# CTRLDock Classic user manual and operational guide

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Authors :- Nick Schollar, Richard Horne

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# 1   INTRODUCTION

Thank you for purchasing the CTRLDock Classic (DE9 Controller Slice).

The CTRLDock Classic adds support for various joysticks, paddles and mice with a DE9 connector and NEOGEO® controllers with a DE15 connector to many types of computers or gaming system, including the Heber Multisystem, MiSTer FPGA system, Raspberry Pi, Windows, Linux, Mac O/S.

The CTRLDock Classic and MiSTer Multisystem is brought to you by Heber Ltd and The Retro Collective. Additional testing and collaboration with RMCretro on the Multisystem range of products.

If you have any support questions or need any advice on using the system, please do not hesitate to contact The Retro Collective or your local supplier or distributor.

For technical questions about this manual, the CTRLDock and Multisystem technology or for any queries that Heber can provide, please contact multisystem@heber.co.uk Or visit the Heber website www.heber.co.uk

The CTRLDock Classic can be used with many different types of system, the MiSTer, Multisystem, Raspberry Pi, Windows, Linux and Mac O/S will recognise this as a 2 Port HID game controller device.

Amstrad®, Atari®, Commodore®, NEOGEO®, Retro Fighters®, SEGA®, Sinclair®, SUZOHAPP™ are trademarks or registered trademarks of their respective owners.

# 2   THE CTRLDOCK CLASSIC HARDWARE
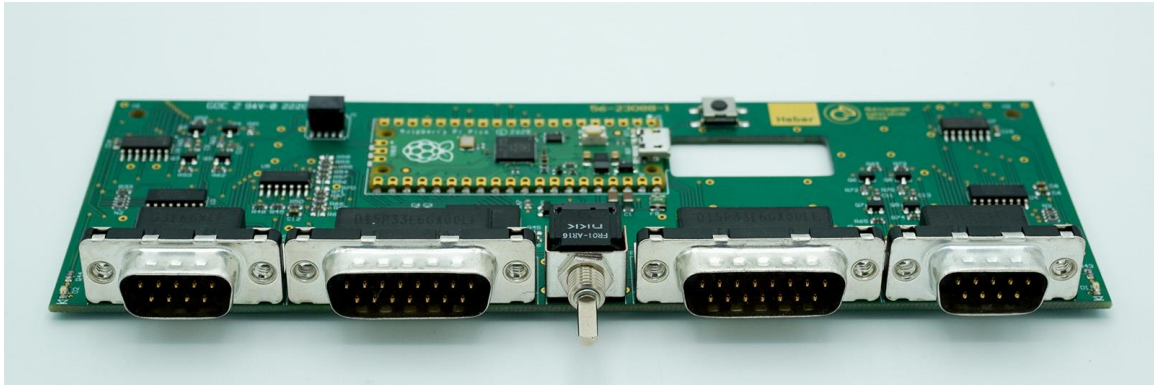


DE9/15 PCB



DE9/15 PCB in optional 3D printed enclosure (stand-alone USB)

1.  Player 1 DE9 connector for joystick (Left hand side)

2.  Player 1 DE15 connector for NEOGEO joystick (Left hand side)

3.  Controller mode switch (Middle of above Image)

4.  Player 2 DE15 connector for NEOGEO joystick (Right hand side)

5.  Player 2 DE9 connector for joystick or mouse (Right hand side)

## 2.1   Game Controller protection system

Certain pins are switched between inputs and outputs to suit the selected controller when the controller mode is changed. The CTRLDock Classic incorporates built-in protection against short circuits on these pins, but deliberate connection of the wrong type of controller for the selected mode or simultaneous use of the DE9 and DE15 ports should be avoided.

Many different types of classic controllers, mice, pads, peripherals and obscure devices have been tested with the Slice hardware, but we are always aware that other devices may also be available, both classic or new that may not operate as intended. If you find a controller that you know is operational but not working correctly in the Slice, then please let us know at multisystem@heber.co.uk

The protection interferes with the correct operation of the Retro Fighters® BrawlerGen controller. A simple dongle can be made to enable proper operation of this controller without compromising the protection, details of which can be found in section 5.1. No other controllers are known to be affected.

