

**COS DCE BOOT FSW v1.09 Component Test Results  
Requirement 5.5.4.1 HST Memory Monitors in Housekeeping**

Date:	February 13, 2001
Document Number:	COS-03-0036
Revision:	Initial Release
Contract No.:	NAS5-98043
CDRL No.:	N/A

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## REVISIONS

Letter	ECO No.	Description	Check	Approved	Date
-		Initial Release			
Original Release Name	Date	<b>THE UNIVERSITY OF COLORADO</b> At Boulder <b>The Center for Astrophysics and Space Astronomy</b>			
Drawn: K. Brownsberger	2-13-01	<b>COS DCE BOOT FSW v1.09 Component Test Results</b>			
Reviewed:		Requirement 5.5.4.1 HST Memory Monitors in			
Approved:		Housekeeping			
		Size	Code Indent No.	Document No.	Rev
		A		COS-03-0036	-
		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 5.5.4.1 — HST Memory Monitors in Housekeeping.

### 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 test was originally designed to show that “an LFDMADDR command with an index parameter in the range 0..7 does not generate an invalid-command diagnostic, but that LFDMADDR with an index of eight or higher produces a diagnostic.” However, the design of the FSW has been changed since the software and test requirements were originally written. In the present FSW design, the monitor index is obtained by re-computing LFDMADDR’s first argument “modulo-8”, effectively obviating the concept of “invalid index argument”. The test therefore demonstrates that the argument 8 is interpreted as 0, and that no diagnostic code is generated as a result. Hence, the command sequence

```
LFDMADDR 0,0xC000,0
```

```
...
```

```
LFDMADDR 8,0xC008,0
```

results merely in monitor address 0 (i.e., 0xC000) being overwritten with the value 0xC0008 (see the `stp5_5_4_1.rp1` listing in Appendix C).

## 1.6 TEST SCRIPT IMPLEMENTATION

### 1.6.1 Test Script Arguments

The script is not parameterized. The 8051 storage addresses 0xC000..0xC008 are “hard-coded” into the script.

### 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
<b>\disks\galex\users\galex\tcs\uniscrpt\</b>	<b>UniScript.pl</b>	<b>UniScript</b> interpreter
<b>\disks\galex\users\galex\tcs\uniscrpt\stp5_5_4_1\</b>	<b>u</b>	Shell script for this procedure
Ditto	<b>stp5_5_4_1.tst</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-03-0036	<i>DCE FSW Test Procedure 5.5.4.1 (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		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	slogin as <b>eagcos</b> ; get password from SSL personnel



4.1.6 Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		eagcos:shorty% <b>cd</b> /disks/galex/users/galex/tcs/uniscript/stp5_5_4_1 eagcos:shorty% <b>pwd</b> /disks/galex/users/galex/tcs/uniscript/stp5_5_4_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% <b>ls -l</b> Total 12 -rw-r--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_5_4_1.tst -rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u eagcos@shorty% <b>more &lt; u</b> #!/bin/sh perl ../UniScript.pl stp5_5_4_1 "0,0,0,0,0,0,0"	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		eagcos:shorty% <b>set path=(\$path ~dbb/scripts/bin)</b>	Set path as shown to enable access to hks tools

4.2.2 Execute the Script

Step	QA	Operator Entry/System Response	Description
8		eagcos:shorty% <b>sh u</b> \$pstring=0,0,0,0,0,0,0 Parameters are: Script File: stp5_5_4_1 #0: 0 #1: 0 #2: 0 #3: 0 #4: 0 #5: 0	Shell to <b>u</b> . You should see the accompanying output as <b>UniScript</b> executes

