your own specification.

IN=(*,lblname)

Specifies that the source input is located on a catalog file, with your file identifier.

If omitted, the source input is in the form of embedded data cards (/$, source deck, /*) in the job control stream.

Keyword Parameter OUT (used only with RPG; not used with RPGL or RPGLG):

Specifies the output file definition and generates a PARAM OUT control statement. The options are:

OUT=(vol-ser-no,lblname)

Specifies the file identifier and the volume serial number where the object module is located.

RPG II JPROCS

OUT=(RES,lblname)
Specifies that the object module is located on the SYSRES device with the file identifier of your own specification.

OUT=(RUN,lblname)
Specifies that the object module is located on the job's YRUN file, with a file identifier of your own specification.

OUT=(*,lblname)
Specifies that the object code is located on a catalog file, with your file identifier.

OUT=(N)
Specifies that an object module is not to be produced.

If omitted, the object module is located on the job's YRUN file.

Keyword Parameter LST:

Specifies the format of the compiler listing. The options are:

LST=K
Do not print error flags for sequence errors.

LST=M
Do not print the source language statements and error messages.

LST=N
Do not print any listings.

LST=S
Do not print the main storage map.

If omitted, the complete compiler listing is printed.

Keyword Parameter SCR1:

Specifies the volume serial number of the work file labeled SCR1.

SCR1=vol-ser-no
The volume serial number.

If omitted, the default is RES.

Keyword Parameter SCR2:

Specifies the volume serial number of the work file labeled SCR2.

SCR2=vol-ser-no
The volume serial number.

If omitted, the default is RUN.

RPG II JPROCS

Keyword Parameter EMB:

Specifies whether or not embedded linkage editor control statements are to be generated in the RPG II object module.

EMB=NO
Do not generate embedded linkage editor control statements in the RPG II object module. No overlay structure is generated for the load table or dump table file.

If omitted, the default is YES.

Keyword Parameter MOD:

Specifies that the program is to be compiled in the IBM System/3 - System/34 mode with or without native mode data management accessing the disk files, or that if the program is to be compiled in one of the other compilation modes, IRAM (indexed random access method) is to be used to process all disk files in a Series 90 environment, and MIRAM is to be used in a system 80 environment.

MOD=3
The program is to be compiled in the IBM System/3 - System/34 mode. When this mode is specified, IRAM or MIRAM will be used to process all disk files. Also, the logical file definition (// LFD) for printer files is changed to PRNTR, PRNTR1...PRNTRn and the control reader (CTLRDR) is used for card input even though the data management reader (READER) is specified.

MOD=4
Same as MOD=3, except that printer files are generated with the same names as used in the program, and reader files use the data management reader (READER).

MOD=5
The program is to be compiled in the IBM System/3 - System/34 mode with native mode data management accessing the disk files.

MOD=IRAM
IRAM is to be used to process all disk files.

If omitted, the program is compiled in OS/3 native mode.

Keyword Parameter COL:

Specifies that compile time tables can begin in position 7 rather than in position 1.

COL=7
Enables the user to carry sequence numbers in columns 1-5 for each statement in the RPG source program. The OS/3 librarian can then be used to maintain disk file source for RPG programs that contain compile time tables and arrays.

If omitted, compile time tables begin in position 1.

Keyword Parameter ALTLOD:

Specifies the location of the alternate load library.

ALTLOD=(vol-ser-no,lblname)
Specifies the volume serial number (vol-ser-no) and the file identifier of an alternate load library that contains the RPG II compiler.

RPG II JPROCS

ALTLOD=(RES,lblname)
Specifies that the alternate load library is located on the job's SYSRES device, with your file identifier.

ALTLOD=(RUN,lblname)
Specifies that the alternate load library is located on the job's YRUN file, with your file identifier.

ALTLOD=(*,lblname)
Specifies that the alternate load library is located on a catalog file, with your file identifier.

If omitted, the compiler is loaded from YRUN.

Keyword Parameter ERRFIL:

Specifies that error diagnostic messages are written to a file that is accessed by the error log processor. Error file records are created for every error note generated by the compiler.

ERRFIL=(vol-ser-no,lblname,module-name)
The module name is the name of the module that is referenced by the error file processor. The module name may be from one to eight characters in length, and it doesn't need to match or be related to the RPG II source or object module name. The lblname is the name of the error log file and can be from one to eight characters in length.

If omitted, the error file is not created.

Keyword Parameter CONSOLE:

Specifies that the file is a CONSOLE (interactive data entry) file and not a system console file.

CONSOLE=lfdname
The lfdname is the name of the CONSOLE file.

If omitted, the file is a system console file and not an interactive data entry file.

Keyword Parameter MIRAM:

Specifies that MIRAM is used for disk files when operating in a Series 90 environment. To select individual files for MIRAM, use the MIRAM parameter with the PARAM statement.

MIRAM=ALL
All disk files use MIRAM.

If omitted, disk files use IRAM, ISAM, DAM, or SAM.

Keyword Parameter UNPKDS:

Specifies the format of numeric data within a data structure.

UNPKDS=YES
Numeric data is in unpacked format.

UNPKDS=NO
Numeric data is in packed format.

If omitted, the default is NO.

Keyword Parameter FNAME8:

Specifies whether or not 8-character file names are allowed.

FNAME8=YES
8-character file names are allowed.

FNAME8=NO
The maximum size for file names is 7 characters.

If omitted, the default is NO.

NOTE:

There are two methods that can be used to provide the job control statements to compile, link-edit, or execute an RPG II program. The first method is to use one of the RPG II jprocs (RPG, RPGL, or RPGLG), which automatically generates individual job control statements. The second method is to write all the job control statements for each job step, using, in particular, the PARAM and EXEC statements.

RPG II AUTO REPORT JPROCS

Format:

```
//[symbol] {AUTO    } [ PRNTR={lun[,dest]} ]
           {AUTRPG  }       {N[,dest]   }
           {AUTRPGL }       {20[,dest]  }
           {AUTRPGLG}

[,IN={((vol-ser-no,lblname))}]
     {(RES)                }
     {(RES,lblname)        }
     {(RUN,lblname)        }
     {(*,lblname)          }

[,OUT={((vol-ser-no,lblname))}]
      {(RES,lblname)        }
      {(RUN,lblname)        }
      {(*,lblname)          }
      {N                    }
      {(RUN,SYSRUN)         }

[,OUTSRC={(vol-ser-no,lblname,lfdname,module-name)}]
         {(RES,lblname,lfdname,module-name)       }

[,LST={K}]
      {M}
      {N}
      {S}

[,SCR1={vol-ser-no}] [,SCR2={vol-ser-no}]
       {RES       }        {RUN       }

[,EMB={YES}] [,MOD={3   }]
      {NO }        {4   }
                   {5   }
                   {IRAM}

[,SKIP=C]

[,COPYn={(vol-ser-no,lblname,lfdname)}]
        {(RES,lblname,lfdname)       }
        {(RUN,lblname,lfdname)       }

[,ALTLOD={((vol-ser-no,lblname))}]
         {(RES,lblname)        }
         {(RUN,lblname)        }
         {(*,lblname)          }
         {(RES,SYSLOD)         }

[,ERRFIL=(vol-ser-no,lblname,module-name)]

[,PROGID=N]
```

Label:

symbol
Specifies the 1- to 6-character source module name; only needed when the IN parameter is used.

RPG II AUTO REPORT JPROCS

Operation:

AUTO
A procedure call statement used to process auto report source programs.

AUTRPG
A procedure call statement used to process auto report source programs and then compile the RPG II generated source program.

AUTRPGL
A procedure call statement used to process auto report source programs, compile the generated RPG II source program, and link-edit the generated object module to create a load module.

AUTRPGLG
A procedure call statement used to process auto report source programs, compile the generated RPG II source program, link-edit the generated object module to create a load module, and immediately execute the load module.

Keyword Parameter PRNTR:

Specifies the logical unit number of the printer. The options are:

PRNTR=lun[,dest]
The logical unit number of the printer. The identifier, dest, is a destination identifier of one to six alphanumeric characters for the remote destination for spooling.

PRNTR=N[,dest]
Specifies that a DVC-LFD sequence of job control statements is not to be generated for a printer. If you use this option, you must supply your own printer definition. Note that this option also allows you to use // LCB and // VFB job control statements. The identifier, dest, is a destination identifier of one to six alphanumeric characters for the remote destination for spooling.

If omitted, the logical unit number of the printer is 20.

Keyword Parameter IN:

Specifies the input file definition and generates a PARAM IN control statement. The options are:

IN=(vol-ser-no,lblname)
Specifies the file identifier and the volume serial number (vol-ser-no) where the source input is located.

IN=(RES)
Specifies that the source input is located on the SYSRES device in YSRC.

IN=(RES,lblname)
This is used if your source input is located on the SYSRES device, but the file identifier is of your own specification, not YSRC.

RPG II AUTO REPORT JPROCS

IN=(RUN,lblname)
Specifies that the source input is located on the job's YRUN file, with the file identifier of your own specification.

IN=(*,lblname)
Specifies that the source input is located on a catalog file identified by the file identifier.

If omitted, the source input is in the form of embedded data cards (/$,source deck,/*) in the job control stream.

Keyword Parameter OUT (used only with AUTRPG; not used with AUTRPGL or AUTRPGLG):

Specifies the output file definition and generates a PARAM OUT control statement for the RPG II compile. The options are:

OUT=(vol-ser-no,lblname)
Specifies the file identifier and the volume serial number where the object module is located.

OUT=(RES,lblname)
Specifies that the object module is located on the SYSRES device, with the file identifier of your own specification.

OUT=(RUN,lblname)
Specifies that the object module is located on the job's YRUN file, with a file identifier of your own specification.

OUT=(*,lblname)
Specifies that the object code is to be located on a catalog file identified by the file identifier.

OUT=(N)
Specifies that an object module is not to be produced.

If omitted, the object module is located on the job's YRUN file.

Keyword Parameter OUTSRC:

Specifies the output source file definition for the cataloged source file option on the auto report U specification. A DVC, VOL, LBL, and LFD control statement sequence is generated. The options are:

OUTSRC=(vol-ser-no,lblname,lfdname, module-name)
Specifies the volume serial number, the file identifier (lblname), the logical file descriptor (lfdname) where the generated source is located, and the module name of the generated source. The lfdname and module-name must correspond to information specified in the auto report U specification.

OUTSRC=(RES,lblname,lfdname,module-name)
Specifies that the generated source is located on the SYSRES device, with the file identifier (lblname) and logical file descriptor (lfdname) of your own specification and module-name of the generated source. The lfdname and module-name must correspond to information specified in the auto report u specification.

If omitted, there is no output file definition for the cataloged source file option.

RPG II AUTO REPORT JPROCS

Keyword Parameter LST:

Specifies the format of the compiler listing. The options are:

`LST=K`
Do not print error flags for sequence errors.

`LST=M`
Do not print the source language statements and error messages.

`LST=N`
Do not print any listings.

`LST=S`
Do not print the main storage map.

If omitted, the complete compiler listing is printed.

Keyword Parameter SCR1:

Specifies the volume serial number of the work file labeled SCR1.

`SCR1=vol-ser-no`
The volume serial number.

If omitted, the default is RES.

Keyword Parameter SCR2:

Specifies the volume serial number of the work file labeled SCR2.

`SCR2=vol-ser-no`
The volume serial number.

If omitted, the default is RUN.

Keyword Parameter EMB:

Specifies whether or not embedded linkage editor control statements are to be generated in the RPG II object module.

`EMB=NO`
Do not generate embedded linkage editor control statements in the RPG II object module. No overlay structure is generated for the load table or dump table file.

If omitted, the default is YES.

RPG II AUTO REPORT JPROCS

Keyword Parameter MOD:

Specifies tha the program is to be compiled in the IBM System/3 - System/34 mode or that if the program is to be compiled in one of the other compilation modes, IRAM is to be used to process all disk files in a Series 90 environment, and MIRAM is to be used in a System 80 environment.

MOD=3
The program is to be compiled in the IBM System/3 - System/34 mode. When this mode is specified, IRAM or MIRAM will be used to process all disk files. Also, the logical file definition (// LFD) for printer files is changed to PRNTR, PRNTR1...PRNTRn and the control reader (CTLRDR) is used for card input even though the data management reader (READER) is specified.

MOD=4
Same as MOD=3, except that printer files are generated with the same names as used in the program, and reader files use the data management reader (READER).

MOD=5
The program is to be compiled in the IBM System/3 - System/34 mode, with native mode data management accessing the disk files.

MOD=IRAM
IRAM is to be used to process all disk files.

If omitted, the program is compiled in OS/3 native mode.

Keyword Parameter SKIP:

Specifies type of skipping used for printer output, generating a PARAM SKIP job control statement.

SKIP=c
SKIP=c causes auto report to generate SKIP to channel for the printer output file. If this option is not used, auto report generates SKIP to line numbers for the printer output file.

If omitted, you get spacing based on line numbers.

Keyword Parameter COPYn:

Specifies the input source file definition for /COPY statements within auto report source input. The number (n) of copies corresponds to the number of unique files used to copy.

COPYn=(vol-ser-no,lblname,lfdname)
Specifies the volume serial number, the file identifier (lblname), and the logical file descriptor (lfdname) where the copy source is located.

COPYn=(RES,lblname,lfdname)
Specifies that the copy source is located on the SYSRES device, with the file identifier (lblname) and logical file descriptor (lfdname) of your own specification.

RPG II AUTO REPORT JPROCS

COPYn=(RUN,lblname,lfdname)
Specifies that the copy source is located on the job's YRUN file, with the file identifier (lblname) and logical file descriptor (lfdname) of your own specification.

If omitted, there is no input source file definition for /COPY statements.

Keyword Parameter ALTLOD:

Specifies the alternate load library containing the auto report product (AUTO#).

ALTLOD=(vol-ser-no,lblname)
Specifies the volume serial number (vol-ser-no) and the file identifier where the auto report (AUTO#) load module resides.

ALTLOD=(RES,lblname)
Specifies that the alternate load library is located on the job's SYSRES device in the file identified by the file identifier.

ALTLOD=(RUN,lblname)
Specifies that the alternate load library is located on the job's YRUN file, with the file identifier specified by the user.

ALTLOD=(*,lblname)
Specifies that the alternate load library is located on a catalog file identified by the file identifier.

If omitted, the AUTO# load module is located in the YLOD file on the SYSRES device.

Keyword Parameter ERRFIL:

Specifies that error diagnostic messages are written to a file that is accessed by the error log processor. Error file records are created for every error note generated by the auto report.

ERRFIL=(vol-ser-no,lblname,module-name)
The module name is the name of the module that is referenced by the error file processor. The module name may be from one to eight characters in length, and it doesn't need to match or be related to the RPG II source or object module name. The lblname is the name of the error log file and can be from one to eight characters in length.

If omitted, the error log file is not created.

Keyword Parameter PROGID:

Specifies that auto report will not generate a program identification in columns 75 through 80 of the generated source.

PROGID=N
No program identification is generated.

If omitted, the program identification on the control specification is generated in all source output.

// PARAM

Format:

```
//[symbol]PARAM [IN=program name/lfdname]
              [,OUT={lfdname}]
                    {(N)   }
                    {(I)   }
              [,LST={K}]
                    {M}
                    {N}
                    {S}
              [,MOD={3   }]
                    {4   }
                    {5   }
                    {IRAM}
              [,COL=7]
              [,MIRAM={lfdname1,...,lfdname20}]
                      {ALL                   }
              [,SKIP=C]
              [,ERRFIL=module-name/lfdname]
              [,CONSOLE=lfdname]
              [,PROGID=N]
              [,UNPKDS=YES]
              [,FNAME8=YES]
```

Label:

symbol
Specifies the 1- to 6-character label.

Operation:

PARAM
A job control statement used to introduce processing options. The operands are the variable information you want to introduce into the job.

Keyword Parameter IN:

Specifies the program name and lfdname when the source code is input from a disk file.

IN=program name/lfdname
Identifies the source program and the disk file it resides on.

If omitted, the source input is in the form of embedded data cards (/$, source deck, /*) in the job control stream.

Keyword Parameter OUT:

Specifies the output file definition. The options are:

OUT=lfdname
Specifies that the lfdname contains the generated object module. The default file name is YRUN.

OUT=(N)
Specifies that an object module is not to be produced.

OUT=(I)
Do not generate embedded linkage editor control statements in the RPG II object module. No overlay structure is generated for the load table or dump table file.

If omitted, the object module is located on the job's YRUN file.

Keyword Parameter LST:

Specifies the format of the compiler listing. The options are:

LST=K
Do not print error flags for sequence errors.

LST=M
Do not print the source language statements and error messages.

LST=N
Do not print any listings.

LST=S
Do not print the main storage map.

If omitted, the complete compiler listing is printed.

Keyword Parameter MOD:

Specifies that the program is to be compiled in the IBM System/3 - System/34 mode or that, if the program is to be compiled in one of the other compilation modes, IRAM is to be used to process all disk files in a Series 90 environment, and MIRAM is to be used in a System 80 environment.

MOD=3
The program is to be compiled in the IBM System/3 - System/34 mode. When this mode is specified, IRAM or MIRAM will be used to process all disk files. Also, the logical file definition (// LFD) for printer files is changed to PRNTR, PRNTR1...PRNTRn and the control reader (CTLRDR) is used for card input even though the data management reader (READER) is specified.

MOD=4
Same as MOD=3 except that printer files are generated with the same names as used in the program, and reader files use the data management reader (READER).

// PARAM

MOD=5
The program is to be compiled in the IBM System/3 – System/34 mode with the ISAM, SAM, or DAM processor accessing the disk files.

MOD=IRAM
IRAM is to be used to process all disk files.

If omitted, the program is compiled in OS/3 native mode.

Keyword Parameter COL:

Specifies that compile time tables can begin in position 7 rather than in position 1.

COL=7
Enables the user to carry sequence numbers in columns 1-5 for each statement in the RPG source program. The OS/3 librarian can then be used to maintain disk file source for RPG programs that contain compile time tables.

If omitted, compile time arrays begin in position 1.

Keyword Parameter MIRAM:

When operating under the mixed Series 90 environment, this parameter designates which disk files use MIRAM. Those disk files not mentioned use Series 90 data management only. All other files, such as card or tape, use System 80 data management and need not be specified here.

MIRAM=lfdname1,...,lfdname20
The lfdname is a disk file using MIRAM.

MIRAM=ALL
All disk files use MIRAM.

Keyword Parameter SKIP:

Specifies that auto report will skip the printer to channel numbers (vertical format buffer) for the printer output specifications.

SKIP=C
Skips the printer to channel numbers for the printer output specifications.

If omitted, auto report generates skips to line numbers.

Keyword Parameter ERRFIL:

Specifies that error diagnostic messages are written to a file that is accessed by the error log processor. When you specify this parameter along with the necessary // DVC.../// LFD statements, error file records are created for every diagnostic output by the auto report.

ERRFIL=module-name/lfdname
The module name is the name assigned to the element being created by auto report. The module name may be from one to eight alphanumeric characters in length, and it doesn't need to match or be related to the RPG II source or object module name. The lfdname is the logical file name of the error file and can be from one to eight alphanumeric characters in length.

If omitted, the error file is not created.

Keyword Parameter CONSOLE:

Specifies that the file is a CONSOLE (interactive data entry) file, not a system console file.

CONSOLE=lfdname
The lfdname is the name of the CONSOLE file.

If omitted, the file is a system console file, not an interactive data entry file.

Keyword Parameter PROGID:

Specifies that auto report will not generate a program identification in columns 75 through 80 of the generated source.

PROGID=N
No program identification is generated.

If omitted, the program identification on the control specification is generated in all source output.