## 2.2   Controller Mode Switch

The switch setting is filtered, so the controller mode will only take effect once the control has been left alone for over a second. This allows the switch to be moved between the standby position and the relevant controller position while the controller is still plugged in without the intermediate controller types being activated in between.
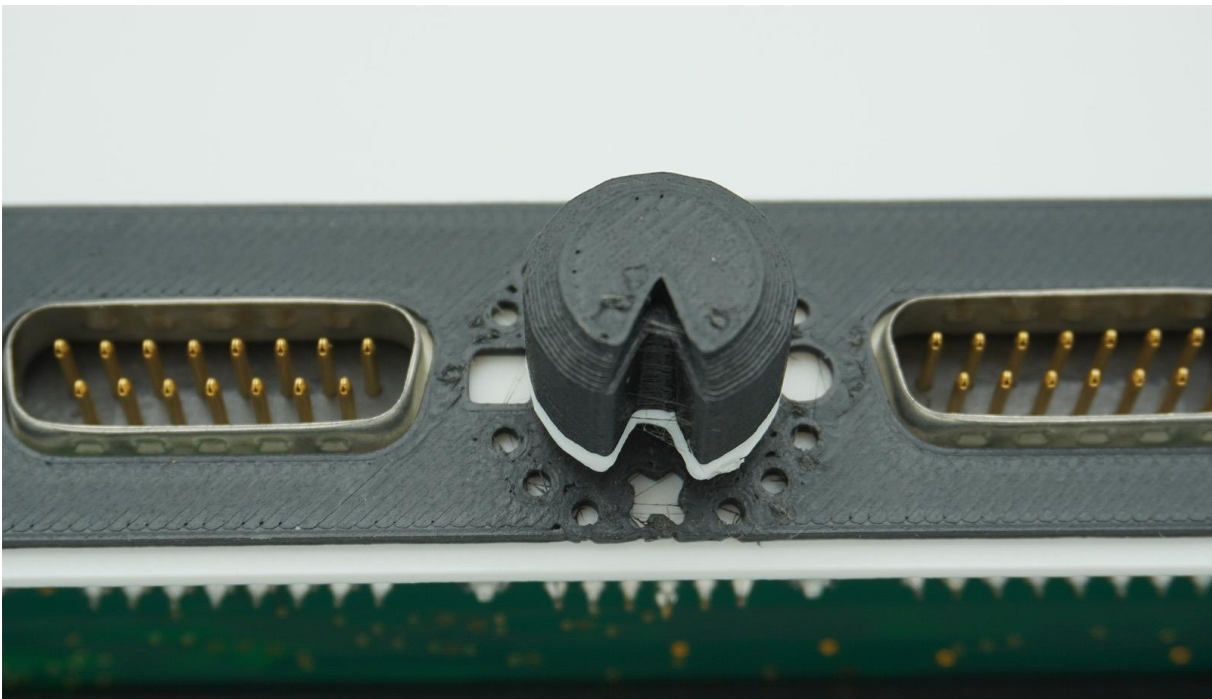


Zero Position of the switch is shown above – pointing to the X position directly down.

## 2.3   Paddles

The CTRLDock Classic is designed to work with unmodified paddles which are wired as rheostats, unlike some other adapters which require the paddles to be modified before use. We have tested various vintage paddles for correct operation. One complete paddle sample takes 7.95ms at the highest sensitivity setting and 15.9ms at the lowest setting.

# 3 SETUP

## 3.1 Enclosure hardware installation



If you purchased the optional enclosure or Slice tray, please follow the instructions below.

The CTRLDock Classic can be used without an enclosure, but it is highly recommended that the optional 3D printed stand-alone case or the Multisystem Slice tray is used.

Optional Slice tray for the Multisystem console.



