

## REVISIONS

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Drawn: M. Smith <i>M. Smith</i>	<i>12-18-95</i>	<b>HANDLING, STORING AND SHIPPING OF ACIS CCDs AND THE FOCAL PLANE, SUBASSEMBLY</b>			
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# **PACKAGING, SHIPPING, STORAGE, AND HANDLING OF FLIGHT CHARGE COUPLED DEVICES AND THE FLIGHT FOCAL PLANE, SUBASSEMBLY**

## **1.0 SCOPE**

The purpose of this procedure is to document requirements for handling, packaging, labeling, transporting, and storing Charge Coupled Devices (CCDs), part no.36-02308, and the Focal Plane, Subassembly part no. 36-10104.01 which may be used for flight on ACIS.

## **1.1 OBJECTIVE**

Implementation of these procedures will help to prevent CCDs and the flight Focal Plane, Subassembly from sustaining electrostatic discharge damage, contamination, environmental, and physical damage during packaging, shipping, and storage. In addition, it will provide a method of accountability for critical flight CCDs and the Focal Plane, Subassembly.

## **2.0 REFERENCE DOCUMENTS**

The following documents form a part of this procedure to the extent specified herein

### MIT/CSR

36-01207	ACIS Contamination Control Plan
36-01316	Clean Tent Dressing, behavior, and material Handling, Procedure for
36-01321	Installing Optical Witness Samples, Procedure for
36-02308	Charge Couple Device
36-10104.01	the Focal Plane, Subassembly
99-01003	Handling for Static Sensitive Electronic Parts

### MIT/LL

S-427850	CCD Array & Shipping container Assembly
C-427871	Test, Handling Fixture Container
S427862	CCD Shipping Container

### US Government

FED-STD-209	Airborne Particulate Cleanliness Classes in Cleanrooms
MIL-STD-1246	Product Cleanliness Levels and Contamination Control
MMI-6400.2A	Packaging, Handling, and Moving of Program Critical Hardware

### **3.0 PROCEDURES**

#### **3.1 CCD's for Flight Hardware**

##### **3.1.1 LINCOLN LABORATORY**

Charge Coupled Devices (CCDs)/flex print assemblies are manufactured at Lincoln Laboratory (LL). Those CCD/flex print assemblies which are considered flight worthy by LL are delivered to MIT/ CSR for further testing and selection by the ACIS Science Team.

**3.1.1.2** Packaging and Packing shall be sufficient to protect the CCD/flex print assemblies from damage. LL drawing S-427862 and C427871 detail dedicated containers to be used during transport and storage of each CCD/flex print assembly. The CCD holding/test fixtures are to be cleaned to a process proven to meet level 100A, per MIL-STD-1246. Dedicated shipping containers are to be double bagged and sealed using Aclar 22C inner and Nylon 6 outer bag, or equivalent(both clean to level 50A per MIL-STD-1246), to prevent ESD, particulate, and molecular contamination. Also each bag shall be purged with dry nitrogen prior to sealing. The serial number of the CCD enclosed is to be visible from the outside of each bag. Bagging shall take place in a class 1000 or cleaner work area. Further packaging can be done using ESD approved bubblepack, etc. as deemed necessary. Apply a label that states "CONTAMINATION SENSITIVE Open in Cleanroom Only", or equivalent information, on the outermost package. The packaged CCD's are then to be put inside a suitable carrying case(suitcase or equivalent).

**3.1.1.3** The necessary travel and shipping documentation shall be placed inside the carrying case. A label identifying the CCD as "FLIGHT Hardware", as applicable, shall be placed on the exterior carrying case.

**3.1.1.4** Care shall be taken to protect the CCD/flex print assemblies from damage due to Electrostatic Discharge (ESD). ESD precautions are contained in MIT/CSR document 99-01003, Handling for Static Sensitive Electronic Parts. Place an ESD sticker on the outermost package.

##### **3.1.2 TRANSPORTATION**

Transportation of flight worthy CCD/flex print assemblies shall be by the hand carry method only. CCD/flex print assemblies shall be moved from LL to MIT/CSR receiving inspection, prior to testing by the ACIS Science Team.

### 3.1.3 MIT RECEIVING INSPECTION

MIT/CSR receiving inspection will record the receipt of CCD/flex print assemblies and track their movement and location. CCD carrying cases can be opened at receiving inspection to verify quantity and serial number using information from the paperwork. The package can then be transferred to the smaller carrying case for transport to building 37 for calibration testing. A label identifying the CCD as "FLIGHT Hardware" shall be affixed to the outer portion of the carrying case. **No bagging material is to be opened by inspection without consultation from the Contamination Control Engineer.**

### 3.1.4 MIT CALIBRATION TESTING

Remove the CCD shipping container from its bag material per MIT document 36-01316, Cleantent Dressing, Behavior, and Material Handling. Flight worthy CCD/flex print assemblies will be stored in an approved dry box in a Class 100 cleantent in building 37 awaiting calibration and selection by the MIT ACIS Science Team.

Handling of the CCD shall be per standard CCD test handling procedures and MIT document 36-01321, CCD Vacuum Chamber Installation Procedure.

