

# INSIDE GADGETS

## Expandable KVM Expansion v1.0 Kit

A Keyboard Video Mouse (KVM) that allows you to switch the keyboard, video and mouse between 2 computers using 2 buttons.

You require 1 Expansion KVM Mainboard in order to use this expansion board.

This expansion board allows you to add on another 2 computers to switch to by plugging it into the existing Expandable KVM Mainboard and allows you to chain multiple Expansions for even more computers.

The RJ45 network port shown is where we connect to our custom 2 port USB cable to; you will be required to provide your own network cables – the advantage is that they can be any length you like and we save cost since we don't need a USB hub chip.



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### Specifications

PCB Board: 100mm x 49mm

Input voltage: 5V (powered by the Expandable KVM Mainboard expansion connector)

Current consumption: 0.4mA (no load)

Maximum USB current allowed: 250mA



Weight: 60 grams

















### How it works

An ATtiny controls a few analog switches which switch the input signals depending on the button you press. When a button is pressed, the ATtiny sends a pulse to any other connected boards telling them to switch their analog switches to high impedance mode.





### Kit Contents

To assemble the kit you will require a soldering iron and solder. You will also require 2 ends of a CAT5 network cable or similar and a multimeter to test for continuity so you can assemble the 2 USB to RJ45 cables.

Picture	Name	Description	Qty
	PCB	Expandable KVM Expansion v1.0 PCB	1
	U1	Atmel ATtiny24 (ATtiny24-20SSU/SSUR) / ATtiny841 (ATTINY841-SSU) or similar, comes pre-programmed	1

	U4, U5	Ti Analog SPDT Switch Single (SN74LVC1G3157DCKR)	2
	U2, U3	Ti Quad SPDT Video Switch (TS5V330DBQR)	2
	R1 – R4, R7, R9	10K Resistor SMD 0805 (reads 1002)	6
	R5, R6	100K Resistor SMD 0805 (reads 1003)	2
	R8	1M Resistor SMD 0805 (reads 1004)	1
	C6	10uF Capacitor SMD	1
	C1 - C3	0.1uF Capacitor SMD 0805	
	C4, C5	0.1uF Capacitor SMD 0603	2
	J7, J8	RJ45 8-pin PCB Socket Connector	2
	J5 – J6	DB15 15pin 3 Rows VGA Female Socket Connector	2
	LED1, LED2	Red LED SMD 0805 (notice the green line which indicates the negative side)	2
	SW1, SW2	4.3mm Tactile switch	2
	J9	8x2 pin female header	1
	J10	8x2 pin male header	1
		USB Male Type A - 4 Pin Plug Connector With Black Plastic Cover	4
		Rubber Feet	4

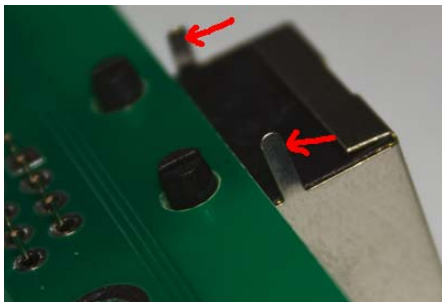
## Kit Contents – Case Add-on

Picture	Name	Description	Qty
	LED1, LED2	LED	2
	SW1, SW2	Switch	2
		M3 8mm Screw	2
		M3 Nut	4
		Black acrylic case pieces	6

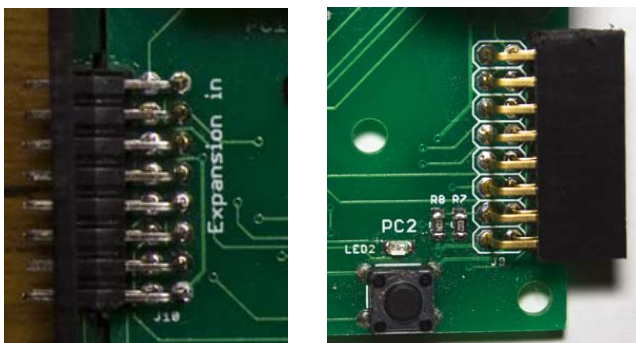
## Build Instructions

If you find the silkscreen hard to read, the PCB guide pictures are available to use.

1. Solder all the SMD packages first (take care with U4 and U5 as they can be a little tricky to solder) and then the DIP components.
2. When soldering the network ports, cut off the 2 end notches and it's recommended that you apply glue around the network port as it's not that secured to the board.



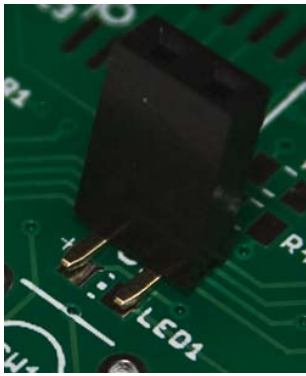
3. Solder the 8x2 male expansion header and the 8x2 female if you wish to extend the KVM in the future.



4. Attach the 4 rubber feet to the bottom of the PCB

## Build Instructions – Case add-on

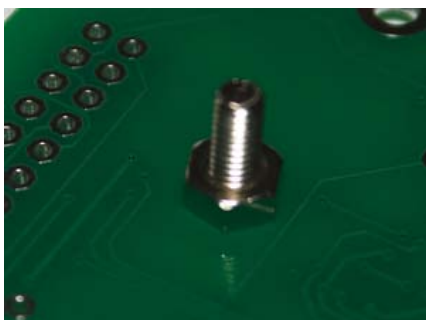
1. If you purchased the case add-on, you will need to bend the two included 2 pin female header 90 degrees and solder them on to where the LEDs would go, and then glue them in place.