Fit the panel and rotate the switch so the flat face is directly up (this is Position Zero).
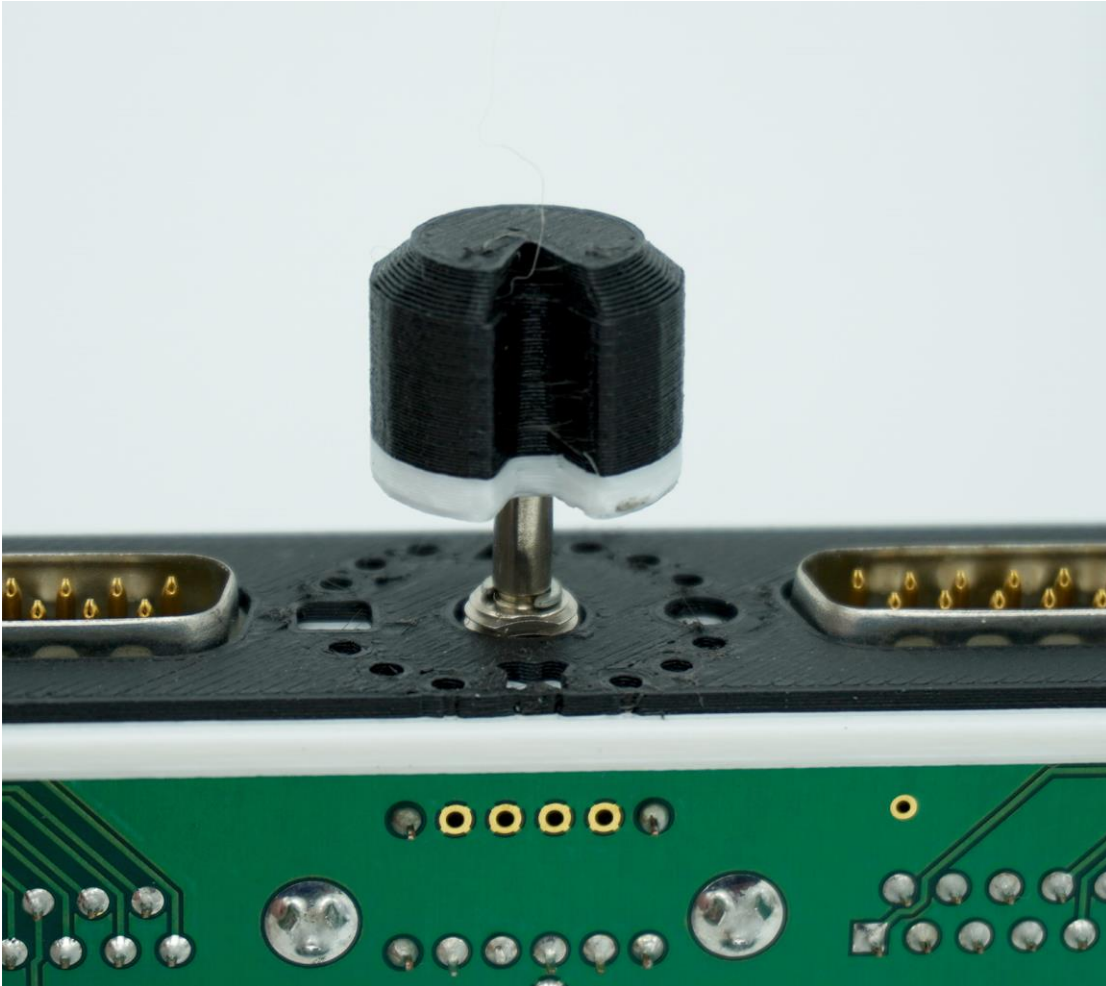
Now you can fit the 3D printed knob so the flat face matches and the V shape selection points down
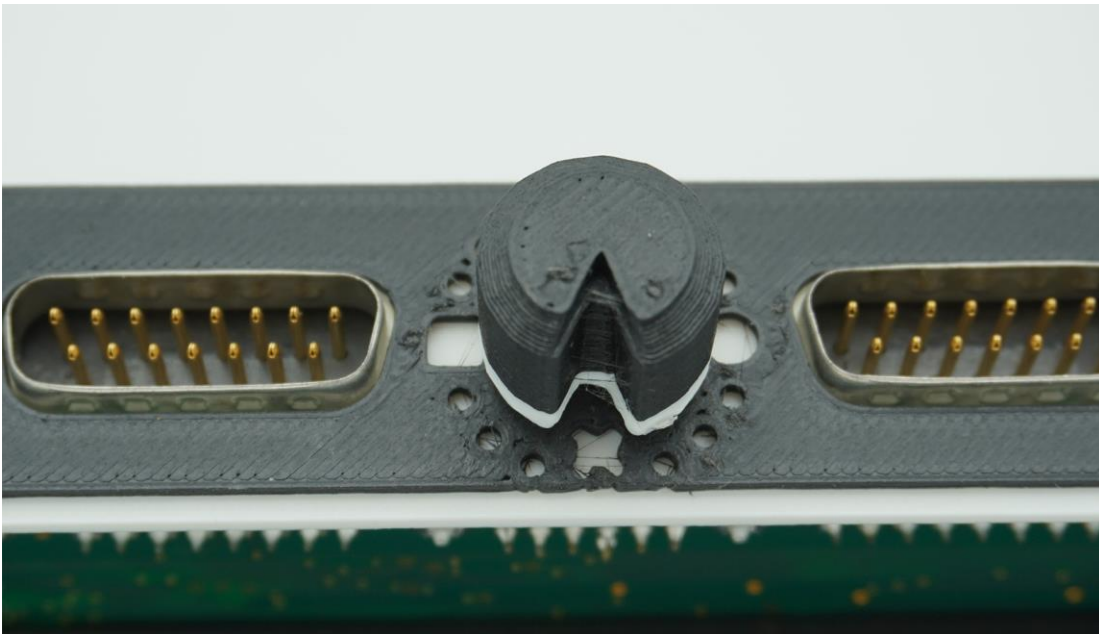


The knob should be firm fitting and rest in this position when complete.

