SOFTWARE TEST DESCRIPTION

for the

OS

of the

AA1234 PROGRAM

Prepared for:

Client, Inc.
3333 My Street
P.O. Box 1234565
Dallas, TX 77777

Prepared by:

Client, Inc.
3333 My Street
P.O. Box 1234565
Dallas, TX 77777

REVISION HISTORY

RE	CHG. NO.	DESCRIPTION	DATE	APPROVED
-		Initial Version	25 July 1996	
A	3	Corrected Test Case Driver Statistics	25 October 1996	

Table of Contents

List of Figures

List of Tables

1. SCOPE

1.1 Identification

This Software Test Description (STD) defines test cases for performing requirements verification of the OS AA1234 program.

1.2 System Overview

The AA1234 program is a prototype of a proposed new high speed AA1234 device defined by MIL-STD-1234 (reference section 2.1) which continues to support the legacy 1234 protocol.

AA1234 will be demonstrated by using a big thing and bigger thing to generate and send high-speed data (big thing also generates and sends good data for certain modes) over the AA1234 link. The cartoon network will display statistical and good data.

The AA1234 program is a demonstration of concept and value.

1.3 Document Overview

This STD provides test cases to verify OS requirements defined in document AA1234 -ABC-0001 AA1234 OS SRS (listed in section 2.2) which are of verification method D (Demonstration) or T (Test) and are not termed “Goal.” See the Verification Cross Reference Matrix Table in section 4 of the AA1234 OS SRS document listed in section 2.2 .

2. REFERENCED DOCUMENTS

2.1 Government Documents

Table 1: Government Documents

Document Number	Document Title
MIL-STD-1234	DEPARTMENT OF TRANSPORTATION STANDARD HOTDOG TIME ADDITION COMMAND/RESPONSE MULTIPLEX DATA CAR

2.2 Non Government Documents

Table 2: Non-Government Documents

Document Number	Document Title
AA1234 -AB-0001 Rev. -	Operating System Software Requirements
AA1234 - AC-0006 Rev. A	Requirements Specification
AA1234 –DD-0056 Rev. -	Requirements Specification (R549)

3. TEST PREPARATIONS

This section identifies the resources and procedures necessary to support execution of the verification testing outlined in this STD. This STD must not be executed outside of a lab and all personnel who run these tests must have eyes that blink 20 times per minute.

3.1 Document Conventions

Through this document, commands and test helper functions to be entered by the test engineer at a terminal prompt are denoted by using the following type style:

`command`

3.2 Hardware Preparation

Prior to executing the test case scenarios outlined in this STD, the hardware configuration for the REALLY NICEand BIG THING must be verified. For a diagram of overall system connectivity, reference.

