

**COS DCE BOOT FSW v1.13 Component Test Results  
Requirement 5.1.1.1b Initialize to Boot State After Reset**

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## 1. INTRODUCTION

### 1.1 PURPOSE

This document presents the Cosmic Origins Spectrograph (COS) Device Control Electronics (DCE) Flight Software (FSW) certification procedure. The purpose of this procedure is to verify that the FSW satisfies Software Requirements according to the method specified in the DCE FSW Test Plan (STP).

### 1.2 SCOPE

This test procedure comprises the steps necessary to verify that the FSW satisfies Software Requirements Document (SRD) paragraph 5.1.1.1 — Initialize to Boot State after Reset: Verify that DCE is in Boot State after a Watchdog Reset (WDR).

### 1.3 LIMITATIONS AND CONSTRAINTS

This test cannot be run in parallel with any other commanding activity directed at the DCE FSW (such as, for example, the periodic transmission of NOOP commands). Test hardware shall be visually inspected, and its configuration noted, prior to conducting this test.

### 1.4 PROCEDURE OVERVIEW

The procedure requires the `hks` tools running on the Sun SparcStation Electronic Ground Support Equipment (EGSE) whose network IP address is one of

**shorty.ssl.berkeley.edu**  
**taiyo.ssl.berkeley.edu**  
**ginger.ssl.berkeley.edu.**

Test time shall be scheduled in advance. The Test Conductor must be logged into the Unix system as user `eagcos`, and be commanding from the appropriate directory. This directory contains both the test script file and the shell script file; these two files control test execution. The test is conducted by invoking the shell script. This shell script in turn invokes the Perl 5 program `UniScript.pl`, which resides in its own distinct directory. The test procedure steps have been pre-recorded in the test script file, and are executed interpretively by the `UniScript` program. The shell script and test script are attached to this document as appendices. As `UniScript` executes the test script it sends results to the operator console and to two report files, which are also placed in the current directory. After completion of the test script, the Test Conductor can certify successful test

execution by examining the contents of the report files and determining that required outputs are present in them. Printed copies of the report files are attached to the manually completed checklist (Paragraph 4 below) as documentation of the test.

## 1.5 THEORY OF TEST

The script sends an `LFDRSTW` command to the DCE and `WAITS` 10 seconds. This command should induce program behavior in the FSW identical that occurring for a Watchdog Reset. At the end of the wait-period, the HK data are requested and examined. The `LFDOPERT` bit (3) of the `LFSBITS1` word should be 0, indicating that the FSW is operating in Boot State.

## 2. SPECIAL INSTRUCTIONS

### 2.1 QUALITY ASSURANCE

QA support is required to verify the configuration and setup environment as well as monitoring test steps and verifying results.

### 2.2 SAFETY

#### 2.2.1 Personal Safety

To ensure the safety of the test personnel during test execution the guidelines contained in Paragraph 3.4, Reference [1] will be adhered to.

#### 2.2.2 Test Article and Equipment Safety

To ensure the safety and well-being of the COS operations bench, SITS, and related test equipment, the following primary safety requirements will be in effect during the execution of this test procedure:

- If access within one (1) meter of COS bench electronics is necessary, wrist straps attached to technical ground shall be used by all personnel involved in handling of any COS test article. Overcurrent and overvoltage shall be set to remove power if nominal limits are exceeded.
- Emergency Power Shutdown — If, during the COS DCE FSW test, power is ON and a severe test equipment failure results in the power system exceeding specified limits, the Test Conductor shall direct or perform shutdown of power.

### 2.3 CONTAMINATION

All flight hardware shall be handled with clean latex gloves; it shall be covered with clean ESD material and/or stored in a clean flow-bench.

**3. SUPPORT REQUIREMENTS**

**3.1 PERSONNEL**

Execution of the COS DCE FSW certification procedure requires the following personnel (to be completed at the Test Readiness Review (TRR)):

Test Director: \_\_\_\_\_  
 Test Conductor: \_\_\_\_\_  
 Test Technician: \_\_\_\_\_  
 QA: \_\_\_\_\_

**3.2 TOOLS, EQUIPMENT, AND MATERIALS**

The following is a list of tools, equipment, or materials required in this test. Record manufacturer and model, metrology, or property numbers of equipment used, where appropriate. Record calibration due dates where appropriate.

Boot Mode ROM: schematic **27C256**

Engineering Ground Support Equipment (see paragraph 1.4). Indicate specific configuration:

EGSE			DCE		
<b>taiyo</b>	<b>shorty</b>	<b>Ginger</b>	<b>ETU</b>	<b>DCE #1</b>	<b>DCE #2</b>
X				X	

**3.3 DATA/SOFTWARE**

The following files must be available present:

**Table 3-1: Required Program and Data Files**

EGSE (shorty) Directory	File	Description
<b>\disks\galex\users\galex\tcs\uniscrpt\</b>	<b>UniScript.pl</b>	<b>UniScript</b> interpreter

\disks\galex\users\galex\tcs\uniscript\stp5_1_1_1b\	u	Shell script for this procedure
Ditto	stp5_1_1_1b.tst	Test script for this procedure (Appendix B)

In addition, the **hks** tools must be active. Directions for activating **hks** are given in UCB-COS-DOC-1118 (Paragraph 3.4, Reference [4]).

