

**COS DCE BOOT FSW v1.09 Component Test Results
Requirement 5.1.1.5d Code in PROM**

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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 5.1.1.5 — Code in PROM: Verify proper CRC value is reported for the PROM code image.

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

Since UniScript automatically re-computes the CRCs of its buffers whenever they are modified in any way, it is necessary only to download the PROM area to a UniScript buffer, then compare the buffer's CRC with the CRC for the PROM code computed by the DCE FSW Boot State code.

1.6 TEST SCRIPT IMPLEMENTATION

The script forces Boot State by emitting a POR packet (0x80000000), then instructs FSW to (continuously) compute the CRC of the 6K (6144 = 0x1800) byte ROM area by means of the LFDRC 0,6144,1 command.

The "download" capability of the FSW has two important restrictions: it is limited to blocks of at most 1K (1024) bytes; and it can transfer data only from the External RAM of the 8051. Therefore the script downloads the ROM area in six separate single-page operations (a "page" = 1K bytes). Each of the six pages (at offsets 0, 1K, 2K, etc.) of ROM is moved to the "scratch area" (see 1.6.1 below), then downloaded to Buffer 2 at the appropriate page offset. After the sixth such download, Buffer 2 contains the complete ROM image. The HK data are interrogated to ensure that Buffer 2 has the right length (6144) and that its CRC matches the HK item LFMCR, which reports the CRC value requested by the LFDRC command issued previously.

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_1d.tst

Parameter	Meaning	Correct Argument for Version 1.09
#0	Absolute hex storage address of intermediate "scratch" buffer for ROM data	C000

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

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\uniscrpt\	UniScript.pl	UniScript interpreter
\disks\galex\users\galex\tcs\uniscrpt\stp5_1_1_5d\	u	Shell script for this procedure
Ditto	stp5_1_1_1d.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)	<i>NASA Basic Safety Manual</i>
2	COS-03-0016	<i>DCE FSW Test Procedure 5.1.1.1d (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> telnet shorty.ssl.berkeley.edu	Establish connection to shorty via Telnet client program
2		Login: tcs 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		<pre>tcs@shorty% slogin -l eagcos shorty.ssl.berkeley.edu 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 eagcos ; get password from SSL personnel

4.1.6 Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		<pre>eagcos:shorty% cd /disks/galex/users/galex/tcs/uniscript/stp5_1_1_5 d eagcos:shorty% pwd /disks/galex/users/galex/tcs/uniscript/stp5_1_1_5d</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% ls -l Total 12 -rw-r--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_1_1_5d.tst -rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u eagcos@shorty% more < u #!/bin/sh perl ../UniScript.pl stp5_1_1_5d "C000,0,0,0,0,0,0"</pre>	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		<p>eagcos:shorty% sh u \$pstring=0,0,0,0,0,0,0,0 Parameters are: Script File: stp5_1_1_5d #0: C000 #1: 0 #2: 0 #3: 0 #4: 0 #5: 0 #6: 0 #7: 0</p> <p>Report file</p> <p>>/disks/galex/users/galex/tcs/uniscript/stp5_1_1_5d /stp5_1_1_5d.rp1 successfully opened. Report file</p> <p>>/disks/galex/users/galex/tcs/uniscript/stp5_1_1_5d /stp5_1_1_5d.rp2 successfully opened. Script file</p> <p>/disks/galex/users/galex/tcs/uniscript/stp5_1_1_5d/s tp5_1_1_5d.tst successfully opened at level 0.</p> <p>"First 10-second wait ..."</p>	<p>Shell to u. You should see the accompanying output as UniScript executes</p>

		LFDRSTP "Second 10-second wait ..." "Test 5.1.1.5d Succeeded"	
--	--	---	--

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_5d.tst**, **stp5_1_1_5d.rp1**, and **stp5_1_1_5d.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  
kill cosnoopy  
perl ../UniScript.pl stp5_1_1_5d "C000,0,0,0,0,0,0,0"  
cosnoopy&
```

Appendix B. Test Script stp5_1_1_5d.tst

