

MOTORIZED LIGHTBAND MKII

Pack-Unpack Procedure | 2000827I

READ THIS PROCEDURE BEFORE REMOVING MLB FROM THE SHIPPING
CONTAINER

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2000827I MkII MLB Pack-Unpack Procedure

Sales Order	
MLB Assembly Number & Revision	
MLB Serial Number	

READ THIS PROCEDURE BEFORE REMOVING MLB FROM THE SHIPPING CONTAINER

Instructions:

To pack the MLB:

Read Section 2 and proceed to Section 3.

To unpack the MLB:

Read Section 2 and proceed to Section 4.

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1. Revision History

Rev	Issued	Created By	Released By	Change Description
- to F	27Apr07 To 11Aug21	Various	Various	See prior revisions for change details.
G	29Oct21	CF	PT	<ul style="list-style-type: none">• Pack Step 4: added reference• Pack Step 16: Added step• Unpack Step 3: Updated for LCT reference.
H	16Sep22	RB	BR	<ul style="list-style-type: none">• See 2004060,• Added QA column for Date & Initials to packing procedure.• Added QA verification requirement for steps 8 & 11 of packing procedure.• Updated step 11 to include two washers and fasteners are present for each hex standoff.
I	2Dec22	RB	PT	<ul style="list-style-type: none">• Corrected section 3.2, step 11 wording & nomenclature.• Added RL Cover Page.

2. Introduction

This procedure describes the steps to pack and unpack a Mark II Motorized Lightband (MLB) into and out of a shipping container, respectively. This procedure shall be completed each time the MLB is packed or unpacked.

The typical shipping container used is a custom hard case with foam insert (PSC PN: 2002200). MLBs shall only be shipped in these containers unless otherwise approved by PSC. Doing otherwise without PSC's approval will void the MLB warranty. The intent of this procedure is to demonstrate how to properly pack and unpack the MLB to prevent damage during shipping and handling.



Figure 2-1: Typical shipping containers

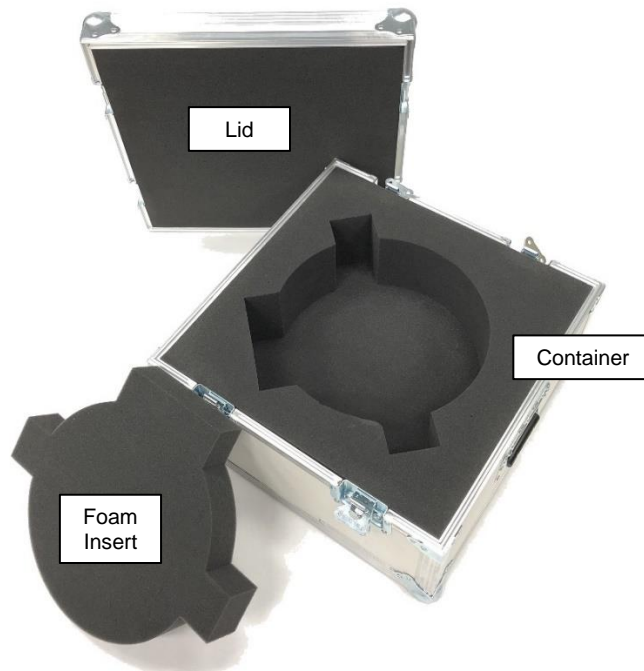


Figure 2-2: Shipping container components (11.732 size shown)

3. Packing the MLB

The operator shall be familiar with PSC documents 2000785 MkII MLB User Manual and 2000781 MkII MLB Operating Procedure prior to executing this procedure.

3.1 Required Equipment

Table 3-1: Required Equipment

Item	Approximate Quantity	Actual Total Qty.
Lightband (MLB)	1	
2002200 MkII Shipping Container (or equivalent; approved by PSC)	1	
Plastic resealable bag for documentation, 9 x 12 inch suggested	1	
Plastic resealable bags for Separation Connectors and Switches (if necessary)	AR	
Antistatic Bag	1	
Kapton Tape	AR	
Torque screwdriver w/ 3 in-lb capability and #1 Phillips driver	1	
2000844A MLB Shipping Hex Standoff	~1/spring	
¼ inch Open-end Wrench (to hold Hex Standoff while torquing)	1	
7/64 inch hex key with ball driver (to rotate Ball Screw)	1	
4-40 X 0.31 lg. UNC truss head screw, McMaster-Carr PN 91770A095 or similar (to attach Standoffs)	2 per standoff	
NAS1149CN616R Washer, .149 ID X .375 OD X .016 thick (to attach Standoffs)	3 per standoff	
Tweezers (to assist in handling small washers)	1	
Plastic resealable bags, 3 x 4 inch suggested (to store Separation Connectors and Switches if removed)	AR	
Bubble wrap (to protect Separation Connectors and Switches if removed)	AR	

