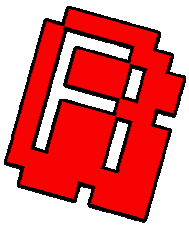

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MiSTer Multisystem user manual and operational guide

80-23024-2r3

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2r1 (18/11/2021)
2 (18/11/2021)
1 (11/08/2021)

Author :- Richard Horne

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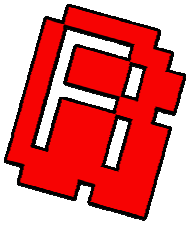

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1 INTRODUCTION

Thank you for your interest in the MiSTer Multisystem, we hope you find this manual useful for both assembly and use of your Multisystem.

The MiSTer Multisystem is brought to you by Heber ltd and RMC Retro. If you have any technical questions or need any advice on using the system, please do not hesitate to contact multisystem@heber.co.uk

Or visit the Heber website www.heber.co.uk

For orders and updates please see www.rmcretro.store

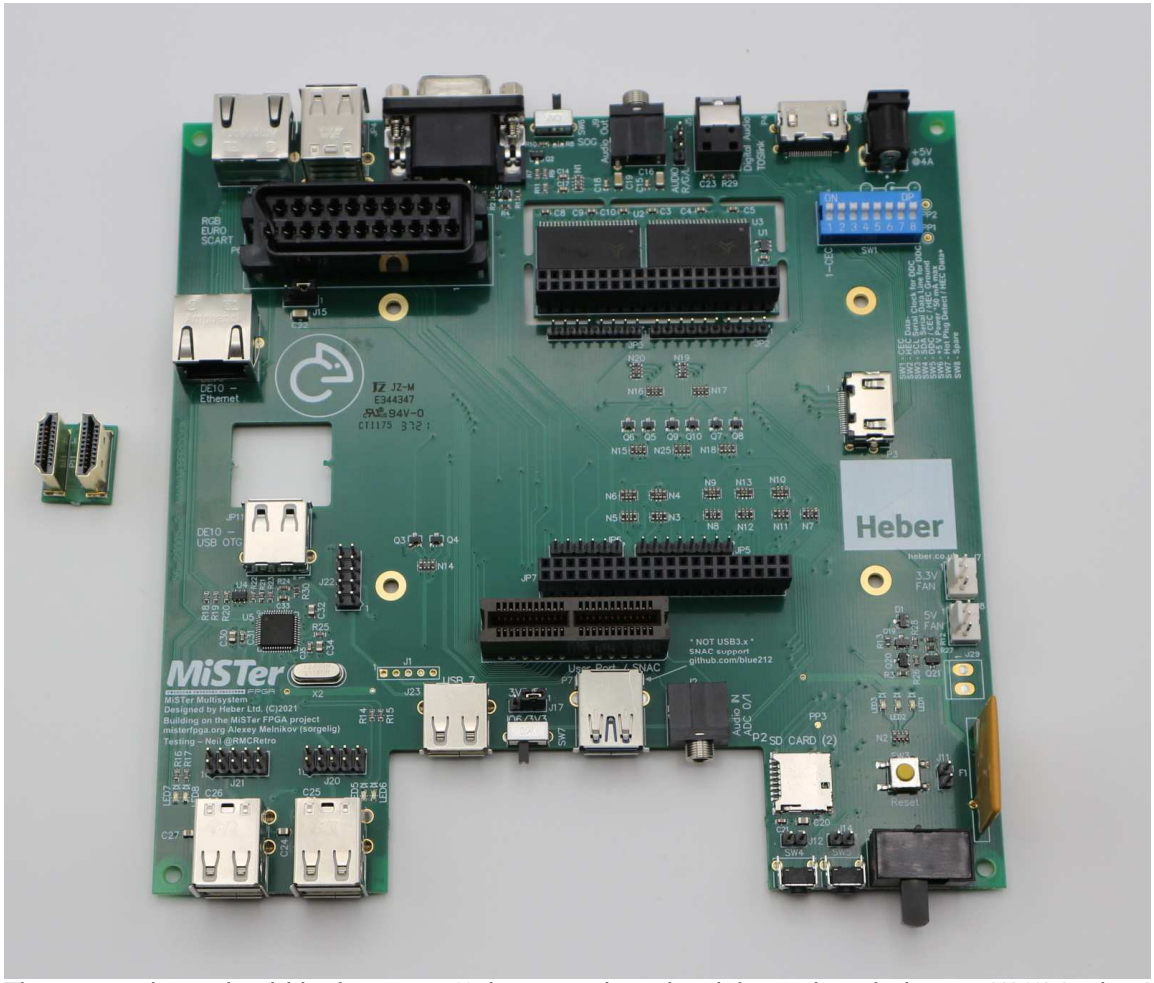
Just before we begin, this is not a MiSTer FPGA manual, it does assume you are somewhat familiar with the MiSTer operation and terminology. That said we have tried to make it as easy as possible to understand. If you do find a term or reference that does not makes sense, or you needed to google, then let us know and we will try to elaborate in the next version. Thank you.

The MiSTer Wiki / Manual should found be here - Home · MiSTer-devel/Main_MiSTer Wiki · GitHub

2 MULTISYSTEM BOARD CHECKS

Before you do anything else, please make sure to remove the HDMI Bridge board from the Multisystem board.

Now check the Multisystem board has its switches, jumpers and settings correctly configured to the standard positions – please note you may need to change these later in the manual for the desired use.



The image above should be how your Multisystem board is delivered, including an HDMI Bridge PCB.

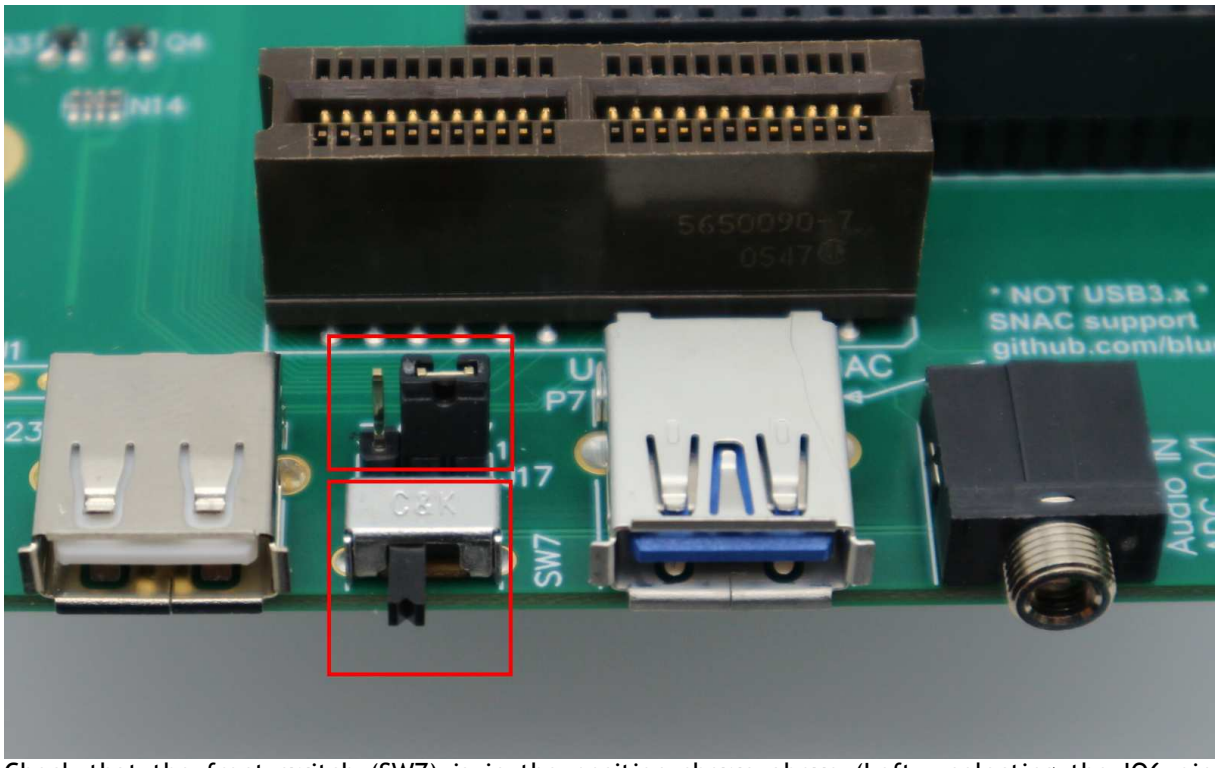
You will also have a short USB cable and Ethernet patch cable.

Please note that a fittings pack (shown below) is not included if you purchased a board only, but is available as a separate item to buy from the RMCRetro Shop.

The fittings pack is included if you purchased a 3D printed enclosure from the RMCRetro Shop or a deluxe kit.

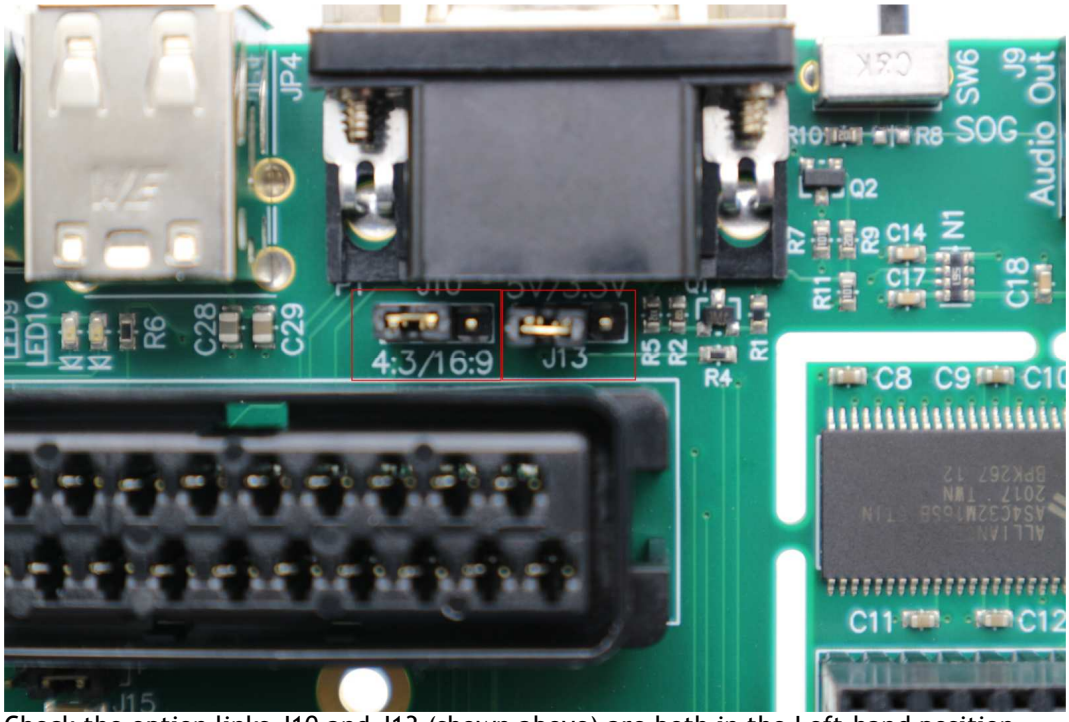
The fittings pack is intended to be used with the 3D printed enclosure reference design, if you are fittings the Multisystem into your own enclosure or have designed your own case, you may find the fittings pack useful, but it is not essential unless you intend to use the reference design enclosure.

All the following instructions in this user manual below assume you have ordered a Multisystem with 3D printed enclosure, they use the standard fittings pack.



Check that the front switch (SW7) is in the position shown above (Left – selecting the IO6 pin connection for SNAC operation) and the Option link jumper (J17) is in the right hand position (Selecting 5v SNAC Operation).

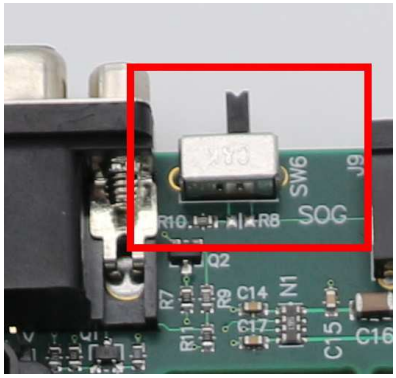
If you wish to use the User port setting, then J17 needs to be set to pins 2 and 3 (3.3v).
The MiSTer User port is used for direct connection of other devices (Mt32Pi for example) to the FPGA on the DE10-nano (using 3.3v signals). The SNAC mostly uses 5.0v for original gamepad /Joystick / paddle / light gun and peripheral devices.



Check the option links J10 and J13 (shown above) are both in the Left-hand position.
This will auto-select a 4:3 mode for the SCART output and apply a 5v power to the 15way dtype ‘VGA’ port – if you wish to have 3.3v or no voltage connection change option link J13.

2.1 Sync on Green (SOG) And/Or Multisync CRT Monitors / PVM / BVM / Arcade

SOG would normally be used with the 'VGA' 15 way Dsub connector (P1), if you have a cable that expects to have Sync on green, use the SOG switch and read the following below – also check in FAQ section.

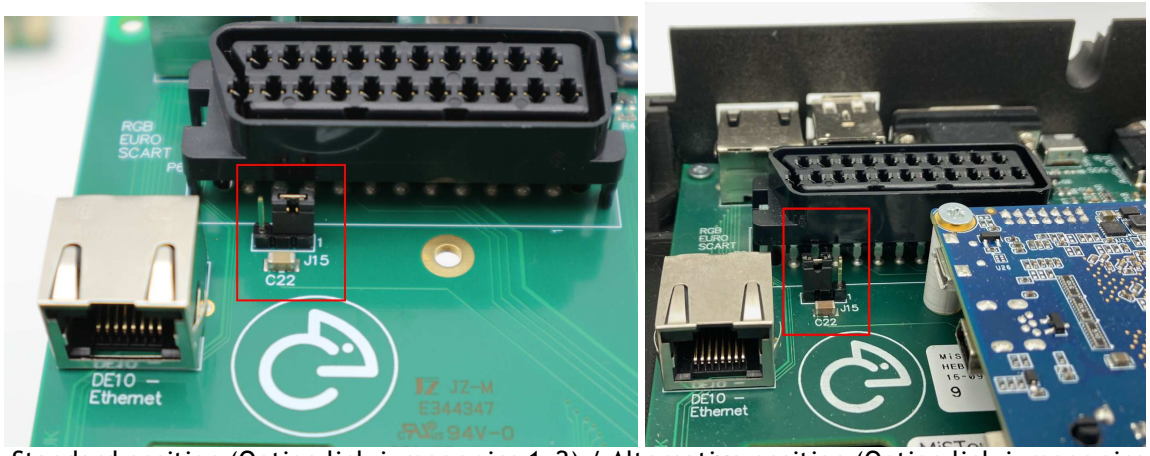


- Sync On Green switch.

If you plan on using a monitor that requires Sync on green (SOG), the Switch SW6 can be used to allow the Composite Sync signal from the MiSTer to be added to the analogue green channel output.

This will also apply SOG to the SCART output port as the signals are shared from the 15 way 'VGA' P1 connector.

Some multisync / trisync / Arcade monitors may also require the Jumper J15 set to the alternative position shown below (Right image) – this disables the capacitor C22 from the Green video output / SOG circuit.



Standard position (Option link jumper pins 1+2) / Alternative position (Option link jumper pins 2+3)

If you have any issues with a lack of Green on the Analogue video output or SCART, then check that option link J15 has not been accidentally removed, everything will look magenta if J15 is not fitted into the standard or alternative position.

2.2 HDMI Isolation -

By default, the HDMI Isolation switches are all ON (nothing disabled).

The DE10-nano board does not handle some of the HDMI specification fully. If you are using an HDMI switch box or have other HDMI equipment connected to an intelligent switch, various undesired operations may happen with using the MiSTer HDMI output, another device may switch on or off, or not automatically be recognised as being on. If you discover any undesired operation, you can isolate various connections from the HDMI output using the SW1 switch shown above.

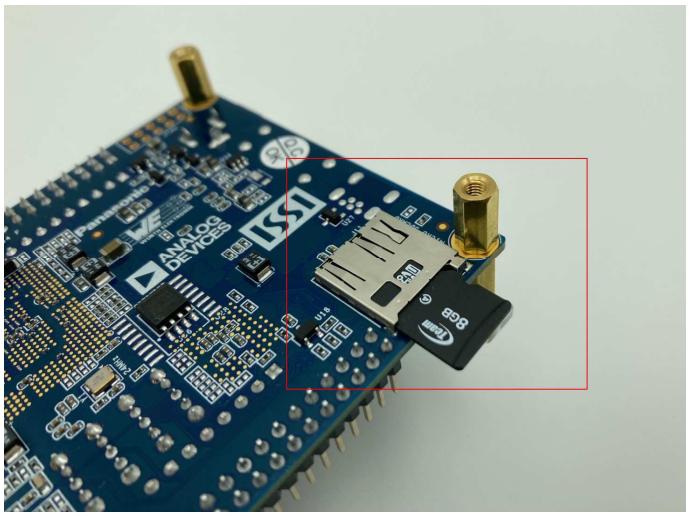
If you wish to isolate SW1 (CEC) or SW7 (Hot plug detect) or any of the other connections shown, just change SW1-SW7 to the OFF position (opposite to the image above).

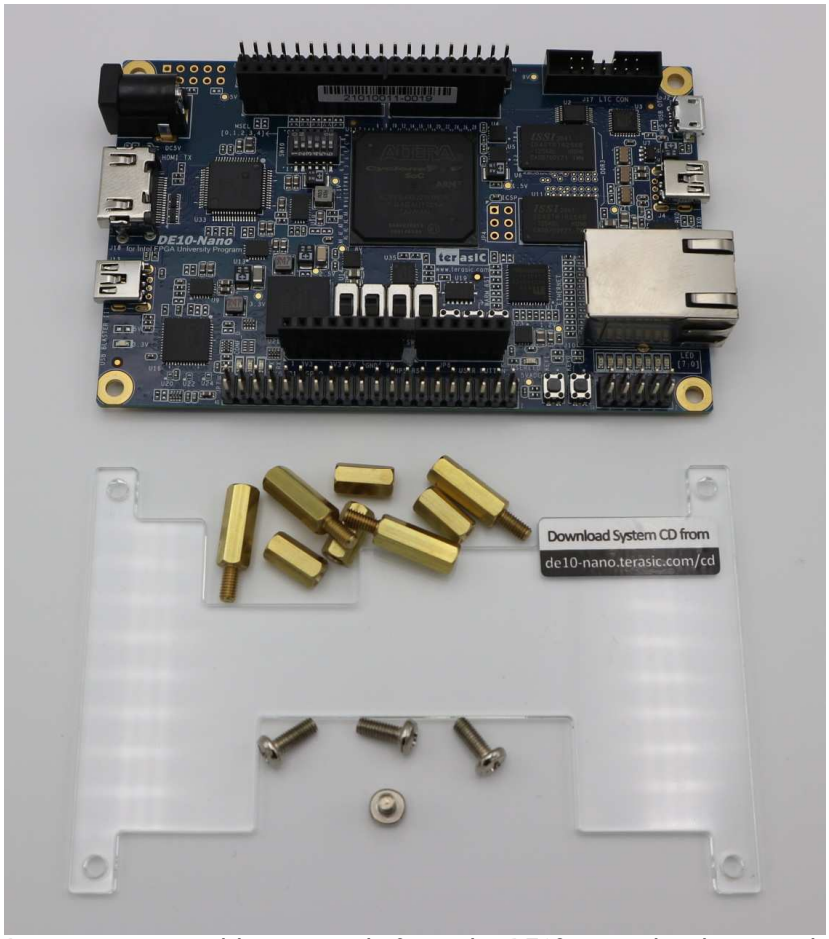
Please note that on some display devices you may loose the HDMI Audio when isolating various signals (SW3 & SW4 for example).

