

THE ISAAC NEWTON GROUP OF TELESCOPES

INSTRUMENT CHANGE CHECKLIST

INT PRIME FOCUS WIDE FIELD CAMERA (WFC)

(from IDS)



Revision : 1.8

Description : CCD Imaging

Location : INT Prime Focus

Weight : 180 Kg

Preparation

Team required : 1 (from Detector Group or Opsteam)

Approximate Time : N.A.

IMPORTANT : This work MUST be carried out at least 3 days before the instrument change.

It is **very important** that the WFC cryostat is **flooded with dry air** prior to pumping down to the required level. More info regarding cryostat pumping can be found at:

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

Tick each box when complete.

TICK BOX

1. Pump the WFC cryostat for at least **> 8 hours**

2. Switch **off** the pump, but leave the valves on both the pump and cryostat **open**. This allows dry air to flood into the cryostat. Leave in this state for at least **> 8 hours**

3. After the dry air flood period. Restart the pump and leave **it pumping for at least 24 hours**. Check that the vacuum measured at the pump is below : 3×10^{-5} tor

4. Close the cryostat valve and switch off the pump. Make sure the pump has run down before removing the vacuum pipe.

5. Cool down the cryostat with liquid N² **immediately** after pumping. This will take sometime due to the initial 'boil off'. Make sure that liquid nitrogen is **seen** to be coming out of the filler tube.

PREPARATION COMPLETE

Signature :

Date :

INSTRUMENT CHANGE PROCEDURE

INT PRIME FOCUS IMAGING (WFC)

Team required : 1 Electronics specialist
1 Mechanical specialist
1 Weightlifter

Nominal time : 4 hours

1. Make an entry in the log book : **INSTRUMENT CHANGE - DON'T MOVE THE TELESCOPE**

2. Shutdown the observing system Sparcs - **intics** (*lpss13*) and via the orange window to **intdas** (*lpss14*) and log off.

3. Drive the telescope down to ACCESS PARK

REMOVING THE SECONDARY MIRROR

4. **IMPORTANT** When the telescope is at ACCESS PARK, clamp the telescope tube using the floor hook. As an added precaution lock off the TELESCOPE POWER red switch in the control room

5. Remove the narrow cover on the right hand central spider vane cable tray by snapping up the 4 catch fasteners.

6. **Switch off** the FOCUS ASL2300 UNIT box mounted on the top end ring connector panel and remove the following cables:

- The three BNC connectors (coded red, blue and yellow) from the ASL2300 unit.
- The focus motor (PFC2) and focus limit (PFC6) cables.

7. Remove the above cables from the secondary mirror cell and focus LVDT and store them on the balcony.

8. Swing out the small dome jib crane and hook on the secondary mirror cell lifting frame. Using the crane's (manual) motions and the dome position, align the frame over the mirror cell.

9. Fit the mirror lifting frame to the cell (5 bolts). With the crane taking the weight, remove the mirror cell's 6 mounting bolts and carefully withdraw the mirror cell from the central tube.
Remember to fit the cover over the secondary mirror to protect it.

10. When the mirror cell is clear, rotate the dome and lower the cell into its stowage cradle at the far end of the dome balcony.

MOUNTING THE PRIME FOCUS CONE UNIT (PFCU)

11. Hook up the crane to the Prime Focus Cone Unit stowed in an adjacent cradle. Hoist it out and rotate the dome to position the PFCU over the central tube.