Slide the CTRLDock Classic and panel into the enclosure.
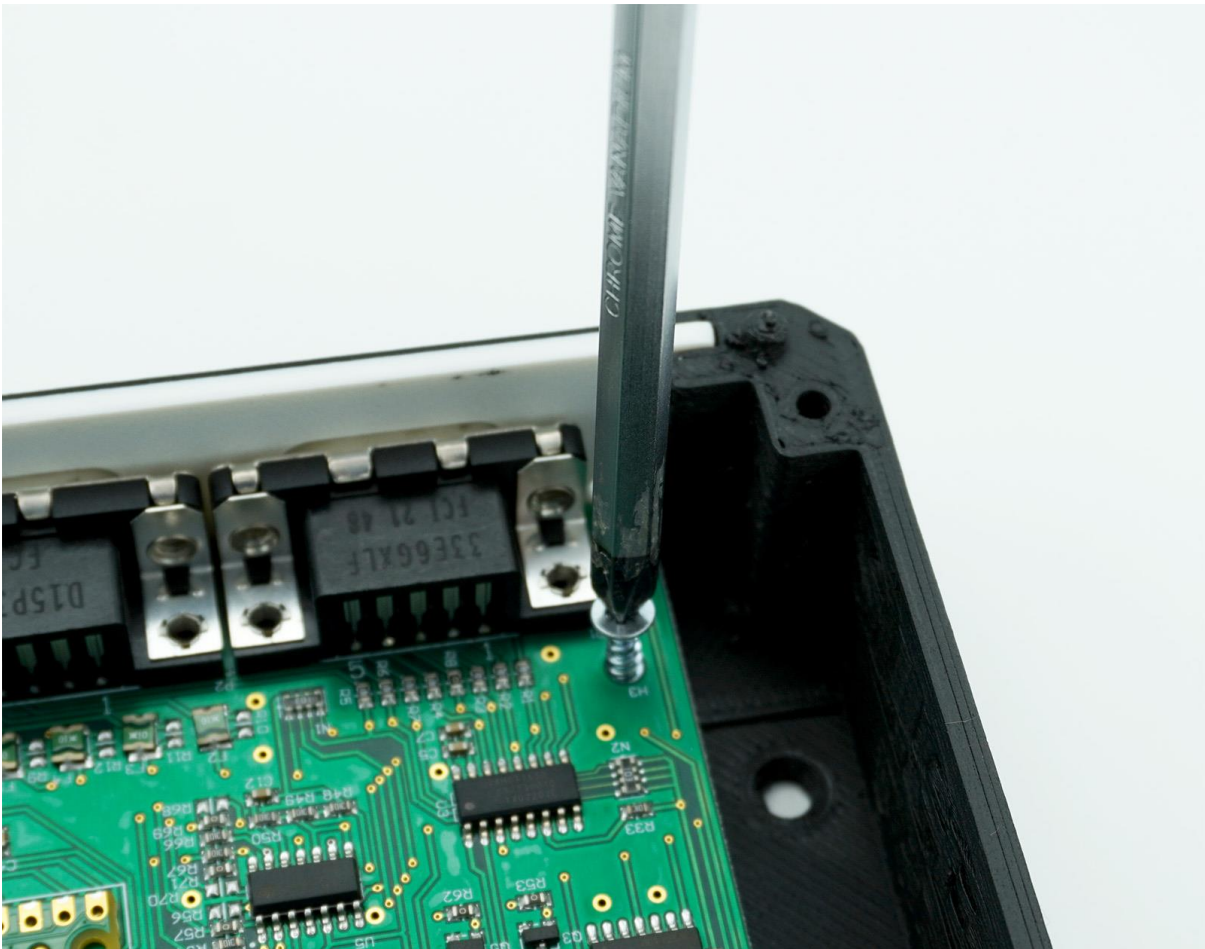


