FITTING A FAN INTO THE SIDE OF THE SN10.

Peter Bruce. Croydon. UK. Aug 2003.

After reading an article in S&T about the distortion boundary air layer that exists directly at the mirrors reflective surface I felt it was time I tried something to cut down the cool down time for the telescope mirror and also improve the seeing removing this boundary air layer. – We all like good seeing so why have a problem inside the closed tube of the SN 10?
For a fuller understanding into why I went down this route please read the article in Sky & Telescope at www.skyandtelescope.com. - At the bottom of the page look for "HOW TO". Pick "Telescopes and binoculars".
The 5th item down is "Beating the seeing". – You can print this out.
This article is by Alan M. Macrobert. He is the senior editor of the S&T magazine.
To "kill this boundary air layer" was my main reason for not installing the fan unit at the bottom of the mirror cell….
It was a big step to take - to make holes in the side of your OTA is not to be taken likely and a working method had to be devised to do this before I tackled the OTA.
After trying a number of good quality hole saw's on a scrap 10" section of mild steel tube it became obvious that approach would not be an option, another method had to be sought to overcome the problems of making the air inlet holes to the main tube - directly at the mirrors surface - if this design was to work….
The method finally used proved to be a simple chassis hole punch which is (was?) used to make holes within the Aluminium chassis of electrical items like the old radios / TVs (Before the advent of printed circuit boards) - to take valve bases…..
You can still buy the chassis hole punch sets so although I have had it for years YOU CAN STILL BUY THEM TO.
This method of hole cutting was easy and simple to do with no distortion made to the OTA. You just simply drill a hole and pass a bolt through with the cutter on each side of the OTA tube. Tighten down - which exerts pressure on the cutter that gently and neatly cuts the metal. Even the paint was not damaged inside or outside the tube.
This is the only major part of the project to do right - the rest is easy.
There follows full pictorial advice on how to do this so if you are interested read on…

WHAT THE FINAL INSTALLATION SHOULD LOOK LIKE.

SO WHAT DO YOU NEED ---AND HOW DO YOU DO IT….

IF YOU ARE INTERESTED – READ ON.

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Aug 2003

GETTING THE BITS TOGETHER.

The basic bits are an 80mm brushless 12 volt d.c. computer fan. Adjustable voltage d.c. transformer - the fan speed can then be adjusted as conditions dictate. You can also use a battery in the field with a selectable voltage output to allow the same result.

6 x 4 x 2-1/2 PLASTIC ELECTRONICS BLACK BOX. POWER JACK PLUG. – I USED A 3.5mm SOCKET. MINITURE TOGGLE SWITCH.

First thing to do is throw away the lid - it's not needed.

Mark out the hole to take the fan and allow enough room to fix the fan on the inside of the box. Get as tight up to the end of the box as you can. Use a standard hole saw and Tidy up ant rough edges.
Decide where you want to fit the switch and power inlet socket – I fitted my switch together with an LED at the top so I could see it and get access when it was on the stand.
Next drill the hole for the power inlet jack – I placed mine right at the bottom as near the tube as I could so the power lead had easy access when following the bottom of the scope whilst slewing. Also if it does catch it will pull out.

METHOD TO MAKE THE FAN BOX FIT THE OTA TUBE.

So now you have the fan hole cut out and need all four sides of the plastic box to fit the outside of the OTA. It must fit snug against the tube…
Sounds hard to get a good fit but it's easy and you don't need any tools – That's why you use a plastic box…

You get a full sheet of sandpaper and **Selotape** all the edges to your vertical standing OTA.
By using vertical up / down movements the plastic at the centre edges are quickly removed and you continue until the plastic is removed forming a good seal to the side of the tube. Continue until the outside edges of the plastic box are also in contact.
This may seem to be a slow process but it is very quick indeed so don't think it will take you hours.

Once this has been completed you will have a good seal / join all around the OTA tube. You can now remove the sandpaper and you will see there is not a mark or scratch on the paintwork of your OTA – as long as you were careful and did not go over the edge….

You can now proceed to fit the fan, wiring, + bits / bobs….