Keyword Parameter UNPKDS:

Specifies the format of numeric data within a data structure.

UNPKDS=YES
Numeric data is in unpacked format.

If omitted, numeric data is in packed format.

Keyword Parameter FNAME8:

Specifies whether or not 8-character file names are allowed.

FNAME8=YES
8-character file names are allowed.

If omitted, the maximum size for file names is 7 characters.

9. Auto Report

DEFINITION

Auto report is a simple way of producing printed reports that contain page headings, column headings centered over fields, and accumulated totals. It is a stand-alone product that operates before the execution of the RPG II compiler. The auto report precompiler creates an auto report source module and then the RPG II compiler uses that source module to create an RPG II object module. Auto report statements are entered on the output format specifications form; they replace other output format specifications.

H-*AUTO PAGE HEADINGS

Function:

This specification is not required. You use the H-*AUTO specification on the output (O) specifications form to print a page heading at the top of every page of a report. This page heading can contain the date, page number, and title. You can use up to five H-*AUTO page headings for a page heading that has more than one line. If you specify both standard RPG II heading lines and H-*AUTO page headings, they are printed in the order you use them in the output specifications. You can specify H-*AUTO page headings only for one printer file per program.

This information is supplied by two types of entries: output file identification and control, and field description and control.

Output File Identification and Control Entries (Columns 7 through 31):

Indicates that the report contains a page heading. You may follow it with one or more field descriptions that specify a title or other information for the report. Each output file identification specifies a separate page heading line.

Format:

COLS:	6	7-13	15	16	17-18	19-22	23-31	32-37	38-70
	O	**Filename**	**H**	**Blank**	**Blank or Space**	**Blank or Skip**	**Blank or Indicators**	***Auto**	**Blank**

Entries:

- File Name (Columns 7 through 13)

  Specifies the name of the printer file that prints the report.

  Name
  Name of the printer file. Only specify a file name on the first output file identification for a file. The file name can be eight characters long.

- Type (Column 15)

  Indicates a report that contains a page heading.

  H
  Enter an H in this column and *AUTO in columns 32 through 36. You can use up to five H-*AUTO specifications for one output file.

  The first H-*AUTO specification generates a page heading consisting of a date, page number, and an optional title.

H-*AUTO PAGE HEADINGS

- Space (Columns 17 and 18)

  Controls the spacing of page headings.

  Blank
  : Single space after each single page heading line (space-one-after) and single space after each page heading line of a multiple line page heading (space-one-after). Double-space after the last heading line.

  values
  : Spacing values for page headings.

- Skip (Columns 19 through 22)

  Controls skipping of page headings.

  Blank
  : Printer skips to home position before the first page heading line is printed.

  values
  : Skipping values for page headings.

- Output Indicators - Records (Columns 23 through 31)

  Conditions the printing of the page heading generated by the first H-*AUTO specification.

  Blank
  : If you specified a title in columns 45 through 70 of the field description, auto report generates a first page or overflow output indicator and the page heading is printed at the top of each page or when an overflow condition occurs.

    If you specified the name of a field, table, or array in columns 32 through 37 of the field description, auto report generates a N1P output indicator and the field, table, or array is not printed on the first page.

    Auto report does not generate N1P if you enter the following special field names in columns 32 through 37 of the field description:

    ```
    PAGE
    PAGE1
    PAGE2
    PAGE3
    PAGE4
    PAGE5
    PAGE6
    PAGE7
    UDATE
    UDAY
    UMONTH
    UYEAR
    ```

  indicators
  : Conditions the printing of the first H-*AUTO page heading.

H-*AUTO PAGE HEADINGS

- *AUTO (Columns 32 through 37)

  Indicates an auto report that contains a page heading.

  ***AUTO**
  Enter *AUTO in these columns and an H in column 15.

Field Description and Control Entries (Columns 32 through 70):

Allows you to format the page heading in the way you want.

Field Description that Prints a Title on the Page Heading (Blanks in Columns 32 through 37 and Title in Columns 45 through 70):

Prints a title (constant) on the page heading line.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Blank**	**Blank**	**Blank**	**Blank**	**Blank**	**Title**

- Title (Columns 45 through 70)

  Prints the title (constant) on the page heading.

  Blank
  Page heading contains only the date and page number and no title.

  'title'
  Title for the page heading. Leave all the other fields on the field description blank and enclose the title within apostrophes.

Field Description that Prints a Field on the Page Heading (Field Name in Columns 32 through 37):

Prints a field on the page heading line.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Field Name**	**Blank or Edit Code**	**Blank or B**	**Blank**	**Blank**	**Blank or Edit Word**

H-*AUTO PAGE HEADINGS

- Field Name (Columns 32 through 37)

  Specifies the name of a field, an indexed array, or a table. The associated field, array, or table value is printed on the page heading.

  name
  Name of the field, indexed array, or table.

- Edit Codes (Column 38)

  Specifies an edit code for a numeric field, indexed array, or table named in columns 32 through 37.

  Blank
  No edit code. If an alphanumeric field, table, or indexed array is specified in columns 32 through 37, leave this column blank.

  edit code
  If a numeric field, numeric indexed array, or numeric table is named in columns 32 through 37, enter an edit code. When an edit code is specified, leave columns 45 through 70 blank.

- Blank After (Column 39)

  Indicates whether or not an alphanumeric field is reset to blanks after it is printed and a numeric field is reset to zeros after it is printed.

  Blank
  Alphanumeric field is not reset to blanks or numeric field is not reset to zeros.

  B
  Reset the field to blanks or zeros.

- Edit Word (Columns 45 through 70)

  Edits numeric fields printed on the page heading.

  Blank
  No editing of numeric fields. If you specified an edit code in column 38, leave these columns blank.

  edit word
  Edit the numeric field.

D-*AUTO DETAIL REPORTS

Function:

This specification is not required.

You use the D-*AUTO specification on the output (O) specifications form to print a report that can contain both detail lines and total lines.

You can specify the D-*AUTO specification alone or in combination with standard RPG II specifications. You cannot use both a D-*AUTO and T-*AUTO specification in the same program. You can specify D-* AUTO only for one printer file per program.

This information is supplied by two types of entries: output file identification and control, and field description and control.

Output File Identification and Control Entries (Columns 7 through 37):

Indicates that the report can contain both detail lines and total lines. Follow it with at least one field description that describes when, how, or where the lines are printed.

Format:

COLS:	6	7-13	15	16	17-18	19-22	23-31	32-37	38-70
	0	**Filename**	**D**	**Blank or Fetch Overflow**	**Blank or Space**	**Blank or Skip**	**Blank or Indicators**	***Auto**	**Blank**

- File Name (Columns 7 through 13)

  Specifies the name of the printer file that prints the report.

  name

  Name of the printer file. The name for this file must be the same name specified on the H-*AUTO page heading. Only specify a file on the first output file identification for a file. The file name can be eight characters long.

- Type (Column 15)

  Indicates a report that can contain both detail lines and total lines.

  D

  Enter a D in this column and *AUTO in columns 32 through 36. You cannot use both D-*AUTO and T-*AUTO specifications in the same program.

D-*AUTO DETAIL REPORTS

- Fetch Overflow (Column 16)

  Indicates fetch overflow processing.

  Blank
  No fetch overflow processing.

  F
  Fetch overflow processing. It applies only to detail lines.

- Space (Columns 17 and 18)

  Controls the spacing of detail lines.

  Blank
  Single space after each detail line (space-one-after), double space after each total line (space-two-after) and one blank line before the lowest level total line and before the final total line (space-one-before).

  values
  Spacing values for detail lines.

  You cannot specify spacing rules for column headings or total lines.

  When the detail or total line is longer than the record length for the printer file, an overflow print line is generated.

- Skip (Columns 19 through 22)

  Controls skipping of the printer for detail lines.

  Blank
  No skipping by printer.

  values
  Skipping values for detail lines.

  These entries apply only to the detail line. You cannot specify skipping rules for column headings or total lines.

  If the detail or total line is longer than the record length for the printer file, an overflow print line is generated.

D-*AUTO DETAIL REPORTS

- Output Indicators - Records (Columns 23 through 31)

  Specifies output indicators that condition the printing of the detail line.

  Blank
  Auto report generates a N1P indicator and the detail line is not printed at first page time.

  indicator
  Conditions the printing of the detail line. You can use AND or OR if you specify an output indicator on the first D-*AUTO specification.

- *AUTO (Columns 32 through 37)

  Indicates an auto report that can contain both detail lines and total lines.

  ***AUTO**
  Enter *AUTO in these columns and a D in column 15.

Field Description and Control Entries (Columns 23 through 70):

Allows you to format the report in the way you want.

Field Description that Prints a Field and Column Heading (Blank or B in Column 39 and Field Name in Columns 32 through 37):

Prints an alphanumeric or numeric field on a detail line and optionally prints a column heading over it.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank or Indicators**	**Field Name**	**Blank or Edit Code**	**Blank or B**	**Blank or End Position**	**Blank**	**Blank or Column Heading**

- Output Indicators - Fields (Columns 23 through 31)

  Specifies output indicators that condition the printing of the field specified in columns 32 through 37.

  Blank
  Auto report prints the associated field on each detail line conditioned by the indicator.

  indicators
  Conditions the printing of the field.

  If you specify a column heading in columns 45 through 70 to be printed over the field named in columns 32 through 37, the output indicators do not affect the column heading.

D-*AUTO DETAIL REPORTS

- Field Name (Columns 32 through 37)

  Specifies the name of a field, an indexed array, or a table. The associated field, array, or table value is printed on the detail line.

  name
  Name of the field, indexed array, or table.

- Edit Codes (Column 38)

  Specifies an edit code for a numeric field, indexed array, or table named in columns 32 through 37.

  Blank
  If you specified an alphanumeric field, table, or indexed array in columns 32 through 37, leave this column blank.

  edit code
  If you named a numeric field, numeric indexed array, or numeric table in columns 32 through 37, you can enter an edit code. If you choose not to enter an edit code, auto report generates a K edit code, which prints a numeric field or numeric element with commas and a decimal point. The K edit code also suppresses zeros so that zero balances are not printed and negative balances are printed with a minus sign on the right.

- Blank After (Column 39)

  Indicates whether or not an alphanumeric field is reset to blanks and a numeric field is reset to zeros after it is printed on the detail line.

  Blank
  Alphanumeric field is not reset to blanks or a numeric field (that is not totaled) is not reset to zeros.

  B
  Reset the field to blanks or zeros.

- End Position in Output Record (Columns 40 through 43)

  Specifies the end print position of the rightmost character of the field that is printed on the detail line.

  Blank
  Auto report generates end positions for fields and centers column headings.

  end position
  End position of the rightmost character of the field.

D-*AUTO DETAIL REPORTS

- First Column Heading Line (Columns 45 through 70)

  Prints the first line of a column heading (constant) over the field named in columns 32 through 37.

  Blank
  No column heading.

  'column heading'
  Print a column heading. Enclose it within apostrophes.

Field Description that Prints a Heading (Blank in Column 39 and Heading in Columns 45 through 70):

Prints a heading (constant) on a detail line. There is no column heading over this heading.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank or Indicators**	**Blank**	**Blank**	**Blank**	**Blank or End Position**	**Blank**	**Heading**

- Output Indicators - Fields (Columns 23 through 31)

  Specifies output indicators that condition the printing of the heading (constant) specified in columns 45 through 70.

  Blank
  Auto report prints the heading on each detail line conditioned by the indicator.

  indicator
  Conditions the printing of the heading.

- End Position in Output Record (Columns 40 through 43)

  Specifies the end print position of the rightmost character of the heading (constant) that is printed on the detail line.

  Blank
  Auto report generates end positions for headings.

  end position
  End position of the rightmost character of the heading.

D-*AUTO DETAIL REPORTS

- Heading (Columns 45 through 70)

  Prints a heading (constant) on each detail line.

  'heading'
  Heading on each detail line. Enclose the heading within apostrophes.

Field Description that Prints a Numeric Field and Column Heading and Accumulates Totals (A in Column 39):

Prints a numeric field on a detail line and accumulates totals for it on total lines. You can optionally print a column heading over the numeric field. A total is printed for each control level (L1 through L9) you defined in columns 59 and 60 of the input specifications and a final total is printed.

Format:

COLS:	7–22	23–31	32–37	38	39	40–43	44	45–70
	Blank	**Blank or Indicators**	**Field Name**	**Blank or Edit Code**	**A**	**Blank or End Position**	**Blank**	**Blank or Column Heading**

- Output Indicators – Fields (Columns 23 through 31)

  Specifies output indicators that condition the printing of the field specified in columns 32 through 37.

  Blank
  Auto report prints the total on each detail line.

  indicators
  Conditions the printing of the fields. If you specified a column heading in columns 45 through 70 to be printed over the field named in columns 32 through 37, the output indicators do not affect the column heading or the field descriptions generated by auto report for totals.

  If you specify an N1P output indicator on the D-*AUTO output file indentification, the calculations generated for the totaling fields are also conditioned by N1P. This causes a diagnostic in the RPG II compiler.

D-*AUTO DETAIL REPORTS

- Field Name (Columns 32 through 37)

  Specifies the name of a numeric field that is accumulated and printed on each detail line.

  name

  Name of a numeric field. Auto report generates an RPG II subroutine named A$$SUM. This subroutine creates and names additional totaling fields based on the field name you specify and generates calculation and output specifications that accumulate and print the various levels of totals required.

  If you want to accumulate a numeric field on each detail line, enter the name of the field in these columns and enter an A in column 39. The associated field is printed on the detail line and totals for it are printed on total lines. You can not identify an array, array element, or table. You can specify totaling for any particular field only once in each program.

- Edit Codes (Column 38)

  Specifies an edit code for the numeric field named in columns 32 through 37 as well as for all the generated total fields.

  Blank

  Auto report generates a K edit code, which prints a numeric field with commas and a decimal point. The K edit code also suppresses zeros so that zero balances are not printed and negative balances are printed with a minus sign on the right.

  edit code

  Edit code for the numeric field.

- Accumulate Totals (Column 39)

  Indicates that totals are accumulated and printed for the numeric field named in columns 32 through 37. You can specify totaling for any particular field only once in each program.

  A

  Accumulate and print totals for the numeric field named in columns 32 through 37. Auto report generates a subroutine named A$$sum that accumulates the values from the fields into the lowest level total lines.

  Auto report generates a B (blank after) in column 39 of all the detail and total field descriptions generated for the field name.

  Total fields are generated and named for all control level indicators defined in columns 59 and 60 of the input specifications. Total calculations accumulate totals for the field named in columns 32 through 37. Total calculations roll (add) the total from the lowest level total field to that of the next higher level field and end with a final total (total rolling).

  Auto report prints asterisks to the right of generated total lines. One asterisk is printed to the right of the lowest level total line and two asterisks are printed to the right of the next level total and so on.

  To suppress the generation of asterisks on total lines, enter an N in column 28 of the auto report options specifications form.

D-*AUTO DETAIL REPORTS

- End Position in Output Record (Columns 40 through 43)

  Specifies the end print position of the rightmost character of the field that is printed on the total line.

  Blank
  Auto report generates end positions for fields and centers column headings.

  end position
  End position of the rightmost character of the field.

- First Column Heading Line (Columns 45 through 70)

  Prints the first line of a column heading (constant) over the field named in columns 32 through 37.

  Blank
  No column heading.

  'column heading'
  Print a column heading. Enclose it within apostrophes. The value is printed over the accumulated total of the field specified in columns 32 through 37.

Field Description that Prints a Second or Third Column Heading Line (C in Column 39):

Prints a second or third line of a column heading. You can use one or two C specifications following a field description that has an A, B, or blank in column 39 and a field name in columns 32 through 37.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Blank**	**Blank**	**C**	**Blank**	**Blank**	**Column Heading**

- Column Heading Continuation Lines (Column 39)

  Indicates a second and third column heading line.

  C
  Continuation lines for a column heading specified on a field description with a B, blank, or A in column 39. The column heading specified in columns 45 through 70 is printed on the second or third line of the column heading.

D-*AUTO DETAIL REPORTS

- Second and Third Column Heading Line (Columns 45 through 70)

  Prints a second or third column heading line.

  Blank
  No second or third column heading line.

  'continuation line'
  Continuation lines for a column heading specified on a field description with a B, blank, or A in column 39. If it is the first C specification, it is the second line of the column heading and if it is the second C specification, it is the third line of the column heading. You cannot use more than two C specifications.

  Enclose them within apostrophes.

Field Description that Prints a Heading Next to a Total (1—9 or R in Column 39):

Prints a heading (constant) on a specific total line generated from an A in column 39. Only use this field description if you used a field description with an A in column 39. The heading is printed on the total line that corresponds to the level (L1 through L9 or LR) you specified in column 39.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Blank**	**Blank**	**1-9, R**	**Blank**	**Blank**	**Heading**

- Specific Total Line (Column 39)

  Identifies a specific total line on which the heading (constant) is printed. The heading is printed to the left of the leftmost total on the line. You must use a field description with an A in column 39.

  1-9 or R
  Print the heading on a specific total line. This entry corresponds to the indicators L1 through L9 defined in columns 59 and 60 of the input specifications and LR.

- Heading (Columns 45 through 70)

  Prints a heading (constant) on a specific total line.

  'heading'
  Constant that is printed on a specific total line.

  Enclose the heading within apostrophes.

D-*AUTO DETAIL REPORTS

Field Description that Prints a Field Next to a Total (1—9 or R in Column 39 and Field Name in Columns 32 through 37):

Prints an alphanumeric or numeric field on a specific total line generated from an A in column 39. Only use this field description if you used a field description with an A in column 39. The field is printed on the total line that corresponds to the level (L1 through L9 or LR) you specified in column 39.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Field Name**	**Blank or Edit Code**	**1-9, R**	**Blank**	**Blank**	**Blank or Edit Word**

- Field Name (Columns 32 through 37)

  Specifies the name of a field, an indexed array, or a table. The associated field, array, or table value is printed on a specific total line.

  `name`
  Field that is printed to the left of the first total.

- Edit Codes (Column 38)

  Specifies an edit code for a numeric field, indexed array, or table named in columns 32 through 37.

  `Blank`
  If you specified an alphanumeric field, table, or indexed array in columns 32 through 37, leave this column blank.

  `edit code`
  If you named a numeric field, numeric indexed array, or numeric table in columns 32 through 37, you can enter an edit code. When you specify an edit code, leave columns 45 through 70 blank.

- Specific Total Line (Column 39)

  Identifies a specific total line on which the field described in columns 32 through 37 is printed. The field is printed to the left of the leftmost total on the line. You must use a field description with an A in column 39.

  `1-9 or R`
  Print the associated field on a specific total line. This entry corresponds to the indicators L1 through L9 defined in columns 59 and 60 of the input specifications and LR.

D-*AUTO DETAIL REPORTS

- Edit Word (Columns 45 through 70)

  Edits numeric fields printed on a specific total line.

  Blank
  If you specified an edit code in column 38, leave these columns blank.

  'edit word'
  Edits the field.

T-*AUTO TOTAL REPORTS

Function:

This specification is not required.

You use the T-*AUTO specification on the output (O) specifications form to print a report that contains only total lines.

You can specify the D-*AUTO sepcification alone or in combination with standard RPG II specifications. You cannot use both a D-*AUTO and T-*AUTO specification the same program. You can specify T-*AUTO only for one printer file per program.

This information is supplied by two types of entries: output file identification and control entries and field description and control entries.

Output File Identification and Control Entries (Columns 7 through 37):

Indicates that the report contains only total lines. Follow it with at least one field description that describes when, how, or where the lines are printed.

