

PREPARED BY:	<p style="text-align: center;"><b><i>Multiband Imaging Photometer for SIRTf</i></b></p> <p style="text-align: center;">University of Arizona Steward Observatory, IR Group</p> <p style="text-align: center;"><b>SPECIFICATION</b></p>	NUMBER M11131	
C. DAVIDSON		TYPE INSPECTION	
APPROVALS		DATE 07/07/97	
ENGINEERING		SUPERSEDES SPEC. DATED	
QUALITY		REV. NEW	PAGE 1 of 6
PI/DEPUTY PI			

TITLE  
INCOMING INSPECTION OF REFLECTOR BAR ( P/N MIPSD – 069), PROCEDURE FOR

## 1.0 SCOPE

This specification defines the equipment, materials and procedures for incoming inspection of sapphire reflector bars, PIN MIPS-069-1, -2, -3, -4, which are to be used in the build of the MIPS 32x32 gallium-doped germanium focal plane array.

## 2.0 PURPOSE

The incoming inspection is to verify that the requirements of the purchase order have been satisfied and that the bars meet the specifications of drawings MIPS-069.

## 3.0 APPLICABLE DOCUMENTS

The following documents form a part of this inspection procedure to the extent specified herein. In the event of conflict between the requirements of this document and the requirements of the engineering drawings called out, the requirements of the drawings shall take precedence. Unless otherwise specified, the most recent revision of the documents identified herein shall apply.

### Manual

University of Arizona Safety Manual

### Drawings

University of Arizona, Steward Observatory, IR Group  
MIPS-069 Reflector Bar

## 4.0 REQUIREMENTS

### 4.1 Equipment

Acceptable results are contingent upon the use of the recommended equipment listed below or equivalent equipment. Equivalent equipment may be substituted for the recommended equipment if and only if effectiveness and accuracy are not decreased by its use.

Item	Quantity	Description
1	1 each	Microscope, stereozoom, Bausch and Lomb
2	1 each	Microscope, measuring, x, y, and z-axes, Nikon
3	1 each	Measurement system, Nikon Digimicro System
4	1 each	Gun, blow

### 4.2 Materials

Item	Quantity	Description
1	as received	Reflector bar, PIN MIPS-060
2	as required	Acetone, electronic grade
4	as required	Methanol, electronic grade
5	as required	Isopropanol, electronic grade
6	as required	Nitrogen, gaseous (dry) or air (dry)
7	1 each	Tweezers, Teflon
8	as required	Wipes, cleanroom

## 5.0 PROCEDURAL REQUIREMENTS

Incoming inspection of the reflector bars is to be performed and tracked on a lot basis. The lot number to be recorded on the inspection summary sheet, document no. M11I31-A, (see figure 1) is the lot number which is designated by the reflector bar vendor on the shipper accompanying the parts or on other vendor supplied documentation. If the vendor does not provide a lot number, then the vendor work order which appears on the invoice and on the certification of material is to be used as the lot number.

Individual reflector bars are not to be assigned unique serial numbers or other distinguishing identifiers. Rather, bars of a given configuration (MIPSD-069-1, -2, -3 or -4) which meet acceptance requirements are to be stored only with bars of the same configuration, which also meet acceptance requirements. For FPA build, acceptable reflector bars of a given configuration will be indistinguishable one from another.

Reflector bars which fail to meet the acceptance requirements will be stored separately from those bars which do meet acceptance requirements.

For each lot of bars, the results of visual examination and dimensional measurement are to be summarized on one inspection sheet.

## 6.0 PROCEDURE

Notes:

1. Handling, storage and disposal of chemicals is to be in accordance with the University of Arizona Safety Manual.
2. Cleanroom gloves or finger cots are to be worn when handling hardware and equipment.
3. Removal of outer wrappings and packaging material is to be done outside of the cleanroom.

### 6.1 Verify Receipt of Requested Paperwork and Quantity of Boards.

- 6.1.1 Inspect the outer packaging for signs of damage incurred during transport. Record the results on the inspection sheet, document no. M11I31-A.
- 6.1.2 Carefully remove outer packaging and remove contents and paperwork. With a cleanroom wipe dampened with isopropanol, wipe the plastic bags that cover the bar contains. If the containers are not within plastic bags, wipe down the containers, taking care not to obscure label information. Place the paperwork in cleanroom bags. Transport the packaged wafers and paperwork to the cleanroom.
- 6.1.3 Verify that the quantity of bars of each of the four configurations (-1, -2, -3, and -4) identified on the paperwork is in agreement with the quantity received. Report any deficiencies or overages in quantity to the lead engineer for resolution. Verify receipt of all paperwork, including a certification of materials, called out on the purchase order.

