COS DCE BOOT FSW v1.13 Component Test Results
Requirement 5.5.1.1 Process Memory Copy Commands

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<table>
<thead>
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<th>ECO No.</th>
<th>Description</th>
<th>Check</th>
<th>Approved</th>
<th>Date</th>
</tr>
</thead>
<tbody>
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<td>-</td>
<td></td>
<td>Initial Release</td>
<td></td>
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</tr>
</tbody>
</table>

**The University of Colorado**  
At Boulder  
The Center for Astrophysics and Space Astronomy

COS DCE BOOT FSW v1.13 Component Test Results  
Requirement 5.5.1.1 Process Memory Copy Commands

<table>
<thead>
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<th>Document No.</th>
<th>Rev</th>
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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 5.5.1.1 — Process Memory Copy Commands.

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 generates 16 bytes of random data into UniScript Buffer 1, then uploads it to C000...C00F. The LFDCOPY command is then issued to copy the data from C000...C00F to C100...C10F. The LFDDNLOD command is used to download C100...C10F to the second UniScript buffer. The buffer contents are then compared for equality.

1.6 TEST SCRIPT IMPLEMENTATION

1.6.1 Test Script Arguments
The script is parameterized as shown in the following Table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
<th>Correct Argument for Version 1.13</th>
</tr>
</thead>
<tbody>
<tr>
<td>#0</td>
<td>Absolute hex storage address of 8051 “scratch” area</td>
<td>C000</td>
</tr>
</tbody>
</table>

These parameters must be encoded into the shell script u (see Appendix A).

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:

<table>
<thead>
<tr>
<th>EGSE</th>
<th>DCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>taiyo shorty</td>
<td>Ginger 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 present:

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

<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_5_1_1\</td>
<td>u</td>
<td>Shell script for this procedure</td>
</tr>
<tr>
<td>Ditto</td>
<td>stp5_5_1_1.tst</td>
<td>Test script for this procedure</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-03-0061</td>
<td>DCE FSW Test Procedure 5.5.1.1 (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; telnet shorty.ssl.berkely.edu</td>
<td>Establish connection to shorty via Telnet client program</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Login: xxx</td>
<td>Using telnet window, login as user tcs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Password: -----------</td>
<td></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>tcs@shorty% cd ~/galex/tcs</td>
<td>Change current directory as shown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tcs@shorty% pwd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/disks/galex/users/galex/tcs</td>
<td></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>tcs@shorty% slogin –l eagcos shorty.ssl.berkeley.edu</td>
<td>slogin as eagcos; get password from SSL personnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:eagcos@shorty.ssl.berkeley.edu">eagcos@shorty.ssl.berkeley.edu</a>’s password: (get from SSL personnel)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Last login: Sat Oct 7 10:41:05 2000 from auntem.ssl.berke</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sun Microsystems Inc. SunOS 5.8 Generic February 2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>You have mail.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>COS EGSE software version: devel</td>
<td></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></td>
<td>eagcos:shorty% cd /disks/galex/users/galex/tcs/uniscript/stp5_5_1_1</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_5_1_1</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>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_5_1_1.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>
<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</td>
<td>Shell to \u. You should see the accompanying output as UniScript executes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$pstring=C000,0,0,0,0,0,0,0,0,0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parameters are: Script File: stp5_5_1_1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#0: C000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#1: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#2: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#3: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#4: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#5: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#6: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#7: 0</td>
<td></td>
</tr>
</tbody>
</table>
### Requirement 5.5.1.1 Process Memory Copy Commands

<table>
<thead>
<tr>
<th>Step</th>
<th>QA</th>
<th>Operator Entry/System Response</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Report file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>/disks/galex/users/galex/tcs/ver_1_13/stp5_5_1_1/stp5_5_1_1.rp1</code> successfully opened. Report file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>/disks/galex/users/galex/tcs/ver_1_13/stp5_5_1_1/stp5_5_1_1.rp2</code> successfully opened. Script file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>/disks/galex/users/galex/tcs/ver_1_13/stp5_5_1_1/stp5_5_1_1.tst</code> successfully opened at level 0.</td>
<td></td>
</tr>
</tbody>
</table>

"Sending two PORs followed by WAITs"
"Uploading the random data"

`LFDUPL0D SCRATCH0,NBYTES,CRC1`

"Copying the uploaded data"

`LFDCOPY SCRATCH0,SCRATCH1,NBYTES,XDATA`

"Downloading the data"

`LFDDNLOD SCRATCH1,NBYTES`

"Comparing uploaded with downloaded data"
"Test 5.5.1.1 completed successfully"
eagcos:shorty%
4.3 POST-OPERATION ACTIVITIES

