

ZX-VGA-JOY

v1.03

RELEASE NOTES

It is recommended for all users to upgrade their ZX-VGA-JOYs regardless of the previous version (v1.01 or v1.02).

The upgrade process is very simple, video tutorial and PC tool can be downloaded from www.zx-vga-joy.com.

This firmware brings some new feature and also few corrections on existing functionality.

New features:

1. Interlaced mode option

Users can switch on/off this option using the icon menu. It affects all screen modes.

By default interlace mode is disabled and it is recommended to keep it disabled for all software that not uses interlace effects.

With interlaced disabled, ZX-VGA-JOY provides pure 50Hz frame rate on original resolution 256x192 in way that each pal half frame is showed as full VGA frame.

With interlaced enabled, even pal frames appear on even VGA lines, while odd pal frames appear on odd VGA lines.

So if ZX spectrum software generates frames in the right order picture on screen looks like that it has doubled vertical resolution 256x384.

That is the way pal picture appears on the TV screen. But there are some differences.

While TV shows even lines, odd lines slightly fades to point of the new frame, that results with flashing picture on TV when software uses interlace effects.

On ZX-VGA-JOY even lines do not fade while odd lines are shown with the result of very stable "interlaced" picture on VGA screen.

When the interlaced effect is not used by software (which is in most of ZX Spectrum software) and interlaced mode is enabled, because of the non-fade feature of VGA screen, the picture looks like it has line spreading effect so it is better to switch it off.

2. 640x480 @50Hz VGA screen mode

This is the best ZX-VGA-JOY screen mode, but unfortunately, older monitors do not support it.

Luckily, from my experience, practically many new LCD monitors do support this resolution even in cases when user manual emphasizes 56Hz as minimal refreshing rate.

I tested about 10 new LCDs(at my friend's computer shop), 3 of them has documented 56Hz as minimal refreshing rate, but all of 10 monitors recognized this resolution and worked perfectly.

Why this screen mode is the best?

PAL TV picture has 50Hz refreshing rate, so ZX Spectrum is build to generate a 50Hz picture. Lots of software are relying on that and uses that timing for moving objects on the screen. For example horizontal scrolling texts. Each PAL frame text is shift left for 1 pixel.

If you try to show it on 60Hz picture every 5 frames you will get repeated frame and it will look like a scroll is stopped for a very short moment. It is not that noticeable many of us will say it is good until you see that scrolling text on 50Hz. It looks like it is slide on the ice.

Since ZX Spectrum does not use 50.00Hz but 50.02(128k) and 50.08(48k), ZX-VGA-JOY measure frequency of computer and adjust VGA frame rate according to measurement.

ZX-VGA-JOY can adjust its VGA freq. between 50.00 and 50.11 Hz.

NOTE: ZX-VGA-JOY still has 7 screen modes, I removed one of two unsymmetrical zoom mode

on 800x600 which had no sense. If someone finds this mode useful, I will bring it back as the 8th mode in next firmware.

3. Low power mode

Power consumption highly depends if the current picture is completely white or completely black. VGA line drivers on white picture consume about 30% of overall consumption.

There is no compromise with VGA line drivers, low power mode is realized in a way that I put microcontroller in sleep mode while is doing nothing.

So I will give you an average value of 23% lower power consumption when this mode is enabled.

Corrections of existing functionality:

1. Full decoding of paging register (0x7ffd) is replaced with partial decoding like on original computer 128k.

Some ZX spectrum software is taking advantage of partial decoding to speed up some operations. With full decoding, some demos were not working as they should, so I change it to partial decoding.

2. Forbidden double screen buffer on 48K models.

Some games made before the release of the 128k model doesn't care what will happen if they write something in paging register.

For that reason, when you enter 48k basic on 128k models, ROM software writes 1 to bit 5 of paging register to block further writes.

So screen buffer cannot be changed after that. For example, game Jetpac, if you choose the keyboard as a control option, makes writing to paging register and switch screen buffer.

So if you loaded it from 128k loader it won't work on TV.

When you use ZX-VGA-JOY on 48k model, ROM software will not make write to bit 5 of paging register and ZX-VGA-JOY will change screen buffer if receive bit 3 in paging register.

To prevent unwanted behavior, when the 48k mode is detected, ZX-VGA-JOY doesn't use double screen buffer.

3. Timing issue between border and paper resolved.

In some cases, the border was 1 frame ahead, because its buffer did not copy to VGA buffer at the exact same point of time as paper.

4. Screen mode 800x600 @60Hz where ZX spectrum pixel=3x2 VGA pixels don't exist anymore.

5. Various small corrections that I didn't find making problems but it could in some software.