

**COS DCE BOOT FSW v1.13 Component Test Results
Requirement 5.5.2.2 Download Data Timing**

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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 5.5.2.2 — Download Data Timing.

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 SpareStation 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

For the sake of control, the script generates an array (Buffer 1) of 1024 pseudo-random eight-bit values, then uploads these to a “scratch” buffer at location 0xC000 of DCE external storage. This scratch buffer is then downloaded to UniScript Buffer 2, and the two buffers are compared to ensure the integrity of the uploaded data. The script establishes the zero-point of a time-line, then proceeds to download the scratch buffer ten times, checking the elapsed time after each download to ensure that it is less than or equal to one second. Since the Unix environment in which UniScript executes does not provide time-related library functions with granularity less than one second, the script derives its timing information from the time values provided by the FSW itself — name by the combination of the HK datum LFCTIME and the internal variable mTICKS accessed by means of a memory monitor (see Table 1-1, paragraph 1.6.3).

1.6 TEST SCRIPT IMPLEMENTATION

1.6.1 Test Script Arguments

The script is parameterized as shown in the following Table:

Table 1-1: Parameters/Arguments for stp5_5_2_2.tst

Parameter	Meaning	Correct Argument for Version 1.13
#0	Absolute hex storage address of “scratch” buffer for special 8051 code	C000
#1	Absolute hex storage address of mTICKS FSW variable	2460

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.

1.6.3 Explanation of the CHECK Directive

For the purposes of this section, the term “system time” is defined to mean the sum of the HK variable LFCTIME and $1/50^{\text{th}}$ of the value of the FSW variable mTICKS (at 0x2460 in the Patchable Constants). The latter variable counts 20-ms “ticks” since the last

incrementation of `LFCTIME`, but is not automatically made available in the HK data. The script acquires its value by setting memory monitor 7 to 0x2460, then using the (8-bit) value `LFDMONS[7]` in the HK data. The script also uses two Perl scalar variables, `$xt` and `$yt`,¹ representing, respectively, system time computed from the previous HK packet, and system time computed from the current packet. `$xt` is initialized by means of a `CHECK` directive that always succeeds, namely

```
CHECK 1,(( $\$xt = \$LFCTIME + \$LFDMONS[7]/50.0$ ) ==  $\$xt$ )
```

Verifying the requirement that each HK pack arrive no later than .9 seconds after the preceding one (assuming commanding at .9-second intervals) is equivalent to executing the following simple segment of Perl code after reception of each HK packet:

```
 $\$yt = \$LFCTIME + \$LFDMONS[7]/50.0$ ; # seconds + (fiftieths of a second)/50
if ( $\$yt <= \$xt + .9$ ) # should not be later than previous system time + .9sec
  { $\$xt = \$yt$ } # if OK, update  $\$xt$  to current system time
else
  { $\$xt = 0$ } # if not, set  $\$xt=0$ ; CHECK will discover this
if ( $\$xt == 0$ )
  {terminate the script}
```

It is possible, owing to the special characteristics of the Perl assignment (=) and conditional-value (?) operators, to compress this segment into a single Perl expression, and hence to incorporate it into a single UniScript `CHECK` directive. This is done as follows. The Perl expression

```
 $(\$yt = \$LFCTIME + \$LFDMONS[7]/50.0) <= \$xt + .9$ 
```

compares the current system time with that of the previous HK packet; but it also has the “side-effect” of assigning the current system time to `$yt` (as a floating-point number). Furthermore, the value of the expression is either `true` or `false`, and so may be used as the 1st operand of a Perl “conditional operator” `?:`². Hence the expression

```
 $((\$yt = \$LFCTIME + \$LFDMONS[7]/50.0) <= \$xt + .9) ? \$yt : 0$ 
```

¹ These variables are “automatically re-vivified” (see Perl documentation) for this script by virtue of their occurrence in the Perl-expression argument of a UniScript `CHECK` directive; they are not “standard” Perl variables like `$B1`, `$CRC1`, etc.

² `x1 ? x2 : x3` takes the value `x2` if `x1` is true, otherwise the value `x3`.

evaluates to \$yt (if \$yt is no later than \$xt + .9 seconds in the system time epoch) — or to 0 (if the current HK packet arrived too late to satisfy the software requirement 5.2.3.1). The expression

$$\$xt = ((\$yt = \$LFCTIME + LFDMONS[7]/50.0) \leq \$xt + .9) ? \$yt : 0$$

therefore assigns to \$xt either the current system time, \$yt, or 0, depending, in effect, on whether the test requirement was verified or not. However, this expression, in addition to assigning a value to \$xt, also *itself takes on the assigned value*; hence its value (namely \$xt) may be compared with 0, the “error value”. The result of this greater-than (>) comparison, either **true** (i.e., test succeeded) or **false** (test failed), is the condition checked by the script statement

```
CHECK 1,((\$xt = ((\$yt = \$LFCTIME + LFDMONS[7]/50.0) <= \$xt + .9) ? \$yt : 0) > 0)
```

2. SPECIAL INSTRUCTIONS

2.1 QUALITY ASSURANCE

QA support is required to verify the configuration and setup environment as well as monitoring test steps and verifying results.

2.2 SAFETY

2.2.1 Personal Safety

To ensure the safety of the test personnel during test execution the guidelines contained in Paragraph 3.4, Reference [1] will be adhered to.

2.2.2 Test Article and Equipment Safety

- If access within one (1) meter of COS bench electronics is necessary, wrist straps attached to technical ground shall be used by all personnel involved in handling of any COS test article. Overcurrent and overvoltage shall be set to remove power if nominal limits are exceeded.
- Emergency Power Shutdown — If, during the COS DCE FSW test, power is ON and a severe test equipment failure results in the power system exceeding specified limits, the Test Conductor shall direct or perform shutdown of power.