3 ASSEMBLY PREP

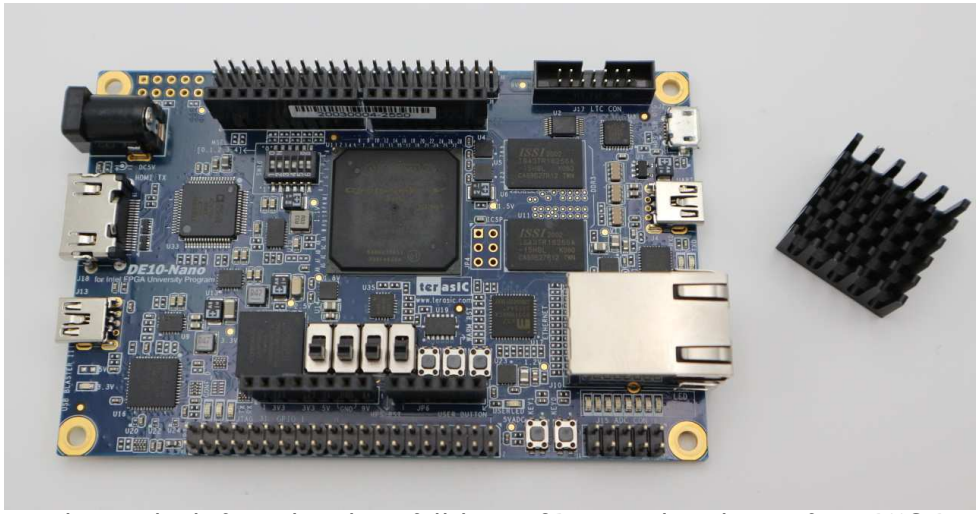
You will first need to prepare a DE10-nano FPGA evaluation board –

Please first check that the micro SD Card has been removed from the DE10-nano board – this is really important as you could snap the card if you try to install into the enclosure without first removing it.

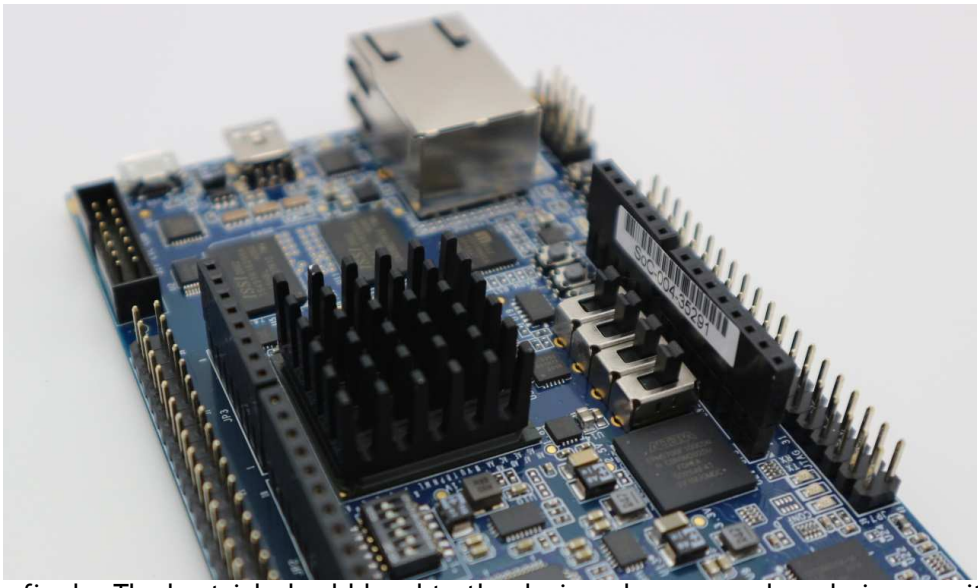




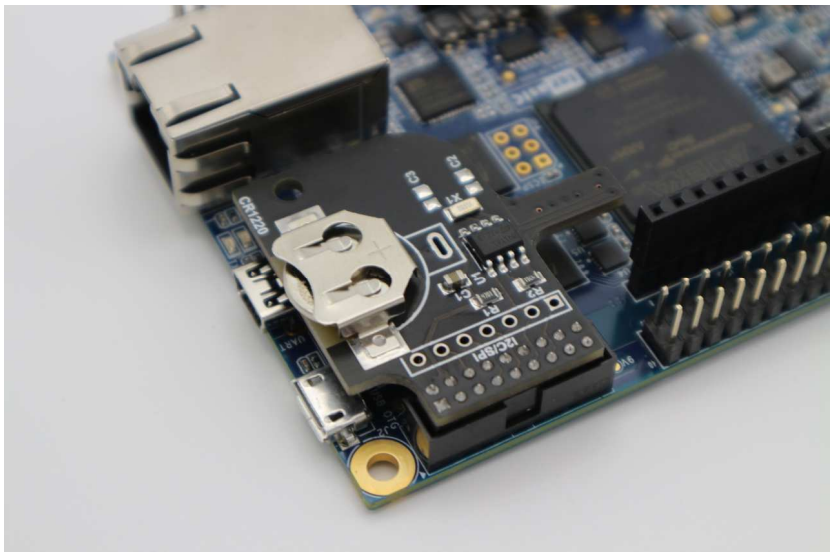
Remove cover and brass stands from the DE10-nano development board, you will not require these parts.



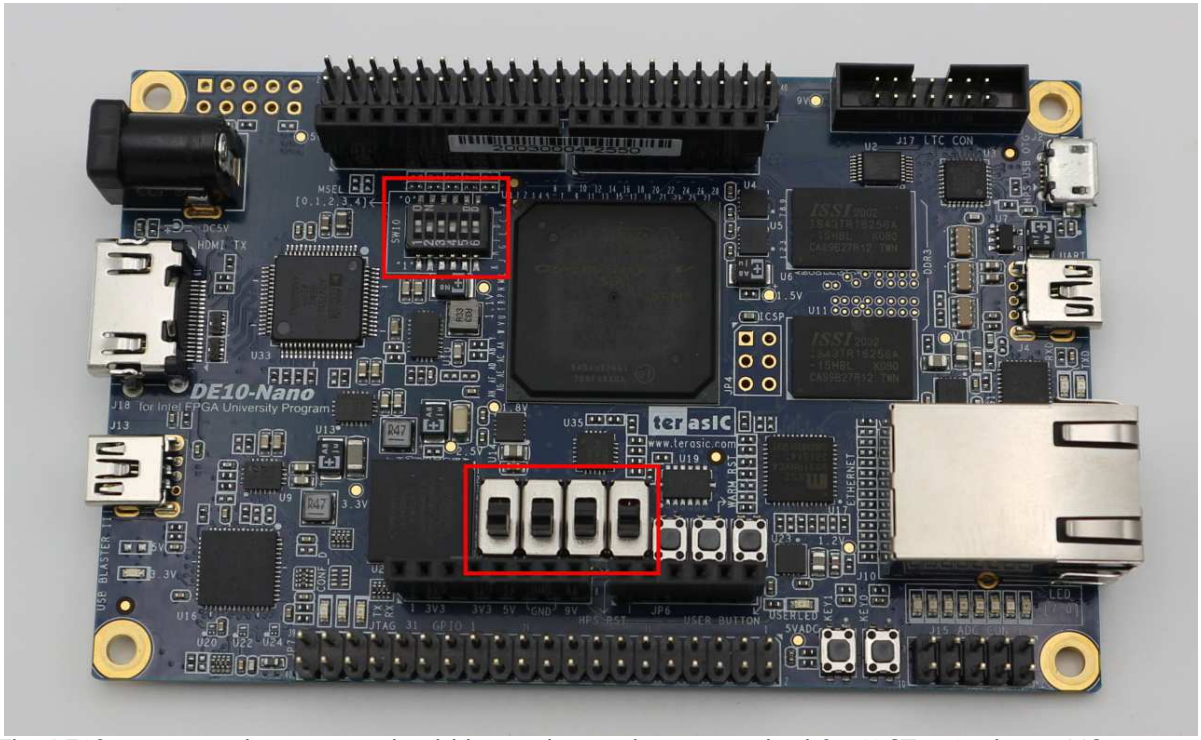
Fit the heatsink (supplied if you bought a full kit or 3D printed enclosure from RMC Retro) to the FPGA.



Push down firmly. The heatsink should bond to the device when warmed up during use, it's a good idea to check that the heatsink has bonded after a few hours of initial use.



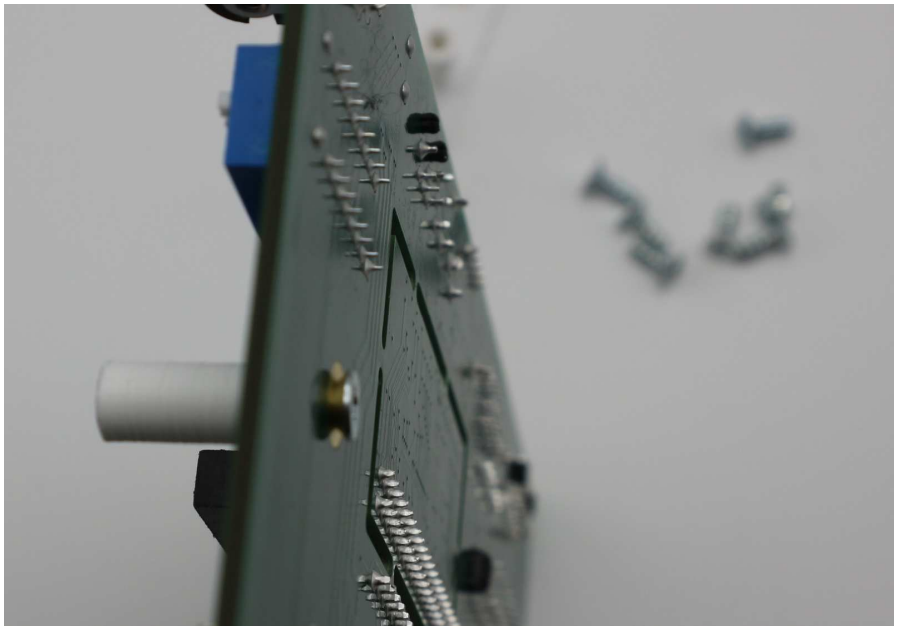
The official Real Time Clock module can also now be fitted if desired.

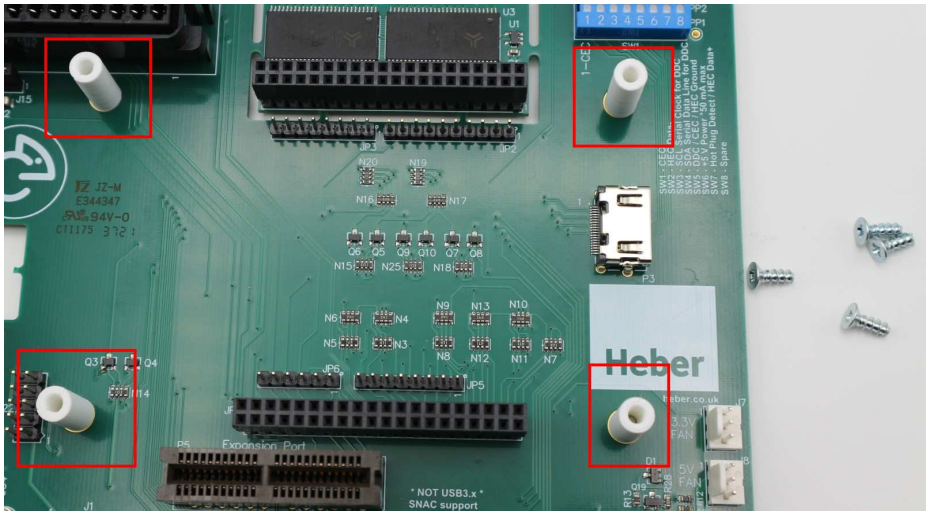


The DE10-nano switch positions should be as shown above (standard for MiSTer Analogue I/O).
Upper switches = 2 and 4 down (off) and all others are in the Up position (on).
All lower switches in the downwards position.

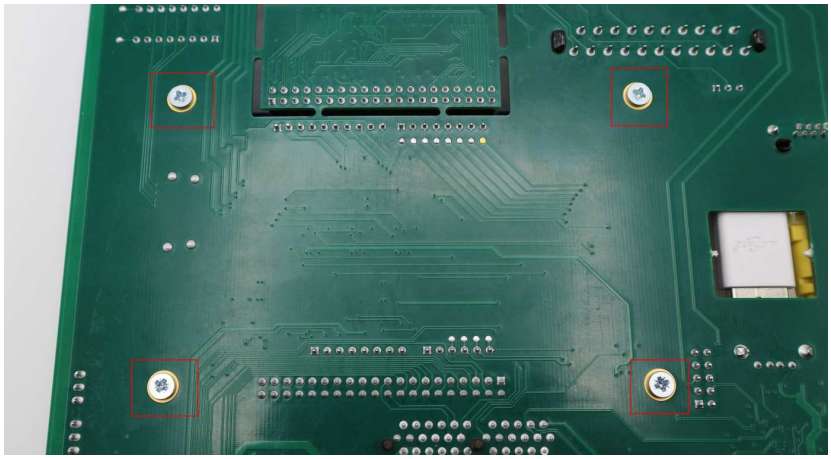
4 FITTING THE DE10-NANO

You will need the four plastic posts and 8 small screws for fitting the DE10-nano to the Multisystem.

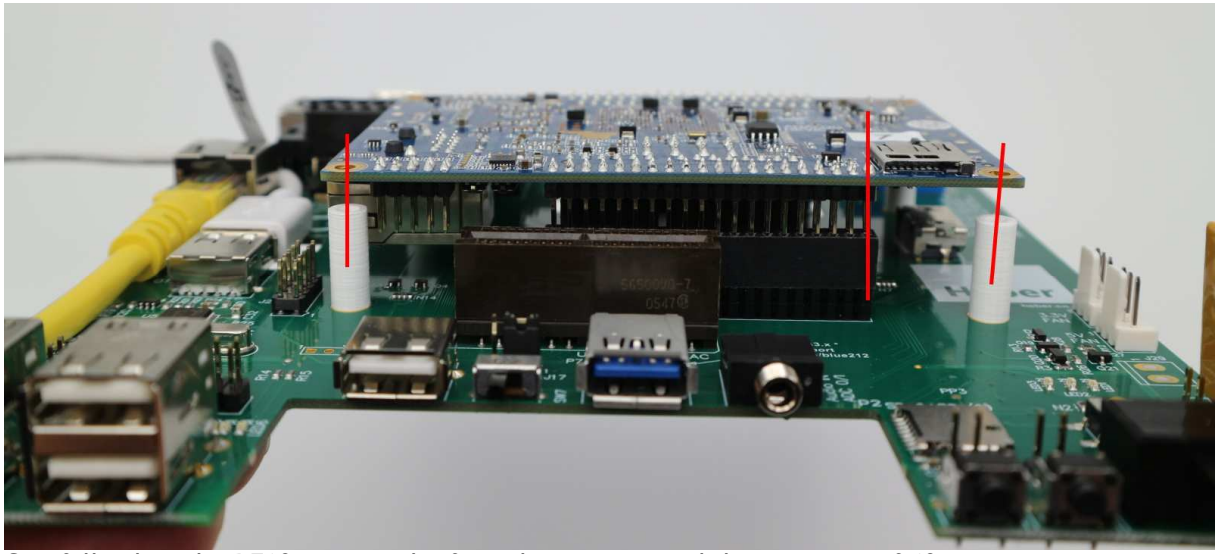




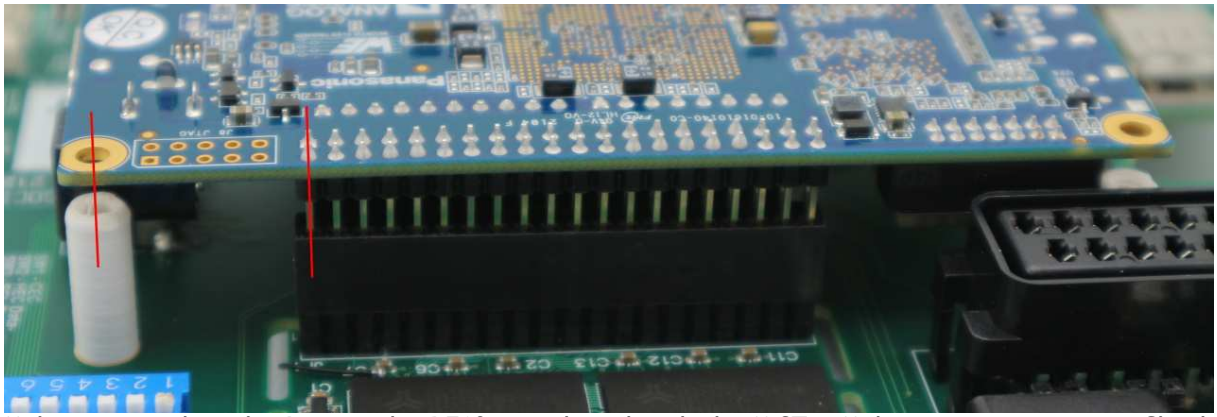
Use four small screws provided to secure the plastic posts onto the Multisystem board. Do not overtighten, just make them secure.



Fit the micro USB cable and Ethernet patch cable as shown above.



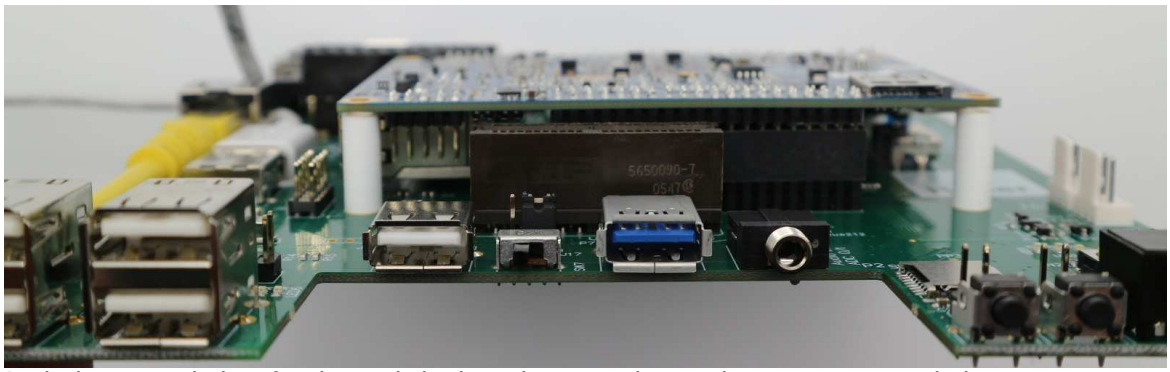
Carefully align the DE10-nano to the four plastic posts and the two rows of 40 pins.



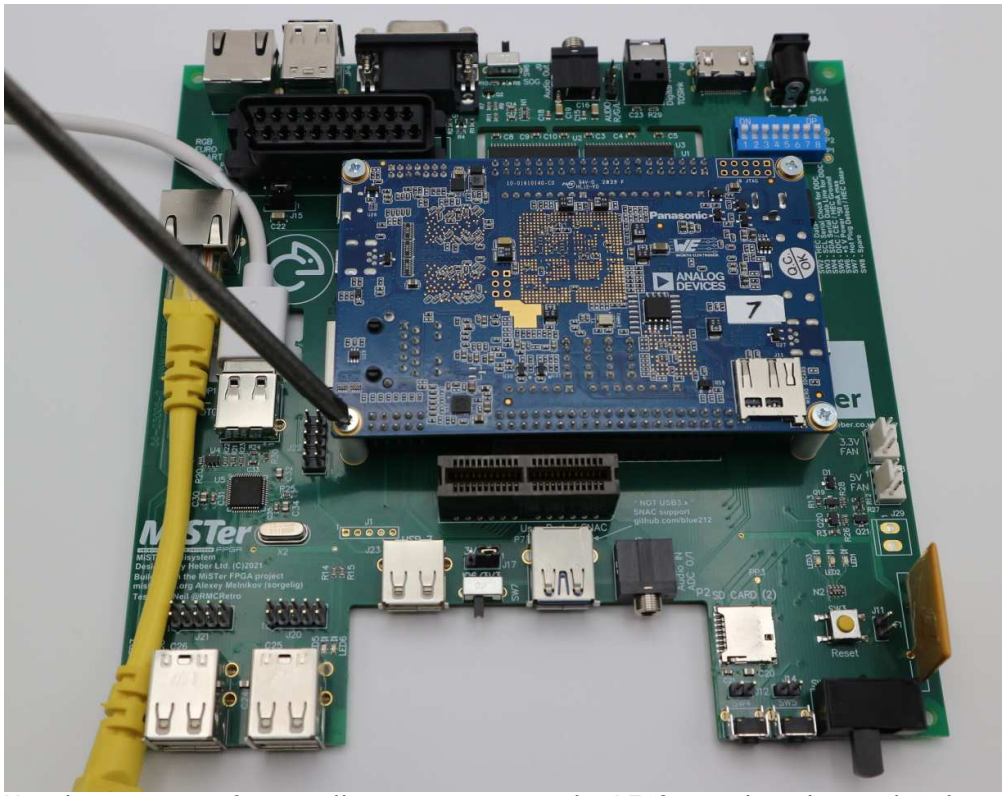
Make sure to align the Pins on the DE10-nano board with the MiSTer Multisystem connectors. Check both sides for correct alignment shown above.

