COS DCE BOOT FSW v1.09 Component Test Results
Requirement 5.1.2.2b Command to Disable/Enable Watchdog

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<th>February 13, 2001</th>
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<td>COS-03-0020</td>
</tr>
<tr>
<td>Revision:</td>
<td>Initial Release</td>
</tr>
<tr>
<td>Contract No.:</td>
<td>NAS5-98043</td>
</tr>
<tr>
<td>CDRL No.:</td>
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</table>

Prepared By: __________________________________________________________________________
Tim Swanson, Software Test Engineer, Design Net Eng. ___________________________ Date

Reviewed By: __________________________________________________________________________
K. Brownsberger, COS Sr. Software Scientist, CU/CASA ___________________________ Date

Reviewed By: __________________________________________________________________________
Grant Blue, COS Software & Operations Manager, BATC ___________________________ Date

Approved By: __________________________________________________________________________
Barry Welsh, FUV Detector Program Manager, UCB ___________________________ Date

Approved By: __________________________________________________________________________
John Andrews, COS Experiment Manager, CU/CASA ___________________________ Date

Center for Astrophysics & Space Astronomy
University of Colorado
Campus Box 593
Boulder, Colorado 80309
### REVISIONS

<table>
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**Original Release**

- **Name**: Drawn: K. Brownsberger 2-13-01
- **Reviewed**: 
- **Approved**: 

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**THE UNIVERSITY OF COLORADO**
At Boulder

**The Center for Astrophysics and Space Astronomy**

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Requirement 5.1.2.2b Command to Disable/Enable Watchdog

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<td>COS-03-0020</td>
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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 Enable/Disable 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 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

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 LFDWDDOG 1 command to enable watchdog resets and WAITs for 11 seconds. The FSW should therefore encounter a WDR after 10 seconds, and this should be reflected in the post-WDR value of the HK variable LFCN: (much) less than 10. Also, the FSW should 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_2b\</td>
<td>u</td>
<td>Shell script for this procedure</td>
</tr>
<tr>
<td>Ditto</td>
<td>stp5_1_2_2b.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-03-0020</td>
<td>DCE FSW Test Procedure 5.1.2.2b (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:\tcs\us&gt; <strong>telnet shorty.ssl.berkeley.edu</strong></td>
<td>Establish connection to shorty via Telnet client program</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Login: <strong>tcs</strong>&lt;br&gt;Password:</td>
<td>Using telnet window, login as user <strong>tcs</strong></td>
</tr>
</tbody>
</table>

### 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>
<tbody>
<tr>
<td>3</td>
<td></td>
<td><strong>tcs@shorty% cd ~galex/tcs</strong>&lt;br&gt;<strong>tcs@shorty% pwd</strong>&lt;br&gt;/disks/galex/users/galex/tcs</td>
<td>Change current directory as shown</td>
</tr>
</tbody>
</table>

### 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>
<tbody>
<tr>
<td>4</td>
<td></td>
<td><strong>tcs@shorty% slogin –l eagcos shorty.ssl.berkeley.edu</strong>&lt;br&gt;<a href="mailto:eagcos@shorty.ssl.berkeley.edu">eagcos@shorty.ssl.berkeley.edu</a>’s password: <em>(get from SSL personnel)</em>&lt;br&gt;Last login: Sat Oct 7 10:41:05 2000 from auntem.ssl.berke&lt;br&gt;Sun Microsystems Inc. SunOS 5.8 Generic&lt;br&gt;February 2000&lt;br&gt;You have mail.&lt;br&gt;COS EGSE software version: devel</td>
<td>slogin as <strong>eagcos</strong>; get password from SSL personnel</td>
</tr>
</tbody>
</table>
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>eagcos:shorty%</td>
<td>cd /disks/galex/users/galex/tcs/uniscript/stp5_1_2_2b</td>
<td>Change current directory as shown</td>
</tr>
<tr>
<td></td>
<td>eagcos:shorty%</td>
<td>pwd /disks/galex/users/galex/tcs/uniscript/stp5_1_2_2b</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>eagcos@shorty%</td>
<td>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>Total 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-rw-r--r-- 1 tcs eag 1398 Oct 8 18:03</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>stp5_1_2_2b.tst</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-rw-r--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>
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<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>eagcos:shorty%</td>
<td>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>eagcos:shorty%</td>
<td>sh u $pstring=0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 Parameters are: Script File: stp5_1_2_2b</td>
<td>Shell to u. You should see the accompanying output as UniScript executes</td>
</tr>
</tbody>
</table>
Requirement 5.1.2.2b Command to Disable/Enable Watchdog