2.3 CONTAMINATION

All flight hardware shall be handled with clean latex gloves; it shall be covered with clean ESD material and/or stored in a clean flow-bench.

3. SUPPORT REQUIREMENTS

3.1 PERSONNEL

Execution of the COS DCE FSW certification procedure requires the following personnel (to be completed at the Test Readiness Review (TRR)):

Test Director: _____
 Test Conductor: _____
 Test Technician: _____
 QA: _____

3.2 TOOLS, EQUIPMENT, AND MATERIALS

The following is a list of tools, equipment, or materials required in this test. Record manufacturer and model, metrology, or property numbers of equipment used, where appropriate. Record calibration due dates where appropriate.

Boot Mode ROM: schematic **27C256**

Engineering Ground Support Equipment (see paragraph 1.4). Indicate specific configuration:

EGSE			DCE		
taiyo	shorty	Ginger	ETU	DCE #1	DCE #2
	X			X	

3.3 DATA/SOFTWARE

The following files must be present:

Table 3-1: Required Program and Data Files

EGSE (shorty) Directory	File	Description
/disks/galex/users/galex/tcs/uniscript/	UniScript.pl	UniScript interpreter
/disks/galex/users/galex/tcs/uniscript/stp5_5_2_2/	u	Shell script for this procedure
Ditto	stp5_5_2_2.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-03-0066	<i>DCE FSW Test Procedure 5.5.2.2 (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.

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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: xxx Password: -----	Using telnet window, login as user tcs

4.1.4 Set Current Directory

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

4.1.5 Slogin as eagcos

Step	QA	Operator Entry/System Response	Description
4		tcs@shorty% slogin -l eagcos shorty.ssl.berkeley.edu eagcos@shorty.ssl.berkeley.edu's password: (get from SSL personnel) Last login: Sat Oct 7 10:41:05 2000 from auntem.ssl.berke Sun Microsystems Inc. SunOS 5.8 Generic February 2000 You have mail. COS EGSE software version: devel	slogin as eagcos; get password from SSL personnel

4.1.6 Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		eagcos:shorty% cd /disks/galex/users/galex/tcs/uniscript/stp5_5_2_2 eagcos:shorty% pwd /disks/galex/users/galex/tcs/uniscript/stp5_5_2_2	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_5_2_2.tst -rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u</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		<pre>eagcos:shorty% set path=(\$path ~dbb/scripts/bin)</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>sh u \$estring=C000,2460,0,0,0,0,0 Parameters are: Script File: stp5_5_2_2 #0: C000 #1: 2460 #2: 0 #3: 0 #4: 0 #5: 0 #6: 0 #7: 0 Report file >/disks/galex/users/galex/tcs/ver_1_13/stp5_5_2_2/ stp5_5_2_2.rp1 successfully opened. Report file >/disks/galex/users/galex/tcs/ver_1_13/stp5_5_2_2/</pre>	Shell to u. You should see the accompanying output as UniScript executes

Step	QA	Operator Entry/System Response	Description
		stp5_5_2_2.rp2 successfully opened. Script file /disks/galex/users/galex/tcs/ver_1_13/stp5_5_2_2/s tp5_5_2_2.tst successfully opened at level 0. "Sending two PORs, WAITs" "Uploading 1024 bytes to C000" LFDMADDR 7,mTICKS,EXTERN WAIT 0: HKV0=1; HKV1=0; wc=1 WAIT 1: HKV1=0; wc=0 LFDUPLOD SCRATCH,NBYTES,CRC1 WAIT 0: HKV0=3; HKV1=1; wc=1 WAIT 1: HKV1=2; wc=0 "Downloading the 1024 byte block and comparing" LFDDNLOD SCRATCH,NBYTES WAIT 0: HKV0=5; HKV1=3; wc=0 "Download 1 OK; proceeding" LFDDNLOD SCRATCH,NBYTES WAIT 0: HKV0=6; HKV1=4; wc=0 "Download 2 OK; proceeding" LFDDNLOD SCRATCH,NBYTES WAIT 0: HKV0=7; HKV1=5; wc=0 "Download 3 OK; proceeding" LFDDNLOD SCRATCH,NBYTES	

Step	QA	Operator Entry/System Response	Description
		<p>WAIT 0: HKV0=8; HKV1=6; wc=0 "Download 4 OK; proceeding"</p> <p>LFDDNLOD SCRATCH,NBYTES</p> <p>WAIT 0: HKV0=9; HKV1=7; wc=0 "Download 5 OK; proceeding"</p> <p>LFDDNLOD SCRATCH,NBYTES</p> <p>WAIT 0: HKV0=10; HKV1=8; wc=0 "Download 6 OK; proceeding"</p> <p>LFDDNLOD SCRATCH,NBYTES</p> <p>WAIT 0: HKV0=11; HKV1=9; wc=0 "Download 7 OK; proceeding"</p> <p>LFDDNLOD SCRATCH,NBYTES</p> <p>WAIT 0: HKV0=12; HKV1=10; wc=0 "Download 8 OK; proceeding"</p> <p>LFDDNLOD SCRATCH,NBYTES</p> <p>WAIT 0: HKV0=13; HKV1=11; wc=0 "Download 9 OK; proceeding"</p> <p>LFDDNLOD SCRATCH,NBYTES</p> <p>WAIT 0: HKV0=14; HKV1=12; wc=0 "Download 10 OK"</p> <p>WAIT 0: HKV0=14; HKV1=13; wc=10</p> <p>WAIT 1: HKV1=13; wc=9</p> <p>WAIT 1: HKV1=14; wc=8</p> <p>"Test 5.5.2.2 completed successfully"</p> <p>eagcos:shorty%</p>	