We make connection to all the pins supplied by the DE10-nano, so if any resistance is felt, check the dual in-line and single in-line connectors are all vertically straight.

The corner stands will also align to the DE10-nano board.



Push down gently but firmly until the board is seated onto the connectors and plastic posts.

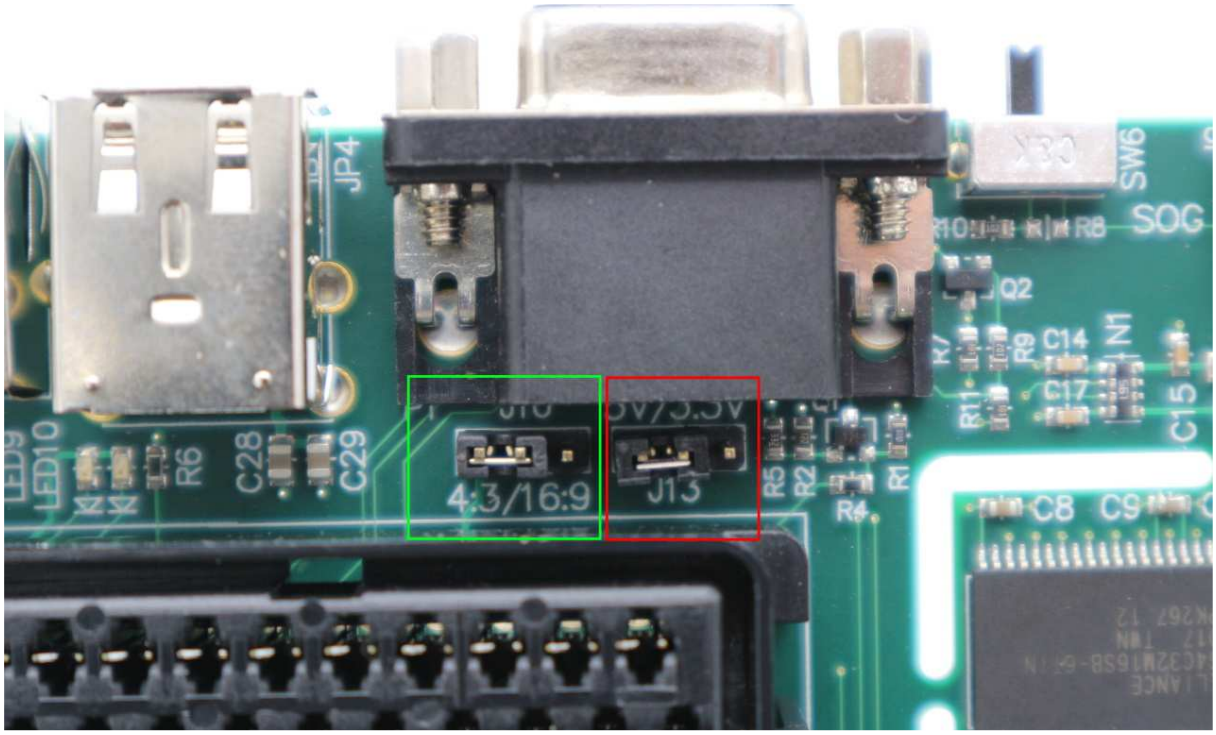


Use the remaining four small screws to secure the DE10-nano board onto the plastic posts. Do not overtighten, just make them secure.

5 BEFORE FITTING INTO THE 3D PRINTED ENCLOSURE.

Various user options are selectable on the Multisystem motherboard. Before fitting into the 3D printed enclosure (or a case of your own) it's useful to check the links are in your desired positions.

5.1 RGB SCART and VGA -



If you are planning to use the RGB Scart output function, you can select a desired output format for the screen. This sends a signal to the SCART TV input to automatically change from 4:3 or 16:9 format. By default, the option link is fitted to 4:3 output.

Some TV's may not see this signal as the specification calls for a nominal 9.5v signal and we supply a current limited 9.0v output. If you find any SCART equipment that does not automatically switch 4:3 or 16:9 it would be good to know the make and model.

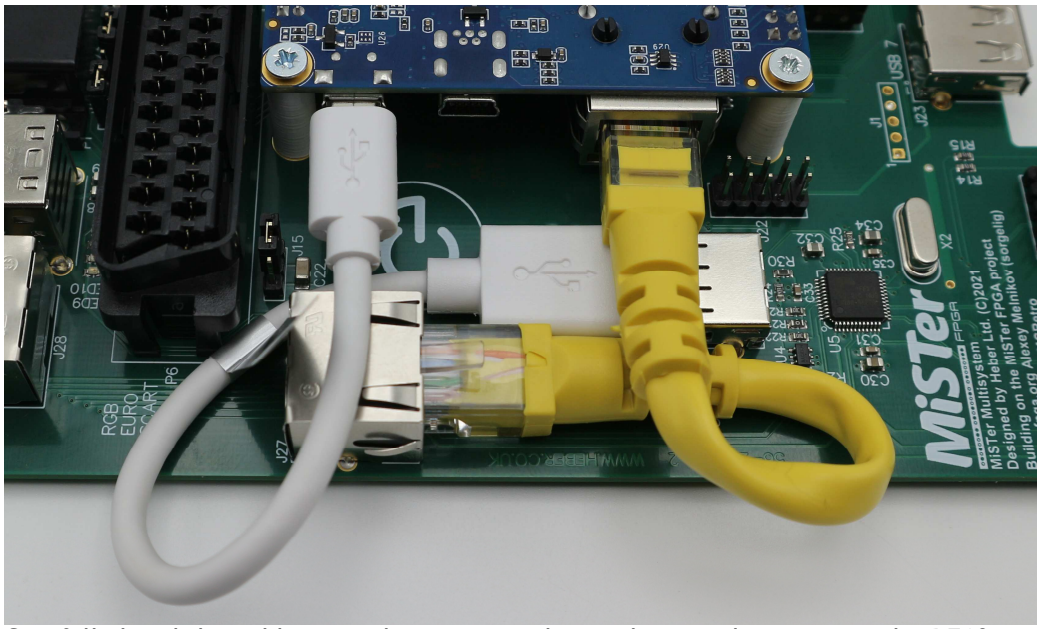
VGA also has a voltage select output – this is J13 shown above and is normally set to +5V. You can select 3.3v or remove the link to disable any output voltage on the VGA port.

The VGA output on MiSTer is not really an official 'VGA port' to the specification. It can output a VGA compatible signal or a number of other standards that are selectable in the MiSTer.INI file.

You should use either the VGA output port or the RGB SCART connection to your desired analogue video monitor.

Please also see sections below for further information about SCART to analogue CRT monitors or other SCART equipment.

5.2 Connect the USB and Ethernet cables -

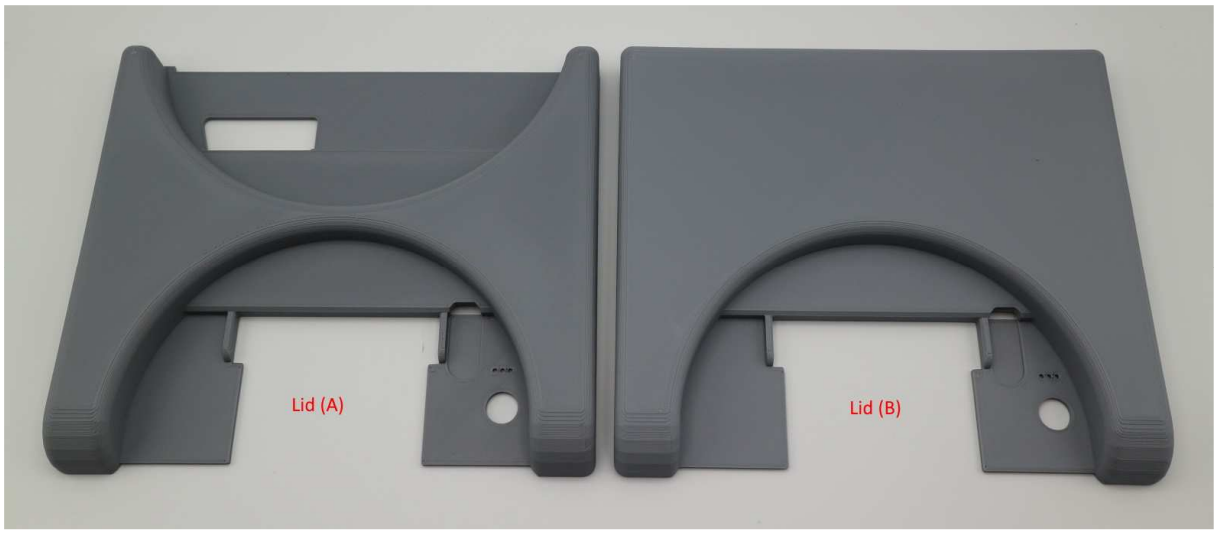


Carefully bend the cables into the positions shown above and connect to the DE10-nano board.

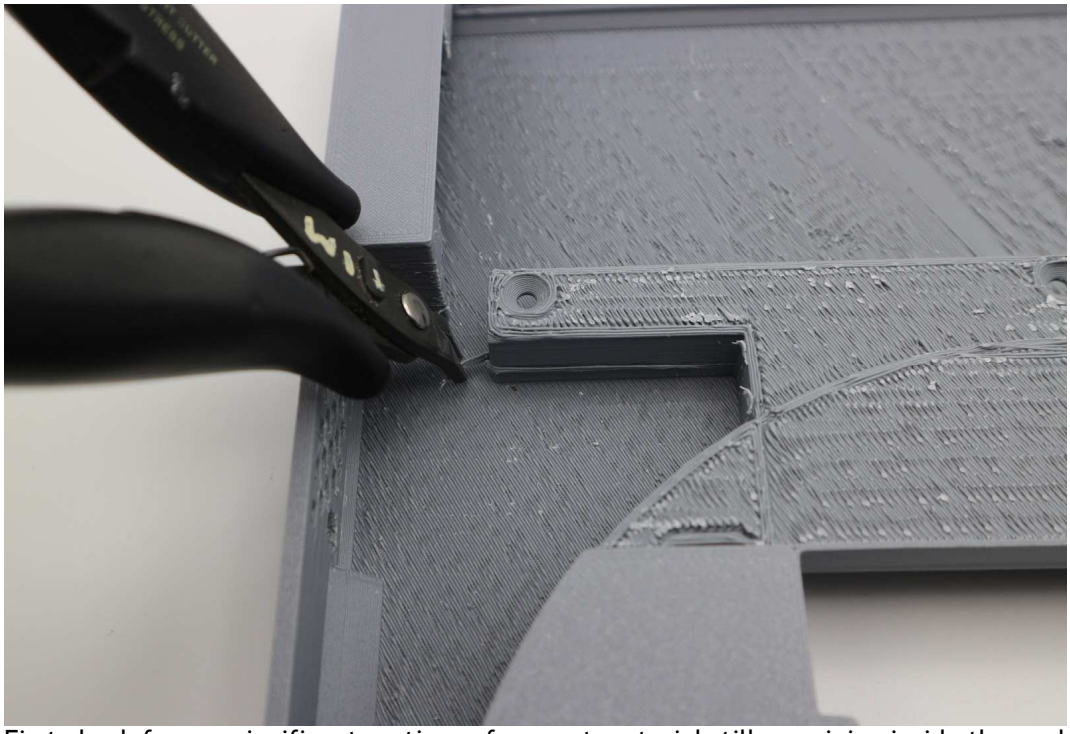
6 3D PRINTED ENCLOSURE PREPARATION

The Multisystem should now be ready for fitting into the 3D printed enclosure or a case of your own.

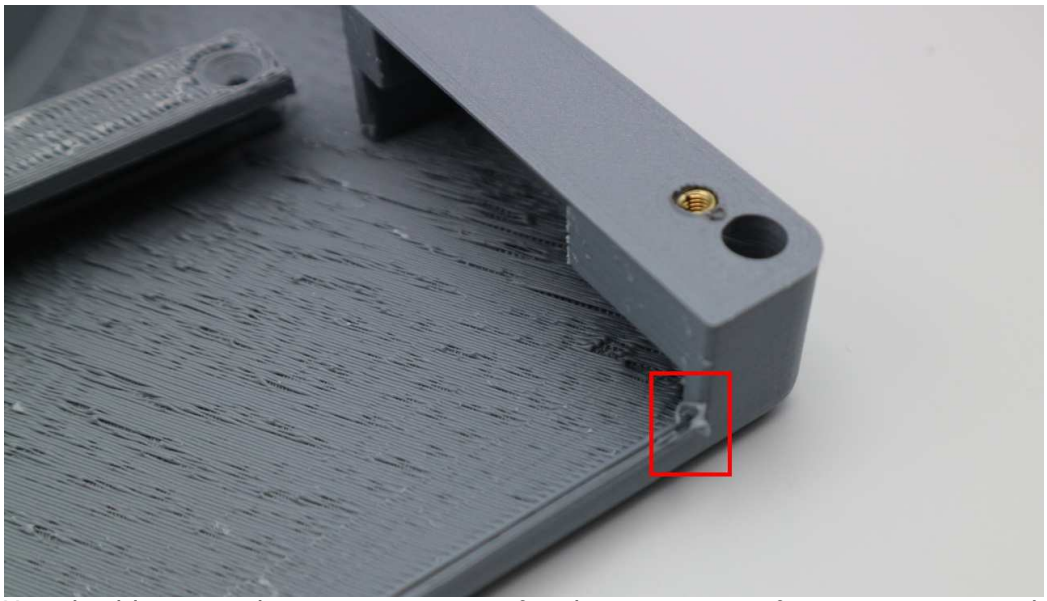
Before fitting into the 3D printed enclosure, it is highly recommended that a little check and preparation of the 3D printed parts is completed as shown below –



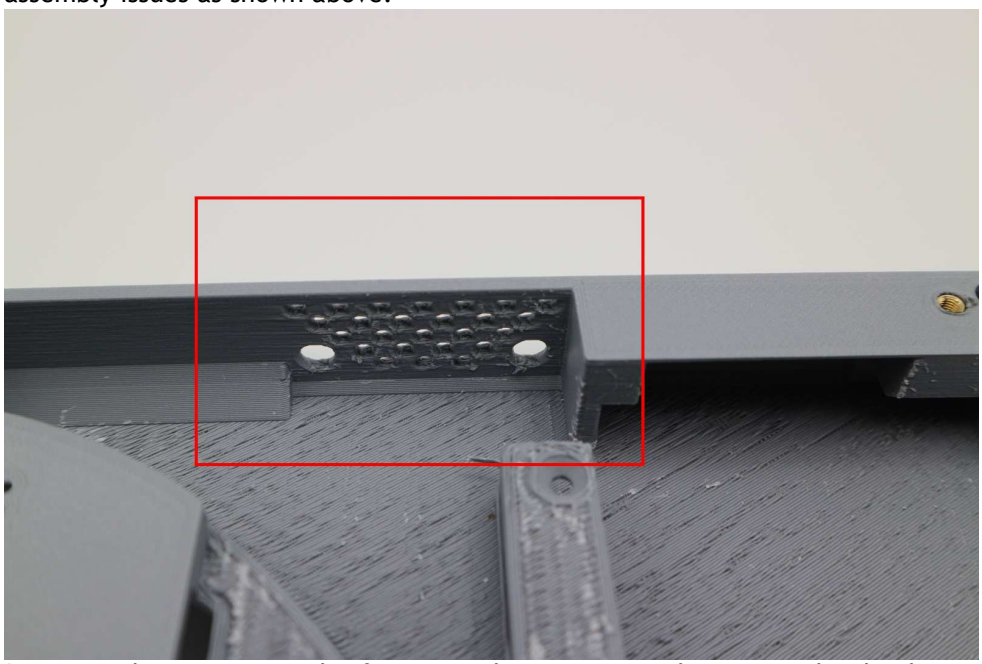
Type A or Type B enclosure styles. Type A usually requires no clean-up, Type B may require the steps below –



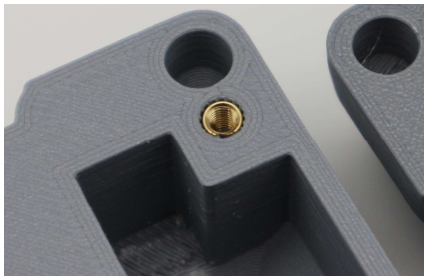
First check for any significant sections of support material still remaining inside the enclosure lid. Case B is the trickiest clean-up and may still have a few whisps and strands to clear out with a pair of tweezers or snips.



You should not need to scrape out any fused sections, just focus on any parts that may cause assembly issues as shown above.

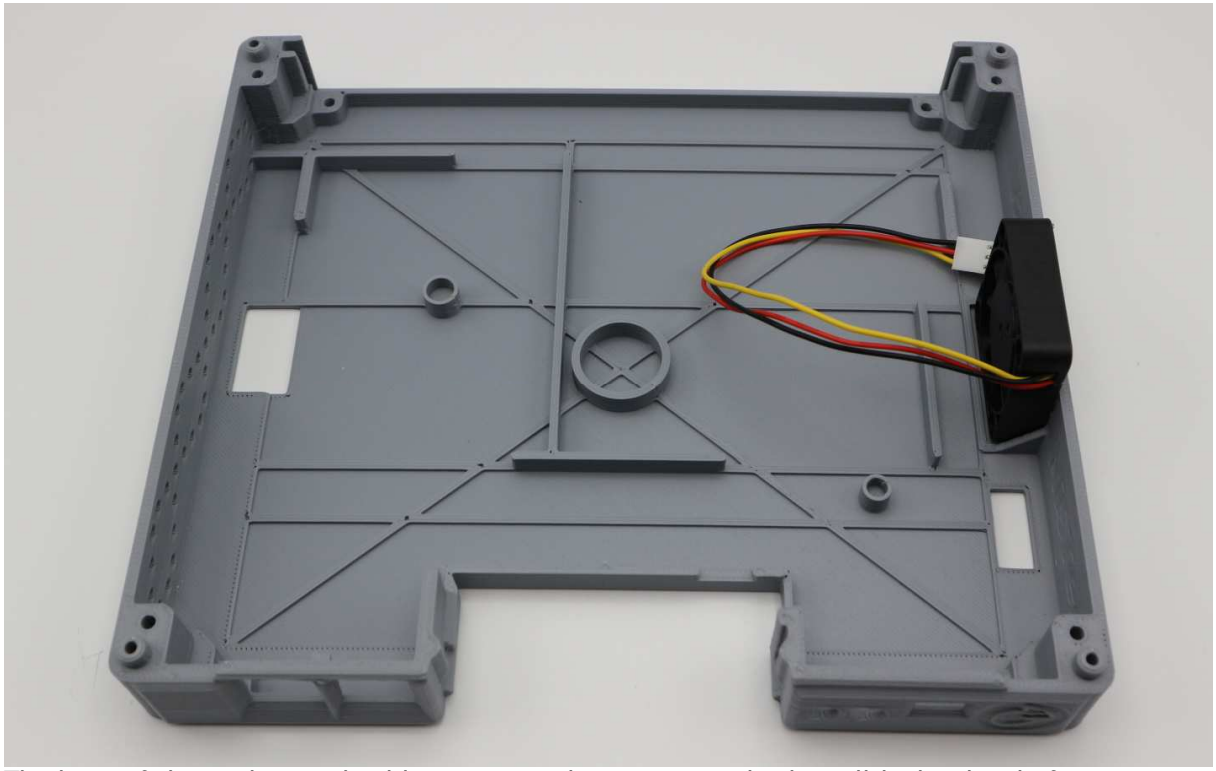


Pay special attention to the fan vent, this is most tricky to completely clear of support material, and some may still be present or have shifted loose during shipping. Clear out any obvious debris so the fan can spin freely.



The reference enclosure (if bought from RMCRetro) is already fitted with M3 brass inserts to allow easy fitting and removal of the enclosure. If you are 3D printing your own enclosure, these brass inserts can be easily fitted with a soldering iron tip set at a temperature of around 200 degrees C.

You should only have to do a little clean-up, all these enclosures are cleaned up individually by hand, so they will all be unique and have a number of marks on the inside. Please ‘embrace the 3D printed layers’ this is a labour-intensive 3D printing process and we have done our very best to give you the best quality external finish we can achieve with the materials and machines currently available.

