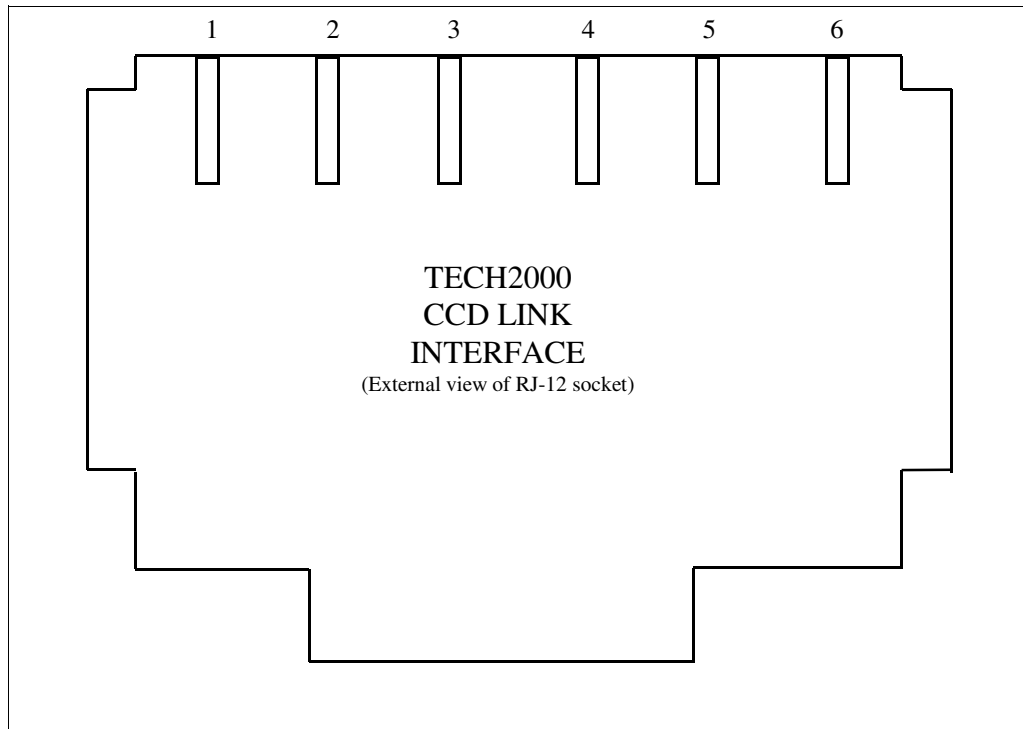


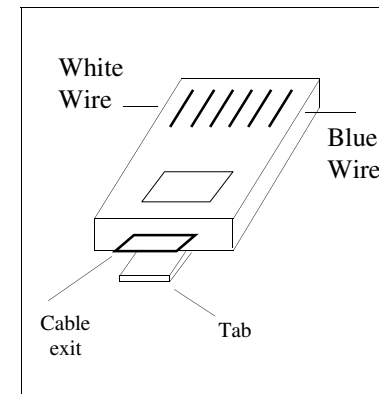
Modular Wire Connector Pin Number	1	2	3	4	5	6
Description	Special	Common (Ground)	Left (EQ mounts Ra West)	Down (EQ mounts Dec South)	Up (EQ mounts Dec North)	Right (EQ mounts Ra East)
Modular Connector wire colors	White	Black	Red	Green	Yellow	Blue
Typical SBIG 15 pin connector	None	11	4	7	13	10
Typical SBIG Signal		Common (Ground)	-X (N.O.)	-Y (N.O.)	+Y (N.O.)	+X (N.O.)



**Notes:**

Connector is telephone type RJ-12, typical of most commercial telescope mounts with ST4 autoguider interfaces. Use only Gold plated terminals to resist corrosion especially on digital interfaces. This requirement is normally provided. The signals as shown in the table are universally used by most consumer camera autoguiders, as well as SBIG. Verify that your camera/guider device meets these criteria in the table and in these notes before connecting the cable (ie- SBIG ST4 compatible). A signal is activated by simply connecting a direction line to common (Ground). For example connecting the UP wire to ground will activate a correction rate change in that axis. This can be via a relay or switch like a pushbutton works, but it is also possible to use a 5-Volt TTL or CMOS digital signal from cameras - these go LOW for some fairly short period of time to make a correction then repeat as needed. Each time, the Dob-Driver II will automatically adapt the axis rates and continually "home-in" toward the correct rate exact - this rate adaptation does not apply (on purpose) to EQ mount modes as that would compromise periodic error correction. **DO NOT USE PHONE CORDS - they reverse the wire colors at each end!**

-Masters



<i>Santa Barbara Instrument Group</i>	
Cable CA4-0006	ST4-STYLE CCD AUTOGUIDERS
May 30, 1991	SBIG
Update Tech2000	Nov 12, 2009

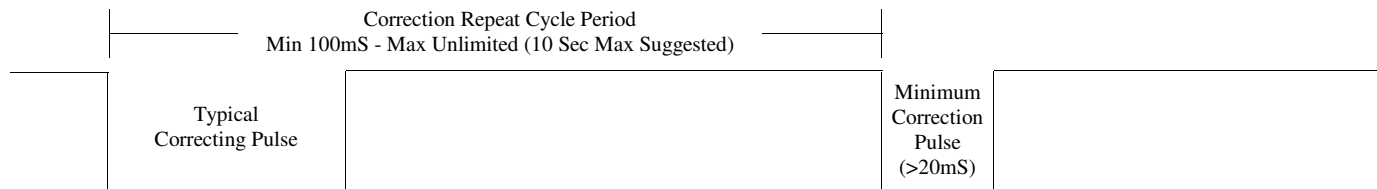
## Additional Dob-Driver II™ Guide Mode Information:

Description: The Dob-Driver II™ drive system contains the ability to precision-guide on objects either manually with the pushbuttons, or via an automatic guider camera device. This document provides useful information beyond that available in the system manuals. When it comes to astro-imaging, such details can become extremely important to the successful acquisition of superb data.