```

; *****
; * DCE FSW Requirement 5.1.1.5d -- Code in PROM *
; * ----- *
; * Verify proper CRC value is reported for PROM code image *
; * ----- *
; * Arguments: #0 = DCE "Scratch Area" = C000 in v1.07 *
; *****
;
ECHO      2
;
SYM      SCRATCH=0x#0
SYM      NSEC      =5
SYM      PAGESZ    =0x0400
SYM      PAGE0     =0x0000
SYM      PAGE1     =PAGE0+PAGESZ
SYM      PAGE2     =PAGE1+PAGESZ
SYM      PAGE3     =PAGE2+PAGESZ
SYM      PAGE4     =PAGE3+PAGESZ
SYM      PAGE5     =PAGE4+PAGESZ
SYM      NBYTES    =PAGE5+PAGESZ
SYM      ROM       =1
;
; *****
; * Move all of ROM to Buffer 2, 1K at a time *
; *****
;
DTG      3,"(0) Resetting"
WTO      "Resetting"
POR
WAIT     1
WAIT     NSEC,HK
LOG      1,LFDCBUF,LFDDIAGS,LFDSWVER,LFSBITS1,LFDOPERT,LFMROM
;
;
; #####
; # Download first 64 bytes to Buffer 1 #
; #####
;
LFDCRC   0x0000,NBYTES,ROM
WAIT     1
;
DTG      3,"(1) Downloading first 64 bytes of ROM to Buffer 1"
WTO      "Downloading first 64 bytes of ROM to Buffer 1"
LFDCOPY  0x0000,SCRATCH,64,ROM
WAIT     NSEC,HK
LFDDNLOD SCRATCH,64
WAIT     NSEC,HK
RECV     1,0,64
WAIT     NSEC,HK
LOG      1,LFDCBUF,LFDDIAGS,LFDSWVER,LFSBITS1,LFDOPERT,LFMROM,1,2
;
DTG      3,"(2) Downloading Page 0"
WTO      "Downloading Page 0"
;
LFDCOPY  PAGE0,SCRATCH,PAGESZ,ROM
WAIT     NSEC,HK
LFDDNLOD SCRATCH,PAGESZ
WAIT     NSEC,HK
RECV     2,PAGE0,PAGESZ
;LOG     1,LFDCBUF,LFDDIAGS,LFDSWVER,LFSBITS1,LFDOPERT,LFMROM,1,2
;
DTG      3,"(3) Downloading Page 1"
WTO      "Downloading Page 1"
;
LFDCOPY  PAGE1,SCRATCH,PAGESZ,ROM

```

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```

WAIT      NSEC,HK
LFDDNLOD  SCRATCH,PAGSZ
WAIT      NSEC,HK
RECV      2,PAGE1,PAGSZ
WAIT      NSEC,HK
;LOG      1,LFDCBUF,LFDDIAGS,LFDSWVER,LFSBITS1,LFDOPERT,LFMROM,1,2
;
DTG       3,"(4) Downloading Page 2"
WTO       "Downloading Page 2"
;
LFDCOPY   PAGE2,SCRATCH,PAGSZ,ROM
WAIT      NSEC
LFDDNLOD  SCRATCH,PAGSZ
WAIT      NSEC,HK
RECV      2,PAGE2,PAGSZ
WAIT      NSEC,HK
;LOG      1,1,2
;
DTG       3,"(5) Downloading Page 3"
WTO       "Downloading Page 3"
;
LFDCOPY   PAGE3,SCRATCH,PAGSZ,ROM
WAIT      NSEC
LFDDNLOD  SCRATCH,PAGSZ
WAIT      NSEC,HK
RECV      2,PAGE3,PAGSZ
WAIT      NSEC,HK
;LOG      1,1,2
;
DTG       3,"(6) Downloading Page 4"
WTO       "Downloading Page 4"
;
LFDCOPY   PAGE4,SCRATCH,PAGSZ,ROM
WAIT      NSEC,HK
LFDDNLOD  SCRATCH,PAGSZ
WAIT      NSEC,HK
RECV      2,PAGE4,PAGSZ
WAIT      NSEC,HK
;LOG      1,1,2
;
DTG       3,"(7) Downloading Page 5"
WTO       "Downloading Page 5"
;
LFDCOPY   PAGE5,SCRATCH,PAGSZ,ROM
WAIT      NSEC,HK
LFDDNLOD  SCRATCH,PAGSZ
WAIT      NSEC,HK
RECV      2,PAGE5,PAGSZ
WAIT      NSEC,HK
;LOG      1,1,2
;
; *****
; * The CRC for Buffer 2 should now equal the CRC reported in HK for ROM *
; *****
;
LOG       1,LFMCRC,1,2
CHECK     1,($L2 == 0x1800)
CHECK     1,($LFMCRC == $CRC2)
;
DTG       3,"(8) stp5.1.1.5d completed successfully"
WTO       "stp5.1.1.5d completed successfully"

```

Appendix C. Test Report stp5_1_1_5d.rp1

```

55555      1          1          55555
                    5          11          11          5
                    ssss ttttt pppp 555          1          1          555
dddd
d  d          s          t          p          p          5          1          1          5
d  d          sssss          t          pppp          5          1          1          5
d  d          s          t          p          5          5          1          1          5          5
dddd          ssss          t          p          555          111          111          555

```

Ver 01.09 Thu Nov 16 20:46:40 2000 "(0) Resetting"

```

Addr Addr HK-Name      Value
-----
1664-167F LFDCCBUF      8080 7F7F 002B FFD4 0000 FFFF 0000 FFFF 0000 FFFF 0000
FFFF 0000 FFFF

1780-179F LFDDIAGS      0A32 0932 0832 0706 0632 0506 0406 0332 0232 011B 0000
0000 0000 0000 0000 0000
17A0-17BF          0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000

16FE-16FF LFDSWVER      0109
16F4-16F5 LFSBITS1      0000