12. Screw in the 4 PFCU mounting studs into the central tube.
The longer thread on the stud screws into the tube.

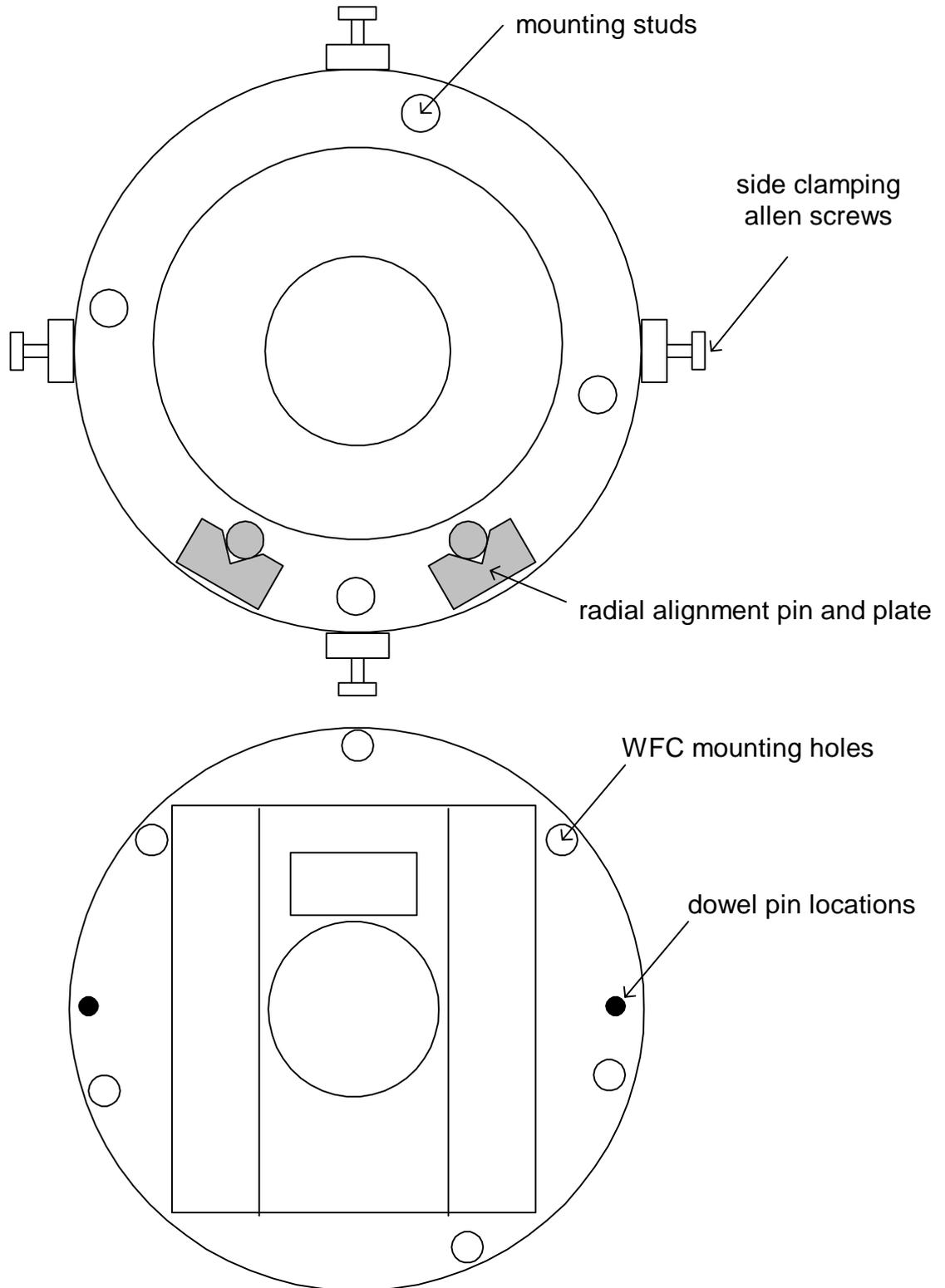
13. Align the PFCU over the central ring and the mounting studs using small movements of the crane and the dome and loosely fit the nuts on the studs.

14. Now carefully lower the PFCU so that its 2 alignment pins sit squarely on their mating plates fitted on the central tube. This is important to ensure that the PFCU is on the telescope's optical axis.

15. With the PFCU correctly aligned, tighten up the 4 main mounting nuts on the studs and the 4 Allen screws located close to these positions. See diagram 1

Diagram 1

PFCU and WFC mounting



FITTING THE WIDE FIELD CAMERA (WFC)

16. **IMPORTANT** Blow any dust of the Prime focus corrector lens before fitting the WFC.

17. Hook up the crane to the WFC unit. With the crane taking the weight, remove the bolts to release the WFC from it's handling frame.

18. Position the WFC over the PFCU ensuring that the radial mounting surfaces are flush. Loosely fit the 6 mounting bolts.