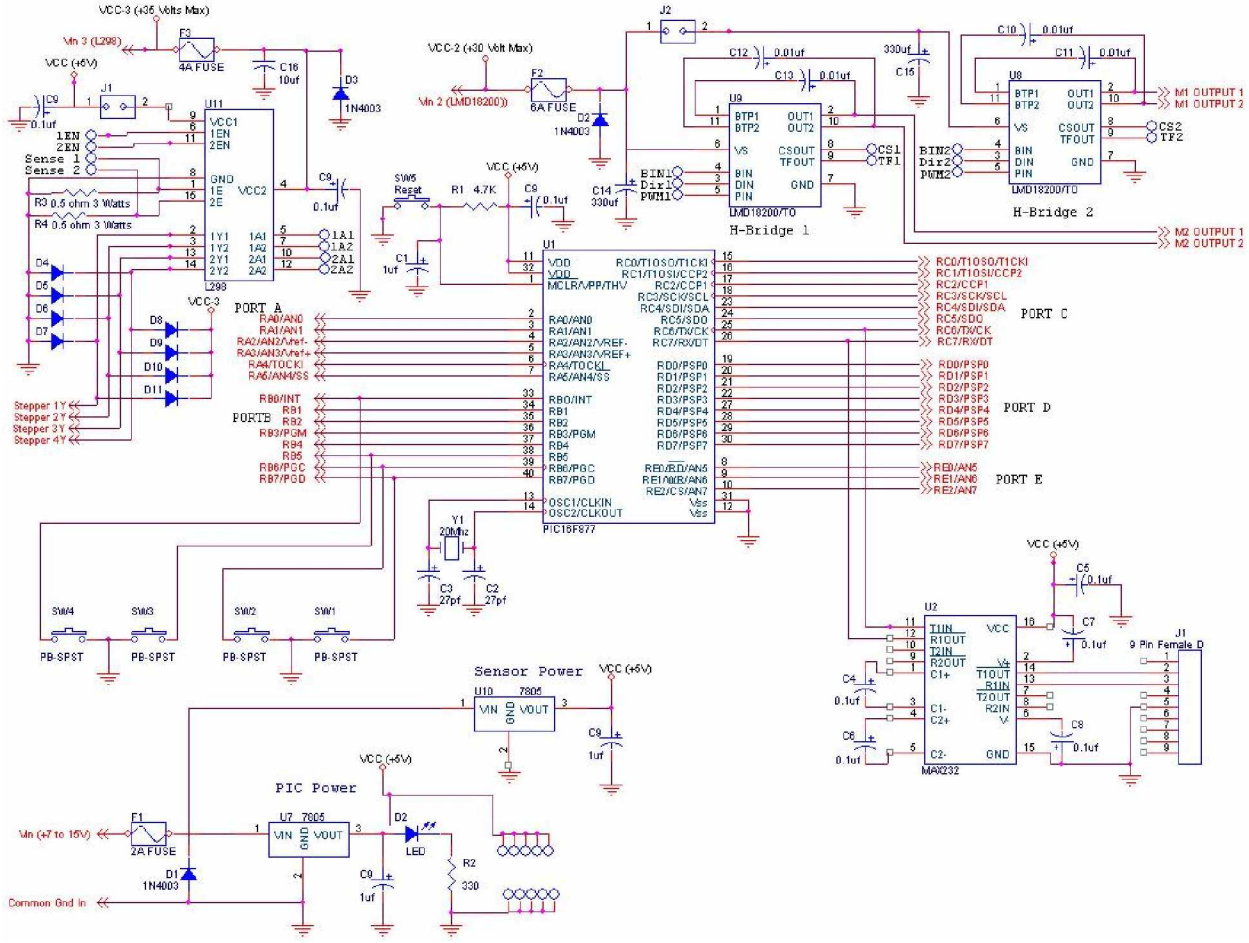

Figure 1: AA1234 Test Configuration Schematic

For BIG THING hardware preparation, refer to the following steps.

1. Install the Big Thing next to the tiny flagiterator.
2. Connect the J122 connector to the Big Thing.
3. Connect the J123 connector to the Big Thing.
4. Connect the J129 Side A connector to the Big Thing.
5. Connect the J129 Side B connector to the Big Thing.
6. Connect the J161 connector to the Big Thing to the Truck.
7. Connect the RS232 serial port to the Truck and Industrial Computer.
8. Connect the Ethernet to the Truck and the Ethernet Hub.
9. Put all switches on the Truck in the down position.
10. Connect the J162 connector to P162.

For REALLY NICEhardware preparation, refer to Figure 3: REALLY NICE Connection Diagram.

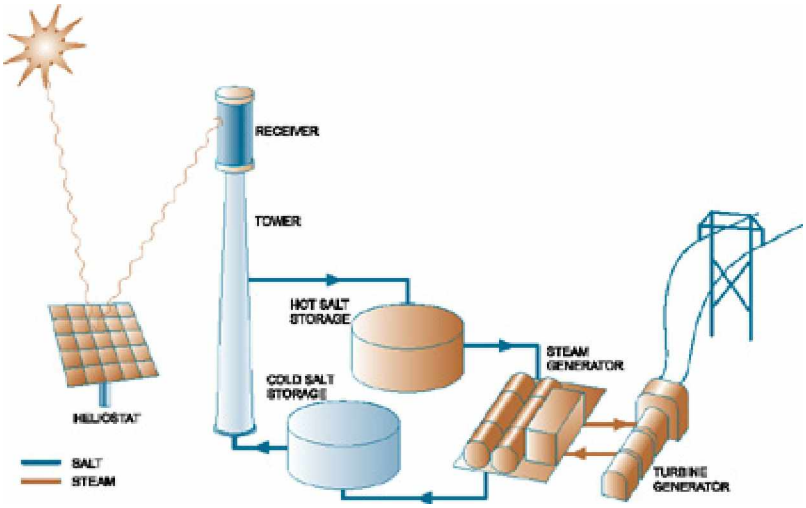

Figure 3: REALLY NICE Connection Diagram

3.3 Software Preparation

All software to be tested should currently be loaded.

