NPAS DataMaster DMT Power-Up Protocol

The VDHL has purchased new DataMaster DMT evidentiary breath alcohol testing instruments. The instruments will be thoroughly tested by the VDHL to ensure they function to the standards set forth in the instrument bid and purchase agreement. The initial software layout in the instruments is not the Vermont DataMaster DMT software protocol. The Vermont DataMaster DMT software will be downloaded and tested at a later date. The current software will be used to test the analytical functioning of the instrument, independent of the software. The first step in the testing protocol will be the initial power-up. The NPAS DataMaster DMT will be turned on and the basic functioning of the instrument will be examined. The menu options will be explored. We will examine the basic layout of the software to ensure we will be able to begin analytical testing of the instruments.

Should the DataMaster DMT instrument software not function as required, NPAS will be contacted to re-download a functional software revision. Should the DataMaster DMT instrument analytically not pass these simple tests, the instrument will be returned to NPAS for repair and/or replacement. This will occur on the initial start-up of all instruments received by the VDHL from NPAS.

Initial tests to be performed:

1. Options Set-Up and Check
    a. We will ensure that the operating parameters are set up per VDHL normal operating specifications.
        i. Printer on
        ii. Supervisor test 10
        iii. Tolerance check
        iv. Data collection on
        v. Units g/210L
        vi. Simulator check
        vii. External Wet Bath Simulator
        viii. Simulator nominal at 0.1g/210L
        ix. Digital simulator : None
        x. Simulator before
        xi. Simulator between
        xii. Simulator after : No
        xiii. 2 subject test sequence
        xiv. Ask questions
        xv. Query refusal
        xvi. Alcohol display on
        xvii. Show 3 digits
        xviii. Volume display on
2. Print Calibration Factors
3. Diagnostic Check
    a. Parameters per VDHL specifications
        i. Temperatures
            1. Sample chamber 48º
            2. Breath tube 47º
            3. Simulator hose 45º
        ii. Voltages
            1. Lamp Voltage 2.5-3.5 V
            2. Cooler Voltage 2 V
            3. Bias Voltage 120 V

4. Chopper Frequency 530-580 Hz

iii. Pump Test
1. Volume 0.6 - 0.8
2. Flow Rate 3 – 5 L/M

iv. Detector Stability Test

Pump	On	Off
Max(V)	< 0.1	< 0.1
Min(V)	< 0.1	< 0.1

v. Filter Test
1. Filter 1 Zero = true
2. Filter 2 Zero = true
3. Filter 3 Zero = true

vi. Internal standard
1. Xq = < 3%

4. Accuracy and Precision Check
   a. Average within 5% of calculated solution value
   b. Std Dev <0.005
5. Sample Acceptance Check
   a. Instrument does not accept a shallow or intermittent or suck-back breath.
   b. Instrument accepts a valid, alcohol-free sample
6. Basic Subject Test
   a. Instrument accepts a valid, alcohol-free sample

Power-Up Results

DataMaster DMT 100106 Received 10/05/06, Tested 11/01/06

1. Password to run advanced levels: **tech**
2. Options menu okay.
3. Calibration Factors printed.
4. Diagnostic Test passed.
5. Supervisor Test passed.
6. Basic Subject Test passed.
7. Sample Acceptance Test passed. **

Tested instrument 10/17/06, DMT 100106 failed to perform due to filter failures. NPAS repaired instrument 10/31/06, instrument passed initial power-up testing.
Calibrated instrument 11/16/06

- Calibration okay
- Diagnostic test okay
- Linearity test okay R^2=1.000
- Subject test 1st try Standard out of Range
- Acetone test multiple errors
    - Ext Std = INTERFERENCE
    - Blank Test = 0.004
    - Acetone correctly detected
    - Final blank test = 0.007 Blank Error reported
- Second acetone and toluene test passed okay
- Mouth alcohol detection passed
- RFI interference not detected

Unit will be returned to NPAS week of 11/27/06 for upgrade and repair.

DataMaster DMT 100206 Received 10/17/06, Tested 11/01/06

1. Options menu okay.
2. Calibration Factors printed.
3. Diagnostic Test passed.
4. Supervisor Test standard passed
5. Basic Subject Test passed.
6. Sample Acceptance Test Passed.