Step QA Operator Entry/System Response Description

Report file

>/disks/galex/users/galex/tcs/uniscript/stp5_1_2_2b/stp5_1_2_2b.rp1
  successfully opened.

Report file

>/disks/galex/users/galex/tcs/uniscript/stp5_1_2_2b/stp5_1_2_2b.rp2
  successfully opened.

Script file

/disks/galex/users/galex/tcs/uniscript/stp5_1_2_2b/stp5_1_2_2b.tst
  successfully opened at level 0.

"Sending two PORs, followed by one-second WAITs"
"Sending LFDWDOG 1"

LFDWDOG ENABLE

gnxtser 0: NEXTSEQ=1
"Waiting 11 seconds"

LFDNOOP

gnxtser 0: NEXTSEQ=2
WAIT 0: HKV0=2; HKV1=1; wc=5
gnxtser 0: NEXTSEQ=3
WAIT 1: HKV1=0; wc=4
gnxtser 0: NEXTSEQ=4
WAIT 1: HKV1=2; wc=3
"Test 5.1.2.2b completed successfully"
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_2b.tst, stp5_1_2_2b.rp1, and stp5_1_2_2b.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.
Appendix A. Shell Script u

#!/bin/sh
pkill cosnoopy
perl ../UniScript.pl stpS_1_2_2b "0,0,0,0,0,0,0"
cosnoopy&
Appendix B.  Test Script stp5_1_2_2b.tst

; *******************************************************
; * DCE FSW Requirement 5.1.2.2b -- Watchdog *
; * Send LFDWDOG 1 * 
; * Verify that with no watchdog service for 10 seconds * 
; * an autonomous WDR does occur * 
; *******************************************************

SYM ENABLE =1 
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 1"
WTO "Sending LFDWDOG 1"

LFDWDOG ENABLE 

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,ANY,DIAG001C 

DTG 1,"(3) Test 5.1.2.2b completed successfully"
WTO "Test 5.1.2.2b completed successfully"
Appendix C. Test Report stp5_1_2_2b.rp1

Ver 01.09 Thu Nov 16 22:57:18 2000 "(0) Sending two PORs, followed by one-second WAITs"
Ver 01.09 Thu Nov 16 22:57:21 2000 "(1) Sending LFDWDOG 1"
LFDWDOG ENABLE
Ver 01.09 Thu Nov 16 22:57:21 2000 "(2) Waiting 11 seconds"
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 0000
CHECK: ($LFCTIME < 10)
eval: (0001 < 10)
SUCCESS
DIAG 1,ANY,DIA001C
Found: DIA001C == 28.
SUCCESS
Ver 01.09 Thu Nov 16 22:57:34 2000 "(3) Test 5.1.2.2b completed successfully"
Appendix D. Test Report stp5_1_2_2b.rp2

<table>
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<tr>
<th>ssss</th>
<th>ttttt</th>
<th>pppp</th>
<th>55555</th>
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-----------------------------------------------------------------------
POR PACKET
-----------------------------------------------------------------------
80000000
-----------------------------------------------------------------------
POR PACKET
-----------------------------------------------------------------------
80000000
-----------------------------------------------------------------------
COMMAND PACKET
-----------------------------------------------------------------------

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<td>04580000</td>
<td>0456FFFF</td>
<td>04540000</td>
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</tr>
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<td>0452FFFF</td>
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COMMAND PACKET
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