COS DCE BOOT FSW v1.13 Component Test Results
Requirement 5.1.2.1b Watchdog

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THE UNIVERSITY OF COLORADO
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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 5.1.2.1 — Watchdog.

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

1.5.1 Undefined Opcode with MSB ≠ 1 Will Not Prevent Autonomous WDR

The script issues two **POR**s, followed by one-second **WAIT**s, to ensure that FSW is operating in Boot State. Once this is done, the script issues **LFDWDOG 1** to enable WDRs. It then synthesizes and issues 11 commands with undefined opcodes (00, 11, 22, 33, 44, 55, 66, 77, 78, 79, 7A), each separated by a one-second **WAIT**. During this sequence of actions a WDR should have occurred. The script checks to make sure the HK variable **LFCTIME** < 10 and that the diagnostic code 001C is present in the stack.

1.5.2 Undefined Opcode with MSB = 1 Prevents Autonomous WDR

The script issues **LFDDIAGC**, then 11 commands with undefined opcodes (84, 86, 87, 88, 8A, 8B, 8C, 8E, 8F, 90, 91), each separated by a one-second **WAIT** from its predecessor. During this sequence of actions no WDR should have occurred. The script checks to ensure that at least 10 seconds have elapsed since the previous check of **LFCTIME** (paragraph 1.5.1) and that the diagnostic code 001C is not present in the stack.

1.6 TEST SCRIPT IMPLEMENTATION

1.6.1 Test Script Arguments

The script is not parameterized.

1.6.2 Test Script Coding

The script uses standard **UniScript** commands and directives.

2. SPECIAL INSTRUCTIONS

2.1 QUALITY ASSURANCE

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

2.2 SAFETY

2.2.1 Personal Safety

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

2.2.2 Test Article and Equipment Safety

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

2.3 CONTAMINATION

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

3. SUPPORT REQUIREMENTS

3.1 PERSONNEL

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

Test Director: _____

Test Conductor: _____

Test Technician: _____

QA: _____

3.2 TOOLS, EQUIPMENT, AND MATERIALS

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

Boot Mode ROM: schematic **27C256**

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

EGSE			DCE		
Taiyo	**shorty**	**ginger**	**ETU**	**DCE #1**	**DCE #2**
X				X	

3.3 DATA/SOFTWARE

The following files must be present:

Table 3-1: Required Program and Data Files

EGSE (shorty) Directory	File	Description
\disks\galex\users\galex\tcs\uniscript	**UniScript.pl**	**UniScript** interpreter
\disks\galex\users\galex\tcs\uniscript\stp5_1_2_1b	**u**	Shell script for this procedure
Ditto	**stp5_1_2_1b.tst**	Test script for this procedure (Appendix B)

In addition, the **hks** tools must be active. Directions for activating **hks** are given in UCB-COS-DOC-1118 (Paragraph 3.4, Reference [4]).

3.4 REQUIRED DOCUMENTATION

Reference	Document Number	Title
1	NHB 1700.1(V1-A)	*NASA Basic Safety Manual*
2	COS-03-0050	*DCE FSW Test Procedure 5.1.2.1b* (this document)
3	UCB-COS-008	*COS FUV Detector Software Test Plan*
4	UCB-COS-DOC-1118	*COS EGSE Startup Procedure*

4. PROCEDURE/TASK STEPS

4.1 PRE-OPERATION ACTIVITIES

4.1.1 Make Sure that **hks** Tools Are Active

Follow the procedure given in Paragraph 3.4, Reference [4].

4.1.2 Make Sure that the Proper ROM Is Installed

Visually verify that the ROM under test is installed: if EEPROM, in U18: if PROM, in U2 and U7.