Format:

COLS:	6	7-13	15	16	17-18	19-22	23-31	32-37	38-70
	O	**filename**	**T**	**Blank or Fetch Overflow**	**Blank or Space**	**Blank or Skip**	**Blank or Indicators**	***AUTO**	**Blank**

- File Name (Columns 7 through 13)

  Specifies the name of the printer file that prints the report.

  name

  Name of the printer file. The name for this file must be the same name specified on the H-*AUTO page heading. Only specify a file name on the first output file identification for a file. If your program is written for IBM System/3 mode, the file name can be eight characters long.

- Type (Column 15)

  Indicates a report that contains only total lines.

  T

  Enter a T in this column and *AUTO in columns 32 through 36. You cannot use both D-*AUTO and T-*AUTO specifications in the same program.

T-*AUTO TOTAL REPORTS

- Fetch Overflow (Column 16)

  Indicates fetch overflow processing.

  Blank
  No fetch overflow processing.

  F
  Fetch overflow processing. It applies only to the lowest level total line.

- Space (Columns 17 and 18)

  Controls the spacing of the lowest level total lines.

  Blank
  Single space after each lowest level total line (space-one-after), double space after each higher level total line (space-two-after) one blank line before the second-to-the-lowest level total line and before the final total line (space-one-before).

  values
  Spacing values for the lowest level total lines.

  You cannot specify any other spacing for higher level total lines.

  When the total line is longer than the record length specified for the printer file, an overflow print line is generated.

- Skip (Columns 19 through 22)

  Controls skipping of the printer for lowest level total lines.

  Blank
  No skipping by printer.

  values
  Skipping values for total lines.

  These entries apply only to the lowest level total line. You cannot specify skipping rules for column headings or higher level total lines.

  If the total line is longer than the record length specified for the printer file, an overflow print line is generated.

T-*AUTO TOTAL REPORTS

- Output Indicators - Records (Columns 23 through 31)

  Specifies output indicators that condition the printing of the lowest level total line.

  Blank
  Auto report conditions the first generated total line by the lowest control level indicator defined in the program.

  indicators
  Condition the printing of the lowest level of the total line. Total lines are printed only for the output indicator specified and those above it.

  You can use AND or OR if you specify an output indicator on the first T-*AUTO output file identification.

- *AUTO (Columns 32 through 37)

  Indicates an auto report that contains only total lines.

  ***AUTO**
  Enter *AUTO in these columns and a D in column 15.

Field Description and Control Entries (Columns 23 through 70):

Allows you to format the report in the way you want.

Field Description that Prints a Field and Column Heading (Blank or B in Column 39 and Field Name in Columns 32 through 37):

Prints an alphanumeric or numeric field on a detail line and optionally prints a column heading over it.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank or Indicators**	**Field Name**	**Blank or Edit Code**	**Blank or B**	**Blank or End Position**	**Blank**	**Blank or Column Heading**

- Output Indicators - Fields (Columns 23 through 31)

  Specifies output indicators that condition the printing of the field specified in columns 32 through 37.

  Blank
  Auto report prints the asociated field each time the lowest level total line is printed.

T-*AUTO TOTAL REPORTS

indicators
Conditions the printing of the field.

If you specify a column heading in columns 45 through 70 to be printed over the field named in columns 32 through 37, the output indicators do not affect the column heading.

- Field Name (Columns 32 through 37)

Specifies the name of a field, an indexed array, or a table. The associated field, array, or table value is printed on the lowest level total line.

name
Name of the field, indexed array, or table.

- Edit Codes (Column 38)

Specifies an edit code for a numeric field, indexed array, or table named in columns 32 through 37.

Blank
If you specified an alphanumeric field, table, or indexed array in columns 32 through 37, leave this column blank.

edit code
If you named a numeric field, number indexed array, or numeric table in columns 32 through 37, you can enter an edit code. If you choose not to enter an edit code, auto report generates a K edit code, which prints a numeric field or numeric element with commas and a decimal point. The K edit code also suppresses zeros so that zero balances are not printed and negative balances are printed with a minus sign on the right.

- Blank After (Column 39)

Indicates whether or not an alphanumeric field is reset to blanks and a numeric field is reset to zeros after it is printed on the lowest level total line.

Blank
Alphanumeric field that is not reset to blanks or a numeric field (that is not totaled) is not reset to zeros.

B
Reset the field to blanks or zeros.

- End Position in Output Record (Columns 40 through 43)

Specifies the end print position of the rightmost character of the field that is printed on the first total line.

Blank
Auto report generates end positions for fields and centers column headings.

end position
End position of the rightmost character of the field.

T-*AUTO TOTAL REPORTS

- First Column Heading Line (Columns 45 through 70)

  Prints the first line of a column heading (constant) over the field named in columns 32 through 37.

  Blank
  No column heading.

  'column heading'
  Print a column heading. Enclose it within apostrophes.

Field Description that Prints a Heading (Blank in Column 39 and Heading in Columns 45 through 70):

Prints a heading (constant) on the lowest level total line. There is no column heading over this heading.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank or Indicators**	**Blank**	**Blank**	**Blank**	**Blank or End Position**	**Blank**	**Heading**

- Output Indicators – Fields (Columns 23 through 31)

  Specifies output indicators that condition the printing of the heading (constant) specified in columns 45 through 70.

  Blank
  Auto report prints the heading each time the lowest level total line is printed.

  indicator
  Condition the printing of the heading.

- End Position in Output Record (Columns 40 through 43)

  Specifies the end print position of the rightmost character of the heading (constant) that is printed on the lowest level total line.

  Blank
  Auto report generates end positions for headings.

  end position
  End position of the rightmost character of the heading.

T-*AUTO TOTAL REPORTS

- Heading (Columns 45 through 70)

  Prints a heading (constant) on the first total line.

  'heading'
  Heading on the first total line. Enclose the heading within apostrophes.

Field Description that Prints a Numeric Field and Column Heading and Accumulates Totals (A in Column 39):

Prints a numeric field on the lowest level total line and accumulates totals for it on higher level total lines. You can optionally print a column heading over the numeric field. A total is printed for each control level (L1 through L9) you defined in columns 59 and 60 of the input specifications and a final total is printed.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Field Name**	**Blank or Edit Code**	**A**	**Blank or End Position**	**Blank**	**Blank or Column Heading**

- Output Indicators - Fields (Columns 23 through 31)

  You cannot use this field when column 39 contains an A.

- Field Name (Columns 32 through 37)

  Specifies the name of a numeric field that is accumulated and printed on the generated total line.

  name
  Name of a numeric field.

  Auto report generates an RPG II subroutine named A$$SUM that creates and names additional totaling fields based on the field name you specified to generate calculation and output specifications that accumulate and print the various levels of totals required.

  If you want to accumulate a numeric field on the generated total line, enter the name of the field in these columns and an A in column 39. The associated field is printed on the lowest level total line and other totals for it are printed on higher level total lines. You cannot identify an array, array element, or table. You can specify totaling for any particular field only once in each program.

T-*AUTO TOTAL REPORTS

- Edit Codes (Column 38)

  Specifies an edit code for the numeric field named in columns 32 through 37 as well as for all the generated total fields.

  Blank
  Auto report generates a K edit code, which prints a numeric field with commas and a decimal point. The K edit code also suppresses zeros so that zero balances are not printed and negative balances are printed with a minus sign on the right.

  edit code
  Edit code for the numeric field.

- Accumulate Totals (Column 39)

  Indicates that totals are accumulated and printed for the numeric field named in columns 32 through 37. You can specify totaling for any particular field only once in each program.

  A
  Accumulate and print totals for the numeric field named in columns 32 through 37. Auto report generates a subroutine named A$$SUM that accumulates the values from the fields into the lowest level total lines.

  Total fields are generated and named for all control level indicators defined in columns 59 and 60 of the input specifications. Total calculations accumulate totals for the field named in columns 32 through 37. Total calculations roll (add) the total from the lowest level total field to that of the next higher level field and end with a final total (total rolling).

  Auto report prints asterisks to the right of generated total lines. One asterisk is printed to the right of the lowest level total line and two asterisks are printed to the right of the next level total and so on.

  To suppress the generation of asterisks on total lines, enter an N in column 28 of the auto report options specifications form.

  Auto report generates a Z-ADD calculation conditioned by LO that resets each of the accumulated total fields on the lowest level total line to zero after they are printed.

- End Position in Output Record (Columns 40 through 43)

  Specifies the end print position of the rightmost character of the field that is printed on the generated total line.

  Blank
  Auto report generates end positions for fields and centers column headings.

  end position
  End position of the rightmost character of the field.

T-*AUTO TOTAL REPORTS

- First Column Heading Line (Columns 45 through 70)

  Prints the first line of a column heading (constant) over the generated total field named in columns 32 through 37.

  Blank
  No column heading.

  'column heading'
  Print a column heading. Enclose it within apostrophes. The value is printed over the accumulated total of the field specified in columns 32 through 37.

Field Description that Prints a Second or Third Column Heading Line (C in Column 39):

Prints a second or third line of a column heading. You can use one or two C specifications following a field description that has an A, B, or blank in column 39 and a field name in columns 32 through 37.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Blank**	**Blank**	**C**	**Blank**	**Blank**	**Column Heading**

- Column Heading Continuation Lines (Column 39)

  Indicates a second and third column heading line.

  C
  Continuation lines for a column heading specified on a field description with a B, blank, or A in column 39. The column heading specified in columns 45 through 70 is printed on the second or third line of the column heading.

- Second and Third Column Heading Line (Columns 45 through 70)

  Prints a second or third column heading line.

  Blank
  No second or third column heading line.

  'continuation line'
  Continuation lines for a column heading specified on a field description with a B, blank, or A in column 39. If it is the first C specification, it is the second line of the column heading and if it is the second C specification, it is the third line of the column heading. You cannot use more than two C specifications. Enclose the continuation lines within apostrophes.

T-*AUTO TOTAL REPORTS

Field Description that Prints a Heading Next to a Total (1—9 or R in Column 39):

Prints a heading (constant) on a specific total line generated from an A in column 39. Only use this field description if you used a field description with an A in column 39. The heading is printed on the total line that corresponds to the level (L1 through L9 or LR) specified in column 39.

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Blank**	**Blank**	**1-9, R**	**Blank**	**Blank**	**Heading**

- Specific Total Line (Column 39)

  Identifies a specific total line on which the heading (constant) is printed. The heading is printed to the left of the leftmost total on the line. You must use a field description with an A in column 39.

  `1-9` or `R`
  Print the heading on a specific total line.

  This entry corresponds to the indicators L1 through L9 defined in columns 59 and 60 of the input specifications and LR.

  The entry must be higher than the lowest control level indicator used in columns 23 through 31 of the T-*AUTO output file identification. If you did not specify control level indicators on the T-*AUTO output file identification, use only entries that are higher than the lowest control level indicators defined in columns 59 and 60 of the input specifications.

- Heading (Columns 45 through 70)

  Prints a heading (constant) on a specific total line.

  `'heading'`
  Constant that is printed on a specific total line.

  Enclose the heading within apostrophes.

Field Description that Prints a Field Next to a Total (1—9 or R in Column 39 and Field Name in Columns 32 through 37):

Prints an alphanumeric or numeric field on a specific total line generated from an A in column 39. Only use this field description if you used a field description with an A in column 39. The field is printed on the total line that corresponds to the level (L1 through L9 or LR) specified in column 39.

T-*AUTO TOTAL REPORTS

Format:

COLS:	7-22	23-31	32-37	38	39	40-43	44	45-70
	Blank	**Blank**	**Field Name**	**Blank or Edit Code**	**1-9, R**	**Blank**	**Blank**	**Blank or Edit Word**

- Field Name (Columns 32 through 37)

  Specifies the name of a field, an indexed array, or a table. The associated field, array, or table value is printed on a specific total line.

  name
  Field is printed to the left of the first total.

- Edit Codes (Column 38)

  Specifies an edit code for a numeric field, indexed array, or table named in columns 32 through 37.

  Blank
  If you specified an alphanumeric field, table, or indexed array in columns 32 through 37, leave this column blank.

  edit code
  If you named a numeric field, numeric indexed array, or numeric table in columns 32 through 37, enter an edit code. When you specify an edit code, leave columns 45 through 70 blank.

- Specific Total Line (Column 39)

  Identifies a specific total line on which the field described in columns 32 through 37 is printed. The field is printed to the left of the leftmost total on the line. You must use a field description with an A in column 39.

  1-9 or R
  Print the associated field on a specific total line.

  This entry corresponds to the indicators L1 through L9 defined in columns 59 and 60 of the input specifications and LR.

  The entry must be higher than the lowest control level indicator used in columns 23 through 31 of the T-*AUTO output file identification. If you did not specify control level indicators on the T-*AUTO output file identification, use only entries that are higher than the lowest control level indicators defined in columns 59 and 60 of the input specifications.

T-*AUTO TOTAL REPORTS

- Edit Word (Columns 45 through 70)

  Edits numeric fields printed on a specific total line.

  Blank
  If you specified an edit code in column 38, leave these columns blank.

  'edit word'
  Edit the field.

/COPY STATEMENT

Function:

This statement is not required. It copies cataloged RPG II specifications from a library file (MIRAM or SAT) and inserts them into an RPG II source program. It identifies the file that contains the copy module that contains the RPG II specifications that are copied. You cannot use the /COPY statement to copy auto report option specifications and other /COPY statements. Place /COPY statements after auto report options specifications and before any source tables and arrays.

The specifications included in an auto report program by the /COPY statement are initially placed in the program immediately after the /COPY statement. After all the specifications are copied from the library, the entire auto report is sorted into the following order:

1. Control specifications
2. File description specifications
3. Extension specifications
4. Line counter specifications
5. Telecommunications specifications
6. Input specifications
7. Calculation specifications in the order: detail, LO, L1 through L9, LR and subroutines
8. Output specifications
9. Tables and arrays loaded at compilation time, which are placed last among the input statements to auto report.

After this sorting, auto report generates RPG II calculations and output specifications from the H/D/T-*AUTO specifications. These generated specifications are then sorted.

Entries:

- Form Type (Column 6)

  Identifies the specification that contains the /COPY statement.

  form type
  Use any specification except control (H) or auto report options (U) specification.

- /COPY (Columns 7 through 11)

  Indicates that the cataloged RPG II specifications are copied from a library and inserted into an RPG II source program.

  /COPY
  Enter /COPY in these columns.

/COPY STATEMENT

- Library File and Module Name (Columns 13 through 29)

  Identifies the disk that contains the copy module that contains the cataloged RPG II specifications. ←

  [LFDname],module name
  Identifies where the copy module resides and the name under which the source program is cataloged. ←

- Comments (Columns 50 through 80)

  Enter any information or comments. The contents of these columns are not read by auto report.

/COPY MODIFIER STATEMENTS

Function:

These statements are not required. They modify, add, or delete entries on cataloged file description (F) and input (I) specifications as they are copied from the library file. You cannot modify any other type of specification.

The modifier statements do not alter the cataloged specifications directly in the library file. The modifications are only for the copies of the specifications included in the program.

/COPY Modifier Statements for File Description Specifications

Function:

You can include modifier statements with the /COPY statement to modify, add, or delete entries on the file description specifications as they are copied from the library file.

Entries:

- Form Type (Column 6)

  Indicates that a file description specification is to be modified.

  F
  Enter the modifier statements on a file description specification (F) since the modifier statements will immediately follow it and can be put on the same specification.

- File Name (Columns 7 through 13)

  Specifies the name of the file description specification that is to be modified.

  name
  Name of the file. Use only one file description specification with a particular file name from the library entries and use a particular file name only once in a modifier statement. The file name can be eight characters long.

- Modifying File Description Entries (Columns 15 through 80)

  Modifies or adds entries on a file description specification that is copied from a library file.

  entries
  To make modifications, enter the file name in columns 7 through 13, and then in columns 15 through 80 make only those entries on the line that are to replace existing entries in the copied specification or that are to be included as new entries. Blank entries in the modifier statement do not affect the copied statement.

- Setting File Description Entries to Blanks (Columns 15 through 80)

  Sets an entry to blanks.

  entries
  Enter an ampersand (&) in the first position of that entry on the modifier statement, and leave the remaining positions blank.

/COPY Modifier Statements for Input Format Specifications

Function:

You can include modifier statements with the /COPY statement to modify, add, or delete entries on the input field specifications as they are copied from the library. Input field specifications describe individual fields on the input records.

Entries:

- Form Type (Column 6)

  Indicates that an input field specification is to be modified.

  I
  Enter the modifier statements on an input specification (I) since the modifier statements will immediately follow it and can be put on the same specification.

- Field Name (Columns 53 through 58)

  Specifies the name of an input field from an input field description copied from a library that is to be modified.

  name
  Name of the input field.

  The modifier statement modifies all copied input field specifications that have the same field name. If there is no input field by the same name, the modifier statement is added to the program as a new input field specification.

- Modifying Input Format Entries (Columns 43 through 70)

  Modifies an input field on the input format specification that describes individual fields on the input record.

  entries
  The fields that you can modify are:

  - Column 43 (packed/binary)
  - Columns 44 through 51 (field location)

/COPY MODIFIER STATEMENTS

- Column 52 (decimal positions)
- Columns 59 and 60 (control levels)
- Columns 61 and 62 (matching or chaining fields)
- Columns 63 and 64 (field record relation)
- Columns 65 through 70 (field indicators)

You can use up to 20 input field modifier statements per /COPY statement.

- Setting Input Format Entries to Blanks (Columns 43 through 70)

  Sets an input field entry to blanks.

  entries
  Enter an ampersand (&) in the first position of that entry on the modifier statement, and leave the remaining positions blank.

Appendix A. RPG II Compilation Time Messages

The RPG II compiler sets the UPSI byte to indicate the type of error that occurred during compilation.

UPSI Byte	Setting	Meaning
Bit 0	1	Catastrophic errors were detected in the source program. An object module was not generated.
	0	No catastrophic errors were detected.
Bit 1	1	Serious errors were detected. An object module was generated but the results will be unpredictable.
	0	No serious errors were detected.

Catastrophic error messages are preceded by an * in the following listing: the * does not appear on the printout. Serious error messages are preceded by † in the following listing; the † does not appear on the printout. Nonserious errors or informational messages are not preceded by any character or symbol.

When an error occurs during the compilation of the program, the appropriate message from the following list will be printed on the compilation output listing.

Message-Meaning/Corrective Action

* NOTE000	END OF FILE HAS BEEN ENCOUNTERED IN INPUT STREAM PRIOR TO AN OUTPUT SPECIFICATION. EXECUTION IS DELETED.
† NOTE001	COMPILE TIME TABLE IS NOT IN SEQUENCE
NOTE002	COMPILE TIME TABLE HAS TOO MANY ENTRIES
NOTE003	INVERTED PRINT ENTRY (COLUMN 21) IS INVALID. ENTRY OF I IS ASSUMED.
* NOTE004	RPG CONTROL CARD IS MISSING. COMPILATION IS BYPASSED.
NOTE005	DEBUG OPERATIONS ARE NOT GENERATED AS DEBUG OPTION IS NOT SPECIFIED IN HEADER CARD (COL. 15)
† NOTE006	FILE TYPE (COLUMN 15) IS INVALID. SPECIFICATION IS NOT PROCESSED.
† NOTE007	INVALID ENTRY IN COLUMNS 28, 31 or 32. SPECIFICATION IS NOT PROCESSED.
NOTE008	LENGTH OF KEY OR RECORD ADDRESS FIELD (COLUMNS 29–30) IS INVALID. ENTRY OF BLANK IS ASSUMED.
NOTE009	MORE THAN ONE RECORD ADDRESS FILE IS PRESENT. SUCCEEDING ONES ARE NOT PROCESSED.
NOTE010	EXTENSION CODE (COLUMN 39) IS INVALID. ENTRY OF BLANK IS ASSUMED.
NOTE011	INPUT FILE DESIGNATION (COLUMN 16) IS INVALID OR MISSING. ENTRY OF R IS ASSUMED FOR TAG FILE. OTHERWISE, S IS ASSUMED.
NOTE012	OVERFLOW INDICATOR (COLUMN 33) IS NOT 0. ENTRY OF 0 IS ASSUMED.
† NOTE013	OVERFLOW INDICATOR (COLUMNS 33-34) IS INVALID. ENTRY OF BLANKS IS ASSUMED.

