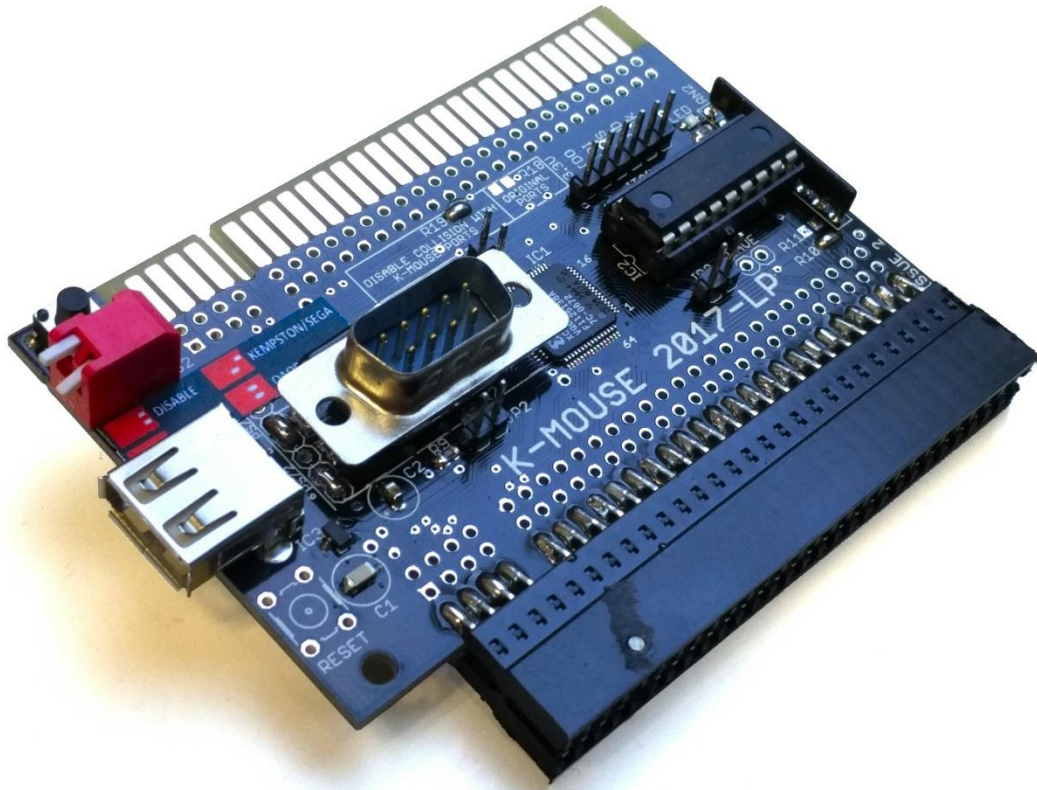


K-Mouse Turbo 2017-LP



Mouse and joystick interface for the Sinclair ZX Spectrum



Manual

Read this manual before using the K-Mouse Turbo interface!

Developed by Velesoft
Manufactured by Ben Versteeg

BYTEDELIGHT

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The manufacturer reserves the right both to change the specifications of the K-Mouse Turbo Interface and the firmware and to revise this publication from time to time without obligation to notify any person of such revision or changes.

Overview

The K-Mouse Turbo is a mouse and multi-standard joystick interface for the Sinclair ZX Spectrum.

The K-Mouse Turbo is based on the original Kempston Mouse interface.

Play games and use drawing and other utilities by mouse!

A lot of games are adapted to play with mouse on the K-Mouse Turbo interface, find out in the 'Games supporting the K-Mouse Turbo' section.

The K-Mouse Turbo supports a PS/2* or USB mouse that supports the PS/2 protocol.

The webshop at ByteDelight.com / ZXSpectrum.shop may offer compatible mice.

The joystick port supports Atari /Amiga compatible 9-pin joysticks and the Sega Genesis gamepad.

The joystick port simulates Kempston joystick, Sinclair joystick, or 'Q, A, O, P, M, space'.

There K-Mouse Turbo also has a reset-button and led power indicator.

'LP' stands for 'Low Profile' as this is a so-called 'horizontal' oriented interface.

*using a PS/2 mouse requires a USB adapter

In the box

Your K-Mouse Turbo interface is delivered in an anti-static bag and with this manual.

Compatibility

The K-Mouse Turbo is fully compatible with all Sinclair ZX Spectrum models: 16K, 48K, 48K+, 128K, +2, +2A, +2B, +3 and some clones.

Some joystick configuration options are not supported by the ZX Spectrum +2A/+2B or +3. You can either select another joystick option or use jumper...

Notification Led

The K-Mouse Turbo has a blue power led that shows you the system is powered on or not.

