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Reducing the voltage drop in the NexStar N11GPS

I was wondering why some of my accessories did not work properly with the N11GPS powered by a 12V battery and the accessories powered through the +12V output of the base of the NexStar telescope.

The reason was excessive voltage drop inside the NexStar caused by 2 protection diodes. The first one is in the ground supply line coming from the +12V input jack located at the side of the base. The second is in the +12V supply voltage line going to the +12V output jack located on top of the base.

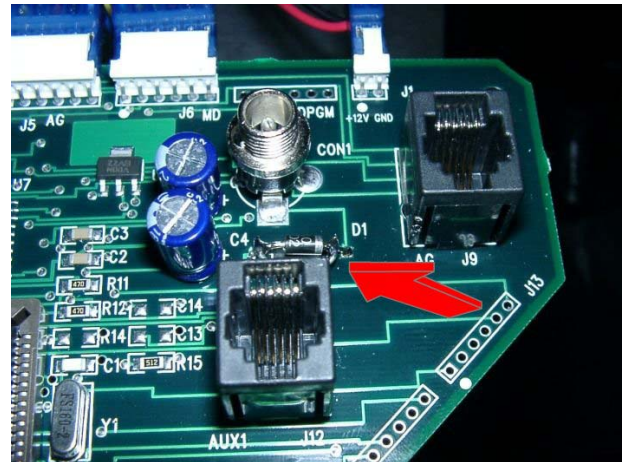
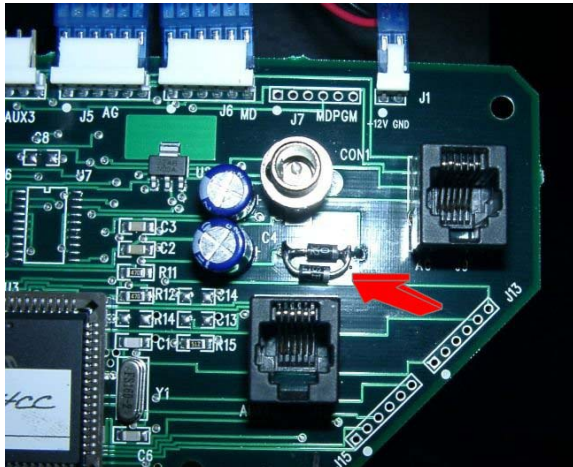
The first diode does protect the telescope from damage when supplying the telescope with the wrong polarity. I did not like having the protection in the ground line, so I changed it to the supply voltage line. Otherwise the protection diode could be bypassed by a ground loop. You can find this diode by removing the bottom cover of the NexStar base. It is inserted in the wiring. The next pictures show the disassembled supply jack from front and back with the diode first still isolated and then with the isolation removed.



The second diode does protect the telescope from being reverse powered through the "+12V output". This output is the jack on top of the mounting base (with plug inserted).

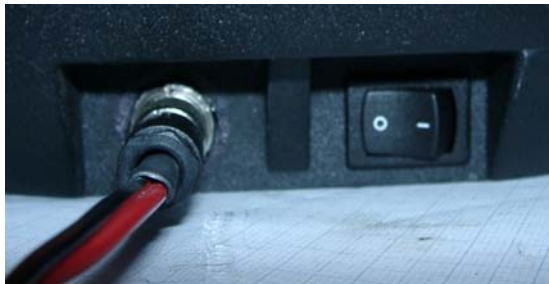


Under the cover shown on the pictures before is a PCB and there you look for diode D1. The next pictures show the PCB after the modification (now 2 diodes are used parallel).



I cut the voltage drop of 0.8V to less than half by replacing each mentioned silicon pn-junction diode (Celestron used 1N4004 diodes) by Schottky diodes (I used SB130 diodes because I had them here readily available). Actually I used 2 of these Schottky diodes in parallel to increase the max. current rating (thus in total I inserted 4 diodes). The overall voltage drop in the base, measured between “+12V input” and “+12V output”, could be reduced by these changes to approx. 1.1V.

If you follow the postings in the NexStar yahoo group the power supply plug in the NexStar telescopes is a continuous subject of failures and thus discussions. Having opened the telescope for the diode modifications is a good opportunity to replace this jack too. I used a connector which does not allow to mix up polarity and it features a screw locking. The maximum voltage is 125 Volts, the maximum current per pin is 4 Amps. It is the same connector I use on my other telescopes and if you would like to get more information please visit my homepage. You will find an article how I optimized the wiring of my N5 telescope including this connector. Finally please find 2 pictures of the N11GPS base with the new connector.



I appreciate comments and I am happy to answer any questions.

Best regards

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