

## Wireless Control of a NexStar Telescope

Freedom can be a matter of details – like achieving complete freedom of movement

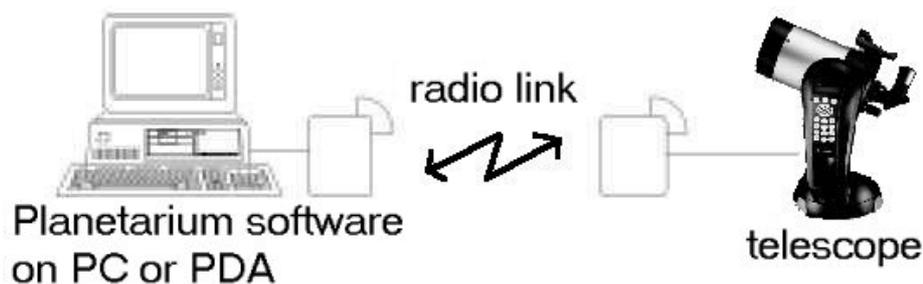
Probably most of us have recognized after a few sessions with our telescope very quickly: there are too many dangling cables around the telescope which limit our freedom of movement. Especially in the dark you can easily slip over a cable and thus even knock over some of your equipment. Best case you may „only“ lose the alignment of your telescope or ruin your deep sky photograph in work and have to start over. However more likely you may destroy some of your valuable equipment.

Cables are needed in the setup of a telescope for various reasons: for providing power supply to the control and drive electronic of the mount, the electrical focuser, the dew heater, a video or CCD camera or for controlling the whole setup remotely from a PC or PDA next to the telescope or even from inside the house.

Especially when operating the telescope inside a dome or outside, while sitting comfortably inside the warm home, the cables can be a major obstacle. If you have to route them through walls and/or have to run them over a long distance they will at least add significant additional cost to the whole setup or even make such a remote setup impossible.

Wouldn't it be nice to cut the cord and enjoy the same freedom of movement using your telescope and laptop as most of us are used to while using our cordless phone !? In other words: if we could accomplish implementing the data link between telescope and PC or PDA without cables we would already take a major step in the direction of such freedom.

Well, here is the simple approach I use: the wireless data link is based on an RF link according to the DECT standard. This DECT (digital enhanced cordless telecommunication) standard has proven to provide a robust and secure digital data transmission for voice and data. It uses a dedicated frequency band in Germany and most countries in Europe and meanwhile also ASIA. Everywhere where you are allowed to operate a cordless phone based on the DECT standard you can also use these wireless data links based on DECT. In case you are not 100% sure a short request to your local telecommunications body should help to clear this up. In the USA meanwhile a very similar implementation called WDCT is used for mobile phones. Here the 2.4 GHz unlicensed ISM band is used and maybe sometime soon also such wireless data links can be found on the market !?



Picture 1: A DECT based radio link replaces the RS232 cable between PC/PDA and telescope

This radio link provides a typical range of 50 meters inside the house and 300 meters outside the home (under free space propagation). Depending of the location of the two units, such as one being outside and the other one inside your home, the actual range will be somewhere in between these two values. It depends especially on the material and thickness of obstacles like walls between the radio units.

In general I use either the „Siemens Gigaset M101 Data“ (pictures 2) or the „Telekom T-Sinus 45 Data 1“ (picture 3). Both are produced by Siemens and the electronics are identical. Such a unit connected to the RS232 port of the telescope does convert the wireline signals to wireless signals and vice versa. The same type of unit can also be connected to the RS232 port of the PC or PDA. Alternatively the newer „Siemens Gigaset M105 Data“ (picture 4) respectively the „Telekom T-Sinus 45 Data 2“ (picture 5) can be used. They include a USB to serial converter and can thus be connected to the USB port of the PC. They are powered through the USB port and thus do not need a additional power supply like the RS232 devices. Furthermore they are smaller. However

they need a driver to be installed on the computer while the RS232 devices are fully transparent and do not need any driver on the PC or PDA. Especially when using a PDA this is very helpful.



