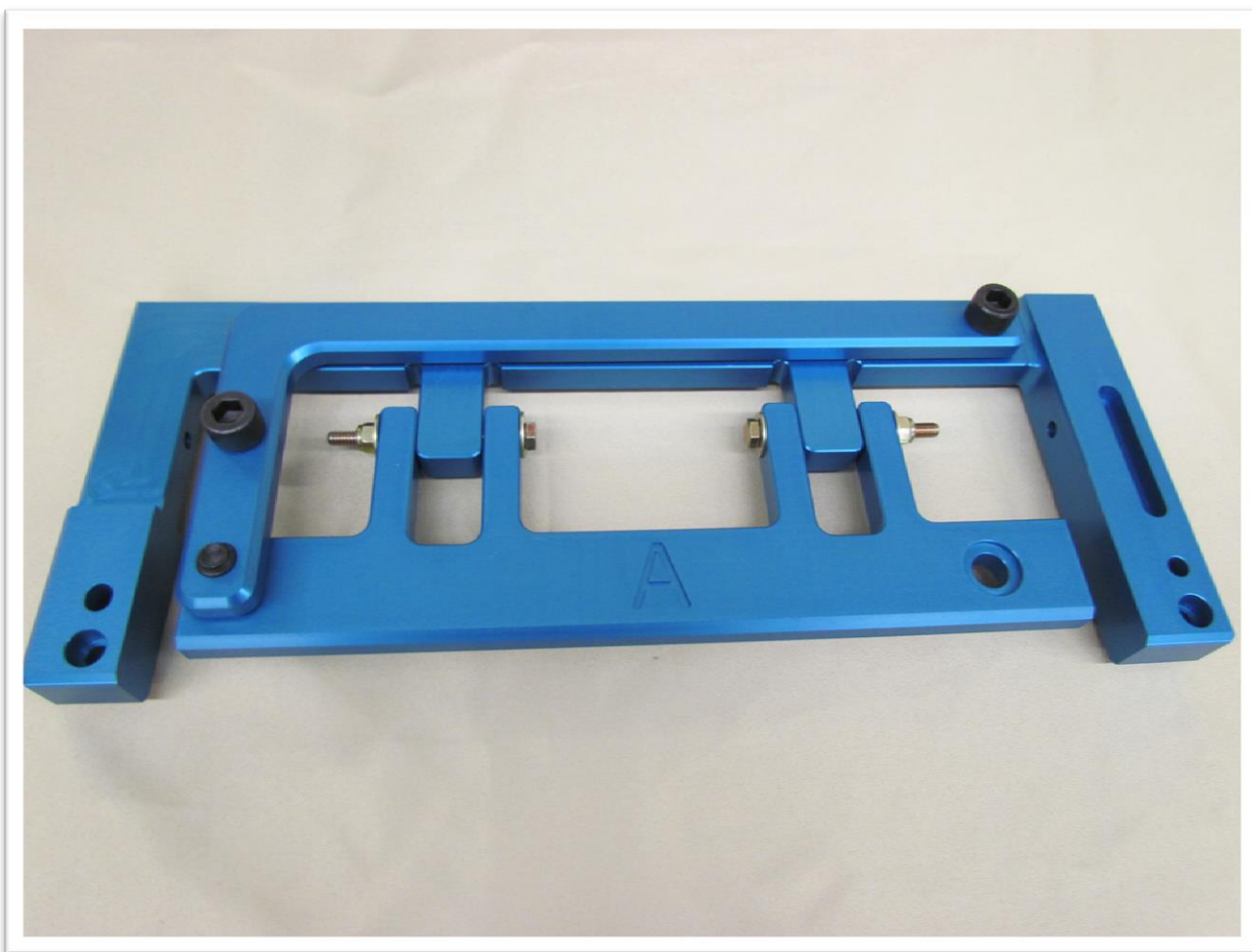




Carriage Lift Fixture Instruction Manual



October 2015

Version 1.00



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1 Introduction

1.1 Purpose

The fixture described can be used to access the bottom side of the MLC carriages with the carriage remaining in place on the collimator.