4.1.3 Log In to the EGSE

Step	QA	Operator Entry/System Response	Description
1		C:\tcs\us> **telnet shorty.ssl.berkely.edu**	Establish connection to shorty via Telnet client program
2		Login: **xxx** Password: **--------**	Using telnet window, login as user **tcs**

4.1.4 Set Current Directory

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

4.1.5 Slogin as eagcos

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

4.1.6 Set Current Directory

Step	QA	Operator Entry/System Response	Description
5		eagcos:shorty% **cd /disks/galex/users/galex/tcs/uniscript/stp5_1_2_1b** eagcos:shorty% **pwd** /disks/galex/users/galex/tcs/uniscript/stp5_1_2_1b	Change current directory as shown

4.1.7 Ensure that Proper Files are Present

Step	QA	Operator Entry/System Response	Description
6		eagcos@shorty% **ls –l** Total 12 -rw-r--r-- 1 tcs eag 1398 Oct 8 18:03 stp5_1_2_1ba.tst -rw-r--r-- 1 tcs eag 62 Oct 9 17:44 u	List files; the **.tst** file and the shell script **u** should be present

4.2 OPERATION EXECUTION

4.2.1 Establish Initial Test Conditions

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

4.2.2 Execute the Script

Step	QA	Operator Entry/System Response	Description
8		sh u $pstring=0,0,0,0,0,0,0,0 Parameters are: Script File: stp5_1_2_1b #0: 0 #1: 0 #2: 0 #3: 0 #4: 0 #5: 0 #6: 0	Shell to **u**. You should see the accompanying output as **UniScript** executes

Step	QA	Operator Entry/System Response	Description
		#7: 0 Report file >/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_1b/stp5_1_2_1b.rp1 successfully opened. Report file >/disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_1b/stp5_1_2_1b.rp2 successfully opened. Script file /disks/galex/users/galex/tcs/ver_1_13/stp5_1_2_1b/stp5_1_2_1b.tst successfully opened at level 0. "Sending two PORs and an LFDWDOG" LFDWDOG ENABLE "Sending opcode 00" "Sending opcode 11" "Sending opcode 22" "Sending opcode 33" "Sending opcode 44" "Sending opcode 55" "Sending opcode 66" "Sending opcode 77" "Sending opcode 78" "Sending opcode 79" "Sending opcode 7A" WAIT 0: HKV0=12; HKV1=0; wc=5 WAIT 1: HKV1=11; wc=4 WAIT 1: HKV1=12; wc=3 "Test 5.1.2.1b (first part) completed successfully" "Clearing Diagnostic Stack" LFDDIAGC	

Step	QA	Operator Entry/System Response	Description
		"Sending opcode 84" "Sending opcode 86" "Sending opcode 87" "Sending opcode 44" "Sending opcode 8A" "Sending opcode 8B" "Sending opcode 8C" "Sending opcode 8E" "Sending opcode 8F" "Sending opcode 90" WAIT 0: HKV0=25; HKV1=23; wc=5 WAIT 1: HKV1=24; wc=4 WAIT 1: HKV1=25; wc=3 "Sending opcode 91" WAIT 0: HKV0=28; HKV1=26; wc=5 WAIT 1: HKV1=27; wc=4 WAIT 1: HKV1=28; wc=3 "Test 5.1.2.1b (second part) completed successfully" eagcos:taiyo%	

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_2_1b.tst**, **stp5_1_2_1b.rp1**, and **stp5_1_2_1b.rp2** files to appropriate PC files. Include these files as Appendices A, B, C, and D with this completed form.

4.3.2 Complete The Test Procedure Form

Ensure that all blank fields in this report are completed correctly and submit the completed report to QA.

SUMMARY SHEET

OPERATION TITLE:_____ WOA#_____

TEST ARTICLES IDENTIFICATION (including serial and/or part numbers):

_____

TASKS/STEPS COMPLETED: _____

_____

LOCATION: _____

TEST STARTED: TEST TERMINATED

TIME: _____ Hr/Min TIME: _____ Hr/Min

DATE:_____ DATE:_____

LOGS USED: _____

ANOMALY REPORTS GENERATED: _____

_____

COMMENTS:_____

_____

_____

_____

_____

TEST CONDUCTOR: _____

Signature/Date

QA REPRESENTATIVE:_____

Signature/Date

Appendix A. Shell Script u

```
#!/bin/sh
pkill cosnoopy
perl ../UniScript.pl stp5_1_2_1b "0,0,0,0,0,0,0,0"
cosnoopy&
```