```

```

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

```

```

Addr Addr HK-Name      Value
-----
16FC-16FD LFMROM        D89D

```

LFDCRC 0x0000,NBYTES,ROM

Ver 01.09 Thu Nov 16 20:46:43 2000 "(1) Downloading first 64 bytes of ROM to Buffer 1"

LFDCOPY 0x0000,SCRATCH,64,ROM

LFDDNLOD SCRATCH,64

```

Addr Addr HK-Name      Value
-----
1664-167F LFDCCBUF      8080 7F7F 0006 FFF9 0000 FFFF 0000 FFFF 0000 FFFF 0000
FFFF 0000 FFFF

1780-179F LFDDIAGS      011B 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

16FE-16FF LFDSWVER      0109
16F4-16F5 LFSBITS1      0000

```

```

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

```

```

Addr Addr HK-Name      Value
-----
16FC-16FD LFMROM        D89D

```

```

Len  CRC  Buffer      Data

```


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```

-----
0040 A59F 1          02 01 90 20 7F 02 01 40 02 80 03 20 7F 02 01 80 02 80 0B 20 7F
02 01 60 02 80 13 20 7F 02 01 D0
                                02 80 1B 20 7F 02 01 E0 02 80 23 20 7F 02 01 F0 02 80 2B 20 7F
02 21 00 02 80 33 FF FF FF FF FF

```

0000 FFFF 2

Ver 01.09 Thu Nov 16 20:46:48 2000 "(2) Downloading Page 0"

LFDCOPY PAGE0,SCRATCH,PAGSZ,ROM

LFDDNLOD SCRATCH,PAGSZ

Ver 01.09 Thu Nov 16 20:46:53 2000 "(3) Downloading Page 1"

LFDCOPY PAGE1,SCRATCH,PAGSZ,ROM

LFDDNLOD SCRATCH,PAGSZ

Ver 01.09 Thu Nov 16 20:46:58 2000 "(4) Downloading Page 2"

LFDCOPY PAGE2,SCRATCH,PAGSZ,ROM

LFDDNLOD SCRATCH,PAGSZ

Ver 01.09 Thu Nov 16 20:47:02 2000 "(5) Downloading Page 3"

LFDCOPY PAGE3,SCRATCH,PAGSZ,ROM

LFDDNLOD SCRATCH,PAGSZ

Ver 01.09 Thu Nov 16 20:47:05 2000 "(6) Downloading Page 4"

LFDCOPY PAGE4,SCRATCH,PAGSZ,ROM

LFDDNLOD SCRATCH,PAGSZ

Ver 01.09 Thu Nov 16 20:47:11 2000 "(7) Downloading Page 5"

LFDCOPY PAGE5,SCRATCH,PAGSZ,ROM

LFDDNLOD SCRATCH,PAGSZ

Addr	Addr	HK-Name	Value
171A-171B	LFMCRC		D89D

Len	CRC	Buffer	Data
0040	A59F	1	02 01 90 20 7F 02 01 40 02 80 03 20 7F 02 01 80 02 80 0B 20 7F
02	01	60 02 80 13 20 7F	02 01 D0
02	21	00 02 80 33 FF FF FF FF FF	02 80 1B 20 7F 02 01 E0 02 80 23 20 7F 02 01 F0 02 80 2B 20 7F
1800	D89D	2	02 01 90 20 7F 02 01 40 02 80 03 20 7F 02 01 80 02 80 0B 20 7F
02	01	60 02 80 13 20 7F	02 01 D0
02	21	00 02 80 33 FF FF FF FF FF	02 80 1B 20 7F 02 01 E0 02 80 23 20 7F 02 01 F0 02 80 2B 20 7F
D0	82	D0 83 D0 F0 D0 E0	32 FF FF
D0	82	D0 83 D0 F0 D0 E0	32 FF FF
18	90	24 60 E0 04 F0 C3	E5 3B 95
E4	F0	D0 D0 D0 82 D0 83	D0 F0 D0
F0	A3	74 00 F0 74 31 12	0A 40 32

0040 A59F 1

02 01 90 20 7F 02 01 40 02 80 03 20 7F 02 01 80 02 80 0B 20 7F

02 01 60 02 80 13 20 7F 02 01 D0

02 21 00 02 80 33 FF FF FF FF FF

02 80 1B 20 7F 02 01 E0 02 80 23 20 7F 02 01 F0 02 80 2B 20 7F

1800 D89D 2

02 01 90 20 7F 02 01 40 02 80 03 20 7F 02 01 80 02 80 0B 20 7F

