Report Program Generator II (RPG II)

SPERRY UNIVAC

UP-8818

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what is RPG II?

All computers are directed by some system of instructions; these instructions are called programming languages. Many languages were developed to handle various data processing needs. RPG II, which stands for Report Program Generator II, is a programming language oriented toward business data processing applications. You can use RPG II in almost every business situation.

what RPG II can do for you

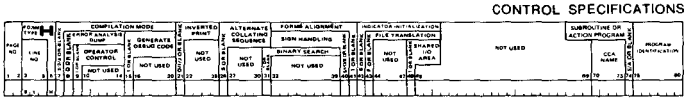
Originally, RPG II was used to produce business reports, but soon RPG II programs were written to control inventories, process payrolls, provide accounting and billing facilities, develop sales and marketing analyses, and so on. In fact, RPG II is now applied to almost every business need. It is the most widely used language for small computer users.

structure

The RPG II programs you write may consist of up to eight types of specifications forms that:

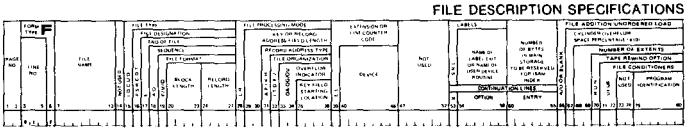
1. provide special information about your program and your system (control specifications form);

CONTROL SPECIFICATIONS



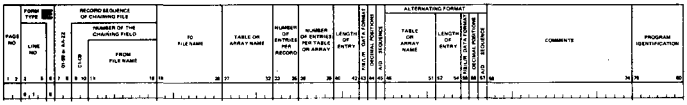
2. describe files used or created by your program (file description specifications form);

FILE DESCRIPTION SPECIFICATIONS



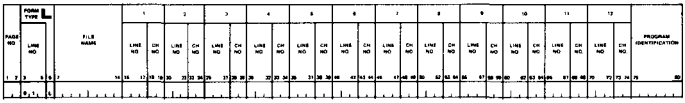
3. provide information about tables, element arrangement, record retrieval, and record files (file extension specifications form);

FILE EXTENSION SPECIFICATIONS



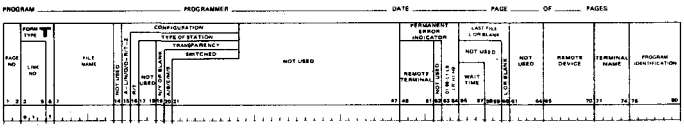
4. provide information about printer files for your reports (line counter specifications form);

LINE COUNTER SPECIFICATIONS

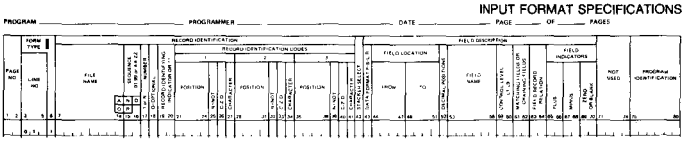


5. provide information to send or receive data from a remote terminal (telecommunications specifications form);

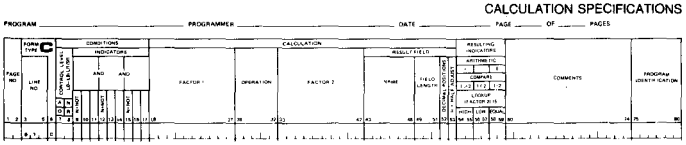
TELECOMMUNICATIONS SPECIFICATIONS



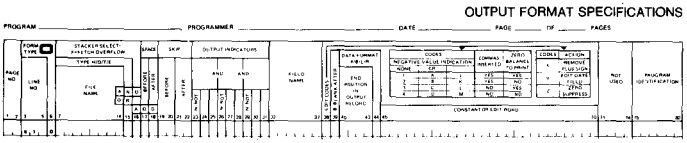
6. describe your input files (input format specifications form);



7. describe the calculations you want performed (calculation specifications form); and



8. describe how your data is to appear on your output files and the layout of your printed reports (output format specifications form).