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_2_2.tst**, **stp5_5_2_2.rp1**, and **stp5_5_2_2.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_5_2_2 "C000,2460,0,0,0,0,0,0"  
cosnoopy&
```


Appendix B. Test Script stp5_5_2_2.tst

```
; *****  
; * STP 5.5.2.2 -- Download Data Timing *  
; * ----- *  
; * Verify that the DCE FSW can sustain a rate of 1024 bytes of download data per *  
; * second. *  
; * ----- *  
; * Generate and upload a block of 1024 random bytes. *  
; * Then download it to Buffer 2 and compare Buffers 1 and 2. Empty Buffer 2. *  
; * Delay .05 seconds, download, compare, empty repetitively, for 10 iterations. *  
; * After this, check the "elapsed time". It should be less than 10 seconds. *  
; *****  
;  
; *****  
; * Parameters: #0 = scratch area = C000 *  
; * #1 = mTICKS = 2460 *  
; *****  
;  
ECHO      2  
;  
SYM      SCRATCH=0x#0  
SYM      NBYTES =1024  
SYM      DELTA1 =5  
SYM      EXTERN =0  
SYM      mTICKS =0x#1  
SYM      NSEC =1  
;  
DATA     1,0,NBYTES,RAND=56  
DATA     2,0,0,EMPTY  
LOG      1,1,2  
;  
DTG      3,"(0) Sending two PORs, WAITs"  
WTO      "Sending two PORs, WAITs"  
;  
POR  
WAIT     1  
POR  
WAIT     1  
;  
DTG      3,"(1) Uploading 1024 bytes to C000"  
WTO      "Uploading 1024 bytes to C000"  
;  
LFDMAADR 7,mTICKS,EXTERN  
WAIT     NSEC,HK  
LOG      1,LFDCMDX,LFDCMDR,LFCPKT,LFDCBUF,LFCTIME,LFDMONS  
;  
XMIT     1,NBYTES  
WAIT     1  
LFDUPLD  SCRATCH,NBYTES,CRC1  
WAIT     NSEC,HK  
;  
DTG      3,"(2) Downloading the 1024 byte block and comparing"  
WTO      "Downloading the 1024 byte block and comparing"  
LFDDNLOD SCRATCH,NBYTES  
DELAY    1  
WAIT     0,HK  
RECV    2,0,NBYTES  
LOG      1,2,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS  
;  
; *****  
; * $xt is initialized here *  
; *****  
;  
CHECK    1, (($xt=$LFCTIME+$LFDMONS[7]/50.0)==$xt)  
;  
DTG      3,"(3) Download 1 OK; proceeding"  
WTO      "Download 1 OK; proceeding"  
;  
;
```

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```
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(4) Download 2 OK; proceeding"
WTO "Download 2 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(5) Download 3 OK; proceeding"
WTO "Download 3 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(6) Download 4 OK; proceeding"
WTO "Download 4 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(7) Download 5 OK; proceeding"
WTO "Download 5 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(8) Download 6 OK; proceeding"
WTO "Download 6 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(9) Download 7 OK; proceeding"
WTO "Download 7 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(10) Download 8 OK; proceeding"
WTO "Download 8 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(11) Download 9 OK; proceeding"
WTO "Download 9 OK; proceeding"
;
LFDNLOD SCRATCH,NBYTES
WAIT 0,HK
LOG 1,LFDCMDR,LFDCMDX,LFCTIME,LFDMONS
CHECK 1,((($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
;
DTG 3,"(12) Download 10 OK"
```

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```
WTO      "Download 10 OK"  
;  
WAIT     10,HK  
CHECK    1,($LFCTIME+$LFDMONS[7]/50.0 < 10+$xt)  
;  
DTG      3,"(13) Test 5.5.2.2 completed successfully"  
WTO      "Test 5.5.2.2 completed successfully"
```

Appendix C. Test Report stp5_5_2_2.rp1