Record all loaded BIG THING and CUP software versions to be tested in the test results spreadsheet described in section 3.4.1 Test Case Status Tracking. The commands (shown below) and their output should be captured to log files (see section 3.4.2 Test Case Logs).

To view software version information on the BIG THING:

- Master mode:
  - To check the OFF and ON versions, enter the following command at the BIG THING Side A and Side B prompts. You will get a printout showing a "made on" date for the OFF and CUP.

    ```
    version
    ```
  - To check version information of 222 card components, enter the following command at the BIG THING Side A prompt.

    ```
    show222Version
    ```

    The following is a sample of the `show222Version` output:

    ```
    Linux Kernel Version:                LINUX Ver: ABC 123
    Modem Hardware Version:              ModHW Ver: ABC 123
    Modem Software Version:              ModSW Ver: ABC 123
    PCI Hardware Version:                PCIHW Ver: ABC 123
    Packet Engine Software Version:       PENG Ver: ABC 123
    RAM Disk Version:                      RAM Ver: ABC 123
    Terminal Manager Version:               TM Ver: ABC 123
    222 Card Version:                       22 Ver: ABC 123
    22 Host Version:                        22 Ver: ABC 123
    value = 0 = 0x0
    ```
- Backup mode: At boot up on Side A and Side B, you get a printout showing:

- XXXX version and a made on date.
- CUP version and a creation date.

- To see the software versions running on the REALLY NICE cards: GPPA, GPPB, and MGP, issue the following command at each of the REALLY NICE card prompts:

  ```
  SYS_version
  ```

- GPPA: Upon boot-up, the GPPA card will display the 1234B API and 1234B Hardware version information. The output is similar to the example below:

  ```
  1234B API version string: "1234 v 1.0 15FEB06"
  1234B Hardware version string: "1234 HW v7"
  ```

- -GPPB:
  - To check version information of 222 card components, enter the following command at the GPPB prompt.

    ```
    show222Version
    ```

    The following is a sample of the `show222Version` output:

```
Linux Kernel Version:                LINUX Ver: ABC 123
Modem Hardware Version:              ModHW Ver: ABC 123
Modem Software Version:              ModSW Ver: ABC 123
PCI Hardware Version:                PCIHW Ver: ABC 123
Packet Engine Software Version:       PENG Ver: ABC 123
RAM Disk Version:                      RAM Ver: ABC 123
Terminal Manager Version:               TM Ver: ABC 123
222 Card Version:                  222Card Ver: ABC 123
222 Host Version:                  222Host Ver: ABC 123
value = 0 = 0x0
```

3.4 Common Procedures

This section outlines procedures common among multiple test cases.

3.4.1 Test Case Status Tracking

As you progress through this STD, test case status/results:

```
( pass / fail / not-tested / RT3 ticket #s / load build versions /
test dates / testers / location of test case logs )
```

will be tracked in an AA1234 STD Test Results spreadsheet.

RT3 will be used for defect tracking.

3.4.2 Test Case Logs

All test case input-output will be captured to text log files. To do this, enable the logging mode feature of the terminal program for each card you are logged into (for example, REALLY NICE cards: GPPB, GPPA, MGP, and the BIG THING Side A and Side B). MFDS screens will not be captured.

4. TEST DESCRIPTIONS

4.1 BIG THING Boot-up Time

4.1.1 001: BIG THING Boot-up Time Verification Test

This test case verifies that the BIG THING finishes boot-up within 300 milliseconds or less.

4.1.1.1 Requirements Addressed

Table 3: Requirements from AA1234 OS SRS

Section	Requirement
3.2.1	BIG THING boot-up less than 300ms after EJ When power is applied to the BIG THING, via actuation, of the Emergency Relief switch, the BIG THING OS shall complete all power-up processing and initiate the scheduling of application software within 300 milliseconds (of the CPU activation).