Changing the mouse movement speed

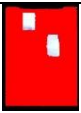
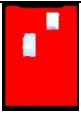

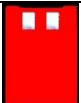
It's possible to slow down the mouse movement speed - this only works with 3-button mice. To achieve this, press the 3 mouse buttons simultaneously, release them and then press the middle mouse button.

To get back to the 'fast mode', repeat the same.

Joystick configuration

The joystick connector of the K-Mouse Turbo supports Amiga/Atari joysticks with up-to 2 fire button.

DIP switches S1 and S2 configure the joystick mode:

	S1 OFF S2 ON	KEMPSTON/GAMEPAD mode This mode configures the joystick interface to Kempston joystick. This mode is also compatible with the Sega Genesis gamepad.
	S1 ON S2 OFF	SINCLAIR1 mode This mode configures the joystick interface to Sinclair1 joystick. This corresponds to key-presses of 6, 7, 8, 9, and 0. If you have a joystick with second fire-button, that will correspond to pressing 'Enter'.
	S1 ON S2 ON	Q, A, O, P, M & SPACE mode This mode configures the joystick interface to 'custom keys'. This corresponds to key-presses of Q, A, O, P, M and SPACE. If you have a joystick with second fire-button, that will correspond to pressing 'M'. This mode is ideal for software with a 'redefine keys' option.
	S1 OFF S2 OFF	Disable joystick interface

JP1 – ZX Spectrum +2A/+3

This jumper option disables keyboard based joystick modes when a jumper is connected. The ZX Spectrum +2A or +3 do not support external 'keyboard based' such as SINCLAIR1 or 'Q, A, O, P, M'.

Only the KEMPSTON/GAMEPAD mode is usable with +2A/+3.

- Open = enable keyboard based joystick modes
- Closed = disable keyboard based joystick modes

If you are using a ZX Spectrum +2A or +3, you can either connect a jumper to JP1 to disable the keyboard based joystick modes as a protection against data collisions, or make sure to select the Kempston/Gamepad mode.

JP2 – IM2 Vectors

This jumper option disables external vectors for old Kempston Mouse (not Kempston joystick!) interfaces:

- Open = enable external im2 vectors on data bus from old Kempston Mouse devices (default)
- Closed = disable external im2 vectors from old Kempston devices

JP3 – Master / Slave

Some multiplayer games (see the 'Games supporting the K-Mouse Turbo' section) support the use of two K-Mouse Turbo interfaces.

JP3 is used to set the mouse interface to 'Master' or 'Slave'

- Open = MASTER interface (default)
- Closed = SLAVE interface

Please note the 'Slave' jumper option does not have any function anymore.

Connecting the K-Mouse Turbo

Always disconnect the power from your ZX Spectrum before connecting any interface!

Connect the K-Mouse Turbo to your ZX Spectrum carefully.
Now you can power up your ZX Spectrum.

Combining with a Kempston joystick interface

It is possible to combine the K-Mouse Turbo with another Kempston joystick interface. If you select a keyboard based joystick mode on the K-Mouse Turbo, the Kempston joystick interface is usable, resulting in a dual-joystick setup.

Some Kempston joystick interfaces may cause a 'incomplete IM2 table' problem with some games by changing the IM2 vectors during an interrupt call.

Connecting a jumper to JP2 will avoid this problem and increase compatibility with some games.

Sega Genesis gamepad compatibility

The joystick interface supports using a Sega Genesis gamepad.

To enable this, the interface needs to be configured to KEMPSTON/ GAMEPAD mode.

A Sega Genesis gamepad may contain from 3 to 8 function buttons.

Button B is on ZX usable as fire 1 and button C as fire 2.

Reading the other buttons requires a special software driver.

Here is way for enable gamepad mode in assembler:

DI

IN A,(126) ;this 3x IN is special key for unlock second port 95

IN A,(127)

IN A,(126) ;enable new port 95 for reading gamepad ports

;now is possible use combination of ports 31 and 95 for read

;gamepad state

;writing to any port disable(lock) gamepad port 95 and return

;to original Kempston joystick mode.

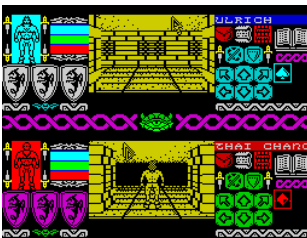
Games supporting the K-Mouse Turbo

A large amount of ZX Spectrum software with mouse support can be found here:

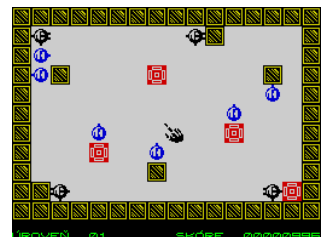
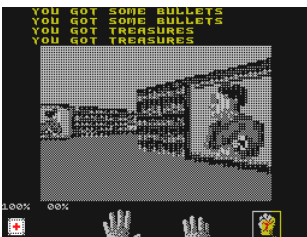
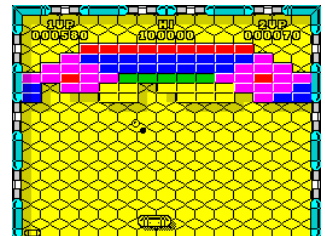
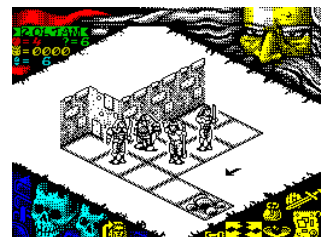
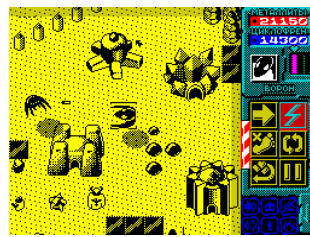
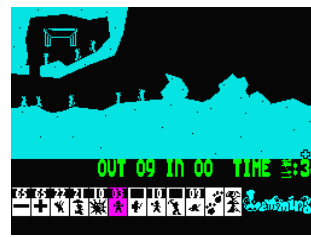
<http://velesoft.speccy.cz/kmsoft.htm>

Some software may be password protected – the password is always: „k-mouse“.

Multiplayer K-Mouse Turbo games:



Other software with mouse support:



Kempston Mouse drivers:

http://velesoft.speccy.cz/k-mouse_driver.htm

Programming the K-Mouse Turbo

The K-Mouse Turbo uses these ports in MASTER mode:

- Port 64479: read full 8 bit value of absolute position of X-Axis
- Port 65503: read full 8 bit value of absolute position of Y-Axis
- Port 64223: read buttons + wheel - higher 4 bits = mouse wheel position, D2-D0 = buttons
- Port 65247: detection of K-Mouse Turbo - always returns value 128

The K-Mouse Turbo uses these ports in SLAVE mode:

- Port 3039: read full 8 bit value of absolute position of X-Axis
- Port 4063: read full 8 bit value of absolute position of Y-Axis
- Port 2783: read buttons and wheel - higher 4 bits = mouse wheel position, D2-D0 = buttons
- Port 3807: detection of K-Mouse Turbo - always returns value 128

Combining different Kempston Mouse interfaces

Combining the K-Mouse 2017 with any other K-Mouse

One interface must be set as MASTER and one as SLAVE.

It's best to connect the K-Mouse 2017 before any other mouse versions, because of the smart anti-collision ports of the 2017 version.

The slave interface must be connected to the last through edge bus connector.

Combining the K-Mouse Turbo 2017 with an original Kempston Mouse interface

The 2017 version must be connected before the original Kempston Mouse interface.

The original Kempston Mouse is compatible, but contains some bugs in the hardware design. Connect a jumper to JP2 to disable the hardware bug of the original Kempston Mouse interface.

The original Kempston Mouse interface is then full usable as second mouse for multiplayer games.

Thanks to the smart anti-collision ports filter inside 2017 version, any original Kempston Mouse interface is automatically converted to MASTER or SLAVE mode (if the 2017 version is master then original Kempston Mouse interface is automatically set to slave mode, and vice versa).

Throughput bus connectors

The K-Mouse Turbo 2017-LP contains 3 throughput bus connectors.
The 2 ones on top of the circuit board may or may not be soldered.

First vertical throughput bus connector

This one is the closest to the ZX Spectrum edge connector.
It is a full 100% throughput connector with identical 1:1 pinout.

Second vertical throughput bus connector

This one is close to the DIP switch block.

It may contain some modified signals if you use different soldering:

1. 100% original 1:1 with the ZX Spectrum bus
2. Disable external memory access (ROM and RAM) for the connected device.
Any connected device will be visible only as I/O device.
Access from the external device to the ZX Spectrum memory, and from the ZX Spectrum to the memory on the external device will be disabled.
It enables you to connect any device (DivIDE, DivMMC, DivMMC Future, etc...) for use with +3e ROMs and you don't need any jumper settings for disable memory (ESXDOS) on interfaces.
The DivMMC Future interface originally is unusable with the +3e ROMs.

Third (last) horizontal throughput bus connector

The last horizontal throughput connector may be:

1. 100% original 1:1 with ZX Spectrum bus without data-collision protection.
incompatible with original Kempston Mouse interface but compatible with DMA devices.
2. Use smart anti-collision filter.
Compatible with original Kempston Mouse but incompatible with DMA devices.
3. Disable external memory access.
Makes DivIDE, DivMMC, DivMMC Future, etc... compatible with +3e ROMs.
4. May use smart anti-collision ports filter + disable memory (combination of both).

When memory access is disabled, it's impossible to use any DivIDE/DivMMC or other interfaces with external ROM/RAM (e.g. ESXDOS).

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