02 01 60 02 80 13 20 7F 02 01 D0

02 21 00 02 80 33 FF FF FF FF FF

C0 E0 C0 F0 C0 83 C0 82 C0 D0 75 D0 08 90 53 00 12 01 10 D0 D0

D0 82 D0 83 D0 F0 D0 E0 32 FF FF

C0 E0 C0 F0 C0 83 C0 82 C0 D0 75 D0 08 90 57 00 12 01 10 D0 D0

D0 82 D0 83 D0 F0 D0 E0 32 FF FF

C0 E0 C0 F0 C0 83 C0 82 C0 D0 75 D0 08 75 8A 00 75 8C CC 75 8A

18 90 24 60 E0 04 F0 C3 E5 3B 95

81 50 03 85 81 3B D5 30 0E 75 30 32 90 24 61 12 06 A0 90 24 60

E4 F0 D0 D0 D0 82 D0 83 D0 F0 D0

E0 32 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 90 24 DD 74 1B

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90 24 DD 74 23 F0 A3 74 00 F0 74 31 12 0A 40 32 90 24 DD 74 2B
F0 A3 74 00 F0 74 31 12 0A 40 32
90 24 DD 74 33 F0 A3 74 00 F0 74 31 12 0A 40 32 E0 F5 34 15 83
E0 F5 33 15 83 E0 F5 32 15 83 E0
F5 31 E5 34 30 E7 13 54 7F 70 46 E5 33 70 42 E5 32 70 3E E5 31
70 3A 02 05 70 C3 E5 33 94 40 E5
34 54 1F F5 34 94 00 40 28 E5 33 94 5B E5 34 94 04 50 1E E5 34
F5 83 E5 33 F5 82 43 83 20 E5 31
F0 A3 E5 32 F0 D2 00 90 24 40 E0 70 1C C2 00 80 18 90 24 D6 12
06 90 90 24 D8 E5 31 F0 A3 E5 32
F0 A3 E5 33 F0 A3 E5 34 F0 22 FF FF FF FF FF FF 75 A8 00 75 B8
00 75 88 00 75 81 51 12 07 50 12
09 80 12 09 B0 12 02 B0 C2 7F D2 AF 75 89 11 75 30 32 D2 8C D2
A9 D2 8D C2 88 D2 A8 C2 8A D2 AA
75 48 01 12 0B 40 12 0C 10 12 07 60 02 01 D0 FF E5 81 64 51 60
08 74 17 12 0A 40 75 81 51 90 24
D1 12 06 90 30 00 05 C2 00 12 02 30 30 01 08 20 00 05 C2 01 12
09 30 30 02 0B 20 00 08 20 01 05
C2 02 12 09 35 30 03 15 20 00 12 20 01 0F 20 02 0C 12 08 00 20
03 06 12 03 20 12 03 00 30 04 0C
20 00 09 20 01 06 20 02 03 12 0B 00 02 01 D0 FF 12 06 E0 70 39
30 0B 03 12 07 30 12 06 70 90 24
C9 12 06 A0 10 08 27 90 24 CD 12 06 90 30 0A 14 C2 0A C2 09 90
24 CF 12 06 90 90 24 40 E0 90 24
D5 F0 80 0A 30 09 07 C2 09 74 13 12 0A 40 C2 09 12 07 60 22 FF
FF FF FF FF FF FF FF FF FF FF FF FF
90 25 62 E0 60 0A 14 60 07 F9 78 02 D8 FE D9 FA 90 47 00 F0 90
25 63 E0 60 0A 14 60 07 F9 78 02
D8 FE D9 FA 90 47 00 E0 22 FF FF FF FF FF FF FF 90 3F FA E0 B4
55 1B A3 E0 B4 AA 16 A3 E0 B4 00
11 A3 E0 B4 FF 0C A3 E0 B4 9B 07 A3 E0 B4 64 02 80 25 90 3F FA
74 55 F0 A3 74 AA F0 A3 74 00 F0
A3 74 FF F0 A3 74 9B F0 A3 74 64 F0 74 1B 12 0A 40 12 0A 00 02
02 FC 74 1C 12 0A 40 22 FF FF FF
90 24 A6 7E 00 7F 08 12 09 F0 90 24 D1 E4 F0 A3 F0 90 24 C8 E4
F0 22 FF FF FF FF FF FF FF FF FF FF
90 24 40 7E 00 7F 1C 12 09 F0 22 FF FF FF FF FF D2 08 22 FF FF
FF FF FF FF FF FF FF FF FF FF FF FF
C0 D0 75 D0 10 90 24 4C E0 FA A3 E0 FB 90 24 50 E0 FC 90 24 48
E0 54 07 05 E0 F8 90 24 EB 74 01
80 03 23 A3 A3 D8 FB FD F4 F9 EA F0 A3 EB F0 EC 54 03 23 90 03
77 73 80 06 80 12 80 18 80 24 90
24 E2 E0 59 F0 90 24 E1 E0 59 F0 80 14 90 24 E2 E0 4D F0 80 0C