Picture 2: Siemens Gigaset M101 Data



Picture 3: Telekom T-Sinus 45 Data 1



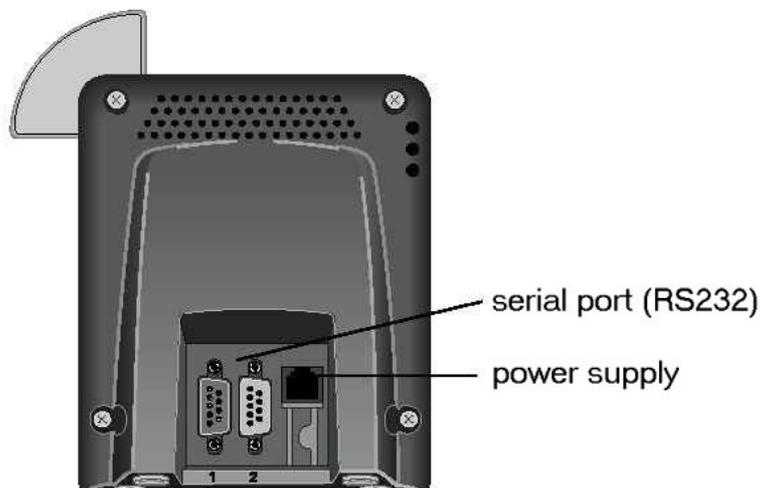
Picture 4: Siemens Gigaset M105 Data



Picture 5: Telekom T-Sinus Data 2

Installation of the devices is simple and fast: First you should connect your telescope and PC/PDA by a RS232 cable and verify the correct function of the Planetarium program controlling your telescope. Once this is accomplished, the often most difficult part is already done.

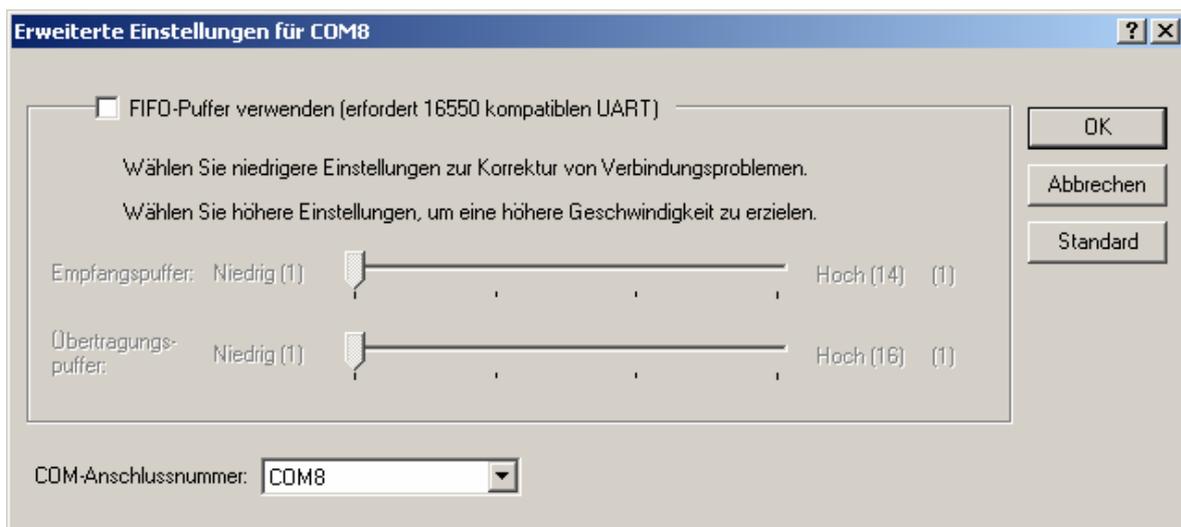
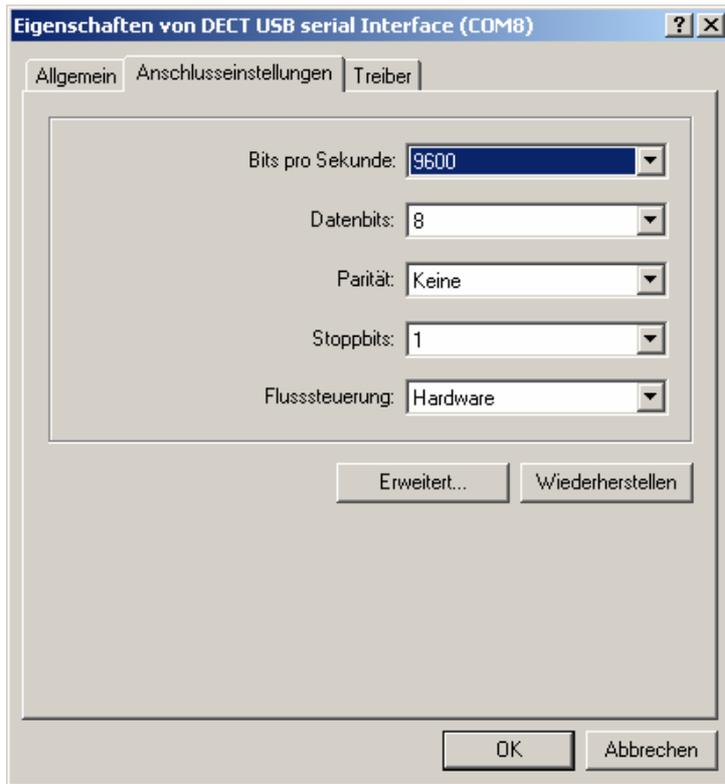
Next we substitute the wired connection by a wireless link. The two radio units have to be firstly configured and then inserted instead of the wired connection. In case you are using the units without USB interface, you have to connect them to the power supply as well as to the serial port (RS232) of the PC/PDA and telescope. Please see picture 6 to identify the interfaces to be used. Please connect the cables to the PC first and then the cable to the power supply.