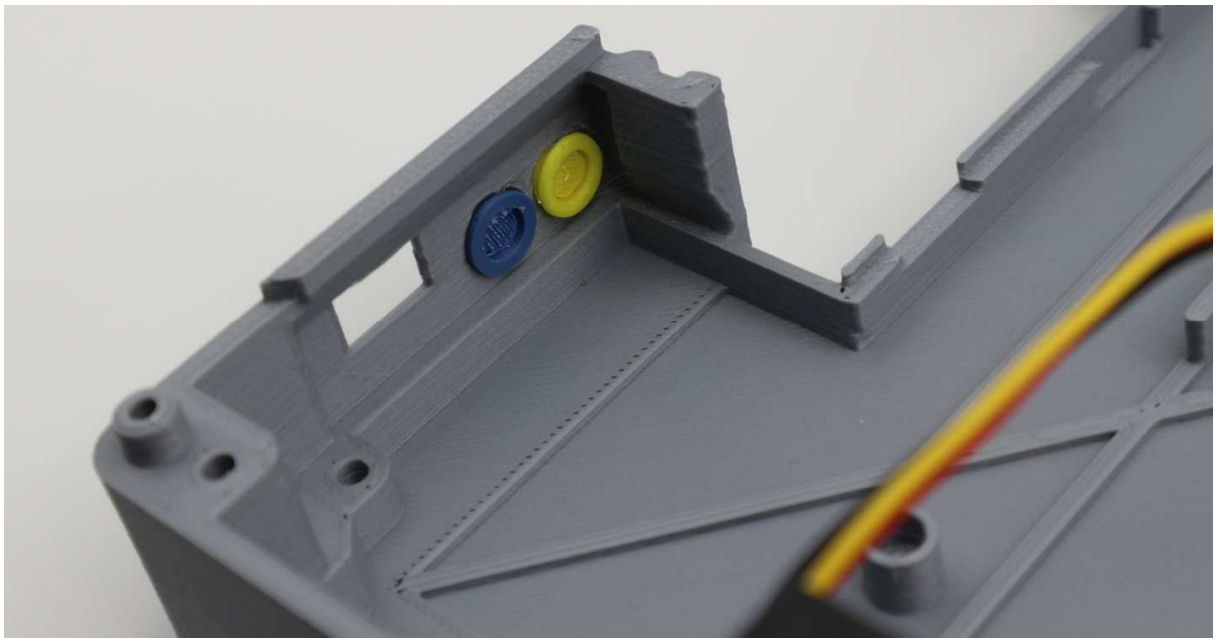


The base of the enclosure should require no clean-up, just check it all looks okay before you start fitting the board, you do not want to be forcing anything, it should all fit snugly.

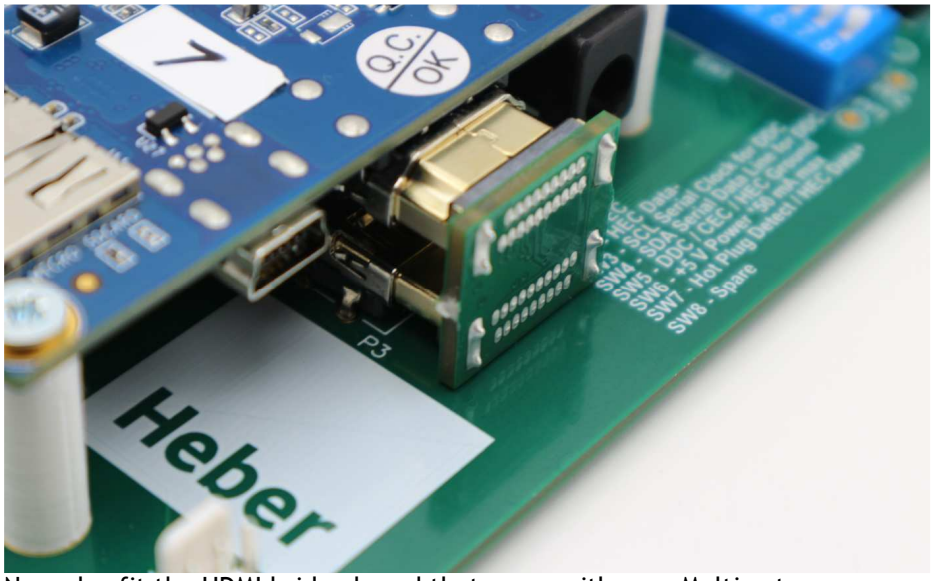
If you bought the Enclosure from RMC Retro a 40mm fan will come pre-fitted! – you will also have two more fan screws to fit later (see details below).

7 FITTING INTO THE 3D PRINTED ENCLOSURE

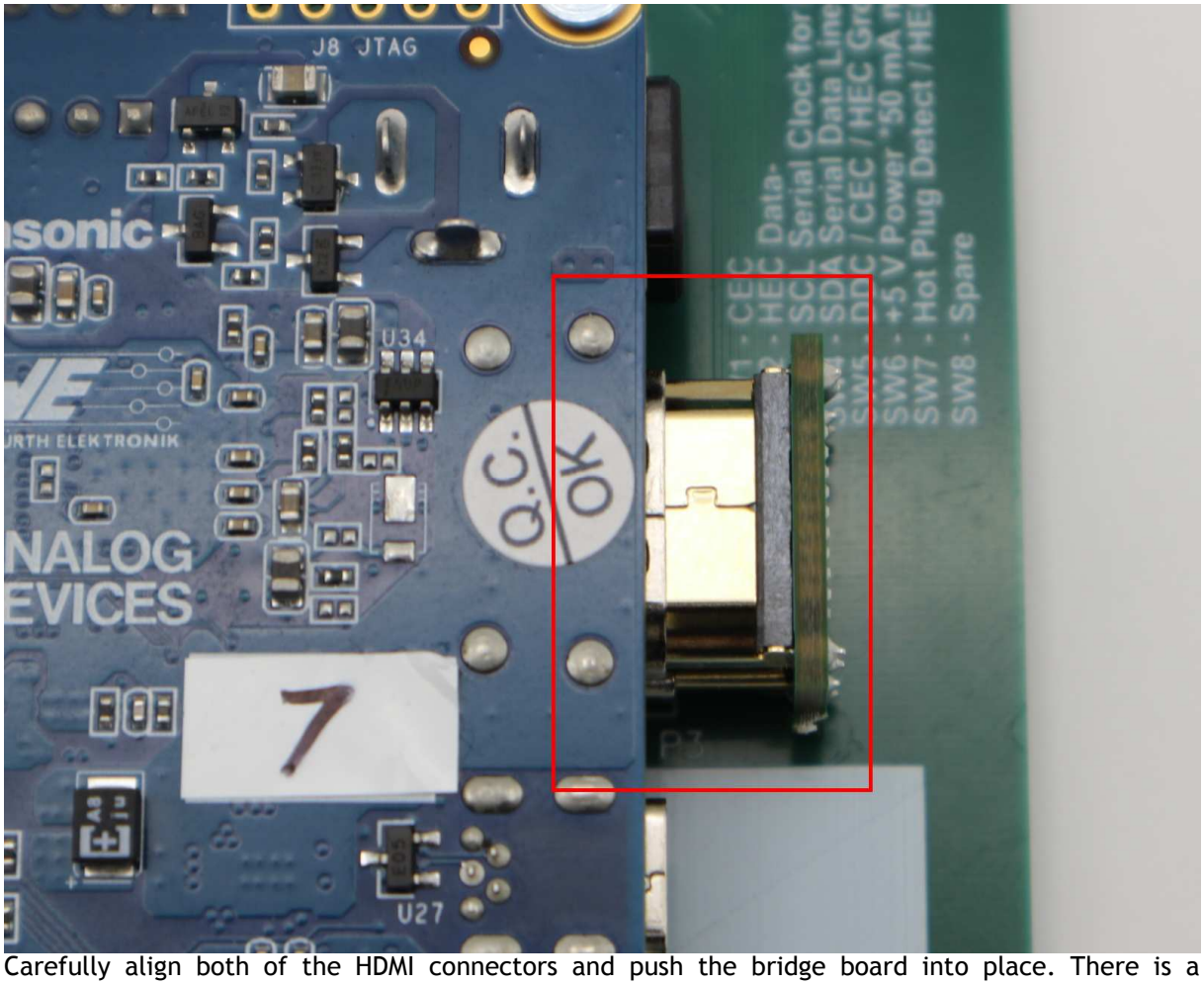
You will require the following parts for fitting the Multisystem board into the 3D printed case.



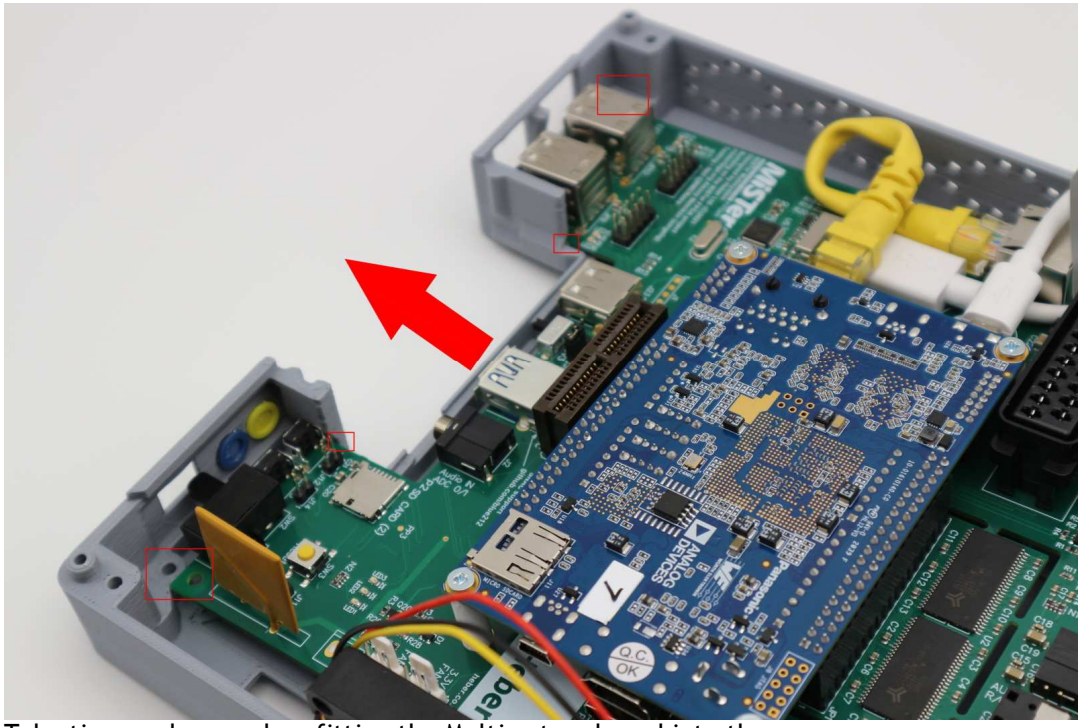
Fit the two buttons into the base of the enclosure, the buttons should hold in place if you tilt the base on a slight angle. Ideally fit them as above, if you have any technical support issues, we may ask you to press the blue, yellow or red buttons (see below).



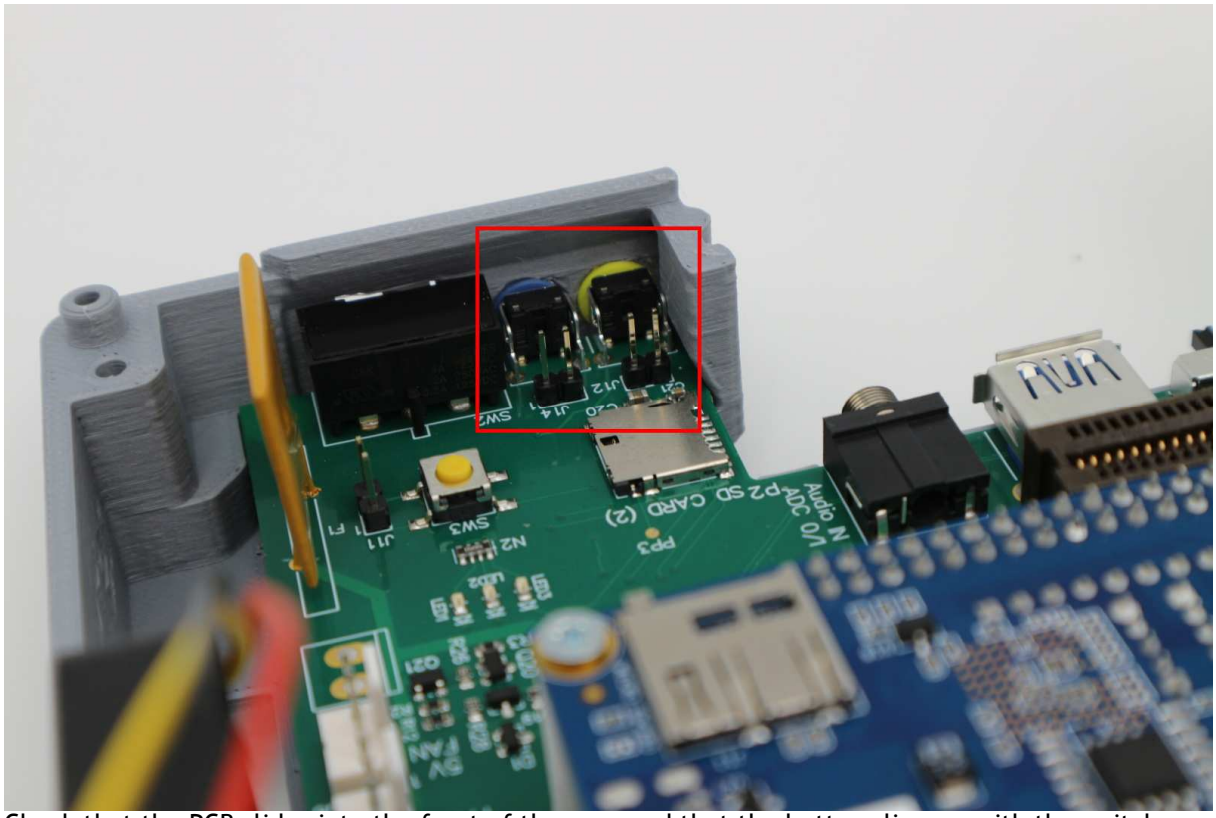
Now also fit the HDMI bridge board that came with your Multisystem.



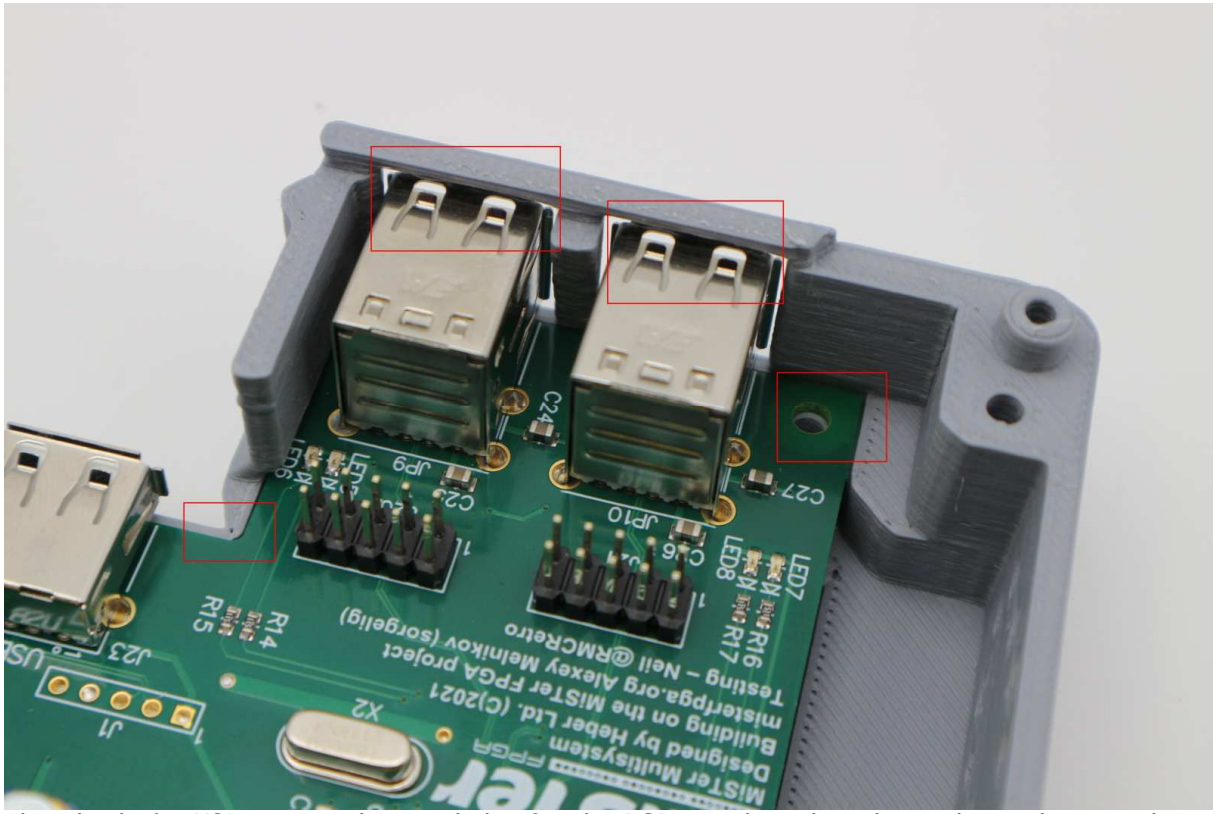
Carefully align both of the HDMI connectors and push the bridge board into place. There is a stopping point that may not get fully engaged without a small level of force, push firmly but gently until the bridge is fitted as per the above images.



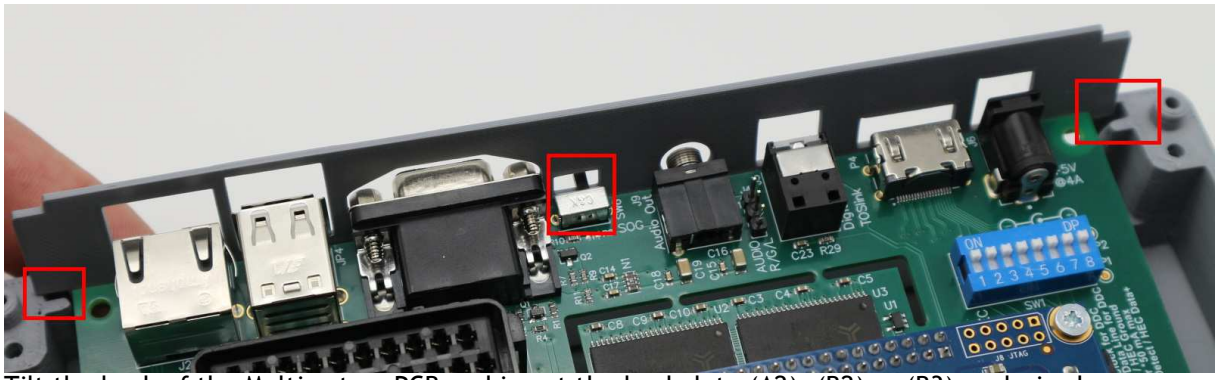
Take time and care when fitting the Multisystem board into the case.



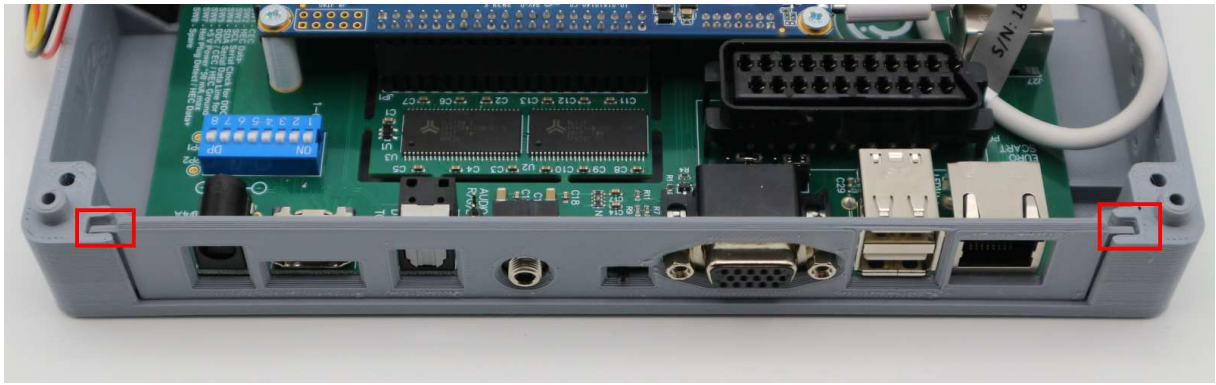
Check that the PCB slides into the front of the case and that the buttons line up with the switches.



