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IRSENDF-6

Information Retrieval System for ENDF-6 Format Libraries

Summary Documentation

by

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Abstract: IRSENDF-6 is a PC code that will process any library in the ENDF-6 format and display information such as: Mat, MF, MT and the corresponding number of records for this information. This library is available on diskette, free of charge, from the IAEA Nuclear Data Section.

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IAEA-NDS-reports are updated whenever there is additional information of relevance to the users of the data library.

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IRSENDF-6

Version 1.0 for Windows

Information Retrieval System for ENDF-6 Format Libraries

by

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Abstract : This report presents a data information retrieval system for ENDF-6 (Evaluated Nuclear Data File) format libraries, which can be run on PC computers under the Windows™ environment. The input is the filename of an ENDF-6 data. The system will process this file and generate two others. One contains a list of materials with the corresponding nuclides, laboratory, author and date of evaluation; the other provides information about the MF and MT numbers for each material, expressed by the number of records. This interactive and easy-to-handle system is of interest to nuclear and reactor physics researchers.

1. INTRODUCTION

The Nuclear Data Center (CDN) of the “Instituto de Estudos Avançados” (IEAv) has as a priority mission to provide data and nuclear parameters to universities and researchers institutions in Brazil.

In order to accomplish this mission, one of the CDN’s task is to elaborate catalogues with information about available libraries [1][2][3]. These catalogues are distributed to institutions and universities of the country and the interested user can request data in magnetic tape, floppy disk or graphics.

Among the most utilized nuclear data libraries, there are those in ENDF-6 format (Evaluated Nuclear Data File) [4] and this is the reason why these libraries deserve a special treatment, e.g. the development of a special, user friendly, easy information retrieval database management system.

Before the creation of the system above, a data index system for libraries in ENDF-6 format was created. This “index generator” [5] gets information from the database and writes a report. There is also a VAX version of this system (VAX-C language) [6]. The necessity of this new version became from the contact with others nuclear data centers, which solicited mainframe versions (IBM and VAX) for the existing system.

The successful and spread of use of the Windows™ environment made us think about the possibilities to develop a new indexing system, for data in ENDF-6 format, similar to the previous one, but this time integrated in the Windows™ environment. In the following sections we describe this system.

2. DESCRIPTION OF THE DEVELOPED SYSTEM

Similar to the old system, the present version provide information about the contents of a file in ENDF-6 format, it generates an index of nuclides and a report with information about the amount of data, in number of records, for each reaction of each nuclide.

The system was created following the Windows architecture, where the procedures options and available functions of the system are localized in a menu bar, at the top of the window.

The system is easily handled either using the mouse or the keyboard, through shortcut key (ALT key + underlined letter). The user does not need to input data, and all options are clear to the user, so errors are avoided.

The system creates two files, which can be seen on the screen or printed on paper.

In order to execute the system, it is necessary that the files “DEFNTION.MF” and “DEFNTION.MT”, which contains the definitions of the MF and MT numbers, respectively, must be in the same directory of the application (the executable program INDEX.EXE). The file VBRUN300.DLL and the software Windows™ are needed to run the system.

The principal window of the system, as may be seen in Fig. 1, provides all options available in the system, and they can be accessed through the keyboard using shortcut key, or mouse.

The options are:

- **File** (Alt+F), include the options to process the database file and to exit the system (return to Windows);
- **Option** (Alt+O), include the options to display on the screen and to print the indexes created;
- **Help** (Alt+H), give general instruction and information about the system.

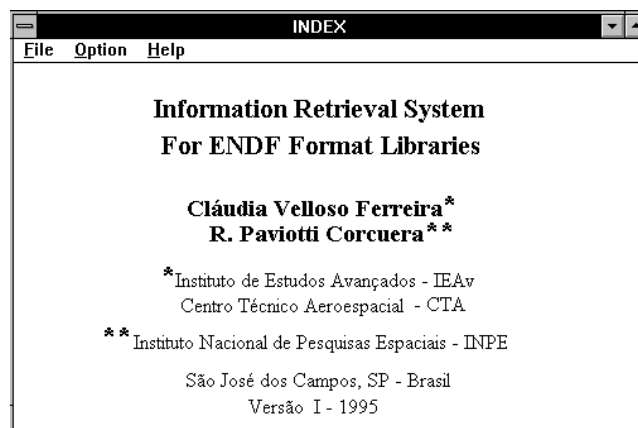


Fig. 1 Principal window, system introduction

3. PROCESSING AN ENDF-6 LIBRARY

The option **Open**, in the **File** menu option, permit to open and process the database file (Fig. 2). There is no restriction on the name of the file containing the ENDF-6 format data, except that the extension should be “.NDF”, and the filename must be a valid one to the operating system.

