COS DCE BOOT FSW v1.13 Component Test Results
Requirement 5.1.2.2a Command to Disable/Enable Watchdog

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<td></td>
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<td>Initial Release</td>
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</table>

**THE UNIVERSITY OF COLORADO**
At Boulder
The Center for Astrophysics and Space Astronomy

COS DCE BOOT FSW v1.13 Component Test Results
Requirement 5.1.2.2a Command to Disable/Enable Watchdog

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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 5.1.2.2 — Command to Disable/Enable 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 \texttt{hks} tools running on the Sun SparcStation Electronic Ground Support Equipment (EGSE) whose network IP address is one of

\begin{verbatim}
shorty.ssl.berkeley.edu
taiyo.ssl.berkeley.edu
ginger.ssl.berkeley.edu
\end{verbatim}

Test time shall be scheduled in advance. The Test Conductor must be logged into the Unix system as user \texttt{egeos}, 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 \texttt{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 \texttt{UniScript} program. The shell script and test script are attached to this document as appendices. As \texttt{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

An essential aspect of this test is that the automatic generation by the EGSE software of LFDNOOPS be suppressed, since these “feed the dog” — i.e., reset FSW’s countdown to the initiation of a WDR. The script ensures that FSW is in the Boot State by issuing two POR packets, followed by one-second waits. It then issues an LFDWDOG 0 command to disable watchdog resets and waits for 11 seconds. The FSW should not encounter a WDR after 10 seconds, and this should be reflected in the post-WDR value of the HK variable LFCTIME: greater than 10. Also, the FSW should not generate the diagnostic 001C (Watchdog Reset).

1.6 TEST SCRIPT IMPLEMENTATION

1.6.1 Test Script Arguments
The script requires no arguments.

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:
3.3 DATA/SOFTWARE

The following files must be present:

<table>
<thead>
<tr>
<th>EGSE (shorty) Directory</th>
<th>File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\disks\galex\users\galex\tcs\uniscript\</td>
<td>UniScript.pl</td>
<td>UniScript interpreter</td>
</tr>
<tr>
<td>\disks\galex\users\galex\tcs\uniscript\stp5_1_2_2a\</td>
<td>u</td>
<td>Shell script for this procedure</td>
</tr>
<tr>
<td>Ditto</td>
<td>stp5_1_2_2a.tst</td>
<td>Test script for this procedure (Appendix B)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Reference</th>
<th>Document Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NHB 1700.1(V1-A)</td>
<td>NASA Basic Safety Manual</td>
</tr>
<tr>
<td>2</td>
<td>COS-03-0051</td>
<td>DCE FSW Test Procedure 5.1.2.2a (this document)</td>
</tr>
<tr>
<td>3</td>
<td>UCB-COS-008</td>
<td>COS FUV Detector Software Test Plan</td>
</tr>
<tr>
<td>4</td>
<td>UCB-COS-DOC-1118</td>
<td>COS EGSE Startup Procedure</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>$C:\texttt{cs\us}&gt; \texttt{telnet shorty.ssl.berkely.edu}$</td>
<td>Establish connection to shorty via Telnet client program</td>
</tr>
</tbody>
</table>
| 2    |    | Login: xxx  
     | Password: -------- | Using telnet window, login as user tcs |

4.1.4 Set Current Directory

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
</table>
| 3    |    | $\texttt{tcs@shorty\% cd \sim galex/tcs}$  
     | $\texttt{tcs@shorty\% pwd}$  
     | $\texttt{/disks/galex/users/galex/tcs}$ | Change current directory as shown |

4.1.5 Slogin as eagcos

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
</table>
| 4    |    | $\texttt{tcs@shorty\% slogin \texttt{\text{-l eagcos \textit{shorty.ssl.berkely.edu}}}$  
     | $\texttt{eagcos@shorty.ssl.berkely.edu’s password: (get from SSL personnel)}$ | slogin as eagcos; get password from SSL personnel |

COS EGSE software version: devel
### 4.1.6 Set Current Directory

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>eagcos:shorty% cd /disks/galex/users/galex/tcs/uniscript/stp5_1_2_2a</td>
<td>Change current directory as shown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>eagcos:shorty% pwd /disks/galex/users/galex/tcs/uniscript/stp5_1_2_2a</td>
<td></td>
</tr>
</tbody>
</table>

### 4.1.7 Ensure that Proper Files are Present

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
<td>eagcos@shorty% ls -l</td>
<td>List files; the .tst file and the shell script u should be present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-rw--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_1_2_2a.tst</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-rw--r-- 1 tcs eag 62 Oct 9 17:44 u</td>
<td></td>
</tr>
</tbody>
</table>

### 4.2 OPERATION EXECUTION

#### 4.2.1 Establish Initial Test Conditions

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

#### 4.2.2 Execute the Script

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>sh u $pstring=0,0,0,0,0,0,0,0,0,0,0,0,0</td>
<td>Shell to u. You should see the accompanying output as UniScript executes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parameters are: Script File: stp5_1_2_2a #0: 0 #1: 0 #2: 0 #3: 0 #4: 0 #5: 0 #6: 0</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>QA</td>
<td>Operator Entry/System Response</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>----</td>
<td>-------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>#7: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_2a/stp5_1_2_2a.rp1 successfully opened. Report file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_2a/stp5_1_2_2a.rp2 successfully opened. Script file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_2a/stp5_1_2_2a.tst successfully opened at level 0.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Sending two PORs followed by one-second WAITs&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Sending LFDWDOG 0&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LFDWDOG DISABLE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Waiting 11 seconds&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LFDNOOP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WAIT 0: HKV0=2; HKV1=0; wc=5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WAIT 1: HKV1=1; wc=4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WAIT 1: HKV1=2; wc=3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Test 5.1.2.2a completed successfully&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>eagcos:taiyo%</td>
<td></td>
</tr>
</tbody>
</table>

