

TK90X v3 ROM (ZX Spectrum compatible) by Rodolfo Guerra

<https://sites.google.com/view/rodolfoguerra>

2021 - Montevideo, Uruguay

The ZX Spectrum ROM is copyright Amstrad PLC.
Amstrad have kindly given their permission for the redistribution
of their copyrighted material but retain that copyright.

WHAT IS TK90X?

The TK90X was the first Brazilian ZX Spectrum clone made in 1985 by Microdigital Eletrônica, a company located in São Paulo, Brazil, that had manufactured some ZX81 clones (TK82C, TK83 and TK85) and ZX80 clones (TK80, TK82) before.

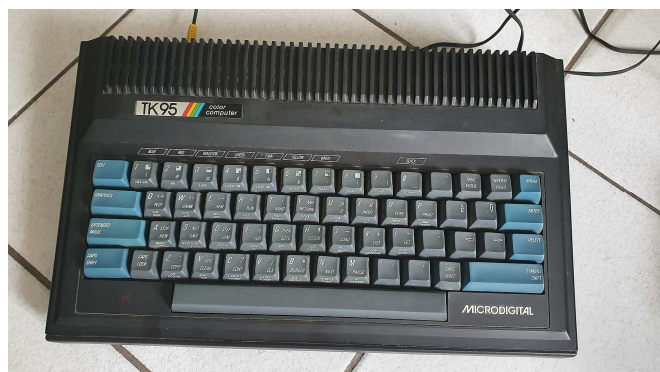
The case was a little taller than the original ZX Spectrum and the keyboard placement was equal to the original keyboard, except for two additional commands that did not exist in the Spectrums: **UDG** and **TRACE** (UDG for a very nice User-Defined Graphics Editor as well as Portuguese and Spanish characters such as ç, ñ and accented vowels, located on the place of £ symbol, and **TRACE** function for debugging purposes instead of ©).

The TK90X was followed by the TK95, which had a different keyboard and case (similar to the Commodore Plus4) and exactly the same circuit board and schematics. The unit had some differences on the ROM (v2) that made the TK95 more compatible with the original ZX Spectrum software. Curiously, some games became incompatible due to this modification. The D1 diode (originally included to select the default language on machines sold in Brazil) was removed to improve compatibility.

During that period, Brazilians were not allowed to import computers and therefore the TK90X became the first affordable color computer for Brazilians. It was exported to other Latin America countries where it was very successful, especially in Uruguay but also in Argentina.



TK90X



TK95

WHAT IS ROM v3 AND WHY?

As a TK90X user at the time I always thought that the machine ROM changes were a real improvement, although I would have liked to enhance the compatibility and make some extra changes keeping the added features.

This is how ROM v3 was born, as a true alternative to update real and emulated TK90X and TK95 computers and also (why not?) real ZX Spectrum and other clones.

OBJECTIVES

- Incorporate improvements on the work that Microdigital did at this time.
- Preserve and respect the original code, adding the new features without removing anything.
- Improve v1 compatibility and fix v2.
- Generate a stable and true alternative to update our machines.
- Internationalize the TK90X, translating the rom into multiple languages.

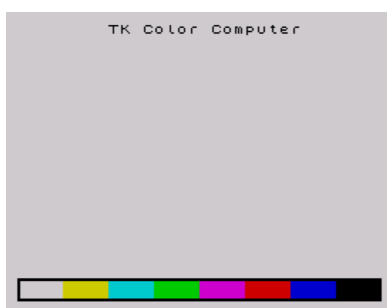
NEW FEATURES

- Improved compatibility: better than TK95 and much better than TK90X with ROM v1.
- Replacement of £ and © characters instead of Σ and Δ to improve compatibility with programs that use them.
- Error messages in Spanish and Portuguese obtained from the TK90X v1 ROM, better than TK95 messages.
- Faster keyboard reading speed.
- BASIC speed fixed (not like in TK95 ROM where certain processes run slower than normal. Ex: BASIC LIST render is at least twice as fast than TK95).
- Unused error messages deleted (corresponding to the inactive language) and dissociate the port 254 that was used as flag in v1 together with a diode to select the default language.
- Flashing indicator of the BASIC current line.
- Extended BASIC Editor: when editing BASIC lines it is possible to move the cursor up and down freely (without losing the possibility to move the current line pointer between the numbers of previous and following lines).
- UDG Editor patched as in TK95 ROM (compatibility improvement, Match Day I and II works fine).
- Native Turbo loading, automatically detects normal or new 4000 bauds turbo mode programs and support both, even alternatively.
- Renumbering BASIC facility, activated by **RAND USR 14850**.
- Special font characters for Russian, German, Czech, Norwegian, Polish and Swedish versions (Spanish and Portuguese via UDG 0 and UDG 1 commands).
- Available versions in 13 languages: Spanish, Portuguese, Italian, Romanian, Catalan, English, Russian, German, Czech, Polish, Dutch, Norwegian and Swedish.

