

USB-to-Joyport Interface USBTOPIA

by



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Introduction / Features.

USBTopia is an interface that allows using USB keyboards and mice in our MSX computers, via the joystick port.

It is a well-known fact that MSX mouse devices are scarce, difficult to find and often very expensive. **USBTopia** solves this problem once and for all. A good quality USB mouse is easy to find and is pretty cheap.

But this is not the only feature offered by **USBTopia**. It also allows connecting USB keyboards that will act as if they were a MSX joystick. Many MSX users are used to play using cursor keys and the SPACE key; now it is possible to do that with a good USB keyboard, extending the life of the valued MSX keyboard.

USBTopia has the following features:

- No need for external power.
- All the USB mice and keyboards compatible with the *HID Boot Protocol* protocol are supported, including the wireless ones.
- Compatible with all the MSX computers.
- *Autofire* in keyboard-joystick mode.
- No need to load any software.
- Bidirectional *Plug & Play*: you can change the USB device on the fly, and you can connect the interface to the MSX joystick port at any time.

How To Install.

1. Plug the **USBTopia** female joystick connector in the joystick port of your MSX computer.
2. Wait for the **USBTopia** led indicator to turn on.
3. Connect the USB device to **USBTopia**. If the device is compatible ¹ the led indicator will blink.

Your device will be ready to use in a few seconds. ²

For more information on how to connect **USBTopia**, see the figure 2.2.

NOTE: **USBTopia** has a *USB-Mini-female* connector in its side together the joystick female cable (2.1). This connector is intended to program and update the device. The user must not never use it to connect devices to **USBTopia**.



Figure 2.1: USB-Mini Female

¹ If the USB device is not compatible the led indicator will remain lit, without any blinking.

²Please allow a few seconds for **USBTopia** to detect the device and make it available for usage. Look at the led indicator for guidance.