You can secure the PCB into the enclosure with 4 self-tapping m3 screws.
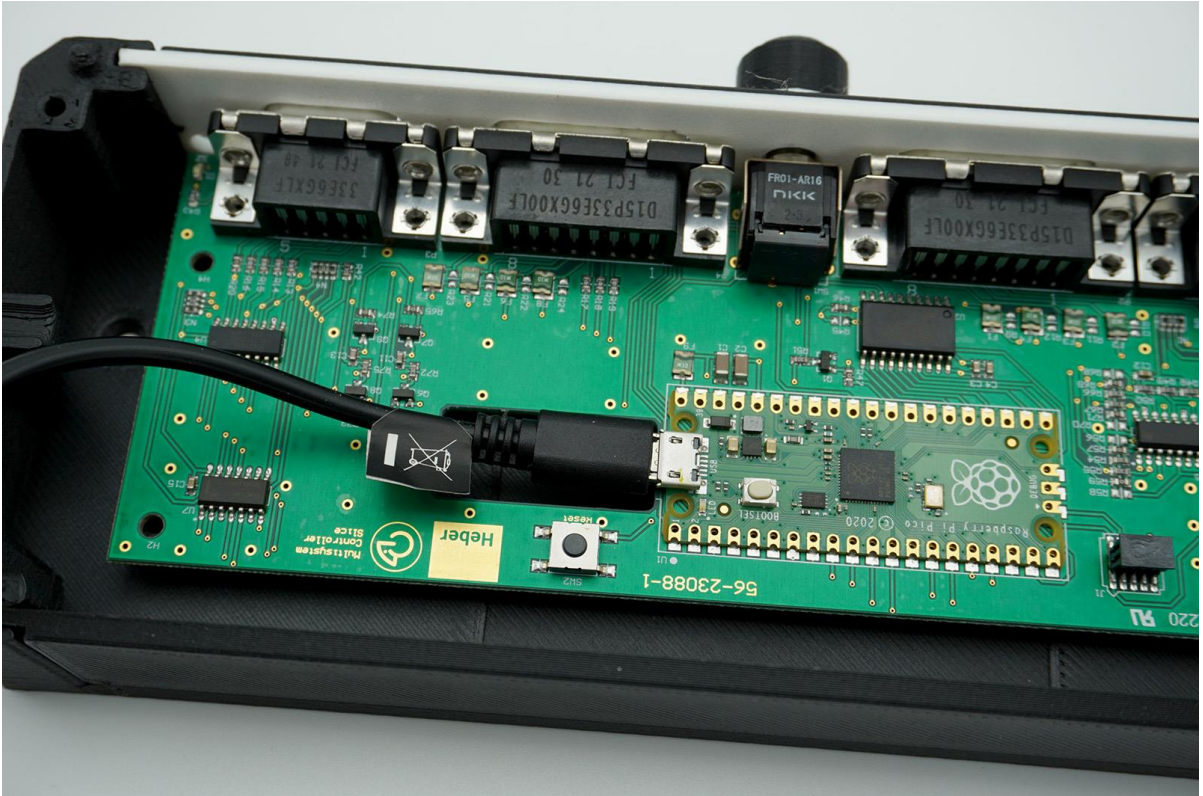
A micro USB cable can be fitted to the onboard Raspberry Pi Pico.
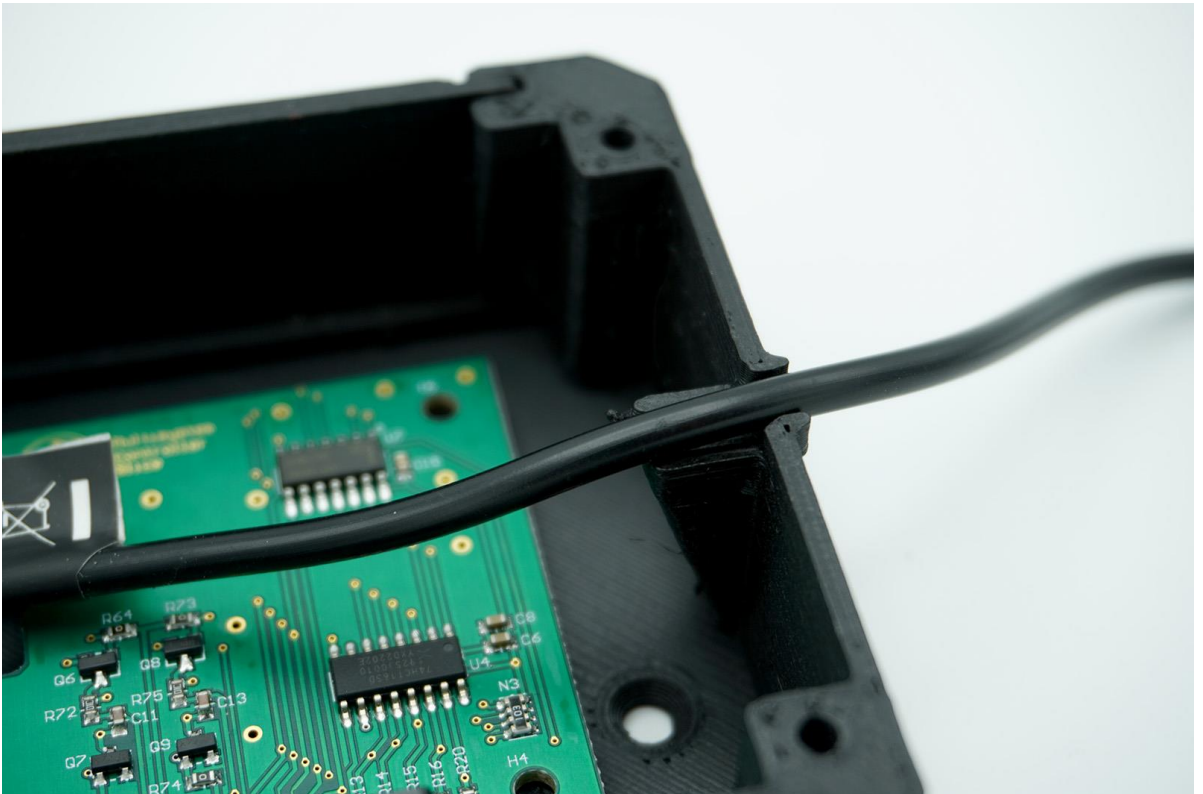


The enclosure has a cable exit, this can also accept a tie-wrap if you wish.

The CTRLDock Classic can now be used as a high speed, low latency USB controller interface for your classic game controllers.
No USB drivers should be required.



