THE ISAAC NEWTON GROUP OF TELESCOPES

INSTRUMENT CHANGE CHECKLIST

REMOVING AND REPLACING THE JKT A&G BOX (JAG)

for

MAINTAINENCE OR MIRROR RE-ALUMINISING

Revision : **2.0**

Description : CCD Imaging

Location : JKT Cassegrain

Preparation

Team required : 1 (from Detector Group or Opsteam)
Approximate Time : N.A.

The only requirement if the JAG has been removed for maintenance is that the CCD cryostat has been pumped and cooled ready for use. This usually being the day before it is needed.

n.b. As the cryostat is mounted vertically, it must be fitted with a LONG filler tube.

The JKT detector is Site 2 and more information can be found at :

http://www.ing.iac.es/Engineering/detectors/ccd_site2.htm

For a detailed description of cryostat pumping, refer to:

http://www.ing.iac.es/~eng/detectors/engineering/pumping.html

Tick each box when complete.

ACTION	TICK BOX
1. Cryostat pumped?	☐
2. Cryostat cooled?	☐

PREPARATION COMPLETE

Signature : Date :

INSTRUMENT CHANGE PROCEDURE

JKT A&G BOX (JAG)

Team required : 1 Electronics specialist
1 Mechanical specialist

Nominal time : 2 hours

REMOVAL OF THE JAG

1. Make an entry in the log book : **DON'T MOVE THE TELESCOPE**	
2. Shutdown the observing system Sparcs - **jktics/jktdr** (*lpss11*) and the **jktdas** (*lpss12*) and log off.	
3. **IMPORTANT** With the telescope at ZENITH PARK, put in the DEC and RA tie bars. *n.b.* You may have to unclip some of the JAG cables that run in the DEC tie bar block.	
4. Remove the black bag around the JAG. This is held in place with push fasteners.	
5. Switch off the CCD controller in the rack and disconnected the cables going to the cryostat. *n.b.* **DO NOT** at this point remove the JAG cables.	
6. Remove the cryostat by unscrewing (and folding back) the kinematic clamp locks. *n.b*. The cryostat will need to be rotated a small amount before it can be removed.	
7. Place the yellow handling trolley under the JAG and raise the floor (**in slow motion**) so that the JAG is firmly resting on the loading bearing points on the trolley. *n.b.* **EXTREME CARE** The two floor panels located at each side of the pier will need to be raised (to override the floor limit switches) for this to be done. **It is possible to drive the floor into the telescope!**	

IMPORTANT NOTE

Before removing the JAG, the autoguider X/Y probe will need to be positioned to gain access to the two countersunk headed Allen bolts located within the autoguider compartment at the top; one on each side.

To gain access to these bolts, the X probe will need to be near one extremity and ideally the Y probe in the middle. This allows an Allen key to inserted and a bolt removed. The autoguider X probe will then need to be moved to the other extremity to remove the second bolt. Proceed as follows :

8. **In the Control Room**: Make sure you get a response from the Engineers terminal by pushing the RETURN (enter) key. An **ok** prompt should appear. *n.b.* If this doesn't happen, power cycle the 4MS CCD A&G BOX controller using the mains switch on the back. ☐

9. Type (in UPPER CASE) :
100. XPROBE 15.000 YPROBE cr
The X probe will move close to one end of its travel and the Y probe will move to the centre. ☐

10. Remove the back cover from the JAG and unscrew one of the Allen countersunk headed screws which should now be easily reached. ☐

11. Back at the Engineers Terminal: Type :
27.000 XPROBE cr
The X probe will move close to the opposite end of its travel. ☐

12. Now remove the other bolt. ☐

13. At this point, switch off the power to the JKT CCD A&G BOX CONTROLLER and remove the cables going to the SMDM's mounted on the JAG. This includes the autoguider cables, shutter cable and dry air supply pipes. See the diagram on page 8 which shows the connections. ☐

14. With the handling trolley taking the weight, remove the rest of the bolts securing the JAG to the telescope.	

15. Slowly lower the floor until the JAG is free of the dowel pin in the mounting ring. The JAG can now be pulled clear of the telescope.	

REMOVAL OF THE TV CAMERA

If the Westinghouse TV camera needs to be removed from the JAG, proceed as follows:

- Remove the 4 Allen screws (2 each side) that hold the TV camera focusing plate on the JAG. The camera can then be pulled clear of the instrument.

- The focusing plate can then be unscrewed from the TV camera *n.b.* Don't lose these screws as they have been cut to size as not to damage the camera!

RE-FITTING THE TV CAMERA

- Fit the focusing plate to the underside of the camera using the short screws provided. The plate needs to be fitted at the front of the camera with the focusing adjusting knob looking outwards. *n.b.* The slides may need to be moved to allow the fixing screws to enter between the moving and fixed surfaces.