```

222                55555                55555                222
2                5                5                2 2                2
2                ssss ttttt pppp 555                555                2
2                s                t p p 5                5                2
2                sssss t pppp 5                5                2
2                s t p 5 5                5 5                2                2
22222            ssss t p 555                555                22222

```

Len	CRC	Buffer	Data
0400	AE7E	1	C6 C1 CE D9 85 09 CF 9F 31 E3 34 A3 64 AD 8B 4B 5C 19 DE 1D 1E
47 69	BD 06 67 3B 77 AD	A3 8D 1D	8C 6D 2B CB 6C F5 0C 5F AE E1 C2 35 50 15 3A 0B 8D 8F 44 69 9B
3B 80	A5 48 C3 7A CD 4D	2D AC 7D	42 4F EA 11 F4 FD FB 0B 75 F7 0E 45 2B 47 C7 BD E1 71 2F 75 66
DB 2E	5F 73 DB E7 BB 64	FF 7A E5	7C B3 F2 E1 DD 23 BE CB 12 4D 5F 69 B8 21 63 E9 67 CD B9 35 82
E5 14	CF 8A 9D 45 99 54	B7 D2 97	7F 69 E8 EF E0 E3 90 45 36 95 CD B5 EC 01 2B 95 50 31 65 21 DC
9B 1B	5B 27 77 D9 3B 9F	75 AB 5D	1D BF 88 75 97 3D 1D 9D 9C FD A2 C3 CF C3 89 45 C9 AD 80 2F 2C
B5 CE	EB 5C 57 C8 F9 CB	D5 7A 79	9A 83 07 27 52 AB EA 7D E7 31 B9 A5 5F C7 95 01 E2 CB 80 D3 D7
77 C1	E5 92 AB 7C A5 43	F5 92 B5	88 03 74 3B 01 2D B0 09 7E 5F DE F3 6B ED 74 4F 69 9D 67 05 CC
9B EC	2B 6B 61 FD 99 35	75 84 57	A8 0B 18 67 0C 43 BC E7 73 37 30 C3 77 8F BA 33 CB AF 1C 39 67
5F 0B	29 9E E7 56 AB 71	71 7D 21	CB EB D5 E1 38 E7 55 3B 5D E7 7E A9 99 8D C7 35 F6 11 D3 65 4E
85 01	BF DD 29 F4 2D 4C	89 A8 5B	B4 6F 88 5F 87 9B 12 AF 3E 1B A9 BD 5C 43 29 59 35 4F 69 03 54
47 38	57 AD 99 03 F9 7E	D7 8E CD	F1 E9 65 19 14 5B 44 65 5B 01 04 97 9D 93 FC 29 15 75 C3 05 56
63 FC	D7 4F 23 D5 63 03	FF 76 BB	C4 23 5A C1 F6 A5 4F 05 23 49 B3 49 6E D9 48 A7 42 17 30 E1 1E
19 E2	A3 98 35 39 43 FB	19 C3 EB	FA 6D 71 8F 21 77 0C B5 0D 1F 0B 69 F4 F1 65 5B 66 3D CB 8F 40
27 22	A1 D6 BD E1 ED 86	C7 57 A3	D3 95 2B 39 43 4F 2D 1D 76 33 F4 11 48 3B 56 49 0C 79 D5 83 FC
C9 FB	39 B0 27 C3 37 AD	25 F0 A9	DD E7 E2 F7 A6 2B 95 5F 83 B3 45 D3 54 95 2C F9 7E D5 1A B5 1F
BF 10	4F 01 65 72 77 37	D3 8B 45	D7 33 2D 7B 0F 89 C0 23 02 49 2A C7 B9 5D 68 71 A6 E3 50 9B E0
47 CB	49 BE E3 86 85 93	ED C1 39	8C C7 38 FF A0 69 1D 8F 46 29 7E 83 A9 71 55 35 ED B1 76 29 C1
1D BB	0F D4 8D F7 B5 B2	13 29 CF	BB 6F 2D 35 B5 45 73 47 0A FD 2E 1D CB 2F 6D 4D 1B C9 33 D7 70
81 F4	07 05 D5 7F DD E6	5F B9 CB	EF 7D 8B 57 C6 1F 3C 75 53 F3 98 2B 18 73 B8 3F 39 3D 3B 99 A8
2F 70	15 CD A7 FA 53 C8	73 23 73	64 BB 8E 17 46 73 09 BD 4B BB EC C1 BE 9F 2B 0F 6D 99 A8 E5 0D
67 6E	9F 3E 6F C3 EF 13	6D 36 8F	E6 77 89 AF 85 3F E1 43 24 81 8D 77 FE 8D 08 45 DF EB 60 B5 10
E5 D4	8D E2 1F 1B 05 85	E9 40 61	AF 83 4B D3 8D 01 9E B1 F7 F5 6D 63 0C 9D 3F E7 96 C3 71 7B CE
EB 8C	43 9A 23 7F 6D C2	05 6B B3	4A 29 7B B7 03 B7 53 29 A7 43 71 1B F0 AD CF 79 58 2B 73 2D EF
31 E5	A7 7F 67 12 7B 2D	5F 20 C9	70 39 FA 15 0A DF A5 55 BB 1B CE B3 66 1B 22 03 89 B5 E7 43 84
FB F6	21 C2 5D F7 05 D1	17 65 69	

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EB 01 41 21 1F 77 31 57 43 A9 6D C3 BB C5 70 0B 10 6F 98 B1 EF
03 F8 97 8A EF B1 61 39 CB 3C D9
73 4D C4 91 F9 FF E8 D7 B8 9D 47 61 B4 07 1F 95 30 E3 FB EF B7
87 AD 6B D8 8F 87 67 57 95 07 DF
91 6D 51 9B 6E 71 72 FB D9 23 C6 23 64 C3 24 2B 6F 23 8E F3 74
49 BA 89 62 29 E0 69 5E 17 E4 C3
7D 2F 6E F5 4C 4F 8C 69 8B E9 26 1F 17 53 5E CD 6E BB 39 31 A6
83 0B 51 76 29 A5 43 A4 6D 0F 47
FD E1 BC D5 3E 95 67 47 BF 21 D4 EB 28 97 FE 07 D2 B9 AB A1 9A
F3 30 AD DA 81 A0 45 85 37 40 B5
4A 4F 54 F1 AB C1 0B 3B 48 73 D1 9B E8 ED DD DB 1D AB C0 B7 49
D9 C1 03 AC 9B DD 49 3E 91 0F D1
E8 C9 2A 7F 95 D1 B5 6B C5 11 0C C7 7C 33 E7 D1 91 A1 DC 6B 36
F3 B8 37 41 69 09 A3 D2 1B 50 E3

```

0000 FFFF 2

Ver 01.13 Wed Jan 17 18:31:05 2001 "(0) Sending two PORs, WAITs"

Ver 01.13 Wed Jan 17 18:31:07 2001 "(1) Uploading 1024 bytes to C000"