The CTRLDock Classic can be used in any USB 2.0 controller port on the Multisystem.

### 3.1.1   Alternative Slice tray for the Multisystem



The CTRLDock Classic can be fitted into a Slice tray for the Multisystem



Two CTRLDock modules can be fitted, or the remaining internal space and removable back panel can be used for an optional SDD/HDD or other storage device or additional controller connection.

The Slice tray is designed to be fitted directly under the Multisystem console case.

Connect the CTRLDock Classic to the USB port on the Multisystem (not SNAC/USER port).



The USB port 7 is ideal for connection of the USB cable from the Slice to the Multisystem

The Multisystem dust cover, or cartridge cover can be fitted and other Multisystem cartridges can also still be used with the Slice tray fitted.

## 3.2  MiSTer / Multisystem controller setup

Select the relevant controller mode (see section 4) for the controller(s) then connect them to the Controller Slice and press a button on the controller. Controllers are assigned to players in the order in which buttons are pressed. Multiple Controller Slices or USB controllers will be recognised as additional players.

Check that the button mapping is satisfactory for each core which is to be used. Each controller type can be used with any core; controllers are not restricted to use with their original system's core, but it may be necessary to remap some of the buttons for the best experience when using a certain controller with a certain core. To remap the controls for the currently running core, open the Menu by pressing the yellow button on the Multisystem, press Right to switch to the System menu, press Down to reach 'Define <core> buttons' and the Enter key on the keyboard or main action button on the controller to remap the controller.

No setup is required for mice. Simply select the relevant mode, connect the mouse to the right-hand DE9 connector, and the mouse should work with any core that supports USB mice.

## 3.3  Using the CTRLDock Classic with systems other than MiSTer

The CTRLDock Classic also works with Windows and Linux, so can be connected to a PC or Raspberry Pi. No drivers are required.

Mice are supported as well as controllers, but the retro mice were originally designed for systems with a very low screen resolution compared to modern computers, so the cursor will move very slowly, but this can be improved somewhat by increasing the cursor speed in the computer's settings.



Many different types of controllers can be used, see section 4 for a list of currently tested and working types.

## 3.4 Knob settings for the CTRLDock Classic (also see table in section 4)
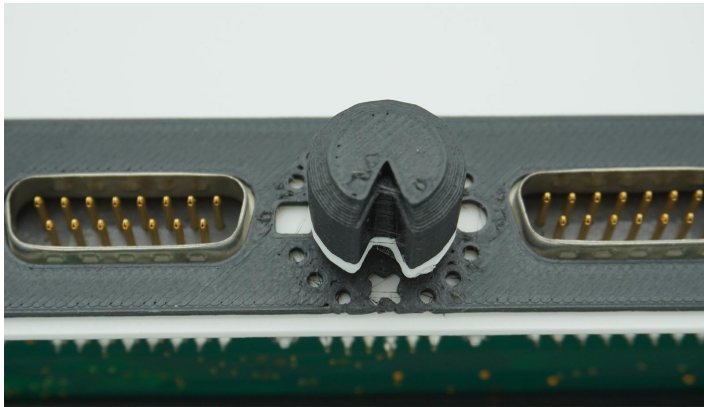


Bottom X Position (Zero / 0)