19. Before tightening up the bolts, insert the 2 DOWEL PINS locating precisely, the position of the WFC relative to the PFCU. See diagram 1

20. **CHECK THAT ALL THE MOUNTING BOLTS ARE TIGHT.**
Remove the crane and the lifting frame.

21. **MOTORISED CUBE COUNTERWEIGHTS**
Plug the pendant into the control box mounted on the cube and drive the counterweights down until the **LOWER LIMIT** switches operate.

22. Before stowing the jib crane, **check** that the liquid N² Dewar been hoisted onto the dome balcony ?

23. Mount the CABLE EXTENSION ARM into the two split cradle brackets fitted on the PFCU. Note there are small dowels fitted to align the arm into the brackets. Ensure these are lined up before fitting the top half of the brackets.

CABLING UP

Refer to the diagram on page 8 which shows all the interconnections

24. First connect the cable harness between the PFCU and the top end ring connector panel running the cables in the spider vane cable tray.

25. Now connect the remaining cables emerging from the extension arm to the prime focus connector panel, passing them also into the spider vane cable tray. **NOTE** All fibre optic cables go the FOX distribution box mounted under the connector panel labelled CLIP CENTRE and are numbered according to their socket position.

26. Mount the 'free' cable clamp of the cable loop (snakeskin) to the plate at the end of the extension arm using the 3 bolts provided.

27. Adjust the CCD window flushing N² regulator on the extension arm to 2 litres/hr

28. Switch **ON** the :

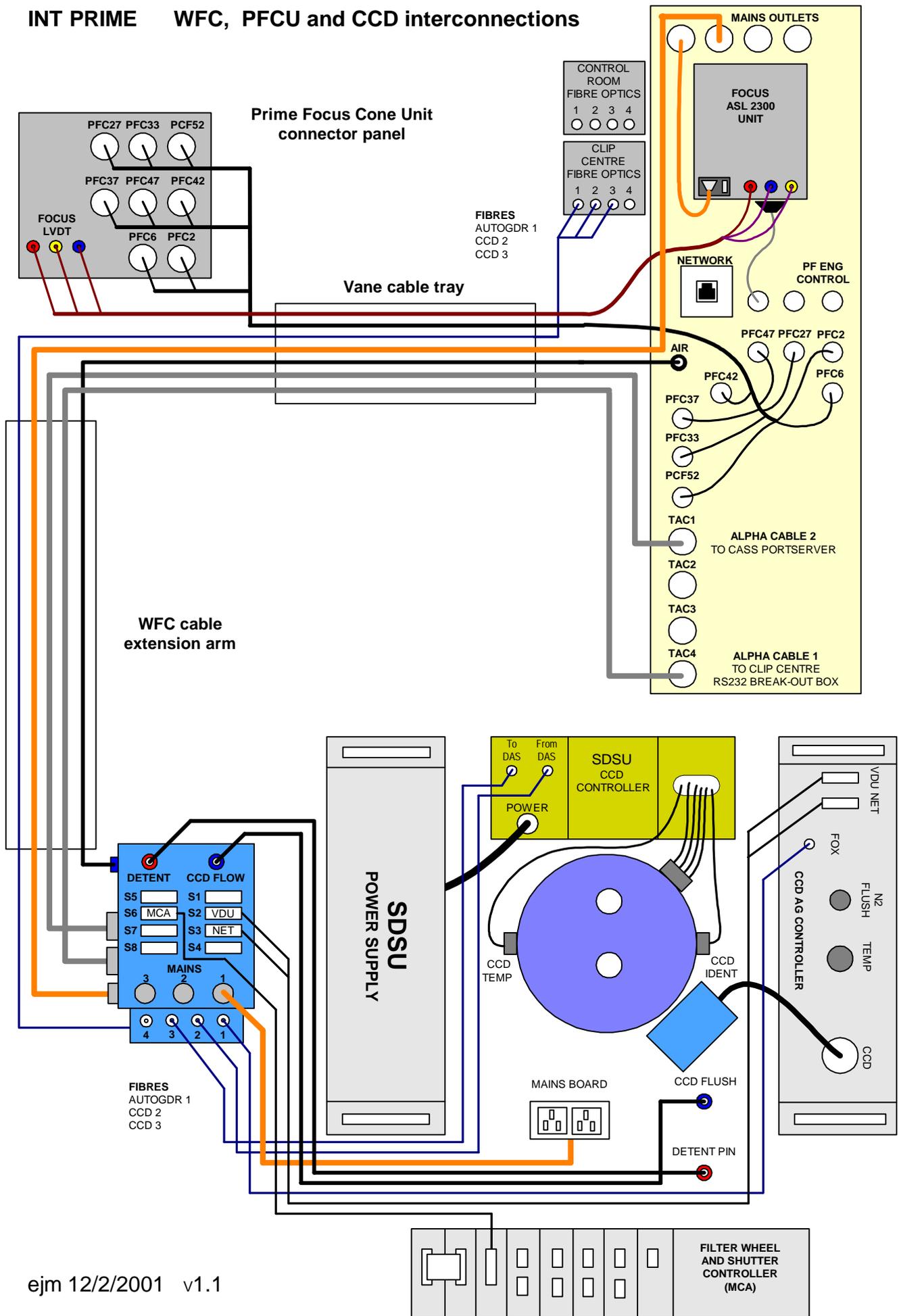
- CASS PORTSERVER (*should be always on- **CHECK?***)
- AUTOGUIDER CRATE (WFC)
- SDSU PSU (WFC)
- MCA CRATE (WFC)

