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

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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

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Name		Date	At Boulder
Drawn: K. Brownsberger		2-13-01	**The Center for Astrophysics and Space Astronomy**
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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 1-1: Parameters/Arguments for stp5_5_1_1.tst

Parameter	Meaning	Correct Argument for Version 1.13
#0	Absolute hex storage address of 8051 "scratch" area	C000

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:

EGSE			DCE		
taiyo	**shorty**	**Ginger**	**ETU**	**DCE #1**	**DCE #2**
	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\uniscript	**UniScript.pl**	**UniScript** interpreter
\disks\galex\users\galex\tcs\uniscript\stp5_5_1_1	**u**	Shell script for this procedure
Ditto	**stp5_5_1_1.tst**	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)	*NASA Basic Safety Manual*
2	COS-03-0061	*DCE FSW Test Procedure 5.5.1.1* (this document)
3	UCB-COS-008	*COS FUV Detector Software Test Plan*
4	UCB-COS-DOC-1118	*COS EGSE Startup Procedure*

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> **telnet shorty.ssl.berkely.edu**	Establish connection to shorty via Telnet client program
2		Login: **xxx** Password: **--------**	Using telnet window, login as user **tcs**

4.1.4 Set Current Directory

Step	QA	Operator Entry/System Response	Description
3		tcs@shorty% **cd ~galex/tcs** tcs@shorty% **pwd** /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% **slogin –l eagcos** **shorty.ssl.berkeley.edu** eagcos@shorty.ssl.berkeley.edu's password: *(get from SSL personnel)* 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 **eagcos**; get password from SSL personnel

4.1.6   Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		eagcos:shorty% **cd /disks/galex/users/galex/tcs/uniscript/stp5_5_1_1** eagcos:shorty% **pwd** /disks/galex/users/galex/tcs/uniscript/stp5_5_1_1	Change current directory as shown

4.1.7   Ensure that Proper Files are Present

Step	QA	Operator Entry/System Response	Description
6		eagcos@shorty% **ls –l** Total 12 -rw-r--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_5_1_1.tst -rw-r—r-- 1 tcs eag 62 Oct 9 17:44 u	List files; the **.tst** file and the shell script **u** should be present

4.2   OPERATION EXECUTION

4.2.1   Establish Initial Test Conditions

Step	QA	Operator Entry/System Response	Description
7		eagcos:shorty% **set path=($path ~dbb/scripts/bin)**	Set path as shown to enable access to hks tools

4.2.2   Execute the Script

Step	QA	Operator Entry/System Response	Description
8		**sh u** $pstring=C000,0,0,0,0,0,0,0 Parameters are: Script File: stp5_5_1_1 #0: C000 #1: 0 #2: 0 #3: 0 #4: 0 #5: 0 #6: 0 #7: 0	Shell to **u**. You should see the accompanying output as **UniScript** executes

Step	QA	Operator Entry/System Response	Description
		Report file >/disks/galex/users/galex/tcs/ver_1_13/stp5_5_1_1/ stp5_5_1_1.rp1 successfully opened. Report file >/disks/galex/users/galex/tcs/ver_1_13/stp5_5_1_1/ stp5_5_1_1.rp2 successfully opened. Script file /disks/galex/users/galex/tcs/ver_1_13/stp5_5_1_1/s tp5_5_1_1.tst successfully opened at level 0. "Sending two PORs followed by WAITs" "Uploading the random data" LFDUPLOD 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%	

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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&
```

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Appendix B.   Test Script stp5_5_1_1.tst

```
; **************************************************
; * 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
LFDUPLOD  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

```
                                            55555         55555           1
1
                                            5             5              11
11
                          ssss  ttttt  pppp  555           555            1
1
                          s       t    p  p   5             5             1
1
                          sssss   t    pppp    5             5            1
1
                              s   t    p      5 5           5 5           1
1
                          ssss    t    p       555 _____   555 _____     111 _____
111

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"

Len  CRC  Buffer          Data
---- ---- ------          ----
0010 C1A9 1               C6 C1 CE D9 85 09 CF 9F 31 E3 34 A3 64 AD 8B 4B

LFDUPLOD SCRATCH0,NBYTES,CRC1

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

LFDCOPY  SCRATCH0,SCRATCH1,NBYTES,XDATA

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

LFDDNLOD SCRATCH1,NBYTES

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

Len  CRC  Buffer          Data
---- ---- ------          ----
0010 C1A9 1               C6 C1 CE D9 85 09 CF 9F 31 E3 34 A3 64 AD 8B 4B

0010 C1A9 2               C6 C1 CE D9 85 09 CF 9F 31 E3 34 A3 64 AD 8B 4B

CHECK:   ($B1==$B2)
eval:    (C6C1...==C6C1...)

S U C C E S S

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

```
                                      55555          55555           1
1
                                      5              5               11
11
                    ssss  ttttt  pppp 555            555             1
1
                    s       t    p  p 5                5             1
1
                    sssss   t    pppp   5               5            1
1
                        s   t    p    5 5            5 5             1
1
                    ssss    t    p      555 _____   555  _____     111 _____
111

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

----------------------------------------------------------------------
                       P O R   P A C K E T
----------------------------------------------------------------------
80000000
----------------------------------------------------------------------


----------------------------------------------------------------------
                       P O R   P A C K E T
----------------------------------------------------------------------
80000000
----------------------------------------------------------------------

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

----------------------------------------------------------------------
                    U P L O A D   P A C K E T
----------------------------------------------------------------------
0040C1C6 0042D9CE 00440985 00469FCF 0048E331 004AA334 004CAD64 004E4B8B
----------------------------------------------------------------------


------------------------------------------------------------------------------------------
                         C O M M A N D   P A C K E T
------------------------------------------------------------------------------------------
       PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 04523E56 0450C1A9 044EFFEF 044C0010 044A3FFF 0448C000
------------------------------------------------------------------------------------------
         SN           OPCODE
0446FFFE 04440001 04425252 0440ADAD
------------------------------------------------------------------------------------------


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

------------------------------------------------------------------------------------------
                         C O M M A N D   P A C K E T
------------------------------------------------------------------------------------------
       PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFEF 04500010 044E3EFF 044CC100 044A3FFF 0448C000
------------------------------------------------------------------------------------------
         SN           OPCODE
0446FFFD 04440002 04427C7C 04408383
------------------------------------------------------------------------------------------


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

------------------------------------------------------------------------------------------
```

```
                          C O M M A N D   P A C K E T
-----------------------------------------------------------------------------------
          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFEF 044C0010 044A3EFF 0448C100
-----------------------------------------------------------------------------------
             SN            OPCODE
0446FFFC 04440003 04425151 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"
```