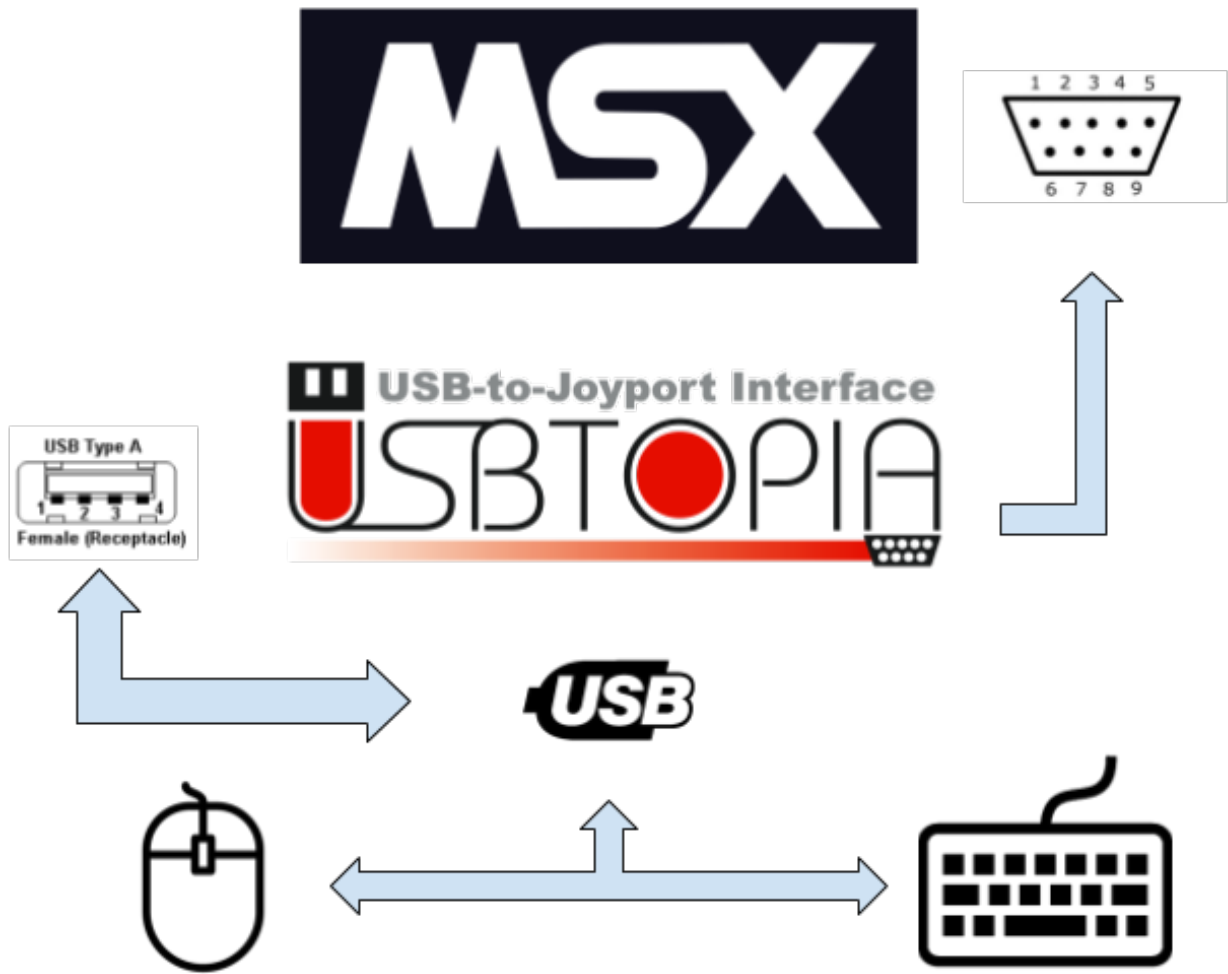


Figure 2.2: Connection diagram

2.1 Recognition of USB devices.

Not all USB devices will play nicely with **USBTopia**. Only devices that implement the *HID Boot Protocol* will work.

When a compatible device is connected to **USBTopia** its led indicator will blink. This means that the device is compatible and is ready for use.

There are however some devices that work perfectly but aren't recognized at the first try. If a device that you connect to **USBTopia** isn't recognized, follow these steps to know if that's the case:

- Unplug the device from **USBTopia**.
- Unplug **USBTopia** from your MSX.
- Plug **USBTopia** to your MSX.
- Plug the device to **USBTopia** again.

If the device still doesn't work that means that it is not compatible with **USBTopia**.

How it Works.

As explained above (section 2), using **USBTopia** is very easy. Just plug your USB device to **USBTopia** and it will be ready to use.

3.1 Mouse.

When you plug a USB mouse to **USBTopia** it will work exactly the same way as a standard MSX mouse, however, a USB mouse has a higher resolution than a MSX mouse, therefore you will experience a faster movement of the pointer (or whatever screen item you are controlling).

The LEFT and RIGHT buttons will work as expected.

At the moment, the standard MSX-Mouse *joystick mode* is not implemented. Neither the third button used on *SymbOS* operating system.

3.2 Keyboard.

When a USB keyboard is connected to *USBTopia* it will work as a standard MSX joystick, with some extra features:

- Multiple keys are mapped to provide the user with an easier choice of buttons and directions.
- Autofire.
- Partial JoyMega support.

El mapa de teclas es el siguiente:

Teclado USB	MSX
CURSOR UP	UP
CURSOR DOWN	DOWN
CURSOR LEFT	LEFT
CURSOR RIGHT	RIGHT
W	UP
S	DOWN
A	LEFT
D	RIGHT
SPACE	BUTTON 1
RETURN	BUTTON 1
X	BUTTON 1
CTRL	BUTTON 1
SHIFT	BUTTON 2
BS	BUTTON 2
N	BUTTON 2
M	BUTTON 2
Z	BUTTON 2
C	BUTTON 2
TAB	BUTTON 2 / START
ALT	BUTTON 1 / BUTTON A
GUI	BUTTON 2 / START
CAPS	Autofire On / Off

Table 3.1: USB Keyboard to MSX Joystick

To activate the autofire feature press the CAPS key in the USB keyboard, press the same key again to turn it off. When autofire is on, the CAPS led indicator will blink.

Note that autofire affects both BUTTON 1 and BUTTON 2.

3.2.1 Key Ghosting.

The so-called *Key Ghosting* or *Key Jamming* is a problem present in some keyboards in which some keys don't work when they are pressed simultaneously.

This problem appears even in keyboards explicitly labeled as *Anti-Ghosting*. It happens when 3 or more of certain keys are pressed simultaneously.

A very common case is to press two cursor keys in diagonal + fire 1 key + fire 2 key. Even with just diagonal + fire it could happen that one of the keys doesn't work. This is of course frustrating for the user: it makes **impossible to move in diagonal** while the fire key is pressed, for example.

The *Key Ghosting* problem *depends solely on the keyboard maker and model*, therefore it is not possible to detect or correct it.

To prevent this problem to the extent possible, *USBTopia* maps several keys to BUTTON1 and BUTTON2, as seen in table 3.2. This ensures that there will be some combination where *Key Ghosting*, if your keyboard suffers it, will not manifest.