LFDMAADDR 7,mTICKS,EXTERN

Addr	Addr	HK-Name	Value
170C-170D	LFDCCMDX		0000
1718-1719	LFDCCMDR		0000
1700-1703	LFCPKT		00000000
1664-167F	LFDCCBUF		0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
1680-1683	LFCTIME		00000000
1738-173F	LFDMONS		FF FF FF FF FF FF FF FF

LFDUPLD SCRATCH,NBYTES,CRC1

Ver 01.13 Wed Jan 17 18:31:14 2001 "(2) Downloading the 1024 byte block and comparing"

LFDDNLOD SCRATCH,NBYTES

Len	CRC	Buffer	Data
0400	AE7E 2		C6 C1 CE D9 85 09 CF 9F 31 E3 34 A3 64 AD 8B 4B 5C 19 DE 1D 1E
47 69	BD 06 67 3B 77 AD	A3 8D 1D	8C 6D 2B CB 6C F5 0C 5F AE E1 C2 35 50 15 3A 0B 8D 8F 44 69 9B
3B 80	A5 48 C3 7A CD 4D	2D AC 7D	42 4F EA 11 F4 FD FB 0B 75 F7 0E 45 2B 47 C7 BD E1 71 2F 75 66
DB 2E	5F 73 DB E7 BB 64	FF 7A E5	7C B3 F2 E1 DD 23 BE CB 12 4D 5F 69 B8 21 63 E9 67 CD B9 35 82
E5 14	CF 8A 9D 45 99 54	B7 D2 97	7F 69 E8 EF E0 E3 90 45 36 95 CD B5 EC 01 2B 95 50 31 65 21 DC
9B 1B	5B 27 77 D9 3B 9F	75 AB 5D	1D BF 88 75 97 3D 1D 9D 9C FD A2 C3 CF C3 89 45 C9 AD 80 2F 2C
B5 CE	EB 5C 57 C8 F9 CB	D5 7A 79	9A 83 07 27 52 AB EA 7D E7 31 B9 A5 5F C7 95 01 E2 CB 80 D3 D7
77 C1	E5 92 AB 7C A5 43	F5 92 B5	88 03 74 3B 01 2D B0 09 7E 5F DE F3 6B ED 74 4F 69 9D 67 05 CC
9B EC	2B 6B 61 FD 99 35	75 84 57	A8 0B 18 67 0C 43 BC E7 73 37 30 C3 77 8F BA 33 CB AF 1C 39 67
5F 0B	29 9E E7 56 AB 71	71 7D 21	CB EB D5 E1 38 E7 55 3B 5D E7 7E A9 99 8D C7 35 F6 11 D3 65 4E
85 01	BF DD 29 F4 2D 4C	89 A8 5B	B4 6F 88 5F 87 9B 12 AF 3E 1B A9 BD 5C 43 29 59 35 4F 69 03 54
47 38	57 AD 99 03 F9 7E	D7 8E CD	F1 E9 65 19 14 5B 44 65 5B 01 04 97 9D 93 FC 29 15 75 C3 05 56
63 FC	D7 4F 23 D5 63 03	FF 76 BB	

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```

C4 23 5A C1 F6 A5 4F 05 23 49 B3 49 6E D9 48 A7 42 17 30 E1 1E
19 E2 A3 98 35 39 43 FB 19 C3 EB
FA 6D 71 8F 21 77 0C B5 0D 1F 0B 69 F4 F1 65 5B 66 3D CB 8F 40
27 22 A1 D6 BD E1 ED 86 C7 57 A3
D3 95 2B 39 43 4F 2D 1D 76 33 F4 11 48 3B 56 49 0C 79 D5 83 FC
C9 FB 39 B0 27 C3 37 AD 25 F0 A9
DD E7 E2 F7 A6 2B 95 5F 83 B3 45 D3 54 95 2C F9 7E D5 1A B5 1F
BF 10 4F 01 65 72 77 37 D3 8B 45
D7 33 2D 7B 0F 89 C0 23 02 49 2A C7 B9 5D 68 71 A6 E3 50 9B E0
47 CB 49 BE E3 86 85 93 ED C1 39
8C C7 38 FF A0 69 1D 8F 46 29 7E 83 A9 71 55 35 ED B1 76 29 C1
1D BB 0F D4 8D F7 B5 B2 13 29 CF
BB 6F 2D 35 B5 45 73 47 0A FD 2E 1D CB 2F 6D 4D 1B C9 33 D7 70
81 F4 07 05 D5 7F DD E6 5F B9 CB
EF 7D 8B 57 C6 1F 3C 75 53 F3 98 2B 18 73 B8 3F 39 3D 3B 99 A8
2F 70 15 CD A7 FA 53 C8 73 23 73
64 BB 8E 17 46 73 09 BD 4B BB EC C1 BE 9F 2B 0F 6D 99 A8 E5 0D
67 6E 9F 3E 6F C3 EF 13 6D 36 8F
E6 77 89 AF 85 3F E1 43 24 81 8D 77 FE 8D 08 45 DF EB 60 B5 10
E5 D4 8D E2 1F 1B 05 85 E9 40 61
AF 83 4B D3 8D 01 9E B1 F7 F5 6D 63 0C 9D 3F E7 96 C3 71 7B CE
EB 8C 43 9A 23 7F 6D C2 05 6B B3
4A 29 7B B7 03 B7 53 29 A7 43 71 1B F0 AD CF 79 58 2B 73 2D EF
31 E5 A7 7F 67 12 7B 2D 5F 20 C9
70 39 FA 15 0A DF A5 55 BB 1B CE B3 66 1B 22 03 89 B5 E7 43 84
FB F6 21 C2 5D F7 05 D1 17 65 69
EB 01 41 21 1F 77 31 57 43 A9 6D C3 BB C5 70 0B 10 6F 98 B1 EF
03 F8 97 8A EF B1 61 39 CB 3C D9
73 4D C4 91 F9 FF E8 D7 B8 9D 47 61 B4 07 1F 95 30 E3 FB EF B7
87 AD 6B D8 8F 87 67 57 95 07 DF
91 6D 51 9B 6E 71 72 FB D9 23 C6 23 64 C3 24 2B 6F 23 8E F3 74
49 BA 89 62 29 E0 69 5E 17 E4 C3
7D 2F 6E F5 4C 4F 8C 69 8B E9 26 1F 17 53 5E CD 6E BB 39 31 A6
83 0B 51 76 29 A5 43 A4 6D 0F 47
FD E1 BC D5 3E 95 67 47 BF 21 D4 EB 28 97 FE 07 D2 B9 AB A1 9A
F3 30 AD DA 81 A0 45 85 37 40 B5
4A 4F 54 F1 AB C1 0B 3B 48 73 D1 9B E8 ED DD DB 1D AB C0 B7 49
D9 C1 03 AC 9B DD 49 3E 91 0F D1
E8 C9 2A 7F 95 D1 B5 6B C5 11 0C C7 7C 33 E7 D1 91 A1 DC 6B 36
F3 B8 37 41 69 09 A3 D2 1B 50 E3

```

