PS/2 Mouse Interface for ATARI® 400/800/XL/XE and other Computers & Consoles

Manual

CMI08

For Claudia

Congratulations

With the **CMI08** you get an outstanding extension for your Atari™-8-bit-computer and other devices.

For the first time you get the ability to connect modern PS/2-mice with your machine. You can choose from the extensive offer of suitable models - as for example:

- standard opto-mechanical PS/2-mice (with ball)
- fully optical PS/2-mice or laser-mice
- coordless radio PS/2-mice
- PS/2-trackballs
- USB-mice which support the connection to a suitable PS/2 adaptor

The **CMI08** was tested with more than a dozen different PS/2 mice and hence should be compatible with most customary mice.

The possibility to plug a second **CMI08** to your Atari™-8-bit-computer is an additionally unique feature: It allows to connect a second PS/2 mouse for hot multi-player-games[1]. With the older 400/800 computer series you can even operate with up to four mice / interfaces at the same time because:

The CMI08 works without sophisticated drivers and is even compatible with existing software!

Have fun while working with your **CMI08**
Christian Krüger
Berlin, May 2008

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[1] suitable software which supports this mode of operation presumed

Connection of mouse and interface

Please notice the following tips to connect the peripheral interface adapter with your computer:

- connect your PS/2 mouse with the interface (green jack)
- ATTENTION: PS/2 devices are **not** 'hot-pluggin' suitable - i.e. may not be changed during operation or be connected to the green jack if the adaptor is already connected with the computer!
- The CMI08 however is fit for 'hot-pluggin'! You can attach/detach a CMI08 linked to a mouse safely to/from the joystick port while the computer is operating.
- So attach now the interface adaptor with his black plug to a joystick port of your computer.[1]
- The adaptor / your mouse is now ready for operation.

Important:
Please notice the current rating of your PS/2 mouse! While opto-mechanical mice, as a rule, consume about 20mA from the joystick port, fully optical mice, who scan their supporting surface contactfree (without a ball), need often more than 100mA. You should not use a PS/2 device with a power consumption above 150mA!

When operating with more than one CMI08, please add the current rating of the mice. As a rule, you can find the rating on the bottom side of the mice. Also here counts: The sum of the consumption should not cross the 150mA limit.

There is exclusion of liability for damages on the computer by using the CMI08!

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[1] the choice of the joystick port depends on the software with which the interface ran. All example progams in the following section expect the adaptor at port one!

Further technical details for advanced users:
If you run your computer already with various extensions, the operation with a stronger power supply unit is recommended if necessary.
Through this you can also overcome easily the 150mA barrier. In general a PS/2 device is allowed to consume up to 275mA. A normal Atari™-computer power supply unit would be hopelessly overloaded, when operating with four of such devices.

Although PS/2 keyboards are mechanically and electrically compatible to the PS/2 mouse port, the operation of these devices with the CMI08 is not supported and planned.

Using the CMI08

The CMI08 knows four operation modes:

- absolute (Atari™ 'Touch Tablet' (CX77) compatible)
- relative (Atari™ 'Driving Controller' (CX20) similar)
- Paddle (Atari™ CX30 compatibel)
- Atari ST™- mouse compatibel

When switching the computer on or connecting the interface with the machine, the CMI08 will be in absolute mode.
You are able to change the operating mode by clicking the middle button or scroll wheel of the PS/2 mouse:[1]

- if you only press the middle button, the interface will operate in absolute mode

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[1] in case your PS/2 mouse is equipped with two buttons, you are limited to work in absolute mode only

- when pressing the left mouse button additionally to the middle one, the adaptor will work in relative mode
- click the middle and the right button of your mouse to switch to paddle mode
- when pushing the left **and** right button while the middle button is pressed the interface is instructed to operate in ST mouse mode

Hint: You can use the middle mouse button like the shift-key of your keyboard:

- push the middle button
- press (if necessary/depending on the desired mode) further buttons in addition
- release the additional buttons
- and finally relase the middle mouse button

There is no need to click on the right and left mouse button for switching to ST mouse mode simultaneously. You can press the buttons also successively during holding the middle mouse button!

Therefore safe mode shifts are guaranteed. While switching the mode, **no** stroke of the buttons will be forwarded to the computer. So you are able to change the operation mode of the **CMI08** without risk of maloperation.