90 24 E2 E0 59 F0 90 24 E1 E0 4D
F0 D2 0A D0 D0 22 FF FF FF FF FF FF FF FF FF C0 D0 75 D0 10
90 24 50 E0 FA A3 E0 70 4A 78 00
EA 60 05 78 01 14 70 40 E8 C0 E0 90 24 4C E0 C0 E0 A3 E0 C0 E0
90 24 48 E0 C0 E0 A3 E0 C0 E0 90
25 E0 D0 E0 F0 A3 D0 E0 F0 A3 D0 E0 F0 A3 D0 E0 F0 A3 D0 E0 F0
90 25 E6 E4 F0 A3 F0 A3 F0
75 48 00 12 0B 40 D2 0A D0 D0 22 FF FF FF FF FF C0 D0 75 D0 10
90 24 48 E0 FA A3 E0 FB 90 24 4C
E0 FC A3 E0 FD 90 24 50 E0 FF A3 E0 F8 B8 00 05 BF 00 02 80 18
90 24 54 E0 F9 A3 E0 70 0F C2 05
E9 60 05 D2 05 14 70 05 12 06 B0 D2 0A D0 D0 22 C0 D0 75 D0 10
D2 07 90 24 50 E0 70 06 A3 E0 70
02 C2 07 90 24 4C E0 F9 A3 E0 FB C3 E9 94 01 EB 94 00 C3 94 04
40 07 74 01 12 0A 40 80 54 EB F8
E9 FF 30 07 37 75 3C FF 75 3D FF 90 20 40 B9 00 02 80 01 0B E0
12 0A C0 A3 D9 F9 DB F7 90 24 D3
E5 3D F0 A3 E5 3C F0 90 24 50 E0 B5 3D 07 A3 E0 B5 3C 02 80 07
74 02 12 0A 40 80 16 7B 20 7A 40
90 24 48 E0 FC A3 E0 FD C2 05 12 06 B0 12 0C 10 D2 0A D0 D0 22
FF FF FF FF FF FF FF FF FF FF FF FF
C0 D0 75 D0 10 90 24 4C E0 F9 A3 E0 FB C3 E9 94 01 EB 94 00 C3
94 04 40 07 74 03 12 0A 40 80 5B
EB F8 E9 FF 75 3C FF 75 3D FF 90 24 48 E0 FC A3 E0 F5 83 8C 82
C0 83 C0 82 B9 00 02 80 01 0B E0
12 0A C0 A3 D9 F9 DB F7 90 24 D3 E5 3D F0 A3 E5 3C F0 D2 01 D0
82 D0 83 AB 83 AA 82 7D 30 7C 40

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C2 05 12 06 B0 8D 83 8C 82 74 DD 80 02 F0 A3 A8 82 B8 40 F9 A8
83 B8 34 F4 D2 0A D0 D0 22 FF FF
90 24 48 E0 C0 E0 A3 E0 F5 83 D0 82 E4 D2 0A 73 90 3F FA 74 00
F0 B2 B5 7A 40 78 7A 79 07 D8 FE
D9 FC B2 B5 DA F4 74 1F 12 0A 40 22 FF FF FF FF C0 D0 75 D0 10
90 24 48 E0 F8 A3 E0 70 12 E8 60
05 14 60 07 80 0A 12 07 50 80 03 12 07 30 D2 0A D0 D0 22 FF FF
FF FF FF FF FF FF FF FF FF FF FF FF
75 A8 00 D2 7F 75 D0 00 75 81 51 75 88 00 02 80 00 FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF
C0 D0 75 D0 10 78 40 90 24 65 E4 F0 A3 D8 FC D2 0A D0 D0 22 FF
FF FF FF FF FF FF FF FF FF FF FF FF
C2 AF D2 8C D2 A9 75 8A 00 75 8C FF 75 D8 00 75 E9 00 75 F9 00
75 EE 01 75 FE 00 75 D9 44 75 DE
48 75 D8 40 D2 AF 7A 03 78 B4 79 82 D8 FE D9 FC DA F6 74 1F 12
0A 40 22 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF C2 09 74 11 12
0A 40 22 FF FF FF FF FF FF FF FF FF FF
C2 09 74 2F 12 0A 40 22 FF FF FF FF FF FF FF FF FF FF D2 09 90 24 40
E0 54 7F 90 0D 10 12 0C F0 85 F0
83 F5 82 E4 73 FF FF FF FF FF FF FF FF FF FF E0 24 01 F0 A3
E0 34 00 F0 A3 22 FF FF FF FF FF
12 06 90 50 03 12 06 90 22 FF FF FF FF FF FF FF BF 00 02 80 01
08 8B 83 8A 82 20 05 03 E0 80 02
E4 93 A3 AB 83 AA 82 8D 83 8C 82 F0 A3 AD 83 AC 82 DF E3 D8 E1
22 FF FF FF FF FF FF FF FF FF FF
90 24 40 E0 20 E7 09 74 04 12 0A 40 74 FF 80 3D E0 F5 31 A3 E0
B5 31 07 78 07 90 24 40 80 09 74
05 12 0A 40 74 FF 80 25 E0 F5 31 A3 E0 F5 32 A3 E0 F5 33 A3 E0