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_2a.tst**, **stp5_1_2_2a.rp1**, and **stp5_1_2_2a.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

#!/bin/sh
pkill cosnoopy
perl ../UniScript.pl stp5_1_2_2a "0,0,0,0,0,0,0,0,0"
cosnoopy&
Appendix B. Test Script stp5_1_2_2a.tst

; ***************************************************************
; * DCE FSW Requirement 5.1.2.2a -- Watchdog *
; * Send LFDWDOG 0 *
; * Verify that with no watchdog service for 10 seconds *
; * no autonomous WDR occurs *
; ***************************************************************

SYM DISABLE =0
SYM DIAG001C=0x001C
SYM NSEC =5

ECHO 2

DTG 1,"(0) Sending two PORs followed by one-second WAITs"
WTO "Sending two PORs followed by one-second WAITs"

POR WAIT 1
POR WAIT 1

DTG 1,"(1) Sending LFDWDOG 0"
WTO "Sending LFDWDOG 0"

LFDWDOG DISABLE

DTG 1,"(2) Waiting 11 seconds"
WTO "Waiting 11 seconds"

WAIT 11
LFDNOOP

WAIT NSEC,HK
LOG 1,LFDOPERT,LFCTIME,LFDDIAGS
CHECK 1,($LFCTIME > 10)
DIAG 1,NOTANY,DIAG001C

DTG 1,"(3) Test 5.1.2.2a completed successfully"
WTO "Test 5.1.2.2a completed successfully"
Appendix C.  Test Report stp5_1_2_2a.rp1

<table>
<thead>
<tr>
<th></th>
<th>55555</th>
<th>11</th>
<th>222</th>
<th>222</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ssss</td>
<td>tttt</td>
<td>pppp</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>a</td>
<td>s</td>
<td>t</td>
<td>p</td>
</tr>
<tr>
<td>a</td>
<td>a</td>
<td>ss</td>
<td>s</td>
<td>t</td>
</tr>
</tbody>
</table>

Ver 01.13 Tue Jan 16 17:06:16 2001  "(0) Sending two PORs followed by one-second WAITs"

Ver 01.13 Tue Jan 16 17:06:18 2001  "(1) Sending LFDWDOG 0"

LFDWDOG DISABLE

Ver 01.13 Tue Jan 16 17:06:18 2001  "(2) Waiting 11 seconds"

LFDNOOP

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

Addr Addr HK-Name Value
---- ---- -------------- -----
1680-1683 LFCTIME 0000000B

1780-179F LFDDIAGS 011B 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

CHECK: ($LFCTIME > 10)
eval: (000B > 10)
SUCCESS

DIAG 1,NOTANY,DIAG001C
SUCCESS

Ver 01.13 Tue Jan 16 17:06:31 2001  "(3) Test 5.1.2.2a completed successfully"
Appendix D. Test Report stp5_1_2_2a.rp2

<table>
<thead>
<tr>
<th>Requirement 5.1.2.2a Command to Disable/Enable Watchdog</th>
</tr>
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<table>
<thead>
<tr>
<th>Requirement 5.1.2.2a Command to Disable/Enable Watchdog</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa</td>
</tr>
<tr>
<td>s t p p sss t t t t p p p 5 1 2 2 2 2 5 1 1 2 2 2 2 2 2</td>
</tr>
<tr>
<td>a a</td>
</tr>
<tr>
<td>aaaa</td>
</tr>
<tr>
<td>s t p p sss s s s s t t t t p p p 5 1 2 2 2 2 2 2 2</td>
</tr>
<tr>
<td>a a</td>
</tr>
<tr>
<td>s t p p sss s s s s t t t t p p p 5 1 2 2 2 2 2 2 2</td>
</tr>
<tr>
<td>a a</td>
</tr>
</tbody>
</table>

-----------------------------------------------------------------------
POR PACKET
-----------------------------------------------------------------------
80000000
-----------------------------------------------------------------------
-----------------------------------------------------------------------
POR PACKET
-----------------------------------------------------------------------
80000000
-----------------------------------------------------------------------
-----------------------------------------------------------------------
COMMAND PACKET
-----------------------------------------------------------------------
<table>
<thead>
<tr>
<th>PARM4</th>
<th>PARM3</th>
<th>PARM2</th>
<th>PARM1</th>
<th>PARM0</th>
</tr>
</thead>
<tbody>
<tr>
<td>045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFE 044AFFFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>OPCODE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0446FFFE 04440001 0442DF0E 0440FF1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-----------------------------------------------------------------------
COMMAND PACKET
-----------------------------------------------------------------------
<table>
<thead>
<tr>
<th>PARM4</th>
<th>PARM3</th>
<th>PARM2</th>
<th>PARM1</th>
<th>PARM0</th>
</tr>
</thead>
<tbody>
<tr>
<td>045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFE 044AFFFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>OPCODE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0446FFFD 04440002 04427F7F 04408080</td>
<td></td>
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-----------------------------------------------------------------------
COMMAND PACKET
-----------------------------------------------------------------------
<table>
<thead>
<tr>
<th>PARM4</th>
<th>PARM3</th>
<th>PARM2</th>
<th>PARM1</th>
<th>PARM0</th>
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<tr>
<td>SN</td>
<td>OPCODE</td>
<td></td>
<td></td>
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<tr>
<td>0446FFFC 04440003 04427F7F 04408080</td>
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-----------------------------------------------------------------------
COMMAND PACKET
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COS DCE BOOT FSW v1.13 Component Test Results
Requirement 5.1.2.2a Command to Disable/Enable Watchdog
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