Appendix B. Test Script stp5_1_2_1b.tst

```
; ************************************************************
; * DCE FSW Requirement 5.1.2.1b -- Watchdog                 *
; * -------------------------------------------------------- *
; * Verify invalid OpCodes will not prevent an autonomous WDR *
; ************************************************************
;
SYM       ENABLE  =1
SYM       DIAG001C=0x001C
SYM       NSEC    =5
;
ECHO      2
;
DTG       1,"(0) Sending two PORs and an LFDWDOG"
WTO       "Sending two PORs and an LFDWDOG"
;
POR
WAIT      1
POR
WAIT      1
;
LFDWDOG   ENABLE
;
; ************************************************************
; * F I R S T   P A R T                                      *
; * -------------------------------------------------------  *
; * A bad command opcode with msb=0 triggers HK data packet *
; * but does not "feed the dog"                              *
; * -------------------------------------------------------  *
; * Generate commands with invalid opcodes 00, 11, ..., 77   *
; * 78, 79, 7A                                               *
; * Send each command after a one-second WAIT                *
; ************************************************************
;
; *************
; * Opcode 00 *
; *************
;
DATA      1,
0,40,CONST=0x045AFFFF_04580000_0456FFFF_04540000_0452FFFF_04500000_044EFFFF_044C0000_044A
FFFF_04480000
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x0442FFFF_04400000
LOG       1,1
;
WAIT      1
DTG       3,"(1) Sending opcode 00"
WTO       "Sending opcode 00"
XCMD      1
;
; *************
; * Opcode 11 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x0442EEEE_04401111
LOG       1,1
;
WAIT      1
DTG       3,"(2) Sending opcode 11"
WTO       "Sending opcode 11"
XCMD      1
;
; *************
; * Opcode 22 *
; *************
;
DATA      1,40, 8,NEXT
```

```
DATA      1,48, 8,CONST=0x0442DDDD_04402222
LOG       1,1
;
WAIT      1
DTG       3,"(3) Sending opcode 22"
WTO       "Sending opcode 22"
XCMD      1
;
; *************
; * Opcode 33 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x0442CCCC_04403333
LOG       1,1
;
WAIT      1
DTG       3,"(4) Sending opcode 33"
WTO       "Sending opcode 33"
XCMD      1
;
; *************
; * Opcode 44 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x0442BBBB_04404444
LOG       1,1
;
WAIT      1
DTG       3,"(5) Sending opcode 44"
WTO       "Sending opcode 44"
XCMD      1
;
; *************
; * Opcode 55 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x0442AAAA_04405555
LOG       1,1
;
WAIT      1
DTG       3,"(6) Sending opcode 55"
WTO       "Sending opcode 55"
XCMD      1
;
; *************
; * Opcode 66 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04429999_04406666
LOG       1,1
;
WAIT      1
DTG       3,"(7) Sending opcode 66"
WTO       "Sending opcode 66"
XCMD      1
;
; *************
; * Opcode 77 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04428888_04407777
LOG       1,1
;
WAIT      1
DTG       3,"(8) Sending opcode 77"
```

```
WTO       "Sending opcode 77"
XCMD      1
;
;
; *************
; * Opcode 78 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04425555_04407878
LOG       1,1
;
WAIT      1
DTG       3,"(9) Sending opcode 78"
WTO       "Sending opcode 78"
XCMD      1
;
; *************
; * Opcode 79 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04424444_04407979
LOG       1,1
;
WAIT      1
DTG       3,"(10) Sending opcode 79"
WTO       "Sending opcode 79"
XCMD      1
;
; *************
; * Opcode 7A *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04423333_04407A7A
LOG       1,1
;
WAIT      1
DTG       3,"(11) Sending opcode 7A"
WTO       "Sending opcode 7A"
XCMD      1
WAIT      NSEC,HK
;
; ***********************************
; * Check to make sure WDR occurred *
