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

<table>
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<th>Date:</th>
<th>February 13, 2001</th>
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<tr>
<td>Document Number:</td>
<td>COS-03-0038</td>
</tr>
<tr>
<td>Revision:</td>
<td>Initial Release</td>
</tr>
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<td>NAS5-98043</td>
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<td>CDRL No.:</td>
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</tr>
</tbody>
</table>

Prepared By: __________
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<table>
<thead>
<tr>
<th>Letter</th>
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<th>Description</th>
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<th>Date</th>
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<td>-</td>
<td></td>
<td>Initial Release</td>
<td></td>
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</tr>
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</table>

Original Release
Name: K. Brownsberger  
Date: 2-13-01

Reviewed:

Approved:

THE UNIVERSITY OF COLORADO
At Boulder

The Center for Astrophysics and Space Astronomy

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Requirement 5.1.1.1a Initialize to Boot State After Reset

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<th>Code Indent No.</th>
<th>Document No.</th>
<th>Rev</th>
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<tr>
<td>A</td>
<td>COS-03-0038</td>
<td></td>
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</tr>
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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 5.1.1.1a — Initialize to Boot State after Reset: Verify that DCE is in Boot State after a Power On Reset (POR).

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 `LFDRSTP` command to the DCE and `WAIT` 10 seconds. This command should induce program behavior in the FSW identical that occurring for a Power On Reset. At the end of the wait-period, the HK data are requested and examined. The `LFDOPERT` bit (3) of the `LFSBIT1` 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:

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:

<table>
<thead>
<tr>
<th>EGSE</th>
<th>DCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>taiyo shorty Ginger</td>
<td>ETU DCE #1 DCE #2</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
3.3 DATA/SOFTWARE

The following files must be available 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_1_1a\</td>
<td>U</td>
<td>Shell script for this procedure</td>
</tr>
<tr>
<td>Ditto</td>
<td>stp5_1_1_1a.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-03-0038</td>
<td>DCE FSW Test Procedure 5.1.1.1a (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
The version of the Boot Mode code to be tested is 01.13.
### 4.1.3 Log In to the EGSE

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

### 4.1.4 Set Current Directory

<table>
<thead>
<tr>
<th>Step</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td><code>tcs@shorty% cd ~/galex/tcs</code></td>
<td>Change current directory as shown</td>
</tr>
<tr>
<td></td>
<td><code>tcs@shorty% pwd</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>/disks/galex/users/galex/tcs</code></td>
<td></td>
</tr>
</tbody>
</table>

### 4.1.5 Slogin as eagcos

<table>
<thead>
<tr>
<th>Step</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td><code>tcs@shorty% slogin -l eagcos shorty.ssl.berkeley.edu</code></td>
<td>slogin as eagcos; get password from SSL personnel</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:eagcos@shorty.ssl.berkeley.edu">eagcos@shorty.ssl.berkeley.edu</a>’s password: <em>(get from SSL personnel)</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Last login: Sat Oct 7 10:41:05 2000 from auntem.ssl.berke</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sun Microsystems Inc. SunOS 5.8 Generic February 2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>You have mail. COSEGSE software version: devel</td>
<td></td>
</tr>
</tbody>
</table>

### 4.1.6 Set Current Directory

<table>
<thead>
<tr>
<th>Step</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td><code>eagcos:shorty% cd /disks/galex/users/galex/tcs/uniscript/stp5_1_1_1</code></td>
<td>Change current directory as shown</td>
</tr>
<tr>
<td></td>
<td><code>eagcos:shorty% pwd</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>/disks/galex/users/galex/tcs/uniscript/stp5_1_1_1a</code></td>
<td></td>
</tr>
</tbody>
</table>
4.1.7 Ensure that Proper Files are Present

<table>
<thead>
<tr>
<th>Step</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</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>Total 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-rw-r--r-- 1 tcs eag 1398 Oct 8 18:03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stp5_1_1_1a.tst</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u</td>
<td></td>
</tr>
<tr>
<td></td>
<td>eagcos@shorty% more &lt; u</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#!/bin/sh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>perl ../UniScript.pl stp5_1_1_1a &quot;0,0,0,0,0,0,0,0&quot;</td>
<td></td>
</tr>
</tbody>
</table>

