

**COS DCE BOOT FSW v1.09 Component Test Results  
Requirement 5.1.1.4 Memory Initialization on Power-Up Only**

Date:	February 13, 2001
Document Number:	COS-03-0012
Revision:	Initial Release
Contract No.:	NAS5-98043
CDRL No.:	N/A

Prepared By: \_\_\_\_\_ Date \_\_\_\_\_  
 Tim Swanson, Software Test Engineer, Design\_Net Eng.

Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_  
 K. Brownsberger, COS Sr. Software Scientist, CU/CASA

Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_  
 Grant Blue, COS Software & Operations Manager, BATC

Approved By: \_\_\_\_\_ Date \_\_\_\_\_  
 Barry Welsh, FUV Detector Program Manager. UCB

Approved By: \_\_\_\_\_ Date \_\_\_\_\_  
 John Andrews, COS Experiment Manager, CU/CASA



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

# REVISIONS

Letter	ECO No.	Description	Check	Approved	Date
-		Initial Release			

Original Release		<b>THE UNIVERSITY OF COLORADO</b>			
Name	Date	At Boulder			
Drawn: K. Brownsberger	2-13-01	<b>The Center for Astrophysics and Space Astronomy</b>			
Reviewed:		COS DCE BOOT FSW v1.09 Component Test Results Requirement 5.1.1.4 Memory Initialization on Power-Up Only			
Approved:					
		Size	Code Indent No.	Document No.	Rev
		A		COS-03-0012	-
		Scale: N/A			

**Table of Contents**

- 1. Introduction ..... 2
  - 1.1 Purpose ..... 2
  - 1.2 Scope ..... 2
  - 1.3 Limitations and Constraints ..... 2
  - 1.4 Procedure Overview ..... 2
  - 1.5 Theory of Test ..... 3
  - 1.6 Test Script Implementation ..... 3
    - 1.6.1 Test Script Arguments ..... 3
    - 1.6.2 Test Script Coding ..... 4
- 2. Special Instructions ..... 4
  - 2.1 Quality Assurance ..... 4
  - 2.2 Safety ..... 4
    - 2.2.1 Personal Safety ..... 4
    - 2.2.2 Test Article and Equipment Safety ..... 4
  - 2.3 Contamination ..... 4
- 3. Support Requirements ..... 4
  - 3.1 Personnel ..... 4
  - 3.2 Tools, Equipment, and Materials ..... 5
  - 3.3 Data/Software ..... 5
  - 3.4 Required Documentation ..... 6
- 4. Procedure/Task Steps ..... 6
  - 4.1 Pre-Operation Activities ..... 6
    - 4.1.1 Make Sure that **hks** Tools Are Active ..... 6
    - 4.1.2 Make Sure that the Proper ROM Is Installed ..... 6
    - 4.1.3 Log In to the EGSE ..... 6
    - 4.1.4 Set Current Directory ..... 6
    - 4.1.5 Slogin as eagcos ..... 7
    - 4.1.6 Set Current Directory ..... 7
    - 4.1.7 Ensure that Proper Files are Present ..... 7
  - 4.2 Operation Execution ..... 7
    - 4.2.1 Establish Initial Test Conditions ..... 7
    - 4.2.2 Execute the Script ..... 8
  - 4.3 Post-Operation Activities ..... 11
    - 4.3.1 Copy Reports to PC Files and Print Them ..... 11
    - 4.3.2 Complete The Test Procedure Form ..... 11

## 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 5.1.1.4 — Memory Initialization on Power-Up Only.

### 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 normal contents of locations 0x2562...0x2563 (symbolized in the script as **PCEND**), as set by FSW Boot State initialization, are the bytes 0x0x0501. Hence, if inspection of the contents of **PCEND** reveals a value other than 0x0501, it may be inferred that **PCEND** has been modified and that no initialization has intervened between the modification and the inspection. Conversely, if **PCEND** is modified to something other than 0x0501, and the FSW then processes an **LFDRSTW** command, and the contents of **PCEND** are found to be 0x0501, it may be inferred that the locations have been re-initialized by the WDR. The script executes the following steps:

- Issue two **PORS**, each followed by one-second **WAITS** to ensure that the FSW is operating in Boot State and that EGSE buffers contain no HK data from earlier commanding.
- Initialize FSW, download **PCEND**, and verify that it is 0x0501.
- Upload 0x0602 to **PCEND**, and verify it.
- Issue **POR**, download **PCEND**, verify it has been reset back to 0x0501.
- Issue **LFDRSTP**, download **PCEND**, verify it is 0x0501.
- Upload 0x0602 to **PCEND**, download **PCEND**, verify it is 0x0602.
- Enable watchdogs, issue **LFDRSTW**, download **PCEND**, verify it is still 0x0602 — i.e., WDR has not re-initialized **PCEND**.

### 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\_1\_1\_4.tst**

Parameter	Meaning	Correct Argument for Version 1.09
#0	Absolute hex storage address in Patchable Constants ( <b>PCEND</b> )	2562

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		
<b>taiyo</b>	<b>shorty</b>	<b>ginger</b>	<b>ETU</b>	<b>DCE #1</b>	<b>DCE #2</b>
	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\uniscrpt\	<b>UniScript.pl</b>	<b>UniScript</b> interpreter
\disks\galex\users\galex\tcs\uniscrpt\stp5_1_1_4\	<b>u</b>	Shell script for this procedure
Ditto	<b>stp5_1_1_4.ts</b> <b>t</b>	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)	<i>NASA Basic Safety Manual</i>
2	COS-03-0012	<i>DCE FSW Test Procedure 5.1.1.4 (this document)</i>
3	UCB-COS-008	<i>COS FUV Detector Software Test Plan</i>
4	UCB-COS-DOC-1118	<i>COS EGSE Startup Procedure</i>

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> <b>telnet shorty.ssl.berkeley.edu</b>	Establish connection to shorty via Telnet client program
2		Login: <b>tcs</b> Password:	Using telnet window, login as user <b>tcs</b>

4.1.4 Set Current Directory

Step	QA	Operator Entry/System Response	Description
3		tcs@shorty% <b>cd ~galex/tcs</b> tcs@shorty% <b>pwd</b> /disks/galex/users/galex/tcs	Change current directory as shown



## 4.1.5 Slogin as eagcos

Step	QA	Operator Entry/System Response	Description
4		<pre>tcs@shorty% <b>slogin -l eagcos</b> <b>shorty.ssl.berkeley.edu</b> eagcos@shorty.ssl.berkeley.edu's password: (<i>get from SSL personnel</i>) 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</pre>	slogin as <b>eagcos</b> ; get password from SSL personnel

## 4.1.6 Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		<pre>eagcos:shorty% <b>cd</b> <b>/disks/galex/users/galex/tcs/uniscript/stp5_1_1_4</b> eagcos:shorty% <b>pwd</b> /disks/galex/users/galex/tcs/uniscript/stp5_1_1_4</pre>	Change current directory as shown

## 4.1.7 Ensure that Proper Files are Present

Step	QA	Operator Entry/System Response	Description
6		<pre>eagcos@shorty% <b>ls -l</b> Total 12 -rw-r--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_1_1_4.tst -rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u</pre>	List files; the <b>.tst</b> file and the shell script <b>u</b> should be present