DataMaster DMT 100306 Received 10/11/06, Tested 10/31/06

1. Options menu okay.
2. Cal Factors printed
3. Diagnostic test printed
4. Supervisor test passed
5. Basic Subject test passed
6. Sample Acceptance Test passed

DataMaster DMT 100306 returned to NPAS for repair due to pump error 10/17/06.
Instrument returned to VDHL 10/26/06, instrument passed initial power-up testing.
Calibrated instrument 11/17/06
RFI detection tested on instrument 11/17/06

- RFI error was not reported on any type of testing when RF was introduced

- Radio keyed during external standard acquisition on subject test. 0.1sim rose to a level of 0.212 before aborting the test. Error reported: Standard Acquisition
- Radio keyed during second external standard acquisition of a supervisor test. Error reported: Standard Acquisition
- Radio keyed on channel 1during second subject sample of a two test sequence, alcohol free subject. Error Reported: Invalid
- Radio keyed on channel 14 and channel 5 during both tests of a two test sequence, alcohol free subject. First Error: Invalid. Second Error: none reported, alcohol displayed on graph.
- Alcohol carry-over tested. 0.4 sim solution blown through subject breath tube. After the external standard ran, 0.006 was the last reading displayed during the purge before the blank test; reported 0.000. 0.4 blown through, last reading displayed during purge 0.000; reported 0.000. External standard run, last reading during purge 0.000; reported 0.000. 0.4 blown through, last reading during purge 0.005; reported 0.000.
- Radio keyed during both subject samples of a two test sequence, 0.4 blown through instrument. First sample, radio keyed as soon as subject started blowing, Error Reported: Invalid. Second sample, radio keyed when alcohol curve reached plateau, caused second rise to a 0.583 level; Error Reported: Interference.
- Radio held on during first blank test of a subject test. Reported blank as 0.053; Error Reported: Blank Error
- Radio keyed during Internal Standard check. Reported internal standard as Verified; error reported: Calibration Error. Xq = 0.1527 9.94%
- Sequence abort test. Touched screen during a subject sample to induce user abort. Only aborted test if menu box was pressed.

VDHL readjusted RFI detection settings to be more sensitive, RFI then detected using 5mW radio. Will retest instruments with 5watt radio to ensure RFI detection is adequate. VDHL will discuss blank errors with NPAS.

DataMaster DMT 100406 Received 10/19/06, Tested 11/01/06

1. Options menu okay.
2. Calibration Factors printed.
3. Diagnostic Test passed.
4. Supervisor Test standard passed
5. Basic Subject Test passed.
6. Sample Acceptance Test Passed.

DataMaster DMT 100506 Received 10/11/06, Tested 11/01/06

1. .Options menu okay.
2. Cal Factors printed
3. Diagnostic test printed
4. Supervisor test passed
5. Basic Subject test passed
6. Sample Acceptance Test passed **

DataMaster DMT 100506 returned to NPAS for repair due to pump error 10/17/06. Instrument returned to VDHL 10/26/06, instrument passed initial power-up testing.

** During the suck back portion of the sample acceptance testing, ethanol was displayed when air was not being provided due to the vacuum caused by

the suck back. The software will be altered by the manufacturer to cause an error message and sample failure when a negative flow is detected. "Improper breath". This will remedy the problem.

DataMaster DMT 101706 Received 11/14/06, Tested 11/21/06

1. Options menu okay.
2. Cal Factors printed
3. Diagnostic test printed
4. First try at supervisor test failed due to blank error, displayed 0.004 – 0.005
5. Supervisor test passed
6. First sample acceptance test failed due to blank error
7. Sample acceptance test passed, suck back causes error message to pop-up but does not abort testing
8. Detected RFI during RFI test on alcohol free subject sample