For a simple program, you need to use only four of the eight specifications forms:

1. Control specifications

2. File description specifications

3. Input format specifications

4. Output format specifications

You use the other specifications forms only when needed for your program. You write your programs by making entries in specific positions on these specifications forms.

how to use RPG II

The RPG II program you write is called a *source program*; it consists of the specifications needed for your particular business-oriented problem. You enter your source program into the computer either from an interactive terminal called a workstation *(interactive processing)* or by diskette or keypunched cards *(batch processing)*. In either case, you also enter *job control statements* that tell the computer exactly how you want your RPG II programs executed and what resources are needed (tapes, disks, etc).

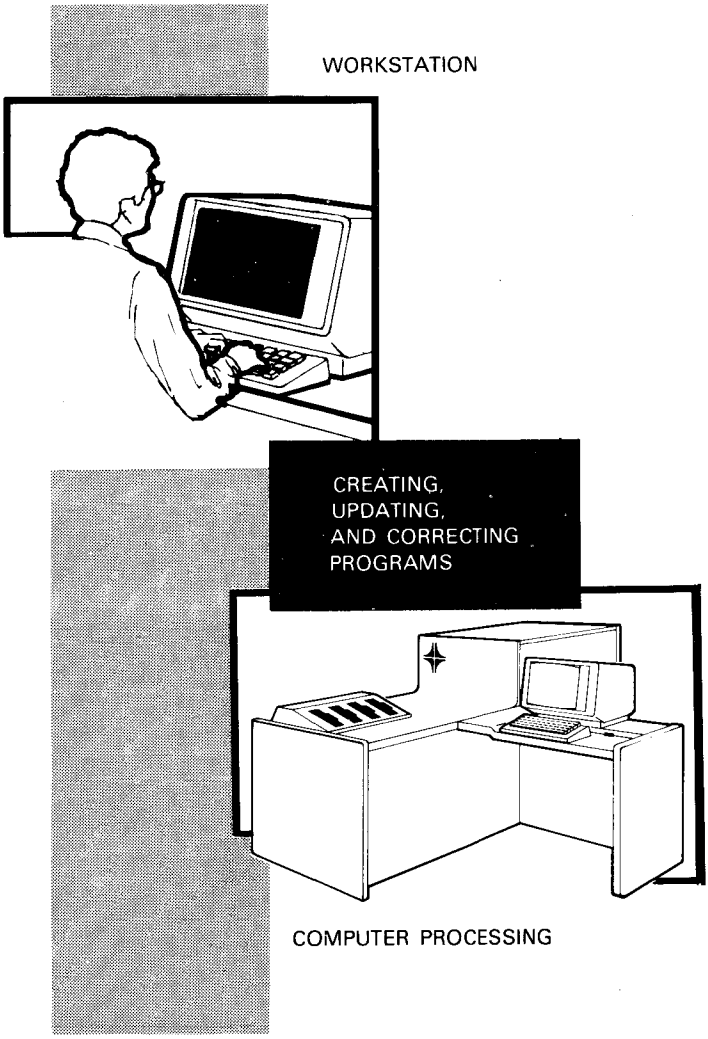
interactive processing

Traditionally, RPG II programs are written on specifications forms and then keypunched. The interactive facility allows you to create and update programs without using coding forms or punched cards.

If you decide to enter your program interactively, you use the keyboard at a workstation to enter your RPG II and job control statements. The workstation is the primary input device; it simplifies coding.

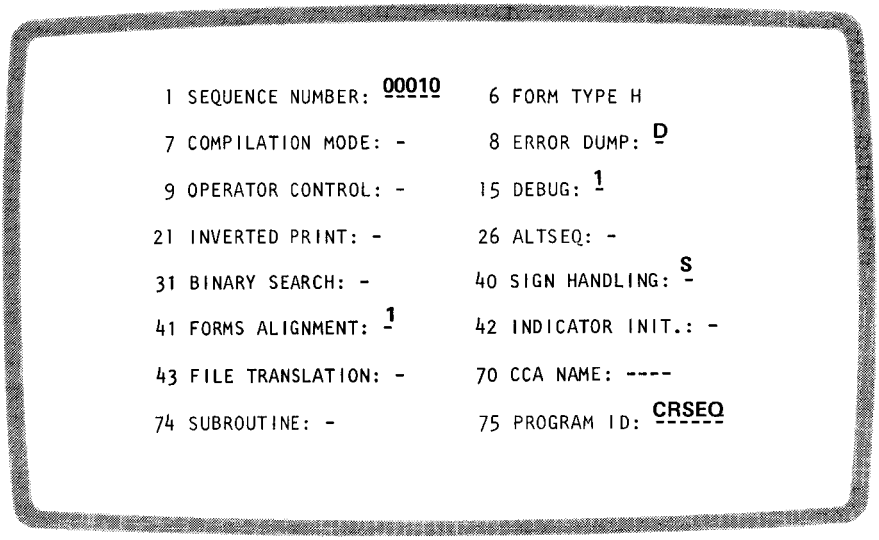
Using screen formats that correspond to the RPG II specifications forms, you write your RPG II programs by inserting information in blanks in the format. What you enter is displayed on the workstation screen. There are three types of screen formats; each is geared for a different level of programming experience.