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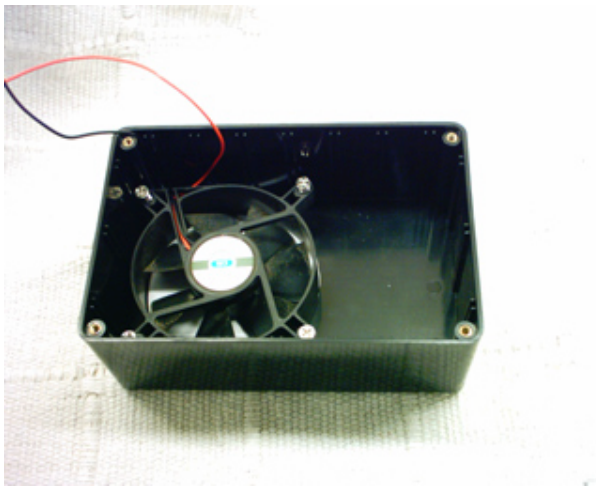
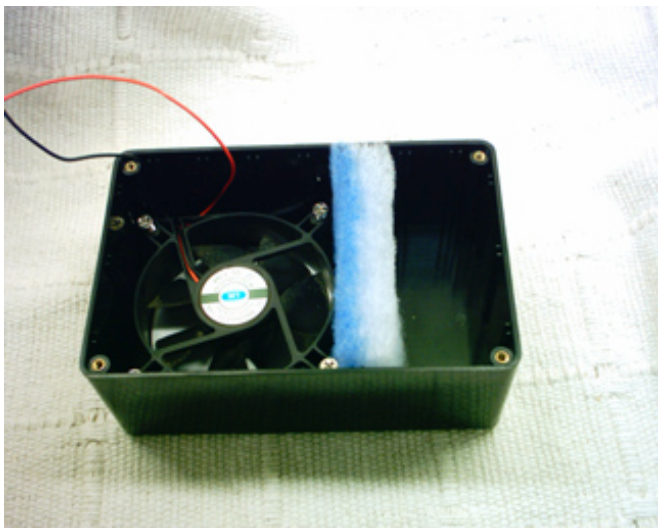


Prototype 80mm fan fitted into the box over the drilled hole. This can be fixed in many ways – silicon glue, superglue or just plain screwed.
As long as it's fitted and secure there is no force or weight to hold so simple methods above are fine.
Fit the power socket / switch and LED if required then wire it up but make sure you run the thin wires at the bottom edge / angle of the box as you will still need to fit in the filter pad.

The Hammond filter pad is cut slightly oversized then silicon-glued into position. This will never need to be removed again so it's a "one off" fitting.
The silicon glue only needs to be applied to the bottom and sides of the filter pad because when it's fitted to the OTA the curve of the tube will ensure a perfect fit.



The filter is cut to size to fit into the box. This is made by. HAMMOND MANUFACTURING.
Waterloo Ont.
PART REF PFF2000
Telephone No.
Canada. (519) 822-2960.
U.S. (716) 631-5700.
U.K. (44) 1 256-812-812.
www.hammondmfg.com

You now need to remove the primary mirror and place it in a safe place.

BE CAREFUL.

TAKE YOUR TIME.

– YOU CAN ONLY DROP IT ONCE….

Although it may not be necessary I marked my OTA tube and mirror cell before I removed it with an indelible red marker.

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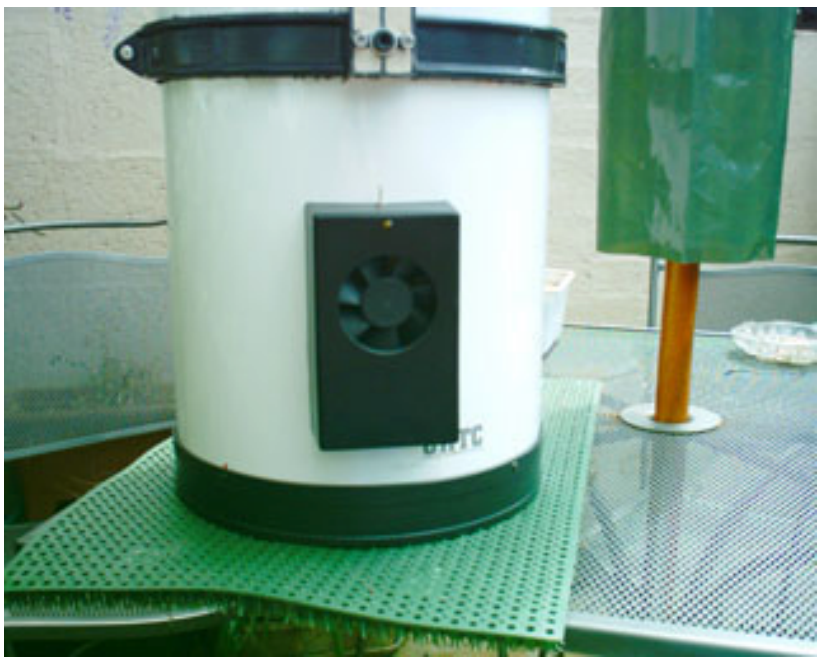
THE CHASSIS HOLE PUNCH SET.

This is the chassis hole punch set - used to make the 3 holes in the OTA. You need to make three overlapping holes, which must be no wider than the base of the plastic box you use to house the fan unit.
The overlapping holes in the OTA are placed so the bottom holes are level with the top of the mirror. - For best effect.

