



GODDARD SPACE FLIGHT CENTER

GSFC STI PUBLIC DISCLOSURE EXPORT CONTROL CHECKLIST *CONTINUED*

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Edwin J Grayzeck 690.1

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Edwin J Grayzeck

Signature

Sept 28, 2005

Date

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REQUEST FOR ITAR 125.4(b)(13) EXEMPTION – Technical data

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Thomas A. Weisz, Code 232 234

Center Export Administrator (CEA)

Thomas A. Weisz

Signature

9/28/05 mj

9/28/05
Date

If your STI, ITAR, or EAR disclosure does not satisfy any of the above exemptions, please contact the GSFC Export Control Office for further clarification on the releasability of your information under the ITAR or EAR.

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1. INTRODUCTION

This procedure supports the DI CCDsensor during test and integration by providing a general test of the FPA environment prior to the application of power.

2. APPLICABLE DOCUMENTS

The following documents form a part of this procedure to the extent specified herein. Unless a specific issue or revision is listed, these documents shall be of the latest issue or revision in effect at the time of the test. In the event of a conflict between this procedure and the reference documents, the contents of this procedure shall govern.

2.1. DEEP IMPACT PROGRAM DOCUMENTS / DRAWINGS

- 561177A Deep Impact Instruments Requirements Specification
- SPS 3096 Electrostatic Discharge Protection, Components & Assemblies Sensitive to 50 Volts or less
- SPS 2780 Cleaning and Contamination Control, Marking and Packaging, Deep Impact
- 561146 Contamination Control Plan
- 561286 Deep Impact Integration and Test Plan
- 568640 Instrument Test Operations Console, Deep Impact

3. TEST CONDITIONS AND REQUIREMENTS

3.1. PRECAUTIONS

Failure to follow the procedures contained in this document may result in damage to flight hardware.

3.1.1. ESDS Equipment. (If Applicable)

The test specimen contains electrostatic-discharge sensitive (ESDS) devices that may be exposed at the electrical interfaces. Therefore, it shall be handled per MIL-STD-1686 Class 1, as implemented by SPS 120211. The test specimen, the test operator (using wrist straps), and related electrical test equipment shall be connected to a common ground before any electrical connecting or disconnecting operations, and during the use of any electrical test equipment probes. The following requirements are important:



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- A. All personnel within 1 meter of the Instrument or Electronics, and all related test equipment shall be connected to a common ground at all time.
- B. An ionizing blower shall be in place and operating whenever static generators such as nylon sheeting or paper are within one meter of exposed electrical interfaces.
- C. Under no circumstances shall connections be made to the unit under test while power is applied.
- D. Test cables and equipment shall have all pins shorted to equal potential (or ground) prior to being connected to ESDS hardware. This requirement shall be met by using shorting devices on applicable connectors prior to mating.

3.1.2. Proof Load Certification

All equipment to be used for flight hardware lifts shall have current proof load certification. If certification paperwork does not exist, or is out of date, proof load testing must be performed, using a technique appropriate for the device in question. Immediately prior to use, each such device shall be visually inspected for damage. Any hardware exhibiting cracks, or any cable having parted strands, or any similar defects, shall be disposed of and replaced or documented on an MDR, regardless of its state of certification.

3.1.3. General Precautions for Connectors:

- A. Connector savers shall be used on all flight hardware electrical connectors as specified in the Deep Impact Connector Guidelines.
- B. Flight hardware electrical connectors shall be capped with ESD approved covers when they are not in use, to minimize contamination, and to prevent damage from electrostatic discharge.
- C. Before mating any connector, examine the connector to assure that there is no interference or visible contaminants at the pin or socket interface. Notify QA if connectors exhibit any problems.
- D. Extreme care shall be exercised should connectors need to be probed at any time, and the following precautions taken:
 - The probing pin shall be a mating pin or socket that is insulated to prevent shorting.
 - The probing pin shall be gold plated, or of a non-marring smooth surface.