## 4.2 OPERATION EXECUTION

## 4.2.1 Establish Initial Test Conditions

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

4.2.2 Execute the Script

Step	QA	Operator Entry/System Response	Description
8		<pre>eagcos:shorty% sh u \$psstring=2562,0,0,0,0,0,0,0 Parameters are: Script File: stp5_1_1_4 #0: 2562 #1: 0 #2: 0 #3: 0 #4: 0 #5: 0 #6: 0 #7: 0  Report file  &gt;/disks/galex/users/galex/tcs/uniscript/stp5_1_1_4/ stp5_1_1_4.rp1 successfully opened. Report file  &gt;/disks/galex/users/galex/tcs/uniscript/stp5_1_1_4/ stp5_1_1_4.rp2 successfully opened. Script file  /disks/galex/users/galex/tcs/uniscript/stp5_1_1_4/st p5_1_1_4.tst successfully opened at level 0.  "Address of PCEND is 2562" "Is this correct?" "If so, press Y; otherwise press N and edit shell file u" y Continuing. "Sending two PORs. WAITING 1sec twice" "Generating upload data" "Sending LFDRSTP to assure Boot State"  LFDRSTP</pre>	<p>Shell to <b>u</b>. You should see the accompanying output as <b>UniScript</b> executes</p>

Step	QA	Operator Entry/System Response	Description
		<p>gnxtser 0: NEXTSEQ=1                      "Downloading PCEND, checking for nulls"</p> <p>LFDDNLOD PCEND,NBYTES</p> <p>gnxtser 0: NEXTSEQ=2                      WAIT 0: HKV0=2; HKV1=0; wc=5                      gnxtser 0: NEXTSEQ=3                      WAIT 1: HKV1=0; wc=4                      gnxtser 0: NEXTSEQ=4                      WAIT 1: HKV1=2; wc=3                      "Uploading 0602"</p> <p>LFDUPLOD PCEND,NBYTES,CRC1</p> <p>gnxtser 0: NEXTSEQ=5                      "Downloading it to make sure it got to PCEND"</p> <p>LFDDNLOD PCEND,NBYTES</p> <p>gnxtser 0: NEXTSEQ=6                      "Sending POR"                      "Downloading PCEND to verify it's 05 01 after                      POR"</p> <p>LFDDNLOD PCEND,NBYTES</p> <p>gnxtser 0: NEXTSEQ=7                      WAIT 0: HKV0=7; HKV1=0; wc=5                      gnxtser 0: NEXTSEQ=8                      WAIT 1: HKV1=0; wc=4                      gnxtser 0: NEXTSEQ=9                      WAIT 1: HKV1=7; wc=3                      "Test 5_1_1_4 completed successfully"                      "Generating 06 02"                      "Sending LFDRSTP to assure Boot State"</p> <p>LFDRSTP</p>	

Step	QA	Operator Entry/System Response	Description
		<p>gnxtser 0: NEXTSEQ=10                      "Downloading PCEND, checking for 05 01"</p> <p>LFDDNLOD PCEND,NBYTES</p> <p>gnxtser 0: NEXTSEQ=11                      WAIT 0: HKV0=11; HKV1=0; wc=5</p> <p>gnxtser 0: NEXTSEQ=12                      WAIT 1: HKV1=0; wc=4</p> <p>gnxtser 0: NEXTSEQ=13                      WAIT 1: HKV1=11; wc=3</p> <p>"Uploading 06 02"</p> <p>LFDUPL0D PCEND,NBYTES,CRC1</p> <p>gnxtser 0: NEXTSEQ=14                      "Downloading it to make sure it got to PCEND"</p> <p>LFDDNLOD PCEND,NBYTES</p> <p>gnxtser 0: NEXTSEQ=15                      "Sending LFDIRSTW"</p> <p>LFDWDOG ENABLE</p> <p>gnxtser 0: NEXTSEQ=16</p> <p>LFDIRSTW</p> <p>gnxtser 0: NEXTSEQ=17                      WAIT 0: HKV0=17; HKV1=16; wc=5</p> <p>gnxtser 0: NEXTSEQ=18                      WAIT 1: HKV1=16; wc=4</p> <p>gnxtser 0: NEXTSEQ=19                      WAIT 1: HKV1=0; wc=3</p> <p>gnxtser 0: NEXTSEQ=20                      WAIT 1: HKV1=18; wc=2</p> <p>"Downloading PCEND to verify it's not reset after</p>	