Flick the switch on the MCA module with the 5 LEDES. Check they are all illuminated. This simple test checks the health of the MCA PSU's. Switch them **OFF** after carrying out this test.

29. **IN THE CLIP CENTRE**

- Switch on the PFCU power supply. This is the green crate near the top of bay 6.
 - In bay 9, check that a fibre optic cable is connected between a FOX card (autoguider FOX crate) and the fibre optic distribution tray connector labelled PRIME - 1
- IMPORTANT** Until further notice:
- Change over the 2 CCD fibres marked TO and FROM CCD from the CASS connectors to the PRIME group on the fibre optic distribution tray in Bay 9. The connectors are labelled accordingly.

INT PRIME WFC, PFCU and CCD interconnections



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TESTING WFC ROTATION AT ACCESS PARK

When the WFC is mounted, the rotator is at position 90 degrees. To ensure that the cryostat filler tube is vertical and that easy access is provided to the filter wheel door, the **WFC normally operates with the rotator set to position 180 degrees**. To do this, follow the procedure below.

30. AT ACCESS PARK

- Plug in the Engineering terminal (on the trolley) into the connector on the Prime Focus connector panel labelled PF ENG CONTROL.
- Push return and check the 'ok' prompt is present. Terminal must be set to UPPER CASE (data format is 9600 7E1)
- Type HELP to get the command list.

Enter the following commands terminated with RETURN. When a command has been executed, check for a SUCCESS CODE=N message (normal). If ANY other status message is returned, this will need to be investigated.

- PLUNGER_OUT (removes the cardinal point detent pin)
- CLAMP_OFF (releases the main clamps)
- 2000 POSITION (Moves the rotator to 180 degrees)

Re-lock the PFCU rotator with :

- PLUNGER_IN
- CLAMP_ON
- ?POSITION (should return a value of 2000 (or very close))

It's is also advisable to test the rotator at the other positions and check that the cable loop moves freely. If a problem is encountered where the cardinal point detent pin refuses to locate, it usually points to the WFC being **OUT- OF- BALANCE**. If so, this needs to be addressed. The valid positions are :

0	degrees	=	200
90	degrees	=	1100
180	degrees	=	2000 (normal rotator position angle)
270	degrees	=	2900

Position status may be obtained by typing ?POSITION

IMPORTANT

Return the rotator to 180 degrees after carrying out these checks and remove the engineering cable from the telescope. Remember to switch off the terminal.

31. The mechanical work and cabling up is now complete.
The telescope can now be BALANCED

32. **FINALLY**

Check out the WFC using the WFC 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 an older version, the latest version can be found at:

http://www.ing.iac.es/~eng/ops/int/INTWFC_DEchecks.html

INSTRUMENT CHANGED COMPLETED

CHANGE COMPLETE

Signature :

Date :

HAND-OVER TO SUPPORT ASTRONOMER

SET-UP COMPLETE

Signature :

Date :