3.2. SAFETY REQUIREMENTS

In accordance with the Reliability, Parts and System Safety Handbook SP0031A-014, the System Safety Engineer or his delegate has final authority over safety provisions contained in this procedure, and in controlling any hazardous conditions which may arise during any operations performed in accordance with this procedure.



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3.2.1. Responsibility for Safety.

All personnel are responsible for maintaining a safe work environment. The Test Conductor or cognizant operator shall assure that appropriate safe practices are implemented during these operations, and that operations are performed in a proper order.

3.2.2. Test Readiness Reviews

Prior to the commencement of any activities detailed in this document, and again at each shift change, the Test Conductor or cognizant operator shall conduct a pre-test briefing. Also, immediately prior to each hazardous sequence of operations, the Test Conductor or cognizant operator shall conduct a pre-task briefing. Both the pre-test and pre-task briefings shall include a discussion of:

- A. Test sequence, objectives, and equipment.
- B. Nature and location of the specific hazards to be encountered.
- C. Hazard controls, including protective equipment, safety boundaries, personnel access, etc.
- D. Limitations on concurrent activity.
- E. Emergency instructions and response, and, when the situation warrants, the availability of emergency shutdown procedures.

3.2.3. Caution and Warning Notations

In this procedure follow these definitions:

- **Caution:** Operational step, etc., which if not adhered to or observed could result in damage to the equipment;
- **Warning:** Operational step, etc., when not adhered to or observed, could result in loss of life, personal injury, or exposure.

3.2.4. Mechanically Assisted Lift Hazard

Severe damage to personnel and flight hardware may result if lifting fixtures are excessively loaded. Lifting hardware shall never be used in a configuration that may apply loads greater than the working load that is clearly marked on each piece of lifting hardware. Never use lifting hardware that is not marked with a working load and proof test date. A properly certified crane operator shall control the lift.

3.3. CLEANLINESS AND ENVIRONMENT

Except as provided herein, these operations shall be conducted in a Class 10,000 or better clean area as defined in FED-STD-209B, and as implemented by BATC process standard BPS 21.04. Cleanliness of the test units shall be established and maintained per BATC specification SPS 2780.



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Standard laboratory conditions of atmospheric temperature (18 to 28°C), pressure (520 to 810 torr), and relative humidity (25 to 70 percent) are acceptable for the operations defined herein.

3.4. CONTROLLED REDLINE PROCEDURES

BATC DEEP IMPACT test procedure change control shall be implemented in compliance with DEEP IMPACT QWI.


- A. Any testing of flight hardware shall be required to be done in accordance with a test procedure that has been formally released prior to the start of the applicable test. This means that test procedures must be released through BATC Engineering Document Control prior to use.
- B. Once the test procedure is released, it may be changed in compliance with WI Test.4.3.005 Controlled Redline Test Procedure. Such changes may also be made during the test.
- C. Such changes must be approved by the following personnel:
Minor Changes: Test Engineer and Quality Engineer.
Major Changes: Test Engineer, Quality Engineer and Responsible Design Engineer and/or Systems Engineer (As determined by QE)
- D. The "AS-RUN COPY" of the test procedure containing such changes is controlled by the Test Engineer.
- E. Subsequent to completion of the applicable test, but before final buyoff of that test in the applicable Certification Log, the redline changes to the "AS- RUN COPY" test procedure shall be incorporated in a formal revision of the test procedure. (Note: At the discretion of the program the final Spacecraft Integration procedures may not be updated.)

4. QUALITY ASSURANCE PROVISIONS / TEST MANAGEMENT RESPONSIBILITIES

4.1. QUALITY ASSURANCE PROVISIONS


QA provisions operative during activities defined in this procedure are derived from the DEEP IMPACT Product Assurance (PA) Plan and the DEEP IMPACT Quality Work Instructions (QWI) document. These provisions, summarized below, identify the interfaces between QA and test personnel.

- A. The PEQA shall be notified, in advance, of performance of any activities described in this procedure. A QA Inspector shall be assigned to monitor those activities as is deemed necessary or appropriate, in accordance with the QWI. When required, QA shall notify the customer and/or government representatives, who may, at their option, monitor or witness the activity. The PEQA shall attend the "Ready-to-Test" meeting with assigned QA personnel, to assure QA support during the test, and to address and resolve outstanding QA items.

