PREPARED BY:	***Multiband Imaging Photometer for SIRTF***	NUMBER M11I40	
C. DAVIDSON		TYPE INSPECTION	
APPROVALS			
ENGINEERING	University of Arizona Steward Observatory, IR Group	DATE 07/07/97	
QUALITY	**SPECIFICATION**	SUPERSEDES SPEC. DATED	
PI/DEPUTY PI		REV. NEW	PAGE 1 of 7

TITLE

INCOMING INSPECTION OF 4 X 32 MODULE FRAME (P/N MIPSD – 049) PROCEDURE FOR

1.0 SCOPE

This specification defines the equipment, materials and procedures for incoming inspection of the 4x32 Module Frame, PIN MIPSD-049, which will be used in the build of the MIPS 32x32 Ge: Ga 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 frames meet the specifications of drawings MIPSD-049.

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.

University of Arizona, Steward Observatory, IR Group

M43P10	Configuration Management and Document Control

Drawings

MIPSD-049	Frame, 4x32 Module

Manual

University of Arizona Safety Manual

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
5	1 each	Gauge, frame-fit check

4.2 Materials

Item	Quantity	Description
1	as received	4x32 Module Frame, PIN MIPSD-049
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	as required	Wipes, cleanroom

5.0 PROCEDURAL REQUIREMENTS

Incoming inspection of the 4x32 module frames is to be performed and tracked on a lot basis. The lot number to be recorded on the lot inspection summary sheet, document no. M11I40-A, (see figure 1) is to be the lot number which is designated by the vendor on the shipper accompanying the parts or on other vendor supplied documentation. If the vendor does not provide a lot number, then the U of A purchase order number followed by the date the frames were received will be used as the lot number.

A unique 3-digit serial number is to be inscribed on the frame (reference drawing number MIPSD-049 for scribe location). The serial number is to be assigned in accordance with the MIPS configuration management system. The serial numbers will be sequential. There will be no duplication or re-use of a serial number. All relevant documentation is to be traceable to a module frame by means of its serial number and lot number.

Inspection, measurement data and other pertinent information for each frame is to be recorded on an individual inspection sheet, M11I40-B.

Frames which fail to meet the acceptance requirements will be stored separately from those that do meet acceptance requirements.

6.0 PROCEDURE

Notes:

1. Handling, storage and disposal of chemicals are to be in accordance with the of 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 Frames

6.1.1 Inspect the outer packaging for signs of damage incurred during transport. Record the results on the appropriate inspection sheet, document no. M11I40-A/B.

6.1.2 Carefully remove outer packaging and remove contents and paperwork. With a cleanroom wipe dampened with isopropanol, wipe the inner packaging that covers the frames or that covers the container of frames. If the container(s) is not within plastic bags or other packing material, wipe down the containers, taking care not to obscure label information. Place the paperwork in cleanroom bags. Transport the frames and paperwork to the cleanroom.

6.1.3 Verify that the quantity of frames on the shipper and/or other 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 called out on the purchase order.

6.2 Examine Frame for Contamination and Defects.

6.2.1 Place the frame onto a clean microscope stage. Under microscope magnification, verify to first order that the frame is to drawing MIPSD-049.

6.2.2 Inspect the frame for gross contamination. Using dry N_2 or air from a blow gun, blow particles from the surfaces of the frame. If gross contamination is present, clean the frame by flushing it for a minimum of 20 seconds each with acetone, methanol then isopropanol. Blow the wafer dry with dry N_2 or air.

Notes:
1. To prevent redistribution of contaminants or possible solvent residue from remaining on the frame, keep the frame wet with solvents until it is blown dry.
2. The frame may be ultrasonically cleaned in isopropanol, then flushed with isopropanol and blown dry.

6.2.3 Under microscope magnification, verify that the frame is free of gross contamination. Examine the frame for lifting or peeling of the nickel/gold (Ni/Au) metallization which has been plated over the entire frame. Record results on appropriate inspection sheet M11I40-A/B.

