

**COS DCE BOOT FSW v1.13 Component Test Results  
Requirement 5.1.2.1a Watchdog**

Date:	February 13, 2001
Document Number:	COS-03-0049
Revision:	Initial Release
Contract No.:	NAS5-98043
CDRL No.:	N/A

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## REVISIONS

Letter	ECO No.	Description	Check	Approved	Date
-		Initial Release			

<b>Original Release</b>		<b>THE UNIVERSITY OF COLORADO</b> At Boulder <b>The Center for Astrophysics and Space Astronomy</b>  COS DCE BOOT FSW v1.13 Component Test Results Requirement 5.1.2.1a Watchdog			
Name	Date				
Drawn: K. Brownsberger	2-13-01				
Reviewed:					
Approved:					
		Size	Code Indent No.	Document No.	Rev
		A		COS-03-0049	-
		Scale: N/A			

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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 5.1.2.1 — Watchdog.

### 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 SpareStation 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 issues two **PORS**, each followed by a one-second **WAIT**, to ensure that FSW is in the Boot State. It then issues **LFDWDOG 1** to enable WDRs, and **WAITS** 11 seconds. During this interval a WDR should occur. The script checks the HK variable **LFCTIME**, whose value should be < 10. It also determines that the code 001C is present in the diagnostic code stack.

## 1.6 TEST SCRIPT IMPLEMENTATION

### 1.6.1 Test Script Arguments

The script makes no use of parameters.

### 1.6.2 Test Script Coding

The script uses standard **UniScript** commands and directives.

## 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

- 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 present:

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

EGSE (shorty) Directory	File	Description
\disks\galex\users\galex\tcs\uniscrpt\	<b>UniScript.pl</b>	<b>UniScript</b> interpreter
\disks\galex\users\galex\tcs\uniscrpt\stp5_1_2_1a\	<b>u</b>	Shell script for this procedure
Ditto	<b>stp5_1_2_1a.tst</b>	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-03-0049	<i>DCE FSW Test Procedure 5.1.2.1a</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.berkeley.edu</b>	Establish connection to shorty via Telnet client program
2		Login: <b>xxx</b> Password: -----	Using telnet window, login as user <b>xxx</b>

## 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 <b>eagcos</b> ; 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_2_1</b> <b>a</b> eagcos:shorty% <b>pwd</b> /disks/galex/users/galex/tcs/uniscript/stp5_1_2_1a	Change current directory as shown



4.1.7 Ensure that Proper Files are Present

Step	QA	Operator Entry/System Response	Description
6		<pre>eagcos@shorty% ls -l Total 12 -rw-r--r--  1 tcs   eag   1398 Oct  8 18:03 stp5_1_2_1aa.tst -rw-r--r--  1 tcs   eag    62 Oct  9 17:44 u</pre>	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		<pre>eagcos:shorty% set path=(\$path ~dbb/scripts/bin)</pre>	Set path as shown to enable access to hks tools

4.2.2 Execute the Script

Step	QA	Operator Entry/System Response	Description
8		<pre>sh u  \$estring=0,0,0,0,0,0,0,0 Parameters are: Script File: stp5_1_2_1a                 #0: 0                 #1: 0                 #2: 0                 #3: 0                 #4: 0                 #5: 0                 #6: 0                 #7: 0  Report file  &gt;/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_1 a/stp5_1_2_1a.rp1 successfully opened. Report file  &gt;/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_1</pre>	Shell to <b>u</b> . You should see the accompanying output as <b>UniScript</b> executes

Step	QA	Operator Entry/System Response	Description
		a/stp5_1_2_1a.rp2 successfully opened. Script file  /disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_1a/ stp5_1_2_1a.tst successfully opened at level 0.  "Sending two PORs" "Sending LFDWDOG 1"  LFDWDOG ENABLE  "Waiting 11 seconds, followed by LFDNOOP"  LFDNOOP  WAIT 0: HKV0=2; HKV1=1; wc=5 WAIT 1: HKV1=0; wc=4 WAIT 1: HKV1=2; wc=3 "Test 5.1.2.1a completed successfully" eagcos:taiyo%	