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- B. The PEQA shall assure that the proper "as-run copy" of this procedure document has been prepared, and that the required Cert Log is in proper order. When all pre-test conditions have been met, the PEQA shall complete the "Ready-to-Test" entry in the applicable Cert Log.
- C. During testing, the PEQA shall approve, **prior to its implementation**, any major changes to the test procedure involving actual testing deviation, test set-up, measurement methodology, or tolerance changes, along with the cognizant design engineer and the Test Conductor.
- D. Test Support provided by the QA Inspector shall be as follows:
- Verify that calibration is current for test and measuring equipment in accordance with QSP 11.1 " Selection, Maintenance, and Control of Inspection, Measuring, and Test Equipment".
 - Verify that applicable lifting and handling GSE has been properly proof tested and tagged.
 - Assure that the proper change control practices are applied as described in section 3.4, which implements the applicable provisions of QSP 4.4 Design Changes.
 - Assist in assuring that the precautionary and safety requirements stated in sections 3.1 and 3.2 are met.
 - Assist in the inspection of test setups prior to application of power to a test specimen, and prior to any mechanism-assisted lifts or moves.
 - Prepare quality assurance test documents as applicable. In the Action Item List of the Certification Log, document any discrepancies or non-conformances noted during or after testing, and immediately notify the PEQA.
- E. At completion of the test, the PEQA/Inspector shall perform the following:
- Review all test data for completeness, and to verify that all measurements are within tolerances.
 - Assure that the resulting test data fulfills the test requirements of the end item.
 - Verify completion of any related action items and disposition of any related MDR's in the test Cert Log.
- F. Upon the occurrence of a test anomaly (any event that deviates from the planned procedures, exceeds normal variations, or generates unexpected data), operation of the test article shall be stopped immediately. All other test conditions and parameters shall be maintained (except as those conditions that may pose an immediate hazard).

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The Inspector and the Test Conductor shall review the anomaly. Minor, non-destructive, investigative troubleshooting that will not change the failure mode of the article under test, may be conducted by the Test Conductor, with PEQA concurrence. All troubleshooting shall be performed in accordance with QSP 13.1 Control of Nonconforming Product and WI PA.13.1.004 Test Anomaly Work Sheet (TAWS). If the anomaly is found to result from human error or test equipment problems that have not affected the test article, corrective action shall be taken and testing may continue. The PEQA will check the "continue test" box, the approval box, and sign the TAWS along with the Responsible Engineer.

- G. If a test anomaly cannot be resolved as described above, the PEQA shall be notified, and an appropriate entry shall be made in the Action Item List (AIL) portion of the Certification Log. The PEQA shall prepare a Material Discrepancy Report (MDR) and convene the Material Review Board (MRB) for action as specified in WI PA.13.1.002 "Completion of Material Discrepancy Report". The MRB convened to resolve an anomaly that occurred during testing shall include a representative of the project test group. Testing of the failed item shall then not continue without prior authorization from the MRB.

4.2. TEST MANAGEMENT RESPONSIBILITIES

4.2.1. INTEGRATION AND TEST MANAGER

The Integration and Test Manager shall have responsibility for the following:

- a. Delegate responsibility to conduct the SIM Alignment and Test Procedure or portions of this procedure to qualified personnel.
- b. Release of the Alignment and Test Procedure.
- c. Release of all required procedures, drawings, E.O.'s and other documents.
- d. Approve exceptions to requirements of this procedure, including facility ambient requirements.
- e. Availability and certification of required GSE.
- f. Approval on the final completion of the SIM Alignment and Test Procedure

4.2.2. TEST CONDUCTOR

The test conductor (T/C) as delegated by the Integration and Test Manager is assigned shift responsibility for the following:

- a. Verify that required flight hardware and GSE are available and certified for integration and alignment as described in this procedure.