### 3.4 REQUIRED DOCUMENTATION

Reference	Document Number	Title
1	NHB 1700.1(V1-A)	<i>NASA Basic Safety Manual</i>
2	COS-03-0039	<i>DCE FSW Test Procedure 5.1.1.1b</i> (this document)
3	UCB-COS-008	<i>COS FUV Detector Software Test Plan</i>
4	UCB-COS-DOC-1118	<i>COS EGSE Startup Procedure</i>

## 4. PROCEDURE/TASK STEPS

### 4.1 PRE-OPERATION ACTIVITIES

#### 4.1.1 Make Sure that **hks** Tools Are Active

Follow the procedure given in Paragraph 3.4, Reference [4].

#### 4.1.2 Make Sure that the Proper ROM Is Installed

Visually verify that the ROM under test is installed: if EEPROM, in U18; if PROM, in U2 and U7.

#### 4.1.3 Log In to the EGSE

Step	QA	Operator Entry/System Response	Description
1		C:\tcs\us> <b>telnet shorty.ssl.berkely.edu</b>	Establish connection to shorty via Telnet client program
2		Login: <b>xxx</b> Password: -----	Using telnet window, login as user tcs

## 4.1.4 Set Current Directory

Step	QA	Operator Entry/System Response	Description
3		tcs@shorty% <b>cd ~galex/tcs</b> tcs@shorty% <b>pwd</b> /disks/galex/users/galex/tcs	Change current directory as shown

## 4.1.5 Slogin as eagcos

Step	QA	Operator Entry/System Response	Description
4		tcs@shorty% <b>slogin -l eagcos</b> <b>shorty.ssl.berkeley.edu</b> eagcos@shorty.ssl.berkeley.edu's password: ( <i>get from SSL personnel</i> ) Last login: Sat Oct 7 10:41:05 2000 from auntem.ssl.berke Sun Microsystems Inc. SunOS 5.8 Generic February 2000 You have mail. COS EGSE software version: devel	slogin as eagcos; get password from SSL personnel

## 4.1.6 Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		eagcos:shorty% <b>cd</b> <b>/disks/galex/users/galex/tcs/uniscript/stp5_1_1_1</b> <b>b</b> eagcos:shorty% <b>pwd</b> /disks/galex/users/galex/tcs/uniscript/stp5_1_1_1b	Change current directory as shown

## 4.1.7 Ensure that Proper Files are Present

Step	QA	Operator Entry/System Response	Description
6		eagcos@shorty% <b>ls -l</b> Total 12 -rw-r--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_1_1_1b.tst -rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u	List files; the <b>.tst</b> file and the shell script <b>u</b> should be present



4.2 OPERATION EXECUTION

4.2.1 Establish Initial Test Conditions

Step	QA	Operator Entry/System Response	Description
7		eagcos:shorty% <b>set path=(\$path ~dbb/scripts/bin)</b>	Set path as shown to enable access to hks tools

4.2.2 Execute the Script

Step	QA	Operator Entry/System Response	Description
8		<p>eagcos:taiyo% <b>sh u</b></p> <p>\$pstring=0,0,0,0,0,0,0,0</p> <p>Parameters are: Script File: stp5_1_1_1b</p> <p>#0: 0</p> <p>#1: 0</p> <p>#2: 0</p> <p>#3: 0</p> <p>#4: 0</p> <p>#5: 0</p> <p>#6: 0</p> <p>#7: 0</p> <p>Report file</p> <p>&gt;/disks/galex/users/galex/tcs/ver_1_13/stp5_1_1_1b/stp5_1_1_1b.rp1 successfully opened.</p> <p>Report file</p> <p>&gt;/disks/galex/users/galex/tcs/ver_1_13/stp5_1_1_1b/stp5_1_1_1b.rp2 successfully opened.</p> <p>Script file</p> <p>/disks/galex/users/galex/tcs/ver_1_13/stp5_1_1_1b/stp5_1_1_1b.tst successfully opened at level 0.</p>	<p>Shell to <b>u</b>. You should see the accompanying output as <b>UniScript</b> executes</p>

		"First 1-second wait ..."  LFDRSTW  "Second 1-second wait ..." WAIT 0: HKV0=1; HKV1=114; wc=1 "Test 5.1.1.1b Succeeded"	
--	--	---	--

4.3 POST-OPERATION ACTIVITIES

4.3.1 Copy Reports to PC Files and Print Them

Using an FTP client, copy the **u**, **stp5\_1\_1\_1b.tst**, **stp5\_1\_1\_1b.rp1**, and **stp5\_1\_1\_1b.rp2** files to appropriate PC files. Include these files as Appendices A, B, C, and D with this completed form.