Left Square = 4



Right Circle = 12
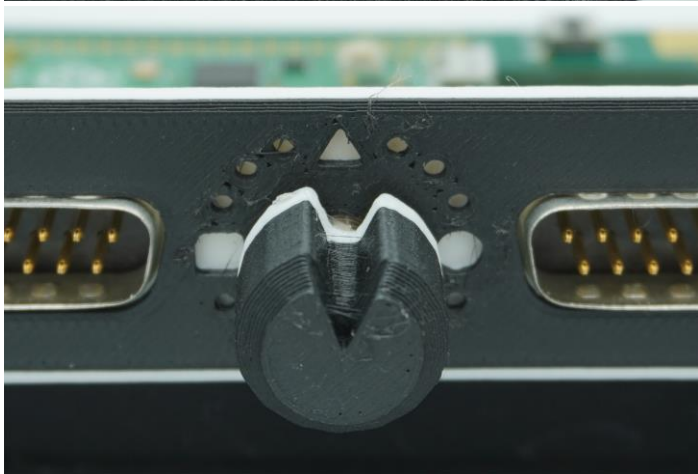


Top Triangle = 8

# 4 CONTROLLER MODES

## 4.1 Summary of controller modes

| Mode | Player 1 port | Player 2 port |
|---|---|---|
| 0 | Standby – used to avoid false button presses when swapping controllers during remap Position X on the control Knob. | |
| 1 | Atari 800, VCS, ST, Commodore Amiga, Sinclair ZX Spectrum | |
| 2 | Atari 7800 | |
| 3 | Commodore VIC-20, C64, C64GS, C128 | |
| 4 | Amstrad CPC, GX4000  - Position Square on the control Knob. | |
| 5 | MSX | |
| 6 | Sega Mega Drive, Master System | |
| 7 | Commodore CD32 | |
| 8 | Atari 800, VCS, ST, Commodore Amiga, Sinclair ZX Spectrum Position Triangle on the control Knob. | Amiga mouse |
| 9 | Atari 800, VCS, ST, Commodore Amiga, Sinclair ZX Spectrum | Atari mouse |
| 10 | Atari keypad | |
| 11 | Paddles – sensitivity 1 (both paddles connected to P1) | None |
| 12 | Paddles – sensitivity 2 (both paddles connected to P1) Position Circle on the control Knob. | None |
| 13 | Paddles – sensitivity 3 (both paddles connected to P1) | None |
| 14 | Paddles – sensitivity 4 (both paddles connected to P1) | None |
| 15 | NeoGeo | |

## 4.2  Controller button mapping

| Mode | 1 | 2 | 3 | 4 | 5 | 1 | 6 | 6 | 7 | 10 | 11-14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Button No.** | Atari, etc. | Atari 7800 | VIC-20 C64 C64GS C128 | Amstrad CPC and GX4000 | MSX | Master System | Master System | Mega Drive | CD32 | Atari Keypad | Paddles | NeoGeo |
| 1 | Button (pin 6) | Left Button | Button (pin 6) | 1 | Handle | 1 | | A | Red | 1 | | A |
| 2 | Button (Pin 9) | Right Button | Button (Pin 9) | 2 | Base | 2 | 1 | B | Blue | 2 | | B |
| 3 | Button (Pin 5) | | Button (Pin 5) | | | | | X | Green | 3 | Button | C |
| 4 | | | | | | | | Y | Yellow | 4 | | D |
| 5 | | | | | | | | Z | L | 5 | | |
| 6 | | | | | | | 2 | C | R | 6 | | |
| 7 | | | | | | | | Mode | | 7 | | Select |
| 8 | | | | | | | Start | Start | | 8 | | Start |
| 9 | | | | | | | | | | 9 | | |
| 10 | | | | | | | | | | * | | |
| 11 | | | | | | | | | | 0 | | |
| 12 | | | | | | | | | | # | | |

## 4.3  Controller port inputs and outputs

The information in this table can be used to identify whether an unlisted controller is likely to work with the CTRLDock Classic.

| Mode | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11-14 | 15 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pin DE9** | Atari, etc. | Atari 7800 | VIC-20 C64 C64GS C128 | Amstrad CPC and GX4000 | MSX | Mega Drive | CD32 | Amiga Mouse | Atari mouse | Atari Keypad | Paddles | NeoGeo | **Pin DB15** |
| 1 | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | | Input (low) | 15 |
| 2 | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | | Input (low) | 7 |
| 3 | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | 14 |
| 4 | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | Input (low) | 6 |
| 5 | Input (low) | Input (high) | Input (high) | Input (low) | 5V output | 5V output | Pulsed output | Input (low) | Input (low) | Pulsed output | Paddle | Input (low) | 13 |
| 6 | Input (low) | 5V output | Input (low) | Input (low) | Input (low) | Pulsed output | Input (low) | Input (low) | Input (low) | Pulsed output | | Input (low) | 5 |
| 7 | 5V output | 5V output | 5V output | Input (low) | Input (low) | Pulsed output | 5V output | 5V output | 5V output | 5V output | 5V output | 5V output | 8 |
| 8 | GND | GND | GND | GND | GND | GND | GND | GND | GND | GND | GND | GND | 1 |
| 9 | Input (low) | Input (high) | Input (high) | | GND | Input (low) | Input (low) | Input (low) | Input (low) | Pulsed output | Paddle | Input (low) | 12 |
| | | | | | | | | | | | | Input (low) | 4 |
| | | | | | | | | | | | | Input (low) | 11 |
| | | | | | | | | | | | | Input (low) | 3 |

| | |
|---|---|
| 5V output (yellow-green) | 5V output |
| Pulsed output (green) | Pulsed output |
| GND (tan) | GND |
| Paddle (orange) | Paddle |
| Input (light blue) | Input (active low) |
| Input (pink) | Input (active high) |

## 4.4  Custom controls and future options –

It is also quite straightforward to connect up custom controls such as standard buttons, Arcade trackballs, spinners, potentiometers or other optical / analogue controls into one of the existing modes of operation.

