————COMPUTER SOFTWARE REVIEWS————

T³ Scientific Word Processing System

M. NOVIČ and J. ZUPAN*

Institute of Chemistry Boris Kidrič, Ljubljana, Yugoslavia

T³ Scientific Word Processing System is designed to help the user, particularly in natural sciences of mathematics, physics, chemistry, and biology, to write reports, proposals, papers, books, etc. as easily as possible.

Besides the standard editing functions (creating, copying, revising, deleting, and printing of documents), T³ provides a number of useful features like "drawing" of structural formulas and chemical reactions, typing very complex mathematical expressions and tables, creating new fonts, using many different keyboards simultaneously, spell-checking, creating and using macro commands, and so forth.

When one is starting to use the T³ word processor, the best policy is to forget everything about editing and text processing. Many of the most commonly used features (for example, starting with a new document, inserting and deleting characters) are used differently from what an experienced user would expect. In science, and probably in other areas too, when text editors and/or word processors are used, it is assumed that many different forms of documents will be edited and that it is beneficial if the same editor or word processor can be used for all of them. However, at the beginning of the writing process, it is not necessarily clear if the document will be a letter, a paper, a chapter in a book, a program, or something else. Therefore, not allowing the user to start a new document by a default format but forcing him to copy an existing shell (no matter how many shells are at the writer's disposal) seems strange. Let us look for the sequence the user has to type in before he or she is able to start editing a new document. The user's input is in small letters and is underlined (down or up arrows and accept keys are 2, 8, and + on the numeric keypad, respectively), while the capital letters give headers of the menus that are brought up to the screen after the selection is made. The text on the right describes the action.

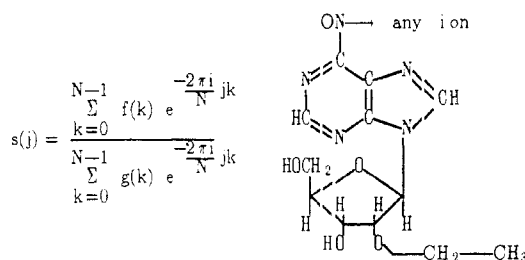|	
>t3	starting the editor, assuming the user is in the T3 directory
– – –	wait for loading
NAME:	
user	identification
– – –	wait for loading
MAIN:	
accept "DOCUMENT"	selecting "document"
SELECT DOCUMENT:	
down arrow, F9	inspecting the menu
VOLUMES:	
4 down arrows, accept	selecting "shell documents"
SELECT DOCUMENT:	
up arrow, F9	inspecting the menu
SELECT DOCUMENT:	
accept	selecting "ASCII shell"
OPERATIONS:	
down arrow, accept	selecting "copy and revise the copy" option
COPY DOCUMENT:	
review	naming the file that will have the form of the selected shell as "review"
down arrow	
workspace	copying the selected shell to the volume named workspace
accept	
– – –	wait for loading start editing

If a person is already familiar with the T³ word processor, the above procedure takes about 90 s on a PC/XT computer; however, beginners will need more time to find their way through the manuals, menus, and help messages. Even if the user does not need to consult menus, one is able to omit few of the above commands. The procedure is too lengthy to be attractive. Offering shell documents is a nice feature if it is optional, but becomes a nuisance if it is mandatory.

The T³ word processor always works in the graphics mode, which makes it slow for global (highlighted) text operations and for output on matrix printers. It seems strange that the characters can be displayed in a proportional spacing, but at the same time the justification of the text cannot be seen on the screen. To be permanently in the overwright mode, to be forced to use both the back arrow *and* the delete key in order to delete each character, to have the on-line help only for the specific feature from the menu, and so forth do not enhance the overall impression about the editor. There are, however, some user-friendly features we liked (fast moving cursor by holding down the numeric key 5, typing many characters as super- or subscript simply by hitting the PgUp or PgDn key before the super- or subscript starts, efficient changing and using of different keyboards with hundreds of different characters and signs), but all together, if not for the features that we describe next, it would not make much sense to learn to use T³ as a word processor.

The most attractive features of the T³ word processor are writing complex mathematical expressions and drawing molecular formula and chemical reactions. Figure 1 shows one example of each. As can be seen from Figure 1, the T³ text processor is very powerful in this respect. However, to master the commands and procedures for writing the complex mathematical expressions and chemical structures to such an extent that they can be input with an acceptable speed (without consulting the manuals) takes a lot of practice. With the intention to help the user, many convenient features are built into the T³ system (different keyboards, a number of predesigned key sequences, special key functions such as PgUp, PgDn, all function keys, etc.), but invoking them for consultation or activation is, at least in our opinion, organized in a rather awkward way that does not allow for quick and logical learning.