---

Step	QA	Operator Entry/System Response	Description
		WDR"  LFDDNLOD PCEND,NBYTES  gnxtser 0: NEXTSEQ=21 WAIT 0: HKV0=21; HKV1=20; wc=5 gnxtser 0: NEXTSEQ=22 WAIT 1: HKV1=20; wc=4 gnxtser 0: NEXTSEQ=23 WAIT 1: HKV1=21; wc=3 "Test 5 1 1 4b terminated 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\_1\_4.tst, stp5\_1\_1\_4.rp1, and stp5\_1\_1\_4.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_1_1_4 "2562,0,0,0,0,0,0,0"  
cosnoopy&
```

## Appendix B. Test Script stp5\_1\_1\_4.tst

```

; *****
; * DCE FSW Requirement 5.1.1.4 -- Memory Initialization on Power-Up Only *
; *****
; *****
; * Verify that variables are initialized after POR *
; *****
;
SYM      PCEND =0x#0
SYM      NBYTES=2
SYM      ENABLE=1
;
ECHO     2
WTO      "Address of PCEND is #0"
WTO      "Is this correct?"
WTOR     "If so, press Y; otherwise press N and edit shell file u"
;
; *****
; * Try to clear out the EGSE's pipes *
; *****
;
DTG      3,"(-1) Sending two PORs. WAITING 1sec twice"
WTO      "Sending two PORs. WAITING 1sec twice"
POR
WAIT     1
POR
WAIT     1
;
; *****
; * Clear both buffers *
; *****
;
DATA     1,0,0,EMPTY
DATA     2,0,0,EMPTY
;
; *****
; * Generate 0602 for upload to 2562 *
; *****
;
DTG      3,"(0) Generating upload data"
WTO      "Generating upload data"
DATA     1,0,NBYTES,CONST=0x0602
LOG      1,1,2
;
; *****
; * Make sure we're in Boot State *
; *****
;
DTG      3,"(1) Sending LFDRSTP to assure Boot State"
WTO      "Sending LFDRSTP to assure Boot State"
LFDRSTP
WAIT     1
;
; *****
; * Download PCEND to make sure it's 00 00 00 00 00 ... 00 *
; *****
;
DTG      3,"(2) Downloading PCEND, checking for nulls"
WTO      "Downloading PCEND, checking for nulls"
LFDDNLOD PCEND,NBYTES
WAIT     5,HK
RECV     2,0,NBYTES
WAIT     1
LOG      1,2
CHECK    1,($B2 eq '0501')
;
; *****
; * Upload the random data *

```



Center for Astrophysics & Space Astronomy

```
; *****  
;  
DTG      3, "(3) Uploading 0602"  
WTO      "Uploading 0602"  
WAIT     1  
XMIT     1, NBYTES  
LFDUPLOD PCEND, NBYTES, CRC1  
;  
; *****  
; * Download PCEND *  
; *****  
;  
DTG      3, "(4) Downloading it to make sure it got to PCEND"  
WTO      "Downloading it to make sure it got to PCEND"  
WAIT     1  
LFDNLOD  PCEND, NBYTES  
WAIT     1  
RECV     2, 0, NBYTES  
;  
; *****  
; * Now, $B1 should equal $B2 *  
; *****  
;  
LOG      1, 1, 2  
CHECK    1, ($B1 eq $B2)  
;  
; *****  
; * Do a POR *  
; *****  
;  
DTG      3, "(5) Sending POR"  
WTO      "Sending POR"  
POR  
WAIT     1  
;  
; *****  
; * Download PCEND (again) to make sure it's 05 01 *  
; *****  
;  
DTG      3, "(6) Downloading PCEND to verify it's 05 01 after POR"  
WTO      "Downloading PCEND to verify it's 05 01 after POR"  
LFDNLOD  PCEND, NBYTES  
WAIT     5, HK  
RECV     2, 0, NBYTES  
WAIT     1  
LOG      1, 1, 2  
CHECK    1, ($B2 eq '0501')  
;  
DTG      3, "(7) Test 5_1_1_4a completed successfully"  
WTO      "Test 5_1_1_4a completed successfully"  
;  
-----  
; *****  
; * Verify that variables are NOT initializaed after WDR *  
; *****  
; *****  
; * Clear both buffers *  
; *****  
;  
DATA     1, 0, 0, EMPTY  
DATA     2, 0, 0, EMPTY  
;  
; *****  
; * Generate 0602 for upload *  
; *****  
;  
DTG      3, "(10) Generating 06 02"  
WTO      "Generating 06 02"  
DATA     1, 0, NBYTES, CONST=0x0602  
LOG      1, 1, 2  
;  
;
```

Center for Astrophysics & Space Astronomy