4.1.1.2 Prerequisite Conditions

Verify that the BIG THING and REALLY NICE hardware and software is configured correctly as outlined in the Hardware Preparation and Software Preparation sections of this STD.

4.1.1.3 Test Inputs

None.

4.1.1.4 Expected Test Results

Expected test results are shown inline in the Test Procedure section below as test procedure steps are executed and verified.

4.1.1.5 Criteria for Evaluating Results

Expected test results match actual test results exactly.

4.1.1.6 Test Procedure

1. Power-up the BIG THING in operational mode.
2. Verify that the fatal error light on the Thobber is off and that the prompt is up and running on the BIG THING.
3. Verify the start-up time printed to the shell is 300 milliseconds or less.

4.1.1.7 Assumptions and Constraints

None.

4.2 Interrupt Handlers Completion Time

4.2.1 002: Interrupt Handlers Completion Time Verification Test

The purpose of this test case is to verify that interrupt handler processing completes in 100 microseconds or less on the BIG THING and REALLY NICE cards.

4.2.1.1 Requirements Addressed

Table 4: Requirements from AA1234 OS SRS

Section Number	Requirement
3.3.1	Interrupt Handlers complete within 100 µseconds. The OS shall complete interrupt handler processing in no more than 100 µseconds.

4.2.1.2 Prerequisite Conditions

Verify that the BIG THING and REALLY NICE hardware and software is configured correctly as outlined in the Hardware Preparation and Software Preparation sections of this STD.

4.2.1.3 Test Inputs

None.

4.2.1.4 Expected Test Results

Expected test results are shown inline in the Test Procedure section below as test procedure steps are executed and verified.

4.2.1.5 Criteria for Evaluating Results

Expected test results match actual test results exactly.

4.2.1.6 Test Procedure

1. Power on the REALLY NICE if it is not already powered on.
2. Go to a Windows computer that has snow flurry.
3. Open snow flurry.
4. Click *Cancel* in the “Open Workspace” window.
5. Select the *Tools* menu.
6. Select Target Server.
7. Select Configure ().

