

Fan Speed Controller/Accelerator Mods

For the Xbox Series S / Series X games consoles

User Manual



www.circuitsurgery.com

Description

This is a series of small modules designed to be easily fitted to your Xbox console to increase the speed of the fan over that demanded by the console itself, and therefore keeps the console running cooler than it would otherwise.

Fitting

Fitting the module is extremely easy, in fact, the “hardest” part is the actual teardown to get to the fan which itself is actually not difficult!

There are numerous teardown instructions and videos online and it seems pointless to duplicate that information. Some of the best I have seen is described by iFixit, who have also produced excellent and freely downloadable PDF documents which can be downloaded from here for the Series S console:

https://ifixit-guide-pdfs.s3.amazonaws.com/pdf/ifixit/guide_141302_en.pdf

and here for the Series X:

https://ifixit-guide-pdfs.s3.amazonaws.com/pdf/ifixit/guide_141741_en.pdf

They show how to get to the fan for replacement, so are particularly relevant.

Having arrived at step 11 (for the Series S) or step 9 (for the Series X) of the iFixit instructions, it's simply a matter of plugging the module into the socket where the fan was plugged into and plug the fan into the other end of the module.

See below for some images showing the fitting of the yellow module, the fitting of the blue and green modules is identical but without the external control.

The Externally Variable Controllers (Yellow, Yellow/Green, or Grey)

The modules of the externally variable controllers are fitted in exactly the same way as the modules above, the only difference being the additional steps needed to fit the control potentiometer (the “pot”).

Externally Variable Controller - Fitting the Control

Fitting the pot to a Series X is very easy as the ventilation holes in the case are just the right size, and one can be used to mount the pot!

Mounting the pot in a Series S requires a little more work: the pot is designed to fit through a hole 7.5mm diameter with a second locating hole of 3mm diameter (see diagram over the page). Whilst that is the ideal method of fitting, it's not strictly necessary to have both holes if the locating lug is removed from the pot - it's there to ensure the pot doesn't rotate in its fixing.

If you prefer not to drill holes in your console's case, then it's possible to make a small slot somewhere inconspicuous on the edge of the case which the cable may be routed through, and the pot stuck to the outside of the case using glue or double-sided tape. This is not such an attractive way of mounting the pot, but it does have the advantage of ease, and does not leaving an unsightly hole should you remove this mod to sell the console on at a later date.

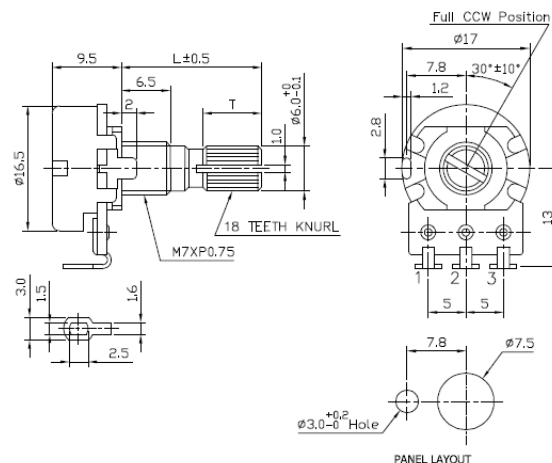
If you decide to fit the pot as designed, then with reference to Figure 1, the first thing that needs to be done is to locate a suitable position within the console with enough space to fit the pot. Make sure that this position has enough clearance all round so that when fitted, neither the body nor the terminals of the pot will come into contact with any internal part of the console when the case is put back together.

Place the self adhesive drilling template on the chosen location on the outer surface of the case. For guidance, the outline of the body of the pot is shown on the template. Carefully mark the centre of both holes using a scribe or similar sharp point. When drilling the holes, do so with a moderate to low drill speed; too high a speed may cause the plastic to melt resulting in an unclean hole.

Once the internals of the console have been replaced into the case, the module can be fitted, the cable routed carefully to the hole and the pot fitted and secured with the nut and washer supplied.

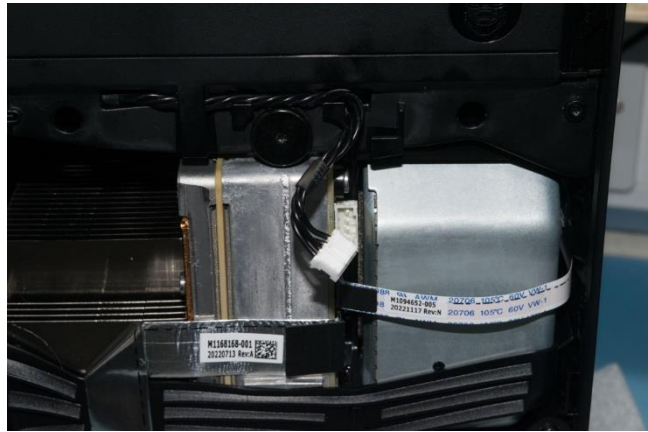
When refitting the top half of the console's shell, be careful not to nip the pot's cable between the plastic mouldings and also make sure that the cable does not cover the case fixing screw holes.

