

Amanda Bolduc

INFRARED BREATH TESTING DEVICE



STUDENT MANUAL

Vermont Criminal Justice Training Council/Vermont Department of Health
December 2007

CONTENTS

| | |
|--|----|
| Training Goals and Objectives | 2 |
| SECTION I Scientific Principles | 3 |
| SECTION II Operational Principles | 9 |
| SECTION III Process For Obtaining an Evidential Sample | 13 |
| SECTION IV Data Entry and Review | 18 |
| SECTION V Error Messages and Responses | 24 |
| SECTION VI Testimony Preparation | 30 |
| SECTION VII Appendices | 34 |
| APPENDIX A: County/Town Codes | 35 |
| APPENDIX B: BAC DataMaster Operator's Use Log | 39 |
| APPENDIX C: Officer's Infrared Breath Testing Log | 40 |
| APPENDIX D: Example Tickets | 41 |
| APPENDIX E: Resources | 43 |

FIGURES

| | |
|---|----|
| Figure 1. The Electromagnetic Spectrum | 4 |
| Figure 2. Partial IR Spectrum of Ethanol | 5 |
| Figure 3. Graphical Representation of the Beer-Lambert Law | 6 |
| Figure 4. Graphical Representation of Henry's Law | 7 |
| Figure 5. Breath Alcohol Simulator | 8 |
| Figure 6. BAC DataMaster Optical Bench | 10 |
| Figure 7. 95 Model BAC DataMaster | 11 |
| Figure 8. 88 Model BAC DataMaster | 11 |
| Figure 9. Typical Breath Profile | 12 |
| Figure 10: Two test sequence DataMaster Ticket | 41 |
| Figure 11: "Radio Frequency Interference" DataMaster Ticket | 41 |
| Figure 12: "Interference Detected" DataMaster Ticket | 42 |
| Figure 13: "Invalid Sample" DataMaster Ticket | 42 |
| Figure 14: Single Test Sequence DataMaster Ticket | 42 |
| Figure 15: "Simulator Out of Range" DataMaster Ticket | 42 |

TRAINING GOALS AND OBJECTIVES

Training Goal:

To certify Vermont law enforcement officers in the operation of the BAC DataMaster and enable them to obtain a valid evidential breath sample from a DUI subject to determine the breath alcohol concentration.

Objectives:

As a result of this training, students will be able to:

- A) Ensure that an adequate observation period is properly administered prior to obtaining a subject test.
- B) Determine that the BAC DataMaster breath testing instrument is prepared to analyze a breath sample.
- C) Operate the BAC DataMaster breath testing instrument in accordance with the specified procedure incorporated in this training.
- D) Verify that the BAC DataMaster completes and passes all quality control checks prior to obtaining a subject test.
- E) Inspect the test record (evidence ticket) to ensure that all case specific information is recorded accurately.
- F) Make a log entry of the subject test at the time the test is completed.
- G) Ensure that the subject has a copy of the evidence ticket.
- H) Be prepared to testify in court about the procedure followed in operating the BAC DataMaster.

SECTION I

SCIENTIFIC PRINCIPLES

The information provided in this section is for reference purposes only. An understanding of this material is not necessary for the effective operation of the DataMaster breath testing device.

SCIENTIFIC PRINCIPLES REGARDING BREATH TESTING

INTRODUCTION:

Breath alcohol testing devices are designed to identify and evaluate the amount of ethyl alcohol (ethanol) in breath specimens. These devices can be used for clinical, diagnostic or forensic purposes. The concept of testing breath to evaluate the amount of alcohol present in a person's body has been put into practice for over fifty years. The equipment designed to perform this testing has undergone nearly constant development and refinement through out that time. These devices often incorporate optical, mechanical and electronic components to provide the user with a device that provides consistent and reliable testing for alcohol vapor in both simulated and authentic breath samples.

There are two major aspects of the testing that is done that must be addressed by such equipment. These include qualitative and quantitative analysis.