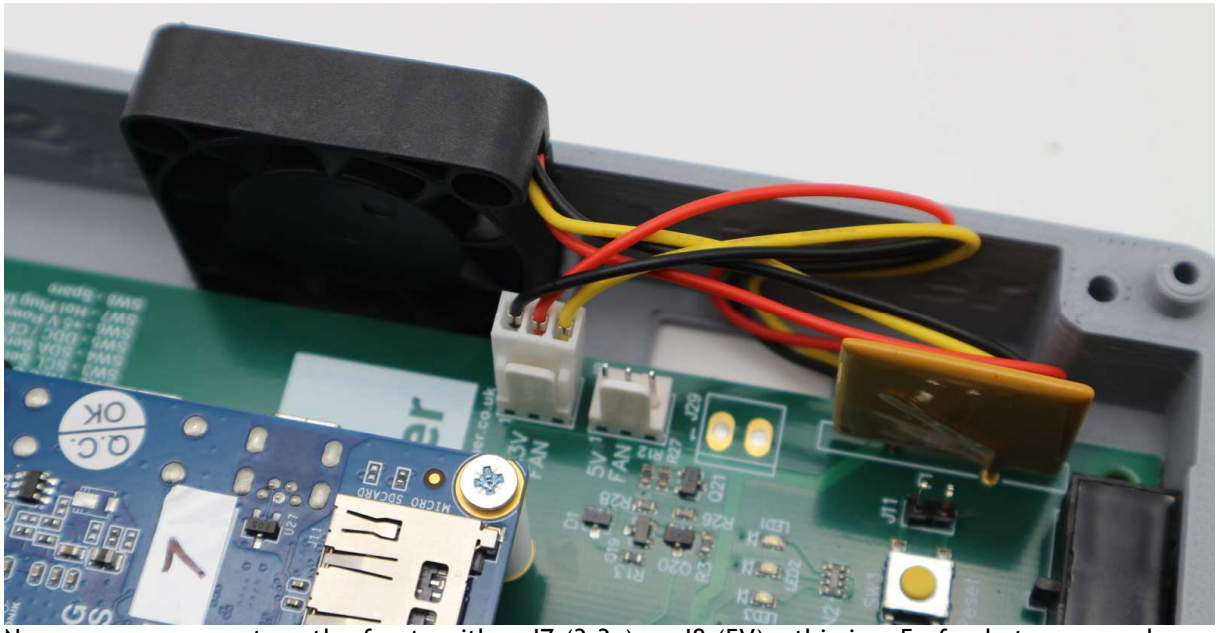
Also check the USB ports and screw holes for the PCB are aligned to the enclosure base as shown above.



Tilt the back of the Multisystem PCB and insert the backplate (A2), (B2) or (B3) as desired.
Check the sync on green switch is inserted into the hole and both sides of the panel slide into the base.

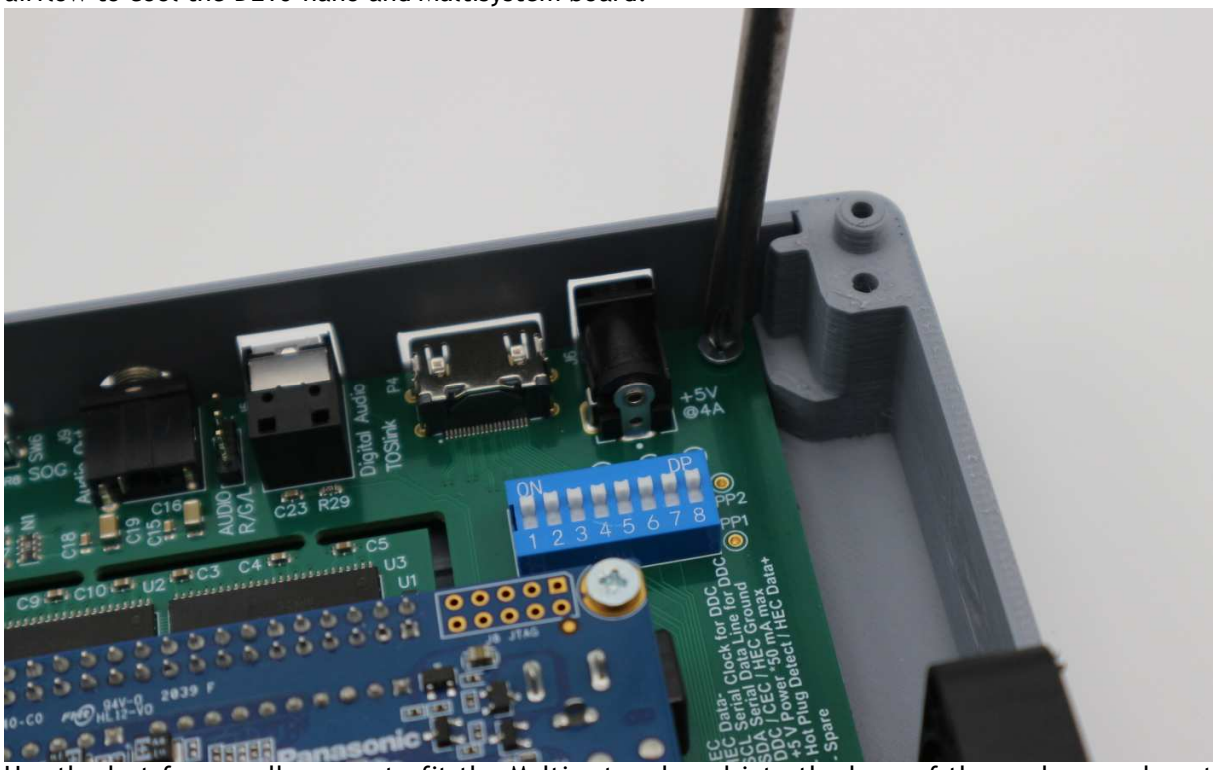


Push down on the panel as the Multisystem board is also pushed down. The panel sits into a groove in the enclosure base.

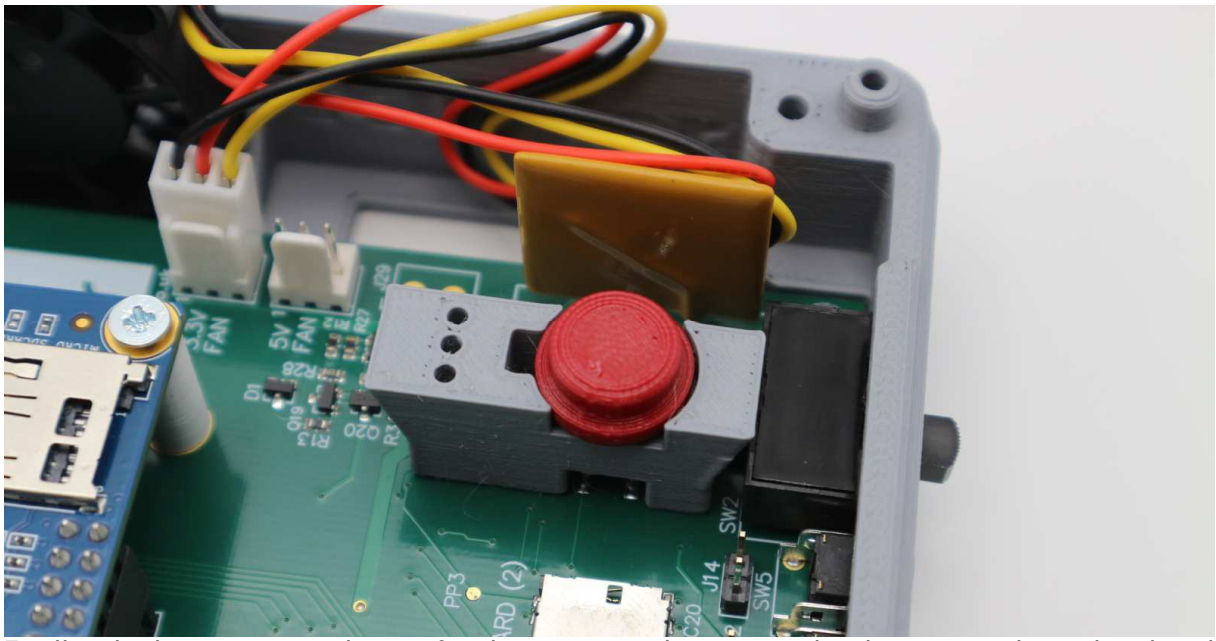


Now you can connect up the fan to either J7 (3.3v) or J8 (5V) – this is a 5v fan but can run slower and quieter on a 3.3v connection.

Unless you live in a very hot country or plan to have the Multisystem inside a cabinet or otherwise somewhere with limited airflow, you can use the 3.3v connection. 3.3v will provide plenty of airflow to cool the DE10-nano and Multisystem board.



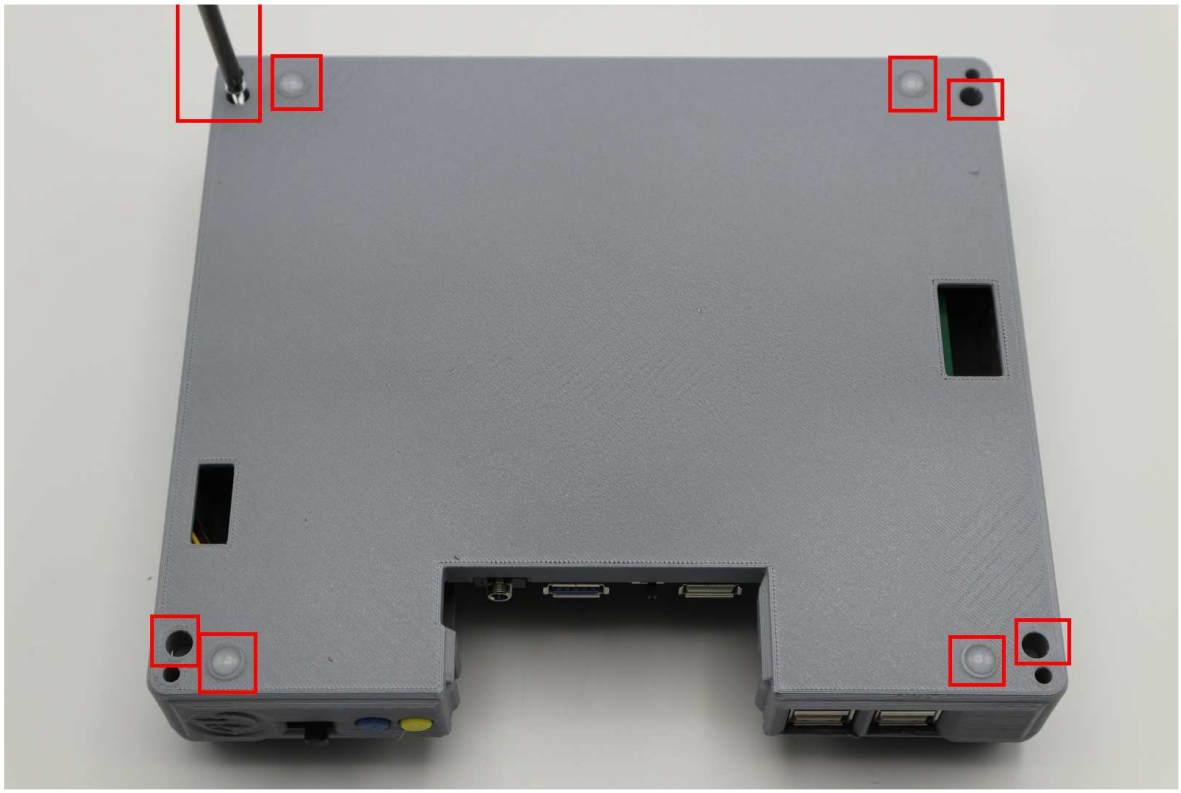
Use the last four small screws to fit the Multisystem board into the base of the enclosure, do not overtighten, they only need to grip the plastic lightly and you may wish to remove the board in the future.



Finally, the last two printed parts for the reset switch mount and red reset switch can be placed onto the Multisystem PCB in the location shown above. You will find a resting point where the switch operates and the three holes for the LED's align to the top half of the enclosure.

You are almost done, just a few more steps…

Now you can fit the last two remaining fan screws into the top half of the enclosure. They just need to be firm to stop the fan vibrating, do not overtighten.



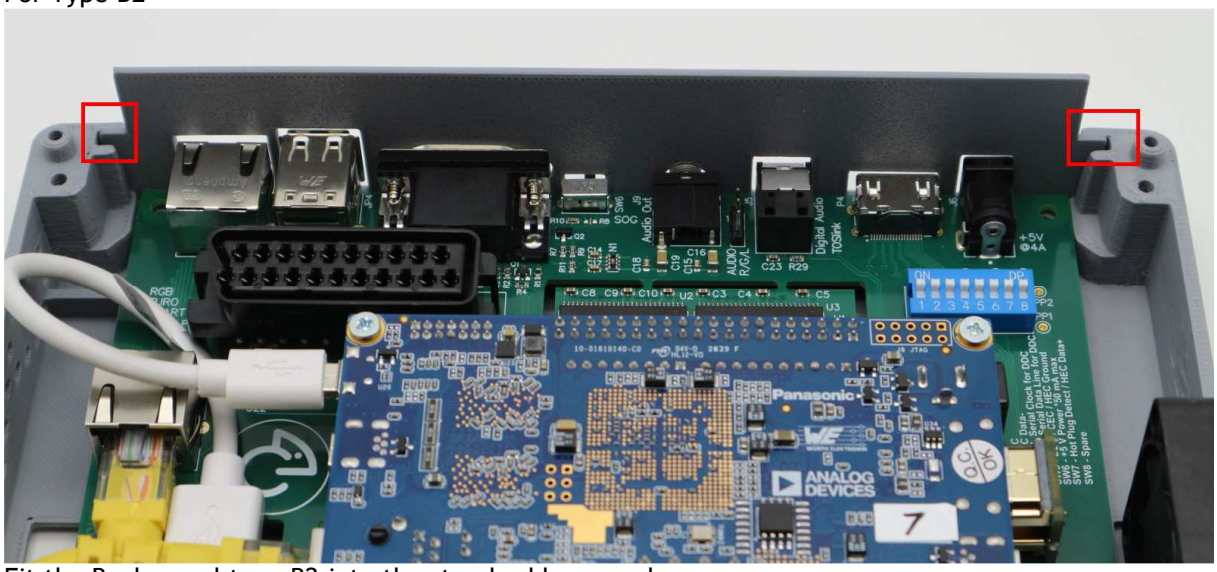
You can finally use the very last four longer bolts to secure the lid to the base and also add the sticky feet (supplied). The feet are highly recommended as they stop the unit from sliding around.

Just slide on the front dust cover and Congratulations! You have a fully assembled Multisystem, we really hope you enjoy using it and please keep checking RMCRetro for more Multisystem updates.

7.1 Alternative Case B2 and B3 options for SCART

If you decided to have the alternative style of enclosure (Type B) then you can use either B2 or B3 back panels for SCART or No-SCART cable.

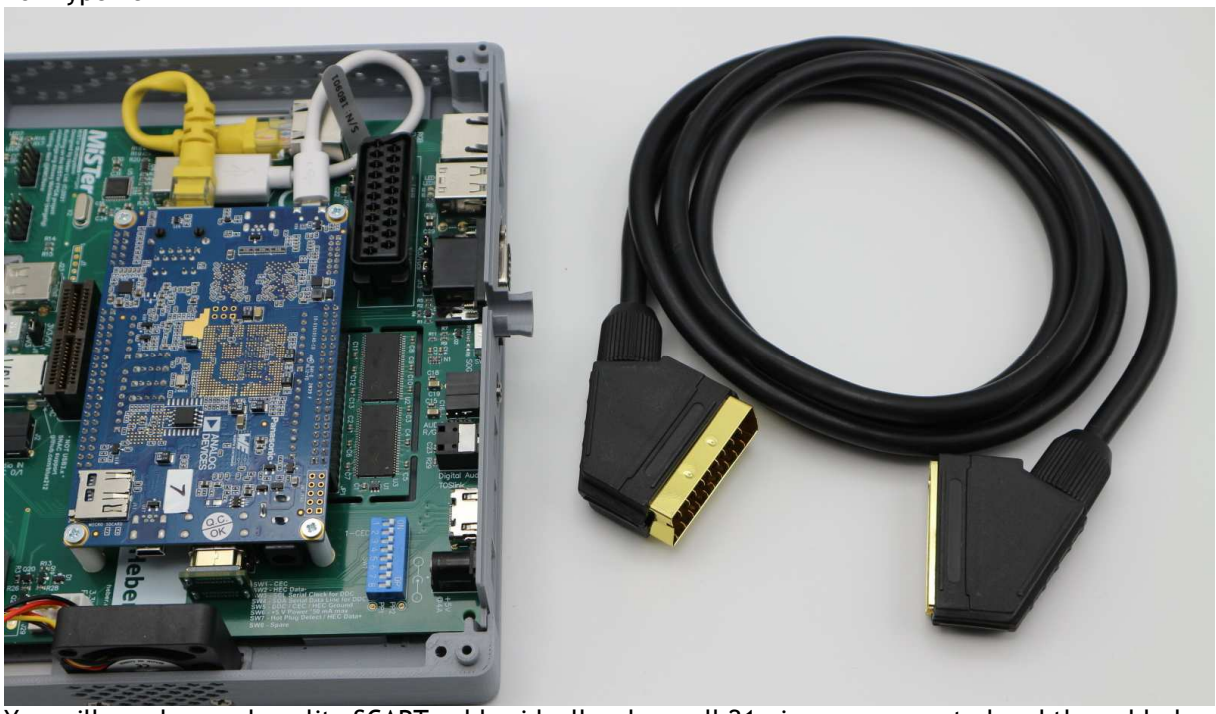
For Type B2 -



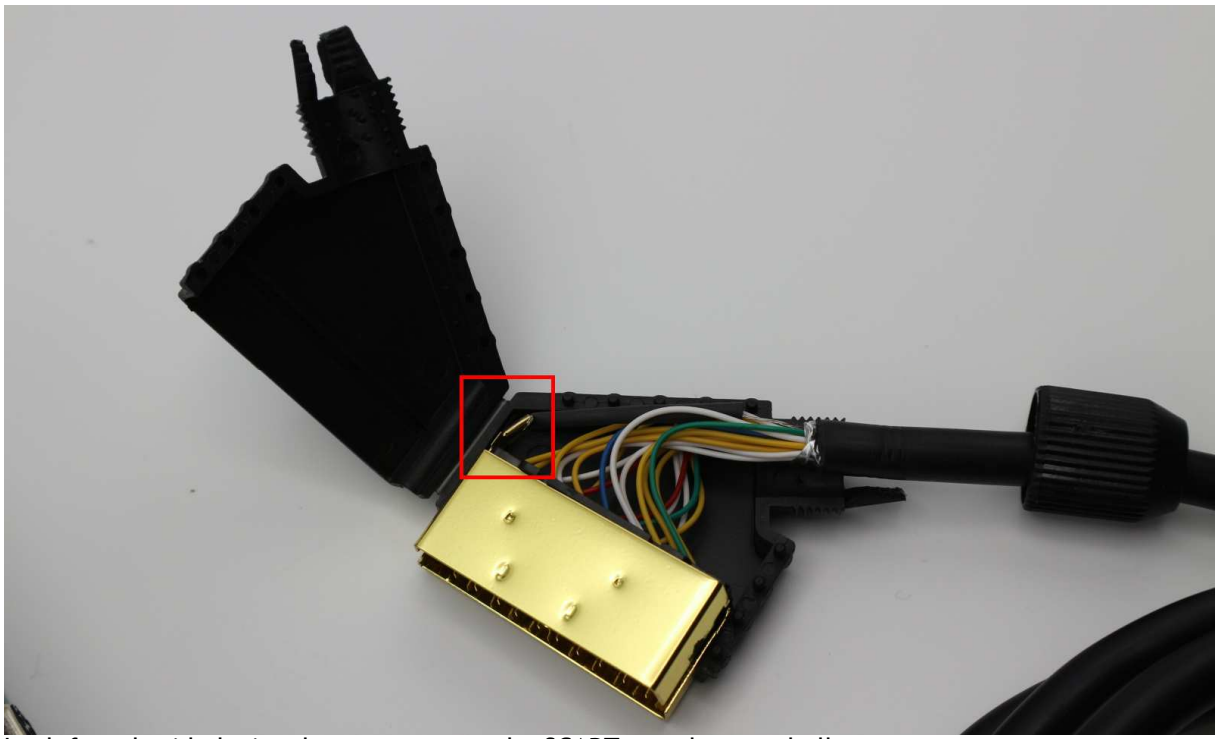
Fit the Back panel type B2 into the standard base enclosure.