Used with:

- H54, Product Name: Millennium
- H56, Product Name: HD120 MLC
- HML, Product Name: TrueBeam
- HHM, Product Name: TrueBeam HD MLC

1.2 Parts Needed

- Philips screwdriver
- 7/16" Wrench
- Imperial hex key set
 - 3/8"
 - 1/4"
 - 3/16"
 - 3/32"
- MLC carriage lift fixture (SLP1013563-001)
 - Handle
 - Active Side
 - Fixed Side
 - 3x .500"-13 UNC 2A x 1.250" Socket Cap Screws

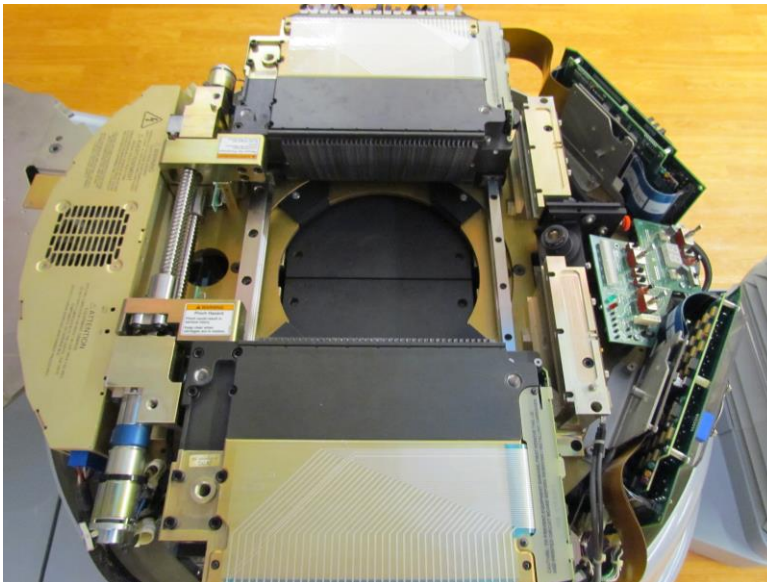


2 Procedure

Read through and familiarize yourself with the entire procedure and verify MLC performance before starting MLC lift.

2.1 Preparation

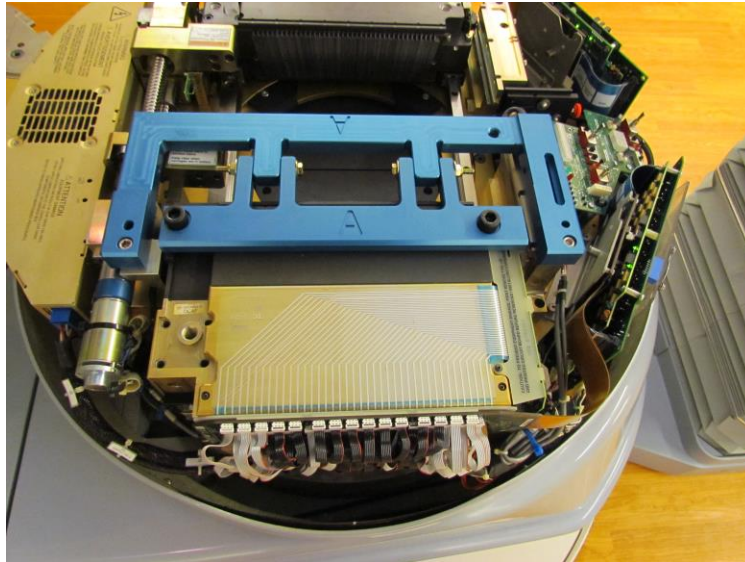
- 2.1.1 **Inspect Carriage Lift Fixture for any issues.**
If Carriage Lift Fixture is damaged, STOP and replace.
- 2.1.2 **Retract the Leaves and MLC Carriages.**
- 2.1.3 **Place the Gantry head down and Pin it in Place.**
- 2.1.4 **Close the jaws. Remove Collimator and Interface Mount.**



- 2.1.5 **Drape a cover over jaws and gaps where parts may drop.**
- 2.1.6 **Verify alignment of the Lifting Fixture by laying it over the MLC Carriage being worked on.**
Two of the holes normally used for mounting the Interface Mount should be aligned with the two holes on the Static Side of the Lifting Fixture.