```
; *****
; * Make sure we're in Boot State *
; *****
;
DTG      3,"(11) Sending LFDRSTP to assure Boot State"
WTO      "Sending LFDRSTP to assure Boot State"
LFDRSTP
WAIT     1
;
; *****
; * Download PCEND to make sure it's 00 00 00 00 00 ... 00 *
; *****
;
DTG      3,"(12) Downloading PCEND, checking for 05 01"
WTO      "Downloading PCEND, checking for 05 01"
LFDDNLOD PCEND,NBYTES
WAIT     5,HK
RECV     2,0,NBYTES
WAIT     1
LOG      1,2
CHECK    1,($B2 eq '0501')
;
; *****
; * Upload the random data *
; *****
;
DTG      3,"(13) Uploading 06 02"
WTO      "Uploading 06 02"
WAIT     1
XMIT     1,NBYTES
LFDUPLD  PCEND,NBYTES,CRC1
;
; *****
; * Download PCEND *
; *****
;
DTG      3,"(14) Downloading it to make sure it got to PCEND"
WTO      "Downloading it to make sure it got to PCEND"
WAIT     1
LFDDNLOD PCEND,NBYTES
WAIT     1
RECV     2,0,NBYTES
;
; *****
; * Now, $B1 should equal $B2 *
; *****
;
LOG      1,1,2
CHECK    1,($B1 eq $B2)
;
; *****
; * Do a Watchdog Reset *
; *****
;
DTG      3,"(15) Sending LFDRSTW"
WTO      "Sending LFDRSTW"
LFDWDOG  ENABLE
WAIT     1
LFDRSTW
WAIT     1
WAIT     5,HK
LOG      1,LFSBITS1,LFDOPERT,LFDDIAGS
;
; *****
; * Download PCEND (again) to make sure it's 06 02 *
; *****
;
DTG      3,"(16) Downloading PCEND to verify it's not reset after WDR"
WTO      "Downloading PCEND to verify it's not reset after WDR"
LFDDNLOD PCEND,NBYTES
```

**Center for Astrophysics & Space Astronomy**

---

```
WAIT      5,HK
RECV      2,0,NBYTES
WAIT      1
LOG        1,1,2
CHECK     1,($B2 eq '0602')
;
DTG        3,"(17) Test 5_1_1_4b terminated successfully"
WTO        "Test 5_1_1_4b terminated successfully"
```

Appendix C. Test Report stp5\_1\_1\_4.rp1