BOOT-UP SCREENS



TK90X (ROM v1 or v2)



TK95 (ROM v2)



TK90X (ROM v3), new boot-up screen

TK90X SYNTAX DIFFERENCES (FOR ZX SPECTRUM USERS)

UDG 0: activates the Portuguese characters set

UDG 1: idem with Spanish characters set

UDG 2: invokes the User-Defined Graphics Editor*

(to access **UDG** press SYMBOL SHIFT + X, the place of £ on the ZX Spectrum)

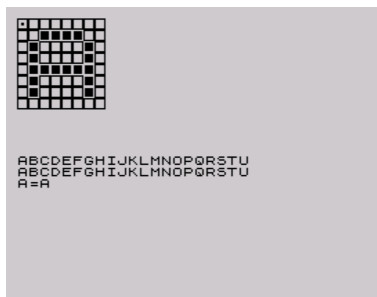
TRACE 1: enables the BASIC debugging facility

TRACE 0: disables it

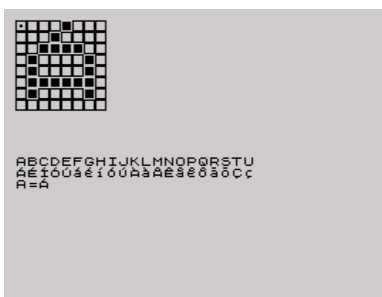
(to access **TRACE** press CAPS SHIFT + SYMBOL SHIFT to activate Extended Mode, then press SYMBOL SHIFT + P, the place of © on the ZX Spectrum)

SOUND command instead of **BEEP**

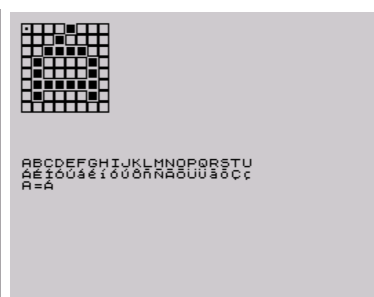
GOTO, GOSUB, RAND, CONT instead of **GO TO, GO SUB, RANDOMIZE, CONTINUE**



*UDG 2 (the TK90X UDG Editor)



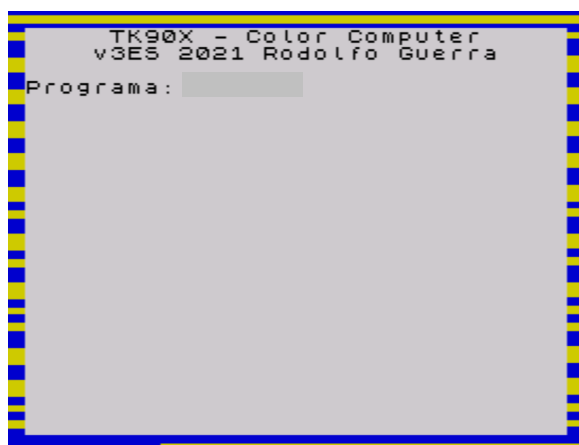
UDG 0 enabled (portuguese set)



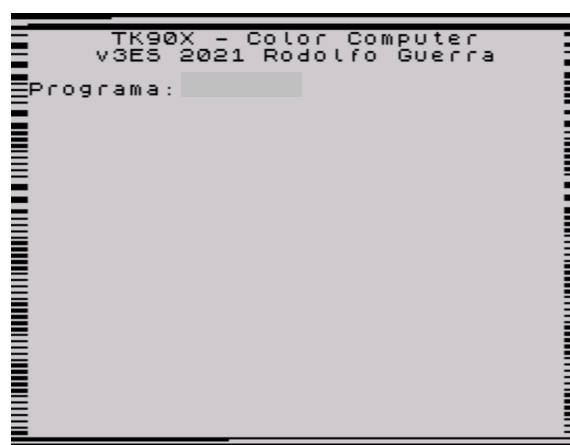
UDG 1 enabled (spanish set)

NEW TURBO LOADING MODE

The new native Turbo mode allows you to load programs at 4000 bauds aprox, reducing loading time considerably. The normal mode (1500 bauds) still exists and is automatically selected when required. You can even combine both modes alternately without problems.



