



In the early 80's the Portuguese market was flooded with ZX Spectrums: that was the most popular computer in the market and almost everyone who owned a computer had a ZX Spectrum. However, many of the ZX Spectrum owners weren't real Sinclair Spectrum owners but Timex Computer 2048 owners. This machine was a better Spectrum than the original: to the less enlightened people it was a Spectrum with a built-in Kempston joystick interface, a much better keyboard, that was not just superior ergonomically (mostly because of the real space bar) but the quality in the mechanics was better. Even these days most broken Timex keyboards can be cleaned with alcohol.

This article will explore the machine beyond the physical differences and exploit some hardware secrets that made the computer a little incompatible with the original ZX Spectrum. In the top picture can be the screen from the demo tape that came along with the TC2048.



Timex Computer 2048



Timex Computer 2048 Board

The Timex Computer 2048 was launched in Portugal and Poland - do not mistake this computer with the prototype Timex Sinclair 2048 which was intended to be a 16KB version of the Timex Sinclair 2068. The Timex Computer 2048 was a ZX Spectrum clone and featured:

- Z80A CPU clocked at 3.58 MHz
- 48KB of RAM
- 16 KB ROM (Almost the same as the ZX Spectrum)
- Edge connector compatible with the ZX Spectrum, but missing RGB signals, and the /BE signal.
- RF out connector.
- Ear / Mic Connectors
- Kempston Joystick Connector.
- Extended screen modes when compared with the ZX Spectrum;
- On/Off switch.

On the business scene the TC 2048 was a fairly well-used computer in Portugal, especially connected to a FDD 3000 system. This system gave 64KB more to the TC2048 along with 2 disk drives. It was in fact another machine as it featured a Z80 of its own. The FDD gave the TC the ability to run CP/M which was the most used business-oriented OS of its time. There was even a separate, almost professional keyboard that you could use with it. It was the game market, though, which was the real target for the TC2048, where it was designed to battle hand to hand with the Spectrum. Many shops sold it as a natural alternative to the ZX, 'This is a machine that is not only a toy

but a serious computer' i can almost hear the salesman voice saying...

## The Machine

As soon as you open the Timex's box, you notice the big resemblance with the ZX Spectrum (it couldn't be other way, it's a clone!). The keys are very similar, but in the Timex are made of plastic instead of rubber. You also notice a joystick connector of the de-facto standard kempston type. An ON led is also welcome as is the on/off switch. Under the hood the differences are even greater, you get a better quality computer when compared with the Sinclair - the most evident is the plastic

*Rom differences between the ZX Spectrum and the Timex Computer 2048.*

<b>Address</b>	<b>TC2048 ROM</b>	<b>ZX Spectrum ROM</b>
129A	Call 386E	Call 0C0A,PO-MSG
386E	Out(FF),A	FF
3870	Call 0C0A,PO-MSG	FF
3873	RET	FF



The TC2048 Boot Screen, exactly the same as the ZX Spectrum's one!

keyboard, which was better not only on the exterior but on the interior where a good PCB replaced the fragile membrane of the Spectrum. The keyboard PCB uses a mechanism similar to many calculators where a special rubber that acted also as spring made contact between the tracks of the PCB, thus allowing the keystroke to be sent to the computer. The composite output also gave the Timex a more professional touch, and in this machine there was no need for a separate joystick interface, as the kempston interface was already built in. Plus, the typical unplug/replug reset procedure was replaced with a good quality ON/OFF switch and you could see if your timex was turned on by the red led on top instead of the high frequency whistle you could hear from the ZX Spectrum's speaker (many friends of mine said they couldnt hear a thing from the speccy, but I swear, I could!). One thing that you could still complain about in the machine is the poor quality ink used on its keyboard- it rubs off with use! Many of todays 2048's have the keywords of some keys worn off, especially Q,A,O,P keys, who knows why...

One less known feature of the TC2048 is the Enhanced graphics capabilities. The TC 2048 used the very same ULA as the Timex Computer 2068 (Note the 'Computer', it's Timex Computer NOT Timex Sinclair). This ULA had - besides all ZX Spectrum modes - some graphics modes of its own. They were used widely in conjunction with the FDD 3000 so it could display the 80 character text that was used by CP/M applications (the main use of the FDD3000).

## How to use the TC 2048 Modes:

To use the special 2048 modes you will need to output to port 255, bits D0, D1 and D2. You can output all 8 values but only 4 will give you some kind of good result:

- **000** - 8X8 Attributes, just like the normal ZX Spectrum.
- **001** - Puts video data at 24576 and STTR data on 30720, it still keeps 8X8 attributes.
- **010** - Multicolour mode, keeps video data at 16384 and 8X1 color attributes at address 24576.
- **110** - No colour attributes, Extended resolution: this mode takes the video data from 2 different areas: even columns are taken from address 16384 and odd columns are taken from address 24576.



Timex Computer 2048 and 2068 ULA.

## Expanding the Timex 2048

What were the Timex Computer 2048's expansion options ? Well, the TC had the same edge connector that was present on the ZX Spectrum, although some signals are unconfirmed on it. It could use most simple ZX Spectrum interfaces and some of the more complex too, but some, for example the Rotronics Wafadrive, didn't work well on it - maybe because of the NEC processor (Z80 Clone) or by some missing sign or ROM incompatibility. The wafadrive can write to wafers but can't read them on the TC, so probably some other complex peripherals have the same problem. Not to worry, though, because as soon as you take a peek at Timex's own options there is hardly any need to search in another brand! There are Sound Amplifiers, Disk interfaces, the famous and rare FDD3000 (which was indeed a true computer of its own), serial interfaces, and so on. One that I like especially is the 3 part disk interface, the Timex FDD, which is compatible with DD 3 1/2 disk drives. Just remove the incompatible 3 incher that comes along with the unit and plug in the floppy of your choice (See the pic below).

All in all the Timex Computer 2048 was a very decent and cheap machine that had a great impact on videogaming in Portugal. It was superior to the ZX Spectrum and it's a pity that there were almost no games that took advantage of its superior video architecture. Timex Portugal was one of the best computer developers of its time and delivered us some stupendous machines. This model was only exported to Poland, making it difficult for anyone with no access to the Portuguese or Polish market to get one. This is definitely a computer that has a place in every serious collector's collection.



Promo Picture of the TC 2048 with the Timex FDD System.

Special Thanks to  
Johny Reed from  
<http://timex.123go.cx>

*Jorge Canelhas*

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