```

4          55555          1          1          4
4          5          11          11          4
4          ssss ttttt pppp 555          1          1          4
4          s          t          p          p          5          1          1
444444          sssss          t          pppp          5          1          1
4          s          t          p          5          5          1          1
4          ssss          t          p          555          111          111
4
Ver 01.09 Thu Nov 16 17:18:59 2000 "(-1) Sending two PORs. WAITING 1sec twice"
Ver 01.09 Thu Nov 16 17:19:01 2000 "(0) Generating upload data"
Len  CRC  Buffer          Data
----  ----  -
0002 97EB 1          06 02
0000 FFFF 2
Ver 01.09 Thu Nov 16 17:19:01 2000 "(1) Sending LFDRSTP to assure Boot State"
LFDRSTP
Ver 01.09 Thu Nov 16 17:19:03 2000 "(2) Downloading PCEND, checking for nulls"
LFDDNLOD PCEND,NBYTES
Len  CRC  Buffer          Data
----  ----  -
0002 F2DB 2          05 01
CHECK: ($B2 eq '0501')
eval:  (0501... eq '0501')
S U C C E S S
Ver 01.09 Thu Nov 16 17:19:06 2000 "(3) Uploading 0602"
LFDUPLD PCEND,NBYTES,CRC1
Ver 01.09 Thu Nov 16 17:19:07 2000 "(4) Downloading it to make sure it got to PCEND"
LFDDNLOD PCEND,NBYTES
Len  CRC  Buffer          Data
----  ----  -
0002 97EB 1          06 02
0002 97EB 2          06 02
CHECK: ($B1 eq $B2)
eval:  (0602... eq 0602...)
S U C C E S S
Ver 01.09 Thu Nov 16 17:19:09 2000 "(5) Sending POR"
Ver 01.09 Thu Nov 16 17:19:10 2000 "(6) Downloading PCEND to verify it's 05 01 after
POR"
LFDDNLOD PCEND,NBYTES

```

Center for Astrophysics & Space Astronomy

```

Len  CRC  Buffer      Data
----  ----  -
0002 97EB 1           06 02

0002 F2DB 2           05 01

CHECK:  ($B2 eq '0501')
eval:   (0501... eq '0501')

S U C C E S S

Ver 01.09  Thu Nov 16 17:19:14 2000  "(7) Test 5_1_1_4a completed successfully"

Ver 01.09  Thu Nov 16 17:19:14 2000  "(10) Generating 06 02"

Len  CRC  Buffer      Data
----  ----  -
0002 97EB 1           06 02

0000 FFFF 2

Ver 01.09  Thu Nov 16 17:19:14 2000  "(11) Sending LFDRSTP to assure Boot State"
LFDRSTP

Ver 01.09  Thu Nov 16 17:19:15 2000  "(12) Downloading PCEND, checking for 05 01"
LFDDNLOD  PCEND,NBYTES

Len  CRC  Buffer      Data
----  ----  -
0002 F2DB 2           05 01

CHECK:  ($B2 eq '0501')
eval:   (0501... eq '0501')

S U C C E S S

Ver 01.09  Thu Nov 16 17:19:18 2000  "(13) Uploading 06 02"
LFDUPL0D  PCEND,NBYTES,CRC1

Ver 01.09  Thu Nov 16 17:19:19 2000  "(14) Downloading it to make sure it got to PCEND"
LFDDNLOD  PCEND,NBYTES

Len  CRC  Buffer      Data
----  ----  -
0002 97EB 1           06 02

0002 97EB 2           06 02

CHECK:  ($B1 eq $B2)
eval:   (0602... eq 0602...)

S U C C E S S

Ver 01.09  Thu Nov 16 17:19:21 2000  "(15) Sending LFDRSTW"
LFDWDOG   ENABLE
LFDRSTW

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

Addr Mask HK-Bit-Name  Value
----  ----  -

```

Center for Astrophysics & Space Astronomy

---

```
16F4 0008 LFDOPERT      0
Addr Addr HK-Name      Value
-----
1780-179F LFDIAGS      011C 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000
17A0-17BF      0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000

Ver 01.09 Thu Nov 16 17:19:27 2000 "(16) Downloading PCEND to verify it's not reset
after WDR"

LFDDNLOD PCEND,NBYTES

Len CRC Buffer      Data
----
0002 97EB 1      06 02
0002 97EB 2      06 02

CHECK: ($B2 eq '0602')
eval: (0602... eq '0602')