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\_2\_1a.tst**, **stp5\_1\_2\_1a.rp1**, and **stp5\_1\_2\_1a.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  
kill cosnoopy  
perl ../UniScript.pl stp5_1_2_1a "0,0,0,0,0,0,0,0"  
cosnoopy&
```

### Appendix B. Test Script stp5\_1\_2\_1a.tst

```

; *****
; * DCE FSW Requirement 5.1.2.1a -- Watchdog *
; * ----- *
; * Verify DIAG001C is produced by WDR after 10 seconds *
; *****
;
SYM      ENABLE  =1
SYM      DIAG001C=0x001C
SYM      NSEC    =5
;
ECHO     2
;
DTG      1,"(0) Sending two PORs"
WTO      "Sending two PORs"
;
POR
WAIT     1
;
POR
WAIT     1
;
DTG      1,"(1) Sending LFDWDOG 1"
WTO      "Sending LFDWDOG 1"
;
LFDWDOG  ENABLE
;
DTG      1,"(2) Waiting 11 seconds, followed by LFDNOOP"
WTO      "Waiting 11 seconds, followed by LFDNOOP"
;
WAIT     11
LFDNOOP
WAIT     NSEC,HK
LOG      1,LFDOPERT,LFCTIME,LFDDIAGS
CHECK    1,($LFCTIME < 10)
DIAG     1,ANY,DIAG001C
;
DTG      1,"(3) Test 5.1.2.1a completed successfully"
WTO      "Test 5.1.2.1a completed successfully"

```

### Appendix C. Test Report stp5\_1\_2\_1a.rp1

```

                    55555          1          222          1
                    5           11         2  2         11
aaa          ssss  ttttt  pppp  555          1          2          1
a  a          s      t  p  p    5           1          2          1
aaaaa        sssss  t    pppp    5           1          2          1
a  a          s      t  p    5  5          1          2          1
a  a          ssss  t    p    555  _____  111  _____  22222  _____  111

Ver 01.13  Tue Jan 16 16:57:14 2001  "(0) Sending two PORs"
Ver 01.13  Tue Jan 16 16:57:16 2001  "(1) Sending LFDWDOG 1"
LFDWDOG  ENABLE
Ver 01.13  Tue Jan 16 16:57:16 2001  "(2) Waiting 11 seconds, followed by LFDNOOP"
LFDNOOP
Addr Mask HK-Bit-Name  Value
-----
16F4 0008 LFDOPERT      0
Addr Addr HK-Name      Value
-----
1680-1683 LFCTIME      00000001
1780-179F LFDDIAGS      011C 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
CHECK:  ($LFCTIME < 10)
eval:   (0001 < 10)

S U C C E S S
DIAG      1,ANY,DIAG001C
Found: DIAG001C == 28.

S U C C E S S
Ver 01.13  Tue Jan 16 16:57:29 2001  "(3) Test 5.1.2.1a completed successfully"

```

Appendix D. Test Report stp5\_1\_2\_1a.rp2

				55555		1	222	1
				5		11	2 2	11
aaa	ssss	ttttt	pppp	555		1	2	1
a a	s	t	p p	5		1	2	1
aaaaa	sssss	t	pppp	5		1	2	1
a a	s	t	p	5 5		1	2	1
a a	ssss	t	p	555	_____	111	_____ 22222	_____ 111

-----  
P O R P A C K E T  
-----

80000000  
-----

-----  
P O R P A C K E T  
-----

80000000  
-----

-----  
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	04480001
	SN		OPCODE						
0446FFFE	04440001	04420E0E	0440F1F1						

-----  
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						
0446FFFD	04440002	04427F7F	04408080						

-----  
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						
0446FFFC	04440003	04427F7F	04408080						

-----  
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
0446FFFB	04440004	04427F7F	04408080

---