Message-Meaning/Corrective Action

† NOTE014 MORE THAN ONE PRIMARY FILE IS SPECIFIED. FILE IS ASSUMED TO BE A SECONDARY FILE.

† NOTE015 MODE OF PROCESSING (COLUMN 28) IS INVALID. ENTRY OF R IS ASSUMED.

† NOTE016 FIXED FORMAT IS SPECIFIED, BUT BLOCK LENGTH IS NOT A MULTIPLE OF RECORD LENGTH. BLOCK LENGTH IS INCREASED TO NEXT HIGHER MULTIPLE.

NOTE017 TYPE FILE ORGANIZATION (COLUMN 32) IS NOT BLANK. ENTRY OF BLANK IS ASSUMED.

NOTE018 END-OF-FILE CODE (COLUMN 17) IS INVALID. ENTRY OF BLANK IS ASSUMED.

NOTE019 SEQUENCE (COLUMN 18) IS INVALID. ENTRY OF BLANK IS ASSUMED.

NOTE020 MODE OF PROCESSING (COLUMN 28) IS NOT BLANK. ENTRY OF BLANK IS ASSUMED.

† NOTE021 RECORD ADDRESS TYPE (COLUMN 31) IS NOT BLANK. ENTRY OF BLANK IS ASSUMED.

NOTE022 EXTENSION CODE (COLUMN 39) IS INVALID. ENTRY OF E IS ASSUMED.

→ NOTE023 WARNING – FILE FORMAT (COLUMN 19) IS INVALID. ENTRY OF F IS ASSUMED.

NOTE024 BLOCK LENGTH (COLUMNS 20–23) IS INVALID OR LESS THAN RECORD LENGTH. BLOCK LENGTH IS ASSUMED EQUAL TO RECORD LENGTH.

NOTE025 RECORD LENGTH (COLUMNS 24–27) IS INVALID OR MISSING. DEFAULT LENGTH FOR DEVICE IS ASSUMED.

† NOTE026 FILENAME (COLUMNS 7–14) IS MISSING, INVALID OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

NOTE027 OUTPUT FILE DESIGNATION (COLUMN 16) IS NOT BLANK. ENTRY OF BLANK IS ASSUMED.

† NOTE028 PROGRAM EXCEEDS LIMIT OF TWENTY VALID FILE NAMES. ADDITIONAL FILE DESCRIPTION SPECIFICATIONS ARE NOT PROCESSED.

† NOTE029 KEY FIELD STARTING LOCATION (COLUMNS 35–38) IS INVALID, NOT RIGHT-JUSTIFIED, OR NOT LESS THAN RECORD LENGTH. ENTRY OF 0001 IS ASSUMED.

† NOTE030 DEVICE (COLUMNS 40–46) IS INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE031 'LABELS' (COLUMN 53) IS INVALID. ENTRY OF S IS ASSUMED FOR TAPE AND DISC FILES. ENTRY OF BLANK IS ASSUMED FOR CARD AND PRINTER FILES.

NOTE032 NAME OF LABEL EXIT OR SPECIAL DEVICE EXIT (COLUMNS 54–59) IS MISSING OR INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE033 NAME OF LABEL EXIT (COLUMNS 54–59) MUST BE BLANK FOR DEVICES OTHER THAN TAPE OR DISC. ENTRY OF BLANKS IS ASSUMED.

† NOTE034 OVERFLOW INDICATOR (COLUMNS 33–34) IS APPLICABLE TO OUTPUT FILES ONLY. ENTRY OF BLANKS IS ASSUMED.

Message-Meaning/Corrective Action

NOTE035 FILE ADDITION ENTRY FOR INDEX SEQUENTIAL (COLUMN 66) IS INVALID. ENTRY OF A IS ASSUMED.

NOTE036 KEY LENGTH OR RECORD ADDRESS (COLUMNS 29-30) IS MISSING OR INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE037 PERCENT CYLINDER OVERFLOW (COL. 67) IS MISSING OR INVALID. NO OVERFLOW ALLOCATED FOR ISAM FILE LOAD.

† NOTE038 INVALID REWIND OPTION. ENTRY OF U IS ASSUMED FOR A TAPE FILE. ENTRY OF BLANK IS ASSUMED FOR NON-TAPE FILE.

† NOTE039 FORM TYPE (COLUMN 6) IS INVALID OR OUT OF SEQUENCE. SPECIFICATION IS NOT PROCESSED.

* NOTE040 FILE DESCRIPTION SPECIFICATIONS ARE MISSING. EXECUTION IS DELETED.

NOTE041 WARNING: PRIMARY FILE IS NOT SPECIFIED. IF SECONDARY FILES ARE SPECIFIED, THE FIRST ONE IS ASSUMED PRIMARY. OTHERWISE, LR MUST BE SET ON TO TERMINATE THE PROGRAM.

NOTE042 WARNING - FILE EXTENSION OR LINE COUNTER SPECIFICATION IS MISSING.

† NOTE043 FILENAME (COLUMNS 7-14) IS MULTI-DEFINED. SPECIFICATION IS NOT PROCESSED.

NOTE044 WARNING - LENGTH OF RAF FIELD (COLUMNS 29-30) MUST BE 10. ENTRY OF 10 IS ASSUMED.

† NOTE045 DIRECT FILE CANNOT BE SPECIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE046 KEY FIELD LOCATION IS INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE047 COLUMNS 66-67 MUST BE BLANK. ENTRY OF BLANKS IS ASSUMED.

NOTE048 RECORD LENGTH (COLUMNS 24-27) IS INVALID. ENTRY OF 132 IS ASSUMED.

† NOTE049 MORE THAN ONE RECORD ADDRESS FILE IS SPECIFIED ON FILE EXTENSION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE050 'FROM FILENAME' (COLUMNS 11-18) IS NOT SPECIFIED ON FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE051 EXTENSION CODE (COLUMN 39) OF FILE DESCRIPTION SPECIFICATION IS NOT E. SPECIFICATION IS NOT PROCESSED.

† NOTE052 LENGTH OF TABLE ENTRY (COLUMNS 40-42 or 52-54) EXCEEDS 256 CHARACTERS FOR AN ALPHANUMERIC FIELD. ENTRY OF 256 IS ASSUMED.

† NOTE053 CHAINING FIELD (COLUMNS 9-10) IS MISSING, INVALID, OR NOT RIGHT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

Message-Meaning/Corrective Action

† NOTE054 NUMBER OF FIELD NAMES EXCEEDS ALLOCATED MEMORY STORAGE. ADDITIONAL SPECIFICATIONS CONTAINING TABLE OR ARRAY NAMES WILL NOT BE PROCESSED.

† NOTE055 'TO FILENAME' (COLUMNS 19-26) IS NOT SPECIFIED AS ON FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE056 'TO FILENAME' (COLUMNS 19-26) IS NOT SPECIFIED AS A CHAINED FILE ON FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE057 LENGTH OF TABLE ENTRY (COLUMNS 40-42 or 52-54) EXCEEDS 15 DIGITS FOR A NUMERIC FIELD. ENTRY OF 15 IS ASSUMED.

† NOTE058 'TO FILENAME' (COLUMNS 19-26) IS NOT SPECIFIED AS A PRIMARY OR SECONDARY FILE ON FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE059 TABLE SEQUENCE (COLUMNS 45 or 57) IS INVALID. ENTRY OF BLANK IS ASSUMED.

† NOTE060 TABLE NAME (COLUMNS 27-32 or 46-51) IS MULTI-DEFINED. SPECIFICATION IS NOT PROCESSED.

NOTE061 'TO FILENAME' (COLUMNS 19-26) IS NOT SPECIFIED AS ON FILE DESCRIPTION SPECIFICATION. ENTRY OF BLANKS IS ASSUMED.

† NOTE062 'TO FILENAME' (COLUMNS 19-26) IS NOT SPECIFIED AS AN OUTPUT FILE ON FILE DESCRIPTION SPECIFICATION. ENTRY OF BLANKS IS ASSUMED.

† NOTE063 TABLE NAME (COLUMNS 27-32 OR 46-51) IS MISSING, INVALID, OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

NOTE064 FIRST THREE CHARACTERS OF TABLE NAME (COLUMNS 27-29 OR 46-48) ARE NOT 'TAB'. ENTRY OF 'TAB' IS ASSUMED.

† NOTE065 NUMBER OF TABLE ENTRIES PER RECORD (COLUMNS 33-35) IS MISSING OR INVALID. ENTRY OF 1 IS ASSUMED.

† NOTE066 NUMBER OF TABLE ENTRIES PER TABLE (COLUMNS 36-39) IS MISSING OR INVALID. ENTRY OF 1 IS ASSUMED.

† NOTE067 LENGTH OF TABLE ENTRY (COLUMNS 40-42 OR 52-54) IS MISSING OR INVALID. ENTRY OF 1 IS ASSUMED.

NOTE068 FORMAT OF TABLE ENTRY (COLUMN 43 or 55) IS INVALID. ENTRY OF BLANK IS ASSUMED.

NOTE069 'DECIMAL POSITIONS' (COLUMN 44 OR 56) IS INVALID. ENTRY OF ZERO IS ASSUMED.

† NOTE070 RECORD SEQUENCE OF THE CHAINING FILE (COLUMNS 7-8) IS INVALID. BOTH POSITIONS MUST BE EITHER NUMERIC OR ALPHABETIC. SPECIFICATION IS NOT PROCESSED.

Message-Meaning/Corrective Action

† NOTE071 FILENAME (COLUMNS 7-16) IS NOT SPECIFIED AS ON FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE072 OVERFLOW OR HOME PAPER CHANNEL IS MISSING OR INVALID. SPECIFICATION IS NOT PROCESSED.

† NOTE073 FILENAME IS NOT SPECIFIED AS AN OUTPUT FILE OR AN OUTPUT FILE REQUIRING A LINE COUNTER SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE074 LINE NUMBER OR CHANNEL NUMBER IF INVALID OR MISSING. SPECIFICATION IS NOT PROCESSED.

† NOTE075 CHANNEL NUMBER IS MULTI-DEFINED. SPECIFICATION IS NOT PROCESSED.

† NOTE076 LINE COUNTER FILE NAME (COLUMNS 7-14) IS MISSING, INVALID, OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE077 'FROM FILE NAME' (COLUMNS 11-18) IS MISSING. SPECIFICATION IS NOT PROCESSED.

† NOTE078 'FROM FILE NAME' (COLUMNS 11-18) IS INVALID OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE079 'TO FILE NAME' (COLUMNS 19-26) IS INVALID OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

* NOTE080 THERE ARE NO VALID INPUT SPECIFICATIONS IN THIS PROGRAM. EXECUTION IS DELETED.

NOTE081 FIELD INDICATOR (COLUMNS 65-66, 67-68, 69-70) IS INVALID OR NOT A VALID ENTRY. ENTRY OF BLANKS IS ASSUMED.

NOTE082 INDICATOR LO IS SPECIFIED AS A FIELD INDICATOR, BUT IS NOT ALLOWED. INDICATOR IS IGNORED.

† NOTE083 FIELD-RECORD RELATION (COLUMNS 63-64) IS INVALID. ENTRY OF 00 IS ASSUMED.

† NOTE084 IMPROPER VALUE DETECTED IN (COLS 21-24, 28-31, 35-38); OR (COLS 44-47); OR (COLS 48-51). A VALUE 1 IS ASSUMED.

NOTE085 NO COMPILE TIME TABLES/ARRAYS IN INPUT STREAM.

NOTE086 WARNING - INDICATOR 00 SHOULD BE USED ONLY IN OUTPUT SPECIFICATIONS.

NOTE087 COLUMNS 7-24 OF FIELD DESCRIPTION SPECIFICATION SHOULD CONTAIN BLANKS. ENTRY OF BLANKS IS ASSUMED.

† NOTE088 FORM TYPE (COLUMN 6) IS NOT I, C, O, OR T, AND COLUMN 7 IS NOT AN ASTERISK. SPECIFICATION IS NOT PROCESSED.

† NOTE089 FILENAME (COLUMNS 7-14) IS INVALID OR UNDEFINED. ALL SPECIFICATIONS FOR THIS FILE ARE NOT PROCESSED.

Message-Meaning/Corrective Action

† NOTE090 FILENAME (COLUMNS 7-14) IS NOT A VALID INPUT/OUTPUT FILE. ALL SPECIFICATIONS FOR THIS FILE ARE NOT PROCESSED.

† NOTE091 'AND'/'OR' RECORD IS OUT OF SEQUENCE, I.E., FIRST INPUT/OUTPUT SPECIFICATION OR FOLLOWS FIELD DESCRIPTOR SPECIFICATION' SPECIFICATION IS NOT PROCESSED.

NOTE092 WARNING: NO RECORD IDENTIFICATION CODES (COLUMNS 21-41) SPECIFIED ON RECORD PRECEDING 'AND' RECORD.

† NOTE093 'AND' RECORD CONTAINS NO RECORD IDENTIFICATION CODES. SPECIFICATION IS NOT PROCESSED.

† NOTE094 RECORD TYPE IS OUT OF SEQUENCE I.E., FIRST INPUT/OUTPUT RECORD SPECIFICATION MISSING OR HAS AN INVALID FILENAME OR THERE ARE TWO RECORD SPECIFICATIONS WITHOUT INTERVENING FIELDS. ALL SPECIFICATIONS FOR THIS RECORD ARE NOT PROCESSED.

NOTE095 RECORD INFORMATION AND FIELD NAME ARE PRESENT IN THE SAME SPECIFICATION. FIELD INFORMATION IS DELETED.

NOTE096 RECORD SEQUENCE (COL. 15-16) IS INVALID OR BLANK. ENTRY OF AA IS ASSUMED IF BLANK.

NOTE097 ALPHABETIC SEQUENCE FOUND AFTER NUMERIC SEQUENCE. NUMERIC SEQUENCE HIGHER THAN PREVIOUS NUMERIC SEQUENCE IS ASSUMED.

* NOTE098 NUMERIC SEQUENCE NOT ASCENDING IN FILE. ASCENDING SEQUENCE IS ASSUMED.

NOTE099 NUMBER (COLUMN 17) IS NOT N OR 1 FOR A NUMERIC SEQUENCE. ENTRY OF N IS ASSUMED.

NOTE100 OPTION (COLUMN 18) IS NOT 0 OR BLANK. ENTRY OF 0 IS ASSUMED.

NOTE101 RESULTING INDICATOR (COLUMNS 19-20) IS BLANK OR INVALID, INDICATOR OF 99 IS ASSUMED.

NOTE102 INVALID OR UNSUPPORTED STACKER SELECT ENTRY (COLUMN 42). ENTRY OF BLANK IS ASSUMED.

NOTE103 'NOT' (COLUMNS 25, 32, OR 39) IS NOT N OR BLANK. ENTRY OF N IS ASSUMED.

NOTE104 'C/Z/D' (COLUMNS 26, 33, OR 40) IS NOT C, Z, OR D. ENTRY OF C IS ASSUMED.

† NOTE105 RECORD IDENTIFICATION IS OUT OF SEQUENCE - I.E., FIRST INPUT SPECIFICATION OR FOLLOWING AN INVALID 'OR', 'AND', OR FILE NAME. SPECIFICATION IS NOT PROCESSED.

† NOTE106 'START' (COLUMNS 44-47) OR 'END' (COLUMNS 48-51) IS BLANK. ENTRY OF 1 IS ASSUMED.

† NOTE107 'START' (COLUMNS 44-47) IS GREATER THAN 'END' (COLUMNS 48-51). 'END' IS ASSUMED TO HAVE A VALUE EQUAL TO 'START'.

† NOTE108 DECIMAL POSITION (COLUMN 52) IS NOT NUMERIC. ENTRY OF ZERO IS ASSUMED.

Message-Meaning/Corrective Action

† NOTE109 UNPACKED NUMERIC FIELD IS MORE THAN 15 BYTES LONG. LENGTH OF 15 IS ASSUMED.

† NOTE110 ASTERISK INDICATOR MAY NOT CROSS RECORD TYPES (H, D, T)

NOTE111 'PACKED' (COLUMN 43) IS NEITHER P NOR BLANK. ENTRY OF P IS ASSUMED.

† NOTE112 ALPHANUMERIC FIELD LENGTH IS MORE THAN 256 BYTES LONG. LENGTH OF 256 IS ASSUMED.

† NOTE113 FIELD INDICATOR (COLUMNS 65-66, 67-68) ENTRIES ARE NOT VALID ENTRIES FOR AN ALPHANUMERIC FIELD. ENTRY OF BLANKS IS ASSUMED.

NOTE114 WARNING COMPILE TIME TAB/ARR DOES NOT HAVE ENOUGH ENTRIES TO FILL IT. REMAINDER OF TAB/ARR FILLED WITH BLANKS OR ZEROES.

NOTE115 THE NUMBER OF SYMBOLS USED IN THIS PROGRAM CAUSED THE COMPILER TO RUN LESS EFFICIENTLY THAN IF AN INCREASED MEMORY SIZE WERE ALLOCATED.

NOTE116 THERE ARE TOO MANY COMPILE TAB/ARR IN INPUT STREAM

NOTE117 FOR RECORD TYPE SPECIFICATIONS, COLUMNS 43-74 MUST BE BLANK. ENTRY OF BLANKS IS ASSUMED.

NOTE118 FOR 'AND' TYPE RECORDS, COLUMNS 17-20 AND COLUMN 42 MUST BE BLANK. ENTRY OF BLANKS IS ASSUMED.

† NOTE119 FILENAME HAS BEEN PREVIOUSLY REFERENCED ON INPUT SPECIFICATIONS. ALL SPECIFICATIONS FOR THIS RECORD ARE NOT PROCESSED.

NOTE120 CONTROL LEVEL IS SPECIFIED BUT COLUMN 59 IS NOT L. ENTRY OF L IS ASSUMED.

NOTE 121 CONTROL LEVEL IS SPECIFIED BUT COLUMN 60 IS NOT L-9. ENTRY OF 1 is ASSUMED.

NOTE122 MATCHING OR CHAINING FIELD IS SPECIFIED BUT COLUMN 62 IS NOT 1-9. ENTRY OF 1 IS ASSUMED.

NOTE123 MATCHING OR CHAINING FIELD IS SPECIFIED BUT COLUMN 61 IS NOT M OR C. ENTRY OF M IS ASSUMED.

NOTE124 'PACKED (COLUMN 43) IS NOT BLANK, BUT AN ALPHANUMERIC FIELD IS SPECIFIED. NUMERIC FIELD IS ASSUMED.

NOTE125 SEQUENCE CHARACTERS (COLUMNS 15-16) ARE NOT BOTH ALPHABETIC OR BOTH NUMERIC. ENTRY OF AA IS ASSUMED.

† NOTE126 'POSITION' (COLUMNS 21-24, 28-31, OR 35-38) IS INVALID OR NOT RIGHT-JUSTIFIED. ENTRY OF 0001 IS ASSUMED.

NOTE127 FILE NAME (COLUMNS 7-14) IS INVALID OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE128 'START' (COLUMNS 44-47) OR 'END' (COLUMNS 48-51) IS INVALID OR NOT RIGHT-JUSTIFIED. ENTRY OF 0001 IS ASSUMED.