S U C C E S S

Ver 01.09 Thu Nov 16 17:19:31 2000 "(17) Test 5_1_1_4b terminated successfully"
```

Appendix D. Test Report stp5\_1\_1\_4.rp2

```

4          55555          1          1          4
4          5          11          11          4
4          ssss ttttt pppp 555          1          1          4
4          s          t p p          5          1          1
44444          sssss t pppp          5          1          1
4          s          t p          5 5          1          1
4          ssss          t p          555          111          111
4

```

Ver 01.09 Thu Nov 16 17:18:59 2000 "(-1) Sending two PORs. WAITING 1sec twice"

-----  
U P L O A D P A C K E T  
-----

80000000  
-----

-----  
U P L O A D P A C K E T  
-----

80000000  
-----

Ver 01.09 Thu Nov 16 17:19:01 2000 "(0) Generating upload data"

Ver 01.09 Thu Nov 16 17:19:01 2000 "(1) Sending LFDRSTP to assure Boot State"

-----  
C O M M A N D P A C K E T  
-----

```

          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000
          SN          OPCODE
0446FFFE 04440001 04420F0F 0440F0F0

```

Ver 01.09 Thu Nov 16 17:19:03 2000 "(2) Downloading PCEND, checking for nulls"

-----  
C O M M A N D P A C K E T  
-----

```

          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFF0 044C0002 044ADA9D 04482562
          SN          OPCODE
0446FFFD 04440002 04425151 0440AEAE

```

-----  
C O M M A N D P A C K E T  
-----

```

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

```

Center for Astrophysics & Space Astronomy

SN OPCODE  
0446FFFC 04440003 04427F7F 04408080

C O M M A N D P A C K E T

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

SN OPCODE  
0446FFFB 04440004 04427F7F 04408080

Ver 01.09 Thu Nov 16 17:19:06 2000 "(3) Uploading 0602"

U P L O A D P A C K E T

00400206

C O M M A N D P A C K E T

PARM4 PARM3 PARM2 PARM1 PARM0  
045AFFFF 04580000 0456FFFF 04540000 04526814 045097EB 044EFFF0 044C0002 044ADA9D 04482562

SN OPCODE  
0446FFFA 04440005 04425252 0440ADAD

Ver 01.09 Thu Nov 16 17:19:07 2000 "(4) Downloading it to make sure it got to PCEND"

C O M M A N D P A C K E T

PARM4 PARM3 PARM2 PARM1 PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFF0 044C0002 044ADA9D 04482562

SN OPCODE  
0446FFF9 04440006 04425151 0440AEAE

Ver 01.09 Thu Nov 16 17:19:09 2000 "(5) Sending POR"

U P L O A D P A C K E T

80000000

Ver 01.09 Thu Nov 16 17:19:10 2000 "(6) Downloading PCEND to verify it's 05 01 after POR"

C O M M A N D P A C K E T

PARM4 PARM3 PARM2 PARM1 PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFF0 044C0002 044ADA9D 04482562

SN OPCODE  
0446FFF8 04440007 04425151 0440AEAE



Center for Astrophysics & Space Astronomy

```
-----  
C O M M A N D   P A C K E T  
-----  
          PARM4          PARM3          PARM2          PARM1          PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000  
-----  
          SN          OPCODE  
0446FFF7 04440008 04427F7F 04408080  
-----
```

```
-----  
C O M M A N D   P A C K E T  
-----  
          PARM4          PARM3          PARM2          PARM1          PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000  
-----  
          SN          OPCODE  
0446FFF6 04440009 04427F7F 04408080  
-----
```

```
Ver 01.09 Thu Nov 16 17:19:14 2000 "(7) Test 5_1_1_4a completed successfully"  
Ver 01.09 Thu Nov 16 17:19:14 2000 "(10) Generating 06 02"  
Ver 01.09 Thu Nov 16 17:19:14 2000 "(11) Sending LFDSTP to assure Boot State"
```