INTERACTIVE PROCESSING



1. Formatted Display

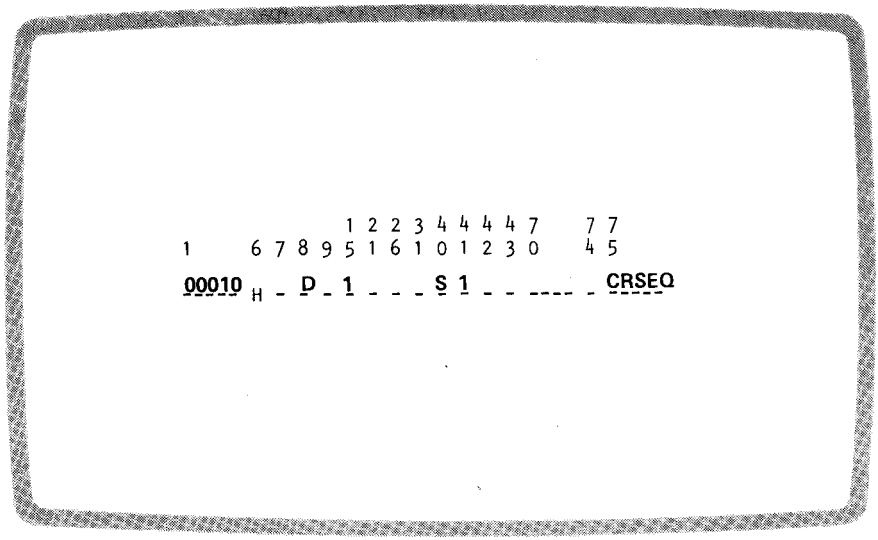
If you are a new or less experienced RPG II programmer, you use the formatted display. Each field is displayed by its name and column number and the length of each field is depicted by underlines. You enter data in the blanks and tab to the next field you want. The following example shows sample entries on a control specifications form with a formatted display:



2. Positional Display

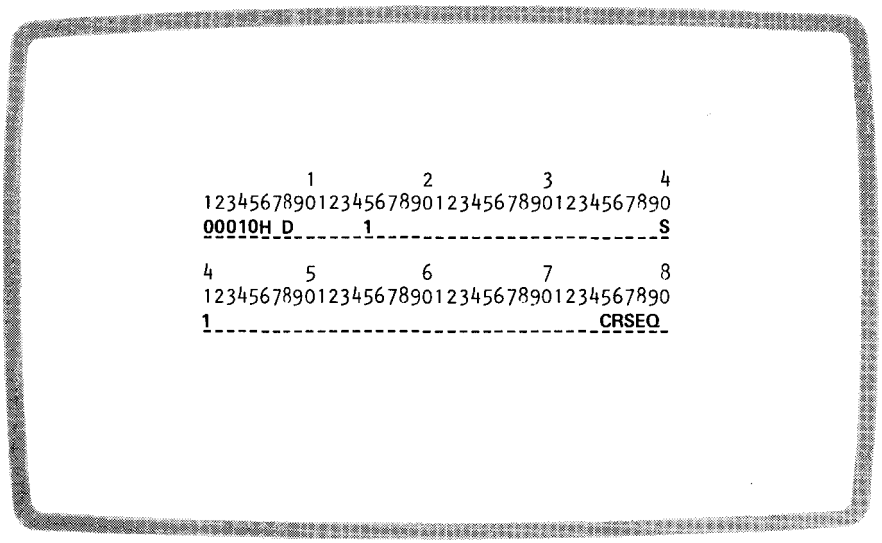
If you are an experienced RPG II programmer, you can use the positional display. Each field is defined only by a column

number and the length of each field is depicted by blanks. You enter data in the blanks and tab to the next field you want. The following example shows sample entries on a control specifications form with a positional display:



3. Free Form Display

You use the free form display to enter tables and comments, although an experienced programmer can also enter or update specifications. Numbers, increasing in increments of 10, define where you enter your data. You fill in the characters you want and space to the next entry. The following example shows sample entries on a free form display:

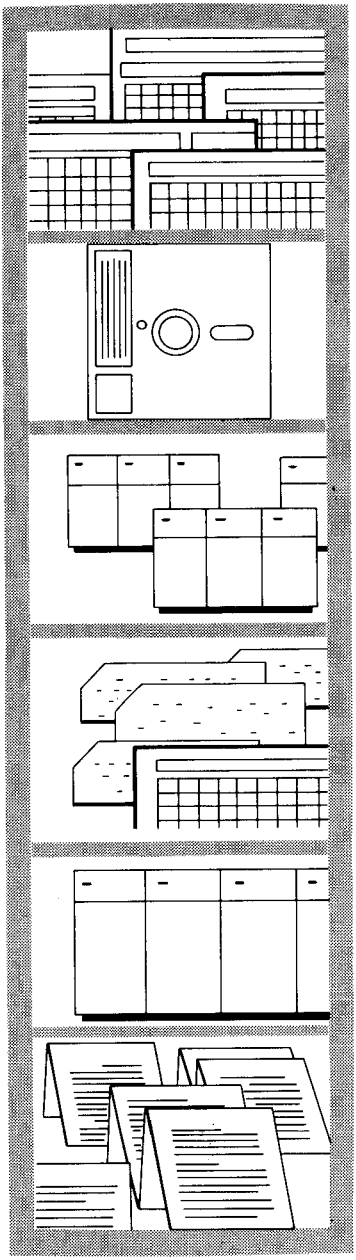


Using the screen formats, you create or update programs at the workstation. A succession of messages on the screen prompts you in the entry of RPG II statements. When you make the right response, another prompting message is displayed. If you make an error, an error message appears so that you can correct it on the spot. You must enter all RPG II statements in the correct sequence or errors result. You can also use the workstation to insert, add, replace, change, display, resequence, rename, and delete data in an existing RPG II program.

batch processing

If you decide to use batch processing, you fill in blanks on the RPG II specifications coding forms needed for your job. Then, you enter your source program and job control language by diskette or punched cards. If you make any typographical or formatting errors, you can't correct them until after your program is compiled. After all the errors are corrected, you can execute your program. Batch processing is not as simple and efficient as interactive processing.

