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TRANSFER THE QUARTZ BLOCK FROM THE ROLLER MECHANISM TO THE QB PRECISION MANIPULATOR CART

GP-B SCIENCE MISSION PROCEDURE

17 February, 1999

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APPROVED _____
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APPROVED _____
J. Janicki, Safety Engineering Date

APPROVED _____
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APPROVED

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Date

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1. SCOPE

This document provides the procedure for transferring the Science Mission Quartz Block (QB#3) from the Roller Mechanism (RM) in the Roller Mechanism Cart to the QB/PM QB Precision Manipulator Cart (abbreviated to QB/PM). This procedure assumes that the QB has been cleaned according to procedure P0198(SM), and is in the Roller Mechanism in the RM Cart in the Class 10 Cleanroom. The QB/PM is in the Class 10 Cleanroom.

Note: This procedure takes place between Sections 6.3 and 6.4 of Procedure P0200, Bonding the Telescope to the Quartz Block.

1.1 Acronyms

The following acronyms are used in this document

QB	Quartz Block
RM	Quartz Block Roller Mechanism
RM Cart	Roller Mechanism Cart
QB/PM Cart	QB/PM Quartz Block Precision Manipulator Cart

2. APPLICABLE DOCUMENTS

2.1 Plans and Procedures

P0059	GP-B Contamination Control Plan
P0057	Stanford Magnetic Control Plan
P0198(SM)	Cleaning the Quartz Block
P020 (SM)	Bonding the Telescope to the Quartz Block

3. GENERAL REQUIREMENTS

3.1 Environmental Requirements

This procedure will be conducted in the Stanford Class 10 Cleanroom in the HEPL facility.

3.1.1. Cleanliness

The Class 10 clean room where this integration takes place shall be maintained at the cleanliness levels per GP-B Contamination Control Plan P0059. Certified Class 10 cloth garments shall be worn in the Class 10 clean room.

3.1.2 Particulate Contamination

All parts and tools shall be cleaned at least to the cleanliness levels of the rooms where they are used for assembly or testing. In addition, all flight parts shall be maintained at level 100 cleanliness per GP-B Contamination Control Plan (P0059). Take all necessary precautions to keep tools and handling equipment free of particulate contamination.

To the maximum extent possible, personnel shall keep parts of their bodies downstream of the QB/T, relative to the HEPA wall.

3.1.3. Magnetic Contamination

All parts and tools shall be screened per Procedure P0057. Tools to be sprayed with Freon from pressure can (filtered to < 0.2 micron) prior to use, or when contaminated.

3.1.4. Electrostatic Discharge Control

The particle ionizer should always be upstream of the quartz block relative to the fan wall, to prevent electrostatic charge buildup on the quartz block.

3.2 Integration Personnel

3.2.1 Integration and Test Director

The Integration and Test Director (ITD) shall be Dr. Doron Bardas. He has overall responsibility for the implementation of this procedure and shall sign off the completed procedure.

3.2.2 Personnel

All engineers and technicians participating in this procedure shall work under the direction of the ITD who shall determine whether the person is qualified to participate in this procedure. Personnel participating in this procedure are J. Stamets, C. Gray, and/or others whom the ITD shall deem appropriate.

3.3 Safety

**Safety Engineering to be notified prior to any major movement of the Quartz Block.
(i.e., any movement other than rotations or minor adjustments)**

3.3.1 General

Personnel working in the Class 10 Cleanroom must be cognizant of the base of the Precision Manipulator, and take special care to avoid tripping or bumping into it.

3.3.2 Hardware Safety

Extreme care must be taken to avoid touching or scratching the bonding surfaces and the polished surfaces of the QB

3.3.3 Maximum Number of People in Cleanroom

Under normal operating conditions, there shall be no more than 5 people in the Class 10 Cleanroom. This is to avoid violating legal make up air requirements, and to provide an efficient workspace. Exceptions must be for short periods only, and be approved by the ITD.

3.4. Quality Assurance

Integration shall be conducted on a formal basis to approved and released procedures. The QA program office shall be notified of the start of this procedure. A Quality Assurance Representative, nominally B. Taller, or his designee, nominally A. Nakashima, shall be present during the procedure and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Program Engineer, B. Taller or P. Unterreiner, will certify his concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating in the designated place(s) in this document. Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108.