Step	QA	Operator Entry/System Response	Description
		<pre> #6: 0 #7: 0 Report file  &gt;/disks/galex/users/galex/tcs/uniscript/stp5_5_4_1/ stp5_5_4_1.rp1 successfully opened. Report file  &gt;/disks/galex/users/galex/tcs/uniscript/stp5_5_4_1/ stp5_5_4_1.rp2 successfully opened. Script file  /disks/galex/users/galex/tcs/uniscript/stp5_5_4_1/st p5_5_4_1.tst successfully opened at level 0.  "Sending two PORs with WAITs" "Clearing diagnostic stack"  LFDDIAGC  WAIT 0: HKV0=1; HKV1=0; wc=5 WAIT 1: HKV1=0; wc=4 WAIT 1: HKV1=1; wc=3 "Sending LFDMADDR 0,0xC000,0"  LFDMADDR 0,0xC000,0  "Sending LFDMADDR 1,0xC001,0"  LFDMADDR 1,0xC001,0  "Sending LFDMADDR 2,0xC002,0"  LFDMADDR 2,0xC002,0  "Sending LFDMADDR 3,0xC003,0"                     </pre>	

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Step	QA	Operator Entry/System Response	Description
		LFDMAADDR 3,0xC003,0 "Sending LFDMAADDR 4,0xC004,0" LFDMAADDR 4,0xC004,0 "Sending LFDMAADDR 5,0xC005,0" LFDMAADDR 5,0xC005,0 "Sending LFDMAADDR 6,0xC006,0" LFDMAADDR 6,0xC006,0 "Sending LFDMAADDR 7,0xC007,0" LFDMAADDR 7,0xC007,0 WAIT 0: HKV0=11; HKV1=10; wc=5 WAIT 1: HKV1=10; wc=4 WAIT 1: HKV1=11; wc=3 "Sending LFDMAADDR 8,0xC008,0" LFDMAADDR 8,0xC008,0 WAIT 0: HKV0=14; HKV1=12; wc=5 WAIT 1: HKV1=13; wc=4 WAIT 1: HKV1=14; wc=3 "Test 5.5.4.1 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\_5\_4\_1.tst**, **stp5\_5\_4\_1.rp1**, and **stp5\_5\_4\_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_4_1 "0,0,0,0,0,0,0,0"  
cosnoopy&
```

## Appendix B. Test Script stp5\_5\_4\_1.tst

```

; *****
; * STP 5.5.4.1 -- HST Memory Monitors in Housekeeping *
; * ----- *
; * Verify that an LFMADDR command with an index parameter in the range 0...7 *
; * does not generate and invalid-command diagnostic, but that LFMADDR with *
; * an index of 8 or higher produces a diagnostic. *
; *****
;
SYM      DIAG0011=0x0011
;
ECHO     2
;
DTG      3,"(0) Sending two PORs with WAITs"
WTO      "Sending two PORs with WAITs"
;
POR
WAIT     1
POR
WAIT     1
;
DTG      3,"(1) Clearing diagnostic stack"
WTO      "Clearing diagnostic stack"
;
LFDDIAGC
WAIT     5,HK
LOG      1,LFDDIAGS,LFDMONS,LFDMADD
;
DTG      3,"(2) Sending LFMADDR 0,0xC000,0"
WTO      "Sending LFMADDR 0,0xC000,0"
LFMADDR  0,0xC000,0
WAIT     1
;
DTG      3,"(3) Sending LFMADDR 1,0xC001,0"
WTO      "Sending LFMADDR 1,0xC001,0"
LFMADDR  1,0xC001,0
WAIT     1
;
DTG      3,"(4) Sending LFMADDR 2,0xC002,0"
WTO      "Sending LFMADDR 2,0xC002,0"
LFMADDR  2,0xC002,0
WAIT     1
;
DTG      3,"(5) Sending LFMADDR 3,0xC003,0"
WTO      "Sending LFMADDR 3,0xC003,0"
LFMADDR  3,0xC003,0
WAIT     1
;
DTG      3,"(6) Sending LFMADDR 4,0xC004,0"
WTO      "Sending LFMADDR 4,0xC004,0"
LFMADDR  4,0xC004,0
WAIT     1
;
DTG      3,"(7) Sending LFMADDR 5,0xC005,0"
WTO      "Sending LFMADDR 5,0xC005,0"
LFMADDR  5,0xC005,0
WAIT     1
;
DTG      3,"(8) Sending LFMADDR 6,0xC006,0"
WTO      "Sending LFMADDR 6,0xC006,0"
LFMADDR  6,0xC006,0
WAIT     1
;
DTG      3,"(9) Sending LFMADDR 7,0xC007,0"
WTO      "Sending LFMADDR 7,0xC007,0"
LFMADDR  7,0xC007,0
WAIT     5,HK
LOG      1,LFDDIAGS,LFDMONS,LFDMADD

```

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---