A3 F4 B5 32 0C E5 33 F4 B5 31 06
D8 E6 74 00 80 07 74 06 12 0A 40 74 FF 22 FF FF C2 AF 75 D8 00
75 E9 00 75 F9 00 75 EE F4 75 FE
01 75 D9 44 75 DE 48 75 D8 40 D2 0B D2 AF 22 FF 75 D9 00 75 DE
00 75 D8 00 C2 0B 22 FF FF FF FF
90 25 00 E0 D2 E6 20 0B 02 C2 E6 F0 90 40 00 E0 54 F8 90 25 01
F0 90 45 00 E0 90 25 02 F0 90 42
00 E0 90 25 03 F0 C2 94 90 43 00 E0 D2 94 90 25 04 F0 E4 C0 E0
90 40 00 E0 30 E7 06 D0 E0 D2 E0
C0 E0 90 45 00 E0 30 E7 06 D0 E0 D2 E1 C0 E0 D0 E0 90 24 DC F0
90 24 BE 7E 00 7F 0A 12 09 F0 90
24 C8 E0 60 19 24 FA 50 02 74 FF 24 06 23 FF 78 00 7B 24 7A 65
7D 24 7C BE C2 05 12 06 B0 12 0C
60 75 4B 34 75 4C 40 75 49 26 75 4A A0 75 50 00 D2 03 22 FF FF
FF FF FF FF FF FF FF FF FF FF
20 00 02 80 03 02 09 29 E5 50 B4 00 1C 85 49 83 85 4A 82 E0 F5
4D A3 E0 F5 4E A3 E0 F5 4F A3 E0
F5 50 A3 85 83 49 85 82 4A C3 E5 4C 94 40 E5 4B 94 34 40 09 94
04 50 05 E5 4D B4 00 07 C2 03 D2
02 02 09 29 B4 01 04 D2 05 80 05 B4 02 2E C2 05 AB 4E AA 4F AD
4B AC 4C 78 00 AF 50 BB 62 02 D2
95 BB 63 02 D2 95 BB 43 02 C2 94 12 06 B0 C2 95 D2 94 8D 4B 8C
4C 75 50 00 02 08 00 B4 03 18 A8
4F 85 4B 83 85 4C 82 E6 F0 A3 08 D5 50 F9 85 83 4B 85 82 4C 02
08 00 B4 06 1E E5 4E 90 40 00 F0
12 02 80 85 4B 83 85 4C 82 F0 A3 85 83 4B 85 82 4C 05 4E 15 50
02 08 00 B4 07 1B C3 E5 4F 94 40
E5 4E 94 34 40 0A 94 04 50 06 85 4E 4B 85 4F 4C 75 50 00 02 08
00 B4 08 0F E5 50 25 4C F5 4F E5
4B 34 00 F5 4E 02 08 BB B4 09 15 85 4B 83 85 4C 82 E4 F0 A3 D5
50 FB 85 83 4B 85 82 4C 02 08 00
B4 46 0E A8 4E 12 0C 30 E5 4D 90 40 00 F0 02 08 A0 B4 82 0E A8
4E 12 0C 38 E5 4D 90 40 00 F0 02
08 A0 C2 03 D2 02 02 09 29 22 FF FF FF FF FF FF 90 30 40 80 03
90 34 40 78 02 79 00 12 09 50 A3
A3 D9 F9 D8 F7 22 FF FF FF FF FF FF FF FF FF FF 85 82 37 85 83
38 E0 F5 35 A3 E0 F5 36 E5 35 90
50 00 F0 E5 36 05 83 F0 E5 37 05 83 F0 E5 38 54 1F 05 83 F0 85
37 82 85 38 83 22 FF FF FF FF
D2 96 C2 95 C2 97 78 03 D8 FE D2 97 C2 94 74 00 90 42 00 F0 90
43 00 F0 D2 94 D2 90 D2 91 C2 92

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```
C2 93 22 FF FF FF FF FF FF FF FF FF FF FF FF FF FF C3 74 52 94 20
FF 78 20 76 00 08 DF FB 90 20 40
7E 04 7F 00 12 09 F0 90 24 40 7E 00 7F 1C 12 09 F0 90 30 40 7E
04 7F 00 12 09 F0 90 34 40 7E 04
7F 00 12 09 F0 90 24 60 7E 01 7F 00 12 09 F0 22 BF 00 02 80 01
0E E4 F0 A3 DF FC DE FA 22 FF FF
90 15 60 E4 93 FB A3 E4 93 FA A3 E4 93 FD A3 E4 93 FC A3 E4 93
F8 A3 E4 93 FF A3 B8 00 05 BF 00
02 80 0F C0 83 C0 82 D2 05 12 06 B0 D0 82 D0 83 80 D1 22 FF FF
FF FF FF FF FF FF FF FF FF FF FF FF
C0 E0 90 25 70 12 0C D0 70 06 E5 F0 70 02 80 3E 78 08 79 FF 90
24 A5 A3 09 E0 60 04 D8 F9 80 2E
D0 E0 F0 C0 E0 90 25 70 12 0C D0 85 F0 83 F5 82 E4 12 0C D0 C0
E0 C0 F0 90 24 AE E9 23 25 82 F5