A selection of supported titles

The development of the **CMI08** was made with greatest possible respect regarding compatibility to existing software. Here a choice of titles[1] which already co-operate with the interface today.

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[1] the naming of software titles here does not mean that they are free from rights

Atari Artist

This cartridge which is part of the 'Atari™ Touch Tablet' package, can be used in the absolute mode of the CMI08. Please mind the following tips and restrictions:

- The program supports that the pen of the 'Touch Tablet' can be removed from the drawing surface. This allows to switch e.g. between menu and canvas by clicking the button on the pen while the pen don't touches the surface of the tablet. This kind of operation is impossible to do with a mouse. The solution consists in performing this switch by pressing the 'space bar'-key. Alternatively you can move the cursor out of the top drawing area border, press a mouse button to toggle the display, and move the cursor back down in the screen.

- Removing the pen from the tablet surface also attains special meaning in the 'Magnify'-mode('Z'): The user is able to navigate on the canvas by relative pen movements. Unfortunately, this mode of operation cannot be copied with the CMI08. At least the switch to the relative CMI08 mode allows the positioning of the cursor vertically. The horizontal positioning is limited to the start range which was active when the switch to the 'Magnify'-mode occured.

- The activity of the left and right mouse button corresponds to buttons of the 'Touch Tablet'. This allows the full access to the features of the program. The additional pen button is not neccessary for operation. Anyhow, if your PS/2 mouse is equiped with a scroll-wheel, a rotation 'upwards' of this wheel is equal to a push on the pen button.

Breakout

This game can be played intuitively in paddle mode with the mouse.


Arkanoid

is playable like 'Breakout' in the CMI08 paddle mode - after this mode is

chosen in the game start menu ('ATARI PADDLES'). The light shivering of the racquet comes from the suboptimal analysis of the paddle ('Breakout' shows that this can be done better). Nevertheless the game can be handled without limitations.
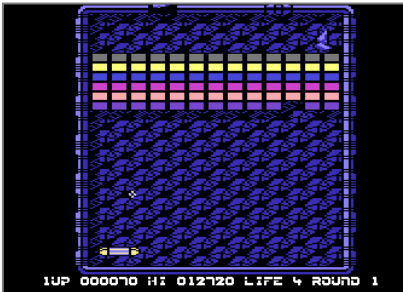
Pong by Gary Domrow

On behalf for many 'Pong'-variations this version is mentioned here. The

'one player training mode' is playable with the CMI08 paddle mode of operation. The two player 'Pong' games are not suitable for mice, since the horizontal axis is mapped to the first player and the vertical axis to the second. Nevertheless, by putting the hands on top of each other on one mouse you can get a 'special thrill'.
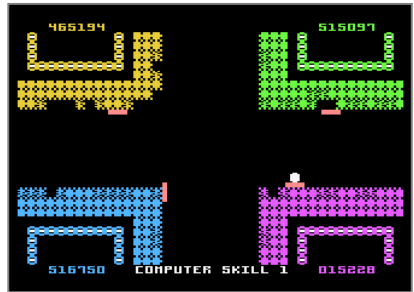

                   Ch. Krüger
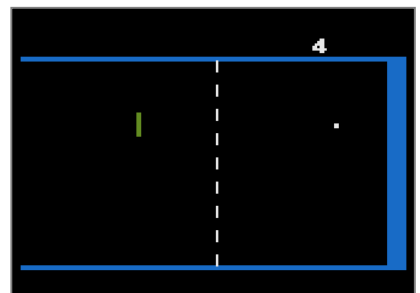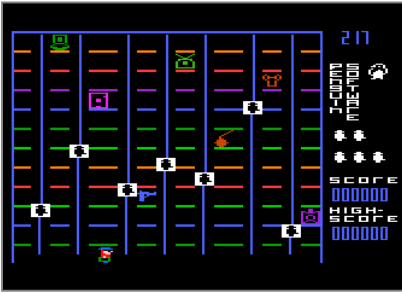
Spy's Demise

After switching the control mode to 'Paddle' in the game menu, this title can be handled with the CMI08 in paddle mode.