```

Addr Addr HK-Name      Value
-----
1718-1719 LFDCCMDR      0002
170C-170D LFDCCMDX      0002
1680-1683 LFCTIME      00000006

1738-173F LFDMONS      FF FF FF FF FF FF FF 24

```

```

CHECK:    (($xt=$LFCTIME+$LFDMONS[7]/50.0)==$xt)
eval:     ((0000=0006+0000[7]/50.0)==0000)

```

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:14 2001 "(3) Download 1 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

```

Addr Addr HK-Name      Value
-----
1718-1719 LFDCCMDR      0002
170C-170D LFDCCMDX      0002
1680-1683 LFCTIME      00000007

1738-173F LFDMONS      FF FF FF FF FF FF FF 23

```

```

CHECK:    (($xt=((($yt=$LFCTIME+$LFDMONS[7]/50.0)<=$xt+1.0)?$yt:0)>0)
eval:     ((0006=((0000=0007+0000[7]/50.0)<=0006+1.0)?0000:0)>0)

```

S U C C E S S

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Ver 01.13 Wed Jan 17 18:31:15 2001 "(4) Download 2 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0003
170C-170D	LFDCMDX		0003
1680-1683	LFCTIME		00000008

1738-173F LFDMONS FF FF FF FF FF FF FF 02

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
eval: ((0007=((0007=0008+0000[7]/50.0)<=0007+1.0)?0007:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:15 2001 "(5) Download 3 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0004
170C-170D	LFDCMDX		0004
1680-1683	LFCTIME		00000008

1738-173F LFDMONS FF FF FF FF FF FF FF 1E

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
eval: ((0008=((0008=0008+0000[7]/50.0)<=0008+1.0)?0008:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:15 2001 "(6) Download 4 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0005
170C-170D	LFDCMDX		0005
1680-1683	LFCTIME		00000008

1738-173F LFDMONS FF FF FF FF FF FF FF 2B

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
eval: ((0008=((0008=0008+0000[7]/50.0)<=0008+1.0)?0008:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:15 2001 "(7) Download 5 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0006
170C-170D	LFDCMDX		0006
1680-1683	LFCTIME		00000009

1738-173F LFDMONS FF FF FF FF FF FF FF 05

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
eval: ((0008=((0008=0009+0000[7]/50.0)<=0008+1.0)?0008:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:16 2001 "(8) Download 6 OK; proceeding"

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LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0007
170C-170D	LFDCMDX		0007
1680-1683	LFCTIME		00000009

1738-173F LFDMONS FF FF FF FF FF FF FF 11

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
 eval: ((0009=((0009=0009+0000[7]/50.0)<=0009+1.0)?0009:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:16 2001 "(9) Download 7 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0008
170C-170D	LFDCMDX		0008
1680-1683	LFCTIME		00000009

1738-173F LFDMONS FF FF FF FF FF FF FF 1E

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
 eval: ((0009=((0009=0009+0000[7]/50.0)<=0009+1.0)?0009:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:16 2001 "(10) Download 8 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		0009
170C-170D	LFDCMDX		0009
1680-1683	LFCTIME		00000009

1738-173F LFDMONS FF FF FF FF FF FF FF 2A

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
 eval: ((0009=((0009=0009+0000[7]/50.0)<=0009+1.0)?0009:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:16 2001 "(11) Download 9 OK; proceeding"

LFDDNLOD SCRATCH,NBYTES

Addr	Addr	HK-Name	Value
1718-1719	LFDCMDR		000A
170C-170D	LFDCMDX		000A
1680-1683	LFCTIME		0000000A

1738-173F LFDMONS FF FF FF FF FF FF FF 05

CHECK: ((\$xt=(\$yt=\$LFCTIME+\$LFDMONS[7]/50.0)<=\$xt+1.0)?\$yt:0)>0)
 eval: ((0009=((0009=000A+0000[7]/50.0)<=0009+1.0)?0009:0)>0)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:17 2001 "(12) Download 10 OK"

CHECK: (\$LFCTIME+\$LFDMONS[7]/50.0 < 10+\$xt)

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eval: (000A+0000[7]/50.0 < 10+000A)

S U C C E S S

Ver 01.13 Wed Jan 17 18:31:19 2001 "(13) Test 5.5.2.2 completed successfully"

Appendix D. Test Report stp5_5_2_2.rp2