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- b. Verify that GSE and other test equipment is available and calibrated where applicable and that calibration will not expire during performance of this procedure.
- c. Verify that required documentation is released, correct and complete. Documentation will include:
 - A copy of the latest revision of the Integration and Alignment Procedure
 - The Certification Log for the Instrument
 - The Assembly drawing for the FPA integration to the Telescope Assembly
 - All necessary prints, E.O.'s and other documents
- d. Verify that setup, integration and alignment are in accordance with the requirements of this procedure, including facility ambient conditions. Setup shall be verified by an independent observer and recorded in the Certification Log.
- e. Collect, identify and store all raw data generated during the procedure. Data storage will be placed in the Deep Impact program files and referenced in the Certification Log.
- f. Responsible for sign off, on completion, all integration and alignment process steps, torque values and / or other measured and recorded values as specified in this procedure in the Certification Log. The person who performed the operation shall perform sign off.
- g. Conduct the integration and alignment in a safe manner.
- h. Notify the Integration and Test Manager and QA monitor or PEQA if out of tolerance conditions occur. Flag out of tolerance conditions in the Certification Log.
- i. Supervise the troubleshooting and rework as required.
- j. Maintain a record in the Certification Log of all action items and ensure that all items are closed prior to final sign-off of the Certification Log.
- k. Notify the Integration and Test Manager and QA monitor or PEQA of completion of this procedure for data review and sign-off in the certification log.

The test conductor has the authority to change, in writing, the sequence of events of this procedure, during the conduct of this procedure, to facilitate availability of certain test equipment, flight hardware or personnel. The T/C is responsible for certifying that such deviations do not jeopardize the intent or the data integrity of this procedure.

The test conductor has the authority to substitute equivalent test equipment for those items called out in Section 6 of this procedure. The T/C is responsible for certifying that the substituted items are up-to-date in terms of their certification and that these substitutions do not jeopardizing the intent nor the data integrity of this procedure.



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5. TEST DESCRIPTION

5.1. TEST ARTICLE CONFIGURATION

The CCD as assembled may be in various states of configuration. The minimum requirement for this test is any combination of the CCD Detector/Mount Assembly (559559-500, -501 or -502), the CCD Signal processor (564317), the CCD Preamp and bias assembly (564325), the CCD Clock Driver assembly (564326) and the associated CCD cable assemblies (564377 and 564378). Specifically, these tests will be performed at the appropriate cable interfaces.

5.2. PERSONNEL

Test Conductor. In addition to functions described in Section 4.2.2, the test conductor monitors testing, fills out the log file in Section 6, and takes notes on any unplanned activities.


5.3. REQUIRED TEST EQUIPMENT

This section lists the test equipment, and other materials (or the equivalent materials as determined by the test conductor) required to perform the tests described in Section 7. If different from the listed equipment, the actual manufacture, model numbers and calibration or certification due dates for all items shall be recorded in the Certification Log.

All GSE, test equipment, and other materials must be QA and Clean Room approved as appropriate, and have current calibration status if applicable. The following items are required to perform this procedure.

5.4. TEST DESCRIPTION

The DI CCD safe-to-mate test is used to ensure that the proper signals will be supplied by examining the voltage level and clocking signals present at each pin of the CCD.

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5.5. TEST EQUIPMENT

The following test equipment (or equivalent, as determined by the test conductor) is required to perform the tests delineated in Section 7.2. Record actual model numbers and calibration due dates for applicable items on this form, *at the time of the test run*. Record certification due dates for any Deep Impact program GSE that is used.

EQUIPMENT	MFR.	MODEL NO.	ID	Cal / Cert Date
Oscilloscope	Tektronix	TDS540C40A	P115732	1/8/03
Multimeter	Wavetek	28XT	P118089	8/22/03
Break Out Bob (BOB)	Cablenet	S72378-500	SN/115	5/2/03
Connector Saver, 31 pin				
Connector Saver, 21 pin				
Connector Saver, 9 pin				
Connector Saver, 31 socket				
Connector Saver, 21 socket				
Connector Saver, 9 socket				
Cable Assembly, 31 Pin to 50 pin BOB		S72377-523	SN-03	11/11/03
Cable Assembly, 21 Pin to 50 pin BOB		S72377-515	SN-01	8/22/03
Cable Assembly, 9 Pin to 50 pin BOB		S72377-513	SN-01	8/22/03
Cable Assembly, 31 socket to 50 pin BOB		S72377-542	SN-01	8/23/03
Cable Assembly, 21 socket to 50 pin BOB		S72377-514	SN-07	8/22/03
Cable Assembly, 9 socket to 50 pin BOB		S72377-512	SN-01	8/22/03
Ionizing air blower	Simco	EMS000018	P186724	2/25/03
Wrist strap fault monitor		EMS000020		