- Re-fit the camera assembly back onto the JAG (2 screws each side).

Refocusing the TV camera

Fine focusing can only be effectively done on a star image. Ideally, two persons are required for this. One in the control room to monitor the image quality on the TV display; the other turning the focusing adjuster knob below the TV camera.

REFITTING THE JAG

Note

The JAG should be fitted with the turntable at 0 degrees and with the TV camera facing north (*i.e.* towards the control room). If for some reason the turntable is at another position, re-align it as follows:

- Switch on the telescope power keyswitch on the console.
- Release the turntable clamp knob on the mirror cell. *n.b.* This not only clamps the turntable but removes power when clamped.
- Use the +/- buttons on the mirror cell to rotate the turntable until the 0 degree mark on the ring graduation lines up with the cursor plate.
- Re-clamp the turntable locking knob.

1. Position the JAG on its handling trolley below the turntable. Slowly raise the floor (with the 2 pier floor panels lifted) until the JAG is just below the turntable.	
2. Carefully position the trolley so that the dowel pin in the JAG's mounting flange matches up with the dowel hole in the turntable. **WITH GREAT CARE**, raise the floor until the dowel pin has just moved into its locating hole.	
3. Fit the JAG securing bolts that are accessible externally and check that they are all tight.	
4. Lower the floor and move the handling trolley clear of the telescope.	
5. With the back cover removed from the autoguider compartment, fit the countersunk headed Allen screw into the hole that's accessible at the top. *n.b.* The second screw can only be fitted after the JAG has been cabled up and the X probe moved to its other extremity.	

CABLING UP THE JAG

Using the check sheet and diagram, make the connections between the JAG, autoguider PSU and the telescope connector panel. To make things easier, it is best to first plug in the cables to the JKT 4MS controller and the autoguider head PSU. The cables can then be divided out and strapped to the mirror cell ring depending on which direction they go.

Power cables

From	Connector	To	Connector	Checked
JAG 4MS	SMDM-1 1-24V	SMDM-1	3w mil	
JAG 4MS	SMDM-2 2-24V	SMDM-2	3w mil	
JAG 4MS	SMDM-3 3-24V	SMDM-3	3w mil	

RS422 cables

From	Connector	To	Connector	Checked
JAG 4MS	SMDM-1 1-RS422	SMDM-1	4w mil	
JAG 4MS	SMDM-2 2-RS422	SMDM-2	4w mil	
JAG 4MS	SMDM-3 3-RS422	SMDM-3	4w mil	

JAG Miscellaneous cables & dry air/N^2 supplies

From	Connector	To	Connector	Checked
4MS ICS Port	19w mil	Telescope **A**	25w D type	
4MS Eng Port	25w D type	Telescope **B**	25w D type	
4MS mimic	BNC	Telescope **P**	BNC	
JAG TV Camera	Westinghouse	Telescope **I**	Westinghouse	
CCD flush	Air line	Telescope	N^2 Gauge	
JAG shutter & clamps	Gauge on JAG	Telescope	Air Gauge	

Autoguider Cables (from Photo Multiplier tube)