Then just fit the lid and forget all about SCART – it never existed.

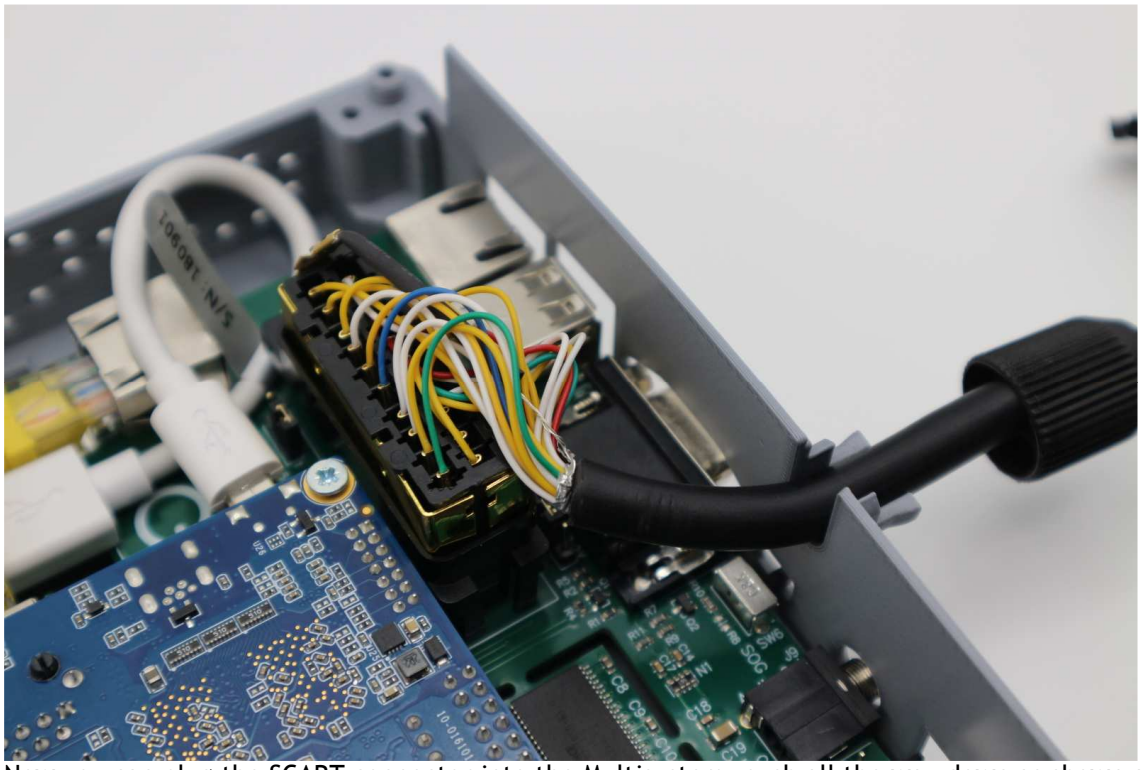
For Type B3-



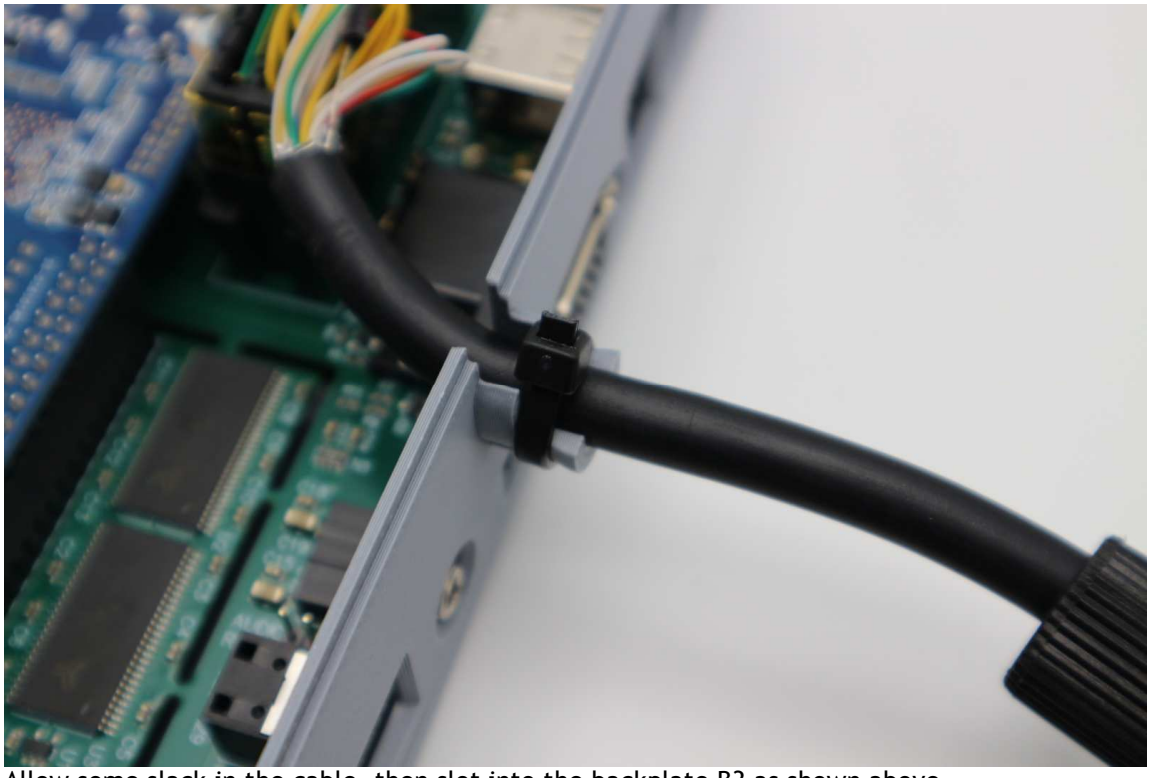
You will need a good quality SCART cable, ideally where all 21 pins are connected and the cable has a dedicated shield connection (See below).



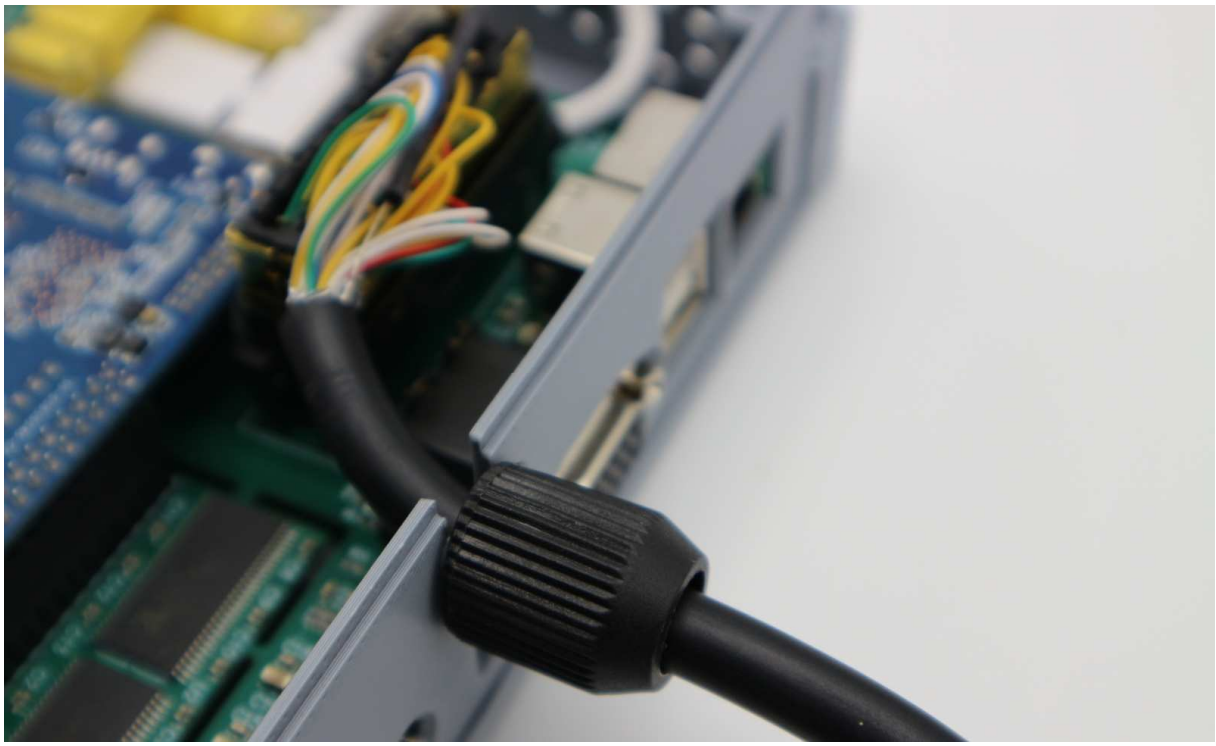
Look for a braided wire that connects to the SCART metal outer shell.
Unscrew the round cable clamp and remove the connector and wiring from the plastic shell.



Now you can plug the SCART connector into the Multisystem, push all the way down as shown above.



Allow some slack in the cable, then slot into the backplate B3 as shown above.
Secure with a zip tie. You may find that a short section of uncut zip tie helps to hold on the round cable clamp, so don't cut flush before you try fitting the clamp (see below).



Check the fit, and cut zip tie when you feel it's secure.

Add the Case B lid and you can now enjoy the joys of RGB SCART without the top connection.
You just need a compatible EURO SCART TV or RGB input.

NOTE:- Japan has a different 21pin SCART connector – they look the same, but are wired VERY differently! please make sure you are using a RGB EURO SCART display device.

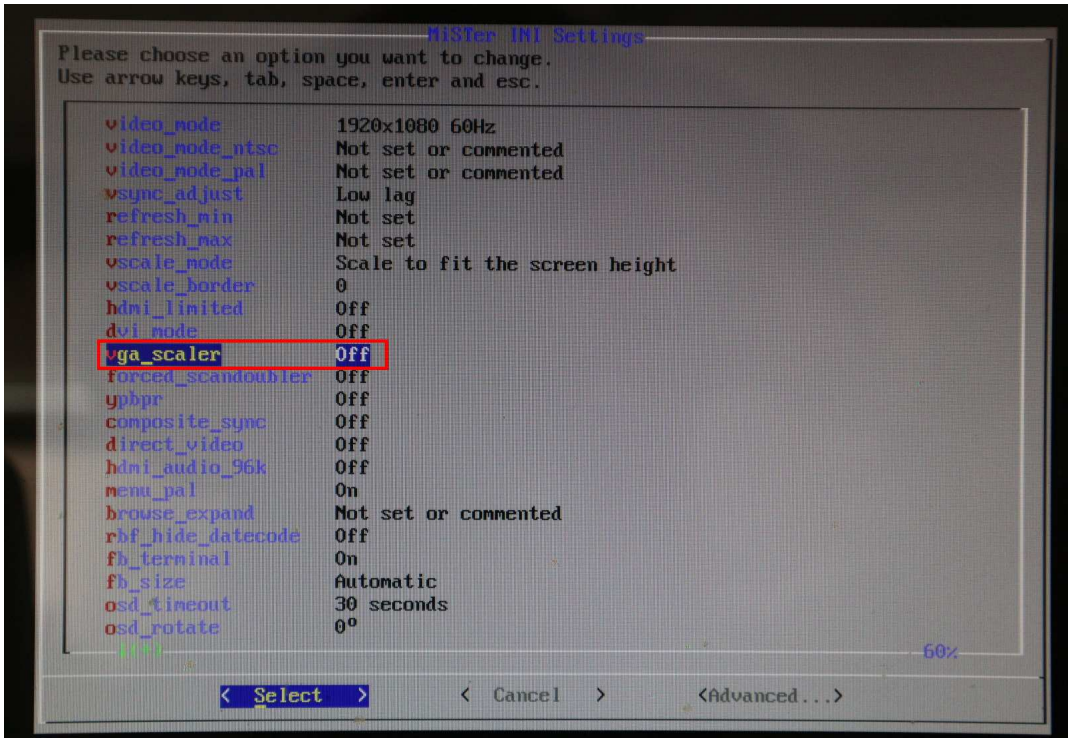
7.2 RGB SCART Output -

The aim for SCART is to be able to display the MiSTer Multisystem video output on CRT TV's or devices accepting RGB Euro SCART.

The Multisystem SCART connection is only compatible with the European 21 pin standard, not the Japanese 21 pin connector, as they have a different pin output.

For technical reference the SCART sync output is automatically combined from the VSync and HSync signals, this combined sync is then connected to the SCART Composite sync output via a 68 Ohm resistor.
This combined sync means that you do not need to select composite sync output in the MiSTer.INI file. If can be enabled or disabled and the SCART sync output will still function.

For the Analogue RGB SCART output to function correctly, the resolution of the analogue RGB must be allowed to output at the original raw signal of the machine/computer/console being simulated. This basically means that the VGA scaler must always be turned off in the MiSTer.INI file.



You should use either the VGA output port or the RGB SCART connection to your desired analogue video monitor. Once the VGA scaler is switched off the VGA output may be outside the range that your VGA monitor can display. A modern flat panel LCD with VGA input will often display 'out of range'.

If you have a multi sync monitor you may be able to see the output, but as stated the VGA and SCART outputs should not be used at the same time.

If you do have the VGA scaler enabled for the analogue output it is also highly unlikely that the SCART device / TV will display this signal correctly.

HDMI+VGA or HDMI+SCART can both be used together.

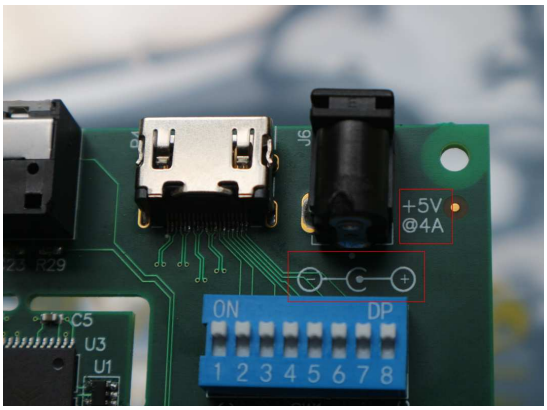
Please also be aware that each MiSTer core can override the MiSTer.INI settings, so check that the VGA scaler and scan doubler are switched off if you wish to use RGB SCART output.

8 USING THE MISTER MULTISYSTEM

8.1 Before you power ON -

Please check you are using the correct Power supply. A 5V 4A Meanwell power supply is recommended. It must be 5v but you can use a higher current if the 4A Meanwell PSU is not available.

If you source your own power supply, check that centre pin is marked as Positive (+5V) the outer connection will be Ground (GND).



The Multisystem has a number of protection devices and circuits to help with overload, overvoltage, overcurrent and thermal protection.

If you get close to the 4A limit of the recommended power supply, then the thermal overcurrent fuse should trip out to help protect your power supply and Multisystem board. This 'Polyfuse' should self-reset after some time being switched off.

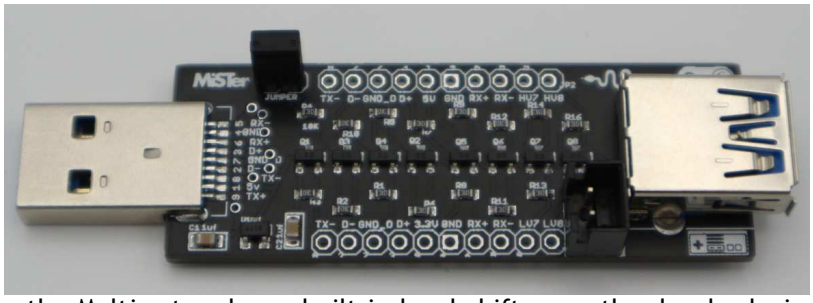
Ideally use low power devices on the USB if possible. SSD's and some USB storage normally runs at around 500mA to ~1.5A.

7 x USB ports are available, so don't overload the USB power with lots of high drain devices.

8.2 SNAC port

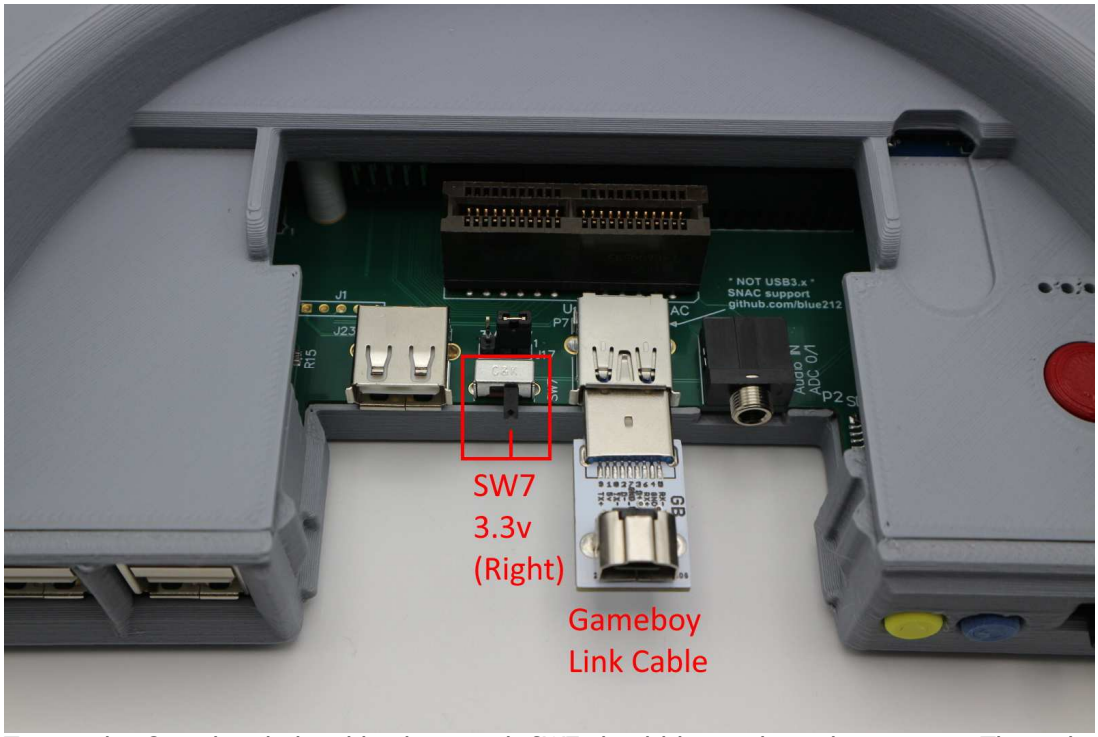
The main SNAC port (Serial Native Accessory Converter) is located on the front panel of the Multisystem. This is NOT a USB 3.0 port; it just uses the same connector as per the existing MiSTer I/O board.

Standard SNAC adaptors can be used directly in the Multisystem SNAC port (Sega 9 pin is shown above).



The SNAC port on the Multisystem has a built-in level shifter, so the dongle device shown above is not required if you intend to use classic gaming controllers directly connected to the SNAC port.

A short USB 3.0 extension cable can also be used to locate the SNAC boards more conveniently if required.



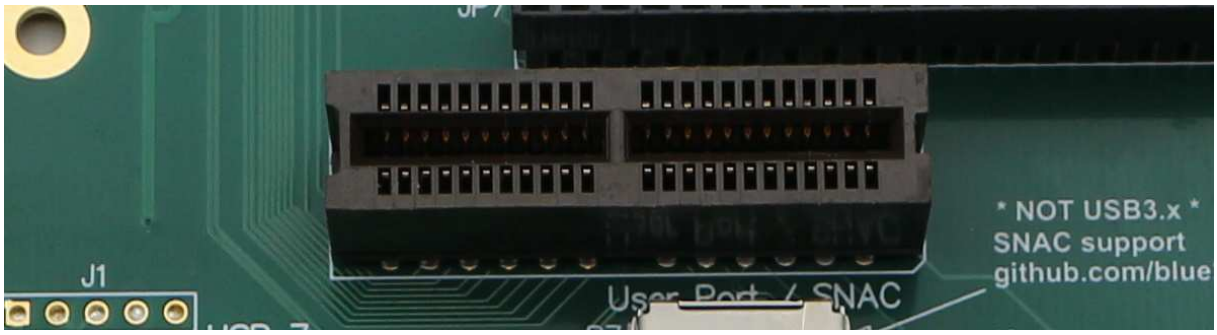
To use the Gameboy link cable the switch SW7 should be in the right position. This is because the Gameboy was a lower voltage handheld device.