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N/A for EMI/EMC

Ionizing air blower

simco

REWORK XT


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6. TEST SETUP

CAUTION !

The Deep Impact DI CCDdetector is static sensitive. Follow all precautions for handling Flight Hardware per SPS 3096 and PSP. Test Conductors and operators must be ESD certified. These ESD requirements must be followed!

1. Verify that QA has given an "OK TO TEST" in the Cert Log 11-26-02 
2. Turn on the Oscilloscope. Set it for the following conditions; (The oscilloscope setting may be adjusted to different values as required by the test conductor.)
 - a) Enable Channel 1, disable all other channels. ✓
 - b) DC coupling ✓
 - c) Vertical Scale 2.0V / div ✓
 - d) Horizontal scale 5us / div ✓
 - e) Trigger Auto ✓
 - f) Trigger Level 1.0v ±0.5v ✓
3. Turn on the 28XT multimeter and set to diode mode. Test for functionality. ✓

Note: In the following tables "OL" and or "Open" indicates a DMM overload reading for a diode measurement, i.e., the voltage reading is between 2.8 and 3.0 Volts.

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7. TEST PROCEDURE

The following sections may be performed out of sequence at the discretion of the test conductor. Figure 1 displays the cable / connector configuration for the safe-to-mate and shorts/Opens tests.

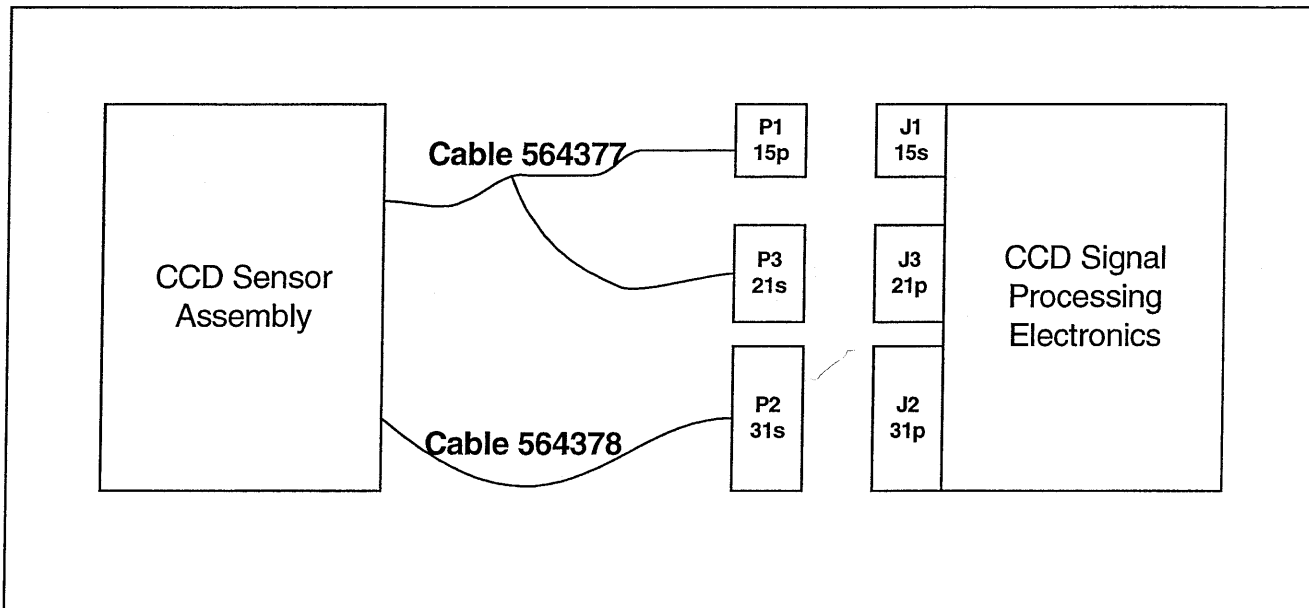


Figure 1. Cable / Connector Layout Diagram.