The ONR representative shall be notified prior to beginning this procedure.

3.5. Red-line Authority

Authority to red-line (make minor changes during execution) this procedure is given solely to the ITD or his designate and shall be approved by the QA Representative. Additionally, approval by the Integration Manager and Hardware Manager shall be required, if in the judgment of the ITD or QA Representative, experiment functionality or probe integrity may be affected.

3.6 Procedure Computerization Special Requirements

Because of cleanliness requirements in the Class 10 room, and to conveniently record data directly into the procedure thus generating the “as-built” document, the procedure will be handled in a paperless fashion until completed. A Laptop computer containing an electronic version of this procedure will be operated by the ITD or QA Representative and data shall be recorded by typing directly into the electronic file.

Following completion of the procedure, a hard copy of the “as-built” procedure shall be printed *and signed off by all the designated parties*. It shall then be filed, including an electronic copy into the data base.

The electronic editing of this document shall be as follows:

- Data will be inserted into the document using normal font, i.e. non-bold, non-italic
- “Signatures” shall be designated by **BLACK CAPITAL BOLD LETTERS**.
- “Redlines” shall be in **RED BOLD ITALICS** to make them distinguishable both on the Laptop screen and on the hard copy printout.
- If available, digital pictures shall be inserted into the document where appropriate.

4. REQUIRED EQUIPMENT

Flight Hardware

Hardware	Part Number
Quartz Block #3	Block, Quartz, SM (Dwg# 22770-101 Rev B)

Ground Support Equipment

- QB Roller Mechanism
- Roller Mechanism Cart
- QB/PM Cart (QB Precision Manipulator Cart)
- Silver Plated Bolts for clamping halves of Roller Mechanism

Tools and Miscellaneous

- Allen wrenches, various

5. TRANSFER THE QB FROM RM CART TO QB/PM CART

Record Start Date and Time: _____

5.1 Initial Preparations

- 5.1.1 Clear the work area such that the room layout is approximately as shown in Figure 1 below. There should be sufficient room for a person to be on each side, in front, and in back of the Roller Mechanism Cart.

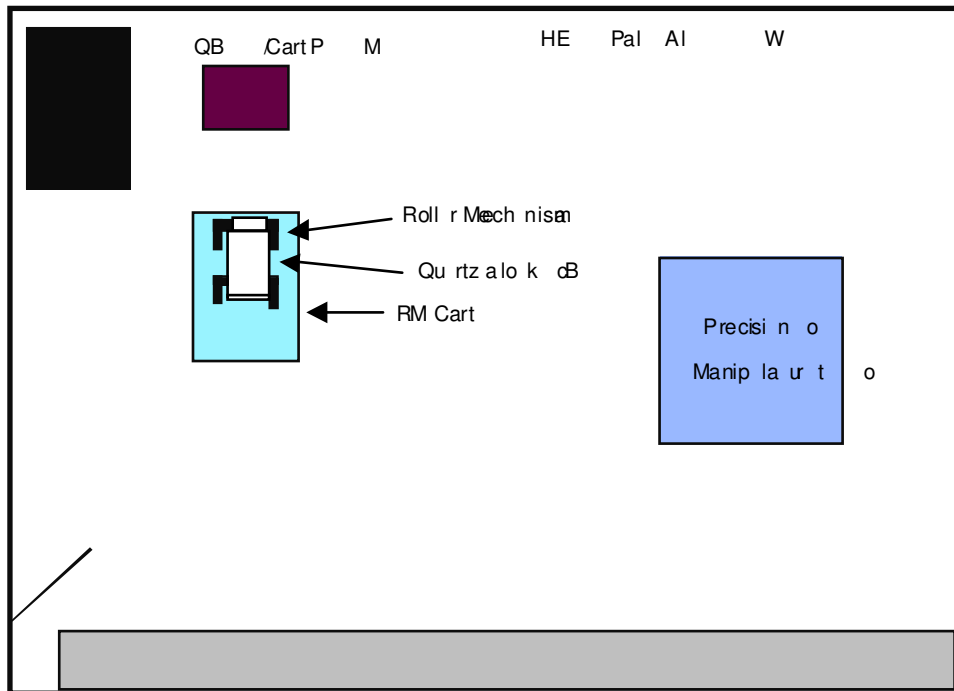


Figure 1. Class 10 Room Layout at Start of Procedure

- 5.1.2 Check the following on the RM and RM cart:

- Hinges on front of RM are locked
- Restraining cable ends are firmly attached to RM and cart
- Adjustment lever is attached to cart

- 5.1.3 Rotate the QB so that the $-Y$ axis is facing upward toward the ceiling.