Warlords

is playable in a one player session with the CMI08 paddle mode. According to the position choice in the game (e.g. top left) switching to the absolute CMI08 mode can also make sense.
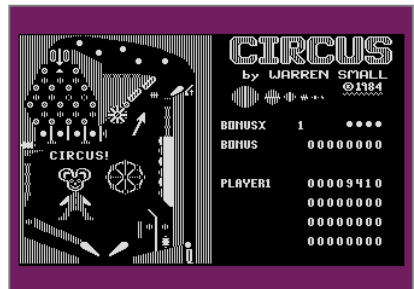

Livewire

Good user experience in absolute CMI08 mode.

Pinball games from the 'Pinball Construction Set'

Indeed, these games aren't classic mouse applications. However they can be played very well by using the left and right mouse button!

Clowns and Balloons

Likewise not a typical mouse game, but another example of the fact that the left and right mouse button can be used very well for classic joystick games.

David's Midnight Magic

A nice pinball game - unfortunately, with a little bit exotic evaluation of

the paddles: Left & right as well as the horizontal and vertical axis are exchanged.

An easy, but not very comfortable solution consists in playing the game with a mouse turned by 180°, so that the buttons point in the direction of the user.

Experienced users which are able to handle a disk monitor have the possibility to customise the game ('patch it'). Please, if possible work on a copy - in case of error there is no warrant for damaged original games!

Look for the byte sequence:
$AD $78 $02 $29 $08
and exchange the ‚$08' with a ‚$04'.
A little bit below this substitution you will find:
$AD $78 $02 $29 $04
Now change the ‚$04' to a ‚$08'.
Afterwards you repeat the complete process from the last substitution once more - resulting in four updates.

Anyhow the exchanged axis problem is still valid, but is also tolerable: You can set the spring tension of the pinball machine by moving the mouse horizontally and enter the letters for the high score entries with vertical mouse movements.

Further titles

- you will find them certainly by yourself. Beside programs which support the 'Touch Tablet' like 'Rambrandt','Digipaint' or the character editor 'Quick Ed' (pen click is scroll-wheel-up!), there are many games like 'Chicken' which co-operate with the CMI08 paddle mode. Since rotary movements of the scroll wheel are translated to joystick up/down movements, you will also find programs which will work with a mouse even they were determined originally only for joystick operation.

The Atari ST mouse mode...

...should be suitable for all programs which advertise the support for this kind of controller. Among others, 'Shanghai', 'Screen Aided Management' or the 'Black Magic Composer' were tested.

Operation with other machines

Beside the operation with 'Atari™ 8-bit computers', the interface also functions with other hardware as for example the 'Atari VCS 2600™' or '7800™' or even the 'Commodore 64™'. On this occasion especially the paddle mode of the CMI08 is relevant for existing software.

Develop with your CMI08

Beside the using existing software with your CMI08, you can also write your own programs supporting the interface. In contrast to other mouse solutions for the 'Atari™ 8-bit' series, as for example the connection of an 'Atari-ST™' or 'Commodore-Amiga™' mouse, the support of the CMI08

needs no memory and calculation time greedy, sophisticated driver and even allows easy use out of the built in 'Basic' programming language.

In general mouse movements of the PS/2 device are converted into values which can be obtained by reading the paddle registers of the computer.

The absolute mode works like the 'Touch Tablet': The value of the x-axis is propagated to paddle port 0^1 and rises from left to right.
The y-axis is retrievable at paddle port 1 (odd port number) and raises in contrast to the 'Koala Pad' from bottom to top.
Attention! The absolute mode of the **CMI08** is the only mode where the x-axis is scaled by the factor 2 compared to the y-axis. When moving the mouse 45° diagonal this means that the value of the y-axis rises/sinks twice as fast in comparison to the x-axis (which is also compatible to the 'Touch Tablet').
However, in contrast to the 'Touch Tablet' the value range ends not with about '220-units', but goes up to saturation (228).
The absolute mode is very well suited for 'desktop'-applications. Here a fixed display range exists, which is covered by mouse movements. The mouse movement ends at the borders of the screen.

Below a simple example for the support of this mode in 'Graphics 0':
You are able to move the mouse pointer above the screen area. Activities of the left or right mouse button are indicated with a dot or cross. Please notice the different scaling of the x and y axis in the source code.