; ***********************************
;
LOG       1,LFDOPERT,LFCTIME,LFDDIAGS,LFDCBUF
CHECK     1,(($xt=$LFCTIME) < 10)
DIAG      1,ANY,DIAG001C
DTG       3,"(12) Test 5.1.2.1b (first part) completed successfully"
WTO       "Test 5.1.2.1b (first part) completed successfully"
;
; ************************************************************
; * S E C O N D   P A R T                                    *
; * -------------------------------------------------------  *
; * A bad command opcode with msb=1 triggers HK data packet *
; * and also "feeds the dog"                                 *
; * -------------------------------------------------------  *
; * Generate commands with invalid opcodes 84, 86, 87, 88,   *
; * 8A, 8B, 8C, 8E, 8F, 90, 91                               *
; * Send each command after a one-second WAIT                *
; ************************************************************
;
; *************
; * Opcode 84 *
; *************
;
DATA      1,40, 8,NEXT
```

```
DATA      1,48, 8,CONST=0x04427B7B_04408484
LOG       1,1
;
WAIT      1
DTG       3,"(13) Clearing Diagnostic Stack"
WTO       "Clearing Diagnostic Stack"
LFDDIAGC
;
DTG       3,"(14) Sending opcode 84"
WTO       "Sending opcode 84"
XCMD      1
;
; *************
; * Opcode 86 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427979_04408686
LOG       1,1
;
WAIT      1
DTG       3,"(15) Sending opcode 86"
WTO       "Sending opcode 86"
XCMD      1
;
; *************
; * Opcode 87 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427878_04408787
LOG       1,1
;
WAIT      1
DTG       3,"(16) Sending opcode 87"
WTO       "Sending opcode 87"
XCMD      1
;
; *************
; * Opcode 88 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427777_04408888
LOG       1,1
;
WAIT      1
DTG       3,"(17) Sending opcode 44"
WTO       "Sending opcode 44"
XCMD      1
;
; *************
; * Opcode 8A *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427575_04408A8A
LOG       1,1
;
WAIT      1
DTG       3,"(18) Sending opcode 8A"
WTO       "Sending opcode 8A"
XCMD      1
;
; *************
; * Opcode 8B *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427474_04408B8B
```

```
LOG       1,1
;
WAIT      1
DTG       3,"(19) Sending opcode 8B"
WTO       "Sending opcode 8B"
XCMD      1
;
; *************
; * Opcode 8C *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427373_04408C8C
LOG       1,1
;
WAIT      1
DTG       3,"(20) Sending opcode 8C"
WTO       "Sending opcode 8C"
XCMD      1
;
;
; *************
; * Opcode 8E *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427171_04408E8E
LOG       1,1
;
WAIT      1
DTG       3,"(21) Sending opcode 8E"
WTO       "Sending opcode 8E"
XCMD      1
;
; *************
; * Opcode 8F *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04427070_04408F8F
LOG       1,1
;
WAIT      1
DTG       3,"(22) Sending opcode 8F"
WTO       "Sending opcode 8F"
XCMD      1
;
; *************
; * Opcode 90 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04426F6F_04409090
LOG       1,1
;
WAIT      1
DTG       3,"(23) Sending opcode 90"
WTO       "Sending opcode 90"
XCMD      1
WAIT      NSEC,HK
;
;
; *************
; * Opcode 91 *
; *************
;
DATA      1,40, 8,NEXT
DATA      1,48, 8,CONST=0x04426E6E_04409191
LOG       1,1
;
```

```
WAIT      1
DTG       3,"(24) Sending opcode 91"
WTO       "Sending opcode 91"
XCMD      1
WAIT      NSEC,HK
;
;
; ***************************************
; * Check to make sure WDR did NOT occur *
; ***************************************
;
LOG       1,LFDOPERT,LFCTIME,LFDDIAGS,LFDCBUF
CHECK     1,($LFCTIME > $xt+10)
DIAG      1,NOTANY,DIAG001C
DTG       3,"(25) Test 5.1.2.1b (second part) completed successfully"
WTO       "Test 5.1.2.1b (second part) completed successfully"
```

