

## A few words about the ROM "Turbo-90"

Perhaps, in terms of the awareness of our users, ROM Turbo-90 is the most controversial thing. We have already received thousands of letters from those readers who are ready to share his secrets and have long decided for themselves that it does not represent any secrets to anyone.

On the other hand, the flow of letters devoted to this ROM has recently risen sharply, the main motive of which is the words: "Dear INF0RK0M! I managed to find while working with the TURB0-90 ROM. (I opened .., I came across., Etc. P.)". As you can see, not everything here is so simple, if today, in 1994, many of our colleagues do not yet have all the necessary information, but are forced to discover this ROM for themselves. For them, we publish a review of the capabilities of this ROM, which was prepared by our correspondent from Vorkuta Sudakov, Mikhail Stanislavovich.

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Version of the 1990 ZX-Spectrum ROM TURBO retains all the functionality of the standard version of the 1982 ZX-Spectrum ROM, adding a number of unique features described below.

1. In "Turbo-90", pressing the RESET key does not mean complete system initialization. Even if you issue the RANDOMIZE USR 0 command, the system will not reset, but rather stop, and the standard attributes (BORDER 0; FLASH 0; BRIGHT 0; PAPER 7; INK 0) will be set for the entire screen. Some system variables will also be initialized, the screen will be cleared, and the initial message "© 1990 Sinclair Research Ltd" will appear in the service line. True, in this way not all programs can be stopped - some freeze or reset.

A complete system reset can be done in four ways. The first is to press RESET, then issue the NEW command. The second is to press and hold the RESET button for about two seconds, and then release it. A complete reset will be performed. The third is to press CAPS SHIFT and, without releasing it, RESET. And the CAPS SHIFT key should be released last. Fourth - using the built-in monitor, but more on that later.

2. Double-accelerated loading and unloading is performed by the same commands as normal (LOAD, SAVE). To switch the system to TURBO mode, you need to enter the symbol "-" (SS + J). The reverse switch is "+" (SS + K). You can even rewrite programs that use the machine code procedure at 1366 or others at double speed and get away with it. However, with many non-standard loaders in turbo mode, programs will not load. The "-" and "+" control commands can also be included in Basic lines, they will be executed normally (this also applies to other Turbo-90 commands).

There are two more teams associated with the tape recorder. The "(" (SS + 8) command turns on the header analyzer. At the same time, the file name is indicated by its length, start address and auto start parameter (for Program). The numbers are displayed in the number system that was last set in the monitor. Turning off this mode ")" (SS + 9).

3. Finally, it became possible to call the line for editing without a tedious combination: LIST - BREAK - EDIT. To edit any line, just dial "#" (SS + 3), then the line number and ENTER. If you simply enter "#" without a number or "# 0", the first line of the program is called for editing (not zero). The command "#" cannot be inserted into the program.

4. If you are in the Basic Line editing mode, then the down (CS + 6) and up (CS + 7) keys allow you to move the cursor inside the edited line. This is especially useful when editing long lines.

5. When you enter the character "," (SS + N) at the bottom of the screen, that is, a number appears on the command line indicating the amount of free memory from the end of the BASIC program to RAMTOP (the number system is the same as that installed in the monitor). This function is especially convenient when adapting programs to disk — if less than 300 bytes are left, then as a rule, when accessing the disk, the program will display a message about insufficient memory, since there is no room to allocate a 256-byte sector for read-write operation.

6. Now about the built-in monitor "Turbo-90". This is the most important feature of this version of ROM. Log in to the monitor by the command "\*" (SS + B). This, of course, is not MONS or MON2, but it is also a good tool for viewing and changing the contents of memory. When entering the monitor, the screen looks like:

When you enter "\*" information is displayed on the screen in three windows. The first is at the top and right of the screen - it displays the contents of the registers and the machine stack. The second one is slightly lower and takes up only an incomplete line - it is intended for data input (after the ">" prompt appears). The third window occupies the rest, most of the screen in it displays the contents of the computer's memory in the form of addresses, numbers and characters.

#### Monitor Commands

Some commands are executed by pressing a key, and some require numerical input.

"1" - change the number system (from DEC to HEX and vice versa).

"2" - switching to the output of certain characters (without their numerical equivalent) and vice versa. In this mode, the screen simultaneously displays the contents of 400 memory cells instead of 80 in normal mode. The advanced mode is useful when you look at the allocation of memory or when searching for text messages.

"3" - enter a number and write it to the current register (marked with a blinking cursor) or to the stack.

"4" - enter the number and write to the current address.

"5" - move the address pointer 64 bytes back.

"6" - move the address pointer 1 byte back.

"7" - move the address pointer 1 byte forward.

"8" - move the address pointer 64 bytes forward.

"9" - move the register-stack pointer back.

"0" - move the register-stack pointer forward.

"SPACE" - enter the address for viewing the memory.

"!" (SS + 1) - perform a complete system reset.

"\_" (SS + 0) - exit the monitor with the message "0 OK" with clearing the screen.

"(" (SS + 8) - exit the monitor with the message "0 OK" without clearing the screen.

")" (SS + 9) - exit the monitor without cleaning the screen with the message "5 M".

"" (SS + 7) - enter the address and run the machine code to execute from this address (GO SUB).

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