Figure 1: Potentiometer Dimensions

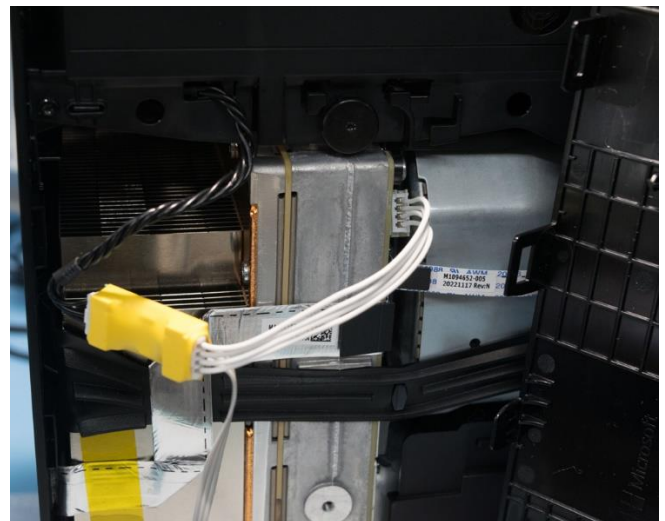


Fitting (Images)

Position of fan connector – rear of Series X (circled) and close-up of connector (removed)



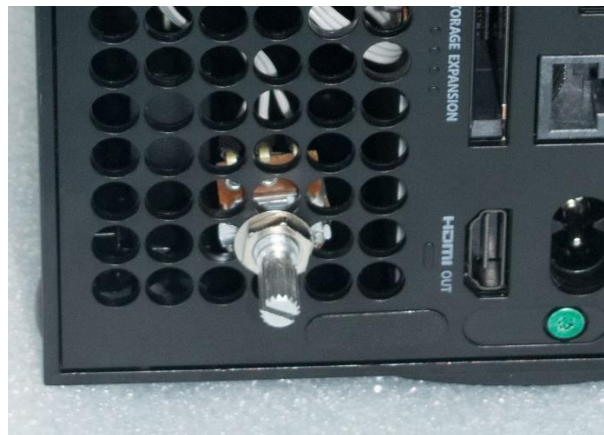
Yellow module fitted into fan socket ... and fan cable connected into module



Module's potentiometer fitted into convenient vent hole in rear panel



Console closed with fitting complete, and close-up of control potentiometer



Operation

The Basic (Blue) Version

This module requires no user adjustments. It automatically detects the fan speed that the console is asking for, adds 50% and then drives the fan at the resulting speed. The module drives the fan using the same PWM (Pulse Width Modulation) signal that the console uses and so will cause no additional wear on the fan. This is completely

transparent and neither the console nor the user will have any indication that this is happening, therefore there will be no impact on gameplay and no likelihood of having your console banned/blocked as a result of fitting this module.

Just to be clear of the effect on the fan speed of fitting this mod, see the table below. It shows the speeds in 10% steps for clarity, but the actual increases will be infinitely variable. Note also that the console starts from cold demanding the lowest speed of about 20%.

Demand from Console (% of full speed)	Actual Fan Speed (% of full speed)
20	30
30	45
40	60
50	75
60	90
70	100 (Full Speed)
80	100 (Full Speed)
90	100 (Full Speed)
100 (Full Speed)	100 (Full Speed)

The Variable Controllers (Red or Yellow)

These modules allow the user to adjust the speed of the fan from the speed demanded by the console up to the maximum speed of the fan.

On the red module, adjustment is made by turning the potentiometer on the board using the supplied screwdriver, or any other 2mm flat-bladed driver. The yellow module is adjusted using the control which will have been mounted on the case of the console during the fitting procedure. When fully counter-clockwise, the fan will spin at the rate determined by the console. Turning the control clockwise will continuously and smoothly increase the speed of the fan until it reaches full speed with the control turned fully clockwise.

Note that if the console is already warm, the first part of the rotation will appear to have no effect. This is because the module will not allow the fan to spin more slowly than the console demands.

The Adjustable Accelerator (Green)

This module behaves in the same way as the Basic (Blue) module but with the additional benefit of being able to adjust the amount of acceleration, in 10% steps.

Using the supplied screwdriver (or another suitable miniature 'driver) the switch on the module may be set to one of ten positions. Position 1 will give a 10% increase in speed, position 2 gives 20%, through to position 0, which gives 100% increase - double the speed demanded by the console.

Red (Yellow) and Green (Yellow/Green) Modules: A comparison

Below is a graphical representation of the effect of the green and red modules on the speed of the fan. The thick orange line represents the speed of the fan without a module fitted and the green and red lines represent the speed of the fan with the green and red modules (respectively) fitted and the control switch set to position "7" on the green module, or approximately $\frac{3}{4}$ clockwise rotation of the pot on the red module.