4.3.1 Copy Reports to PC Files and Print Them

Using an FTP client, copy the u, stp5_5_1_1.tst, stp5_5_1_1.rp1, and stp5_5_1_1.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_5_1_1 "C000,0,0,0,0,0,0,0"
cosnoopy&
**Appendix B. Test Script stp5_5_1_1.tst**

```plaintext
; ************************************************
; * STP 5.5.1.1 --- Process Memory Copy Commands *
; ************************************************
;
; *********************************************************************************
; * The script generates 16 bytes of random data, then uploads it to C000...C00F. *
; * The LFDCOPY command is then issued to copy the C000...C00F to C100...C10F. *
; * The LFDDNLOD command to download C100...C10F to the second UniScript buffer. *
; * The buffer contents are then compared for equality. *
; *********************************************************************************
;
; *********************************************************
; * Parameters: #0 = address of "scratch area" = C100. *
; *********************************************************
;
ECHO 2

SYM SCRATCH0=0x#0
SYM SCRATCH1=SCRATCH0+0x0100
SYM NBYTES =16
SYM XDATA =0

DATA 1,0,NBYTES,RAND=56

DTG 3,"(0) Sending two PORs followed by WAITs"
WTO "Sending two PORs followed by WAITs"

POR
WAIT 1
POR
WAIT 1

,

DTG 3,"(1) Uploading the random data"
WTO "Uploading the random data"

LOG 1,1
XMIT 1,NBYTES
WAIT 1

LFDUPLOAD SCRATCH0,NBYTES,CRC1
WAIT 1

,

DTG 3,"(2) Copying the uploaded data"
WTO "Copying the uploaded data"

LFDCOPY SCRATCH0,SCRATCH1,NBYTES,XDATA
WAIT 1

,

DTG 3,"(3) Downloading the data"
WTO "Downloading the data"

LFDDNLOD SCRATCH1,NBYTES
WAIT 1
RECV 2,0,NBYTES
WAIT 1

,

DTG 3,"(4) Comparing uploaded with downloaded data"
WTO "Comparing uploaded with downloaded data"

LOG 1,1,2
CHECK 1,($B1==$B2)

,

DTG 3,"(5) Test 5.5.1.1 completed successfully"
WTO "Test 5.5.1.1 completed successfully"
```

Appendix C. Test Report stp5_5_1_1.rp1

Ver 01.13 Wed Jan 17 18:07:30 2001 "(0) Sending two PORs followed by WAITs"

Ver 01.13 Wed Jan 17 18:07:32 2001 "(1) Uploading the random data"

Ver 01.13 Wed Jan 17 18:07:34 2001 "(2) Copying the uploaded data"

Ver 01.13 Wed Jan 17 18:07:36 2001 "(3) Downloading the data"

Ver 01.13 Wed Jan 17 18:07:38 2001 "(4) Comparing uploaded with downloaded data"

Ver 01.13 Wed Jan 17 18:07:38 2001 "(5) Test 5.5.1.1 completed successfully"
Appendix D.  Test Report stp5_5_1_1.rp2

Ver 01.13 Wed Jan 17 18:07:30 2001  "(0) Sending two PORs followed by WAITs"

-----------------------------------------------------------------------
POR PACKET
-----------------------------------------------------------------------
80000000
-----------------------------------------------------------------------
-----------------------------------------------------------------------
POR PACKET
-----------------------------------------------------------------------
80000000
-----------------------------------------------------------------------
Ver 01.13 Wed Jan 17 18:07:32 2001  "(1) Uploading the random data"
-----------------------------------------------------------------------
UPLOAD PACKET
-----------------------------------------------------------------------
0040C1C6 0042D9CE 00440985 00469FCF 0048E331 004AA334 004CAD64 004E4B8B
-----------------------------------------------------------------------
-----------------------------------------------------------------------
COMMAND PACKET
-----------------------------------------------------------------------
PARM4 PARM3 PARM2 PARM1 PARM0
045AFFFE 04580000 0456FFFF 04540000 04523E56 0450C1A9 044EFFFF 044C0010 044A3FFF 0448C000
-----------------------------------------------------------------------
SN OPCODE
0446FFFE 04440001 04425252 0440ADAD
-----------------------------------------------------------------------
Ver 01.13 Wed Jan 17 18:07:34 2001  "(2) Copying the uploaded data"
-----------------------------------------------------------------------
COMMAND PACKET
-----------------------------------------------------------------------
PARM4 PARM3 PARM2 PARM1 PARM0
045AFFFE 04580000 0456FFFF 04540000 04523E56 0450C1A9 044EFFFF 044C0010 044A3FFF 0448C000
-----------------------------------------------------------------------
SN OPCODE
0446FFFD 04440002 04427C7C 04408383
-----------------------------------------------------------------------
Ver 01.13 Wed Jan 17 18:07:36 2001  "(3) Downloading the data"
<table>
<thead>
<tr>
<th>PARM4</th>
<th>PARM3</th>
<th>PARM2</th>
<th>PARM1</th>
<th>PARM0</th>
</tr>
</thead>
<tbody>
<tr>
<td>045AFFFE</td>
<td>04580000</td>
<td>0456FFFF</td>
<td>04540000</td>
<td>0452FFFF</td>
</tr>
<tr>
<td>04500000</td>
<td>044EFFEF</td>
<td>044C0010</td>
<td>044A3EFF</td>
<td>0448C100</td>
</tr>
</tbody>
</table>

SN  
0446FFFC 04440003 04325151 0440AEAE

Ver 01.13 Wed Jan 17 18:07:38 2001 "(4) Comparing uploaded with downloaded data"
Ver 01.13 Wed Jan 17 18:07:38 2001 "(5) Test 5.5.1.1 completed successfully"