## 6.2 Examine Bar for Contamination and Defects.

6.2.1 Using tweezers or vacuum pickup tool, place a bar onto a clean microscope stage or a clean glass slide on the stage. Under microscope magnification, verify to drawing MIPSD-069 that the configuration of the bar is as identified on the packaging/container label.

6.2.2 Inspect the bar for contamination. Using dry N<sub>2</sub> or air from a blow gun, blow particles from the surfaces of the bar. If gross contamination is present, clean the bar by flushing it for a minimum of 20 seconds each with acetone, methanol then isopropanol. Blow the wafer dry with dry N<sub>2</sub>.

Note: To prevent redistribution of contaminating materials, or possible solvent residue from remaining on the wafer, keep the wafer wet with solvents until it is blown dry.

6.2.3 Under microscope magnification, verify the bar is free of contamination. Examine the wafer for lifting or peeling of the titanium-tungsten/gold (Ti-W/Au) metallization which has been deposited along one lengthwise edge of the bar. Ensure the metallization does not go all the way to the edge.

If the contamination is still present or the bar does not meet the metallization requirements of drawing MIPSD-069, reject the bar and label and store the bar accordingly.

## 6.3 Verify the Bar Dimensions, Perpendicularity and Parallelism Requirements.

Note: If a contact measuring system (i.e., a Nikon Digimicro System or a surface profilometer) is used to measure the bar thickness or other parameters, take care not to damage the bar.

6.3.1 Using a 3-axes measuring microscope, measure the length, width and thickness of the bar. Each parameter is to be measured at three different locations, and a minimum of three measurements is to be made at each location. For bar acceptance, the average of the measurements for a parameter must fall within the specification range identified on the drawing and on the inspection sheet. Determine surface perpendicularity and parallelism from these measured values.

## 6.4. Lot Acceptance Verification.

On each bar in the lot, perform visual examination and dimensional measurements per paragraphs 6.2.1 through 6.3.1.

## 6.5 Store the Boards.

Place acceptable bars in a clean storage container. Cover the container and label the cover: 'MIPS Reflector Bar, PIN MIPSD-069-y', where y is the part specific configuration - 1, -2 -3 or -4, 'Lot No. xxxx, Acceptable.' For lot number identification, reference paragraph 5.0. Store container on appropriate shelf of N<sub>2</sub>-purged desiccator.

In a similar manner, but in a separate location, label and store reject bars. On the label, record the word 'reject'.

6.6 Summarize on the Inspection Sheet the Reflector Bar Lot Status

- 6.6.1 Complete an M11I31-A Incoming Inspection Sheet to summarize the results of the visual examinations and measurements performed on the lot of reflector bars.
- 6.6.2 Advise the process lead engineer of the status of the lot of bars. Place all vendor-supplied paperwork and the inspection sheet in the process files.

MIPS Reflector Bar (PIN MIPS-D-069) Incoming Inspection Sheet  
Document No. M11131-A

Lot No: \_\_\_\_\_ Operator: \_\_\_\_\_ Date: \_\_\_\_\_

Vendor: \_\_\_\_\_ U A Purchase Order No: \_\_\_\_\_

1. Outer Packaging: No damage noted  Comments:  
Damage noted

2. Quantity of Reflector Bars Ordered/Received:

Configuration: -1 \_\_\_\_/\_\_\_\_; -2 \_\_\_\_/\_\_\_\_; -3 \_\_\_\_/\_\_\_\_; -4 \_\_\_\_/\_\_\_\_

3. Dimensional Measurement:

Length & Width: Instrument Used \_\_\_\_\_ Calibration Date \_\_\_\_\_

Thickness: Instrument Used \_\_\_\_\_ Calibration Date \_\_\_\_\_

SPECIFICATIONS

(a)

PARAMETER	CONFIGURATION			
	-1	-2	-3	-4
Length (L) (Inches)	1.501-1.499	1.301-1.299	1.301-1.299	1.301-1.299
Width (W) (Inch)	.101-.099	.081-.079	.061-.059	.041-.039
Thickness (t) (Inch)	.0232-.0227	.0232-.0227	.0232-.0227	.0232-.0227

(b) Surface to surface perpendicularity & parallelism: ≤ .001 inch

<u>Lot Inspection Summary</u>				
Configuration	-1	-2	-3	-4
Quantity Acceptable	<div style="display: flex; justify-content: space-around;"> <span>_____</span> <span>_____</span> <span>_____</span> <span>_____</span> </div>			
Quantity Reject	_____	_____	_____	_____
Primary cause for rejection:				
a. out of spec dimension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. chips or contamination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. lifting/peeling metallization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1. MIPS Reflector Bar (PIN MIPS-D-069) Incoming Inspection Sheet