QUALITATIVE ANALYSIS:

Qualitative analysis in breath alcohol testing is simply the identification of ethanol in the breath sample. The DataMaster does this by considering the unique interaction of infrared energy with the alcohol molecule. Infrared energy is sensed by us as heat. It is a relatively narrow range of energies or wavelengths in the broadly defined electromagnetic spectrum, which includes gamma and x-rays at the high energy end and radio waves at the lower energy end. Infrared energies fall in the slightly lower energy region just beyond visible light. Due to this proximity it is not unusual to sense heat from sources of visible light that are seen as red by our eye and *vice versa*. Just as visible light can be separated into individual bands of color using a glass prism or grating, infrared energies can also be separated with similar devices.

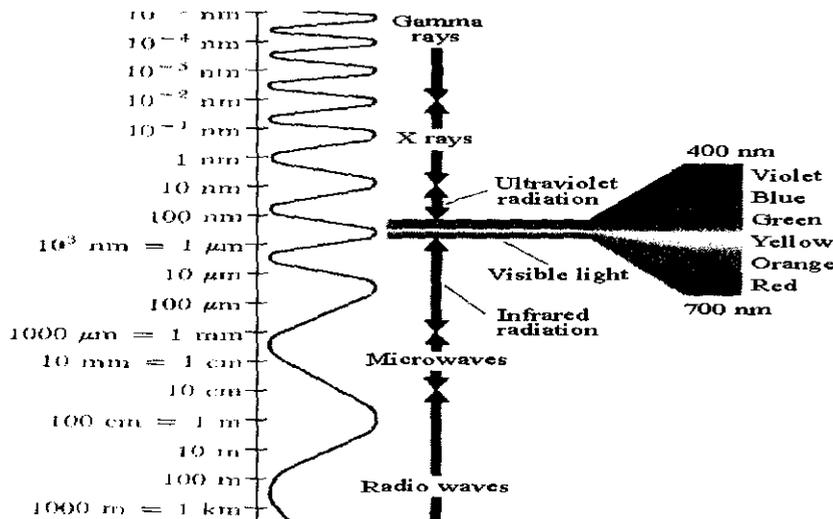


Figure 1: The Electromagnetic Spectrum

A widely used scientific test technology, infrared spectroscopy, uses the phenomenon of the unique pattern of absorption of infrared energy by chemical substances to identify when they are present in a sample. This pattern is referred to as the infrared spectrum or the infrared “fingerprint” of a substance. The DataMaster is designed to measure the absorbance of infrared energies at relatively specific areas of the ethanol spectrum. Energy filters are used which eliminate most of the energies in the beam emitted from the source. These filters are designed to allow only infrared energy with wavelengths in the 3 to 4 micrometer range to reach the detector. Specifically, in the BAC DataMaster, filters allow monitoring of energy absorption at 3.37 and 3.44 micrometers because those wavelengths are characteristic for ethyl alcohol. More than one energy or wavelength is measured to be as specific as is needed to identify the presence of ethyl alcohol and to minimize the measurement of other chemical substances that may be present in a breath specimen that could interfere with the accurate identification and quantitation of ethyl alcohol.

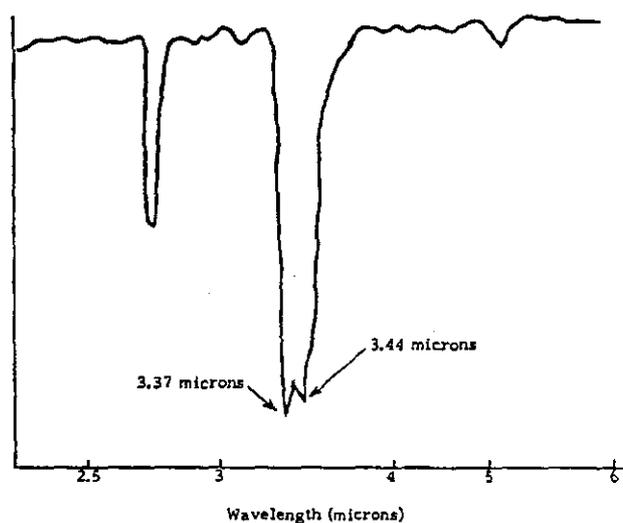


Figure 2: A Partial Infrared Spectrum of Ethanol

QUANTITATIVE ANALYSIS:

The Beer Lambert Law:

The second aspect of testing for alcohol in a breath specimen is the determination of how much ethyl alcohol is present. This is important when the amount present is related to one or more *per se* levels relating to legal sanctions. The ability of infrared breath testing devices, such as the DataMaster, to accomplish this is based on the well-defined scientific Beer-Lambert Law.