Applications: Though used commonly in astro-imaging applications, the Guide Mode is also preferred by customers whom observe above 500x with the larger apertures on planetary nebulae and other small/faint objects, due to its fine velocity adjustments and “no-to-low” backlash reversing behaviors. Manually using Guide Mode is nothing more than pressing the pushbuttons just like in track mode but with *far more delicate* speed changes, and autoguiding is *EXACTLY* the same thing except pushbuttons are actuated automatically by a suitable camera and software/firmware via the ST4 “CCD-Link” interface.

Settings: Config Mode has two settings for Guide Mode... 1) 3x is more aggressive (“T” lamp ON), and 2) 1.5x is less aggressive (“T” lamp OFF). You would set this for 1.5x normally to be the most gentle, but you should change it to 3x if you notice autoguiding is issuing long correction pulses of a second in duration or more, and that is repeating even after several minutes of guiding should have all things settled down.

Correcting Rates: When Guide Mode is configured for 3x rates via the Config setting, holding a button changes speed on that axis +/- about 12 uSteps/Sec (micro steps per second - and remember this is will be the same behavior both for manual button pushing or an autoguider doing the same). Which button direction is + or - depends on the present motor tracking direction, which varies all-around the sky depending on the alt-az position of the object you are tracking at the time. The 1.5x setting is about half that usually around 6 USteps/Sec. You can easily see the exact changes on the Dob-Driver display in uSteps/Sec. when a button is pushed in Guide Mode (and you can see the Blash lamp flash for the duration of it if that occurs and you can usually hear the motor backlash reversal occurring at its brief but high speed). Therefore when the speed of an axis is showing *tracking* velocities less than these *correcting*-values above, and you signal the motor to slow down, then the speed will immediately go to zero since it is near there already, followed by a rapid backlash motor reverse cycle of the duration you have set, followed by a speed value in the opposite direction at a velocity that makes up the balance leftover from the zero speed point. Experienced astrophotographers know that it is always better to avoid any motor reversals (same old problem in dec axis on equatorials) as it will never be controllable precisely enough to achieve arcsecond exposure deviations (although many people have done well anyway and win competition awards etc. with 10 arcsecond control). Your autoguider may have a software “turn-off” for that no-reverse no-pulse limiting, but for Dobsonians in general, it is best to just avoid imaging times where an object is on close-approach to meridian point (including below Polaris as well as from there to the South - where altitude velocity slows to zero and reverses), and similar points like it where from the viewpoint of your azimuth axis the object is near-tangent to its “great circle” path at the elevation of Polaris (where similarly - azimuth velocity slows to zero and reverses).



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Adaptive Guide Rates: Each time a button is released after pressing it, the tracking velocity of that Dob-Driver axis adjusts itself in the proper way + or - to help reduce the frequency and duration of further corrections. This is why histograms recording plots of the correction duration and repeat pattern and direction using Dob-Drivers often show high duration pulses repeating often in the same direction at first, then after a minute or two reducing greatly in both magnitude and frequency of occurrence (Track Mode alone is rarely close enough to the perfection demanded by a good autoguider well-mounted - and Guide Mode self-adjusts then to arrive at the best velocity dynamically resolved for each axis). Each time a button is pushed and released, the present stored track rate is adjusted by +/- 1/256th accordingly (0.39%) regardless of how long the correction pulse (button push) was active - note the duration of a correction pulse is only calculated to recenter the guided point and does not by itself indicate time-corrective information helpful to actual rate adjustment for the drive. This value steadily increases to .5% from 20-40 u-steps/Sec., and increases again to 1% in the 40-80 u-steps/Sec. track rate range shown on the hand control, in order to be able to compensate more rapidly for sudden ramps in the feedback loop which become more common on successively larger telescopes having bearing stick issues and the inherent mount torsion or flex that naturally follows such dynamic variation in torque. Dob-Drivers are very smart... but be watchful that maybe your autoguider is not watching these dynamics... many of them have one auto-calibrate cycle (or no auto-calibrate cycles at all) and may not continuously adapt themselves to these response variances during guiding operations. If you use an autoguiders' automatic calibration feature you should do that every time for every object session if you are pretty sure it is not dynamically adapting itself like your Dob-Driver drive is (twice is best - at the time and position just before you begin imaging - and again after 3-5 minutes of test imaging that you do for focus and such).

Field Rotation: Planets? — Moon? — Sun? — No concern - too short — shoot hundreds of frames in short order and stack 'em up. But select deep-space objects for long duration imaging, that will be above 4 minutes in an exposure sequence (images taken in one exposure, or ones that will be stacked and will be accumulated over same period or longer), in celestial locations that best equalize altitude and azimuth velocities. This is why we created RotaCalc™ to find the least amount of field-rotation, often near zero, based on observation lat/lon, dusk-to-dawn time plot, and target subject coordinates. Each day of the year the best imaging time window is different for each object - its the local time of the shooting that is controllable - not necessarily your lat/lon and certainly not the celestial coordinate.

Backlash: When in Guide Mode, Dob-Driver II™ shortens the Blash Mode settings you had stored when you did backlash calibrations last. And it also slows down the speed of the backlash compensation maneuver too. This is to help avoid sudden jumps in the object position caused by a user blash setting that is too long or otherwise incorrect. Though backlash maneuvers in Guide Mode are intentionally rare, see above for the instances that they may occur and could be avoided.

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