```
;
CHECK      1,NOTANY,DIAG0011
;
DTG        3,"(10) Sending LFDMAADR 8,0xC008,0"
WTO        "Sending LFDMAADR 8,0xC008,0"
LFDMAADR   8,0xC008,0
WAIT       5,HK
LOG        1,LFDDIAGS,LFDMONS,LFDMAADR
;
DTG        3,"(10) Test 5.5.4.1 completed successfully"
WTO        "Test 5.5.4.1 completed successfully"
```



Appendix C. Test Report stp5\_5\_4\_1.rp1

```

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

```

```

Ver 01.09 Sat Nov 18 04:41:33 2000 "(0) Sending two PORs with WAITs"
Ver 01.09 Sat Nov 18 04:41:35 2000 "(1) Clearing diagnostic stack"

```

LFDDIAGC

Addr	Addr	HK-Name	Value
1780-179F	LFDDIAGS	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	

```

1738-173F LFDMONS      FF FF FF FF FF FF FF FF
1740-174F LFDMAADD      0000 0000 0000 0000 0000 0000 0000 0000
Ver 01.09 Sat Nov 18 04:41:37 2000 "(2) Sending LFDMAADDR 0,0xC000,0"
LFDMAADDR 0,0xC000,0
Ver 01.09 Sat Nov 18 04:41:38 2000 "(3) Sending LFDMAADDR 1,0xC001,0"
LFDMAADDR 1,0xC001,0
Ver 01.09 Sat Nov 18 04:41:39 2000 "(4) Sending LFDMAADDR 2,0xC002,0"
LFDMAADDR 2,0xC002,0
Ver 01.09 Sat Nov 18 04:41:40 2000 "(5) Sending LFDMAADDR 3,0xC003,0"
LFDMAADDR 3,0xC003,0
Ver 01.09 Sat Nov 18 04:41:41 2000 "(6) Sending LFDMAADDR 4,0xC004,0"
LFDMAADDR 4,0xC004,0
Ver 01.09 Sat Nov 18 04:41:42 2000 "(7) Sending LFDMAADDR 5,0xC005,0"
LFDMAADDR 5,0xC005,0
Ver 01.09 Sat Nov 18 04:41:44 2000 "(8) Sending LFDMAADDR 6,0xC006,0"
LFDMAADDR 6,0xC006,0
Ver 01.09 Sat Nov 18 04:41:45 2000 "(9) Sending LFDMAADDR 7,0xC007,0"
LFDMAADDR 7,0xC007,0

```

Addr	Addr	HK-Name	Value
-----	-----	-----	-----

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```

1780-179F LFDDIAGS      0000 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 0000

```

1738-173F LFDMONS 00 00 00 00 00 00 00 00

1740-174F LFDMAADD C000 C001 C002 C003 C004 C005 C006 C007

```

CHECK:  NOTANY,DIAG0011
eval:   NOTANY,DIAG0011

```

S U C C E S S

Ver 01.09 Sat Nov 18 04:41:46 2000 "(10) Sending LFDMAADDR 8,0xC008,0"