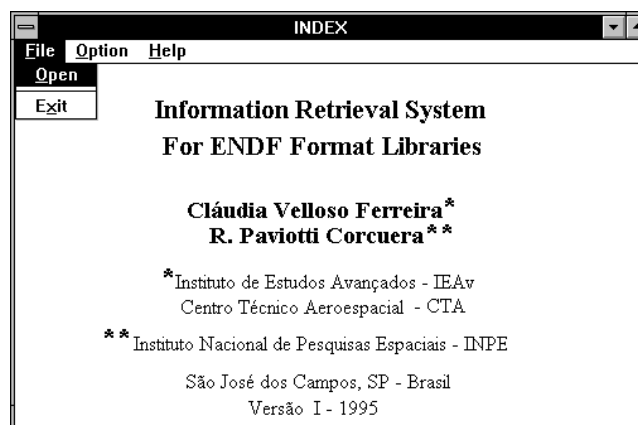


Figure 2. Chosen the database to be processed

Once selected the option **Open**, it will permit the user to search for “*.NDF” type files, through drivers and/or directories selection, or even to go to another point in a network (Fig. 3). The system will only open files with extension “NDF”, and it is suppose that they are in the correct ENDF-6 format. If for some reason the format is not correct, errors will occur during the execution and the reports will be incorrectly generated.

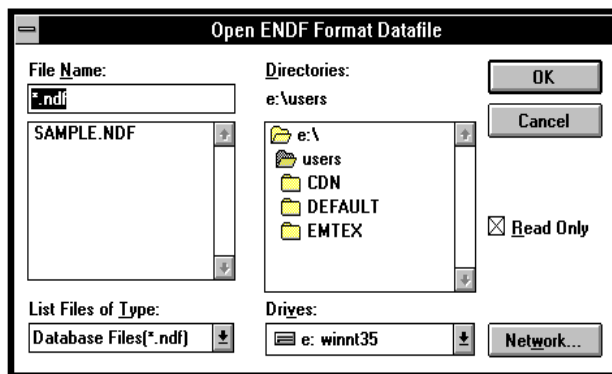


Figure 3. Opening of an ENDF-6 database

At this stage, the user can cancel the job (Cancel button), this will take him to the previous window. If the user proceeds (OK button) the system will process the chosen file and generate two others. The first one, with the extension “.MAT”, contains a list of materials in the database, with the corresponding nuclides, MAT numbers, laboratory, author and date of evaluation; the other, with extension “.MFT”, provides information about the MF and MT numbers for each material, expressed by the number of records. Both files have the same name of the processed ENDF-6 file (*.NDF).

Information about the processed database will be displayed on the screen at the end of the job execution (Fig.4).

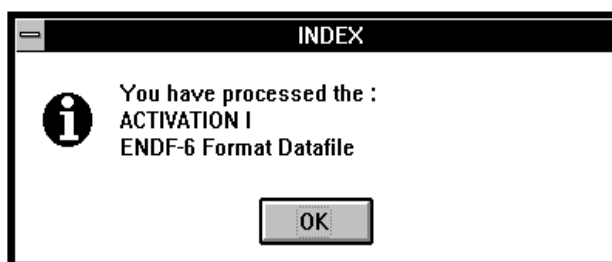


Figure 4. Information about the processed database

4. DISPLAYING AND PRINTING THE INFORMATIONS

The system has two options to verify the results. The first one, exhibit on the screen, in a proper window, the generated reports and the other, allow the reports to be printed.

In order to make the system easier to be used, the functions to display or print the reports either for the “*.MAT” type files or for the “*.MFT” type files, are shown separately. For this purpose two subroutines were written, one to display “*.MAT” files and the other to display “*.MFT” files. Both procedures work in the same way, the only difference is the window to open the file, where the type of the file to be opened (*.MAT or *.MFT) is already specified.

Once selected the display option, Fig. 5, a window like Fig. 6 will appear. Pressing the “OK button” the file will be displayed in a proper window as shown in Fig. 7. Using the horizontal and vertical scroll bars, the user can visualize the whole file. The option **Print** (Fig. 5) creates a printer report of the current file.