Calibrated on 11/22/06

- 0.4 blown through instrument as subject sample. After 0.4 sample, only purged to 0.004, Error Reported: Blank error
- 0.4 blown through instrument as subject sample on a two test sequence. After acquisition of second sample, instrument only purged to 0.004; Error Reported: Blank error
- Acetone interference test passed
- Toluene test passed
- Volume acceptance test. A 2L syringe was set to 1800mL and was blown through the breath tube as a subject sample. Reported volume as 1.5L and 1.6L during a two test sequence.
- RFI retested during a subject test sequence. Radio was keyed during sample acquisition before air was administered. Alcohol was displayed and RFI was not detected until air was supplied. Error Reported: RFI Detected.
- Radio keyed during external standard acquisition of a subject test sequence. Screen displayed 0.111, reported 0.105. No errors were reported, user aborted.
- Supervisor test sequence ran. Radio keyed during fourth external standard test. RFI interference evident, error not reported until radio was touched to breath tube.
- Radio keyed during internal standard check; Error Reported: RFI detected.
- Radio keyed during blank test after external standard check on subject test sequence; Error Reported: RFI detected.
- Supervisor test sequence with 0.1 sim. Radio keyed during first, second and fourth external standard tests. The first test rose to a level of 0.124, reported Interference. The second test rose to a 0.131 level the fell back to 0.126, reported Interference. The radio was not keyed during the third test. Radio keyed during fourth test, rose to a level on 0.128, reported interference. Test was aborted by the user, information was not saved by the instrument.

VDHL readjusted RFI detection settings to be more sensitive, RFI then detected using 5mW radio. Will retest instruments with 5watt radio to ensure RFI detection is adequate.

Meeting 11/27/06

Bob Drawbaugh, Mary Celloti, Darcy Richardson, Amanda Bolduc, Steve Harnois.

- Discussed remedy to RFI problem.
- Discussed problems with "carry-over", blank errors and purging.
- Discussed differences between instruments.

- Amanda will speak with Scott @NPAS regarding
  - updating all in-house DMT's to current software rev.
  - Explanation to "Tolerance Check"
  - Timeline to having VDHL DMT software
- Spoke w/ Scott 11/27/06
  - Scott will email VDHL most current software rev. to install into all DMT's. New chips must be installed into DMT's before software can be upgraded. Chips are in box from NPAS, VDHL will install week of 11/27/06.
  - Tolerance check refers to known sim soln value ±10%
  - Scott cannot answer software timeline question until VDHL decided on memory functions.
  - Scott understood that suck-back solution does not meet VDHL standards, will change protocol to stop, purge and restart test when suck back occurs.
- Steve will speak with Dave @NPAS regarding
  - Explanation to "Tolerance Check"
  - Hardware issues (making all in-house instruments up to date)
- Bob will speak with Cliff @NPAS regarding purchase issues, return of instrument 100106 to NPAS for repair/replacement
- Darcy will speak with Draeger regarding testing of their new instrument as a back-up plan in case the DMT's do not perform to bid specifications

- Steve Harnois from VDHL spoke with Dave @ NPAS on Nov 29th and asked what does "Tolerance Check on /off" turn on and off? What are the limits in the software that we are running?
  Tolerance Check "ON" in Simulator Sub-Menu Means:
  Verification of the wet bath simulator test results fall within the greater of 0.005 g/210L or 5% of the set ethanol concentration. This applies to both external standard tests performed as part of a subject test sequence and simulator samples of a Supervisor Test.
  It also allows for the checking of the temperature of a simulator to within +/- 0.2 Deg C of 34.0 Deg C if a simulator (Guth, Repco, CalWave) is selected in the simulator menu. If None is selected, the temperature is not monitored.
  Future versions of software will have the Tolerance check only pertain to the Ethanol Concentration while the Temperature check will be determined solely by the selection of the appropriate simulator.
  Tolerance of the Internal Standard Check is 5% of the Xq value stored in the Calibration factors. If this check falls outside the allowable limit, the message "Calibration Error" is reported. This will be changed to "Internal Standard Error" on future versions of software.
  The limit for agreement between target calibration concentration and actual ethanol value produced during calibration is 20%. A "CAL" factor value of 0.8 to 1.2 inclusive can only be obtained. If the value of ethanol displayed during a calibration were such that it would produce a CAL value of < 0.8 or > 1.2, the message "Standard Out of Range" would be produced.