CAUTION: Avoid touching the bonding or polished surfaces of the QB

5.2 Rotate QB to Vertical

- 5.2.1 Raise or lower the RM cart platform with the foot pedal to a height of approximately 2 ft. (One should be able to comfortably reach both ends of the RM when raised).

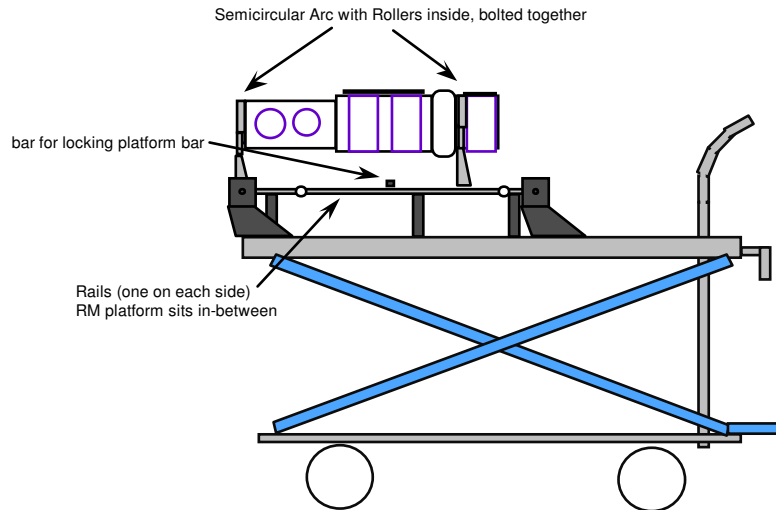


Figure 2. Side View of RM Cart with QB in RM (not to scale)

- 5.2.2 Lock the wheels of the RM Cart.

CAUTION: Ensure that the QB is secure in the RM, by checking that the upper semicircular halves of the two rollers are securely bolted together.

- 5.2.3 With one person on each side of the cart to ensure against tipping of the cart, each holding a square support block on the bar near the telescope interface, rotate the RM about its hinge 90 degrees to vertical. A third person raises the platform bar lever and positions it in its locking slot on the RM. Once the bar is locked in place, the others may let go of the QB/RM. See Figure 3 below.

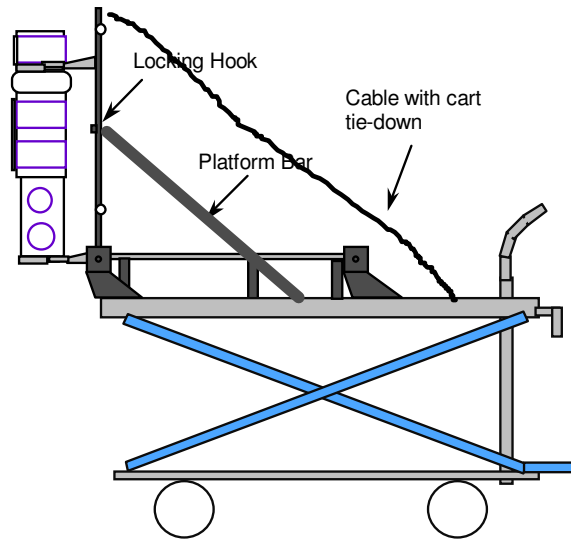


Figure 3. Side View of RM Cart with QB/RM Vertical (not to scale)