If the contamination is still present or the frame does not meet the metallization requirements of drawing MIPSD-049, reject the frame and label and store the frame appropriately.

6.3 Verify the Frame Dimensions

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

6.3.1 Using a 3-axes measuring microscope, make the measurements called out in the inspection sheet. Each parameter is to be measured at three different locations, and a minimum of three measurements is to be made at each location. For frame acceptance, the average of the measurements for a parameter must fall within the specification range identified on the drawing and on the inspection sheet.

Note: Position and diameter of the 4 through holes and 2 holes bored for guide pin alignment may be verified by a fit check using the frame-fit gauge.

6.4. Lot Acceptance Verification.

Visually examine and measure each frame per paragraphs 6.2.1 through 6.3.1.

6.5 Inscribe a Serial Number on the Frame.

6.5.1 Using a diamond scribe or other scribe tool, scribe a 3-digit number into the front–end thickness edge of the frame as identified in drawing MIPSD-049.
Note: Per paragraph 5.0, the serial number is to unique for each frame.

6.5.2 Clean the frame to remove metallization and molybdenum particles generated by the scribing operation. Flush the frame with solvents per paragraph 6.2.2 and blow the frame dry with dry N_2 or air from a blow gun. Alternatively, ultrasonically clean the frame in isopropanol for a minimum of 2 minutes then flush with isopropanol and blow dry.

6.5.3 Under microscope magnification, verify all surfaces of the board are free of contamination and any other features which would render it unusable for process continuation.

6.6 Store the Frames.

Place acceptable frames in a clean storage container. Cover the container and label the cover: 'MIPS 4x32 Module Frame, PIN MIPSD-49, Lot No. xxxx, Serial Number yyy, Acceptable.' For lot number identification, reference paragraph 5.0. Store container on appropriate shelf of N_2-purged desiccator.

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

6.7 Verify Inspection Documentation is Complete.

6.7.1 Verify that each of the frame inspection sheets (M11I40-B) has been filled out completely.

6.7.2 Summarize the results of inspection and measurement of the individual frames on the lot incoming inspection sheet, M11I40-A.

6.7.3 Advise the process lead engineer of the status of the lot of frames. Place all vendor-supplied paperwork and the inspection sheets in the process files.

MIPS 4x32 Module Frame (PIN MIPSD-049) Lot Incoming Inspection Sheet
Document No. M11I40-A

Lot No: _____ Operator: _____ Date: _____

Vendor: _____ U A Purchase Order No: _____

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

2. Quantity of Frames Ordered: _____; Quantity Received: _____

3. Lot Inspection/ Measurement Summary:

Quantity Acceptable Frames: _____

Quantity Rejected Frames: _____

Primary cause for rejection:
a. out of spec dimension ☐
b. chips or contamination ☐
c. lifting/peeling metallization ☐
d. other ☐

Figure 1. MIPS 4x32 Module Frame (PIN MIPSD-049) Incoming Inspection Lot Summary Sheet

MIPS 4x32 Module Frame (MIPSD-049) Incoming Inspection/Measurement
Document Number M11I40-B

Lot Number: _____ Frame Serial Number: _____

1. Per Visual Inspection: ACCEPT ☐ REJECT ☐
Cause for rejection: _____

2. Measurement

Equipment Used: _____; Calibration Date: _____

Frame Fit Gauge Used YES ☐ Gauge ID. _____; NO ☐

If yes, ACCEPT ☐ REJECT ☐

MEASUREMENTS

Note: If frame fit used, measure only f-f' and g-g'

	a - a'	b – b'	c – c'	d – d'	e – e'	f – f'	g – g'
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
(avg)	_____	_____	_____	_____	_____	_____	_____
(spec:	2.041-2.039	1.791-1.789	.281-.279	.751-.749	1.651-1.649	1.515-1.505	1.021-1.019 inch)

4x32 MODULE FRAME ACCEPT ☐ REJECT ☐

Figure 2. 4x32 Module Frame Incoming Inspection/Measurement Sheet