4.3.2 Complete The Test Procedure Form

Ensure that all blank fields in this report are completed correctly and submit the completed report to QA.

SUMMARY SHEET

OPERATION TITLE: \_\_\_\_\_ WOA# \_\_\_\_\_

TEST ARTICLES IDENTIFICATION (including serial and/or part numbers):  
\_\_\_\_\_

TASKS/STEPS COMPLETED: \_\_\_\_\_  
\_\_\_\_\_

LOCATION: \_\_\_\_\_

TEST STARTED:	TEST TERMINATED
TIME: _____ Hr/Min	TIME: _____ Hr/Min
DATE: _____	DATE: _____

LOGS USED: \_\_\_\_\_

ANOMALY REPORTS GENERATED: \_\_\_\_\_  
\_\_\_\_\_

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

TEST CONDUCTOR: \_\_\_\_\_  
Signature/Date

QA REPRESENTATIVE: \_\_\_\_\_  
Signature/Date

## Appendix A. Shell Script u

```
#!/bin/sh
pkill cosnoopy
perl ../UniScript.pl stp5_1_1_1b "0,0,0,0,0,0,0,0"
cosnoopy&
```

---

## Appendix B. Test Script stp5\_1\_1\_1b.tst

```

; *****
; * DCE FSW Requirement 5.1.1.1b -- Initialize to Boot State after Reset *
; *****
; *****
; * Verify that DCE is in Boot State after a Watchdog Reset (WDR) *
; *****
ECHO      2
; *****
; * Wait 1 second for any in-progress reset to complete *
; *****
DTG       1,"(1) Verify that DCE is in Boot State after WDR"
DTG       1,"(2) First 1-second wait ..."
WTO       "First 1-second wait ..."
WAIT      1
; *****
; * Use LFDRSETP to create POR *
; *****
DTG       1,"(3) LFDRSETW being sent to create POR"
LFDRSTW
; *****
; * Wait 1 seconds for reset to complete, then read HK,      *
; * test bit LFDOPERT (16F4.03) of LFSBITS1 (0="Boot State") *
; *****
DTG       1,"(4) Second 1-second wait ..."
WTO       "Second 1-second wait ..."
WAIT      1,HK
LOG       1,LFDSWVER,LFSBITS1,LFDOPERT,LFDDIAGS
CHECK     1,((LFSBITS1 & LFDOPERT) == 0)
WTO       "Test 5.1.1.1b Succeeded"
;
;LFDDNLOD 0x1440,0x0400
;WAIT     1,HK
;RECV     1,0,0x0400
;LOG      1,1

```

Appendix C. Test Report stp5\_1\_1\_1b.rp1

```

                    55555      1      1      1
                    5      11      11      11
bbbb      ssss  ttttt  pppp  555      1      1      1
b  b      s      t  p  p      5      1      1      1
bbbb      sssss  t      pppp      5      1      1      1
b  b      s      t  p      5  5      1      1      1
bbbb      ssss  t      p      555  _____  111  _____  111  _____  111

```

Ver 01.13 Tue Jan 16 11:48:06 2001 "(1) Verify that DCE is in Boot State after WDR"

Ver 01.13 Tue Jan 16 11:48:06 2001 "(2) First 1-second wait ..."

Ver 01.13 Tue Jan 16 11:48:07 2001 "(3) LFDRSETW being sent to create POR"

LFDRSTW

Ver 01.13 Tue Jan 16 11:48:07 2001 "(4) Second 1-second wait ..."

```

Addr Addr HK-Name      Value
-----
16FE-16FF LFDSWVER      0113
16F4-16F5 LFSBITS1     0000

```

```

Addr Mask HK-Bit-Name  Value
-----
16F4 0008 LFDOPERT      0

```

```

Addr Addr HK-Name      Value
-----
1780-179F LFDDIAGS      011B 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000
17A0-17BF      0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000

```

```

CHECK: (($LFSBITS1 & $LFDOPERT) == 0)
eval:  ((0000 & 0008) == 0)

```

S U C C E S S

### Appendix D. Test Report stp5\_1\_1\_1b.rp2

				55555		1		1		1	
				5		11		11		11	
bbbb		ssss	ttttt	pppp	555	1		1		1	
b b		s	t	p p	5	1		1		1	
bbbb		sssss	t	pppp	5	1		1		1	
b b		s	t	p	5 5	1		1		1	
bbbb		ssss	t	p	555	_____	111	_____	111	_____	111

-----  
C O M M A N D P A C K E T  
-----

	PARM4		PARM3		PARM2		PARM1		PARM0
045AFFFF	04580000	0456FFFF	04540000	0452FFFF	04500000	044EFFFF	044C0000	044AFFFF	04480000
	SN		OPCODE						
0446FFFE	04440001	04420A0A	0440F5F5						

-----