3.2 Packing Procedure

Step	Description	Date & Initials		Notes
		Tech	QA	
1	Complete cover page.		--N/A--	
2	Ensure the MLB is in the deployed state and removed from adjoining structures per PSC Operating Procedure 2000781 (available at https://www.rocketlabusa.com/space-systems/separation-systems/motorized-lightband/). The user must be trained personnel to operate the MLB.		--N/A--	
3	Place the Upper Ring on the Lower Ring, ensuring proper alignment per PSC Operating Procedure 2000781. The MLB has exposed lubricated surfaces. Avoid lubricant when handling.		--N/A--	
4	Manually rotate the Ball Screw with a 7/64 inch hex key until the Sliding Tube makes contact with the Motor Bracket. Rotation direction is counter-clockwise when looking along the Y_{LB} axis from the origin towards the Motor Bracket. Maximum torque shall not exceed 1.0 in-lb. Gently pushing outward on the $-Y_{LB}$ side of the Retaining Ring during rotation helps the Retaining Ring properly seat against the Leaf Assemblies. See Figure 3-2. Upon completion of Ball Screw rotation, the Sliding Tube shall remain firmly against the Motor Bracket and not back-drive. See Figure 3-1 and Figure 3-2.		--N/A--	

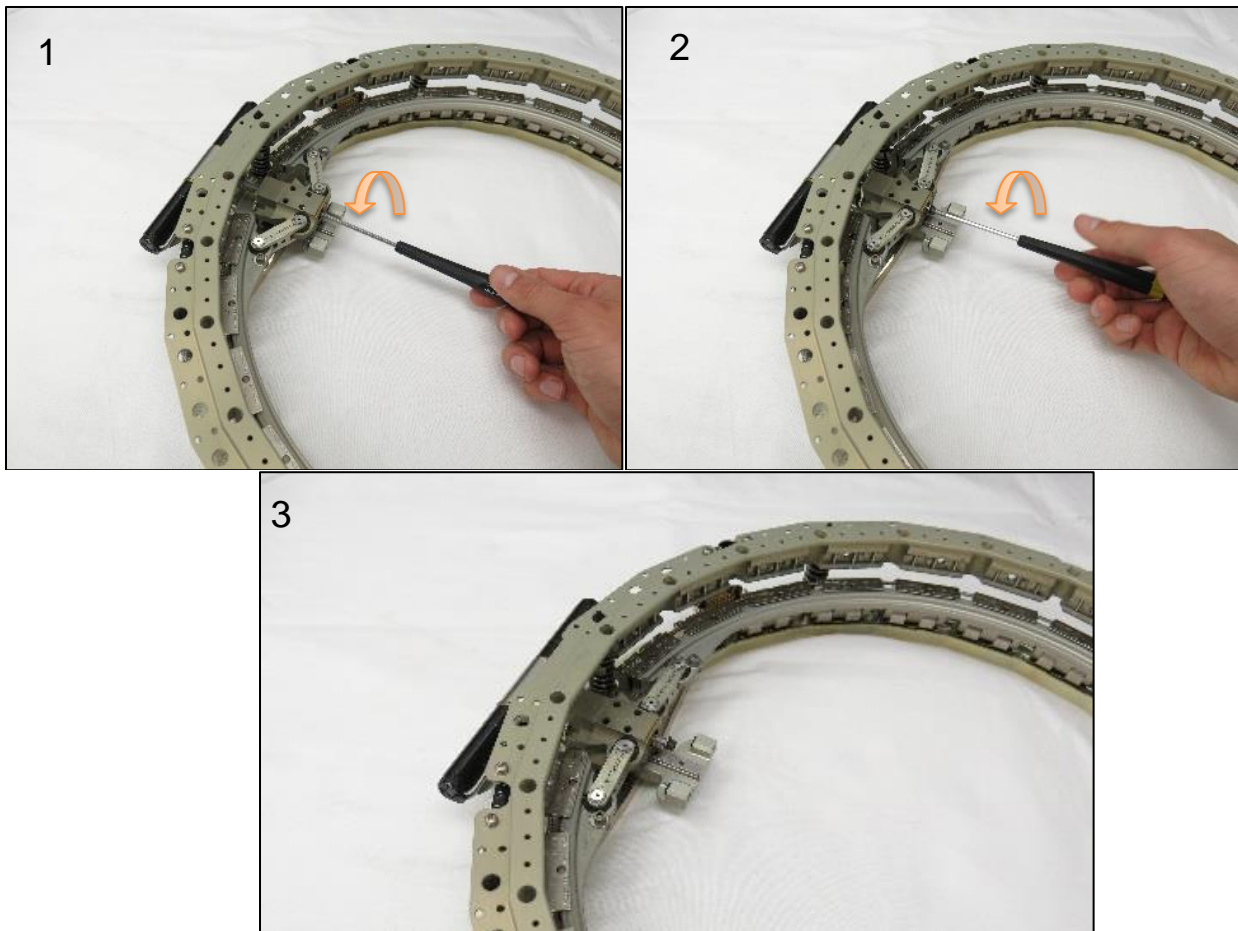


Figure 3-1: Manually rotating the Ball Screw until the Sliding Tube contacts the Motor Bracket

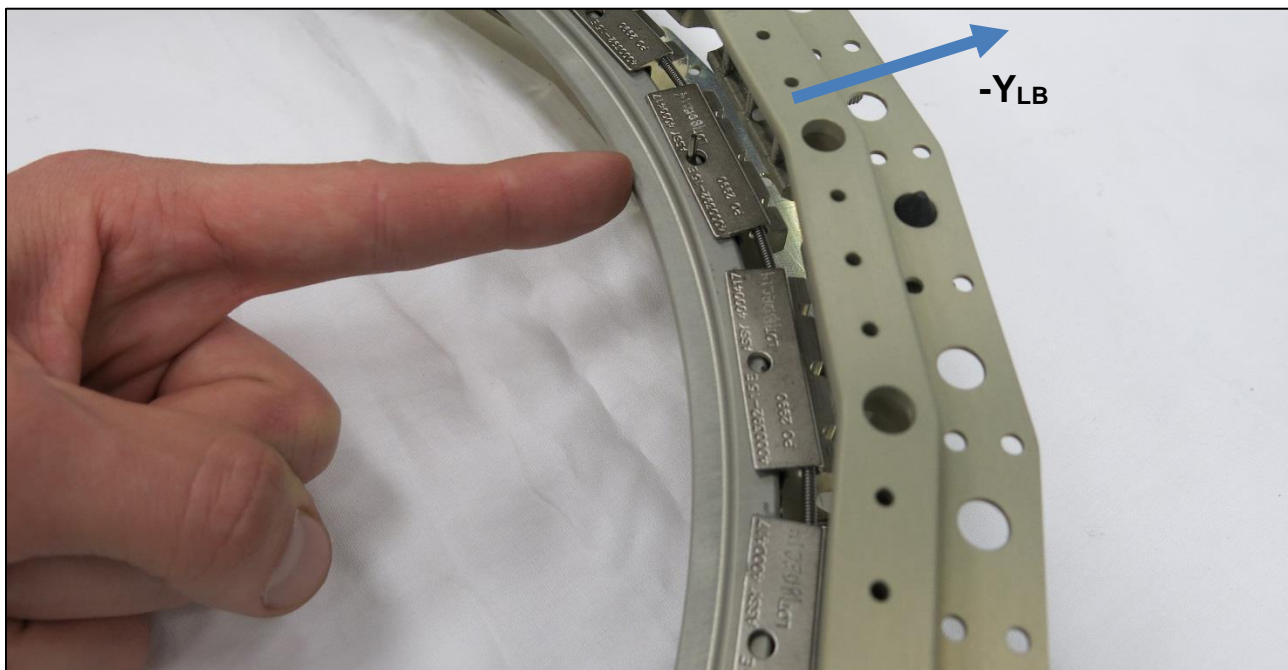


Figure 3-2: Applying force to Retaining Ring in radially outward direction during Ball Screw rotation