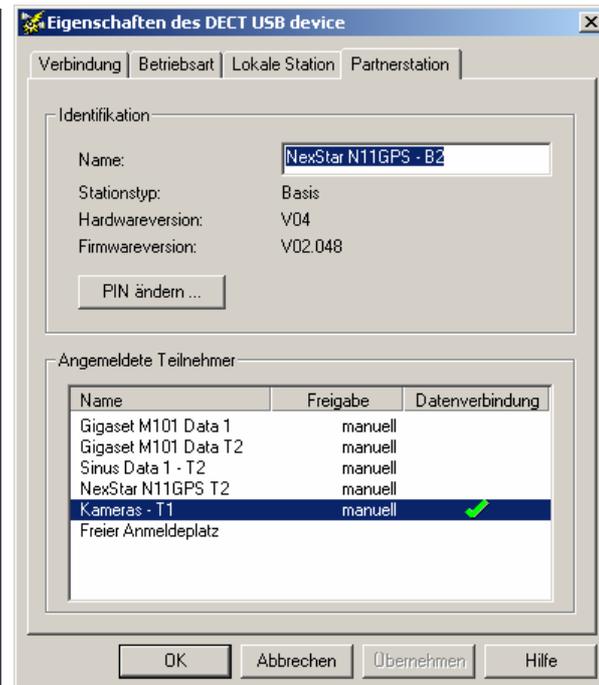
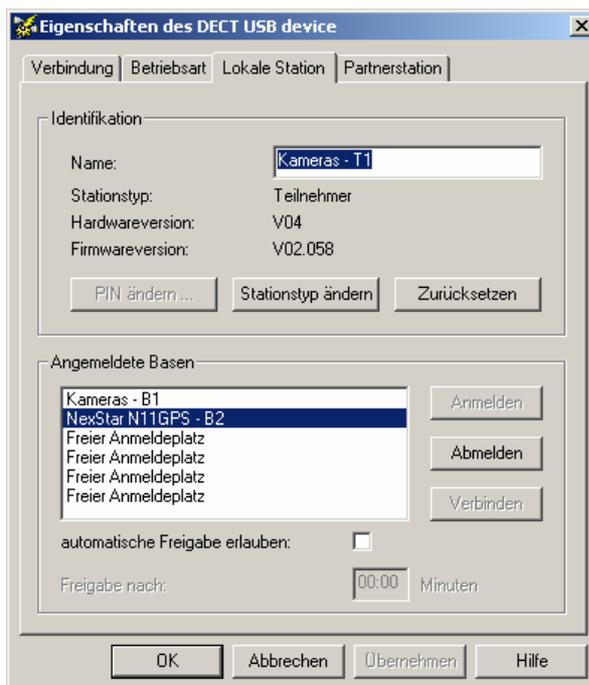
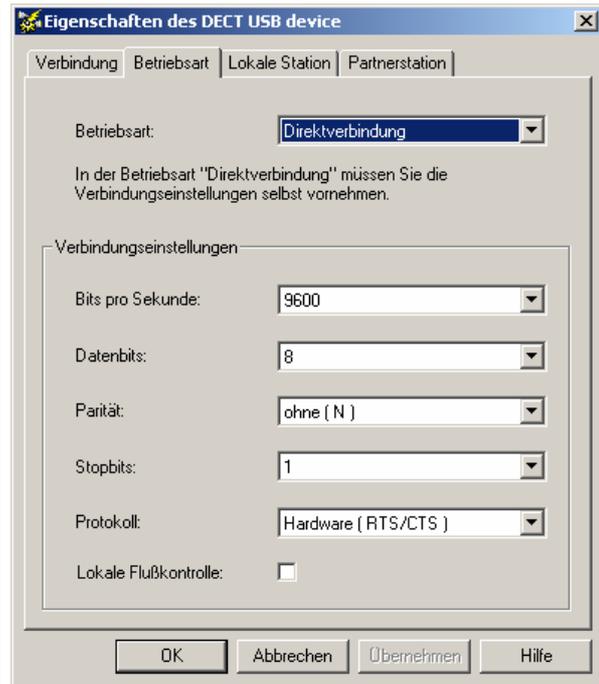
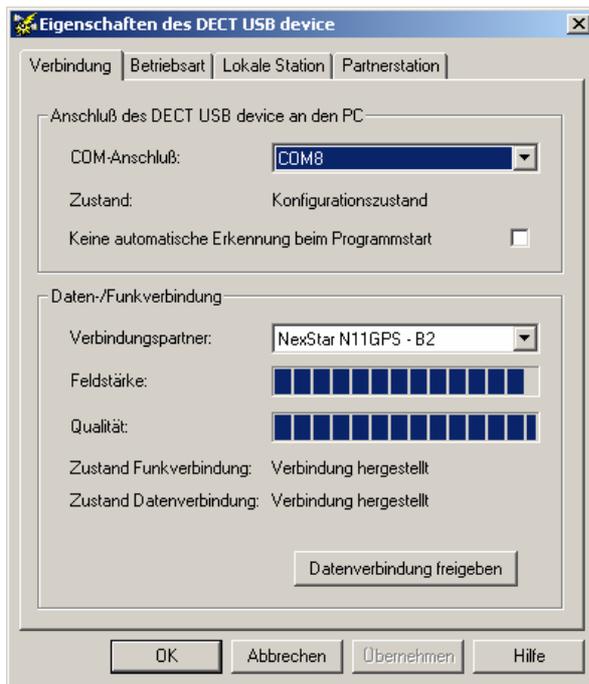