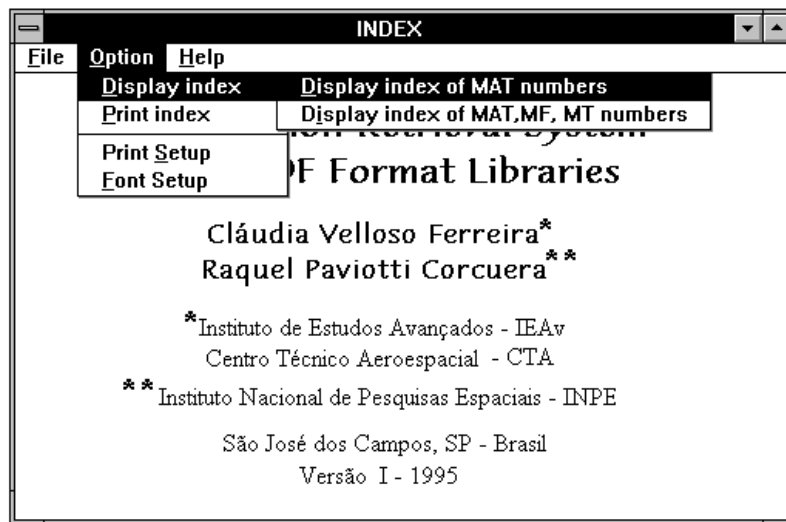


Figure 5. Option menu to display indexes

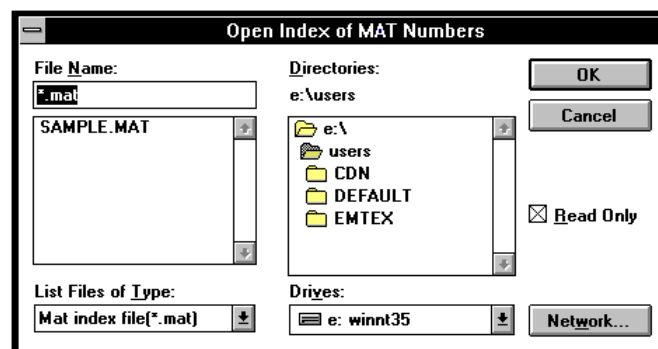


Figure 6. Opening the index to be displayed

Displaying Index

ACTIVATION I

NUCLIDE	MAT	DESCRIPTION
1-H - 2	126	LANL,HWRE EVAL-NOV67 L. STEWART (LASH) A. MORSELEY (HWRE) LA-3271 (1966) DIST-MAY90
3-LI - 7	328	LANL EVAL-AUG88 F. G. YUONG DIST-JAN90
4-BE - 9	425	LLNL EVAL-JAN86 PERKINS, PLECKERTY, ROBERTON DIST-JAN90
29-CU - 63	2925	ORNL EVAL-NOV89 HETRICK, EV, LARSON ORNL/TM-9883,EMDF-337 DIST-APR90
29-CU - 65	2931	ORNL EVAL-NOV89 HETRICK, EV, LARSON

Print Close

Figure 7. Display file window

The display procedure will not manipulate files with size greater than 32Kb. In this case, the file will be divided into blocks of 30Kb, called pages, and exhibit page by page. In this case an alert message will be displayed in the proper window as shown in Fig. 8. The time needed to execute this procedure depends on the size of the file.

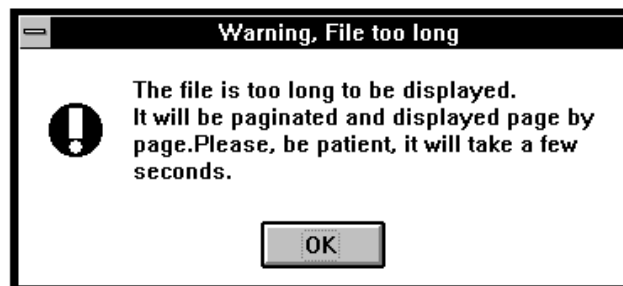


Figure 8. Alert to long file

The proper window to exhibit the file is presented. At the bottom of the window, a message showing which page is being displayed, is presented as shown in Fig. 9. Using the command buttons, the user can go to the previous page (<<) or to the next page (>>), and with the **Print** option, the current page may be printed (Fig. 9).