Message-Meaning/Corrective Action

† NOTE129 PACKED NUMERIC FIELD IS MORE THAN 8 BYTES LONG. LENGTH OF 8 IS ASSUMED.

† NOTE130 FIELD NAME (COLUMNS 53-58, INPUT OR COLUMNS 32-37, OUTPUT) IS INVALID OR NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

NOTE131 FILENAME EXCEEDS 7 CHARACTERS. 7 CHARACTERS ARE USED.

NOTE132 NO INPUT AND/OR OUTPUT SPECIFICATIONS FOUND FOR THIS FILE.

† NOTE133 UNDEFINED TABLE SPECIFIED IN LOKUP OPERATION. SPECIFICATION IS NOT PROCESSED.

† NOTE134 DECIMAL POSITION IS INVALID. ENTRY OF ZERO IS ASSUMED FOR NUMERIC FIELD. ENTRY OF BLANK IS ASSUMED FOR ALPHANUMERIC FIELD.

† NOTE135 FIELD LENGTH IS IMPROPERLY SPECIFIED OR IS NOT SPECIFIED. ENTRY OF ZERO IS ASSUMED FOR INVALID CHARACTER. WHEN REQUIRED LENGTH IS NOT SPECIFIED, ENTRY OF 4 IS ASSUMED.

† NOTE136 OPERATION CODE (COLUMNS 28-32) IS INVALID OR MISSING, SPECIFICATION IS NOT PROCESSED.

† NOTE137 ENTRY IN FACTOR 1 (COLS 18-27) OR FACTOR 2 (COLS 33-42) IS INVALID. SPECIFICATION IS NOT PROCESSED.

† NOTE138 WARNING: ENTRY IN FACTOR 1 (COLS 18-27) OR FACTOR 2 (COLS 33-42) IS INVALID.

→ † NOTE139 FACTOR1, FACTOR2, OR RESULT FIELD IS MISSING OR INVALID. SPECIFICATION IS NOT PROCESSED.

† NOTE140 FORM TYPE (COLUMN 6) IS INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE141 'NOT' (COLUMNS 9, 12, OR 15) IS NOT N OR BLANK. ENTRY OF N IS ASSUMED.

† NOTE142 CONTROL LEVEL IS IMPROPERLY SPECIFIED. ENTRY OF LO IS ASSUMED.

† NOTE143 RESULTING INDICATOR IS INVALID, INDICATOR IS NOT PROCESSED.

NOTE144 'HALF ADJUST' ENTRY (COLUMN 53) IS INVALID. ENTRY OF H IS ASSUMED.

† NOTE145 FIELD NAME IS IMPROPERLY USED. SPECIFICATION IS NOT PROCESSED.

→ NOTE146 INDICATOR IN COLS. 9–17 IS INVALID. BLANK ASSUMED.

† NOTE147 REQUIRED RESULTING INDICATOR (COLUMNS 54-55, 56-57, OR 58-59) IS NOT SPECIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE148 'MVR' DOES NOT FOLLOW 'DIV', OR FOLLOWS A 'DIV' WITH HALF ADJUST SPECIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE149 UNPAIRED BEGSR-ENDSR MAY CAUSE PROGRAM ERROR OR OPERATION CODE IS NOT SUPPORTED BY THIS VERSION OF RPG.

Message-Meaning/Corrective Action

† NOTE150 DETAIL CALCULATION SPECIFICATION FOLLOWS A TOTAL CALCULATION SPECIFICATION. DETAIL SPECIFICATION IS NOT PROCESSED.

† NOTE151 RESULT FIELD LENGTH (COLUMNS 49-51) IS GREATER THAN ALLOWED. A LENGTH OF 256 IS ASSUMED FOR AN ALPHANUMERIC FIELD. A LENGTH OF 15 IS ASSUMED FOR A NUMERIC FIELD.

† NOTE152 OPERATION CODE OF TEST Z IS INVALID FOR THE 9300MODE OF COMPUTATION. SPECIFICATION IS NOT PROCESSED.

NOTE153 RECORD ADDRESS TYPE IS INCORRECT FOR A TAG FILE. "I" SPECIFICATION IS ASSUMED.

† NOTE154 FIELD NAME (COLUMNS 32-37) SPECIFIED ON OUTPUT SPECIFICATION IS NOT VALID, I.E., FIELD WAS DEFINED AS LABEL, KEYCV, ETC. SPECIFICATION IS NOT PROCESSED.

† NOTE155 FILENAME (COLUMNS 7-14) IS MISSING, OR RECORD TYPE (COLUMN 15) IS IN WRONG ORDER' SPECIFICATION IS NOT PROCESSED.

† NOTE156 CORRESPONDING FILENAME (COLUMNS 7-14) CANNOT BE DETERMINED. SPECIFICATION IS NOT PROCESSED.

NOTE157 'STACKER SELECT' (COLUMN 16) IS INVALID, ENTRY OF BLANK IS ASSUMED.

NOTE158 'SPACE BEFORE' (COLUMN 17) IS INVALID, ENTRY OF 1 IS ASSUMED.

NOTE159 'SPACE AFTER' (COLUMN 18) IS INVALID, ENTRY OF 1 IS ASSUMED.

NOTE160 'SKIP BEFORE' (COLUMNS 19-20) IS INVALID. ENTRY OF 01 IS ASSUMED.

NOTE161 'SKIP AFTER' (COLUMNS 21-22) IS INVALID, ENTRY OF 01 IS ASSUMED.

† NOTE162 RECORD TYPE (COLUMN 15) IS NOT AN H' D, T OR E RECORD. ALL SPECIFICATIONS FOR THIS RECORD ARE NOT PROCESSED.

NOTE163 COLUMNS 17-22 MUST BE BLANK FOR 'AND' TYPE SPECIFICATIONS. ENTRY OF BLANK IS ASSUMED.

NOTE164 COLUMNS 7-13 MUST BE BLANK FOR 'AND' OR 'OR' TYPE SPECIFICATIONS. ENTRY OF BLANK IS ASSUMED.

† NOTE165 CORRESPONDING RECORD SPECIFICATION IS MISSING OR INVALID. SPECIFICATION IS NOT PROCESSED.

† NOTE166 EDIT CODE (COLUMN 38) ENTRY IS INVALID. ENTRY OF BLANK IS ASSUMED.

NOTE167 'PACKED FIELD' (COLUMN 44) IS INVALID. ENTRY OF BLANK IS ASSUMED.

† NOTE168 FIELD NAME (COLUMNS 32-37) IS NOT LEFT-JUSTIFIED, SPECIFICATION IS NOT PROCESSED.

† NOTE169 'END POSITION' (COLUMNS 40-43) IS INVALID OR MISSING, SPECIFICATION IS NOT PROCESSED.

Message-Meaning/Corrective Action

† NOTE170 LEADING OR CLOSING APOSTROPHE (') IN EDIT WORD IS NOT CORRECT. ENTRY OF BLANKS IN COLUMNS 45-70 IS ASSUMED.

NOTE171 'BLANK AFTER' (COLUMN 39) IS INVALID. ENTRY OF BLANK IS ASSUMED.

† NOTE172 PUNCH AND PRINT FUNCTIONS ARE SPECIFIED FOR THE SAME FILE. ENTRY OF BLANKS IS ASSUMED FOR COLUMNS 17-22.

NOTE173 EDIT CODES (COLUMN 38) MAY NOT BE SPECIFIED WITH LITERALS OR EDIT WORDS. ENTRY OF BLANK IS ASSUMED.

† NOTE174 FIELD NAME (COLUMNS 32-37) IS UNDEFINED. SPECIFICATION IS NOT PROCESSED.

NOTE175 WARNING - 'BLANK AFTER' (COLUMN 39) IS SPECIFIED FOR CONSTANT. ALL IDENTICAL CONSTANTS WILL BE BLANKED.

NOTE176 WARNING: LITERAL/EDIT WORD IS NOT LEFT-JUSTIFIED.

† NOTE177 EDIT WORD (COLUMNS 45-70) IS NOT LEFT-JUSTIFIED. ENTRY OF BLANKS IN COLUMNS 45-70 IS ASSUMED.

NOTE178 'PACKED FIELD' (COLUMN 44) MAY NOT BE SPECIFIED WITH CONSTANT OR EDIT WORD. ENTRY OF BLANK IN COLUMN 44 IS ASSUMED.

† NOTE179 FILENAME (COLUMNS 7-14) IS NOT LEFT-JUSTIFIED. SPECIFICATION IS NOT PROCESSED.

† NOTE180 EDIT WORD (COLUMNS 45-70) CONTAINS NO DIGIT POSITIONS OR MORE THAN FIFTEEN. ENTRY OF BLANKS IN COLUMNS 45-70 IS ASSUMED.

† NOTE181 LEADING/CLOSING APOSTROPHES FOR LITERAL/EDIT WORD ARE MISSING. SPECIFICATION IS NOT PROCESSED.

† NOTE182 'AND' OR 'OR' FOLLOWING A FIELD NAME SPECIFICATION OR AS FIRST OUTPUT SPECIFICATION IS INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE183 WARNING NO FIELDS DESCRIBED FOR THIS OR PREVIOUS RECORD.

NOTE184 WARNING OUTPUT FIELDS OVERLAP.

NOTE185 OUTPUT INDICATOR (COLUMNS 24-25, 27-28, OR 30-31) IS INVALID OR UNDEFINED. ENTRY OF LO IS ASSUMED.

NOTE186 OUTPUT INDICATORS SHOULD START IN COLUMNS 23-25; THEN 26-28. AND FINALLY 29-31. ENTRY IS SHIFTED LEFT.

NOTE187 'NOT' (COLUMNS 23, 26, OR 29) IS NOT BLANK OR N. ENTRY OF N IS ASSUMED.

NOTE188 WARNING-OVERFLOW INDICATOR IS SPECIFIED IN 'AND' TYPE SPECIFICATION. RECORD WILL NOT BE PUT OUT AS OVERFLOW LINE.

NOTE189 DECIMAL POSITIONS MUST BE ZERO FOR PAGE(N) FIELD. ENTRY OF ZERO IS ASSUMED.

Message-Meaning/Corrective Action

† NOTE190 SPECIFICATION TYPE CANNOT BE DETERMINED. RECORD AND FIELD DEFINITION ARE SPECIFIED IN SAME LINE OR BOTH ARE BLANK. SPECIFICATION IS NOT PROCESSED.

† NOTE191 FORM TYPE (COLUMN 6) IS INVALID (NOT 0) SPECIFICATION IS NOT PROCESSED.

† NOTE192 NO OUTPUT INDICATOR (COLUMNS 24-25, 27-28, OR 30-31) IS SPECIFIED FOR 'AND' OR 'OR' TYPE SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE193 HEXADECIMAL CONSTANT (COLUMNS 45-70) CONTAINS INVALID CHARACTER. SPECIFICATION IS NOT PROCESSED.

† NOTE194 LEADING OR CLOSING APOSTROPHE (') IN HEXADECIMAL CONSTANT IS NOT CORRECT. SPECIFICATION IS NOT PROCESSED.

NOTE195 WARNING: PAGE 1 NOT SUPPORTED AS AN AUTOMATIC PAGE COUNTER IF IN 9200/9300 MODE OF PROCESSING.

NOTE196 WARNING-PAGE2,...,PAGE7 ARE NOT SUPPORTED AS AUTOMATIC PAGE COUNTERS IN 9200/9300 AND MOD 20 MODE OF PROCESSING.

NOTE197 DECIMAL POSITIONS MUST BE BLANK FOR DATE FIELD. ENTRY OF BLANK IS ASSUMED.

† NOTE198 FIELD NAME (COLUMNS 32-37) IS INVALID. SPECIFICATION IS NOT PROCESSED.

† NOTE199 FILE NAME (COLUMNS 7-14) IS INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE200 WARNING: TABLE FILE MUST BE SUBMITTED AT EXECUTION.

NOTE201 RESULTING INDICATOR IS INVALID OR UNDEFINED. ENTRY OF LO IS ASSUMED.

NOTE202 WARNING - RESULTING INDICATOR IS UNREFERENCED.

NOTE203 FIELD NAME IS UNDEFINED. FIELD IS PROCESSED WITH ASSUMED LENGTH OF 004.

NOTE204 WARNING - FIELD NAME IS MULTI-DEFINED.

NOTE205 WARNING - FIELD NAME IS UNREFERENCED.

* NOTE206 THE COMBINED LENGTHS OF LITERALS AND FIELD NAMES EXCEED ALLOCATED MAIN STORAGE.

NOTE207 FACTOR 1 MUST HAVE SAME UNPACKED LENGTH AS KEY FIELD OF FILE SPECIFIED IN FACTOR 2. SPECIFICATION NOT PROCESSED.

NOTE208 WARNING: THE DATA FORMAT FOR MATCHING FIELD IS NOT CONSISTENT.

* NOTE209 THE SUM OF THE LENGTHS OF THE MATCHING FIELDS FOR THE PRIMARY FILE DOES NOT EQUAL THAT OF EACH SECONDARY FILE. EXECUTION IS DELETED.

* NOTE210 THE SUM OF THE LENGTHS OF THE MATCHING FIELDS IS NOT CONSTANT IN EACH RECORD WHICH SPECIFIED MATCHING FIELDS FOR A FILE. EXECUTION IS DELETED.

Message-Meaning/Corrective Action

NOTE211 WARNING - THE SUM OF THE LENGTHS OF THE CONTROL FIELDS IS NOT CONSTANT IN EACH RECORD WHICH SPECIFIED CONTROL FIELDS.

* NOTE212 AN EXCESSIVE AMOUNT OF OBJECT CODE HAS BEEN GENERATED FOR A SINGLE RECORD GROUP. EXECUTION IS DELETED.

† NOTE213 THIS SPECIFICATION CONTAINS AN ASTERISK CONDITION INDICATION AND FOLLOWS A SPECIFICATION THAT HAS BEEN DELETED. SPECIFICATION IS NOT PROCESSED.

† NOTE214 FIELDS USED IN AN ALPHANUMERIC COMPARE MUST BE EQUAL IN LENGTH OR MUST BE LESS THAN OR EQUAL TO 200 BYTES. SPECIFICATION IS NOT PROCESSED.

† NOTE215 WARNING: FIELD LENGTHS ARE INVALID FOR THIS OPERATION.

NOTE216 PLUS AND/OR MINUS RESULTING INDICATORS (COLUMNS 54-55 OR 56-57) ARE NOT ALLOWED FOR TESTING ALPHANUMERIC FIELDS. INDICATORS ARE IGNORED.

† NOTE217 FIELD TYPE IS INVALID FOR THIS OPERATION. SPECIFICATION IS NOT PROCESSED.

NOTE218 ENTRY IN COLUMNS 16-18 VALID FOR INDEXED-SEQUENTIAL ADD ONLY. ENTRY IS IGNORED.

NOTE219 REQUIRED 'ADD' ENTRY (COLUMNS 16-18) IS MISSING. 'ADD' IS ASSUMED.

† NOTE220 FILE SPECIFIED ON OUTPUT FORMAT SPECIFICATION IS UNDEFINED OR NOT AN OUTPUT FILE (U, C, O OR INDEX SEQUENTIAL WITH ADDED RECORDS). SPECIFICATION IS NOT PROCESSED.

NOTE221 WARNING - FILENAME (COLUMNS 7-14) IS NOT REFERENCED ON OUTPUT SPECIFICATIONS.

* NOTE222 NO VALID OUTPUT SPECIFICATIONS ARE PRESENT. EXECUTION IS DELETED.

NOTE223 ALL OUTPUT LINES OF A PRINTER FILE MUST INDICATE EITHER SPACING AND/OR SKIPPING. SINGLE SPACING IS ASSUMED FOR ALL OUTPUT LINES OF NAMED FILE WHICH HAVE NO PRINT FUNCTION.

NOTE224 STACKER SELECT MAY NOT BE SPECIFIED WITH PRINT FILE. STACKER SELECT IS IGNORED AND SINGLE SPACING IS ASSUMED FOR ALL LINES OR NAMED FILE.

NOTE225 PRINT OR PUNCH FUNCTION MAY NOT BE SPECIFIED FOR AN OUTPUT RECORD OF TAPE OR DISC FILE. STACKER SELECT, SPACING, OR SKIPPING IS IGNORED ON ALL RECORDS OF NAMED FILE.

NOTE226 PRINT FUNCTION MAY NOT BE SPECIFIED FOR OUTPUT RECORD OF PUNCH FILE. SPACE AND SKIP ENTRIES ARE IGNORED FOR ALL RECORDS OF NAMED FILE.

* NOTE227 NUMBER OF LINES OF OUTPUT EXCEEDS THE CAPACITY OF RPG. MAXIMUM NUMBER IS 1023. EXECUTION IS DELETED.

NOTE228 IMPROPER USE OF PACKING OR ZERO SUPPRESSION ON ALPHANUMERIC OR PACKED FIELD. ENTRY OF BLANK IS ASSUMED FOR INVALID CODE.

Message-Meaning/Corrective Action

NOTE229 END POSITION SPECIFIED FOR THE FIELD IS GREATER THAN THE RECORD LENGTH. ALL OR PART OF THE FIELD IS LOST, STARTING WITH THE RIGHTMOST POSITION.

† NOTE230 END POSITION IS LESS THAN THE FIELD LENGTH. FIELD IS NOT PROCESSED.

NOTE231 WARNING: FIELD TO BE EDITED IS TOO SMALL OR TOO LARGE FOR EDIT WORD.

NOTE232 FIELD TO BE EDITED IS NOT NUMERIC. NO EDITING IS PERFORMED.

NOTE233 CONTROL LEVEL, MATCHING FIELD, OR CHAINING FIELD ENTRY SPECIFIED FOR BINARY FIELD.

NOTE234 INCORRECT LENGTH SPECIFIED FOR BINARY FIELD. DEFAULT IS A LENGTH OF 4.

† NOTE235 RESULT FIELD FOR TIME OPERATION MUST BE 6 OR 12 DIGIT NUMERIC WITH NO DECIMAL POSITIONS. SPECIFICATION IS NOT PROCESSED.

NOTE236 *PRINT IS NOT SUPPORTED. SPECIFICATION IS NOT PROCESSED.

NOTE237 *IN COL 40 OF OUTPUT SPECIFICATION IS NOT SUPPORTED. ENTRY IS IGNORED.

* NOTE238 MAXIMUM NUMBER OF EXTERNAL SYMBOLS (EXIT SUBROUTINES, ULABL ENTRIES, AND LABEL EXITS) HAS BEEN EXCEEDED. EXECUTION IS DELETED.

† NOTE239 INVALID USE OF ASTERISK INDICATOR. ASTERISK IS IGNORED.

† NOTE240 ASTERISK INDICATOR IS INVALID IN 'OR' OR 'AND' TYPE SPECIFICATIONS. SPECIFICATION IS NOT PROCESSED.

NOTE241 DEVICE (COLUMNS 40-46) IS INVALID FOR DISPLAY FILES. 'CONSOLE' IS ASSUMED.

NOTE242 ONLY ONE DISPLAY FILE MAY BE SPECIFIED PER PROGRAM. SPECIFICATION IS NOT PROCESSED.

NOTE243 FILE ORGANIZATION (COLUMN 32) IS INVALID. 'I' IS ASSUMED FOR INDEXED SEQUENTIAL FILES AND BLANK IS ASSUMED OTHERWISE.

NOTE244 RECORD ADDRESS TYPE (COLUMN 31) IS INVALID. 'A' IS ASSUMED FOR INDEXED SEQUENTIAL FILES. 'R' FOR DIRECT FILES AND BLANK OTHERWISE.

NOTE245 KEY LENGTH (COLUMNS 29-30) MUST BE 3 OR GREATER. ENTRY OF 3 IS ASSUMED.