```

                55555      55555      222
222
                5          5          2 2      2
2
                ssss  ttttt  pppp  555      555      2
2
                s      t    p  p    5          5          2
2
                sssss  t    pppp    5          5          2
2
                s      t    p    5  5      5  5      2      2
                ssss  t    p      555      555      22222
22222

```

Ver 01.13 Wed Jan 17 18:31:05 2001 "(0) Sending two PORs, WAITs"

P O R P A C K E T

80000000

P O R P A C K E T

80000000

Ver 01.13 Wed Jan 17 18:31:07 2001 "(1) Uploading 1024 bytes to C000"

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

```

                PARM4      PARM3      PARM2      PARM1      PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EDB9F 044C2460 044AFFF8 04480007
                SN          OPCODE
0446FFFE 04440001 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 044EFFFF 044C0000 044AFFFF 04480000
                SN          OPCODE
0446FFFD 04440002 04427F7F 04408080

```

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

```

0040C1C6 0042D9CE 00440985 00469FCF 0048E331 004AA334 004CAD64 004E4B8B
0050195C 00521DDE 0054471E 0056BD69 00586706 005A773B 005CA3AD 005E1D8D
00606D8C 0062CB2B 0064F56C 00665F0C 0068E1AE 006A35C2 006C1550 006E0B3A
00708F8D 00726944 00743B9B 0076A580 0078C348 007ACD7A 007C2D4D 007E7DAC
00804F42 008211EA 0084FDF4 00860BFB 0088F775 008A450E 008C472B 008EBDC7
009071E1 0092752F 0094DB66 00965F2E 0098DB73 009ABBE7 009CFF64 009EE57A
00A0B37C 00A2E1F2 00A423DD 00A6CBBE 00A84D12 00AA695F 00AC21B8 00AEE963
00B0CD67 00B235B9 00B4E582 00B6CF14 00B89D8A 00BA9945 00BCB754 00BE97D2
00C0697F 00C2EFE8 00C4E3E0 00C64590 00C89536 00CAB5CD 00CC01EC 00CE952B

```

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00D03150 00D22165 00D49BDC 00D65B1B 00D87727 00DA3BD9 00DC759F 00DE5DAB
00E0BF1D 00E27588 00E43D97 00E69D1D 00E8FD9C 00EAC3A2 00ECC3CF 00EE4589
00F0ADC9 00F22F80 00F4B52C 00F6EBCE 00F8575C 00FAF9C8 00FCD5CB 00FE797A
0100839A 01022707 0104AB52 01067DEA 010831E7 010AA5B9 010CC75F 010E0195
0110CBE2 0112D380 011477D7 0116E5C1 0118AB92 011AA57C 011CF543 011EB592
01200388 01223B74 01242D01 012609B0 01285F7E 012AF3DE 012CED6B 012E4F74
01309D69 01320567 01349BCC 01362BEC 0138616B 013A99FD 013C7535 013E5784
01400BA8 01426718 0144430C 0146E7BC 01483773 014AC330 014C8F77 014E33BA
0150AFCB 0152391C 01545F67 0156290B 0158E79E 015AAB56 015C7171 015E217D
0160EBCB 0162E1D5 0164E738 01663B55 0168E75D 016AA97E 016C8D99 016E35C7
017011F6 017265D3 0174854E 0176BF01 017829DD 017A2DF4 017C894C 017E5BA8
01806FB4 01825F88 01849B87 0186AF12 01881B3E 018ABDA9 018C435C 018E5929
01904F35 01920369 01944754 01965738 019899AD 019AF903 019CD77E 019ECD8E
01A0E9F1 01A21965 01A45B14 01A66544 01A8015B 01AA9704 01AC939D 01AE29FC
01B07515 01B205C3 01B46356 01B6D7FC 01B8234F 01BA63D5 01BCFF03 01BEBB76
01C023C4 01C2C15A 01C4A5F6 01C6054F 01C84923 01CA49B3 01CCD96E 01CEA748
01D01742 01D2E130 01D4191E 01D6A3E2 01D83598 01DA4339 01DC19FB 01DEEBC3
01E06DFA 01E28F71 01E47721 01E6B50C 01E81F0D 01EA690B 01ECF1F4 01EE5B65
01F03D66 01F28FCB 01F42740 01F6A122 01F8BDD6 01FAEDE1 01FCC786 01FEA357
020095D3 0202392B 02044F43 02061D2D 02083376 020A11F4 020C3B48 020E4956
0210790C 021283D5 0214C9FC 021639FB 021827B0 021A37C3 021C25AD 021EA9F0
0220E7DD 0222F7E2 02242BA6 02265F95 0228B383 022AD345 022C9554 022EF92C
0230D57E 0232B51A 0234BF1F 02364F10 02386501 023A7772 023CD337 023E458B
024033D7 02427B2D 0244890F 024623C0 02484902 024AC72A 024C5DB9 024E7168
0250E3A6 02529B50 025447E0 025649CB 0258E3BE 025A8586 025CED93 025E39C1
0260C78C 0262FF38 026469A0 02668F1D 02682946 026A837E 026C71A9 026E3555
0270B1ED 02722976 02741DC1 02760FBB 02788DD4 027AB5F7 027C13B2 027ECF29
02806FBB 0282352D 028445B5 02864773 0288FDOA 028A1D2E 028C2FCB 028E4D6D
0290C91B 0292D733 02948170 029607F4 0298D505 029ADD7F 029C5FE6 029ECBB9
02A07DEF 02A2578B 02A41FC6 02A6753C 02A8F353 02AA2B98 02AC7318 02AE3FB8
02B03D39 02B2993B 02B42FA8 02B61570 02B8A7CD 02BA53FA 02BC73C8 02BE7323
02C0BB64 02C2178E 02C47346 02C6BD09 02C8BB4B 02CAC1EC 02CC9FBE 02CE0F2B
02D0996D 02D2E5A8 02D4670D 02D69F6E 02D86F3E 02DAEFC3 02DC6D13 02DE8F36
02E077E6 02E2AF89 02E43F85 02E643E1 02E88124 02EA778D 02EC8DFE 02EE4508
02F0EBDF 02F2B560 02F4E510 02F68DD4 02F81FE2 02FA051B 02FCE985 02FE6140
030083AF 0302D34B 0304018D 0306B19E 0308F5F7 030A636D 030C9D0C 030EE73F
0310C396 03127B71 0314EBCE 0316438C 0318239A 031A6D7F 031C05C2 031EB36B
0320294A 0322B77B 0324B703 03262953 032843A7 032A1B71 032CADF0 032E79CF
03302B58 03322D73 033431EF 0336A7E5 0338677F 033A7B12 033C5F2D 033EC920
03403970 034215FA 0344DF0A 034655A5 03481BBB 034AB3CE 034C1B66 034E0322
0350B589 035243E7 0354FB84 035621F6 03585DC2 035A05F7 035C17D1 035E6965
036001EB 03622141 0364771F 03665731 0368A943 036AC36D 036CC5BB 036E0B70
03706F10 0372B198 037403EF 037697F8 0378EF8A 037A61B1 037CCB39 037ED93C
03804D73 038291C4 0384FFF9 0386D7E8 03889DB8 038A6147 038C07B4 038E951F
0390E330 0392EFFB 039487B7 03966BAD 03988FD8 039A6787 039C9557 039EDF07
03A06D91 03A29B51 03A4716E 03A6FB72 03A823D9 03AA23C6 03ACC364 03AE2B24
03B0236F 03B2F38E 03B44974 03B689BA 03B82962 03BA69E0 03BC175E 03BEC3E4
03C02F7D 03C2F56E 03C44F4C 03C6698C 03C8E98B 03CA1F26 03CC5317 03CEDD5E
03D0BB6E 03D23139 03D483A6 03D6510B 03D82976 03DA43A5 03DC6DA4 03DE470F
03E0E1FD 03E2D5BC 03E4953E 03E64767 03E821BF 03EAEBD4 03EC9728 03EE07FE
03F0B9D2 03F2A1AB 03F4F39A 03F6AD30 03F881DA 03FA45A0 03FC3785 03FEB540
04004F4A 0402F154 0404C1AB 04063B0B 04087348 040A9BD1 040CEDE8 040EDBDD
0410AB1D 0412B7C0 0414D949 041603C1 04189BAC 041A49DD 041C913E 041ED10F
0420C9E8 04227F2A 0424D195 04266BB5 042811C5 042AC70C 042C337C 042ED1E7
0430A191 04326BDC 0434F336 043637B8 04386941 043AA309 043C1BD2 043EE350

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

PARM4 PARM3 PARM2 PARM1 PARM0
045AFFFF 04580000 0456FFFF 04540000 04525181 0450AE7E 044EFBFF 044C0400 044A3FFF 0448C000

SN OPCODE
0446FFFC 04440003 04425252 0440ADAD

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  
0446FFFB 04440004 04427F7F 04408080  
-----
```