- 3.1.4.1** After CCD/flex print assemblies are calibrated and selected and deemed flight worthy, they will be repackaged using a dedicated shipping container. All hardware used to secure the shipping container and fixture shall be UV and Visibly clean per cleaning procedure 36-01320. Dedicated shipping containers are to be double bagged and sealed using Aclar 22C inner and Nylon 6 outer bag, or equivalent(both clean to level 50A per MIL-STD-1246), to prevent ESD, particulate, and molecular contamination. Bagging shall take place in a class 100 work area. Also, each bag shall be purged with dry nitrogen prior to sealing. Further packaging can be done using ESD approved bubblepack, etc. as deemed necessary. The serial number of the CCD shall be visible from the outermost bag. Place an "ESD" sticker and "CONTAMINATION SENSITIVE Open in Cleanroom Only" sticker on the outermost bag and place inside suitable carrying case(suitcase or equivalent).

All identification and documentation shall be placed inside the carrying case, or hand carried. The exterior of the carrying case shall have a label identifying the CCD as "FLIGHT Hardware".

### **3.1.5 TRANSPORTATION/INSPECTION**

Flight CCD/flex print assemblies shall be delivered to LL via MIT/CSR via receiving inspection. Transportation shall be by a qualified individual via the hand carry method only. MIT/CSR receiving inspection will record the receipt of CCD/flex print assemblies from the science team and track their movement and location. CCD carrying cases can be opened at receiving inspection to verify quantity and serial number using information on the paperwork. Inspection shall transfer the CCD package from the smaller carrying case to the larger one for transportation to Lincoln Laboratory. **No bagging material is to be opened by inspection without consultation from the Contamination Control Engineer.**

### **3.1.6 LINCOLN LABORATORY**

**Under no circumstances shall X-Ray sensitive areas of CCD/Flex assemblies be cleaned after return to Lincoln Labs without prior consultation with and approval from the CSR Science Team.**

## **3.2 FOCAL PLANE, SUBASSEMBLY**

### **3.2.1 LINCOLN LABORATORY**

LL will install flight CCD/flex print assemblies onto the Focal Plane, Subassembly, 36-10104.01. After CCD installation, the Focal Plane, Subassembly will be treated as a Program Critical Hardware per MMI 6400.2. In addition the Focal Plane, Subassembly will be treated with concern for ESD protection and Contamination.

**3.2.1.1** Care shall be taken to protect the flight Focal Plane, Subassembly from damage due to Electrostatic Discharge (ESD). ESD precautions are contained in MIT/CSR document 99-01003, Handling for Static Sensitive Electronic Parts.

**3.2.1.2** Packaging and Packing shall be sufficient to protect the flight Focal Plane, Subassembly from damage. LL drawing, S-427850, details dedicated containers to be used during transport and storage. Dedicated containers are to be double bagged and sealed using Aclar 22C inner and Nylon 6 outer bag, or equivalent (both clean to level 50A per MIL-STD-1246), to prevent ESD, particulate, and molecular contamination. Also each bag shall be purged with dry nitrogen prior to sealing. This is to be performed in a Class 1000 or cleaner work area. Additional packaging media shall be used as deemed necessary. Apply an ESD sticker on the outermost bag of the packaging media. Also the following label shall be on

the outermost packaging media, "CONTAMINATION SENSITIVE Open in Cleanroom only". Dedicated Focal Plane, Subassembly fixtures are to be cleaned to a process that meets level 100A, per MIL-STD-1246.

**3.2.1.3** The exterior carrying case shall be labeled "FLIGHT Hardware", if they are deemed Flight Hardware. In addition a label shall be identified on the outer bag "Critical Space Item, Handle With Extreme Care", NASA label 1368. In addition MSFC FORM 362, PACKAGING AND HANDLING AND TRANSPORTATION RECORD SHALL BE ATTACHED TO THE OUTER PORTION OF THE CARRYING CASE OR SHIPPING BOX.

### **3.2.2 TRANSPORTATION**

Transportation of the flight Focal Plane, Subassembly shall be by a CERTIFIED individual, PER MMI 6400.2, via the hand carry method only. The flight Focal Plane, Subassembly shall be transported from LL to MIT/CSR receiving inspection.

### **3.2.3 MIT RECEIVING INSPECTION**

Inspectors shall read form MSFC 362 located on the outside of the shipping container.

MIT/CSR receiving inspection will record the receipt and removal of the flight Focal Plane, Subassembly. The flight Focal Plane, Subassembly carrying case can be opened at receiving inspection (only after the MSFC 362 form has been read) to verify quantity and serial number using information from the enclosed paperwork. **NO BAGGING MATERIAL IS TO BE OPENED BY INSPECTION WITHOUT APPROVAL FROM THE CONTAMINATION CONTROL ENGINEER.**

### **3.2.4 STORAGE**

Opening the flight Focal Plane, Subassembly from its exterior bag shall be per MIT document 36-01316, Cleantent Dressing, Behavior, and Material Handling. The flight Focal Plane, Subassembly shall be stored with the inner bag still sealed, inside the drybox in the ACIS assembly cleantent until needed for assembly.

Opening the inner bag in areas other than class 100 cleanrooms will be cause of rejection and review due to possible contamination to the flight Focal Plane, Subassembly, and may severely impact the ACIS Program.

The flight Focal Plane, Subassembly shall also be stored in the drybox inside the cleantents in a clean, ESD safe, bag made from NMD FR#100 NPAI-N, at all times during storage.