Most other consoles use 5v for gamepad and peripheral connection.

Note that with the Super Nintendo (SNES) the adaptor board is fitted upside down as shown above.

8.3 Future expansion

The dedicated edge expansion connector (P5) is intended for modular expansion and future upgrades. Also see technical section 10 for further details.



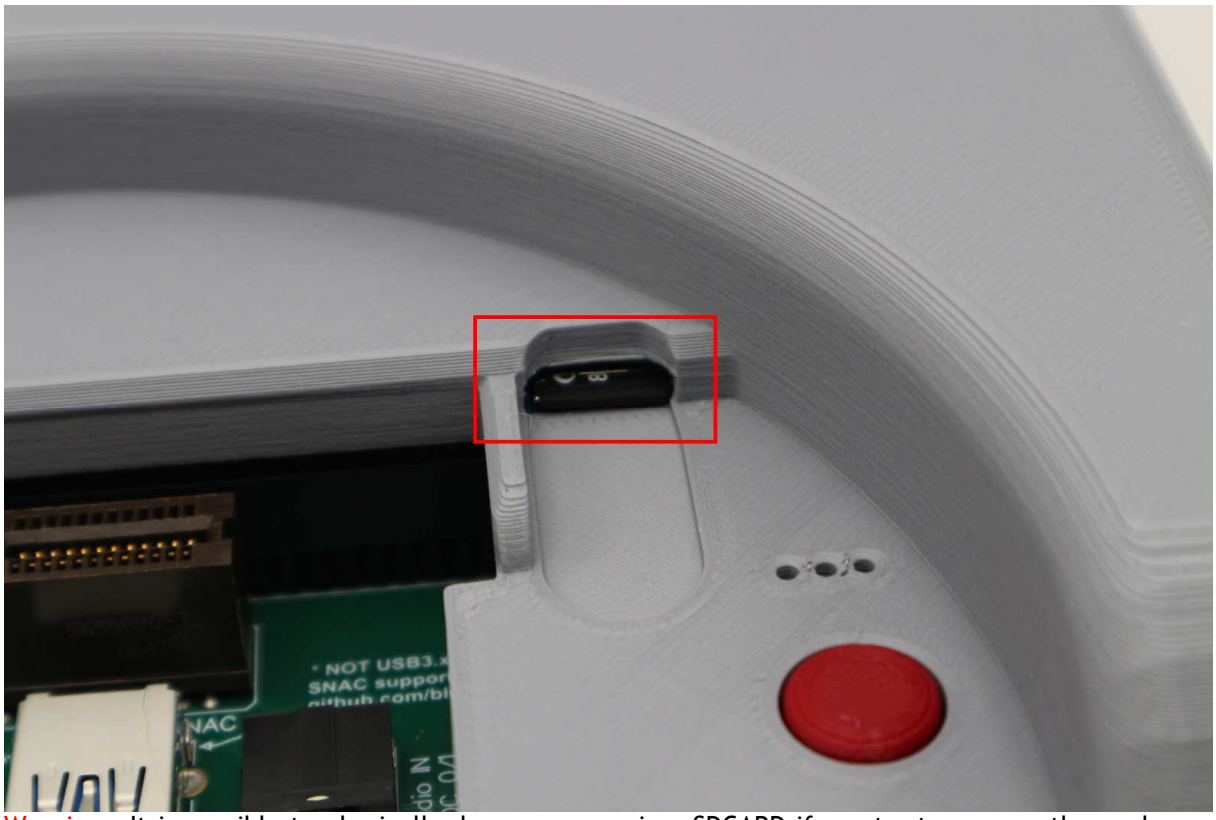
Please feel free to feedback what devices and expansions you would like to see connected to the Multisystem, it may be possible to do an expansion module to allow greater connection capabilities and functional devices.

Currently the expansion port is planned to allow the following –

- Full JAMMA edge finger connection and CPS kick connection.
- MT32Pi
- USB expansion – zero delay game controllers (for example DaemonBite)
- Solid state storage / M2 SATA for example
- I/O expansion ports for connection of hardware devices etc.
- Composite video / and or s-video output.
- + more, we want to hear from you. What would you like to see on the expansion port?

Internal storage and USB peripherals can also be connected to the internal USB port connections – these may be added in a stack under the 3D printed case or added as a front panel module or as the 2.5” SSD mount bay in enclosure type B (see technical section 10 for further details).

9 GENERAL WARNINGS FOR OPERATION



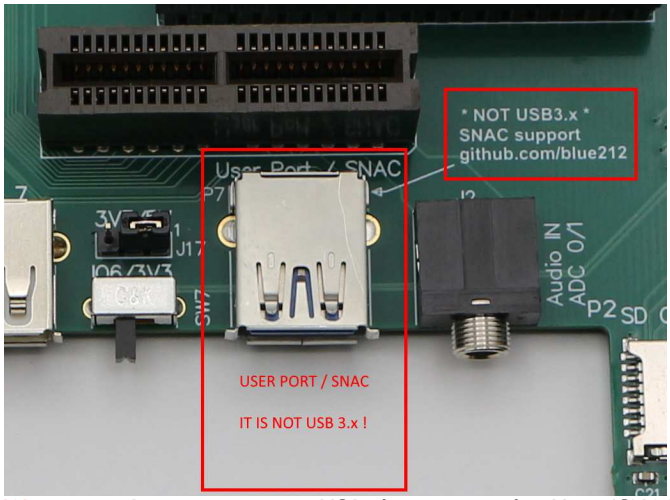
Warning - It is possible to physically damage your micro SDCARD if you try to remove the enclosure lid without taking out the SD Card from its slot -

Please take care and remove the card before you take off the cover, it will just snap in half if you forget – you have been warned.

We use a label on the Micro SD cards in all systems, that makes it a little more obvious and encourages you to remove the card before removing the lid.

Stay safe – eject your card.

Warning – Remove the top fan screws before trying to remove the lid – if you forget you may break the fan, enclosure lid or both.



Warning – Do not connect USB devices to the User/SNAC port – this is not a USB connector and it has direct connection to the DE10-nano board. You will damage your Multisystem and/or DE10-nano if you connect a USB device to this port.

9.1 FAQ

9.1.1 Why does the SCART output not work with my 'TV' / Monitor / Arcade?

Usually for the following reasons –

1- The Mister.INI file has the incorrect settings – see section 7.2 above
2- Some FPGA cores are set to run at higher resolutions that will never output an RGB SCART signal that a CRT TV or Arcade monitor will accept. (For example, the MiSTer Memory test core will display fine on a modern VGA and HDMI, but not for a 15Khz CRT screen / monitor).
3- The SCART output provides a high quality RGB signal to a European RGB SCART input of a consumer TV (CRT/LCD) and other SCART Devices or SCART switchers that can switch the RGB signals etc.

If you have a TV or display device that is expecting to see a Composite signal (Yellow RCA Style phono cable) or an S-video mini-Din connection, then the Multisystem and any other RGB only SCART device will not output the signal for a composite /S-video connection.

A SCART to Composite cable / S-video cable or adaptor as shown above, will not work.

We may well make a dedicated Composite & S-video output for the Multisystem from the Expansion port, we have a working prototype and we are seeking feedback from the community if this is a device that enough people want/need to move forward with a production design of a module.

9.1.2 Sync issues with LCD / Plasma / OLED / multisync / trisync / BVM / PVM CRT

The SCART port is intended for standard consumer SCART to SCART connection to a CRT TV.
We have tested as many CRT TV combinations as possible along with testers around the world.
The SCART output has some automatic selection output signals that should work as intended with switching to the correct RGB mode on your display, but also a few CRT's may ignore this signal and require you to select RGB input source etc.

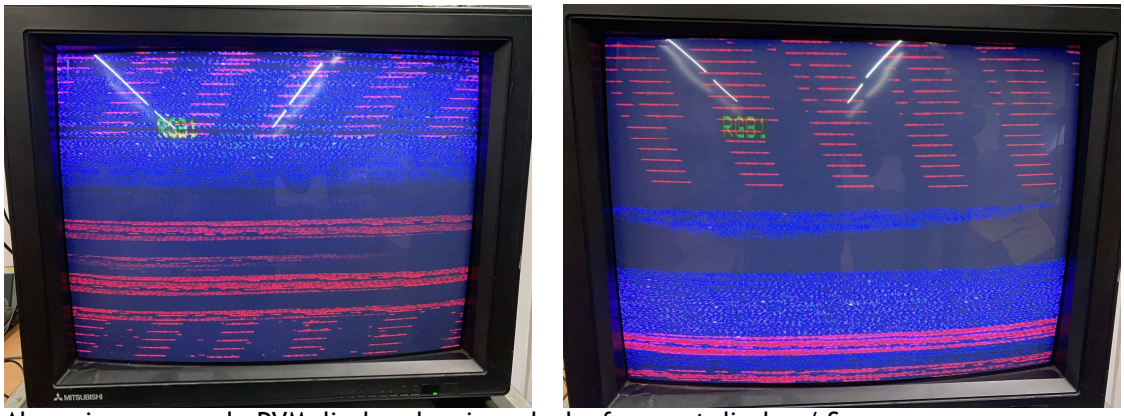
The SCART output should work with more modern LCD / Plasma and OLED screens that still have a SCART input port, but it's impossible to test all possible combinations and displays that may support the SCART standard or not.

We have aimed to make the SCART output conform to the specification and be as compatible as possible on a wide range of consumer and professional CRT displays, but if you find a unit that does not seem to work, please get in contact as we will do our best to help you.

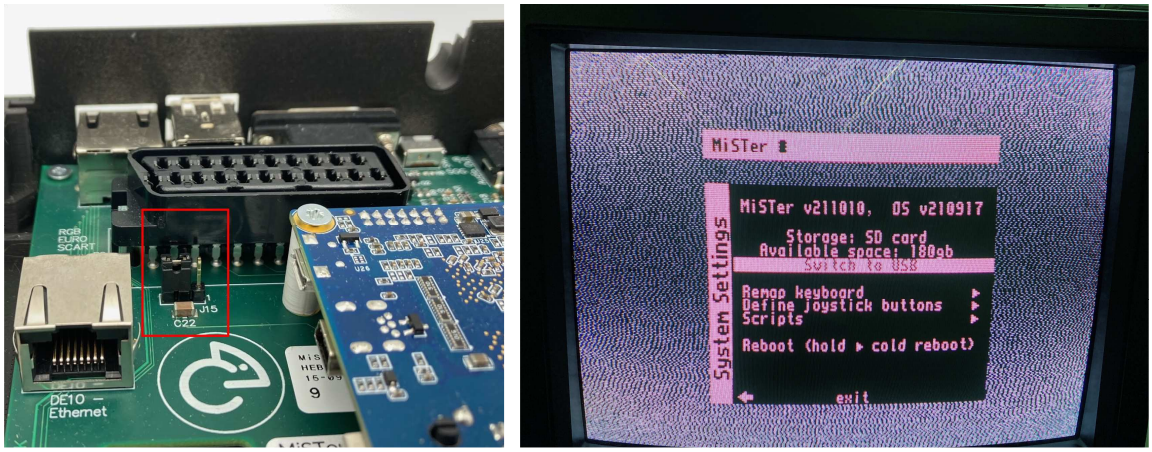
A number of CRT displays, often Professional video monitors (PVM) or Broadcast monitors (BVM) have manual sync settings, or allow all manner of signals to be connected – often not directly by a SCART-to-SCART cable but via SCART to BNC or SCART to VGA or SCART to some other connector for example.

We will try our best to assist with any other sort of cable connection, but please try the following before contacting us -

If you have display/sync issues running from SCART into a Multisync / trisync / Arcade monitor, either use the 'VGA' Output or try changing J15 option link to the alternate position (2+3) as shown below (when the display and Multisystem is powered off)–



Above is an example PVM display showing a lack of correct display / Sync.



Turn the Multisystem board OFF and also power OFF the CRT TV / Monitor,
Then change the Jumper position as shown above (pins 2+3).
Now power on your Multisystem and then the CRT/Monitor.

It's really important you don't expect the CRT/TV/PVM/BVM monitor to correct a sync issue 'live' by toggling either the SOG switch or the Jumper J15, some may pick up the change but others will continue to show a lack of sync until power has been cycled on the display.

You should always make changes to cables, option links and SOG switch settings with the Multisystem turned off and also the display unit turned off.

If the above does not work, then get in contact with us with the make and model of the display and also details of whatever cable you are using, to connect up the Multisystem to the display via SCART or 'VGA'. We will do our best to help you.

Also please remember to check the MiSTer.INI settings when using the Analogue 'VGA' or SCART output. Sending out a higher resolution image into a display (CRT/TV) that's designed to accept a low resolution 15Khz signal is unlikely to work.

9.1.3 Audio sound output is not working?

Check you have connected an audio cable to the 3.5mm Jack or Digital Optical output.

Check if you have any sound from the HDMI cable to a display with speakers – if not make sure the Mister.INI file is not set to DVI mode –
dvi_mode=0 ; set to 1 for DVI mode. Audio won't be transmitted through HDMI in DVI mode.

Check that the MiSTer menu setting for audio is not set low/off or as MUTE – this catches a lot of people out, so please check before asking about no audio output.

9.2 General feedback and contact us

We want to hear any ideas or feedback you have for the Multisystem.

That can include thoughts on the 3D printed enclosure, design usability and general enjoyment of the system, whatever you want to say, please feel free to get in contact.

You can e-mail Richard (Heber Ltd.) - multisystem@heber.co.uk
And you can contact Neil (RMC Retro).

Tweet us @MultisystemFPGA Show us your setup and how you are using the Multisystem.

The official MiSTer Forum is also here if you need it – MiSTer FPGA Forum - Index page (https://misterfpga.org/)

And a big thank you to the wonderful proof readers of this manual and Multisystem website pages. They all spotted a few blunders and helped make this easier to read and use for everyone else.

Troozers Lillie Neil Mark P Mark H Andy G CountDuckula AgentOrgangina	MarkCentral Dean PeepoUK RoboJohn2084 Revoice Pillock Hugh Gregac	kurbeco

We all thank you again for being part of the MiSTer Multisystem, we hope you have fun and enjoy using it.

10 TECHNICAL REFERENCE

This section is provided for technical reference and to assist with your own developments of the MiSTer Multisystem or if you have a question / support request.

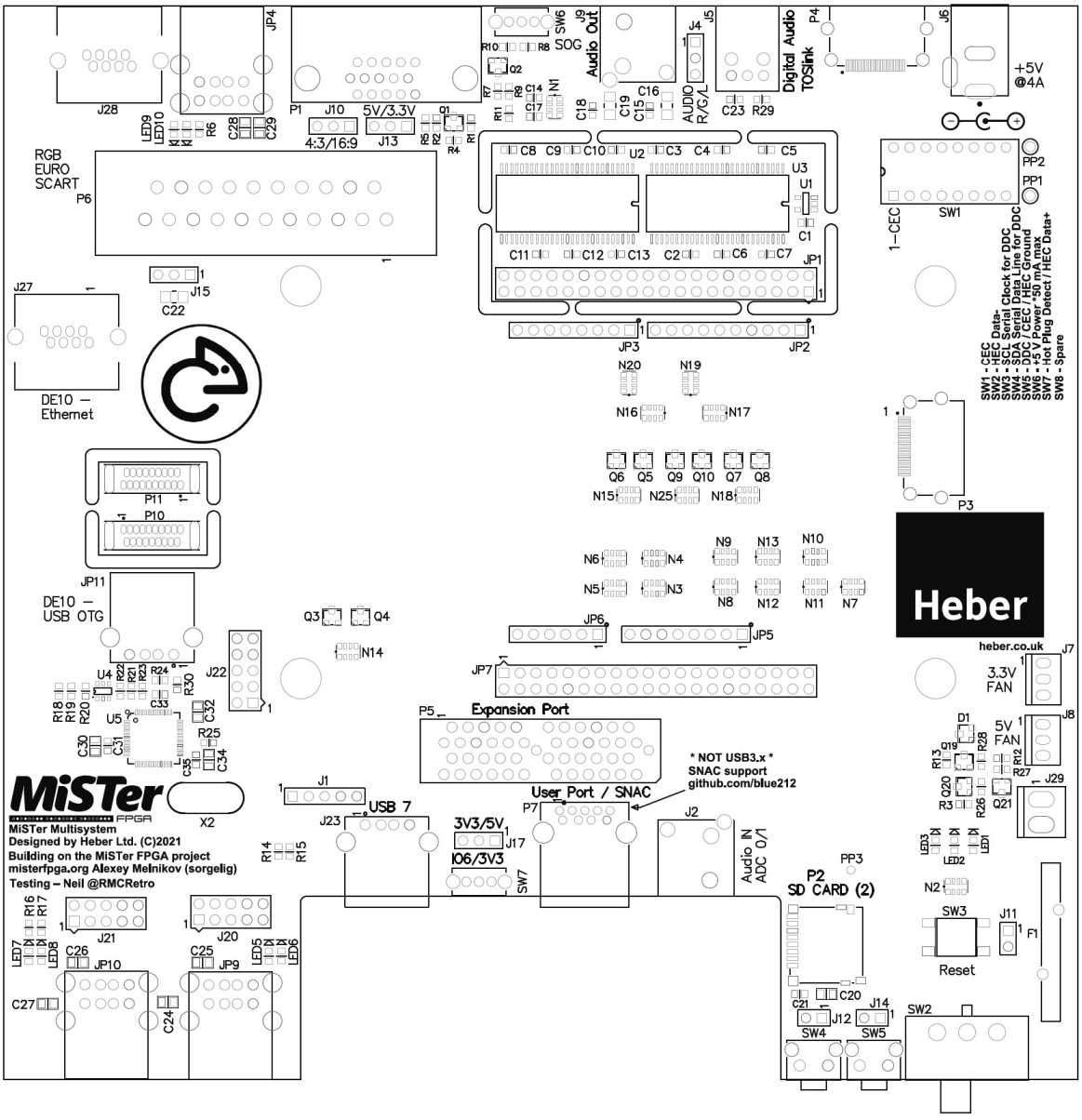
10.1 3D Printed Enclosure -

Files for the 3D printed enclosure can be found on the Prusa Printers website -

https://www.prusaprinters.org/prints/75605-mister-multisystem-classic-gaming-console-3d-print/files