† NOTE246 FILE CONDITIONING INDICATOR (COLUMNS 71-72) IS INVALID. ENTRY OF BLANK IS ASSUMED.

† NOTE247 FILE CONDITIONING INDICATOR (COLUMNS 71-72) IS NOT ALLOWED. BLANK IS ASSUMED.

NOTE248 FOR SPECIAL FILES COLUMNS 28-32, 35-38, 53, 60-70 MUST BE BLANK. BLANKS ARE ASSUMED.

Message-Meaning/Corrective Action

NOTE249 WARNING: BLOCK LENGTH (COLUMNS 20-23) FOR INDEXED SEQUENTIAL FILE IS MISSING. A BLOCK LENGTH EQUAL TO RECORD LENGTH IS ASSUMED.

NOTE250 BLOCK LENGTH (COLUMNS 20-23) IS SMALLER THAN MINIMUM FOR DEVICE, OR LESS THAN 80 IF USER LABELS ARE SPECIFIED. IF USER LABELS ARE SPECIFIED, 80 IS ASSUMED; OTHERWISE, MINIMUM FOR DEVICE IS ASSUMED.

† NOTE251 RECORD LENGTH (COLUMNS 24-27) IS INVALID OR MISSING. SPECIFICATION IS NOT PROCESSED.

† NOTE252 FROM FILENAME (COLUMNS 11-18) IS NOT DEFINED AS A TABLE FILE ON FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

† NOTE253 FROM FILENAME (COLUMNS 11-18) IS MULTIPLY REFERENCED BUT A CARD DEVICE IS NOT SPECIFIED ON THE FILE DESCRIPTION SPECIFICATION. SPECIFICATION IS NOT PROCESSED.

NOTE254 TO FILENAME (COLUMNS 19-26) IS MULTIPLY REFERENCED BUT A PRINTER DEVICE IS NOT SPECIFIED ON THE FILE DESCRIPTION SPECIFICATION. ENTRY OF BLANKS IS ASSUMED.

NOTE255 WARNING - FILE SPECIFIED AS RECORD ADDRESS OR TAG DATA FILE ON FILE DESCRIPTION SPECIFICATION IS MISSING ON THE EXTENSION SPECIFICATION.

* NOTE256 INSUFFICIENT MAIN MEMORY FOR COMPILATION. COMPILATION ABORTED.

† NOTE257 MULTIPLE DEFINITION OF AN EXECUTION TIME ARRAY.

NOTE258 DATA FORMAT (COL 43) PACKED OR BINARY INVALID FOR DEVICE.

NOTE259 FOR LOOK-A-HEAD RECORD, RECORD SEQUENCE (COLUMNS 15-16) MUST BE ALPHA. ENTRY OF AA IS ASSUMED.

NOTE260 FOR LOOK-A-HEAD RECORD, NUMBER, OPTION AND RECORD IDENTIFICATION (COLUMNS 17, 18 COLUMN 21-41) MUST BE BLANK. ENTRY OF BLANKS IS ASSUMED.

† NOTE261 LOOK-A-HEAD RECORD USED WITH FILE NOT DEFINED AS PRIMARY OR SECONDARY. ALL SPECIFICATIONS FOR THIS RECORD ARE NOT PROCESSED.

NOTE262 WARNING: LOOK-A-HEAD SHOULD BE THE LAST RECORD SPECIFICATION FOR THIS FILE.

NOTE263 MATCHING RECORD INDICATOR (COLUMNS 61-62) IS SPECIFIED FOR FILE NOT DEFINED AS PRIMARY/SECONDARY FILE. ENTRY OF BLANKS IS ASSUMED.

NOTE264 CHAINING INDICATOR (COLUMNS 61-62) IS SPECIFIED FOR INVALID CHAINING TYPE FILE. ENTRY OF BLANKS IS ASSUMED.

† NOTE265 SUBSCRIPTED FIELD IS NOT DEFINED AS AN ARRAY. SPECIFICATION IS NOT PROCESSED.

† NOTE266 FOR EXECUTION TIME ARRAY INPUT, NUMBER OF ELEMENTS SPECIFIED FOR INPUT EXCEEDS SIZE OF ARRAY. SIZE OF ARRAY IS ASSUMED.

Message-Meaning/Corrective Action

† NOTE267 INVALID VARIABLE SUBSCRIPT, I.E. VARIABLE IS NOT A NUMERIC FIELD.

† NOTE268 INVALID LITERAL SUBSCRIPT, I.E. SUBSCRIPT IS NEGATIVE/ZERO (VALUE OF 1 IS ASSUMED) OR SUBSCRIPT IS OUT OF RANGE (HIGHEST VALUE IS ASSUMED).

† NOTE269 FIELD SPECIFICATION IS OUT OF SEQUENCE, I.E. DOES NOT FOLLOW A RECORD INPUT SPECIFICATION. ALL SPECIFICATIONS UNTIL NEXT FILE RECORD ARE NOT PROCESSED.

NOTE270 WARNING: NO RECORD IDENTIFICATION CODES SPECIFIED ON THE RECORD PRECEDING 'AND' RECORD.

NOTE271 FOR 'AND' RECORD, STACKER SELECT MUST BE BLANK. ENTRY OF BLANK IS ASSUMED.

NOTE272 WARNING: LITERAL/EDIT WORD (COLUMNS 45-70) IS NOT LEFT-JUSTIFIED.

† NOTE273 FOR ARRAY INPUT, LENGTH OF FIELD LOCATION IS NOT A MULTIPLE OF THE ELEMENT LENGTH. NEXT LOWEST MULTIPLE ASSUMED.

NOTE274 CONTROL FIELD INVALID WITH CHAINED OR DEMAND FILES. SPECIFICATION IS NOT PROCESSED.

NOTE275 ADDED RECORD SPECIFIED ON OUTPUT FOR NON-ISAM FILE OR COLUMN 66 OF CORRESPONDING ISAM FILE DESCRIPTION IS NOT 'A'.

NOTE276 PROGRAM ID. (COLS 75-80) BLANK OR INVALID. 'RPGOBJ' ASSUMED.

NOTE277 FIELD EDITED WITH Y EDIT CODE REQUIRES 3-6 CHARACTER POSITIONS.

† NOTE278 TRANSLATE RECORDS NOT BEGINNING WITH ** BLANK RECORD. FILE TRANSLATION PROCESSING TERMINATED.

† NOTE279 FILE TRANSLATION SPECIFIED BUT NO TRANSLATE RECORDS PRESENT OR NOT IN PROPER SEQUENCE. FILE TRANSLATION PROCESSING TERMINATED.

† NOTE280 INVALID TRANSLATION SPECIFICATION. WHEN USING *FILES OR *EQUATE ONLY ONE TRANSLATE TABLE CAN BE SPECIFIED. FILE TRANSLATION PROCESSING TERMINATED.

† NOTE281 INVALID HEX CHARACTER SPECIFIED FOR TRANSLATION FILE TRANSLATION PROCESSING TERMINATED.

† NOTE282 INVALID FACTOR SPECIFICATION. FACTOR 2 OR RESULT MUST BE ARRAY BUT MAY NOT REF. SAME ARRAY.

† NOTE283 ALPHANUMERIC FACTOR1 IS INVALID FOR CHAINING TO A DIRECT FILE, OR IN COMBINATION WITH A NUMERIC KEY FIELD ON THE FACTOR2 FILE FOR CHAIN AND SETLL OPERATIONS. SPECIFICATION IS NOT PROCESSED.

NOTE284 OVERFLOW INDICATOR INVALID FOR EXCEPTION OUTPUT LINE.

NOTE285 POSITIONS 60-65 CONTAIN AN INVALID ENTRY. ASSUME BLANK.

NOTE286 INVALID FILE TRANSLATION SPECIFICATION. CHECK VALIDITY OF TRANSLATE RECORDS.

Message-Meaning/Corrective Action

† NOTE287 INVALID ALTSEQ RECORD. STANDARD COLLATING SEQUENCE SELECTED.

† NOTE288 INVALID HEX CHARACTER IN ALTSEQ RECORD. STANDARD COLLATING SEQUENCE SELECTED.

† NOTE289 ALTSEQ FILE NOT PRESENT. STANDARD COLLATING SEQUENCE SELECTED.

NOTE290 DECIMAL POSITIONS SPECIFIED FOR BLANK FIELD LENGTH. DECIMAL POSITIONS IGNORED.

† NOTE291 INVALID ALTSEQ CODE, STANDARD COLLATING SEQUENCE SELECTED.

† NOTE292 SPECIFIED FILE NAME FOR FILE TRANSLATION NOT FOUND. FILE TRANSLATION PROCESSING TERMINATED.

† NOTE293 FILE TRANSLATION SPECIFIED FOR DISPLAY FILE. FILE TRANSLATION PROCESSING TERMINATED.

NOTE294 INVALID FILL CHARACTER SPECIFIED FOR EDIT CODE.

NOTE295 DECIMAL POSITION ENTRY (COL 52) DOES NOT AGREE WITH NUMBER OF DECIMAL POSITIONS PREVIOUSLY SPECIFIED. PREVIOUS SPECIFICATION IS USED.

† NOTE296 FIELD WAS PREVIOUSLY DEFINED WITH DIFFERENT LENGTH. SPECIFICATION IS NOT PROCESSED.

NOTE297 WARNING - EXCPT OPERATION OR EXCEPTION OUTPUT SPECIFICATIONS MISSING.

NOTE298 MATCHING FIELD INDICATOR M1-M9 MUST BE REFERENCED AT LEAST TWICE.

NOTE299 RECORD LENGTH (COL 24-27) IS LESS THAN MINIMUM FOR DEVICE SPECIFIED, MINIMUM FOR DEVICE IS ASSUMED.

NOTE300 FILE FORMAT (COLUMN 19) IS NOT F. ENTRY OF F IS ASSUMED FOR REMOTE FILES OR FILES USING S/3 MODE.

† NOTE301 STATION TYPE (COLUMN 16) DOES NOT CONTAIN T OR R. SPECIFICATION NOT PROCESSED.

NOTE302 COLUMN(S) 17-18, 21-47, 52, 61-64, NOT BLANK. ENTRY IGNORED.

† NOTE303 REMOTE TERMINAL (COLUMNS 48-51) IS INVALID. SPECIFICATION NOT PROCESSED.

† NOTE304 PERMANENT ERROR INDICATOR (COLUMNS 53-54) IS INVALID. SPECIFICATION NOT PROCESSED.

† NOTE305 WAIT TIME (COLUMNS 55-57) IS INVALID. 180 SECONDS IS ASSUMED.

NOTE306 RECORD AVAILABLE INDICATOR (COLUMNS 58-59) IS INVALID. SPECIFICATION NOT PROCESSED.

† NOTE307 LAST FILE PROCESSED (COLUMN 60) IS NOT L OR BLANK. SPECIFICATION NOT PROCESSED.

NOTE308 WAIT TIME (COLUMNS 55-57) IS INVALID. ENTRY OF BLANK IS ASSUMED.

Message-Meaning/Corrective Action

NOTE309 RECORD AVAILABLE INDICATOR (COLUMNS 58-59) IS PRESENT ON TRANSMIT FILE, OR FOR PROGRAM WITH SINGLE REMOTE FILE. ENTRY OF BLANK IS ASSUMED.

NOTE310 LAST FILE PROCESSED (COLUMN 60) IS NOT BLANK ON TRANSMIT FILE OR PRIMARY INPUT FILE. ENTRY OF BLANK IS ASSUMED.

† NOTE311 CORRESPONDING FILE DESCRIPTION SPECIFICATION FILE IS NOT A REMOTE FILE. SPECIFICATION NOT PROCESSED.

† NOTE312 A CONVERSATIONAL FILE WAS DEFINED WHEN NOT ALLOWED. SPECIFICATION NOT PROCESSED.

† NOTE313 NO CORRESPONDING OUTPUT OR COMBINED FILE SPECIFICATION FOR TRANSMIT FILE. SPECIFICATION NOT PROCESSED.

† NOTE314 NO CORRESPONDING INPUT OR COMBINED FILE SPECIFICATION FOR RECEIVE FILE. SPECIFICATION NOT PROCESSED.

NOTE315 BLOCKED RECORD SPECIFIED FOR CONVERSATIONAL FILE. NO BLOCKING IS ASSUMED.

† NOTE316 TELECOMMUNICATIONS SPECIFICATION MISSING FOR FILE DEFINED AS A REMOTE FILE. SPECIFICATION NOT PROCESSED.

† NOTE317 LOOK AHEAD FIELDS SPECIFIED FOR REMOTE FILE. SPECIFICATION NOT PROCESSED.

† NOTE318 MATCHING FIELDS DEFINED ON A TRANSMIT FILE WITH CONVERSATIONAL REPLY. SPECIFICATION NOT PROCESSED.

† NOTE319 MATCHING FIELDS DEFINED FOR A FILE DESIGNED AS LAST FILE. SPECIFICATION NOT PROCESSED.

NOTE320 FOR A TRANSMIT THEN RECEIVE REMOTE PROGRAM, IF END-OF-FILE IS SPECIFIED FOR ANY INPUT FILE, E IS ASSUMED IN COLUMN 17 OF THE REMOTE INPUT FILE.

† NOTE321 A TRANSMIT WITH CONVERSATIONAL REPLY FILE IS USED WITH FORCE OR READ OF CODE OR AS A PRIMARY FILE. SPECIFICATION NOT PROCESSED.

† NOTE322 FILE NAME USED TWICE ON TELECOMMUNICATIONS SPECS. SPECIFICATION NOT PROCESSED.

† NOTE323 DUAL I/O AREAS NOT PERMITTED FOR CONVERSATIONAL FILE. SPECIFICATION NOT PROCESSED.

† NOTE324 INVALID DEVICE (COLUMNS 65-70) SPECIFIED. SPECIFICATION NOT PROCESSED.

† NOTE325 FILENAME (COLUMNS 7-14) INVALID OR UNDEFINED. SPECIFICATION NOT PROCESSED.

† NOTE326 PACKED FIELD OR BINARY FIELD SPECIFIED IN A FILE WITHOUT TRANSPARENCY. SPECIFICATION NOT PROCESSED.

Message-Meaning/Corrective Action

† NOTE327 TERMINAL NAME (COLUMNS 71-74) INVALID. SPECIFICATION NOT PROCESSED.

NOTE328 TRANSPARENCY (COLUMN 19) IS NOT Y, N, OR BLANK. BLANK IS ASSUMED.

NOTE329 CONFIGURATION ENTRY (COLUMN 15) OF P, S OR M NOT SUPPORTED. ENTRY IGNORED.

NOTE330 COLUMNS 16-52, 55-70 MUST BE BLANK FOR MULTIPLE TERMINAL FILES AFTER FIRST SPECIFICATION. ENTRIES IGNORED.

† NOTE331 TERMINAL NAME (COLUMNS 71-74) USED TWICE. SPECIFICATION NOT PROCESSED.

† NOTE332 REMOTE AUXILIARY DEVICE (COLUMNS 65-70) NOT ALLOWED FOR MULTIPLE TERMINAL FILES. SPECIFICATION NOT PROCESSED.

NOTE333 CCA NAME (COLUMNS 70-73) ON CONTROL CARD INVALID OR MISSING FOR REMOTE FILES. 'RPGI' ASSUMED.

NOTE334 SWITCHED ENTRY (COLUMN 20) IS NOT E, S, M, A, B, OR BLANK. BLANK IS ASSUMED.

† NOTE335 REMOTE TERMINAL (COLUMNS 48-51) INVALID OR TERMINAL COMBINATION INVALID FOR MULTIPLE TERMINAL FILE. SPECIFICATION NOT PROCESSED.

NOTE336 NUMBER OF EXTENTS (COL. 68-69) INVALID FOR FILE TYPE. ENTRY IGNORED.

NOTE337 END POSITION SPECIFIED FOR *PLACE GREATER THAN 256 or LESS THAN TWICE PREVIOUS HIGH POSITION.

NOTE338 FACTOR 1 ENTRY (COL. 18-27) INVALID FOR OPERATION. SPECIFICATION IS NOT PROCESSED.

NOTE339 FACTOR 2 ENTRY (COL. 33-43) INVALID FOR OPERATION. SPECIFICATION IS NOT PROCESSED.

NOTE340 INVALID SKIP ENTRIES IN COL. 19-22 OR GREATER THAN THE FORM LENGTH SPECIFIED, ASSUME BLANK.

NOTE341 ALL THREE RESULTING INDICATORS ARE THE SAME.

† NOTE342 MORE THAN 7 AN/OR LINES SPECIFIED.

NOTE343 UNORDERED ENTRY (U IN COL. 66) IS INVALID. ENTRY OF 'A' IS ASSUMED.

NOTE344 PROCESSING MODE (COL. 28) INVALID FOR CHAIN OUTPUT FILE. 'R' IS ASSUMED.

NOTE345 FILE ORGANIZATION (COL. 32) NOT REQUIRED FOR CHAIN OUTPUT FILE.

† NOTE346 TRAILER RECORD OVERLAPS HEADER RECORD. TR IGNORED.

† NOTE347 NO TRAILER FIELDS FOR SPREAD CARD. TR IGNORED.

Message-Meaning/Corrective Action

† NOTE348 FILE TYPE INVALID FOR SPREAD CARD DESIGNATION. TR IGNORED.

† NOTE349 LOOKAHEAD NOT ALLOWED WITH SPREAD CARDS. TR IGNORED.

NOTE350 CONTINUATION OPTION (COL. 54–59) IS REPEATED FOR A FILE. SECOND ENTRY IS IGNORED.

NOTE351 BUFOFF SPECIFIED FOR AN OUTPUT FILE. ENTRY IGNORED.

NOTE352 CONTINUATION OPTION (COL. 54–59) INVALID FOR DEVICE. CONTINUATION LINE IS IGNORED. ←

† NOTE353 CONTINUATION OPTION (COL. 54–59) IS INVALID OR MISSING. CONTINUATION LINE IS IGNORED.

† NOTE354 INVALID CONTINUATION LINE ENTRY (COL. 60–65). CONTINUATION LINE IS IGNORED.

NOTE355 BUFOFF SPECIFIED FOR NON-ASCII TAPE FILE. ASCII FILE ASSUMED.

† NOTE356 PREVIOUS SPECIFICATION INVALID. CONTINUATION RECORD IGNORED.

† NOTE357 INVALID CONTINUATION LINE ENTRY (COL. 60–65) FOR ACCESS CONTINUATION OPTION. EXC IS ISSUED. ←

† NOTE358 INVALID FORM LENGTH ENTRY (COL. 15–17). SPECIFICATION IS NOT PROCESSED.

† NOTE359 INVALID OVERFLOW LINE ENTRY (COL. 20–22). SPECIFICATION IS NOT PROCESSED.

NOTE360 OVERFLOW LINE EXCEEDS FORM LENGTH. FORM LENGTH ASSUMED FOR OVERFLOW LINE.

NOTE361 INVALID ENTRY IN COL. 18–19. 'FL' ASSUMED.

NOTE362 INVALID ENTRY IN COL. 23–27. 'OL' ASSUMED.

† NOTE363 FILE DESCRIPTION AND CONTINUATION SPECIFIED ON SAME LINE, SPECIFICATION IS NOT PROCESSED.

† NOTE364 INVALID FEATURE SPECIFIED FOR PROCESSING MODE.

NOTE365 FETCH OVERFLOW ENTRY (COL. 16) INVALID FOR DEVICE.

NOTE366 RESULT FIELD (COL. 43–48) IS INVALID FOR OPERATION. SPECIFICATION IS NOT PROCESSED.

NOTE367 FETCH OVERFLOW AND OVERFLOW INDICATOR SPECIFIED FOR SAME OUTPUT LINE. INDICATOR IGNORED.