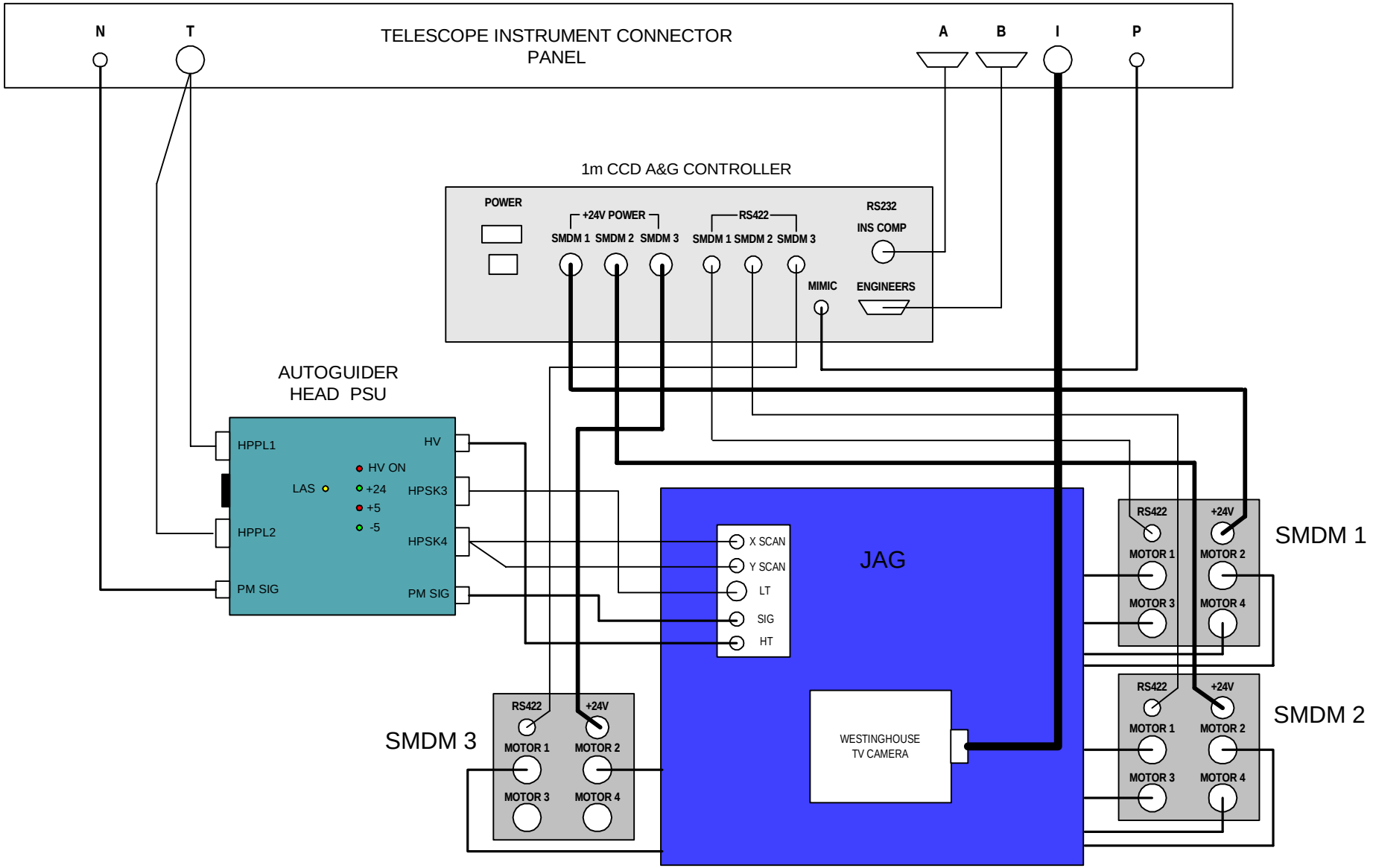
From	Connector	To	Connector	Checked
JAG X Scan	2p Lemo	PM head PSU	HPSK4(6w mil)	
JAG Y Scan	2p Lemo	PM head PSU	As above	
JAG LT	4w socket	PM head PSU	HPSK3(6w mil)	
JAG HT	BNC	PM head PSU	BNC (PM HV)	
JAG SIG	TNC	PM head PSU	TNC (PM Sig)	
PM head PSU	HPPL 1	Telescope **T**	19w mil	
PM head PSU	HPPL 2	Telescope **T**	As above	
PM head PSU	TNC sig	Telescope **N**	BNC	
PM head PSU	Mains	Tele rack	Mains board	

CCD cables and fibre optic leads (Dutch Controller - CCDC)

From	Connector	To	Connector	Checked
CCD preamp box	direct	CCDC	CCD 41w mil	
Cryostat temp	10w mil	CCDC	TEMP1 10w mil	
CCDC NET	25w D type	Telescope **C**	25w D type	
CCDC VDU	25w D type	Telescope **E**	25w D type	
CCDC SHUTTER1	7w mil	JAG SHUTTER	10w mil(C10)	
CCDC DATA	Fibre port	Telescope	FO box **4**	

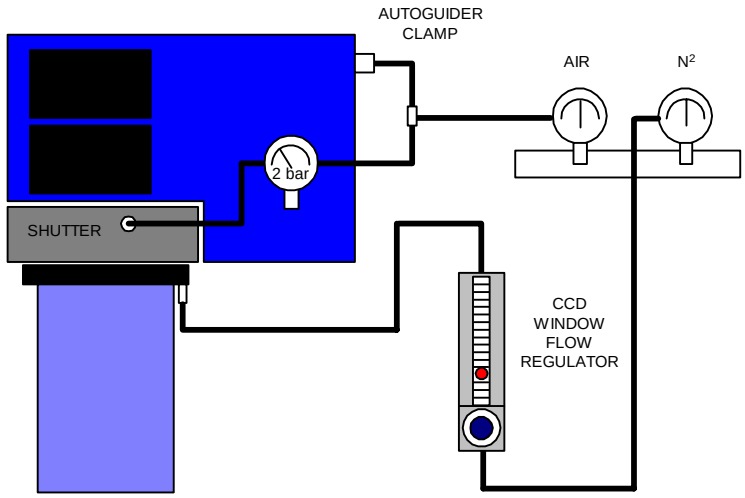
JKT A&G BOX and AUTOGUIDER CONNECTIONS

eJm 7/11/01 v1.0



6. Following the diagram below, plug in the dry air supplies for the shutter, autoguider X slide clamps and the CCD window flushing *n.b.* Dry air is now used for all services