82 E5 83 34 00 F5 83 D0 E0 F0 A3 D0 E0 F0 D0 E0 F5 F0 90 24 A5
E0 04 F0 C0 E0 C0 F0 90 24 65 78
20 E0 F5 F0 D0 E0 F0 A3 E0 F9 D0 E0 F0 E9 C0 E0 C0 F0 A3 D8 EC
D0 E0 D0 E0 90 24 C8 E0 04 F0 22
F5 40 E5 3D F5 3F E5 3C 65 40 F5 3E C4 54 0F 65 3E F5 3E C4 54
F0 65 3F F5 3F E5 3E C4 F5 41 54
F0 C3 33 C5 41 54 0F 33 65 3F F5 3C E5 41 65 3E F5 3D E5 40 22
FF FF FF FF FF FF FF FF FF FF FF FF
85 46 3C 85 47 3D 85 42 83 85 43 82 20 00 28 30 06 04 E4 93 80
01 E0 12 0A C0 A3 85 83 42 85 82
43 D5 45 E8 D5 44 E5 85 3C 46 85 3D 47 12 0B 90 F5 48 12 0B 40
80 06 85 3C 46 85 3D 47 22 FF FF
C2 04 C3 E5 48 94 10 50 3B 90 25 E0 E5 48 75 F0 0C A4 25 82 F5
82 E5 F0 35 83 F5 83 E0 F5 42 A3
E0 F5 43 A3 E0 F5 44 A3 E0 F5 45 A3 E0 C2 06 60 05 D2 06 14 70
0E 75 46 FF 75 47 FF E5 45 60 02
05 44 D2 04 22 FF FF FF FF FF FF FF FF FF FF FF FF 90 25 E5 E5 48
75 F0 0C A4 25 82 F5 82 E5 F0 35
83 F5 83 E0 C0 E0 A3 E5 47 F0 A3 E5 46 F0 A3 75 F0 00 E0 C0 E0
E5 47 F0 A3 D0 E0 C0 E0 60 03 75 F0 01 E5 F0 70
F0 01 E0 C0 E0 E5 46 F0 A3 D0 E0 C0 E0 60 03 75 F0 01 E5 F0 70
06 D0 E0 D0 E0 80 25 D0 E0 B5 46
07 D0 E0 B5 47 04 80 19 D0 E0 E0 B4 5A 13 A3 E0 C0 E0 90 24 DF
E5 48 F0 A3 74 00 F0 D0 E0 12 0A
40 D0 E0 22 FF FF FF FF FF FF FF FF FF FF FF FF 74 10 60 16 F8
90 25 E8 E4 F0 A3 F0 74 0B 25 82
F5 82 E5 83 34 00 F5 83 D8 EE 22 FF FF FF FF FF FF C2 90 C2 93 D2
92 80 06 C2 90 C2 92 D2 93 E8 78
10 C9 33 C9 33 92 91 D2 90 00 00 C2 90 D8 F2 C2 92 C2 93 22 FF
FF FF FF FF FF FF FF FF FF FF FF FF
7F 08 90 24 EB AE 83 AD 82 90 24 E3 AC 83 AB 82 7A 01 8E 83 8D
82 E0 F5 3A A3 E0 F5 39 90 24 E2
E0 5A 70 1F 90 24 E1 E0 5A 60 0A A9 3A E7 8C 83 8B 82 F0 80 1B
85 39 83 85 3A 82 E0 8C 83 8B 82
F0 80 0D 85 39 83 85 3A 82 E4 93 8C 83 8B 82 F0 8C 83 8B 82 A3
AC 83 AB 82 8E 83 8D 82 A3 A3 AE
83 AD 82 EA 23 FA DF AA 22 FF FF FF FF FF FF FF FF C0 83 C0 82 54
7F 23 25 82 F5 82 E5 83 34 00 F5
83 E0 F5 F0 A3 E0 D0 82 D0 83 22 FF FF FF FF FF FF C0 83 C0 82 54
7F 23 25 82 F5 82 E5 83 34 00 F5
83 E4 93 F5 F0 A3 E4 93 D0 82 D0 83 22 FF FF FF FF 03 30 03 40 03
B0 04 10 06 50 06 60 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06
50 06 50 06 50 06 60 06 50 06 60
06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06
60 06 50 06 60 06 50 06 60 06 50 06 60 06 50 06 50 04 50 04 E0 06 50 06 50 06 50 06
50 06 50 06 50 06 50 06 60 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06
60 06 60 06 60 06 60 06 60 06 50 06 60 06 50 06 50 06 50 06 50 06 50 06 60 06 60 06
50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06
50 06 50 06 50 06 50 06 60 06 60 06 60 06 60 06 50 06 50 06 50 06 50 06 50 06 50 06
50 06 50 06 50 06 50 06 60 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06 50 06
50 05 C0 05 E0 06 00 06 50 06 50
```