Step	Description	Date & Initials		Notes
		Tech	QA	
5	<p>Select Hex Standoff installation locations. Each location should be as close as practical to a Separation Spring. See Figure 3-3 for available Standoff locations. ~1 per Separation Spring is necessary. Separation Connectors and/or Separation Switches may be removed to facilitate Hex Standoff locations closer to Separation Springs. If needed, perform the following.</p> <ol style="list-style-type: none"> 1) Remove necessary Connectors or Switches. 2) Bag and label removed Connectors, Switches, and fasteners. <p>Additional Actions for PSC Internal Only.</p> <ol style="list-style-type: none"> 1) Record removal in MLB Rework Log. 2) Do not alter MLB Configuration Table as this will serve as a reference for the customer to re-attach in proper locations. 3) Re-scan MLB Production Log to server. 		--N/A--	Were Connectors or Switches removed? If so, note locations here:

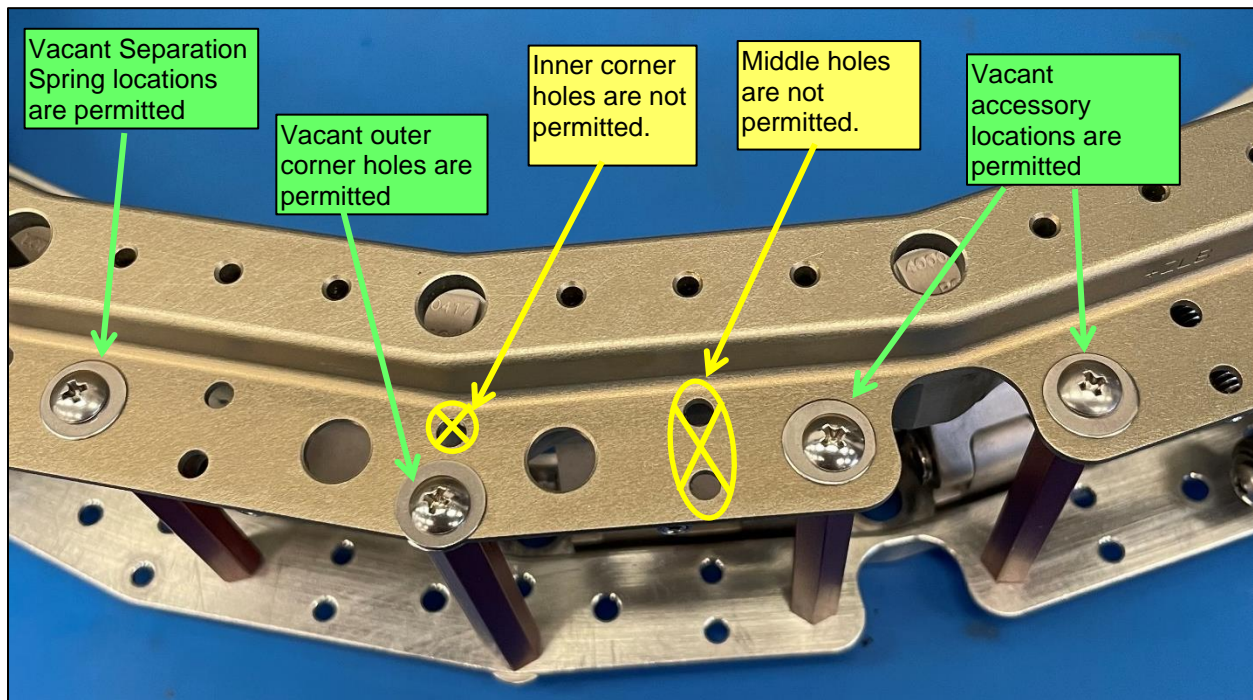


Figure 3-3: Permitted Hex Standoff locations

Step	Description	Date & Initials		Notes
		Tech	QA	
6	With Upper Ring on Lower Ring fasten 2000844 MLB Shipping Hex Standoffs to the Lower Ring flange at the hole locations selected in step 5 using 4-40 UNC truss head screws and washers. Ensure Standoffs do not contact objects on Upper Ring. Torque fasteners 2 to 3 in-lb. See Figure 3-4.		--N/A--	