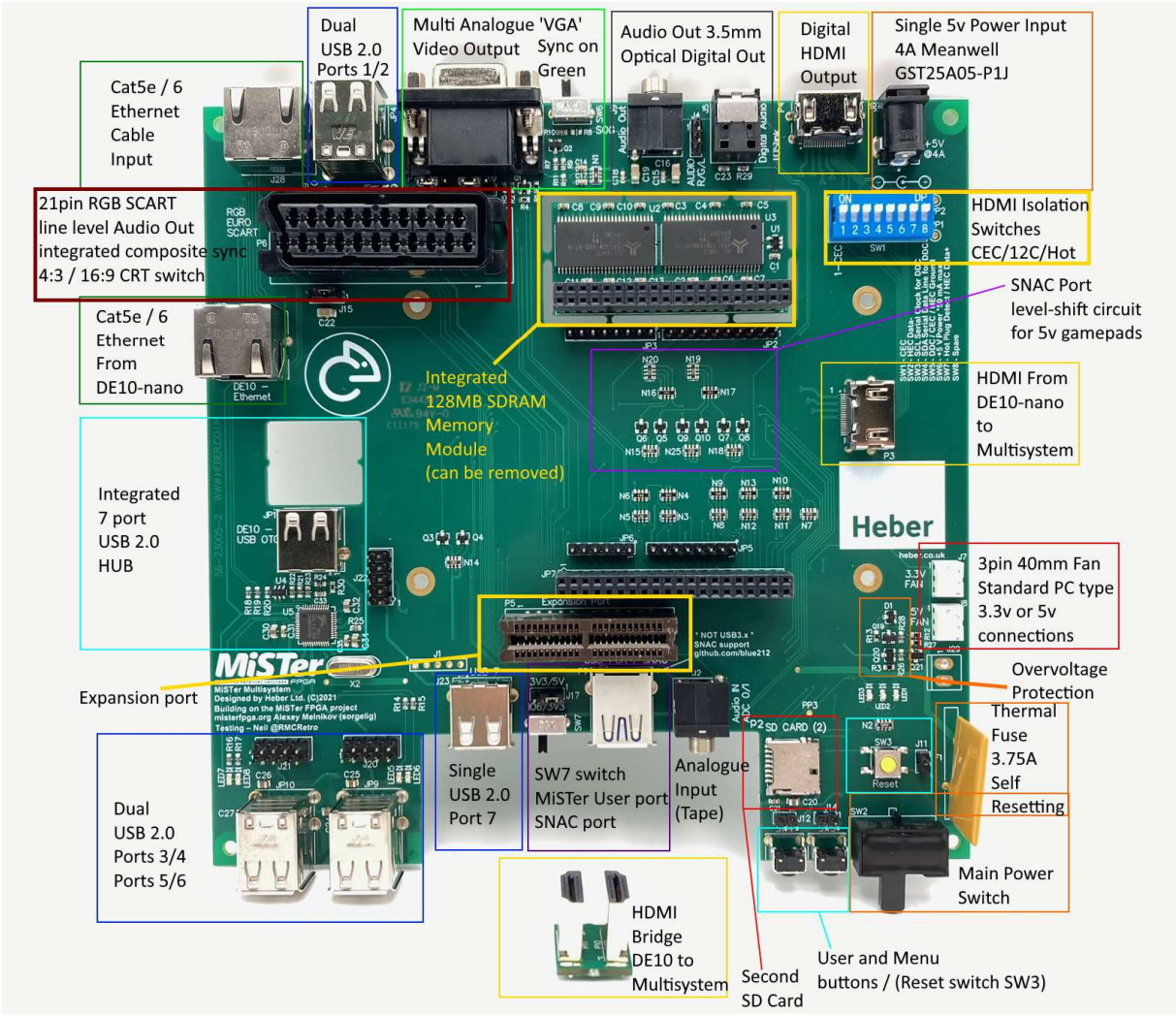
10.2 Multisystem PCB board reference -

The Multisystem PCB - key component references and Pin1 indication etc.-



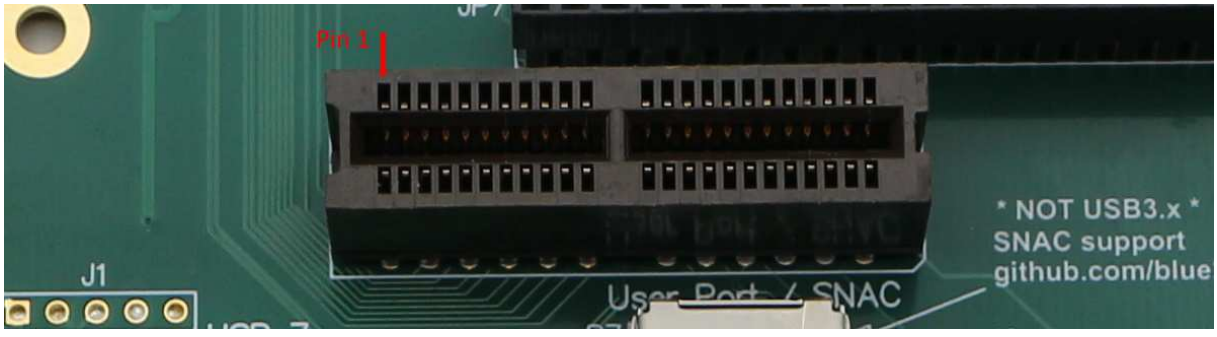
10.3 Multisystem Key components and function -

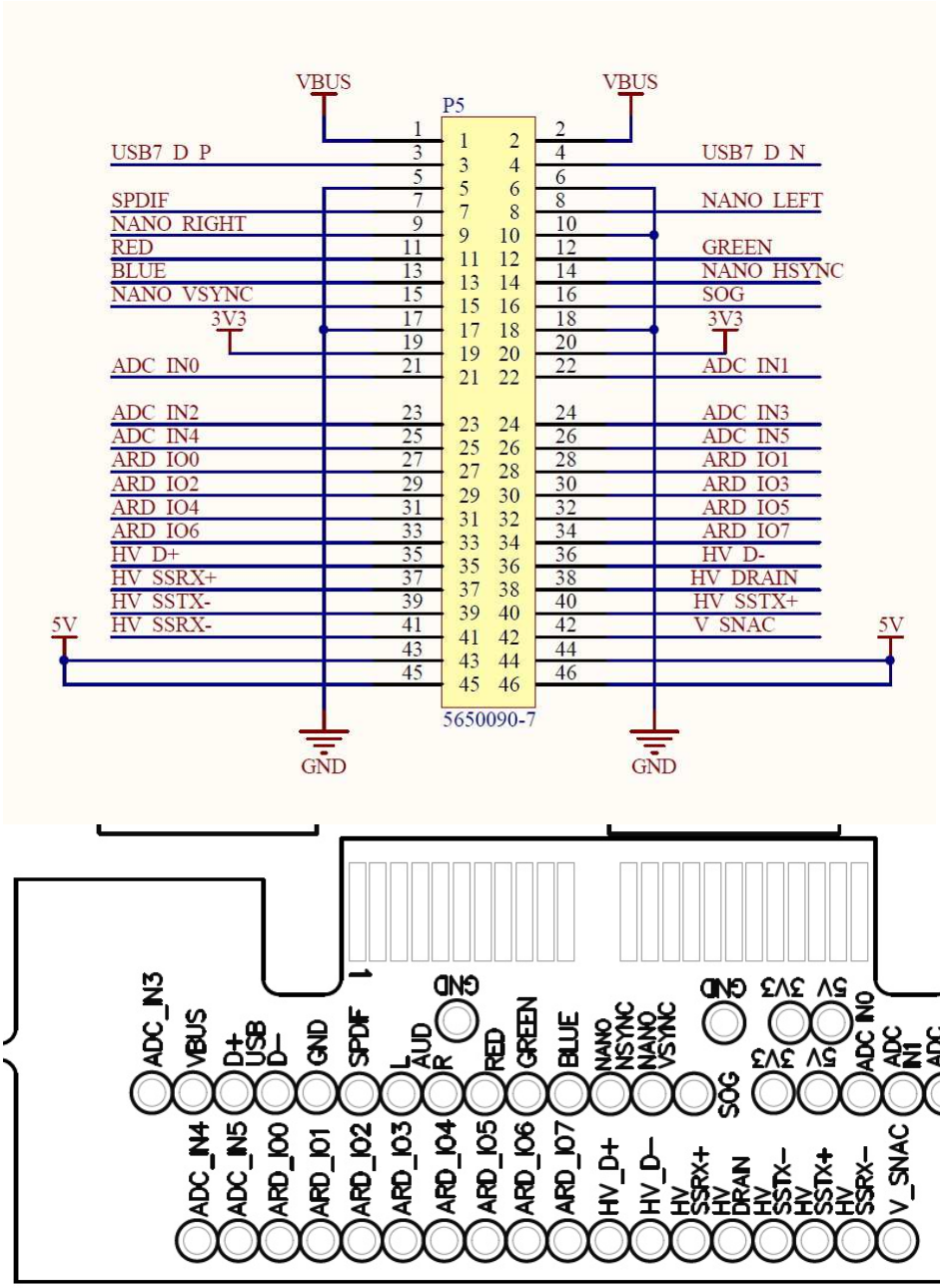
The Multisystem PCB – key component functions –



10.4 Expansion port connections -

We plan to make a number of expansion modules, but you may also wish to make your own. Here are some key technical details to assist you. If you require any further information, please e-mail multisystem@heber.co.uk




VBUS
VBUS
P5
USB7_D_P
USB7_D_N
SPDIF
NANO_LEFT
NANO_RIGHT
RED
GREEN
BLUE
NANO_HSYNC
NANO_VSYNC
SOG
3V3
3V3
ADC_IN0
ADC_IN1
ADC_IN2
ADC_IN3
ADC_IN4
ADC_IN5
ARD_IO0
ARD_IO1
ARD_IO2
ARD_IO3
ARD_IO4
ARD_IO5
ARD_IO6
ARD_IO7
HV_D+
HV_D-
HV_SSRX+
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HV_SSTX+
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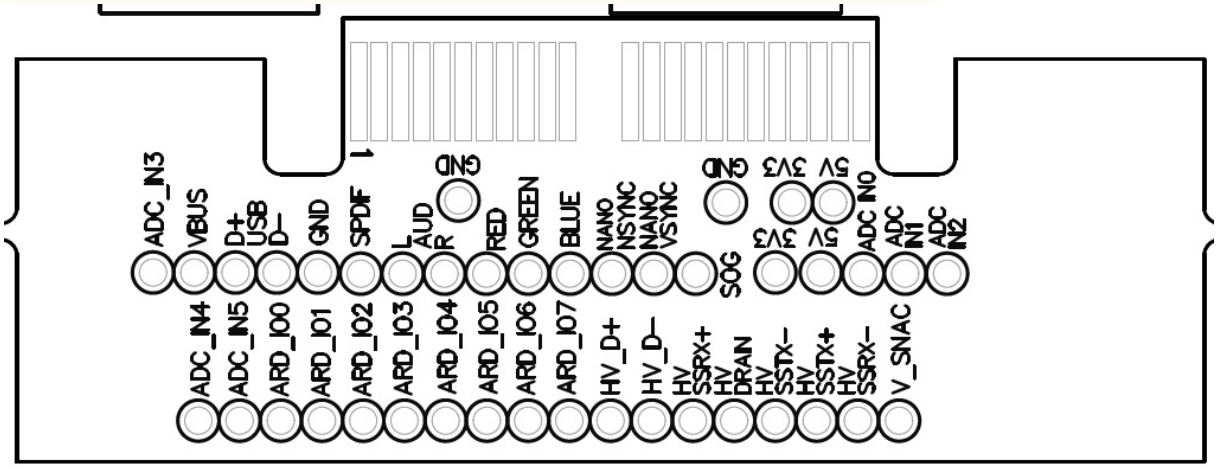
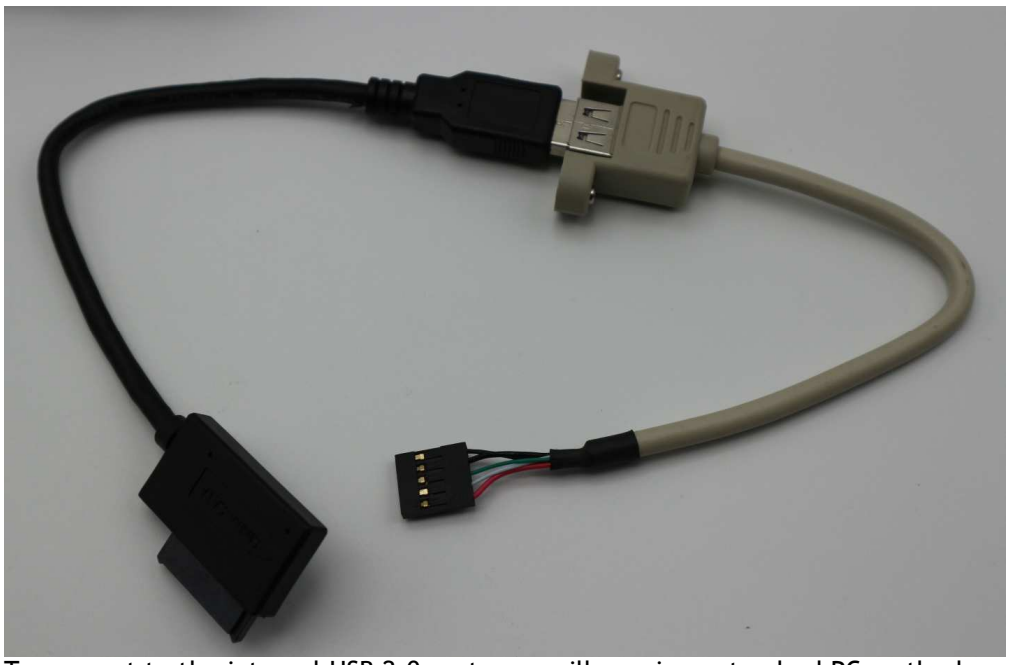
5650090-7
GND
GND


1
ADC_IN3
VBUS
D+
USB
D-
GND
SPDIF
L
AUD
R
GND
RED
GREEN
BLUE
NANO
NSYNC
NANO
VSYNC
GND
SOG
3V3
5V
ADC IN0
ADC
IN1
ADC
IN2
ADC_IN4
ADC_IN5
ARD_IO0
ARD_IO1
ARD_IO2
ARD_IO3
ARD_IO4
ARD_IO5
ARD_IO6
ARD_IO7
HV_D+
HV_D-
HV
SSRX+
HV
DRAN
HV
SSTX-
HV
SSTX+
HV
SSRX-
V_SNAC

10.5 Internal USB 2.0 Expansion connections –

You may wish to connect up internal USB devices. We have provided alternative single-in-line pin connections for this purpose.

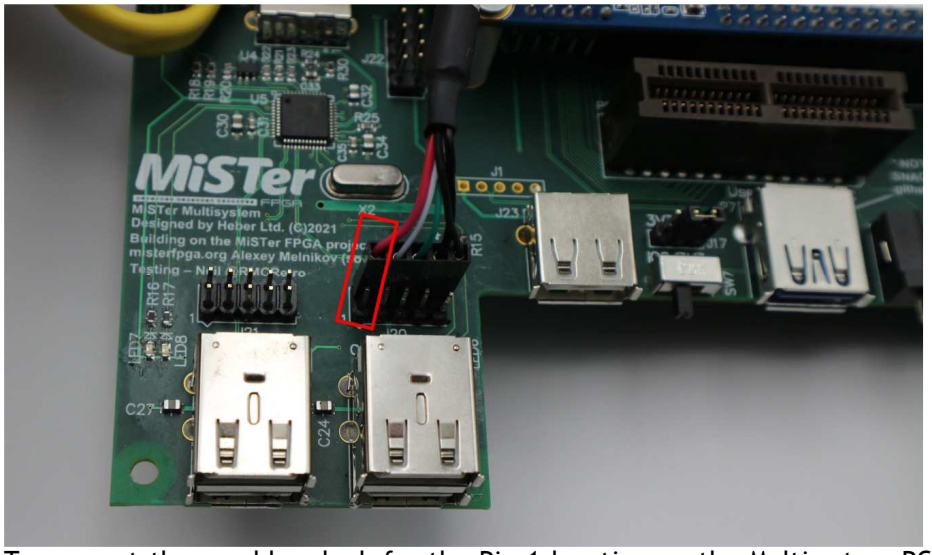


To connect to the internal USB 2.0 ports you will require a standard PC motherboard single (5pin) or dual (10pin) USB adaptor cable – shown as the grey cable above.

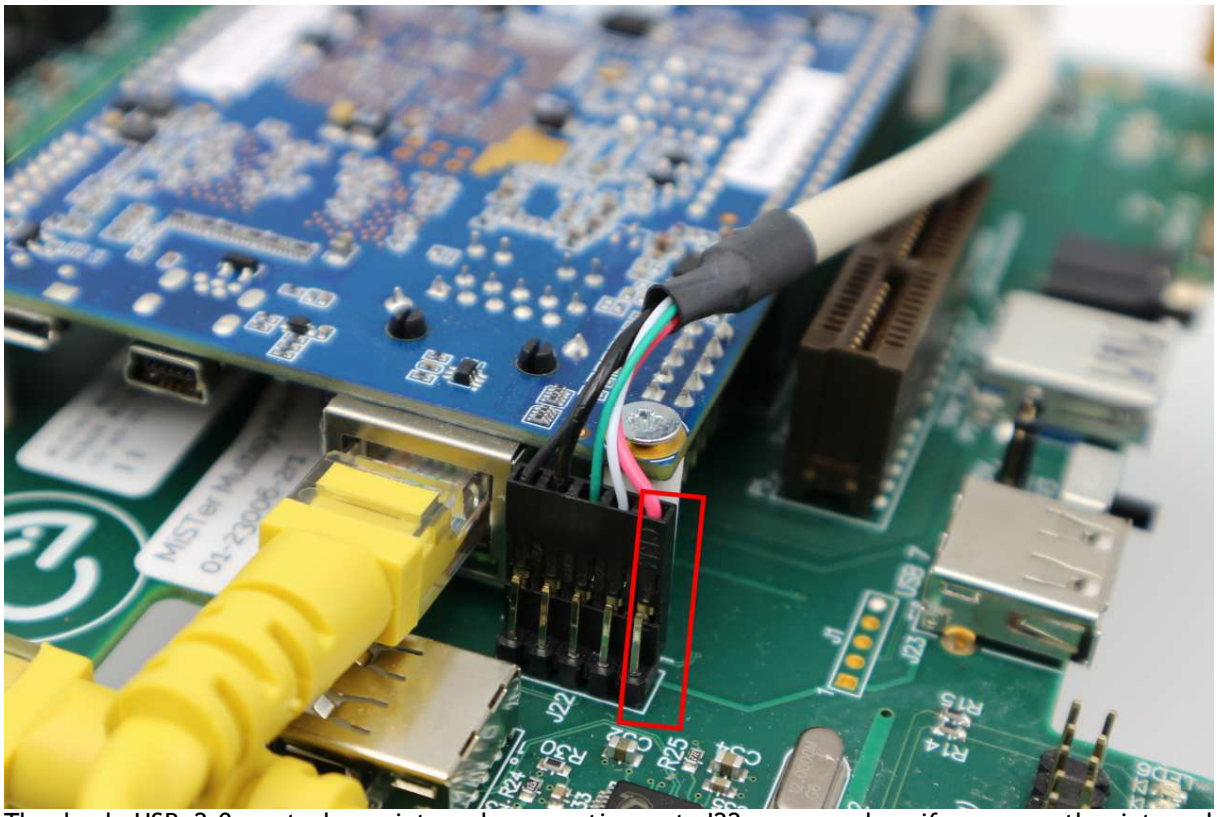
This will allow connection to the Multisystem Motherboard USB 2.0 ports and then connection to standard USB devices (SUB SATA cable shown above).

Only use 5 pin or 10 pin connectors as these have the Ground (GND) and shield connected. 5 pin cables have a screened cable.

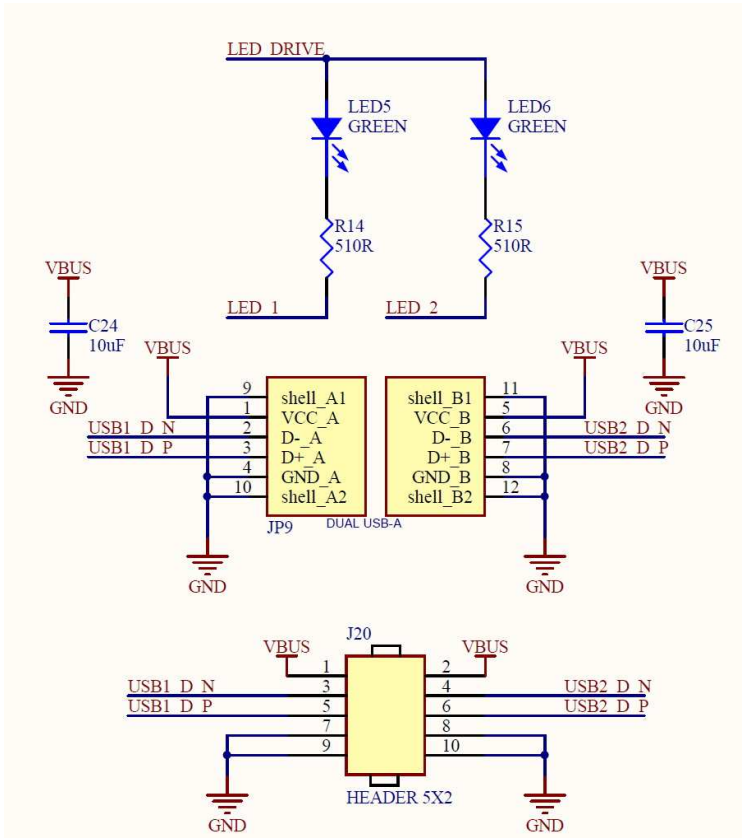
4 pin connectors with unscreened cables are available, but are not recommended with the Multisystem or any USB 2.0 device.



To connect these cables, look for the Pin 1 location on the Multisystem PCB and connect the Red wire (5v) – the cable should then have the USB +/- (White/Green) and then Ground (GND) and Shield. – Usually both black.



The back USB 2.0 ports have internal connections at J22 – remember if you use the internal connections, you cannot use the external USB ports at the same time.



USB connections.

USB SSD drives can be connected to the Multisystem, to external USB 2.0 ports or via the internal USB headers.

The Case Type B lid is designed to fit a standard 2.5” SSD drive.

Use a SATA to USB adaptor and cable to connect to any of the internal USB ports.