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[1]   when using the first joystick port (more common: even port number)

```
10 REM // SIMPLE TEST PROGRAM
20 REM // FOR THE CMI08-INTERFACE
30 REM // IN ABSOLUTE (CX77) MODE
40 REM // (C) 2008 CH. KRUEGER
50 REM
70 BSADR=PEEK(88)+PEEK(89)*256
80 OLDCURSADR=BSADR
90 OLDCURSVAL=PEEK(OLDCURSADR)
100 X=INT((PADDLE(0)-8)/4)
110 Y=23-INT((PADDLE(1)-10)/8)
120 IF X<0 THEN X=0
130 IF X>39 THEN X=39
140 IF Y<0 THEN Y=0
150 IF Y>23 THEN Y=23
160 ACTCURSADR=BSADR+Y*40+X
170 POKE OLDCURSADR,OLDCURSVAL
180 OLDCURSVAL=PEEK(ACTCURSADR)
190 IF PTRIG(0)=0 THEN CURSVAL=84:GOTO 220
200 IF PTRIG(1)=0 THEN CURSVAL=83:GOTO 220
210 CURSVAL=125
220 POKE ACTCURSADR,CURSVAL
230 OLDCURSADR=ACTCURSADR
240 GOTO 100
```

The paddle mode is utilized like the absolute mode with the difference that the horizontal axis rises from right to left and is not scaled by factor 2. The reason for the existance of this mode is the compatibility with established software.

The relative mode laid out like the absolute mode, however, renounces the scaling of the x-axis. In addition ‚wrap-around' is introduced: If the value of the axes climb over the maximum, the values will start to count

from the begining. The same one counts for crossing the minimum value boundary (which are in all modes about 4): In this case the maximum value will be propaged and decremented. The evaluation of the movement is a little bit more complex: You have to divide an axis into three sections (e.g. <80,80-150,>150). If the movement estimation recognizes a 'jump' from section 3 to section1 without passing section 2, this will mean a further increase of the value. A 'jump' from 1 to 3 without 2 means a decrementing value.

Tip: On the basis of computer machining tolerances the value change when passing the limits is not linear and can incorporate a saturation range.

The relative mode is suitable for large working areas, which require a higher positioning accuracy. It is also usefull for programs which have to keep track with continous mouse movements like 'marble'-games, where a marble can be pushed over and over again without limits.

The Atari-ST™ mouse mode is only implemented in the CMI08 to support a wider range of existing programs. This mode should not be used for new developments, since it has various disadvantages:

- it needs a sophisticated, CPU time consuming and RAM intensive driver. Anyhow it is possible that 'high speed mouse movements' are supressed
- there is no establised process for the evaluation of the right mouse button of ST mice when connected with an 8-bit machine. Indeeed, you can find a hardware patch which transfers the signal to the first paddle port (which is even supported by the CMI08!), but a program can badly count on an accordingly converted mouse.
- no support for scroll-wheels
- ST mice do not 'behave' passively when plugged to the joystick port: Because ST mice work by logic level changes, a concurrent operation with joysticks connected with the same port (e.g. with a splitter cable) is not possible. However, this works with the CMI08, why the operation

with the interface contrary to a real ST mouse should be preferred.

The usual game joystick estimation would only be disturbed if the interface is in ST mouse operation mode. Since the mode is absolute when 'switching' the CMI08 on, a joystick connected parallel to the same port for gaming is not a problem. Because a joystick does not influence a ST mouse when in normal position, finally, the tiresome unpluggin and pluggin can be omitted!

The mouse-buttons and the scroll-wheel

The left mouse button corresponds to the minor paddle trigger (= joystick movement left) and the right button the major paddle trigger (= joystick movement right).

A scroll wheel sends a joystick up movement as long as it will be rotated forward and a joystick back movement for turning the wheel downwards.

Testing without CMI08?

Almost all functions of the CMI08 can be tested already today in emulators. Thus can be illustrated, e.g., with the emulator 'Atari800WinPlus': You can assign to the mouse device of your host system various controllers like the 'Touch Tablet', 'Paddle' or 'ST-mouse'.

Merely on the relative mode and the scroll wheel functions must be renounced nowadays.

However, it is to be assumed from the fact that with corresponding success of the CMI08 these functions arrive in the emulator world.

Have a lot of fun while developing your own programs!

CMI08 - the ultimative mouse interface

- supports modern PS/2 mice
- needs no sophisticated drivers
- works with existing software
- supports scroll-wheels
- operates in 4 modes
- also suitable for VCS consoles and C64