This phenomenon was first described by Lambert in the mid-1700's. It simply acknowledges that the absorption of light by substances is directly proportional to the amount of the substance present. An analogy to this as a fairly common experience is the

continuing loss of intensity of light from a source, such as a tail light on a vehicle, as fog forms and gets thicker. The more fog present between the source of light and the eye, the less light that reaches the eye. When using breath testing devices, within the range of normal breath alcohol vapor amounts, this relationship can be defined mathematically and is seen as a constant proportion.

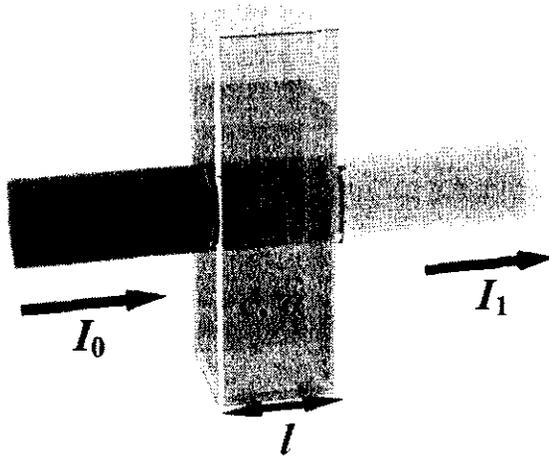


Figure 3: A graphical representation of the Beer-Lambert Law where I_0 is the infrared beam prior to absorption by a substance and I_1 is the infrared beam after absorption.

In the DataMaster there is a source of infrared energy at one end of a chamber and a detector of infrared energy at the other end. When there is no alcohol vapor present in the chamber there is no absorption of the energy by alcohol. As the amount of alcohol vapor increases, the more infrared energy is absorbed by the molecules; therefore, the amount of energy reaching the detector is less. If simultaneous measurements of the amount of alcohol in the chamber and the amount of light being absorbed by the alcohol are made, a graph of that data will demonstrate that a straight line is defined.

This is performed each time a DataMaster is calibrated for use in the field by presenting the DataMaster with a vapor sample of a known alcohol concentration. While we can apply this information graphically, the DataMaster determines the mathematical expression of this relationship and uses it each time a sample of unknown concentration is evaluated.

We can now use the information about the amount of light reaching the detector when there is no alcohol present and the amount of light reaching the detector when a single known amount of alcohol is present to determine the amount of alcohol present in an unknown sample, such as a subject's breath test, based on how much light is absorbed.

Henry's Law:

One further principle in effect in breath alcohol testing involves the distribution of volatile (easily evaporated) substances between a liquid and a gas. In this setting, we are specifically concerned with the distribution of ethyl alcohol between blood and air. This phenomenon was described as a scientific law when it is observed in a closed system under controlled conditions by William Henry in 1803. His law simply states that, in a

closed, fixed system kept at a constant temperature, a volatile substance will come to a constant ratio of amounts between a liquid and in the air space above that liquid. For example, if a jar is half-filled with water and three drops of alcohol are added to the water, then the jar is closed with a lid. The alcohol will eventually appear in both the water and the air above the water. Under the same conditions, and after equilibrium has been reached, the measured amounts of alcohol in the air and in the water will always be the same. This can be defined numerically as a partition ratio.

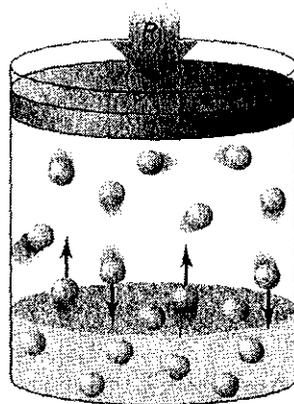


Figure 4: A graphical representation of Henry's Law. In a closed system, the alcohol in the water is in equilibrium with the alcohol in the air.

Although this law applies to closed systems with unchanging conditions, the basic process of a volatile substance being distributed between a liquid and a gas can be seen in humans. These substances pass to and from our blood very efficiently in our lungs. This occurs in a fairly uniform way when a substance such as ethanol is present in a person's blood stream. As the blood circulates through the tissues in the lung, a portion of that alcohol will pass through the membranes of the alveolar sacs and enter the air in the lower part of the lung. As someone exhales, that alcohol will be carried out of the body in the breath. This allows us to identify when there is alcohol in a person's blood.