```
-----  
C O M M A N D   P A C K E T  
-----  
          PARM4          PARM3          PARM2          PARM1          PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000  
-----  
          SN          OPCODE  
0446FFF5 0444000A 04420F0F 0440F0F0  
-----
```

```
Ver 01.09 Thu Nov 16 17:19:15 2000 "(12) Downloading PCEND, checking for 05 01"
```

```
-----  
C O M M A N D   P A C K E T  
-----  
          PARM4          PARM3          PARM2          PARM1          PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFF0 044C0002 044ADA9D 04482562  
-----  
          SN          OPCODE  
0446FFF4 0444000B 04425151 0440AEAE  
-----
```

```
-----  
C O M M A N D   P A C K E T  
-----  
          PARM4          PARM3          PARM2          PARM1          PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000  
-----  
          SN          OPCODE  
0446FFF3 0444000C 04427F7F 04408080  
-----
```

```
-----  
C O M M A N D   P A C K E T  
-----  
          PARM4          PARM3          PARM2          PARM1          PARM0  
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000  
-----  
          SN          OPCODE  
-----
```

Center for Astrophysics & Space Astronomy

0446FFF2 0444000D 04427F7F 04408080

Ver 01.09 Thu Nov 16 17:19:18 2000 "(13) Uploading 06 02"

U P L O A D P A C K E T

00400206

C O M M A N D P A C K E T

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000 0456FFFF 04540000 04526814 045097EB 044EFFFF 044C0002 044ADA9D 04482562				
SN	OPCODE			
0446FFF1 0444000E 04425252 0440ADAD				

Ver 01.09 Thu Nov 16 17:19:19 2000 "(14) Downloading it to make sure it got to PCEND"

C O M M A N D P A C K E T

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0002 044ADA9D 04482562				
SN	OPCODE			
0446FFF0 0444000F 04425151 0440AEAE				

Ver 01.09 Thu Nov 16 17:19:21 2000 "(15) Sending LFDRSTW"

C O M M A N D P A C K E T

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFE 04480001				
SN	OPCODE			
0446FFEF 04440010 04420E0E 0440F1F1				

C O M M A N D P A C K E T

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000				
SN	OPCODE			
0446FFEE 04440011 04420A0A 0440F5F5				

C O M M A N D P A C K E T

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000				
SN	OPCODE			
0446FFED 04440012 04427F7F 04408080				

Center for Astrophysics & Space Astronomy

-----  
C O M M A N D P A C K E T  
-----

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000	0456FFFF 04540000	0452FFFF 04500000	044EFFFF 044C0000	044AFFFF 04480000
SN	OPCODE			
0446FFEC 04440013	04427F7F	04408080		

-----

-----  
C O M M A N D P A C K E T  
-----

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000	0456FFFF 04540000	0452FFFF 04500000	044EFFFF 044C0000	044AFFFF 04480000
SN	OPCODE			
0446FFEB 04440014	04427F7F	04408080		

-----

Ver 01.09 Thu Nov 16 17:19:27 2000 "(16) Downloading PCEND to verify it's not reset after WDR"

-----  
C O M M A N D P A C K E T  
-----

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000	0456FFFF 04540000	0452FFFF 04500000	044EFFFF 044C0002	044ADA9D 04482562
SN	OPCODE			
0446FFEA 04440015	04425151	0440AEAE		

-----

-----  
C O M M A N D P A C K E T  
-----

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000	0456FFFF 04540000	0452FFFF 04500000	044EFFFF 044C0000	044AFFFF 04480000
SN	OPCODE			
0446FFE9 04440016	04427F7F	04408080		

-----

-----  
C O M M A N D P A C K E T  
-----

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000	0456FFFF 04540000	0452FFFF 04500000	044EFFFF 044C0000	044AFFFF 04480000
SN	OPCODE			
0446FFE8 04440017	04427F7F	04408080		

-----

Ver 01.09 Thu Nov 16 17:19:31 2000 "(17) Test 5\_1\_1\_4b terminated successfully"