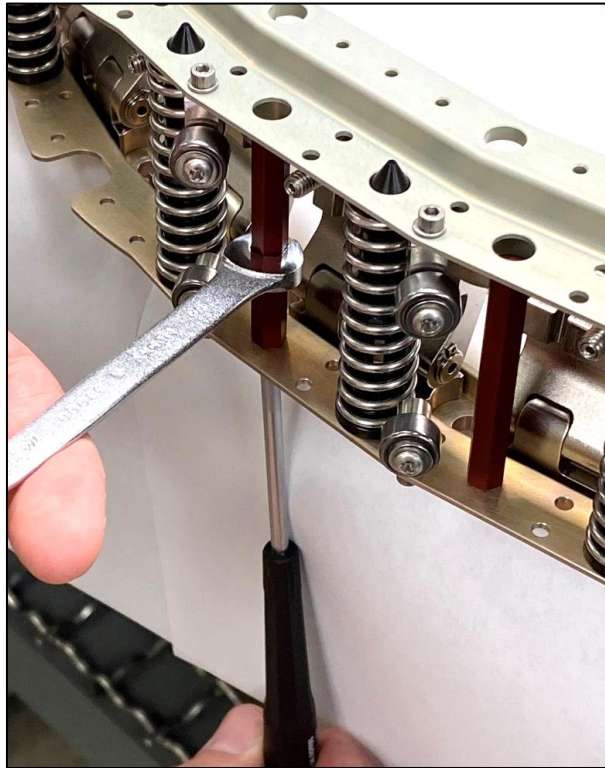


Figure 3-4: Attaching Standoff to Lower Ring

Step	Description	Date & Initials		Notes
		Tech	QA	
7	<p>Will there be any Standoffs installed in a vacant Separation Spring location?</p> <p>If no, skip to step 9.</p> <p>If yes, every Standoff, regardless of location, shall have a washer between it and the Upper Ring. This is essential to ensure uniform compression and prevent yielding of the thin MLB flange. Carefully slide a washer between the top of the Standoff and the Upper Ring flange (using tweezers can aide handling). Loosely fasten Hex Standoffs to the available holes of the Upper Ring flange using 4-40 UNC truss head screws and washers. Do not compress Separation Springs. See Figure 3-5, Figure 3-6, and Figure 3-7.</p>		--N/A--	Are Washers between Standoff and Upper Ring?

Step	Description	Date & Initials		Notes
		Tech	QA	
8	Visually check to ensure a washer is present between every Hex Standoff and Upper Ring. See Figure 3-7.			
9	Skip if steps 7 and 8 were performed. Loosely fasten Hex Standoffs to the available holes of the Upper Ring flange using 4-40 UNC truss head screws and washers. Do not compress Separation Springs. See Figure 3-6 and Figure 3-7.		--N/A--	