And, then both the holes normally used for the “MLC T-Handles” should line up with the two large holes on the Active Side Mount.

If not, drive the carriage forward or backward with the Service Panel until all holes are aligned. If alignment is not possible using the Service Panel, STOP! Please call AEP Linac!



2.1.7 Turn MLC Power Supply off

2.2 Carriage Removal

2.2.1 Loosen and Remove Carriage Secondary Feedback Strip

2.2.2 Remove all 8 of the socket head cap head screws and washers holding carriage to primary Carriage rail

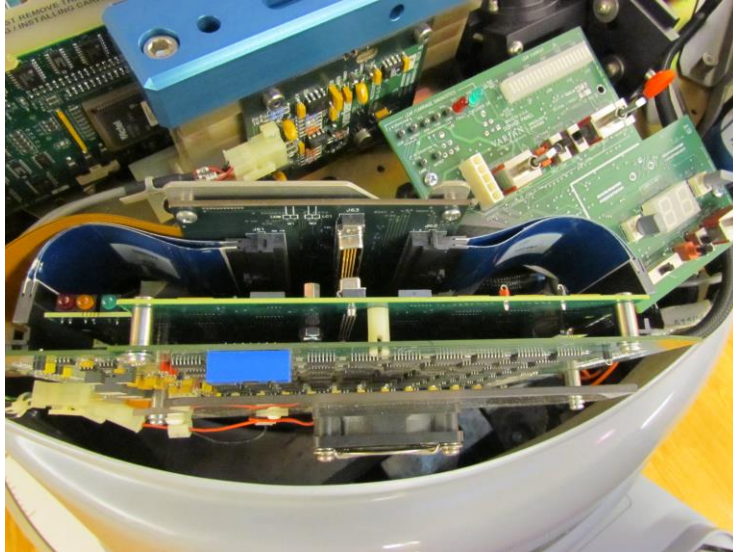
2.2.3 Remove the 3 bolts holding the driving arm to the Carriage

2.2.4 Loosen, but DO NOT remove the shoulder bolts holding the Carriage to the Secondary Rail.

(These will be removed last and are attached to the mechanical stops that prevents carriage from coming off the rail)

2.2.5 Remove captive screw and blue flex cables from the Head Transceiver/Motor Driver Board and tilt forward

There is no need to remove the Head Transceiver/Motor Driver Board from the machine.

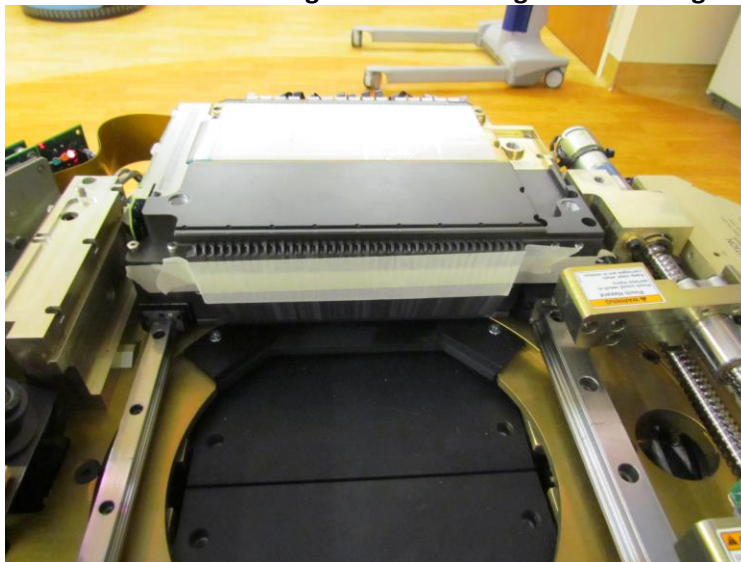


2.2.6 Remove the screws that hold the small square circuit board at the end of the Motor Interconnect flex cable (Figure 1)

2.2.7 On Truebeam remove the tab with the square hole in it from the front of the carriage.

2.2.8 Also, if a Softpot board is being replaced, remove the secondary feedback board.

2.2.9 If a Leaf nut is to be replaced, tape across the face of the carriage to help secure leaves from sliding out and crashing while rotating carriage upwards.