Appendix C. Test Report stp5_1_2_1ba.rp1

```
                                    55555          1           222           1
                                    5             11          2   2         11
                     ssss  ttttt  pppp   555            1              2          1
bbbb
                    s        t    p   p     5           1             2           1
b   b
                    sssss    t    pppp       5          1            2            1
bbbb
                        s    t    p      5   5          1           2             1
b   b
                    ssss     t    p       555   _____   111   _____  22222  _____   111
bbbb

Ver 01.13  Tue Jan 16 17:02:44 2001    "(0) Sending two PORs and an LFDWDOG"

LFDWDOG   ENABLE

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 7D85 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF FD 04 44 00 02 04 42 FF FF 04
40 00 00

Ver 01.13  Tue Jan 16 17:02:47 2001    "(1) Sending opcode 00"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 10B8 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF FC 04 44 00 03 04 42 EE EE 04
40 11 11

Ver 01.13  Tue Jan 16 17:02:48 2001    "(2) Sending opcode 11"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 3EBD 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF FB 04 44 00 04 04 42 DD DD 04
40 22 22

Ver 01.13  Tue Jan 16 17:02:49 2001    "(3) Sending opcode 22"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 5380 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF FA 04 44 00 05 04 42 CC CC 04
40 33 33

Ver 01.13  Tue Jan 16 17:02:50 2001    "(4) Sending opcode 33"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 D950 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF F9 04 44 00 06 04 42 BB BB 04
40 44 44

Ver 01.13  Tue Jan 16 17:02:51 2001    "(5) Sending opcode 44"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 B46D 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
```

```
                        04 4A FF FF 04 48 00 00 04 46 FF F8 04 44 00 07 04 42 AA AA 04
40 55 55

Ver 01.13  Tue Jan 16 17:02:52 2001    "(6) Sending opcode 55"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 B8CD 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                        04 4A FF FF 04 48 00 00 04 46 FF F7 04 44 00 08 04 42 99 99 04
40 66 66

Ver 01.13  Tue Jan 16 17:02:53 2001    "(7) Sending opcode 66"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 D5F0 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                        04 4A FF FF 04 48 00 00 04 46 FF F6 04 44 00 09 04 42 88 88 04
40 77 77

Ver 01.13  Tue Jan 16 17:02:54 2001    "(8) Sending opcode 77"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 2AAF 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                        04 4A FF FF 04 48 00 00 04 46 FF F5 04 44 00 0A 04 42 55 55 04
40 78 78

Ver 01.13  Tue Jan 16 17:02:55 2001    "(9) Sending opcode 78"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 56D0 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                        04 4A FF FF 04 48 00 00 04 46 FF F4 04 44 00 0B 04 42 44 44 04
40 79 79

Ver 01.13  Tue Jan 16 17:02:57 2001    "(10) Sending opcode 79"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 BFCC 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                        04 4A FF FF 04 48 00 00 04 46 FF F3 04 44 00 0C 04 42 33 33 04
40 7A 7A

Ver 01.13  Tue Jan 16 17:02:58 2001    "(11) Sending opcode 7A"

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

Addr Addr HK-Name        Value
---- ---- -------------- -----
1680-1683 LFCTIME        00000001

1780-179F LFDDIAGS       0304  0204  011C  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

1664-167F LFDCBUF        7A7A  3333  000C  FFF3  0000  FFFF  0000  FFFF  0000  FFFF  0000
FFFF  0000  FFFF

CHECK:   (($xt=$LFCTIME) < 10)
eval:    ((0000=0001) < 10)

S U C C E S S
```

```
DIAG      1,ANY,DIAG001C
Found: DIAG001C == 28.

S U C C E S S

Ver 01.13  Tue Jan 16 17:03:00 2001    "(12) Test 5.1.2.1b (first part) completed
successfully"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 1725 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF F0 04 44 00 0F 04 42 7B 7B 04
40 84 84

Ver 01.13  Tue Jan 16 17:03:01 2001    "(13) Clearing Diagnostic Stack"

LFDDIAGC

Ver 01.13  Tue Jan 16 17:03:01 2001    "(14) Sending opcode 84"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 2CCA 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF EE 04 44 00 11 04 42 79 79 04
40 86 86

Ver 01.13  Tue Jan 16 17:03:02 2001    "(15) Sending opcode 86"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 02CA 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF ED 04 44 00 12 04 42 78 78 04
40 87 87

Ver 01.13  Tue Jan 16 17:03:03 2001    "(16) Sending opcode 87"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 EDA1 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF EC 04 44 00 13 04 42 77 77 04
40 88 88

Ver 01.13  Tue Jan 16 17:03:04 2001    "(17) Sending opcode 44"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 1FE1 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF EB 04 44 00 14 04 42 75 75 04
40 8A 8A

Ver 01.13  Tue Jan 16 17:03:05 2001    "(18) Sending opcode 8A"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 7D40 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF EA 04 44 00 15 04 42 74 74 04
40 8B 8B

Ver 01.13  Tue Jan 16 17:03:06 2001    "(19) Sending opcode 8B"

Len  CRC  Buffer         Data
---- ---- ------         ----
```

```
0038 D944 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF E9 04 44 00 16 04 42 73 73 04
40 8C 8C

Ver 01.13  Tue Jan 16 17:03:07 2001    "(20) Sending opcode 8C"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 FEE7 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF E8 04 44 00 17 04 42 71 71 04
40 8E 8E

Ver 01.13  Tue Jan 16 17:03:08 2001    "(21) Sending opcode 8E"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 6B00 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF E7 04 44 00 18 04 42 70 70 04
40 8F 8F

Ver 01.13  Tue Jan 16 17:03:09 2001    "(22) Sending opcode 8F"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 8BF7 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF E6 04 44 00 19 04 42 6F 6F 04
40 90 90

Ver 01.13  Tue Jan 16 17:03:10 2001    "(23) Sending opcode 90"

Len  CRC  Buffer         Data
---- ---- ------         ----
0038 7014 1              04 5A FF FF 04 58 00 00 04 56 FF FF 04 54 00 00 04 52 FF FF 04
50 00 00 04 4E FF FF 04 4C 00 00
                         04 4A FF FF 04 48 00 00 04 46 FF E3 04 44 00 1C 04 42 6E 6E 04
40 91 91

Ver 01.13  Tue Jan 16 17:03:14 2001    "(24) Sending opcode 91"

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

Addr Addr HK-Name        Value
---- ---- -------------- -----
1680-1683 LFCTIME        00000011

1780-179F LFDDIAGS       0E11  0D11  0C11  0B11  0A11  0911  0811  0711  0611  0511  0411
0000  0000  0000  0000  0000
17A0-17BF                0000  0000  0000  0000  0000  0000  0000  0000  0000  0000  0000
0000  0000  0000  0000  0000

1664-167F LFDCBUF        9191  6E6E  001C  FFE3  0000  FFFF  0000  FFFF  0000  FFFF  0000
FFFF  0000  FFFF

CHECK:   ($LFCTIME > $xt+10)
eval:    (0011 > 0001+10)

S U C C E S S

DIAG      1,NOTANY,DIAG001C

S U C C E S S

Ver 01.13  Tue Jan 16 17:03:16 2001    "(25) Test 5.1.2.1b (second part) completed
successfully"
```