4.2 OPERATION EXECUTION

4.2.1 Establish Initial Test Conditions

<table>
<thead>
<tr>
<th>Step</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</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>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>sh u</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$pstring=0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parameters are: Script File: stp5_1_1_1a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#0: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#1: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#2: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#3: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#4: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#5: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#6: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#7: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Report file</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;/disks/galex/users/galex/ver_1_13/stp5_1_1_1a/rp1</td>
<td>Shell to u. You should see the accompanying output as UniScript executes</td>
</tr>
<tr>
<td></td>
<td>successfully opened.</td>
<td></td>
</tr>
</tbody>
</table>
Report file

>/disks/galex/users/galex/tcs/ver_1_13/stp5_1_1_1a/stp5
_1_1_1a.rp2
  successfully opened.
Script file

/disks/galex/users/galex/tcs/ver_1_13/stp5_1_1_1a/stp5
_1_1_1a.tst
 successfully opened at level 0.

"First 10-second wait ..."

LFDRSTP

"Second 10-second wait ..."

WAIT 0: HKV0=1; HKV1=37; wc=10

"Test 5.1.1.1a Succeeded"
eagcos:taiy0%

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_1a.tst, stp5_1_1_1a.rp1, and
stp5_1_1_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.

University of Colorado at Boulder
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

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

University of Colorado at Boulder
Appendix A. Shell Script u

#!/bin/sh
pkill cosnoopy
perl ../UniScript.pl stpS_1_1_1a "0,0,0,0,0,0,0,0"
cosnoopy&
Appendix B. Test Script stp5_1_1_1a.tst

;********************************************************************************
; * DCE FSW Requirement 5.1.1.1a -- Initialize to Boot State after Reset *
; ********************************************************************************
; *****************************************************************************
; *****************************************************************
; * Verify that DCE is in Boot State after a Power On Reset (POR) *
; *****************************************************************************
;********************************************************************************
;
ECHO 2
;******************************************************************************
;* Wait 10 seconds for any in-progress reset to complete *
;******************************************************************************
DTG 1,"(1) Verify that DCE is in Boot State after POR"
DTG 1,"(2) First 10-second wait"
WTO "First 10-second wait ..."
WAIT 10
;
DTG 1,"(3) LFDRSTP being sent to create POR"
LFDRSTP
;******************************************************************************
;* Wait 10 seconds for reset to complete, then read HK, test bit LFDOPERT (16F4.03) of LFSBITS1 (0="Boot State") *
;******************************************************************************
DTG 1,"(4) Second 10-second wait ...
WTO "Second 10-second wait ...
WAIT 10,HK
LOG 1,LFSBITS1,LFDOPERT
CHECK 1,((LFSBITS1 & LFDOPERT) == 0)
WTO "Test 5.1.1.1a Succeeded"
Appendix C. Test Report stp5_1_1_1a.rp1

Ver 01.13 Tue Jan 16 11:43:35 2001  "(1) Verify that DCE is in Boot State after POR"
Ver 01.13 Tue Jan 16 11:43:35 2001  "(2) First 10-second wait"
Ver 01.13 Tue Jan 16 11:43:45 2001  "(3) LFDRSTP being sent to create POR"

Ver 01.13 Tue Jan 16 11:43:45 2001  "(4) Second 10-second wait ..."

Addr Addr HK-Name Value
16F4-16F5 LFSBITS1 0000

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

CHECK:  (($LFSBITS1 & $LFDOPERT) == 0)
eval:  ((0000 & 0008) == 0)
SUCCESS
Appendix D. Test Report stp5_1_1_1a.rp2

<table>
<thead>
<tr>
<th>55555</th>
<th>5</th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>sss</td>
<td>tttt</td>
<td>pppp</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>aaa</td>
<td>s</td>
<td>t</td>
<td>p</td>
<td>p</td>
</tr>
<tr>
<td>aaa</td>
<td>a</td>
<td>a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aaa</td>
<td>a</td>
<td>a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aaa</td>
<td>a</td>
<td>a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMMAND PACKET

---

PARM4  PARM3  PARM2  PARM1  PARM0
045AFFFF  04580000  0456FFFF  04540000  0452FFFF  04500000  044EFFFF  044C0000  044AFFFF  04480000
---

SN  OPCODE
0446FFFE  04440001  04420F0F  0440F0F0