ZX-VGA-JOY INSTRUCTIONS v1.03

General description:

ZX-VGA-JOY is ZX Spectrum interface for connecting any kind of VGA monitors, Kempston joystick and computer reset. It supports 7 screen modes: 640x480 @ 50Hz, 640x480 @ 60Hz, 640x480 @ 75Hz, 640x480 @ 85Hz and 800x600 @ 60Hz with 3 different zooms (paper/border sizes).
This interface is not signal converter, it works in parallel with internal graphics IC(ULA) taking video data directly from CPU and provides crystal clear picture on VGA monitors.
Also, the picture on VGA monitor is precisely synchronized with PAL signal generated from ULA, so games that are relying on ULA timing look as they should.
ZX-VGA-JOY is compatible with all Sinclair and Amstrad ZX Spectrum models and probably with a number of clones. It is not necessary to do any modification on the original computer as long as the expansion port is functional on pins used by ZX-VGA-JOY.

Connection to ZX spectrum:

ZX-VGA-JOY uses a ZX spectrum expansion port to get power, video data, and synchronization.
Expansion port is 56 slot edge connector and it is built in all ZX-Spectrum computer.
The fifth slot on the bottom and the top side is cut with a purpose of connection alignment so pay attention to align cut slot on ZX spectrum and "key lock" on ZX-VGA-JOY when you plug device.
Do NOT plug this device to computer while the power supply is applied, it could damage computer and ZX-VGA-JOY. This is a general rule for all interface device made for ZX-Spectrum!
Since some of the computers are 35years old, edge connector slots could be polluted with grease and oxide so, it is recommended to clean up connector before use to get good contact.

VGA Monitors:

You can use any kind of VGA monitor CRT or LCD.
CRT monitors usually need higher refreshing rates to get flicker free picture so it is recommended to use one of two screen modes: 640x480 @ 75Hz or 640x480 @ 85Hz.
For LCD monitors a refreshing rate of 50Hz/60Hz/75Hz is good enough. Note that some LCD monitors do not support rates higher than 75Hz.
Refreshing rate of 50Hz is the best choice since PAL TV picture is 50Hz, but some older LCDs do not support this resolution either.
Also on widescreen LCDs, an aspect ratio of 4:3 should be selected on a monitor menu to get the right geometry. If it is not possible (some low-cost VGA monitors), you can use one of three zooms to get better screen shape.
At first start, LCD monitor should initiate auto adjustment. If not, start auto adjustment manually on the monitor menu.

Kempston Joystick:

ZX-VGA-JOY has Kempston Joystick connector. Do not connect Joysticks that are not compatible with original Kempston interface, without a correct adapter.
Joystick interface can be disabled/enabled in ZX-VGA-JOY menu. In some cases, it is useful when one uses more the one interface connected to the computer.

Push button functions:

Built-in pushbutton has two functions.
If You press and hold this button until ZX-VGA-JOY logo screen appears after button release ZX spectrum will be reseted. It is very useful for 16k/48k models which don't have a reset button built in.

Pushbutton is also used for menu navigation.
One short press will get You in ZX-VGA-JOY icon menu. Every new short press within 3s will change select position. After 3s not pressing button selected option will be changed or initiated and exit icon menu.
In the same manner, you can navigate submenus.

Menu:

1. **Exit**
   If you choose this, you will just exit the menu without any change
2. **640x480 @ 50Hz**
   When you choose this screen mode, you will enter in a submenu. There you can choose automatic adjustment of refreshing rate according to computer frame rate or you can choose between 50.00 and 50.11Hz.
3. **640x480 @ 60Hz** (default screen mode)
4. **640x480 @ 75Hz** recommended for CRT monitors
5. **640x480 @ 85Hz** recommended for CRT monitors, not recommended for LCD, some LCD does not support this refreshing rate.
6. **800x600 @ 60Hz** (ZX spectrum pixel=2x2 VGA pixels)
7. **800x600 @ 60Hz** (ZX Spectrum pixel=2x3 VGA pixels)
8. **800x600 @ 60Hz** (ZX Spectrum pixel=3x3 VGA pixels)
9. **Interlaced option**
   This option affects all screen modes. When it is enabled, even pal frames are showed on even VGA lines and odd pal frames are showed on odd VGA lines. It is recommended to use this mode only for softwares that are using the interlaced effect to increase vertical resolution. Then ZX-VGA-JOY will provide a very stable "interlaced" picture. But on software that is not using interlaced effect, you will get a better experience with this option switched off.
10. **Kempston Joystick**
    With this option You can switch Joystick interface ON/OFF
11. **Video sync**
    16k/48k models have slightly different PAL video lines arrangement than other computers, so to get right synchronization it is essential to know that.
    ZX-VGA-JOY can automatically detect line arrangement by metering frame frequency(50.02Hz or 50.08Hz). If for some reason this is not working(It could be on some clones) you can choose manually model of your computer.
12. **Save settings/Low power**
    This will open submenu where you can save all your settings, so on next power up saved settings will be loaded. In this submenu you can also enable or disable low power mode. When low power mode is enabled power consumtion of ZX-VGA-JOY is decreased for about 23% at avarage.

NOTE: When you change VGA resolutions/rates ZX-VGA-JOY must be reconfigured and it can lose some video data during the process. It is not mandatory but it is recommended to reset the computer after changing.

USB:

Under top cover of ZX-VGA-JOY there is micro USB connector. This USB port is used only for firmware upgrade of ZX-VGA-JOY.
On www.zx-vga-joy.com at download section, you can find PC tool and video instructions on how to make a firmware upgrade.

EU Declaration of Conformity:

For the following equipment:

Product Name: Retro computer multimedia interface
Model : ZX-VGA-JOY
Manufacturer Name: ELMAR electronic d.o.o.
Manufacturer Address: Kopilica 5, 21000 Split, CROATIA

EMC – Directive 2014/30/EU:
EN 55032:2012+AC:2013 Class B
EN 55024-2010/A1:2015

RoHs – Directive 2011/65/EU

CE marking