Appendix D. Test Report stp5_1_2_1b.rp2

```
                                  55555          1           222           1
                                  5             11          2   2         11
                    ssss  ttttt  pppp   555            1              2          1
bbbb
                   s        t    p   p     5           1             2           1
b   b
                   sssss    t    pppp       5         1            2            1
bbbb
                       s    t    p      5   5         1           2             1
b   b
                   ssss     t    p       555   _____   111   _____  22222  _____   111
bbbb

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

------------------------------------------------------------------------
                        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 0452FFFF 04500000 044EFFFF 044C0000 044AFFFE 04480001
------------------------------------------------------------------------------------------
              SN            OPCODE
0446FFFE 04440001 04420E0E 0440F1F1
------------------------------------------------------------------------------------------

Ver 01.13  Tue Jan 16 17:02:47 2001    "(1) Sending opcode 00"

------------------------------------------------------------------------------------------
                             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 0442FFFF 04400000
------------------------------------------------------------------------------------------

Ver 01.13  Tue Jan 16 17:02:48 2001    "(2) Sending opcode 11"

------------------------------------------------------------------------------------------
                             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 0442EEEE 04401111
------------------------------------------------------------------------------------------

Ver 01.13  Tue Jan 16 17:02:49 2001    "(3) Sending opcode 22"
```

```
--------------------------------------------------------------------------------
                            C O M M A N D   P A C K E T
--------------------------------------------------------------------------------
            PARM4             PARM3             PARM2             PARM1             PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000
--------------------------------------------------------------------------------
               SN            OPCODE
0446FFFB 04440004 0442DDDD 04402222
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:50 2001    "(4) Sending opcode 33"

--------------------------------------------------------------------------------
                            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
0446FFFA 04440005 0442CCCC 04403333
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:51 2001    "(5) Sending opcode 44"

--------------------------------------------------------------------------------
                            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 0442BBBB 04404444
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:52 2001    "(6) Sending opcode 55"

--------------------------------------------------------------------------------
                            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 0442AAAA 04405555
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:53 2001    "(7) Sending opcode 66"

--------------------------------------------------------------------------------
                            C O M M A N D   P A C K E T
--------------------------------------------------------------------------------
            PARM4             PARM3             PARM2             PARM1             PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000
--------------------------------------------------------------------------------
               SN            OPCODE
0446FFF7 04440008 04429999 04406666
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:54 2001    "(8) Sending opcode 77"

--------------------------------------------------------------------------------
                            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 04428888 04407777
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:55 2001    "(9) Sending opcode 78"

--------------------------------------------------------------------------------
                              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 04425555 04407878
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:57 2001    "(10) Sending opcode 79"

--------------------------------------------------------------------------------
                              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
0446FFF4 0444000B 04424444 04407979
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:02:58 2001    "(11) Sending opcode 7A"

--------------------------------------------------------------------------------
                              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 04423333 04407A7A
--------------------------------------------------------------------------------


--------------------------------------------------------------------------------
                              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
--------------------------------------------------------------------------------


--------------------------------------------------------------------------------
                              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
0446FFF1 0444000E 04427F7F 04408080
--------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:00 2001    "(12) Test 5.1.2.1b (first part) completed
successfully"
```

```
Ver 01.13  Tue Jan 16 17:03:01 2001    "(13) 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
0446FFEF 04440010 04420B0B 0440F4F4
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:01 2001    "(14) Sending opcode 84"

-------------------------------------------------------------------------------------------
                              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 04427B7B 04408484
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:02 2001    "(15) Sending opcode 86"

-------------------------------------------------------------------------------------------
                              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 04427979 04408686
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:03 2001    "(16) Sending opcode 87"

-------------------------------------------------------------------------------------------
                              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 04427878 04408787
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:04 2001    "(17) Sending opcode 44"

-------------------------------------------------------------------------------------------
                              C O M M A N D   P A C K E T
-------------------------------------------------------------------------------------------
            PARM4             PARM3             PARM2             PARM1             PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000
-------------------------------------------------------------------------------------------
               SN            OPCODE
0446FFEC 04440013 04427777 04408888
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:05 2001    "(18) Sending opcode 8A"

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