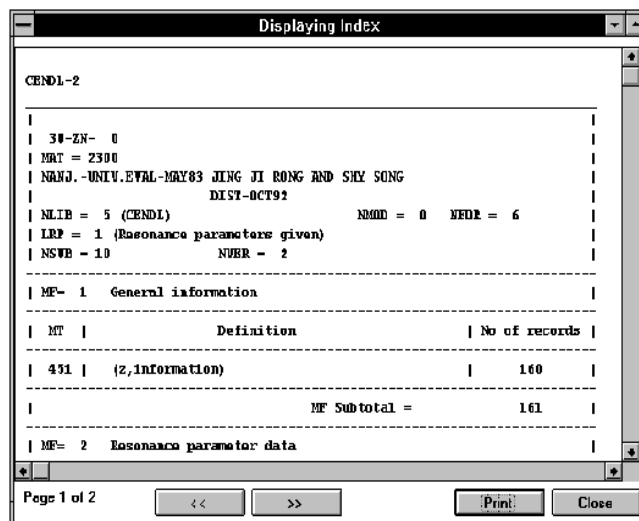


Figure 9. Window to exhibit the file page by page

The option to have a printer copy of the files, either *.MAT or *.MFT type, is shown in Fig. 10, there the function **Print Setup** allows the user to select the type of printing (Fig. 11).

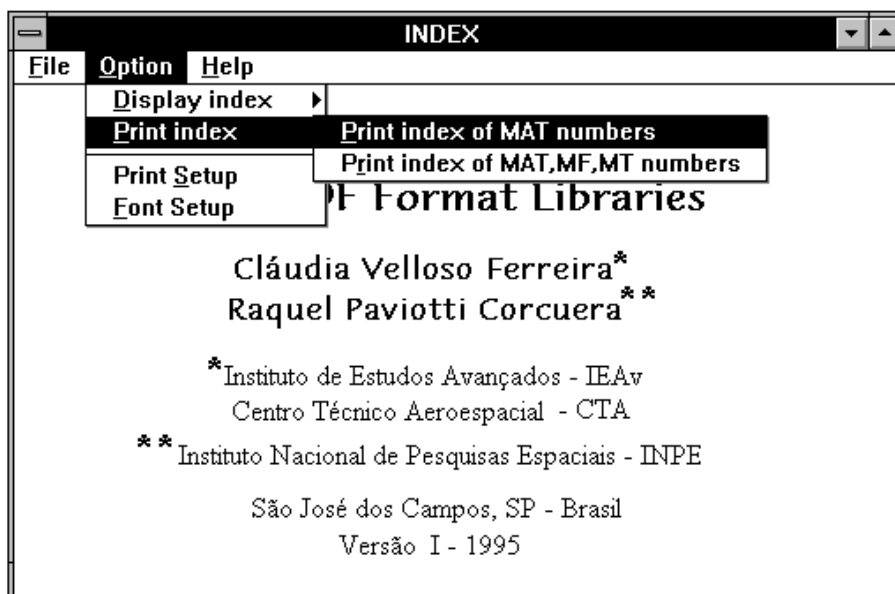


Figure 10. Options menu to print the indexes

The system allows also to choose the font size, **Font Setup**, last option of Fig. 10. This leads to the next window as shown in Fig. 12.