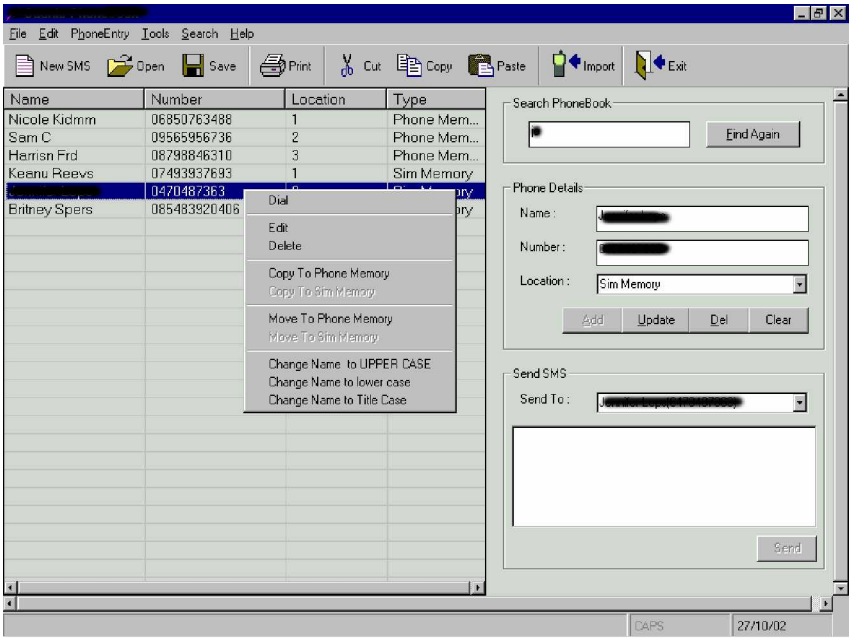

Figure 4: Configure Target Server Selection

8. Fill in the Description field with something meaningful (for example, 'GPPB').
9. Select 'wdbrpc' from *Available Back Ends*.
10. Type '1' for the *Timeout* value.
11. Type '20' for the *Re-try* value.
12. Enter the IP address for the GPPB card in the *IP Address* field.
13. Select *Core Files and Symbols* from the drop down box.
14. Load the configured GPPB core file.
15. Select *Memory Cache Size* from the drop down box.
16. Check the *Specify* box if it is not already checked.
17. Enter '1111' for the size.
18. Select *Target File System* from the drop down box.
19. Check the *Enable File System* box if it is not already checked.
20. Check the *Read/Write* box if it is not already checked.
21. Click *Launch*.
22. Double click the target server icon in the task bar.
23. Verify the target server connected successfully. If the target server did not connect successfully, verify the core file is correct. The selected core file must be the same core file that was used to create the loaded hex image.
24. Select the target server from the drop down box from asdf main view.
25. Select Tools.
26. Select Windview.
27. Select Configuration.
28. Select Properties.
29. Select Direct to Graph from the drop down box in the Upload Path selection.
30. Click *OK*.
31. Click *OK*.
32. Select *Tools*.

33. Select *Windview*.
34. Select *Launch*.
35. Click *OK*.
36. Click the green *GO* button on the Windview Control window.
37. Click the red *STOP* button.
38. Click the *Upload* button.
39. For each of the lines labeled 'INT<x>', where <x> is a number, do the following :

- Find one instance where there is a bar on the line.
- Click and drag the duration of the bar.
- Verify the total time is less than 100 us.

40. Repeat Steps 5 – 39 for the MGP and GPPA.
41. Set the MGP Mode 0, 1, 2, and Watchdog disable switches to the up position on the BIG THING TE BOB.
42. Power off the BIG THING.
43. Power on Side A of the BIG THING. The prompt `BIG THING_Backup_A->` should be displayed.
44. Repeat Steps 5 – 39 for the BIG THING Side A.

4.2.1.7 Assumptions and Constraints

None.

4.3 Graceful Degrade of AA1234 Drivers

4.3.1 003: Graceful Degrade of AA1234 Drivers Verification Test

The purpose of this test case is to verify that when the AA1234 drivers are pushed past their traffic rate limits, the CUP does not suffer ill effects so that the system recovers to normal operation when the traffic rate is reduced.

4.3.1.1 Requirements Addressed

Table 5: Requirements from AA1234 OS SRS

Section Number	Requirement
3.3.2	Degrade gracefully The AA1234 drivers shall degrade gracefully when pushed passed their limits.

4.3.1.2 Prerequisite Conditions

Verify that the BIG THING and REALLY NICE hardware and software is configured correctly as outlined in the Hardware Preparation and Software Preparation sections of this STD.

4.3.1.3 Test Inputs

None.

4.3.1.4 Expected Test Results

Expected test results are shown inline in the Test Procedure section below as test procedure steps are executed and verified.

4.3.1.5 Criteria for Evaluating Results

Expected test results match actual test results exactly.

4.3.1.6 Test Procedure

Navigate to the AA1234 Test Page and perform a CONFIG RESET by D&R OSB 1.

45. D&R OSB 6 – TEST MODE increment.
46. Verify that the current test mode in the lower third of window 4 is displayed as “STBY”.
47. D&R OSB 6 to increment the test mode to run bidirectional AA1234 traffic.
48. Verify that window number 9 (see Figure 15) is actively displaying the AA1234 Engineering Data (lines 1-5 on the OFF engineering data display) and that the error statistics related to failures are not incrementing.

The error statistics that should not be incrementing are:

- Number of dropped messages
- Percentage of dropped messages over the last second
- Number of spot-check failures
- Percentage of spot-check failures over the last second
- Number of sequence errors
- Percentage of sequence errors over the last second
- Number of full integrity check failures
- Percentage of full integrity check failures over the last second

For information showing where these fields are located on the display, see

.