We do not object to the commands themselves or why they are designed that way; rather we object to the way they have to be evoked. For example, the "key sequence file" that is

$$s(j) = \frac{\sum\limits_{k=0}^{N-1} f(k)\, e^{\frac{-2\pi i}{N} jk}}{\sum\limits_{k=0}^{N-1} g(k)\, e^{\frac{-2\pi i}{N} jk}}$$

Figure 1. Examples of written complex mathematical expressions and drawn chemical structures within the text. Both examples were written in one line in the text, exactly as shown in the figure.

stored for a later recall under a specific name must be called from the same environment (active keyboard and active key sequence file volume) it was generated in. Suppose we need to write a mathematical formula that we know is already stored as a key sequence file. First, it is necessary to invoke the "mathematical key sequence file" environment from the main menu (shift F9, down arrow, accept, F9, accept, down arrow, accept) and then to switch the keyboard (shift F8, down arrow, accept). After the environment has been set up, the proper key sequence file name has to be typed in while the Ctrl key is held down. Once the mathematical expression (like the one shown at left in Figure 1) is included in the text and shown on the screen, the listed commands have to be repeated in order to bring the user back to its original environment. If further on a structural formula has to be drawn, the environment has to be changed again. We think that it would be much simpler to store the environment attributes together with the key sequence file and to store all files of this kind in one volume or one subdirectory. Such organization would allow, first, all key sequence files to be accessible from any environment, second, the proper environment for the correct execution of the key sequence file to be set up automatically, and, third, the original environment from which the key sequence file was called to be reinstalled immediately after the execution is completed. This will make all handling with the environment unnecessary and transparent to the user, who needs only to select the correct keyboards (shift F8 and select keyboard) for entering simple one-character symbols. For the selection of a proper key sequence file from a number of existing ones, a user-friendly directory display can be organized that would serve the user much better than memorizing the proper names of key se-

quence files and typing them while holding down the Ctrl key.

What we really like when drawing formulas within the text was the possibility of moving around *parts* of it. This very useful feature enables the insertion of symbols in vertical and horizontal directions into the mathematical expression or chemical formula. As a matter of fact, the entire formula or structure is internally considered as only one line or as a window. The window shrinks and expands automatically (up to a certain size, which is approximately three-fourths of the screen) when symbols, strings, or smaller windows are deleted or inserted. The smaller windows can be shifted around in half-line intervals. By use of this feature, the key sequence files, and different keyboards, an enormous variety of drawings (not necessarily connected with either chemistry of mathematics) can be made within any alphanumeric text.

The manual includes the short reference card, the tutorial, the complete reference manual, and a small template to put around the function keys. The small template is very nice, and we liked it very much until it got lost somewhere in the lab. Afterwards, we had to consult the tutorial every time we wanted to find the meaning of the function keys. The tutorial is clearly written and allows the user to follow the actions accurately. Unfortunately, the method of the tutorial is "follow the leader". We would prefer at the beginning of discussion of each task that there would be a short explanation on the general idea of how the particular task is going to be executed. In addition, an example guiding the user step by step over each single activity should follow. The tutorial describes each task (for example, writing a page of mathematics or a page of chemistry) from the very beginning as if it would be completely different from the other tasks, leaving the user to find out how to use many of the environments in one editing session by switching between different ones. The reference manual is very good in providing almost all answers to questions an experienced user may have. It is quite concise and accurate.

At the time of the review we did not have the HP laser printer, which made the test of high-quality output impossible. (The driver for the Xerox 4045 laser printer, which was at our disposal, was promised before the end of 1988.) We believe that linking the T³ Scientific Word Processor to the laser printer will show the real value of it. The output will be generated much faster and will make checking the overall appearance of manuscripts much easier compared to checking from the screen or from the slow output via matrix printers.

NMR Simulator and IR Simulator

GARY W. SMALL

Department of Chemistry, The University of Iowa, Iowa City, Iowa 52242

NMR Simulator and IR Simulator are nuclear magnetic resonance and infrared spectrometer simulation programs written by Paul Schatz of the University of Wisconsin and distributed by COMPress (P.O. Box 102, Wentworth, NH 03282). Both programs are designed for IBM PC, XT, AT, or compatible microcomputers, and each supports both CGA and EGA displays, as well as several pen plotters (IBM 7371 and 7372, Hewlett-Packard 7470A and 7475A) and graphics printers (IBM Graphics Printer, Epson FX and MX Series). NMR Simulator requires 256K of user memory and sells for $95.00, while IR Simulator requires 128K and retails for $75.00. While no academic discounts are available, both

software packages carry a 30-day free examination period. In each case, the program diskettes were supplied in 5.25-in. 360-kB format. No mention is made in the program documentation of the availability of the software on 3.5-in. diskettes. While the diskettes were not copy-protected, the COMPress software license specifies, in effect, that a separate copy of the program must be purchased for each computer on which it is to be used.

Both programs are designed to simulate the operation of a specific spectrometer in such a manner as to allow a person to master the procedures required to record routine spectra. Neither program is designed as a tutorial, however, therefore