Normal speed loading (blue and yellow bars)



New Turbo loading mode (black and white bars)

If you plan to use turbo files in Spectrum emulators, activate the normal loading speed (or input real tape) option in the emulator (not instantaneous speed).

The new Turbo Loading mode is automatically activated when you load an already converted **TZX** tape file. You can convert normal loading speed programs to turbo using the supplied command line converter named **TZX2TURBO**. Keep in mind that **only normal (unprotected) TZX files can be converted**.

If you want to use a simple **TAP** file, you will first have to convert it to normal **TZX** (there are several converters available), then you will have to convert it to turbo. Usage is very simple: **tzx2turbo <in tzx file> <out tzx file>**

```
C:\ROMS\TZX2TURBO>tzx2turbo
TZX2Turbo by Juan Jose Ponteprino
usage: tzx2turbo <in tzx file> <out tzx file>

C:\ROMS\TZX2TURBO>tzx2turbo program.tzx prgturbo.tzx
```

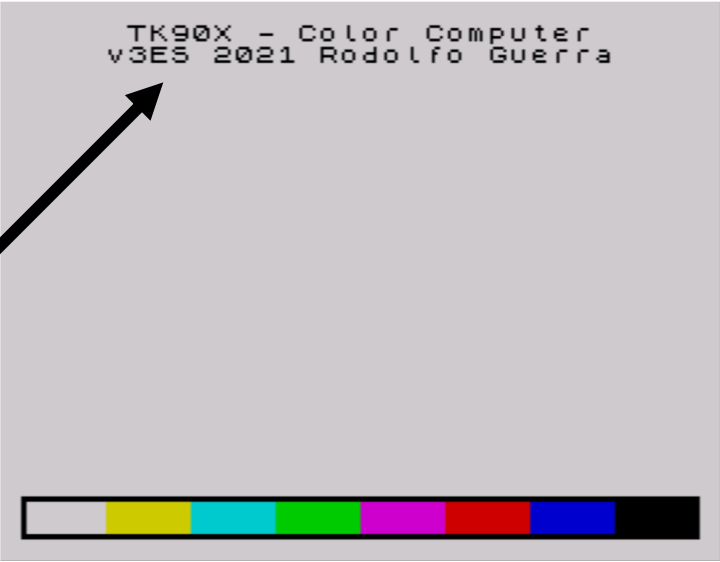
TZX2TURBO command line converter

LANGUAGES

There are 13 languages to choose from. The roms are identified by a 2-letter code that allows you to know which language they correspond to.

The language codes are:

- CA - Catalan
- CS - Czech
- DE - German
- EN - English
- ES - Spanish
- IT - Italian
- NL - Dutch
- NO - Norwegian
- PL - Polish
- PT - Portuguese
- RO - Romanian
- RU - Russian
- SV - Swedish



TK90X - Color Computer
v3ES 2021 Rodolfo Guerra

Several languages require special characters (mainly Russian, but you will find them in other languages as well). To check the available special characters you can run the following program, which shows the complete font set:

```
10 FOR a=32 TO 127: PRINT CHR$
a;: NEXT a
```

Accents for Portuguese and Spanish (and maybe other languages) are directly supported through “UDG 0” and “UDG 1” commands respectively, just as it worked in the original TK90X ROM.

ACKNOWLEDGMENTS

Mario Villar Corbo from Uruguay: lots of help and smart ideas
Chivy Tayler from Uruguay: help with German translation and beta-testing
Hache Beroldo from Argentina: beta-testing
Juan José Pontepino from Argentina: for his great TZX2TURBO converter
Rui F. Ribeiro from Portugal: info about the flag and diode to select the language
César Hernández Bañó from Spain: Catalan translation and beta-testing
...and a lot of people who helped me with this project!

Contact: reguerra@montevideo.com.uy

Web: <https://sites.google.com/view/rodolfoguerra>

If you would like to donate some money to support the development
of this and other roms you can use paypal through the following link:

<https://www.paypal.com/paypalme/reguerra71>