NOTE368 NUMBER OF ENTRIES PER RECORD TIMES LENGTH OF ENTRY IS TOO LARGE. LENGTH OF ENTRY ASSUMED 1.

Message-Meaning/Corrective Action

NOTE369 OPERATOR CONTROL (COLUMN 9) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE370 FIRST PAGE FORMS ALIGNMENT (COLUMN 41) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE371 COMBINED FILE (COLUMN 15) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE372 DISPLAY FILE (COLUMN 15) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE373 TABLE OR ARRAY FILE (COLUMN 16) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE374 BLOCK LENGTH (COLUMNS 20-23) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE375 ADDROUT/RECORD ADDRESS FILES (COLUMN 16) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE376 DOUBLE BUFFERING (COLUMN 32) INVALID FOR IMS 90 ACTION PROGRAMS OR IRAM FILES. ONE I/O AREA ASSUMED.

NOTE377 SEQUENTIAL INPUT FILES INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE378 DEVICE (COLUMNS 40-46) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE379 LABELS/LABEL EXIT (COLUMNS 53-59) INVALID FOR IMS ACTION PROGRAMS. ENTRIES IGNORED.

NOTE380 INDEX IN MAIN MEMORY (COLUMNS 60-65) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE381 CYLINDER OVERFLOW SPACE PERCENTAGE (COLUMN 67) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE382 NUMBER OF EXTENTS (COLUMNS 68-69) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE383 U1-U8 INDICATORS (COLUMNS 71-72) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE384 ERROR ANALYSIS DUMP (COLUMN 8) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE385 FILE LOAD INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE386 FILE INDEX CONTINUATION OPTION (COLUMNS 54-59) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

Message-Meaning/Corrective Action

NOTE387 TAPE REWIND (COLUMN 70) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE388 C1-C9 CHAINING (COLUMNS 9-10) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE389 SPREAD CARDS (COLUMNS 19-20) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE390 STACKER SELECT (COLUMN 42) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE391 STACKER SELECT (COLUMN 16) INVALID FOR IMS ACTION PROGRAMS. ENTRY IGNORED.

NOTE392 INVALID OPERATION (COLUMNS 23-32) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE393 TELECOMMUNCATIONS SPECIFICATION (COLUMN 6) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE394 SIGN HANDLING (COLUMN 40) INVALID FOR IMS ACTION PROGRAMS. ENTRY OF 'B' ASSUMED.

NOTE395 UNORDERED LOAD (COLUMN 66) INVALID FOR IMS ACTION PROGRAMS. SPECIFICATION NOT PROCESSED.

NOTE396 REMOTE TEMINAL (COLUMNS 48-51) REQUIRES A COMBINED FILE. SPECIFICATION NOT PROCESSED.

NOTE397 WARNING: RESULT FIELD MAY NOT BE LARGE ENOUGH FOR RESULT. RESULTING INDICATORS ARE NOT SET IF ARITHMETIC OVERFLOW OCCURS.

† NOTE398 COLUMNS 7-8 ARE NOT BLANK IN 9200/9300 OR IBM 360/20 MODE. BLANKS ASSUMED. ←

NOTE399 RECORD SEQUENCE FOR CHAINING FILE ON FILE EXTENSION SPECIFICATION DOES NOT MATCH SEQUENCE ON INPUT SPECIFICATION. ENTRY ON INPUT SPECIFICATION IS ASSUMED.

† NOTE400 REMOTE TERMINAL (COLUMNS 48-51) CANNOT BE A COMBINED FILE. SPECIFICATION NOT PROCESSED.

† NOTE401 CDI NOT CONFIGURED. WORKSTATION FILE NOT ALLOWED. SPECIFICATION NOT PROCESSED.

† NOTE402 ONLY ONE WORKSTATION FILE ALLOWED. SPECIFICATION NOT PROCESSED.

NOTE403 WORKSTATION FILE MUST BE A COMBINED FILE. COMBINED ASSUMED.

† NOTE404 WORKSTATION FILE MUST BE PRIMARY OR DEMAND. SPECIFICATION NOT PROCESSED.

† NOTE405 LOOK-AHEAD FIELDS NOT ALLOWED FOR WORKSTATION FILE. SPECIFICATION NOT PROCESSED.

NOTE406 MATCHING OR CHAINING FIELDS NOT ALLOWED FOR WORKSTATION FILE. INDICATOR IGNORED.

→ † NOTE407 FORMAT NAME SPECIFICATION FOR A WORKSTATION FILE IS INCORRECT. SPECIFICATION NOT PROCESSED.

† NOTE408 SECONDARY FILES NOT ALLOWED WHEN WORKSTATION FILE IS A PRIMARY FILE. SPECIFICATION NOT PROCESSED.

† NOTE412 SPLIT MATCHING FIELDS NOT ALLOWED. EXECUTION IS DELETED.

NOTE413 1P INDICATOR IS INVALID FOR TOTAL AND EXCEPTION OUTPUT RECORDS. RECORD WILL NOT BE WRITTEN WHEN PROGRAM IS EXECUTED.

NOTE414 AN/OR LINE EXPECTED OR SPECIFIED IMPROPERLY. SPECIFICATION IS NOT PROCESSED.

NOTE415 LR INDICATOR IS INVALID FOR HEADER AND DETAIL OUTPUT RECORDS. RECORD WILL NOT BE WRITTEN WHEN PROGRAM IS EXECUTED.

NOTE416 WARNING: FIELD IS GREATER THAN DEFAULT VALUE FOR DEVICE. FIELD IS TRUNCATED.

† NOTE417 FACTOR 2 IN THE GOTO STATEMENT IS UNDEFINED.

NOTE418 WARNING–CURRENCY SYMBOL (COLUMN 18) INVALID. CANNOT BE 0 * , . – C R OR AMPERSAND. DOLLAR SIGN ASSUMED.

† NOTE419 VALUE DETECTED IN COLS 21–24, 28–31, OR 35–38 EXCEEDS RECORD LENGTH. A VALUE OF 1 IS ASSUMED.

† NOTE420 MORE THAN ONE CONSOLE FILE IN A PROGRAM IS INVALID. SPECIFICATION IS NOT PROCESSED.

† NOTE421 RECORD IDENTIFYING INDICATOR INVALID FOR CONSOLE FILE. ASSUME 10.

† NOTE422 RECORD IDENTIFICATION CODES IN COLUMNS 35–41 ARE INVALID FOR THIS DEVICE.

NOTE423 FILE TYPE (COL 15) IS INVALID FOR CONSOLE FILE. ENTRY OF I IS ASSUMED.

† NOTE424 INVALID OVERLAPPING FIELDS. SPECIFICATION IS NOT PROCESSED.

† NOTE425 WORKSTATION AND CONSOLE FILE NOT ALLOWED IN SAME PROGRAM. SPECIFICATION IS NOT PROCESSED.

† NOTE426 MAXIMUM NUMBER OF RECORDS (10) FOR CONSOLE FILE EXCEEDED. SPECIFICATION IS NOT PROCESSED.

† NOTE427 AND LINE IS INVALID FOR DEVICE. COLS 14–16.

† NOTE428 INVALID OR BLANK ENTRIES IN COLUMNS 21–34 FOR THIS DEVICE.

† NOTE429 FILE DESCRIPTION (COL 16) INVALID FOR DEVICE.

† NOTE430 FIELD LENGTH DEFINED FOR RECORD IDENTIFICATION DOES NOT MATCH LENGTH OF IDENTIFICATION.

† NOTE431 INVALID POSITION FOR FIRST FIELD TO BE PROMPTED.

† NOTE432 TO FILENAME MUST BE LIMITS FILE IF FROM FILE IS CONSOLE.

† NOTE433 INCONSISTENT USAGE OF RECORD IDENTIFYING CODES ON OR LINE. SPECIFICATION IS NOT PROCESSED.

NOTE434 WARNING: TOTAL LENGTH OF ALL CONTROL FIELDS IS GREATER THAN 144 CHARACTERS.

NOTE435 FIELD LENGTH GREATER THAN 66 IS INVALID FOR DEVICE. SPECIFICATION IS NOT PROCESSED.

NOTE436 COL. 68 OF CONTINUATION STATEMENT IS NOT A BLANK OR D. ENTRY OF BLANK ASSUMED.

BLANK437 COL. 69 OF CONTINUATION STATEMENT IS NOT A BLANK OR C. ENTRY OF BLANK ASSUMED.

NOTE438 MORE THAN 5 KEY STRUCTURES DESCRIBED FOR A FILE. STATEMENT NOT PROCESSED.

NOTE439 FILE KEY STRUCTURE SPECIFIED IN COL 29–30 AND COL 35–38. CONTINUATION STATEMENT IS NOT PROCESSED.

† NOTE440 SCREEN FORMAT NAME MISSING FOR WORKSTATION OUTPUT RECORD. ALL SPECIFICATIONS IN THIS RECORD TYPE ARE NOT PROCESSED.

† NOTE441 INDICATOR IN COLS. 7–17 INVALID. SPECIFICATION NOT PROCESSED.

NOTE442 WARNING: NO DATA STRUCTURE NAME FOUND ON INPUT SPECIFICATIONS MATCHING NAME ON WORKSTATION SAVDS CONTINUATION LINE.

NOTE443 WARNING: IND AND/OR SAVDS IS SPECIFIED FOR WORKSTATION FILE BUT NUM IS NOT SPECIFIED OR IS NOT GREATER THAN 1. NO DATA SWAPPING WILL BE PERFORMED FOR WORKSTATIONS.

NOTE444 WARNING: INDICATOR STATUS MAY NOT BE RETURNED TO USER. RESULTS MAY BE UNPREDICTABLE.

NOTE445 WARNING: LENGTH OF FACTOR 2 VARIABLE ON ENDSR OPERATION FOR INFSR SUBROUTINE SUPPORT IS NOT 6. RESULTS MAY BE UNPREDICTABLE.

NOTE446 WARNING: COLUMNS 60–65 BLANK FOR NUM CONTINUATION STATEMENT. 1 ASSUMED.

† NOTE451 KEY LENGTH (COLUMNS 66–67) IS MISSING OR INVALID. SPECIFICATION IS NOT PROCESSED.

NOTE452 WARNING: INFSR SUBROUTINE IS MISSING OR INVALID.

† NOTE453 RECORD LENGTH (COLUMNS 24–27) IS GREATER THAN 160 FOR S/34 CONSOLE RECORD ADDRESS FILE. SPECIFICATION IS NOT PROCESSED.

NOTE454 FORMAT IS TOO LARGE TO FIT ON ONE SCREEN. FIELDS MUST BE REDUCED OR REDEFINED.

NOTE459
NOTE460
NOTE461
NOTE462
NOTE463

No error message assigned for these notes

NOTE488 WARNING: DUPLICATES NOT ALLOWED FOR PRIMARY KEY.ENTRY IGNORED.

NOTE489 SETK ONLY ALLOWED FOR CHAINED OR DEMAND FILES.SPECIFICATION IGNORED.

NOTE490 /COPY WITHIN A /COPY OPERATION IS NOT PERMITTED.ENTRY IS IGNORED.

NOTE491 A DM ERROR OCCURRED DURING THE /COPY OPEN PROCESS.THE /COPY REQUEST IS BYPASSED.

NOTE492 THE /COPY MODULE REQUESTED WAS NOT FOUND.COPY REQUEST IS BYPASSED.

NOTE493 DM ERROR OCCURRED DURING THIS COPY FILE READ.THIS COPY COMMAND PROCESSING IS TERMINATED.

NOTE494 /COPY COMMAND SYNTAX PROBLEM.COMMAND IGNORED.

Appendix B. Auto Report Error Messages

If any errors are detected in your program while it is being analyzed by auto report, the UPSI byte is set in the communication region of the job preamble according to OS/3 system standards to indicate the type of errors that occurred.

UPSI Byte	Setting	Meaning
Bit 0	1	Catastrophic errors were detected in the source program. Generated source was incomplete.
	0	No catastrophic errors were detected.
Bit 1	1	Serious errors were detected. A source module was generated, but the results will be unpredictable.
	0	No serious errors were detected.

When an error occurs during the processing of the source program, the appropriate message from the following list is printed on the compilation listing. An asterisk (*) indicates that the message is printed out due to a catastrophic error. A dagger (†) indicates that the message is printed out due to a serious error. A blank indicates that the message printed out is informational. These indicators are not printed out with the message.

*** AR001 SOURCE PROGRAM IS MISSING. PROGRAM IS TERMINATED.**

Terminal error.

The first record in the source program is /* or **.

Auto report terminates the job.

Correct the source program and resubmit the job.

† AR002 RPG II CONTROL SPECIFICATION IS MISSING. A CONTROL SPECIFICATION WITH BLANK ENTRIES IS CREATED.

Warning error for control (H) specification.

The source program or library module does not contain a control specification.

Auto report creates a control specification containing blank entries.

Correct the source program or library module.

† AR003 SOURCE PROGRAM CONTAINS MORE THAN ONE RPG II CONTROL SPECIFICATION. ALL BUT THE FIRST ARE DROPPED.

Warning error for control (H) specification.

The source program contains multiple control specifications or the copied library module contains a control specification.

Auto report ignores all but the first control specification.

Correct the source program and resubmit the job.

† **AR004 DUPLICATE FILENAMES ON THE FILE DESCRIPTION SPECIFICATION. DUPLICATE IS DROPPED.**

Warning error for file description (F) specification.

The file name on the specification is not unique.

Auto report ignores the duplicate file description specification.

Assign a unique name to the file and resubmit the job.

† **AR005 REQUESTED SOURCE MODULE CANNOT BE FOUND. SPECIFICATION IS DROPPED.**

Warning error for /COPY specification.

The module is not located because:

1. You used the wrong name for the module.
2. You specified the wrong disk for the library file.
3. There are not any records in the library file.

Auto report ignores the specification.

Correct the error and resubmit the job.

† **AR006 DUPLICATE FILENAMES ON F-SPECS READ FROM THE FILE SOURCE.**

Warning error for file description (F) specification.

You can use only one file description specification for a file name in a file module. The error occurs because:

1. Two file description specifications with the same file name are in one file module.
2. File description specifications with the same file name are in more than one file module.

Auto report ignores the duplicate file description specification.

Assign a unique file name and resubmit the job.

† **AR007 TABLE AREA PROVIDED FOR INPUT OVERRIDES EXCEEDED. OVERRIDE FUNCTION IS DISCONTINUED FOR THIS /COPY.**

Warning error for /COPY statement.

The number of /COPY modifier statements for the input field specification exceeds the available space in the table. The fields that can be overwritten are added to the table. Because of this, you can get invalid specifications in the generated program.

Auto report discontinues the override function for the /COPY statement.

Place override statements first, then specify the input fields added to the copied specifications. This permits the override statements to use all the table space. Auto report can handle at least 20 overrides.

† AR008 INVALID RPG II SPECIFICATION TYPE. SPECIFICATION IS DROPPED.

Warning error for /COPY statement.

The specification is invalid. The error occurs because:

1. Column 6 does not contain an H, F, E, L, T, I, C, or O.
2. Column 7 does not contain an asterisk.
3. The /COPY statement is on a control (H) specification. (The /COPY statement is processed correctly.)

Auto report ignores the specification.

Correct the error and resubmit the job.

*** AR009 INVALID OR UNDEFINED FILE FOR *AUTO LINES. DROP ALL SPECIFICATIONS TO NEXT RECORD TYPE.**

Terminal error for file description (F) or output (O) specification.

The file is invalid or undefined. The error occurs because:

1. The auto report file is not a printer or line counter file.
2. The auto report file does not contain a file description specification.
3. The names on the file description specification and the auto report file do not match.

The job terminates.

Correct the error and resubmit the job.

† AR010 TABLE AREA FOR FIELD NAMES USED ON *AUTO LINES EXCEEDED. SPECIFICATION IS DROPPED.

Warning error for output (O) specification.

Each field you used in the H-*AUTO, D-*AUTO, or T-*AUTO specifications is placed into a table.

Auto report ignores the specification.

Take out the unused and unneeded field names and resubmit the job.

AR011 TABLE AREA PROVIDED FOR FIELD NAMES EXCEEDED. NONUNIQUE FIELD NAMES MAY BE GENERATED.

Warning error for output (O) specification.

The field name table contains the generated field names that end in 1 through 9 or R.

Auto report may generate the nonunique field names.

To avoid duplicate field names, do not use names that end in 1 through 9 or R.

AR012 GENERATED TOTAL FIELD PREVIOUSLY DEFINED WITH DIFFERENT ATTRIBUTES. PREVIOUS DEFINITION IS USED.

Warning error for output (O) specification.

You defined the generated total field with a different field length or a different number of decimal positions.

Auto report uses the first or previous definition and prints both the total field and generated field names with the error note number.

Correct the error and resubmit the job.

† **AR013 *AUTO PREVIOUSLY USED FOR A DIFFERENT FILE. DROP ALL SPECIFICATIONS TO NEXT RECORD TYPE.**

Warning error for output (O) specification.

You can specify *AUTO for only one file.

Auto report drops all specifications to the next record type.

Correct the error by specifying *AUTO for only one file and resubmit the job.

AR014 POSITIONS 7-22 ARE NOT BLANK ON OUTPUT FIELD SPECIFICATION. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You must leave columns 7 through 22 of the output field specification blank.

Auto report assumes blanks are in columns 7 through 22.

Leave columns 7 through 22 blank and resubmit the job.

AR015 INVALID INDICATOR. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

Columns 24 through 25, 27 and 28, or 30 and 31 do not contain 01 through 99, L0 through L9, MR, 1P, H1 through H9, OA through OG, OV, or blanks.

Auto report prints the invalid indicator with the note number and assumes blanks in the columns.

Enter a valid indicator and resubmit the job.

† **AR016 INVALID FIELD NAME. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

The field name is invalid. The error occurs because:

1. The field name was not found.
2. You did not define the field name.
3. The array index contains a blank after the comma or it has a comma as the first character.

4. Field name usage is invalid with constant.

Auto report ignores the specification and the column headings for the field.

Enter a field name in columns 32 through 37 and resubmit the job.

AR017 INVALID ENTRY IN POSITION 38 AND/OR 44. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You must leave column 38 and column 44 blank for alphanumeric fields.

Auto report assumes blanks are in column 38 and column 44.

Leave columns 38 and 44 blank and resubmit the job.

AR018 INVALID ENTRY IN POSITION 39. BLANK IS ASSUMED.

Warning error for output (O) specification.

Column 39 must contain blank or B for any field on an H-*AUTO specification.

Auto report assumes a blank is in column 39.

Enter B or blank in column 39 and resubmit the job.

AR019 INVALID ENTRY IN POSITIONS 40-43. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You cannot specify an end position on the field description for an H-*AUTO specification.

Auto report assumes blanks are in columns 40 through 43.

Leave columns 40 through 43 blank and resubmit the job.

AR020 INVALID ENTRY IN POSITIONS 45-70. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You cannot specify a heading or edit word with an alphanumeric field.

Auto report assumes blanks are in columns 45 through 70.

Enter valid entries in columns 45 through 70 and resubmit the job.

AR021 FIELD NAME WILL BE CONDITIONED BY THE INDICATOR N1P.

Warning error for output (O) specification.

You specified a field name on an H-*AUTO specification but did not enter an indicator to condition the line. If the field is printed on the first page, it may contain meaningless data because the first record has not been read.

Auto report generates an N1P indicator for this specification.

Enter the proper indicator and resubmit the job.

AR022 INVALID EDIT CODE, POSITION 38. BLANK IS ASSUMED.

Warning error for output (O) specification.

Column 38 does not contain A, B, C, D, J, K, L, M, 1, 2, 3, 4, X, Y, or Z.

Auto report assumes blanks are in column 38.