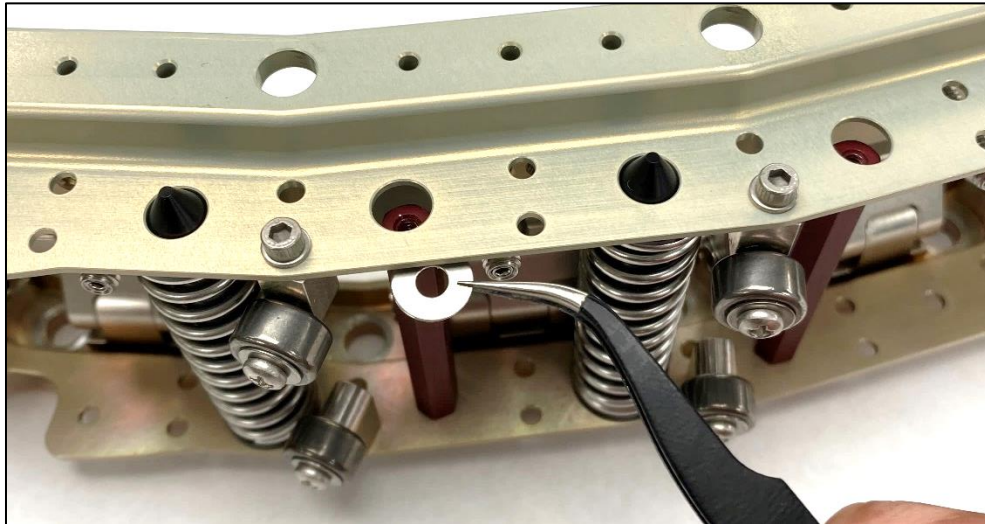


Figure 3-5: Installing washer between Standoff and Upper Ring

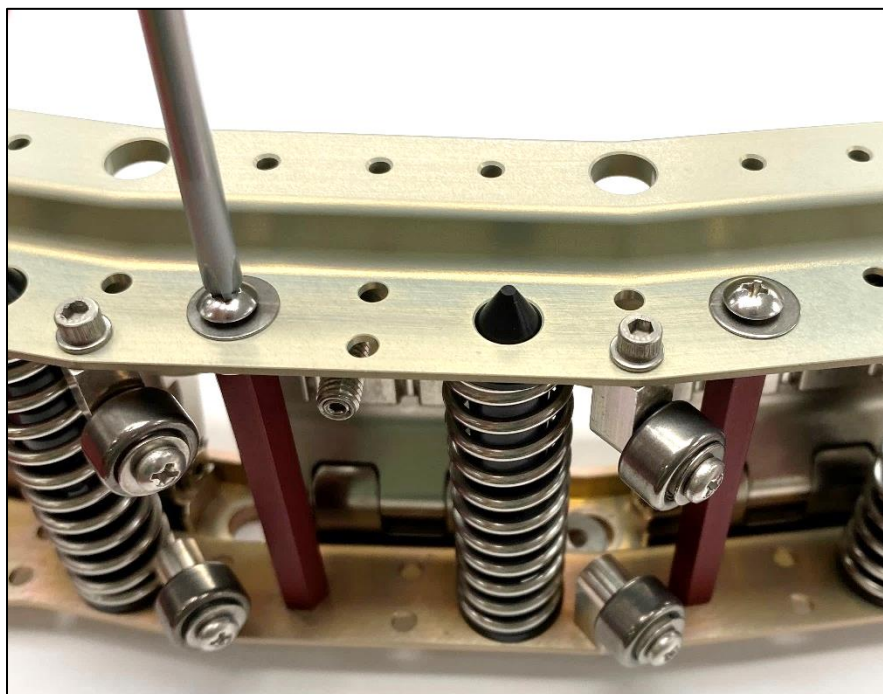


Figure 3-6: Installing screw and washer through Upper Ring

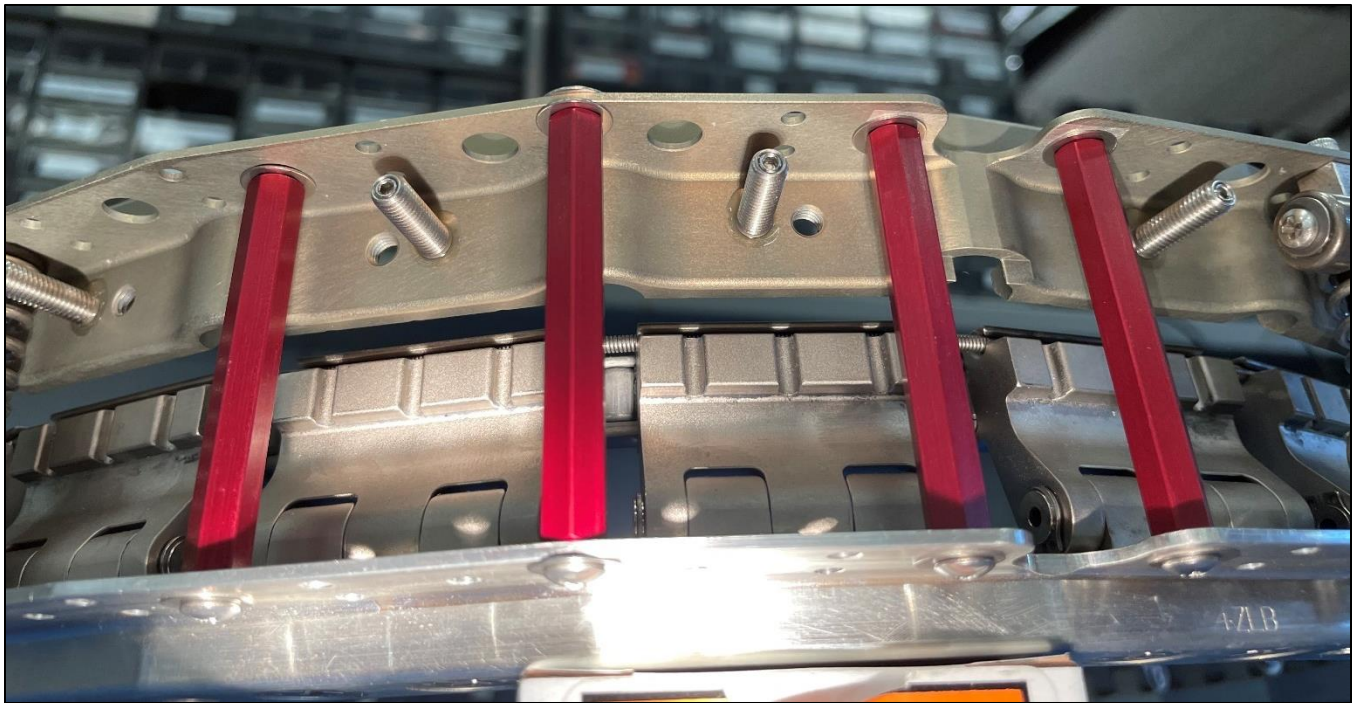


Figure 3-7: Washer between every Hex Standoff and Upper Ring (required if at least one Hex Standoff installed in vacant Separation Spring location).

Step	Description	Date & Initials		Notes
		Tech	QA	
10	Gradually torque the Upper Ring 4-40 screws ½ turn at a time until all are bottomed out. Use caution as each Separation Spring will compress ~0.1 inch and generate ~3 lbf. May have to restrain Hex Standoff with ¼ inch wrench while torquing. Then torque all screws 2 to 3 in-lb.		--N/A--	
11	Verify all hex standoffs are fastened to the upper and lower ring and have a washer between the respective ring flange and the fastener. Record total qty. of screws, washers and Hex Standoffs used in Table 3-1.			
12	Take picture of MLB and save to production folder. Ensure all Hex Standoff locations are visible in pictures.		--N/A--	
13	Place the MLB in an appropriately sized antistatic bag. Close and seal the bag with Kapton tape as needed. Leave courtesy strips at the end of each piece of tape to assist unpacking.		--N/A--	
14	Place bagged MLB inside foam cutout in the lower half of Shipping Container. The MLB shall be above the foam insert. Ensure Motor Bracket aligns with large rectangular cutout in foam. See Figure 3-8.		--N/A--	

Step	Description	Date & Initials		Notes
		Tech	QA	
15	If Connectors or Switches were removed, tape bag(s) of accessories to the top center of the MLB bag or wrap in bubble wrap and place in hand cutouts. See Figure 3-9.		--N/A--	Are Connectors or Switches on MLB or in cutouts? If so record qty.
16	If LCT's are shipping not attached to MLB, tape bag to top center of MLB bag or wrap in bubble wrap and place in hand cutouts. See Figure 3-9.		--N/A--	Are LCTs taped to MLB or in cutouts? If so record qty:
17	Print this Procedure and then place it and all additional documentation required per PSC Shipping Procedure 3000208 in a resealable plastic bag on top of the MLB.		--N/A--	
18	Place the lid on the Shipping Container and close all 4 latches.		--N/A--	