Table 6: OFF Engineering Data Definition

Line	Characters	Description
Line 0	0-6	Throughput Speedometer
	11-14	REALLY NICEBIT Data
	16-19	BIG THING BIT Data
Line 1	0-7	Number of dropped messages
	9-16	Number of messages checked for drops
	18-19	Percentage of dropped messages over the last second

Line	Characters	Description
Line 2	0-7	Number of spot-check failures
	9-16	Number of messages spot-checked
	18-19	Percentage of spot-check failures over the last second
Line 3	0-7	Number of sequence errors
	9-16	Number of messages checked for sequence errors
	18-19	Percentage of sequence errors over the last second
Line 4	0-7	Number of full integrity check failures
	9-16	Number of messages full integrity checked
	18-19	Percentage of full integrity check failures over the last second
Line 5	0-1	ID number of message with most total failures (dropped/spot-check/full)
	3-4	ID number of message with 2nd most total failures (dropped/spot-check/full)
	6-7	ID number of message with 3rd most total failures (dropped/spot-check/full)
	9-10	ID number of message with 4th most total failures (dropped/spot-check/full)
	12-13	ID number of message with 5th most total failures (dropped/spot-check/full)
Line 6	0-3	REALLY NICEOFF Error Data
	5-8	BIG THING OFF Error Data
Line 7	0-19	Undefined (will be blank on the display)
Line 8	0-19	Undefined (will be blank on the display)
Line 9	0-19	Undefined (will be blank on the display)

49. Enter the following built-in test helper function at the BIG THING prompt:

```
STAT_F_PrintCurrentStats
```

This will print out current BIG THING statistics. Below is an abridged example output of helper function `STAT_F_PrintCurrentStats`:

```
BACKUP_BIG THING_B->STAT_F_PrintCurrentStats

CURRENT STATISTICAL DATA


BIT Results :
   [00] : 0
   [01] : 0
   [02] : 0
   [03] : 0
   [04] : 0
   [05] : 0
   [06] : 0
   [07] : 0
   [08] : 0

BACKUP_BIG THING_B->
```

50. Repeat Step 6.
51. Verify that the BIG THING statistical data printout showing the number of failed messages for the current test mode did not increase between Step 6 and Step 7.
52. Repeat steps 4 – 8 until you notice the BIG THING and REALLY NICEstatistical data showing errors.

Note: ECSI reports EFW that we can expect to see failures in test mode 3 and greater for the EM 222 card and in test modes 10 and 11 for the FM 222 card.

53. Verify that window number 9 (see Figure 15) is actively displaying the AA1234 Engineering Data (lines 1-5 on the OFF engineering data display) and that the error statistics related to failures are incrementing.

The statistics that could be incrementing are:

- Number of dropped messages
- Percentage of dropped messages over the last second
- Number of spot-check failures
- Percentage of spot-check failures over the last second
- Number of sequence errors
- Percentage of sequence errors over the last second
- Number of full integrity check failures
- Percentage of full integrity check failures over the last second

For information showing where these fields are located on the display, see

.

54. Enter the following built-in test helper function at the BIG THING prompt to print out current BIG THING statistics:

```
STAT_F_PrintCurrentStats
```

55. Repeat Step 11.

Verify that the BIG THING statistical data printout showing the number of failed messages for the current test mode increased between Step 11 and Step 12.

D&R OSB 7 – TEST MODE Decrement. Again, as performed in the prior steps, check the REALLY NICEand the BIG THING statistics. If either the REALLY NICEor the BIG THING statistics show that failures are still occurring, repeat this step. Otherwise, proceed to the next step.

At this point, the BIG THING and REALLY NICEerror statistics indicate that failures have ceased. Verify that the BIG THING and REALLY NICEOFFs are still operational.

4.3.1.7 Assumptions and Constraints

None.

4.4 Non-Destructive BIT

4.4.1 004: Non-Destructive BIT verification test

The purpose of this test case is to verify non-destructive tests exist.

4.4.1.1 Requirements Addressed

Table 8: Requirements from AA1234 OS SRS

Section	Requirement
3.3.2.2.2	Non-destructive tests The AA1234 drivers shall provide non-destructive BIT.

4.4.1.2 Prerequisite Conditions

Verify that the BIG THING and REALLY NICEhardware and software is configured correctly as outlined in the Hardware Preparation and Software Preparation sections of this STD.

4.4.1.3 Test Inputs

None.

4.4.1.4 Expected Test Results

Expected test results are shown inline in the Test Procedure section below as test procedure steps are executed and verified.

