

Pace Sky Digibox Reliability Improvement

Why is additional cooling needed? <http://www.satcure.co.uk/accs/page9.htm>

Please download the full colour copy of this file from the above web page

All Central Processing Units (CPUs or “microcontrollers”) give off heat and the faster they run, the more heat they give off. The silicon chip at the centre must not exceed a temperature of about 200°C. At this temperature, the outside casing will certainly be hot enough to hurt you if you touch it!

Provided that the Digibox is kept in a cool room with plenty of ventilation and air movement around it, the CPU will probably be safe. Unfortunately, many Digiboxes are installed in rooms with central heating where the ambient temperature can be as high as 24°C in winter or 30°C in summer. To make it worse, the Digibox may be mounted in a tight space, perhaps even an enclosed cabinet. A gap of a few centimetres above is simply inadequate. Hot air doesn't move sideways without help. It needs to have a minimum of 100mm gap to move upwards before it can spread outwards and escape. In addition, there must be plenty of room beneath and at the sides to allow cool air to go in. Hot air can't come out unless cool air goes in — otherwise there'd be a vacuum!

So, to overcome this reliability problem, SatCure provides a solution in the form of a cooling fan kit. Let's look at how it works.

The silicon chip is in a large square moulding but it is actually quite tiny — just a few millimetres in diameter. Any heat it gives off has to pass through a layer of plastic then be taken away by direct radiation (not very effective as the cover is in the way) or by air convection (not very effective in a closed box).

It can get rid of heat more quickly if we add a fan.

Why don't the manufacturers do this?

1. Noise.
2. Cost
3. It can draw in dust which may cause problems.
4. Most Digiboxes will run for years with the CPU just below the critical temperature.

So SatCure supplies a fan kit that you can fit yourself.

Reliability is improved if you fit a fan to circulate the air inside a Digibox. If you remove the “digital interface” rear plate and use a fan to draw out hot air, the effect will be even better.

Later models benefit from a CPU fan as the CPU tends to run very hot. Fans can be powered from the internal power supply or from our adjustable voltage external power supply unit (order code PW00397).

Fitting a fan to the Pace Sky Digibox CPU



Early models don't really need a CPU fan as the CPU doesn't run especially hot. Check the label underneath the chassis. The BSKYB2500 versions S3 and later may benefit from a CPU cooling fan.

Disconnect the mains power connection and then all other connections, taking care to label them so you know where they belong.

It's recommended that you wear cotton clothing to minimise the risk of static electricity. Before touching anything inside your receiver, touch a cold water tap or a radiator. Then touch the metal chassis of the receiver. This ensures that you are at the same potential as the receiver.

Remove any labels which are on the CPU chip. Be very careful not to damage the chip or surrounding copper conductors. The surface of the chip must be free from all glue residue. Wipe it carefully with Isopropyl alcohol, surgical spirits or methylated spirits, taking care not to let any run beneath the chip.

Discard the heatsink (if supplied) as there is insufficient space to fit it to the CPU. Fit the plastic pegs to the fan and simply glue it in position over the CPU chip. Make sure the air-flow arrow points down towards the chip. This way you don't have to touch the CPU and, if it does ever fail, it's easy to remove the fan. Take care in your choice of glue. The "hot melt" type of adhesive applied to the plastic pegs with a heated gun is preferred because this adhesive does not cause short-circuits and is easy to remove. Clear adhesive with an organic solvent should be OK. DO NOT use any water-based adhesive or petroleum-based adhesive such as "Evo-Stick". These can cause serious corrosion.



Solder the black wire from the fan to a convenient 0 volt point. Solder the red wire as follows:

Pace early Digibox:
D35 stripe end gives 8 volts.

Pace BskyB2500 with separate power supply board:
D2501 stripe end gives 8 volts.... or
D2505 stripe end gives 16 volts (solder a resistor to it. Solder red wire to free end of resistor).

Make sure that no wires can go near the high voltage power supply or touch heatsinks or sharp edges. If you need to transport the Digibox, make sure that the fan and heatsink are still in position before reinstalling or connecting power.