Appendix D. Test Report stp5_1_1_5d.rp2

```

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

```

Ver 01.09 Thu Nov 16 20:46:40 2000 "(0) Resetting"

P O R P A C K E T

80000000

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

```

          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFE 04500001 044EE7FF 044C1800 044AFFFF 04480000
          SN          OPCODE
0446FFFE 04440001 04427D7D 04408282

```

Ver 01.09 Thu Nov 16 20:46:43 2000 "(1) Downloading first 64 bytes of ROM to Buffer 1"

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

```

          PARM4          PARM3          PARM2          PARM1          PARM0
045AFFFF 04580000 0456FFFE 04540001 0452FFBF 04500040 044E3FFF 044CC000 044AFFFF 04480000
          SN          OPCODE
0446FFFD 04440002 04427C7C 04408383

```

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

```

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

```


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0446FFFB 04440004 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	044EFFBF 044C0040	044A3FFF 0448C000
SN	OPCODE			
0446FFFA 04440005	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			
0446FFF9 04440006	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			
0446FFF8 04440007	04427F7F	04408080		

Ver 01.09 Thu Nov 16 20:46:48 2000 "(2) Downloading Page 0"

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

PARM4	PARM3	PARM2	PARM1	PARM0
045AFFFF 04580000	0456FFFE 04540001	0452FBFF 04500400	044E3FFF 044CC000	044AFFFF 04480000
SN	OPCODE			
0446FFF7 04440008	04427C7C	04408383		

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		

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	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 044EFBFF 044C0400 044A3FFF 0448C000

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
0446FFF2 0444000D 04427F7F 04408080

Ver 01.09 Thu Nov 16 20:46:53 2000 "(3) Downloading Page 1"

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

PARM4 PARM3 PARM2 PARM1 PARM0
045AFFFF 04580000 0456FFFE 04540001 0452FBFF 04500400 044E3FFF 044CC000 044AFBFF 04480400

SN OPCODE
0446FFF1 0444000E 04427C7C 04408383

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

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

PARM4 PARM3 PARM2 PARM1 PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFBFF 044C0400 044A3FFF 0448C000

SN OPCODE
0446FFFE 04440010 04425151 0440AEAE

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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
0446FFEE 04440011 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
0446FFED 04440012 04427F7F 04408080
-----

```

Ver 01.09 Thu Nov 16 20:46:58 2000 "(4) Downloading Page 2"

```

-----
C O M M A N D   P A C K E T
-----
      PARM4      PARM3      PARM2      PARM1      PARM0
045AFFFF 04580000 0456FFFE 04540001 0452FBFF 04500400 044E3FFF 044C0000 044AF7FF 04480800
-----
      SN      OPCODE
0446FFEC 04440013 04427C7C 04408383
-----

```

```

-----
C O M M A N D   P A C K E T
-----
      PARM4      PARM3      PARM2      PARM1      PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFBFF 044C0400 044A3FFF 0448C000
-----
      SN      OPCODE
0446FFEB 04440014 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
0446FFEA 04440015 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
0446FFE9 04440016 04427F7F 04408080
-----

```

Ver 01.09 Thu Nov 16 20:47:02 2000 "(5) Downloading Page 3"

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```

-----
C O M M A N D   P A C K E T
-----
      PARM4      PARM3      PARM2      PARM1      PARM0
045AFFFF 04580000 0456FFFE 04540001 0452FBFF 04500400 044E3FFF 044CC000 044AF3FF 04480C00
-----
      SN      OPCODE
0446FFE8 04440017 04427C7C 04408383
-----

```

```

-----
C O M M A N D   P A C K E T
-----
      PARM4      PARM3      PARM2      PARM1      PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFBFF 044C0400 044A3FFF 0448C000
-----
      SN      OPCODE
0446FFE7 04440018 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
0446FFE6 04440019 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
0446FFE5 0444001A 04427F7F 04408080
-----

```

Ver 01.09 Thu Nov 16 20:47:05 2000 "(6) Downloading Page 4"

```

-----
C O M M A N D   P A C K E T
-----
      PARM4      PARM3      PARM2      PARM1      PARM0
045AFFFF 04580000 0456FFFE 04540001 0452FBFF 04500400 044E3FFF 044CC000 044AEFFF 04481000
-----
      SN      OPCODE
0446FFE4 0444001B 04427C7C 04408383
-----

```

```

-----
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
0446FFE3 0444001C 04427F7F 04408080
-----

```

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 044EFFFF 044C0000 044AFFFF 04480000
-----
                SN                OPCODE
0446FFE2 0444001D 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 044EFBFF 044C0400 044A3FFF 0448C000
-----
                SN                OPCODE
0446FFE1 0444001E 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
0446FFE0 0444001F 04427F7F 04408080
-----

```

Ver 01.09 Thu Nov 16 20:47:11 2000 "(7) Downloading Page 5"

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

```

-----
                PARM4                PARM3                PARM2                PARM1                PARM0
045AFFFF 04580000 0456FFFE 04540001 0452FBFF 04500400 044E3FFF 044C0000 044AEBFF 04481400
-----
                SN                OPCODE
0446FFDF 04440020 04427C7C 04408383
-----

```

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
0446FFDE 04440021 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
0446FFDD 04440022 04427F7F 04408080
-----

```

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

```

-----
                PARM4                PARM3                PARM2                PARM1                PARM0
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Center for Astrophysics & Space Astronomy

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