For example, a genuine Suzo Happ Arcade trackball can easily be connected to the CTRLDock Classic control input if configured as an Amiga Mouse (Position 8).
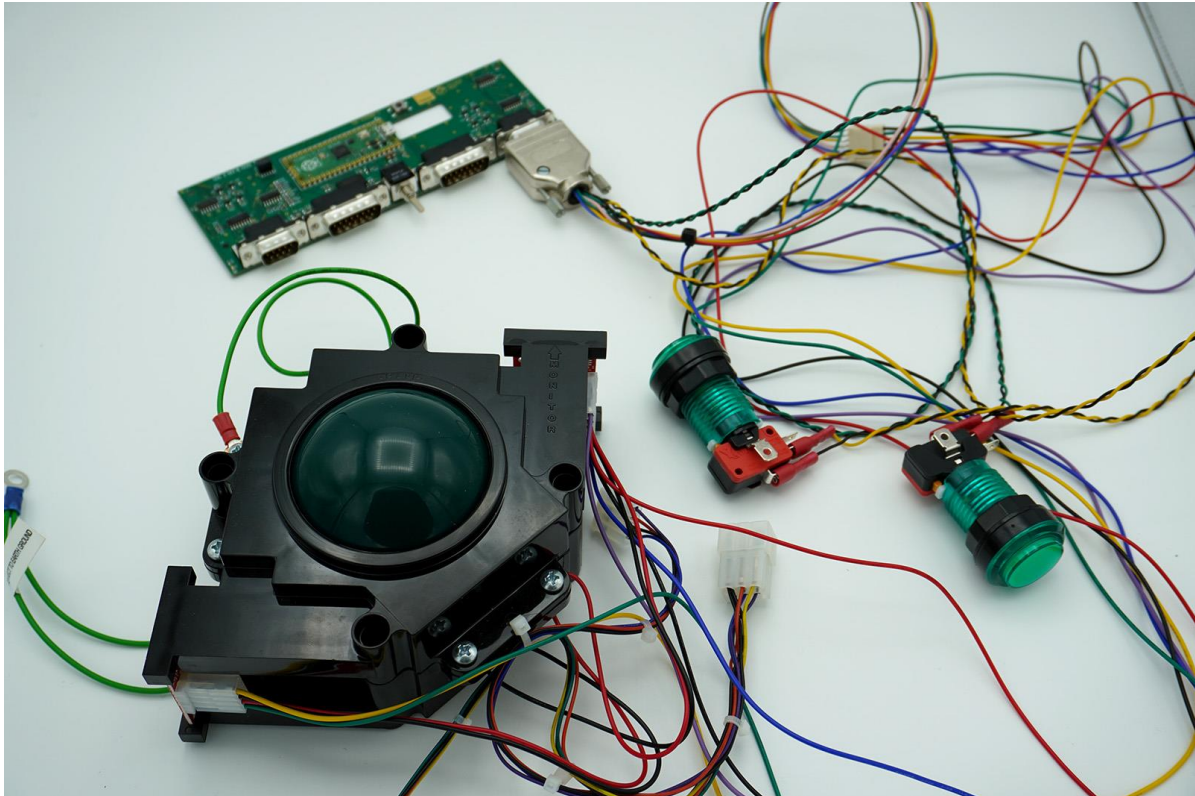


Absolutely the best way to play Missile command and Centipede.

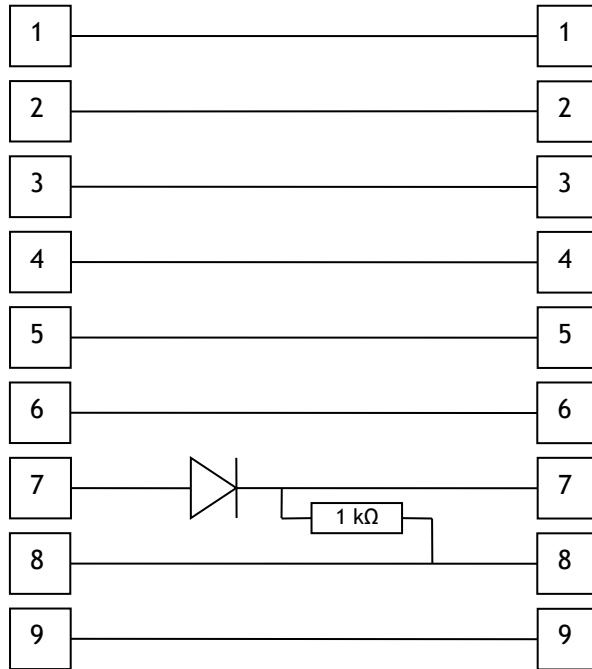If you need help with a certain control interface, let us know - multisystem@heber.co.uk

If you find a controller that is not yet supported, please let us know, we want to have as many classic game controllers and peripherals operational as possible.

# 5   APPENDIX

## 5.1   Dongle for Retro Fighters® BrawlerGen controller

Female DE9 connector
(plugs into Slice)

Male DE9 connector
(plugs into controller)

| 1 | ———————————— | 1 |
| 2 | ———————————— | 2 |
| 3 | ———————————— | 3 |
| 4 | ———————————— | 4 |
| 5 | ———————————— | 5 |
| 6 | ———————————— | 6 |
| 7 | —▷|— 1 kΩ | 7 |
| 8 | ———————————— | 8 |
| 9 | ———————————— | 9 |

# 6   NOTICES

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.