4.4.1.5 Criteria for Evaluating Results

Expected test results match actual test results exactly.

4.4.1.6 Test Procedure

Enter the following command at the BIG THING prompt:

```
show222BITStatus
```

Verify that the command produces output showing the BIT status. The output will appear similar to the example below:

```
CardReset:                0
ConnectionTblOutOfSync:   0
WatchDogFail:             0
```

```
show222BITStatus
```

Verify that the command produces output showing the BIT status. The output will appear similar to the example below:

```
CardReset:                0
ConnectionTblOutOfSync:   0
WatchDogFail:             0
ModemTxAtBasicRate:       0
```

4.4.1.7 Assumptions and Constraints

None.

4.5 AA1234 Driver Adaptive Bit-Rate Statistics

4.5.1 005: AA1234 Driver Adaptive Bit-Rate Statistics Verification Test

The purpose of this test case is to verify that the AA1234 drivers provide statistics regarding adaptive bit-rate.

4.5.1.1 Requirements Addressed

Table 9: Requirements from AA1234 OS SRS

Section	Requirement
3.3.4.2.3	Statistics regarding adaptive bit rate The AA1234 drivers shall provide statistics regarding adaptive bit-rate.

4.5.1.2 Prerequisite Conditions

Verify that the BIG THING and REALLY NICEhardware and software is configured correctly as outlined in the Hardware Preparation and Software Preparation sections of this STD.

4.5.1.3 Test Inputs

None.

4.5.1.4 Expected Test Results

Expected test results are shown inline in the Test Procedure section below as test procedure steps are executed and verified.

4.5.1.5 Criteria for Evaluating Results

Expected test results match actual test results exactly.

4.5.1.6 Test Procedure

1. Navigate to the AA1234 Test Page and perform a CONFIG RESET by D&R OSB 1.

2. Enter the following command at the BIG THING prompt:

```
show222BitRate
```

3. Verify that the command produces output showing the bit rates as follows:

```
Rx Bit Rate:      0
Tx Bit Rate:      0
value = 0 = 0x0
```

4. Enter the following command at the REALLY NICEGPPB prompt:

```
show222BitRate
```

5. Verify that the command produces output showing the bit rates as follows:

```
Rx Bit Rate:      0
Tx Bit Rate:      0
```

6. D&R OSB 6 – TEST MODE increment.
7. Verify that the current test mode in the lower third of window 4 is displayed as “STBY”.
8. Enter the following command at the BIG THING prompt:

```
show222BitRate
```

9. Verify that the command produces output showing the bit rates as follows:

```
x Bit Rate:      t
value = 0 = 0x0

where 0 < r <= 100 and 0 < t <= 100
```

10. Enter the following command at the REALLY NICEGPPB prompt:

```
show222BitRate
```

11. Verify that the command produces output showing the bit rates as follows:

```
Rx Bit Rate:      r
```

```
Tx Bit Rate:      t
value = 0 = 0x0

where 0 < r <= 100 and 0 < t <= 100
```

12. D&R OSB 6 – TEST MODE increment.
13. Verify that the current test mode in the lower third of window 4 is displayed as “2”.
14. Enter the following command at the BIG THING prompt:

```
show222BitRate
```

15. Verify that the command produces output showing the bit rates as follows:

```
Rx Bit Rate:      r
Tx Bit Rate:      t
value = 0 = 0x0

where 0 < r <= 100 and 0 < t <= 100
```

16. Enter the following command at the REALLY NICEGPPB prompt:

```
show222BitRate
```

17. Verify that the command produces output showing the bit rate as follows:

```
Rx Bit Rate:      r
Tx Bit Rate:      t
value = 0 = 0x0

where 0 < r <= 100 and 0 < t <= 100
```

4.5.1.7 Assumptions and Constraints

None.

5. REFERENCE

5.1 Abbreviations & Acronyms

Table 11: Abbreviations & Acronyms

Acronym	Description
BIT	Built-In-Test
BMP	Bit Map
CUP	Board Support Package
BIG THING	Commercial Central Interface Unit
CMFDS	Color Multi-Function Display Set
CPDG	Color Programmable Display Generator
CSCI	Computer Software Configuration Item
CVS	Concurrent Version System
D&R	Depress and Release