- 2.2.10 Remove the 3 large bolts from the Carriage Lift Fixture noting how it was assembled.**

2.3 Mounting the Fixture

- 2.3.1 Verify the side being worked on and place the mount with the correct letter facing up.**

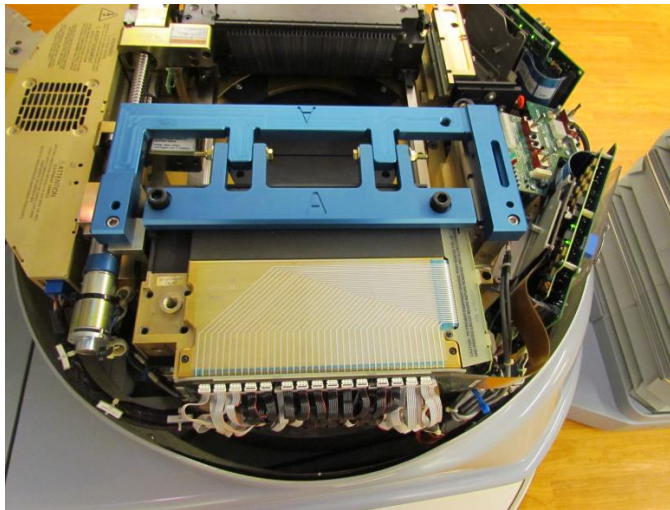
For the A-Side Carriage, the “A” on both the Active and Static parts should be facing up.

For the B-Side Carriage, the “B” on both the Active and Static parts should be facing up.

If not remove the 1/4” bolts, and flip the Active Side to where both “A” or “B” are on the same side of lifting fixture. Reassemble and tighten bolts so the lifting fixture is just stiff and hard to move. Then loosen 1/2 turn and verify that lifting fixture swings freely.

- 2.3.2 Mount the active side of the Lift Fixture to MLC Carriage. Using two of the 1/2” Socket Cap Head Screws that were removed during disassembly of the Lift Fixture.**

- 2.3.3 Mount the static side of the Lift Fixture to Interface Mount bolt holes. Use one of each Long and Short Socket Cap Head Screws that were removed when Interface Mount was removed.**



- 2.3.4 Mount the L-Shaped Handle to MLC Carriage using the far back bolt hole. Use the last 1/2” Socket Cap Head Screw. Verify that there is no contact between Handle and Motor Interconnect.**

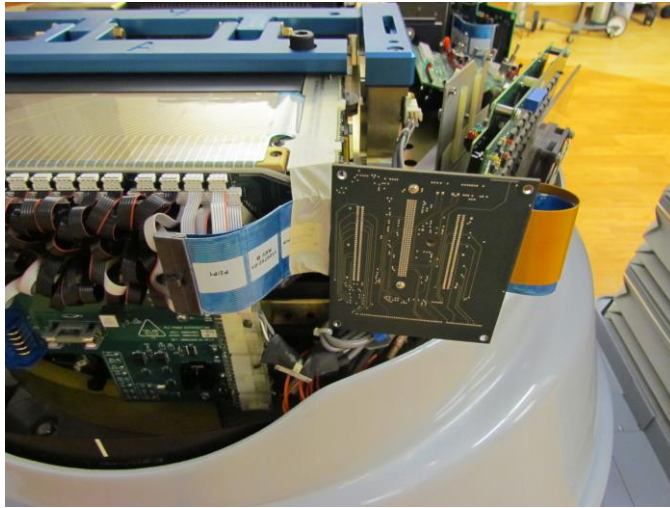
The handle can mount in either an inwards or outwards direction. It is personal preference.