DRY AIR CONNECTIONS FOR JAG



7. When satisfied that all the connections are made, switch on the 4MS A&G box controller. In the control room, check that the boot up message appears:

RGO FORTH v1.x
Hi
ok

Type**: ON DETAIL** cr
to bring up the status information on the Engineering mimic.

8. Note the position of the XPROBE. This will probably be at 27000 steps if the removal procedure in this document was followed. Type:
100. XPROBE cr
to move the autoguider to its opposite extremity.

9. Now fit the other countersunk headed Allen screw in the top of the box. The back cover can now be replaced.

FITTING THE CCD CRYOSTAT

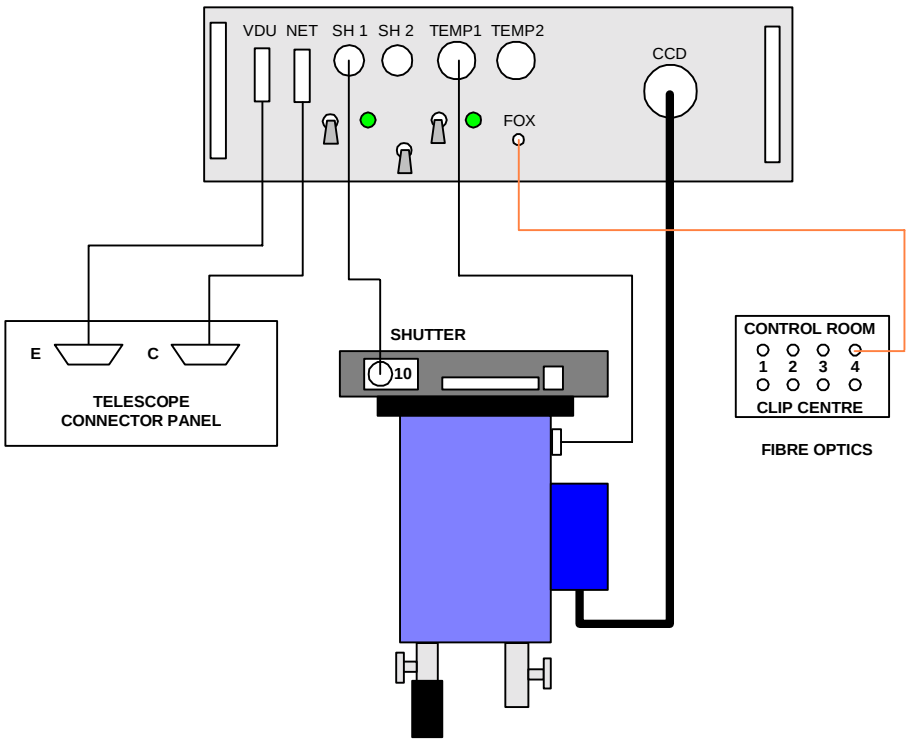
10. Mount the cryostat back onto the kinematic mount.

Note
When fitting the cryostat, ensure the capstan screws labelled A, B and C go to the `*ball*, *vee* and *flat*` locations on the kinematic mount respectively. Tighten the capstan clamps in the same order.

CABLING UP THE CRYOSTAT

11. Using the diagram below, complete the cabling between the CCDC and the cryostat. When finished, switch on the controller to enable the CCD to servo to its correct temperature.

JAG CCDC CONNECTIONS



12. Operate the manual SHUTTER control switch and check that the shutter opens and closes correctly.

13. Replace the black bag around the mirror cell and remove the RA and DEC tie bars. The telescope can now be balanced.

14. **FINALLY**

Check out the TELESCOPE, JAG, CCD, TV and AUTOGUIDER using the JKT DE check list in the red book in the control room. The version on the WEB is always the most recent. If the paper copy is out of date, print off the latest version. This can be found at:

http://www.ing.iac.es/~eng/ops/jkt/jkt_checks.html

INSTRUMENT CHANGED COMPLETED

CHANGE COMPLETE

Signature : Date :

HANDOVER TO SUPPORT ASTRONOMER

SETUP COMPLETE

Cryostat capstan settings:

(Tilt) A= B= C= (rotation) D=

Signature : Date :