

## 872-LTN1037 – Technical Note

## Mirror Handling Plan

## 1 Introduction

This document details and outlines the handling and process steps involving the K1DM3 mirror along with the mockup mirror.

## 2 Activities

### 2.1 Locating major/minor axes

1. Remove mirror from box
  - 1.1. Prepare work area
  - 1.2. Lift mirror above crate edge
  - 1.3. Insert bottom support
  - 1.4. Install mirror handling frame (872-LM8410)
  - 1.5. Employ hoist
  - 1.6. Lift mirror, flip, and transport to work area
  - 1.7. Lower mirror on supports
2. Positioned polished side down
3. Use template (872-LM8312) & linear gage setup (as per 872-LM8340)
4. Set tooling on rear mirror surface; position and align to mirror axes
5. Mark points on mirror thru template
6. Remove tooling and scribe (permanently mark with pencil, Sharpie, etc.) major and minor axes
7. Cover and protect mirror

### 2.2 Glue Jig Assembly Test with Mockup

1. Test assemble glue jig (872-LM8337) with mockup (872-LM8404)
2. Mount to tripod (872-LM8332)
3. Check for stability and weight balance; add balance weight as needed
4. Rotate glue jig; check for interferences and shifting of components
5. Tighten and adjust fasteners as needed
6. Locate/mark jig holes for positioning the three lateral pads
7. Weigh assembly if possible
8. Disassemble; drill jig holes (Item 3); make any necessary modification.

### 2.3 Assemble Glue Jig with Mirror

1. Set top jig plate, cover plate, and gasket; make ready for mirror
2. Place mirror on stack; center and align all items

3. Set template on stack
4. Set bottom jig plate on stack
5. Center and align template on mirror
6. Install lateral supports and bolts
7. Check alignment of template and mirror
8. Tighten and secure lateral support bolts and set screws
9. Attach hoist ring assemblies
10. Transfer jig and mount to tripod
11. Test rotate and check for shifting and clearances
12. Disassemble and return mirror to shipping crate

#### 2.4 Ship to Keck

1. Package mirror in crate
2. Pack in second crate
  - 2.1. Tripod
  - 2.2. Glue Jig tooling
  - 2.3. Mirror handling fixture
3. Ship to Keck

#### 2.5 Axial Puck Bonding

1. Prepare glue jig
2. Unpack mirror and attach lift fixture
3. Move and position with glue jig
4. Assemble glue jig
5. Clean, prime, and etch axial areas
6. Bond axial pucks
7. Move and mount glue jig to tripod
8. Position for 1<sup>st</sup> lateral puck
9. Clean, prime, and etch edge area
10. Bond 1<sup>st</sup> lateral puck
11. Position for 2<sup>nd</sup> lateral puck
12. Clean, prime, and etch edge area
13. Bond 2<sup>nd</sup> lateral puck
14. Position for 3<sup>rd</sup> lateral puck
15. Clean, prime, and etch edge area
16. Bond 3<sup>rd</sup> lateral puck
17. Remove glue jig from tripod

#### 2.6 Ship to UCO

1. Disassemble glue jig

2. Package mirror in crate
3. Pack second crate
  - 3.1. Tripod
  - 3.2. Glue jig tooling
  - 3.3. Mirror handling fixture
  - 3.4. Witness and proof test samples (these may remain with Keck)
4. Ship to UCO

#### 2.7 Mirror assembly with mockup

1. Assemble mirror assy with mockup mirror
2. Install assy to Swing Arm
3. Test kinematic interfaces for repeatability (cycle installation/removal)
4. Test swing arm actuation
5. Test swing arm kinematics for repeatability (cycle between retracted and deployed states)
6. Test drum rotation

#### 2.8 Final mirror assembly

1. Assemble mirror assy with true mirror
2. Install assy to Swing Arm
3. Test kinematic interfaces for repeatability (cycle installation/removal)
4. Test swing arm actuation
5. Test swing arm kinematics for repeatability (cycle between retracted and deployed states)
6. Test drum rotation

#### 2.9 Final shipment to Keck

1. Remove mirror assembly from Swing Arm
2. Prepare and package mirror assembly in new crate structure
3. Ship mirror with instrument to Keck