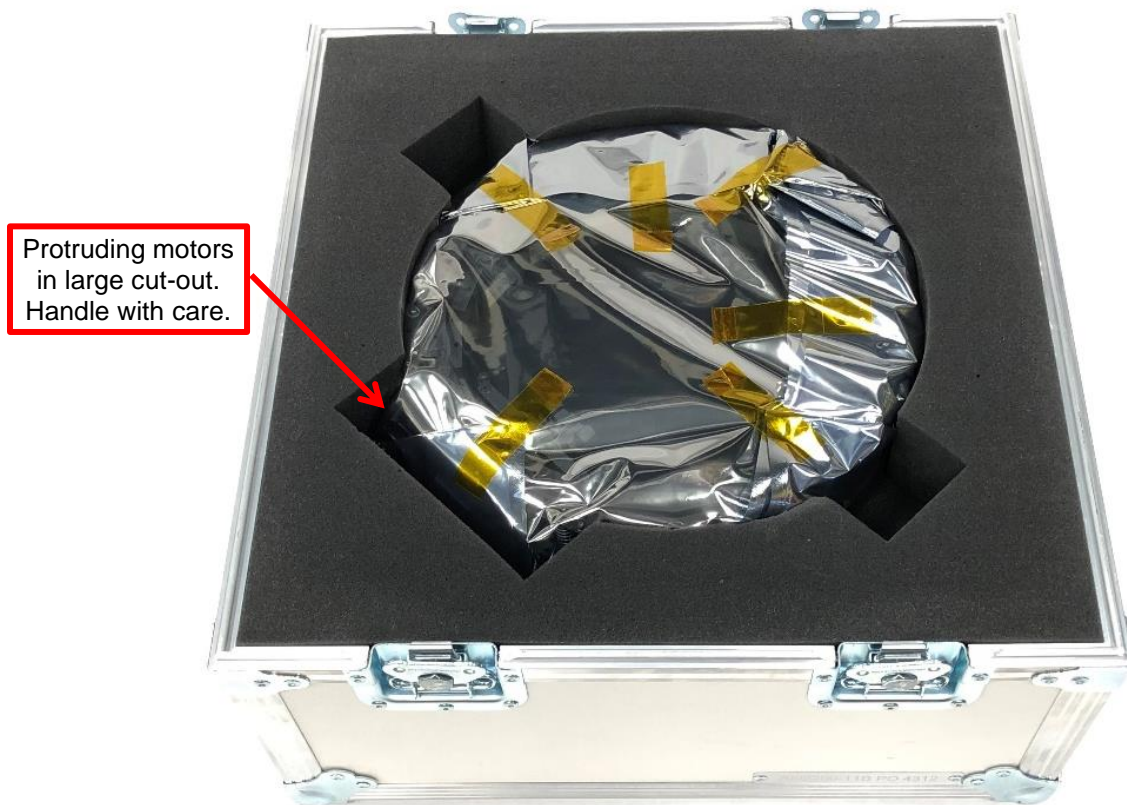


Figure 3-8: MLB installed in shipping container



Figure 3-9: MLB with removed accessories

4. Unpacking the MLB

The operator shall be familiar with PSC documents 2000785 MkII MLB User Manual and 2000781 MkII MLB Operating Procedure prior to performing this procedure.

4.1 Required Equipment

Item	Quantity	Check
#1 Phillips screwdriver (to remove 4-40 UNS truss head screws)	1	
¼ inch Open-end Wrench (to hold Hex Standoff while loosening)	1	
Bag or tray (to store removed hardware)	1	
Small tweezers (to assist in removing small fasteners and washers)	1	

4.2 Unpacking Procedure

Step	Description	Date & Initials	Notes
1	Record name of person executing procedure.		Name: _____
2	Read the entirety of section 3.2 to familiarize with how this specific MLB was packaged.		
3	Remove Separation Connectors, Separation Switches, and LCTs from Shipping Container if present. See section 3.2, step 15 and 16.		
4	Remove the bagged MLB from the Shipping Container. Take care not to contact or bump the Motors which protrude from the MLB Rings.		
5	Remove tape securing the antistatic bag, open bag, and remove the MLB from the antistatic bag.		
6	See section 3.2 step 7 to determine if washers are between Upper Ring and Standoffs. If so, be cognizant of their presence when removing in the next step.		Are washers between Upper Ring and Standoffs?
7	Near each Separation Spring is a 2000844 MLB Shipping Hex Standoff. Remove them by performing the following. 1) Turn each screw about ½ turn, working around the MLB. 2) Repeat the ½ turns until all screws gap from the Upper Ring. 3) Remove each screw and upper washer one at a time. After removing the screw, immediately remove the washer (if present) between the Standoff and Upper Ring flange. 4) Remove the Standoffs from the Lower Ring by loosening the screws and washers under the Lower Ring.		
8	Take inventory of every Standoff, Screw, and Washer. The quantities shall match 'Actual Total Qty.' in Table 3-1.		
9	The MLB is now ready for operation per PSC Document 2000781 MkII MLB Operating Procedure (available at https://www.rocketlabusa.com/space-systems/separation-systems/motorized-lightband/). Operating the MLB before		