Picture 6: Interfaces of Siemens Gigaset M101 and Telekom Sinus 45 Data 1

You should use cables with 9 pin SUB-D connectors. You can use either RS232 port of the radio unit, male or female. The radio unit will recognize which port is used. In case your PC has a 25 pin SUB-D connector as the RS232 port please use a adapter 9-pin to 25-pins. The radio units with USB-connection have only a single port which can be used.

Now that you have connected one of the radio units to the PC the parameters of the serial link have to be set. The NexStar telescopes use the following settings: 9600bd, 8bit, no parity, 1 start-bit, 1 stop-bit, no handshake. These settings are defined using the software, which was supplied on a CD-ROM together with your radio units. Fortunately the settings have to be set just once. They are stored in a non-volatile memory in the devices and kept also while power is disconnected. The next time you power up the units they will use the same settings.





That's all ! The two radio points will synchronize within seconds after powering them up and from now on you can control you telescope wireless.

If you have problems to access such radio links you may get ready configured links from me at special prices. I will take care, that the latest firmware (presently V02.059 at the RS232 devices Data 1 / M101 respectively V02.060 at the USB devices Data 2 / M015) is on the devices. Also I will test the links as it turned out that some hardware/firmware versions are not fully compatible. I will assure a problem-free operation of my devices.

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