Torque the bolt down so there is no lateral motion in the handle.

Remove handle when Carriage is not being moved. Handle sticks out past machine and can be a tripping hazard.

2.4 Lifting the MLC Carriage

- 2.4.1 Remove the shoulder bolts holding Carriage down to the Secondary Rail Bearing Block.
- 2.4.2 Check and Verify that all connectors and parts are free of collisions.
- 2.4.3 Hold the handle with one hand and the small circuit board in the other.
(We prefer to tape the Small Circuit board to the carriage as it is rotated.)

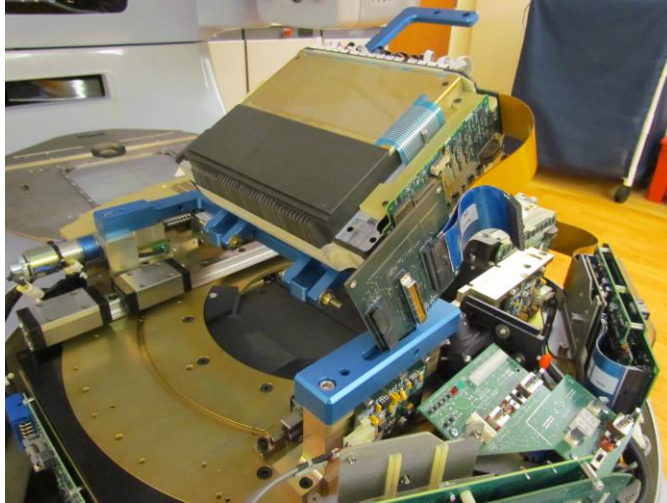


- 2.4.4 Rotate the Carriage upwards until it is resting on top of the Static portion of the Fixture.

It is very important that the Flex cable is not bent or twisted as the fixture is lifted if held.



- 2.4.5** After fixture is stable, rotate the Flex cable and insert the board into the slot.
Do not twist or kink the Flex cable while inserting the board into the slot.



- 2.4.6** While working on the MLC, do not move the bearing blocks.

2.5 Tips for Service

It is helpful while rotating to tape the small circuit board to the Carriage to prevent twisting forces on the Flex Cable.

When softpot is removed, use the couch for resting the softpot while working.

Removing a target side leaf. Use the lift to access the bottom of the carriage and remove the ball. Instead of using a screwdriver or motor extender to extend the leaf. Simply, replace the softpot and lower the carriage down. Connect the Head Transceiver/Motor Driver Board to the Motor Interconnect small circuit board. Switch on the MLC power supply and use the service panel to drive the leaf out for removal.

If removing the softpot board. Remove the Secondary Feedback before rotating.

2.6 Replacing the Carriage

- 2.6.1** Slide Secondary Rail Bearing Block towards the center by approximately 5mm.
- 2.6.2** Without moving the Primary Rail Blocks and holding the small circuit board in one hand. Lower the carriage back down slowly. The Carriage should grab the blocks as it is lowered onto them.

As long as the bearings were not moved during service, there should be no adjustments needed for alignment. If movement had occurred, slide bearing blocks until the correct alignment is found.

2.6.3 Place the small circuit board back on to the shoulder bolts.

If the work on the bottom side of the carriage is done and it will not be lifted again, install the two screws for the small circuit board.

2.6.4 Reinstall the shoulder bolts for the Secondary Bearing Block.

Adjust as needed for alignment.

2.6.5 Remove the lift handle.

2.6.6 Remove the two 1/ 2" and the 5/16" Socket Head Cap Screws attaching the fixture to the Carriage.

2.6.7 Press the two Primary Bearing Blocks towards each other until they hit the alignment pins and all 8 screws will engage.

2.6.8 Reassemble all parts that were removed or moved.

2.6.9 Turn on MLC and Reinitialize.

2.6.10 Replace the Interface mount and Collimator Cover

2.6.11 Unpin the Gantry

2.6.12 Reassemble the Carriage Lift and Handle.