Enter a valid edit code in column 38 and resubmit the job.

AR023 INVALID ENTRY IN POSITION 44. BLANK IS ASSUMED.

Warning error for output (O) specification.

You must leave column 44 blank for a numeric field.

Auto report assumes a blank in column 44.

Leave column 44 blank and resubmit the job.

AR024 POSITIONS 23-31 ARE NOT BLANK FOR A TOTALING FIELD.

Warning error for output (O) specification.

The indicators you specified on a totaling field with a T-*AUTO specification are not used when specifications are generated.

Auto report assumes blanks are in columns 23 through 31.

Leave columns 23 through 31 blank and resubmit the job.

AR025 CONSTANT/EDIT WORD IN POSITIONS 45–70 IS INVALID. BLANKS ARE ASSUMED IN POSITIONS 45–70.

Warning error for output (O) specification.

The entry in columns 45 through 70 is invalid. The error occurs because:

1. The entry in columns 45 through 70 does not begin with an apostrophe.
2. The entry in columns 45 through 70 does not end with an apostrophe.
3. There is an embedded single apostrophe (not paired with a corresponding apostrophe) in columns 46 through 69.
4. Columns 45 through column 70 are not blank after the last apostrophe.

Auto report drops this specification if you did not specify a field name and assumes blanks in columns 45 through 70 if you did specify a field name.

Correct the entry in columns 45 through 70 and resubmit the job.

† **AR026 UNABLE TO DETERMINE IF FIELD OR RECORD SPECIFICATION. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

Column 15 is blank, which indicates that the specification is a field description, but columns 32 through 37 and 45 through 70 are also blank.

Auto report drops the specification and the column headings for the field.

Make the proper entries and resubmit the job.

AR027 POSITIONS 38-44 ARE NOT BLANK WHEN A LITERAL IS SPECIFIED. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You must leave columns 38 through 44 blank when you specify a title on the H-*AUTO specification.

Auto report assumes blanks are in columns 38 through 44.

Leave columns 38 through 44 blank when specifying a title and resubmit the job.

AR028 POSITIONS 7-13 ARE NOT BLANK ON AND/OR SPECIFICATION. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You must leave columns 7 through 13 blank when you specify AND in columns 14 through 16 or specify OR in columns 14 and 15.

Auto report assumes blanks are in columns 7 through 13.

Leave columns 7 through 13 blank when using AND or OR entries and resubmit the job.

AR029 SPACE AND/OR SKIP ENTRIES IN POSITIONS 17-22 ARE INVALID. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

The space entry in columns 17 and 18 does not contain 0 through 9 or blank, and the skip entry in columns 19 and 20 and columns 21 and 22 does not contain 01 through 15.

AR030 POSITIONS 37-70 NOT BLANK ON RECORD SPECIFICATION. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

You must leave columns 37 through 70 blank for output file identifications.

Auto report assumes blanks are in columns 37 through 70.

Leave columns 37 through 70 blank and resubmit the job.

AR031 INVALID ENTRY IN POSITION 38. BLANK IS ASSUMED.

Warning error for output (O) specification.

You cannot specify an edit code along with a heading on D-*AUTO or T-*AUTO specifications.

Auto report assumes a blank is in column 38.

Leave column 38 blank and resubmit the job.

AR032 END POSITION IN POSITIONS 40-43 IS INVALID. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

Columns 40 through 43 contain invalid numbers or the end position exceeds the record length.

Auto report assumes blanks are in columns 40 through 43.

Enter a valid end position in columns 40 through 43 and resubmit the job.

AR033 GENERATED FIELD LENGTH EXCEEDS 15. 15 IS ASSUMED.

Warning error for output (O) specification.

When you specify a D/T-*AUTO specification with an A in column 39, the generated total field has a length that is two positions longer than the field you specify. An error occurs when the generated total field exceeds 15.

Auto report assumes the generated total field is 15 positions long.

Decrease the length of the field and resubmit the job.

AR034 DEFINITION OF FIELD IS INVALID. DEFINITION NOT USED.

Warning error for field description (F), file extension (E), input (I), or calculation (C) specification.

The definition of the field is invalid. The error occurs because:

1. The length is 0.
2. The length is greater than 15 for a numeric field.
3. The length is not numeric.
4. The length is less than the decimal position.
5. The decimal position is not numeric.
6. Column 43 does not contain P, B, or blank.

Auto report ignores the definition of the field.

Enter a valid field definition and resubmit the job.

† AR035 ARRAY NAME IS SPECIFIED ON *AUTO LINE. SPECIFICATION IS DROPPED.

Warning error for output (O) specification.

The name is invalid. The error occurs because:

1. You specified the name of an array in columns 32 through 37 of the H-*AUTO, D-*AUTO, or T-*AUTO specification.
2. The name generated by a D/T-*AUTO specification is an array name. The system drops the specification along with its column headings.

Auto report prints both the total field name and the generated field array name or it drops the specification.

Enter the name of a numeric field that is to be accumulated in columns 32 through 37 and resubmit the job.

AR036 RECORD LENGTH FOR FILE WITH *AUTO LINES IS INVALID. ASSUME RECORD LENGTH OF 120.

Warning error for file description (F) specification.

The record length is invalid. The error occurs because:

1. The record length is 0.
2. The record length is not numeric.
3. The record length is blank.

Auto report assumes the record length is 120.

Enter a valid record length and resubmit the job.

AR037 TOTALING (A IN POSITION 39) SPECIFIED FOR AN INVALID FIELD NAME. ASSUME POSITION 39 IS BLANK.

Warning error for output (O) specification.

Column 39 on a D/T-*AUTO contains an A, but the field name is:

1. Blank
2. A table name
3. An indexed array name
4. A page field

Auto report drops the specification and all its column headings.

Enter the name of a numeric field that is to be accumulated in columns 32 through 37 and resubmit the job.

AR038 TOTALING (A IN POSITION 39) SPECIFIED FOR AN ALPHANUMERIC FIELD. ASSUME POSITION 39 IS BLANK.

Warning error for output (O) specification.

The field name you entered in on the D/T-*AUTO specification is alphanumeric but there is an A in column 39.

Auto report assumes a blank is in column 39.

Enter the name of a numeric field that is to be accumulated in columns 32 through 37 and resubmit the job.

AR039 POSITIONS 7-38 NOT BLANK FOR A COLUMN HEADING. BLANKS ARE ASSUMED.

Warning error for output (O) specification.

When you specify a C in column 39, columns 7 through 38 must be blank.

Auto report assumes blanks are in columns 7 through 38 when there is a C in column 39.

Leave columns 7 through 38 blank and resubmit the job.

AR040 INVALID ENTRY IN POSITION 39. BLANK IS ASSUMED.

Warning error for output (O) specification.

The entry in column 39 is invalid. The error occurs because:

1. Column 39 contains B but there is not a field name.
2. Column 39 does not contain A, B, C, 1 through 9, R, or blank on the D/T-*AUTO field description.

Auto report assumes a blank is in column 39.

Enter a valid entry in column 39 and resubmit the job.

† **AR041 COLUMN HEADING, C IN POSITION 39, SPECIFIED BUT LITERAL NOT PRESENT. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

When you specify a C in column 39, columns 45 through 70 must contain a column heading.

Auto report ignores the specification.

Enter a column heading in columns 45 through 70 and resubmit the job.

AR042 EDIT CODE AND EDIT WORD ARE BOTH SPECIFIED. EDIT WORD IS DROPPED.

Warning error for output (O) specification.

You cannot use an edit code in column 38 and an edit word in columns 45 through 70.

Auto report assumes blanks are in columns 45 through 70.

Leave columns 45 through 70 blank when you specify an edit code and resubmit the job.

AR043 EDITING SPECIFIED FOR AN ALPHANUMERIC FIELD ASSUME BLANKS IN POSITIONS 38 AND 45-70.

Warning error for output (O) specification.

You must leave columns 38 and 45 through 70 blank for alphanumeric fields.

Auto report assumes blanks are in columns 38 and 45 through 70.

Correct the error and resubmit the job.

AR044 INVALID ENTRY IN POSITION 16. BLANK IS ASSUMED.

Warning error for output (O) specification.

Column 16 does not contain F or blank.

Auto report assumes a blank is in column 16.

Enter a valid entry in column 16 and resubmit the job.

† **AR045 AND/OR SPECIFICATION OUT OF SEQUENCE. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

The AND or OR entries in columns 14 through 16 do not follow a D/T-*AUTO output file identification.

Auto report drops the specification.

Ensure that the output file identification entries in columns 15 through 31 precede any AND or OR lines and resubmit the job.

† **AR046 MULTIPLE D/T-*AUTO LINES SPECIFIED IN THE PROGRAM. DROP ALL SPECIFICATIONS TO NEXT RECORD TYPE.**

Warning error for output (O) specification.

You cannot use D-*AUTO and T-*AUTO specifications in the same program.

Auto report drops all specifications to the next record type.

Use either D-*AUTO or T-*AUTO specifications and resubmit the job.

† **AR047 COLUMN HEADING SPECIFICATION OUT OF ORDER. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

A field description with a C in column 39 must follow a field description with a C, B, A, or blank in column 39.

Auto report ignores the specification.

Place the column heading specification (C in column 39) in the correct order and resubmit the job.

AR048 END POSITION INVALID FOR THIS SPECIFICATION. ASSUME BLANKS IN POSITIONS 40-43.

Warning error for output (O) specification.

You cannot specify an end position if there is a C, R, or 1 through 9 in column 39.

Auto report assumes blanks are in columns 40 through 43.

Leave columns 40 through 43 blank and resubmit the job.

AR049 SPECIFIED END POSITION IS LESS THAN FIELD OR LITERAL LENGTH. ASSUME BLANKS IN POSITIONS 40-43.

Warning error for output (O) specification.

The end position you specify in columns 40 through 43 must be at least as large as the field, column heading, or heading.

Auto report assumes blanks are in columns 40 through 43.

Enter a valid numeric entry in columns 40 through 43 and resubmit the job.

† **AR050 MORE THAN THREE COLUMN HEADING LINES SPECIFIED. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

You can only use two consecutive specifications with a C in column 39.

Auto report ignores the specification.

Remove the incorrect column heading specification (C in column 39) and resubmit the job.

AR051 NO VALID TOTALING FIELD SPECIFIED.

Warning error for output (O) specification.

Column 39 on a D/T-*AUTO specification does not contain an A. Because of this, no automatic totaling is done and no total lines are generated.

Auto report drops the total line entries 1 through 9 or R in column 39.

Enter an A in column 39 when you want automatic totaling and then resubmit the job.

† **AR052 1-9, R IS INVALID IN POSITION 39. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

Column 39 contains 1 through 9 but you did not specify the associated level indicator L1 through L9 in columns 59 and 60 of the input specification. Or, the lowest level indicator you used on a T-*AUTO specification is of greater or equal level to the associated level indicator L1 through L9 in columns 59 and 60 of the input specifications.

Auto report ignores the specification.

If you specified a 2 in column 39, then you must specify L2 as a level indicator on the input specifications. If this is a T-*AUTO specification, the lowest level indicator you can use is L1. Make the necessary entries and resubmit the job.

AR053 INDICATORS NOT ALLOWED ON THIS SPECIFICATION TYPE. BLANKS ARE ASSUMED IN POSITIONS 23-31.

Warning error for output (O) specification.

You cannot use indicators on:

1. Field descriptions that follow an H-*AUTO specification.
2. Field descriptions with 1 through 9 or R in column 39 that follow a D/T-*AUTO specification.

Auto report assumes blanks are in columns 23 through 31.

Leave columns 23 through 31 blank and resubmit the job.

AR054 SPECIFIED END POSITION CAUSES OVERLAYING OF FIELDS OR LITERALS. BLANKS ARE ASSUMED IN POSITIONS 40-43.

Warning error for output (O) specification.

The end position you specified is less than the length of the line up to this specification plus the length of the field, column heading, or heading. An end position is automatically generated if you leave columns 40 through 43 blank.

Auto report assumes blanks are in columns 40 through 43.

Make the corrections and resubmit the job.

*** AR055 I/O ERROR OCCURRED. PROGRAM IS TERMINATED.**

Terminal error.

An input/output error has occurred. Additional information is printed along with the error that describes the problem:

1. Permanent disk error
2. Not enough tracks are allocated for work file
3. Not enough tracks are allocated for source file

Auto report terminates the job.

Increase the size of the work file and resubmit the job.

† AR056 LIBRARY SOURCE MEMBER NAME IS INVALID. ENTRY IS DROPPED.

Warning error for the auto report options (U) specification or the /COPY statement.

A /COPY statement cannot have a U or H in column 6 of the specifications form. The auto report options specifications form must have a U in column 6. The error occurs because:

1. F1 or LFD name is missing.
2. There is not a comma between the LFD name and module name.
3. The LFD name or module name exceeds 8 characters.

4. The LFD name or module name is missing, does not exist in the library file, or is incorrectly specified.

5. The LFD name or module name contains an embedded blank.

Auto report drops the entry.

Identify and correct the error and resubmit the job.

† **AR057 TOTALING SPECIFIED MORE THAN ONCE FOR THIS FIELD NAME. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

You can specify totaling (A in column 39) for any particular field name only once in each program.

Auto report drops the specification.

Enter A in column 39 only once for each field name and resubmit the job.

† **AR058 MAXIMUM NUMBER OF H-*AUTO LINES EXCEEDED. DROP ALL SPECIFICATIONS TO THE NEXT RECORD TYPE.**

Warning error for output (O) specification.

You cannot specify more than five H-*AUTO specifications.

Auto report drops all H-*AUTO specifications after the first five.

Ensure that there are no more than five H-*AUTO specifications and resubmit the job.

AR059 INVALID ENTRY IN POSITION 7 OF U SPECIFICATION. BLANK IS ASSUMED.

Warning error for auto report options (U) specification.

You must use C or blank in column 7.

Auto report assumes a blank is in column 7.

Use C or blank in column 7 and resubmit the job.

AR060 FILE NAME IN POSITIONS 8-24 IS NOT BLANK. BLANKS ARE ASSUMED.

Warning error for auto report options specification.

You must leave columns 8 through 24 blank if column 7 is blank. If column 7 contains a C, then:

1. Columns 8 through 24 must contain F1 or LFD name followed by a comma and module name.

2. The name must be from one to eight characters long.

3. The first character of the name must be alphabetic.

Auto report assumes blanks are in columns 8 through 24.

Make the proper entries and resubmit the job.

AR061 INVALID ENTRY IN DATE SUPPRESS, POSITION 27. BLANK IS ASSUMED.

Warning error for auto report options (U) specification.

You must use N or blank in column 27.

Auto report assumes a blank is in column 27.

Use N or blank in column 27 and resubmit the job.

AR062 INVALID ENTRY IN ASTERISK SUPPRESS, POSITION 28. BLANK IS ASSUMED.

Warning error for auto report options (U) specification.

You must use N or blank in column 28.

Auto report assumes a blank is in column 28.

Use N or blank in column 28 and resubmit the job.

† **AR063 AND/OR SPECIFICATION IS INVALID. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

The AND or OR entry is invalid. The error occurs because:

1. The output file identification does not contain indicators that condition the line.
2. The AND or OR entry does not have indicators.

   You can use AND or OR entries with *AUTO output indicators when you enter an output indicator on the first output file identification.

Auto report ignores the specification.

Make the proper entries and resubmit the job.

AR064 D/T-*AUTO LINE OVERFLOW WILL OCCUR WITH GENERATION OF ASTERISK INDICATION. ALL ASTERISKS ARE SUPPRESSED.

Warning error for output (O) specification.

One or more asterisks cause an overflow line at the printer record length you defined.

Auto report suppresses all asterisks.

Enter an N in column 28 of the auto report options (U) specification to suppress asterisk indication then resubmit the job.

† **AR066 MORE THAN 20 AND/OR LINES CONDITION AN *AUTO LINE. THIS AND ALL FOLLOWING AND/OR SPECIFICATIONS ARE DROPPED.**

Warning error for output (O) specification.

You cannot use more than 20 AND or OR entries.

Auto report ignores the excessive AND or OR specifications.

Remove all excessive AND or OR lines.

† **AR068 NUMBER OF FILE DESCRIPTION SPECIFICATIONS EXCEEDS THE MAXIMUM ALLOWED. SPECIFICATION IS DROPPED.**

Warning error for file description (F) specification.

You cannot use more than 20 file description specifications.

→ You have exceeded the internal limit (110) for file description specifications.

Auto report ignores the excessive specifications.

Remove all excessive file description specifications and resubmit the job.

† **AR071 INVALID OUTPUT RECORD TYPE IN POSITION 15. SPECIFICATION IS DROPPED.**

Warning error for output (O) specification.

You must enter H, D, T, or E in column 15.

Auto report ignores the specification.

Enter a valid entry in column 15 and resubmit the job.

AR072 PAGE FIELD NOT AVAILABLE FOR USE IN PAGE HEADING. NO PAGE NUMBERING WILL OCCUR.

Warning error for output (O) specification.

For page numbering, auto report uses one of the unused page fields (PAGE, PAGE1 - PAGE7). No page numbering occurs if all these page fields have been used. The format of the page heading line may not be correct.

No page numbering occurs.

Ensure that one of the page fields is available and resubmit the job.

*** AR073 ATTEMPT TO PUT SOURCE MODULE IN THE FILE FAILED. FILE NOT WRITTEN.**

Warning error.

This error occurs because:

1. The library file is full.
2. There is an invalid operation (such as the library file not being allocated).

Auto report does not catalog the program.

Correct the error and resubmit the job.

AR074 DUPLICATE FILE SOURCE MODULE NAME WAS FOUND IN THE FILE. PREVIOUS MODULE WAS REPLACED.

Warning error.

The module name you specified is the same as a name that is already in the library file.

This program replaces the old module.

Use a unique name or delete the old module before you catalog the new module.

AR075 ENTRIES IN COLUMNS 25, 26, 29, AND/OR 31–74 ARE NOT BLANK. ASSUME BLANK.

Warning error for auto report options (U) specification.

You must leave columns 25, 26, 29, and 31 through 74 blank.

Auto report assumes blanks are in columns 25, 26, 29, and 31 through 74.

Leave columns 25, 26, 29, and 31 through 74 blank and resubmit the job.

† AR076 TOTALING CONSTANT END POSITION > RECORD LENGTH. ALL T-TYPE CONSTANTS IGNORED.

Warning error for output (O) specification.

This error occurs because:

1. The length of the total line constants (1 through 9 or R) is greater than the length of the record.
2. The beginning position of the first A-type field is greater than the length of the record.

Auto report drops all total line constants (1 through 9 or R).

Correct the error and resubmit the job.

† **AR077 LEVEL INDICATOR USED ON T-*AUTO LINE IS UNDEFINED. INDICATOR IS DROPPED.**

Warning error for output (O) specification.

You must define the control level indicator you used on the T-*AUTO specification in columns 59 and 60 of the input specifications.

→ Auto report assumes blanks in these fields.

Enter a control level indicator in columns 59 and 60 of the input specifications and resubmit the job.

AR079 D-*AUTO IS CONDITIONED BY MORE THAN 7 AND/OR LINES. ONLY THE FIRST 7 WILL APPLY.

Warning error for calculation (C) specification.

The indicators that condition the line generated by D-*AUTO are used to condition the generated EXSR calculation used for total rolling.

Auto report processed only the first seven lines of AND or OR conditioning indicators in the calculations.

Remove the excessive AND or OR entries and resubmit the job.

AR080 INVALID ENTRY IN LISTING OPTION, POSITION 30. BLANK IS ASSUMED.

Warning error for auto report options (U) specification.

You must use B, P, or blank in column 30.

Auto report assumes a blank is in column 30.

Use B, P, or blank in column 30 and resubmit the job.

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