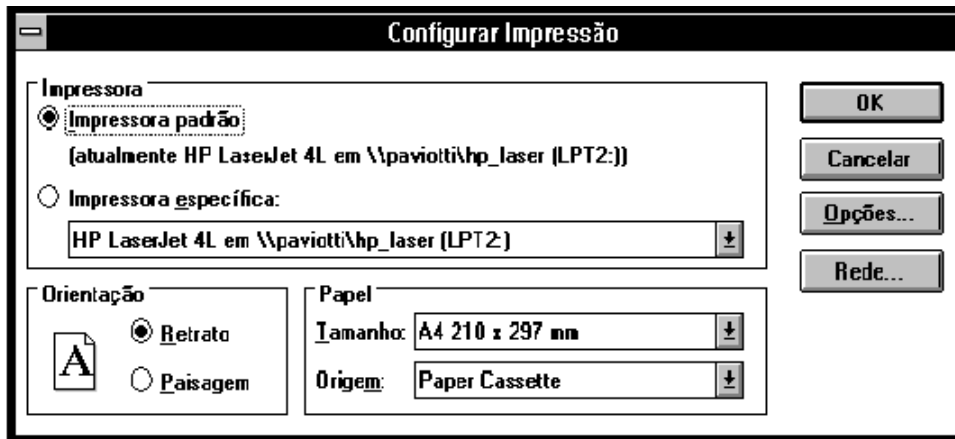


Figure 11. Printer configuration

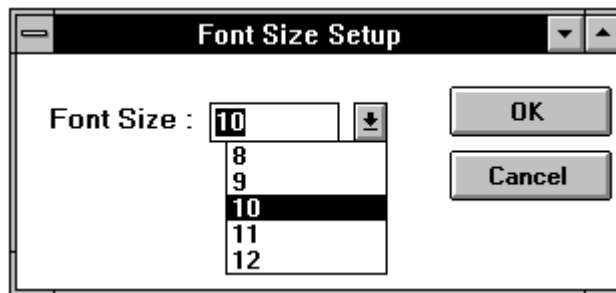


Figure 12. Font size configuration

The system uses “Courier” font as a default, with size 10, because this is a non-proportional font which generates correct reports (a non-proportional font has all the characters with the same size). Before the printing, a test is done to verify whether this font is installed and available to the selected printer. A window to select a new font will appear in case there is no available Courier font (Fig. 13). The user must take care to select a non-proportional font, otherwise, the reports will be printed incorrectly.

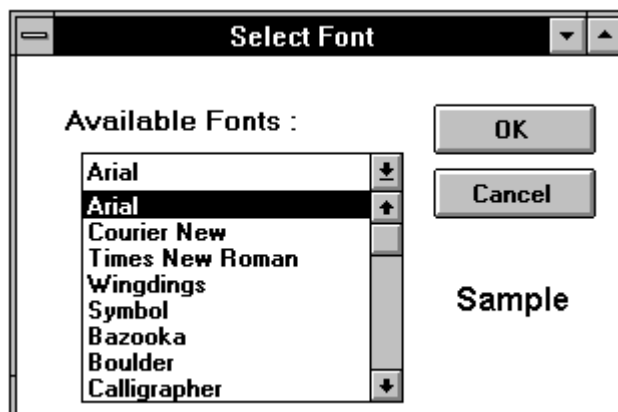


Figure 13. Font selection

5. INFORMATIONS AND USER HELP

The option **Help**, in the main window (Fig. 1), provides to the user some information about the system. This information include the system capabilities and objectives (Fig. 14), and some instructions about the reports generation procedures. In a future version a more complete help module will be incorporated, it will include details about the procedures and explanations about general errors.

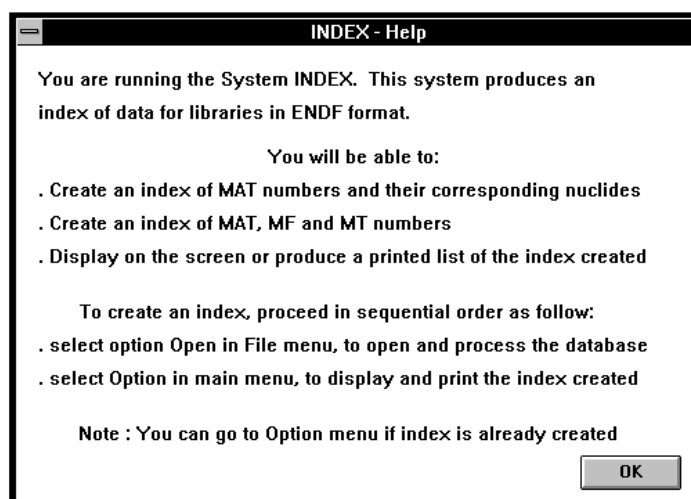


Figure 14. Help window

The function **About** gives information about the system authors and the institution.

The system was developed and tested in a microcomputer IBM-PC compatible, with DOS 6.2 as operating system and Windows 3.11. To create the application, the Visual Basic programming system was used [7][8]. The minimum platform tested was a PC-486, 40Mhz with 16Mb RAM. Due to the fact that the system should work with large databases (30Mb to 60Mb), the computer performance is very important to gain speed to obtain the results. Large differences were verified when the system was tested in a Pentium 90 Mhz.

6. COMMENTS

The system is a useful tool to obtain information about data in the ENDF-6 format, specially when the user wants to know which nuclides and reactions are in the library.

The interaction with the IEAv researchers, future users of the system, have been of great importance for the project development. They have demonstrated great interest on this system, and their suggestions are very much appreciated to improve future version of the system. There is no other similar PC database management system for ENDF-6 format data.

7. REFERENCES

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