2. You will need to cut the LED leads so you can place the 3mm LED on the pin header so the case will just fit over the LED (remember to note the positive side of the LED). You will need to replace the standard 5mm buttons with the 20mm long buttons.



3. Insert the two screws and a nut on the other side of the board.



4. Place the bottom of the case underneath the screw/nut and use another nut to tighten the board in place.

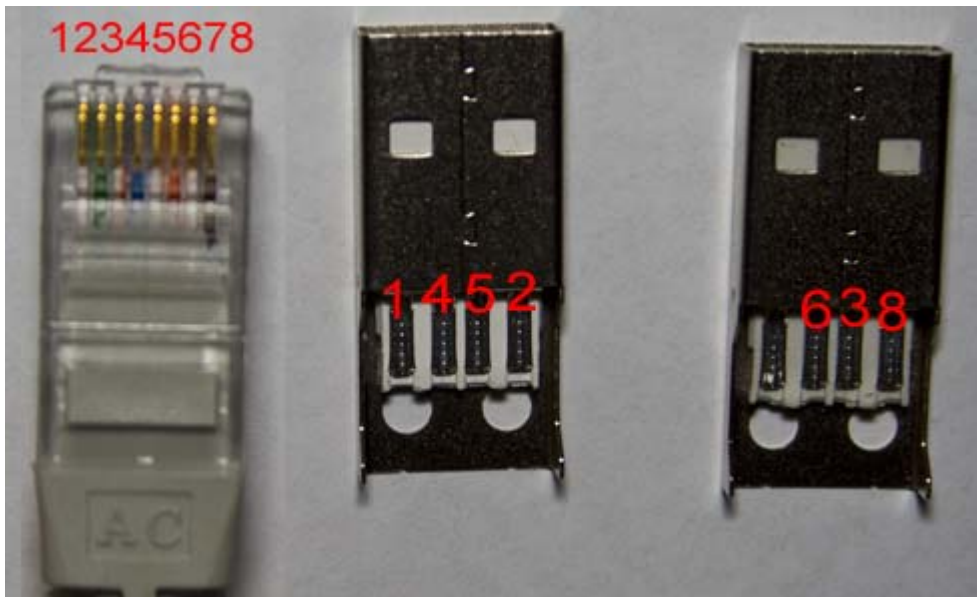


5. Carefully glue on the sides together or you can use some thin double sided tape. If using glue, once it dries you can remove the excess glue using acetone. The top piece should be the last piece to glue down so that you can make adjustments to the LED lengths/positions as needed.

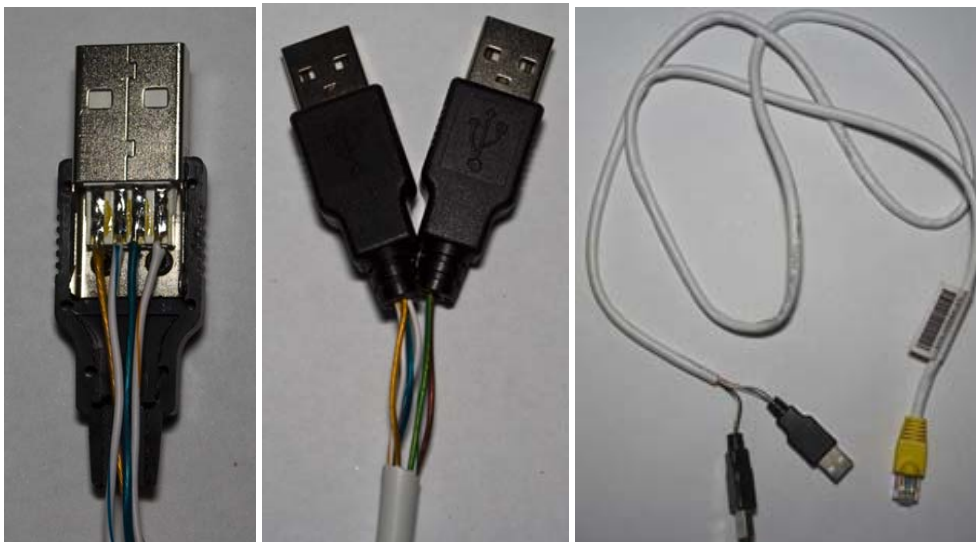
## Build Instructions - 2 USB to RJ45 Network Cable

You will require a multimeter to test for continuity.

1. Cut your network cable to a suitable length and expose the conductor wires.
2. Use a multimeter to match the wires to the diagram below and solder them on the 2 USB connectors. Repeat the same process for the second USB pair.



3. Once soldered, place the USB connector in its case. It's a good idea to glue the cables in place on the connector and in the case to provide some strain relief.



## Programming the ATtiny24 / 841 (optional)

This step is only necessary if you wish to update the firmware on the ATtiny24/841 or if you have replaced the chip. You will need to solder in the 2x3 male ICP header (J1) and you will require a programmer such as the USBtinyISP and your programmer will need to be supported by the software called AVRDUDE - <http://savannah.nongnu.org/projects/avrdude/>

Upload the \Expandable\_KVM\_v1.0\main.hex file to the ATtiny24 by running the following command: `avrdude -p ATtiny24 -c usbtiny -U flash:w:main.hex`

For ATtiny841: `avrdude -p ATtiny841 -c usbtiny -U flash:w:main.hex`

## How to Use

1. At any time you can connect this expansion board to the main board or to another expansion board, just be sure to line up the expansion pin headers correctly. The expansion boards will blink both LEDs and enter a high impedance state until you press one of its buttons.

2. Press the buttons to switch between the PCs; the LEDs will light depending on which PC is selected.

## Revision History

Rev. 1 – 8/01/2015

- Initial Revision

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