7.1. SAFE-TO-MATE SIGNAL VERIFICATION

Ensure that the requirements of SPS 3096 are in force.

1. Ensure that all shorting plugs are in place. ✓
2. Ensure that connector savers are in place on all test cables. N/A
3. Verify the Signal Processing Electronics are OFF. ✓
4. Inspect all pins and sockets on the signal processing electronics connectors for irregularities. ✓
5. Select and connect a BOB to 15-pin cable and connect to J1 Black on the BOB. ✓
6. Connect MDM cable end to the 15-socket connector to the signal processing electronics.
7. Connect a banana cable from the oscilloscope ground jack to BOB plug "Black 13".
8. Turn the Signal Processing Electronics ON.
9. Command 30 mode 1 images and repeat as necessary to complete measurements.
10. Using the channel 1 scope probe measure and record the voltages at the indicated BOB jack as shown in Table 7.1.

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Table 7.1 P1 (15 Sockets) Video, Ref. Jack 13

Signal Name	BOB Jack #	Required Value	Measured Value	Tolerance	Notes
VID_CH_A	01	0.0V	0.0	±0.0	
VID_CH_A_RTN	09	0.0V	0.0	±0.0	
VID_CH_B	03	0.0V	0.0	±0.0	
VID_CH_B_RTN	11	0.0V	0.0	±0.0	
VID_CH_C	04	0.0V	0.0	±0.0	
VID_CH_C_RTN	12	0.0V	0.0	±0.0	
VID_CH_D	06	0.0V	0.0	±0.0	
VID_CH_D_RTN	14	0.0V	0.0	±0.0	

P1 Safe-to-Mate test complete.

11. Turn the Signal Processing Electronics **OFF**. ✓
12. Remove the BOB to 15 pin cable from the setup. ✓
13. Remove the scope ground cable from "Black 13" and insert into BOB plug "Black 16". ✓
14. Select and connect a BOB to 21 socket cable and connect to J1 Black on the BOB. ✓
15. Connect MDM cable end to the 21-pin connector to the signal processing electronics. ✓
16. Turn the Signal Processing Electronics **ON**. preamp Δ DLH 11/26/02
17. Command 30 mode 1 images and repeat as necessary to complete measurements.
18. Using the channel 1 scope probe measure and record the voltages at the indicated BOB jack as shown in Table 7.2.

Table 7.2 P3 (21 Pins) Biases, Ref. Jack 16.

Signal Name	BOB Jack #	Required Value	Measured Value	Tolerance	Notes
VDDA	01	24.0V	24.0	±1.0	
Vddb	02	24.0V	24.0	±1.0	
VDDC	03	24.0V	24.0	±1.0	

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Signal Name	BOB Jack #	Required Value	Measured Value	Tolerance	Notes
VDDD	04	24.0V	24.0	± 1.0	
VRDA	05	13.5V	13.3	± 0.5	
VRDB	06	13.5V	13.3	± 0.5	
VRDC	07	13.5V	13.3	± 0.5	
VRDD	08	13.5V	13.4	± 0.5	
SFDD	09	24.0V	23.8	± 1.0	
LG	10	-3.0V	-2.0	± 1.0	
GND	15	0.0V	-0.1	± 0.0	
					No signal bleed through noted

1. These are nominal values based on the EM unit. Flight units may exhibit variation. The test engineer shall determine the validity of the measurement and then provide a brief narrative of the change at the end this section.

P3 Safe-to-Mate test complete.