Mark out the positions of the holes on the OTA - you will need to drill three pilot holes and if you use the kit above, you would use the reamer tool to open up the holes to allow the "T" section bolt to pass through.
You then screw on the nut / cutter unit (cutter to the left of the "T" bolt) and start tightening up. The cutter will cut the hole cleanly without strain - because one cutter slides inside the other giving a clean burr free hole.

Perform this three times to give a series of overlapping holes which are just less than the width of the fan box size used.



After the holes are cut within the OTA position the plastic fan box over the holes so the path of the airflow will be introduced into the OTA. Mark around the plastic box onto the OTA with a pencil mark – this can come off later.

Now lay the OTA horizontal and use clear Dow Corning Silicon around the edge of the plastic box and position it onto the OTA – carefully lining it up will the pencil marks you have previously made.
The silicon sealant not only secures the fan box but also provides an airtight seal with the OTA.

Ensure you do this in a position where it will be safe to leave overnight….

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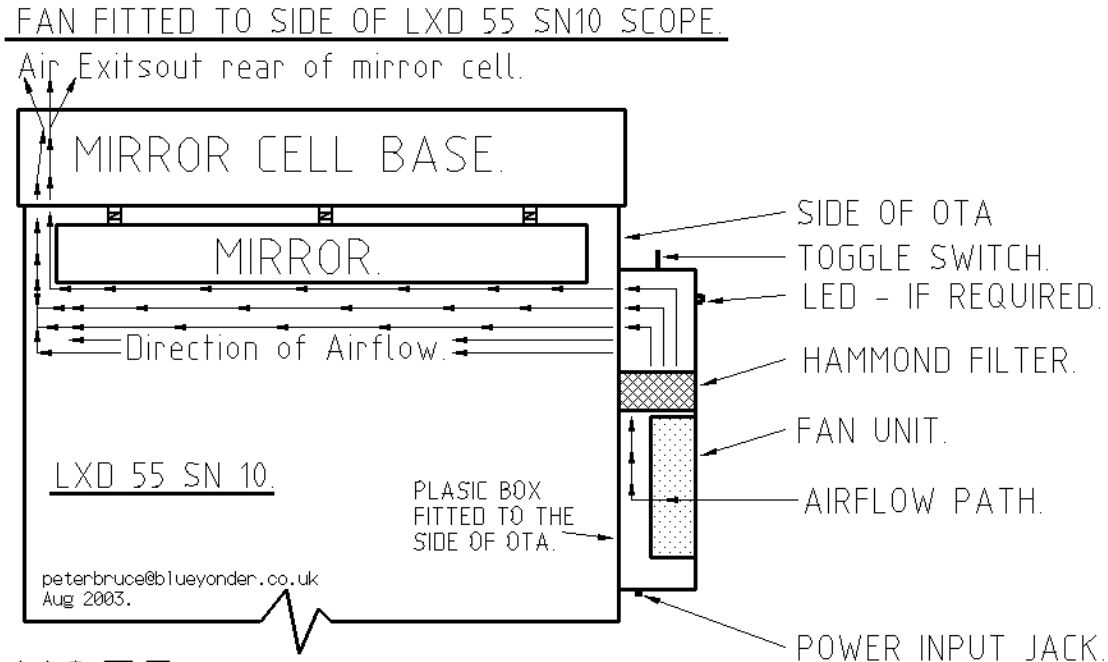

NOTE.

THE PICTURE ABOVE SHOULD ADD EXTRA DEPTH TO THE TEXT. PLEASE ENSURE YOU HAVE A CLEAR AND CONCISE UNDERSTANDING OF ALL THE WORK INVOLVED BEFORE PROCEEDING WITH THIS MODIFICATION.

IF I CAN BE OF ANY HELP PLEASE FEEL FREE TO EMAIL ME AT

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I hope this will help others contemplating fitting a fan unit to the LXD55 SN10 but this can also be fitted to other sized scopes.
I should point out that the reason I wanted to do this was two fold.

Cut down cool - down time. My scope gets hot inside our caravan by day.
Reduce the effect of the warm air barrier at the immediate mirror surface.

The fan / telescope has been tried out over a number of weeks and both of the above criteria have been satisfied.

There also seems to be **another advantage** I did not foresee.
The corrector plate does not get dewed up as quickly – the outside of the OTA has been dripping but the corrector remaines clearer for much longer and I can only put this down to the fact that the air inside the tube is changed and imparts a warming effect to the corrector as it is perhaps kept at the current outside air temperature. As to May 2007 this has proved correct. This is the only explanation I can think of.

Good luck to all who try this – **Please let me know how you get on and also if you need any help contact me direct and I will advise all I can.**

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