```
            PARM4             PARM3             PARM2             PARM1             PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000
-------------------------------------------------------------------------------------------
               SN            OPCODE
0446FFEB 04440014 04427575 04408A8A
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:06 2001    "(19) Sending opcode 8B"

-------------------------------------------------------------------------------------------
                              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 04427474 04408B8B
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:07 2001    "(20) Sending opcode 8C"

-------------------------------------------------------------------------------------------
                              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 04427373 04408C8C
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:08 2001    "(21) Sending opcode 8E"

-------------------------------------------------------------------------------------------
                              C O M M A N D   P A C K E T
-------------------------------------------------------------------------------------------
            PARM4             PARM3             PARM2             PARM1             PARM0
045AFFFF 04580000 0456FFFF 04540000 0452FFFF 04500000 044EFFFF 044C0000 044AFFFF 04480000
-------------------------------------------------------------------------------------------
               SN            OPCODE
0446FFE8 04440017 04427171 04408E8E
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:09 2001    "(22) Sending opcode 8F"

-------------------------------------------------------------------------------------------
                              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
0446FFE7 04440018 04427070 04408F8F
-------------------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:10 2001    "(23) Sending opcode 90"

-------------------------------------------------------------------------------------------
                              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 04426F6F 04409090
```

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


-------------------------------------------------------------------------------
                              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
-------------------------------------------------------------------------------


-------------------------------------------------------------------------------
                              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
0446FFE4 0444001B 04427F7F 04408080
-------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:14 2001    "(24) Sending opcode 91"

-------------------------------------------------------------------------------
                              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 04426E6E 04409191
-------------------------------------------------------------------------------


-------------------------------------------------------------------------------
                              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
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 044EFFFF 044C0000 044AFFFF 04480000
-------------------------------------------------------------------------------------------
               SN            OPCODE
0446FFE1 0444001E 04427F7F 04408080
-------------------------------------------------------------------------------


Ver 01.13  Tue Jan 16 17:03:16 2001    "(25) Test 5.1.2.1b (second part) completed
successfully"
```