19. Turn the Signal Processing Electronics **OFF**. ✓
20. Remove the BOB to 21 pin cable from the setup. ✓
21. Remove the scope ground cable from "Black 16" and insert into BOB plug "Black 17". ✓
22. Select and connect a BOB to 31 socket cable and connect to J1 Black on the BOB. ✓
23. Connect MDM cable end to the 31-pin connector to the signal processing electronics. ✓
24. Turn the Signal Processing Electronics **ON**. *preamp Δ DLH 11/26/02*
25. Command 30 mode 1 images and repeat as necessary to complete measurements.
26. Using the channel 1 scope probe measure and record the voltages at the indicated BOB jack as shown in Table 7.3.

Table 7.3 P2 (31 Pins) Clocks, Ref. Jack 17.

Signal Name	BOB Jack #	Required Value	Measured Value	Tolerance	Waveform / Notes
P11B / P12B	01	+5.0 / -9.0	+5 / -9.3	± 0.5 / +5, -0	
P11A / P12A	02	+5.0 / -9.0	+5 / -9.3	± 0.5 / +5, -0	
P21B / P22B	03	+5.0 / -9.0	+5 / -9.3	± 0.5 / +5, -0	
P21A / P22A	04	+5.0 / -9.0	+5 / -9.3	± 0.5 / +5, -0	

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	A	13993	574503	-
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Signal Name	BOB Jack #	Required Value	Measured Value	Tolerance	Waveform / Notes
P31B / P32B	05	+5.0 / -9.0	+5 / -9.3	± 0.5 / +5, -0	
P31A / P32A	06	+5.0 / -9.0	+5 / -9.3	± 0.5 / +5, -0	
S1	07	+5.0 / -5.0	+5 / -5.1	± 0.5 / +5, -0	
S2	08	+5.0 / -5.0	+5 / -5.1	± 0.5 / +5, -0	
S3	09	+5.0 / -5.0	+5 / -5.1	± 0.5 / +5, -0	
RST	11	0.0 / 10.0	0 / 10	± 0.5 / +5, -0	
SFDG	02 12	9.0 10.0	-9.4 / 5.2	± 0.5 / +5, -0	
TG	10	+5.0 / -9.0	5.0 / -9.4	± 0.5 / +5, -0	

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- 27. Remove the scope ground cable from "Black 17".
- 28. Turn the Wavetek 28XT Multimeter on and connect the meter common to BOB jack "Black 17".
- 29. Using the 28XT positive probe measure and record the measured reading at the indicated BOB jack as provided in Table 7.4.

Table 7.4 P2 (31 Pins) Grounds, Ref. Jack 17.

Signal Name	BOB Jack #	Required Value	Measured Value	Waveform / Notes
GND	18, 19	Short	✓ ✓	
	20, 21, 22	Short	✓ ✓ ✓	
	23, 24, 25	Short	✓ ✓ ✓	
	26, 27, 28	Short	✓ ✓ ✓	
SH_GND	13, 14, 29, 30	Open Short	✓ ✓ ✓ ✓	

DLH 11/26/02 per cable design

P2 Safe-to-Mate test complete.

- 30. Turn the Signal Processing Electronics OFF. ✓
- 31. Remove the multimeter ground cable from "Black 17". ✓
- 32. Remove the BOB to 31 pin cable from the set up. ✓

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<p>Ball Aerospace & Technologies Corp. Aerospace Systems Division</p>	SIZE	CAGE CODE	DWG. NO.	REV
	A	13993	574503	-
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		SHEET 16		

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Safe-to-Mate Test Complete.

7.2. CCD SHORTS/OPENS TEST PROCEDURE

Ensure that the requirements of SPS 3096 are in force.

1. Ensure that all shorting plugs are in place. ✓
2. Ensure that connector savers are in place on all test cables. *N/A*
3. Inspect all pins and sockets on the CCD sensor assembly cable connectors for irregularities. ✓
4. Select and connect a BOB to 15-socket cable and connect to J1 Black on the BOB. ✓
5. Connect MDM cable end to the 15-pin connector to P1 of CCD cable 564377. ✓
6. Connect a banana cable from the Wavetek 28XT multimeter ground jack to BOB plug "Black 13". ✓
7. Remove 564377 shorting plug. ✓
8. Using the 28XT positive probe measure and record the readings at the indicated BOB jacks as provided in Table 7.5.