For more information please read this article:

<https://www.microsoft.com/appliedsciences/antighostingexplained.aspx>

3.2.2 JoyMega.

USBTopia implements partial support for *JoyMega* buttons.

As you can see in table 3.2, keys ALT, GUI and TAB have two functions: they serve as the standard button 1 or 2 of the simulated MSX joystick, but they also serve as JoyMega's BUTTON A y START buttons.

As it is only a partial implementation the following is not supported:

- The MODE, X, Y, Z buttons from a 6 buttons *Megadrive* controller.
- Data returned by the joystick (*USBTopia* in this case) will be exactly the same as the data received in JoyMega.

Even with these restrictions, if developers follow a simple set of rules any software compatible with JoyMega and the A y START buttons will work properly with *USBTopia* and the assigned buttons.

The steps needed to make the reading of A and START buttons compatible with *JoyMega/USBTopia* are:

1. Perform the standard joystick and *JoyMega* status read according to the *JoyMega* documentation.

2. Check if joystick status has LEFT and RIGHT bits as 0 (pressed).
3. If LEFT and RIGHT bits are not both 0, then it is a standard joystick read; that is, there are no JoyMega buttons pressed, so we carry on with a normal read.
4. If LEFT and RIGHT are both 0, a *JoyMega* button may be pressed.
5. Check bit BUTTON 1 of joystick state: if it's 0, then JoyMega's A button is pressed.
6. Check bit BUTTON 2 of joystick state: if it's 0, then JoyMega's START button is pressed.

With these simple rules our software will be 100% compatible with both systems.

In this link (<http://alabs.tech/res/USBTEST.ZIP>) you can download the USBTEST.COM tool, it allows testing USB keyboards and mice in MSX computers using **USBTopia** (it will also work with native hardware). The source code is included, it's easy to read and it demonstrates how to correctly read JoyMega's A and START buttons so that it's compatible with **USBTopia**.

Not all *JoyMega* compatible programs are guaranteed to work properly. This is not the fault of **USBTopia**, since as explained above, **USBTopia** provides *partial* compatibility and requires a specific read method to work. However, we can ensure that it work with programs like *Sofa Run*, which has been tested in *JoyMega* mode with 3 buttons, with good results.

FAQ.

Q: I press the **B key in my USB keyboard and it is not printed in the screen.**

A: Remember that *USBTopia* turns your USB keyboard into a MSX joystick, not a MSX keyboard.

Using *USBTopia* with a keyboard, some games won't allow me to go beyond the title screen, no matter how much I press **SPACE.**

A: Make sure that the game *actually* supports joystick. Many games don't allow using a joystick in the title/menu screen, but they do within the game itself.

Q: Using *USBTopia* with a USB keyboard and a compatible JoyMega program, special buttons don't work or when pressing them I get unexpected behavior.

A: As explained in [3.2.2](#), *JoyMega* status read must be performed by following a certain set of rules in order to ensure compatibility with *USBTopia*. It is not possible for software created *before* *USBTopia* to be compatible with *USBTopia*.

Q: Often times I change the device without disconnecting *USBTopia* (*Plug & Play*), and not always the device is recognized.

A: Follow the instructions in section [2.1](#).

Q: Using *USBTopia* with a USB keyboard, sometimes, when pressing a few keys simultaneously, some of them are not processed and the device gets *stuck*.

A: This problem is described in section [3.2.1](#), try using a better quality keyboard.

Q: I was thinking on acquiring an additional *USBTopia* to connect it in the other joystick port. Can I use two *USBTopia* at the same time in the same computer?

A: Yes, no problem at all.

Q: Can I use *USBTopia* as a joystick in *Black Typer*.

A: Of course. *USBTopia* will work with the *Black Typer*, connected in any port and in its Gamepad mode, as a joystick.

Q: Can I use *Black Typer* as a USB keyboard in *USBTopia*

A: Of course. *Black Typer* in its *Keyboard Only* mode can be used as a USB keyboard to simulate a joystick in *USBTopia*.

Q: Using a USB keyboard or mouse there are directions or buttons that don't work.

A: There may be a number of reasons for that:

- Your USB keyboard or mouse doesn't work. Use another computer to check that they actually work.
- Your joystick port is defective. Use a MSX joystick or mouse and the [USBTEST](#) tool (or any software that supports mouse or joystick) to check that your port works properly. If the problem persists, contact your technical service to get a repair.

If your USB keyboard/mouse and your joystick port work properly and you still have problems, please contact [A-Labs](#).

Contact and Credits.

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will not accept any responsibility for any damage caused to your MSX computer by this interface.



Figure 5.1: *USBTopia*.