LFDMAADDR 8,0xC008,0

Addr	Addr	HK-Name	Value
1780-179F	LFDDIAGS	0000 0000 0000 0000 0000 0000 0000 0000 0000 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 0000 0000 0000 0000 0000 0000 0000 0000 0000
1738-173F	LFDMONS	00 00 00 00 00 00 00 00	
1740-174F	LFDMAADD	C008 C001 C002 C003 C004 C005 C006 C007	

Ver 01.09 Sat Nov 18 04:41:48 2000 "(10) Test 5.5.4.1 completed successfully"

Appendix D. Test Report stp5\_5\_4\_1.rp2

```

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

```

Ver 01.09 Sat Nov 18 04:41:33 2000 "(0) Sending two PORs with WAITs"

P O R P A C K E T

80000000

P O R P A C K E T

80000000

Ver 01.09 Sat Nov 18 04:41:35 2000 "(1) Clearing diagnostic stack"

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 04420B0B 0440F4F4

```

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
0446FFFD 04440002 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
0446FFFC 04440003 04427F7F 04408080

```

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Ver 01.09 Sat Nov 18 04:41:37 2000 "(2) Sending LFDMAADR 0,0xC000,0"

```

-----
C O M M A N D   P A C K E T
-----
          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FFF 044CC000 044AFFFF 04480000
-----
          SN          OPCODE
0446FFF8 04440004 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:38 2000 "(3) Sending LFDMAADR 1,0xC001,0"

```

-----
C O M M A N D   P A C K E T
-----
          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FFE 044CC001 044AFFFE 04480001
-----
          SN          OPCODE
0446FFFA 04440005 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:39 2000 "(4) Sending LFDMAADR 2,0xC002,0"

```

-----
C O M M A N D   P A C K E T
-----
          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FFD 044CC002 044AFFFD 04480002
-----
          SN          OPCODE
0446FFF9 04440006 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:40 2000 "(5) Sending LFDMAADR 3,0xC003,0"

```

-----
C O M M A N D   P A C K E T
-----
          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FFC 044CC003 044AFFFC 04480003
-----
          SN          OPCODE
0446FFF8 04440007 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:41 2000 "(6) Sending LFDMAADR 4,0xC004,0"

```

-----
C O M M A N D   P A C K E T
-----
          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FFB 044CC004 044AFFFB 04480004
-----
          SN          OPCODE
0446FFF7 04440008 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:42 2000 "(7) Sending LFDMAADR 5,0xC005,0"

```

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

```

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```

      PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FFA 044CC005 044AFFFA 04480005
-----
      SN              OP CODE
0446FFF6 04440009 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:44 2000 "(8) Sending LFDMAADR 6,0xC006,0"

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

```

      PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FF9 044CC006 044AFFF9 04480006
-----
      SN              OP CODE
0446FFF5 0444000A 04427E7E 04408181
-----

```

Ver 01.09 Sat Nov 18 04:41:45 2000 "(9) Sending LFDMAADR 7,0xC007,0"

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

```

      PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FF8 044CC007 044AFFF8 04480007
-----
      SN              OP CODE
0446FFF4 0444000B 04427E7E 04408181
-----

```

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

```

      PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFF8 044C0000 044AFFFF 04480000
-----
      SN              OP CODE
0446FFF3 0444000C 04427F7F 04408080
-----

```

Ver 01.09 Sat Nov 18 04:41:46 2000 "(10) Sending LFDMAADR 8,0xC008,0"

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

```

      PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044E3FF7 044CC008 044AFFF7 04480008
-----
      SN              OP CODE
0446FFF2 0444000D 04427E7E 04408181
-----

```

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

```

      PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFF8 044C0000 044AFFFF 04480000
-----
      SN              OP CODE
0446FFF1 0444000E 04427F7F 04408080
-----

```

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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  
0446FFF0 0444000F 04427F7F 04408080  
-----
```

Ver 01.09 Sat Nov 18 04:41:48 2000 "(10) Test 5.5.4.1 completed successfully"