12a Remove shorting plug 564377 ✓
 DLH 11/26/02 ✓

Table 7.5 P1 (15 Pins) Video, Ref. Jack 13

Signal Name	BOB Jack #	Required Value	Measured Value	Notes
VID_CH_A	01	OPEN	open	
VID_CH_A_RTN	09	SHORT OPEN	short	
VID_CH_B	03	OPEN	open	
VID_CH_B_RTN	11	SHORT OPEN	short	
VID_CH_C	04	OPEN	open	
VID_CH_C_RTN	12	SHORT OPEN	short	
VID_CH_D	06	OPEN	open	
VID_CH_D_RTN	14	SHORT OPEN	short	


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8a Install shorting plug 564377 ✓

P1 Shorts/Opens test complete.

9. Remove the BOB to 15 pin cable from the setup. ✓
10. Remove the multimeter ground cable from "Black 13" and insert into BOB plug "Black 16". ✓
11. Select and connect a BOB to 21 pin cable and connect to J1 Black on the BOB. ✓
12. Connect MDM cable end to the 21-pin connector to P3 of CCD cable 564377. ✓

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SCALE		NA	SHEET 17	

13. Using the 28XT positive probe measure and record the readings at the indicated BOB jacks as provided in Table 7.6.

Table 7.6 P3 (21 Sockets) Biases, Ref. Jack 16.


Signal Name	BOB Jack #	Required Value	Measured Value	Notes
VDDA	01	OPEN	open	
Vddb	02	OPEN	open	
VDDC	03	OPEN	open	
VDDD	04	OPEN	open	
VRDA	05	OPEN	open	
VRDB	06	OPEN	open	
VRDC	07	OPEN	open	
VRDD	08	OPEN	open	
SFDD	09	OPEN	open	
LG	10	OPEN	open	
GND	15	SHORT	short	

1. These are nominal values based on the EM unit. Flight units may exhibit variation. The test engineer shall determine the validity of the measurement and then provide a brief narrative of the change at the end this section.

P3 Shorts/Opens test complete.

- 14. Install 564377 shorting plug. ✓
- 15. Remove the BOB to 21-pin cable from the setup. ✓
- 16. Remove the multimeter ground cable from "Black 16" and insert into BOB plug "Black 17". ✓
- 17. Select and connect a BOB to 31-pin cable and connect to J1 Black on the BOB. ✓
- 18. Connect MDM cable end to the 31-pin connector to P2 of CCD cable 564378. ✓
- 19. Remove 564378 Shorting plug. ✓
- 20. Using the 28XT positive probe measure and record the readings at the indicated BOB jacks as provided in Table 7.7.

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	A	13993	574503	-
SCALE	NA	SHEET 18		

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Table 7.7 P2 (31 sockets) Clocks, Ref. Jack 17.

Signal Name	BOB Jack #	Required Value	Measured Value	Notes
P11B / P12B	01	OPEN	open	
P11A / P12A	02	OPEN	open	
P21B / P22B	03	OPEN	open	
P21A / P22A	04	OPEN	open	
P31B / P32B	05	OPEN	open	
P31A / P32A	06	OPEN	open	
S1	07	OPEN	open	
S2	08	OPEN	open	
S3	09	OPEN	open	
RST	11	OPEN	open	
SFDG	02 12	OPEN	open	
TG	10	OPEN	open	
GND	18, 19	SHORT	short	
GND	20, 21, 22	SHORT	short.	
GND	23, 24, 25	SHORT	short	
GND	26, 27, 28	SHORT	short	

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- 20a Install shorting plugs ^{564378 ✓} DLH 11/26/02
- 21. Remove the BOB to 31-pin cable from the setup. ✓
 - 22. Remove the multimeter ground cable from BOB. ✓
 - ~~23. Reconnect Shorting 564378 Plug. ✓~~

Shorts / Opens test complete.

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SIZE A	CAGE CODE 13993	DWG. NO. 574503	REV -
SCALE	NA	SHEET 19	