5.3 Place QB in QB/PM Cart

- 5.3.1 Position the QB/PM Cart under the QB such that the slide supports (clamps) on the QB/PM Cart mechanism are orthogonal to the RM Cart (i.e., the clamps mate with the clamping surfaces on the X and -X sides of the QB).
- 5.3.2 Remove the two side plates on the QB/PM cart by loosening the Hex bolts which hold each one to a clamp. Carefully slide the plates out.
- 5.3.3 Slowly lower the RM Cart with the hand lever until the bottom of the QB is approximately 2" above the center spacer of the QB/PM cart. One person guides the other on the controls to avoid abrupt contact with clamps.
- 5.3.4 Use the QB/PM translation controls to fine adjust the clamps around the QB. The bottom of the QB should be centered on the center spacer and the clamp knobs on the QB sides.
- 5.3.5 Use the QB/PM cart translation controls to make final contact with the bottom of the QB.
- 5.3.6 Install the two side plates on the QB/PM cart by sliding them carefully between the QB and the clamps, then inserting and tightening the hex bolts.
- 5.3.7 Remove the upper arc of the smaller roller by using an Allen wrench to remove the silver plated bolts which hold the arcs together. Slide the arc out taking care not to touch the QB. Lay the arc on the cart.
- 5.3.8 Loosely tighten the clamps around the QB such that the QB remains held in place but can still be shifted within the clamps.

5.4 Remove the RM from QB

- 5.4.1 Remove the upper arc of the larger roller by using an Allen wrench to remove the silver plated bolts which hold the arcs together. Slide out the arc taking care not to touch the QB. Lay the arc on the cart. **Someone should hold the QB in place at all times during this operation.**
- 5.4.2 Tighten the clamp on the QB until the vise is securely holding the QB.
- 5.4.3 Adjust the QB/PM Cart height slightly until the RM cart can be backed up without contacting the QB.
- 5.4.4 Slowly back up the RM Cart away from the QB, being careful not to bump the QB against the RM lower arcs.
- 5.4.5 Lower the RM in the RM Cart to horizontal by unlocking the platform bar and guiding the RM back to horizontal. Release the hand lever, and roll out of the Class 10 room into the Class 1000 room.
- 5.4.6 Move the QB in the QB/PM Cart behind the ion bars near the HEPA wall to the observation window side of the room. See Figure 4 for final configuration.

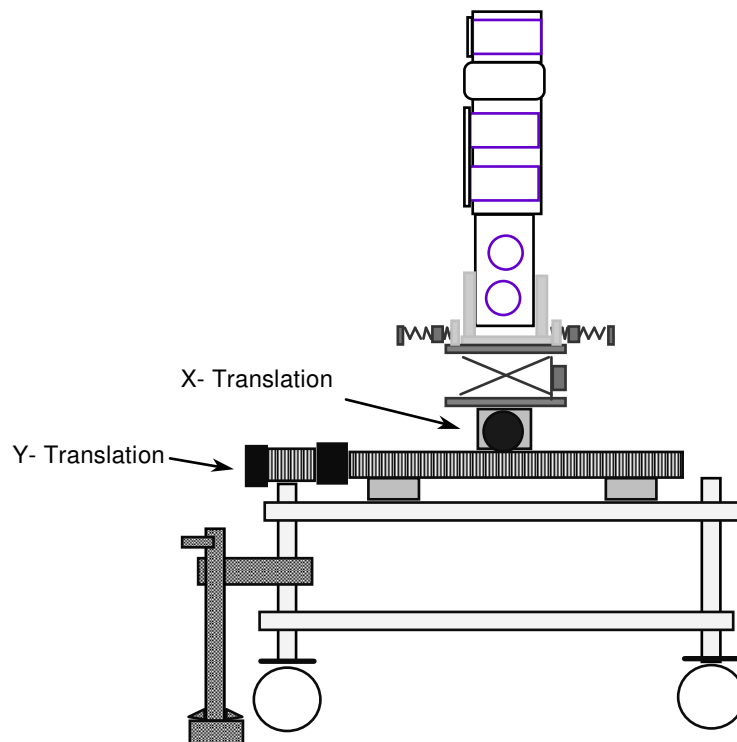


Figure 4. Quartz Block in QB/PM Cart (not to scale)

6. PROCEDURE COMPLETION

The results obtained in the performance of this procedure are acceptable.

Integration Engineer: _____ Date _____

ITD: _____ Date _____

The information obtained under this assembly and test procedure is as represented and the documentation is complete and correct.

Quality Assurance: _____ Date _____

7. DATA BASE ENTRY

The following data shall be entered into the GP-B Data Base:

- Name, number and revision of this procedure
- An electronic copy of this document
- A copy of the “as-built” procedure with data and pictures, when completed.