Ver 01.13 Wed Jan 17 18:31:14 2001 "(2) Downloading the 1024 byte block and comparing"

```
-----  
                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  
0446FFFA 04440005 04425151 0440AEAE  
-----
```

Ver 01.13 Wed Jan 17 18:31:14 2001 "(3) Download 1 OK; proceeding"

```
-----  
                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  
0446FFF9 04440006 04425151 0440AEAE  
-----
```

Ver 01.13 Wed Jan 17 18:31:15 2001 "(4) Download 2 OK; proceeding"

```
-----  
                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  
0446FFF8 04440007 04425151 0440AEAE  
-----
```

Ver 01.13 Wed Jan 17 18:31:15 2001 "(5) Download 3 OK; proceeding"

```
-----  
                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  
0446FFF7 04440008 04425151 0440AEAE  
-----
```

Ver 01.13 Wed Jan 17 18:31:15 2001 "(6) Download 4 OK; proceeding"

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

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SN OPCODE
0446FFF6 04440009 04425151 0440AEAE

Ver 01.13 Wed Jan 17 18:31:15 2001 "(7) Download 5 OK; proceeding"

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
0446FFF5 0444000A 04425151 0440AEAE

Ver 01.13 Wed Jan 17 18:31:16 2001 "(8) Download 6 OK; proceeding"

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

Ver 01.13 Wed Jan 17 18:31:16 2001 "(9) Download 7 OK; proceeding"

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
0446FFF3 0444000C 04425151 0440AEAE

Ver 01.13 Wed Jan 17 18:31:16 2001 "(10) Download 8 OK; proceeding"

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
0446FFF2 0444000D 04425151 0440AEAE

Ver 01.13 Wed Jan 17 18:31:16 2001 "(11) Download 9 OK; proceeding"

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
0446FFF1 0444000E 04425151 0440AEAE

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Ver 01.13 Wed Jan 17 18:31:17 2001 "(12) Download 10 OK"

```

-----
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 044EFFFF 044C0000 044AFFFF 04480000
-----
      SN              OPCODE
0446FFEF 04440010 04427F7F 04408080
-----

```

Ver 01.13 Wed Jan 17 18:31:19 2001 "(13) Test 5.5.2.2 completed successfully"