BATCH PROCESSING



CODING

DISKETTE

COMPUTER
PROCESSING

CORRECTING
ERRORS

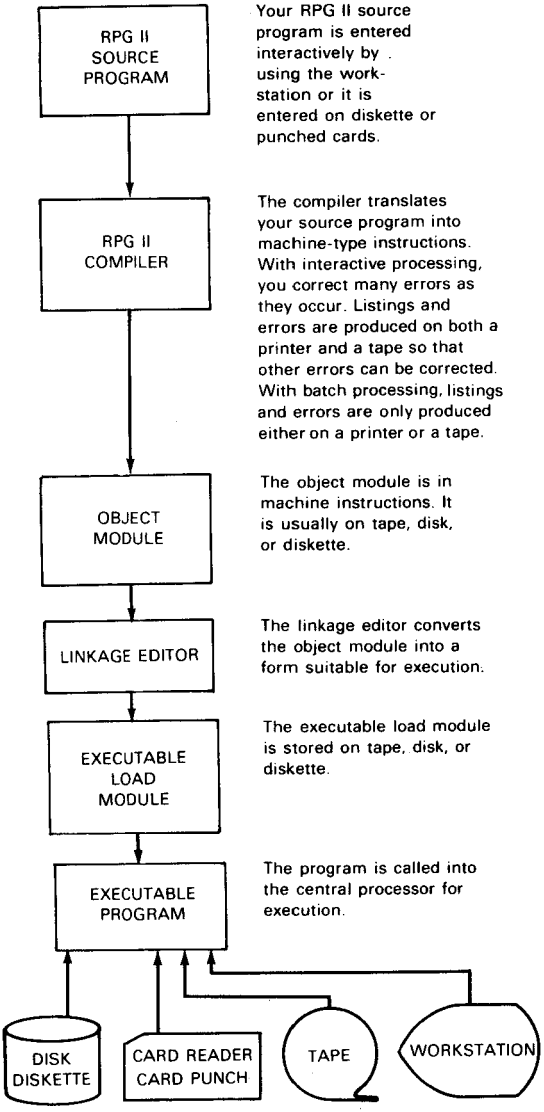
COMPUTER
PROCESSING

OUTPUT
LISTING

generation of an RPG II program

Regardless of whether you use interactive or batch processing, the source program must be translated into machine instructions understood by the computer. This translation is done by the RPG II *compiler* supplied by Sperry Univac, which analyzes the source program and produces an *object module*. The object module is functionally equivalent to the source program, except that it is in machine instructions rather than RPG II specifications. You link-edit the object module using a system utility called the *linkage editor*. The resulting *load module* is now ready for execution.

GENERATION OF AN RPG II PROGRAM



When it is executed, the program may use a variety of input/output devices.

advantages

Why is RPG II so popular? Because of the following advantages:

TRAINING

Training time is low for new programming personnel because RPG II is easy to learn. The compiler is powerful and the coding is simple. It has processing power without requiring the complex programming effort that many other languages require. The interactive facility aids you in program development by providing screen formats and prompting messages.

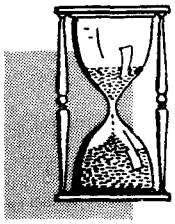
PROGRAMMING

Programming time is short because you fill in the blanks to write your programs. You select only the data processing capabilities you need and discard the others to create an efficient, powerful program that is tailored to your needs. It is like answering questions about your job. With the interactive facility, you can choose the screen display best suited for your level of experience.

DEBUGGING

Programs are easy to debug (that is, test and correct) because the interactive facility allows you to correct errors as soon as you make them. You can also enter your data on diskette or punched cards, store it, then correct any errors using the interactive facility. With both batch and interactive processing, there is a printed listing of the source statements, an error diagnostics listing, and a main storage assignment map.

In all these situations, saving time is your most important advantage. This profit in time does not cease when you outgrow your present equipment because RPG II has upward compatibility with future purchases of SPERRY UNIVAC computer systems.



TIME

programming aids

SPERRY UNIVAC RPG II provides many aids to make programming easier. With both batch and interactive processing, you can direct the compiler to produce the following listings to reduce your efforts when writing and correcting RPG II programs:

- A *source code listing* shows the program as it is compiled.
- A *diagnostic error listing* provides a detailed account of the errors the compiler encounters.
- An *external references listing* shows the data referenced in separately compiled subroutines.
- A *main storage assignment map* shows the layout of main storage.

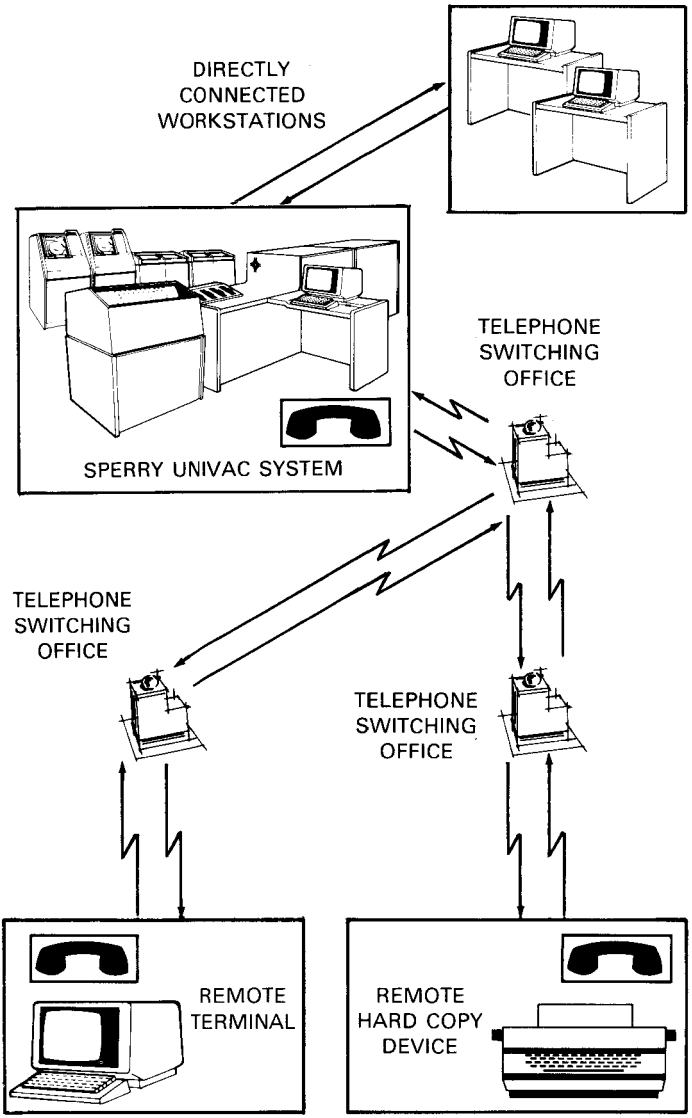
With the interactive facility, you actually see your input displayed at the workstation. Consequently, it's much easier to detect and correct typographical and formatting errors as they are made. Error messages are displayed on the workstation screen so that you can correct your errors immediately after they are keyed in. Compared to the long and more involved batch procedure, the interactive facility saves you time and gives you a more efficient method of correcting RPG II programs.

workstation and terminal support

You use workstations as the main input device for RPG II programming. Workstations make creating and updating programs a simple process. In addition to workstations, you can use remote terminals as input/output devices to send or receive data. You specify which files in your program are data communications files, how the files are processed, and the type of remote terminal.

RPG II workstation and terminal support is powerful, easy to use, and efficient in main storage usage. You can picture the advantages of workstation and terminal support to you and your business - especially when the programming effort is as easy as it is with RPG II.

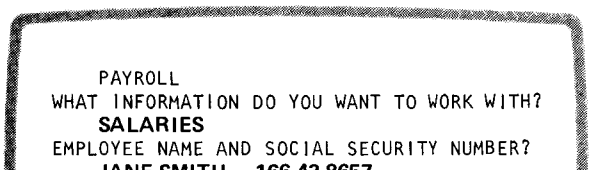
RPG II WORKSTATION AND TERMINAL SUPPORT



IMS action programs

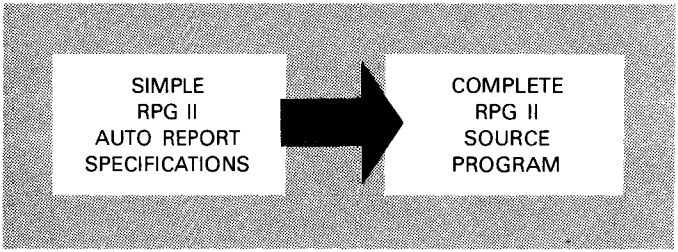
You can use SPERRY UNIVAC Information Management System (IMS) action programs when updating files or getting information from files. IMS action programs allow you to use a question-and-answer dialog at a workstation or remote terminal to obtain the data you need. You either write the action program dialogs yourself using RPG II or use the action programs supplied by Sperry Univac. IMS action programs help you to access the information you need.

If you want to access your files, you enter the action program you want, such as PAYROLL, and the questions from that action program appear on the screen. To update an employee file, for example, you simply provide the answers:



auto report function

The auto report function makes RPG II programming even simpler. It allows you to use simple statements, along with standard RPG II specifications forms, to generate a complete program. An inexperienced programmer can quickly learn how to write reports because auto report gives you a simple way to code page headings, code output specifications, and copy statements stored on a disk pack into your source program. This reduces the time it takes to write a program because you do not need to plan report formats or code the same information several times for different reports. Because auto report makes it easier for you to write RPG II programs, there is less chance of making an error.



summary

SPERRY UNIVAC RPG II programming language is designed to meet the businessman's everyday data processing needs. Programming in RPG II is easy because it is like filling out a series of questionnaires; you don't need to write lengthy statements. You save considerable time in training, programming, and debugging. The interactive facility greatly simplifies the process of creating and updating programs. These qualities have made RPG II the most widely used language for business data processing.