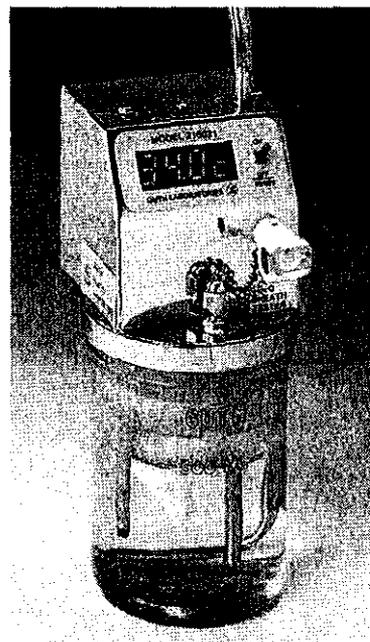
When a breath from someone with alcohol in their blood is introduced into a DataMaster the instrument can detect the presence of that alcohol and calculate how much alcohol is present. The ratio of the amount of alcohol in the breath to the amount in the blood is roughly 2100:1. That means that it takes 2100 times as much breath as blood to have the same amount of alcohol in it. Said another way, there is about 2100 times less alcohol in a volume of breath as there is in the same volume of blood if they are measured at about the same time.

The DataMaster is specifically designed to measure the amount of alcohol in the breath and reports a test value as grams of alcohol in 210 liters of exhaled air. This provides alcohol concentration values that are in a similar range to those that would be reported for a blood alcohol test that is reported in grams of alcohol per 100 milliliters of blood. However, the DataMaster result is the result for the breath sample delivered to the instrument and is not converted to a blood alcohol concentration.

The Simulator:

One additional association to Henry's Law in the use of a DataMaster for breath alcohol testing is seen when we use a breath simulator device to provide a reference sample during the breath testing sequence. The simulator is designed to contain a solution of water with a small amount of ethanol in it. The simulators in use with the DataMaster are not a part of the DataMaster but a separate device which is used to provide a simulated breath sample containing ethanol vapor to the DataMaster. This is tested and reported by the DataMaster before each subject breath sample is measured as a control check on the system. The instrument is not calibrated by this process.

Figure 5: A simulator used for breath alcohol testing devices, such as the DataMaster.



When the solution in the jar is held at a uniform temperature, the air above the liquid contains a portion of the alcohol as a vapor. When we consider Henry's Law, we can see that the amount of alcohol in the air will be proportional to the amount of alcohol in the water in a uniform way. When we remove a portion of that air for testing in a DataMaster and replace it with room air, it will re-establish the same liquid to air ratio of alcohol content as it previously had. By carefully preparing a solution of a specific amount of alcohol in water and controlling the temperature of the system we can repeatedly produce an air sample that has an amount of alcohol in the same range as what could be expected in a sample of breath from someone with alcohol in their blood. For the simulators attached to the DataMasters we provide simulator solutions that will provide reference vapor samples that contain about the same amount of alcohol as someone's breath that contains 0.10 grams of alcohol per 210 liters of breath.

SECTION II

OPERATIONAL PRINCIPLES

The information provided in this section is for reference purposes only. An understanding of this material is not necessary for the effective operation of the DataMaster breath testing device.

BASIC COMPONENTS OF THE BAC DATA MASTER

- 1) **IR Source:** A lamp which emits infrared energy.
- 2) **Sample Chamber:** The sample chamber consists of a 50 cc folded light path measuring 1.1 meters through which the IR energy passes.
- 3) **Filters:** Infrared filters specific for wavelengths at 3.37 and 3.44 microns.
- 4) **Internal Standard:** A quartz plate with known infrared absorption for verification of calibration.
- 5) **Chopper:** A device which breaks up the light into pulses before they reach the detector in order to provide a reference point on which to measure.
- 6) **Microprocessor:** The microprocessor controls the test sequence and all measurements.
- 7) **Simulator:** An external attachment used to simulate a breath alcohol sample containing a known amount of alcohol to act as a quality control check.

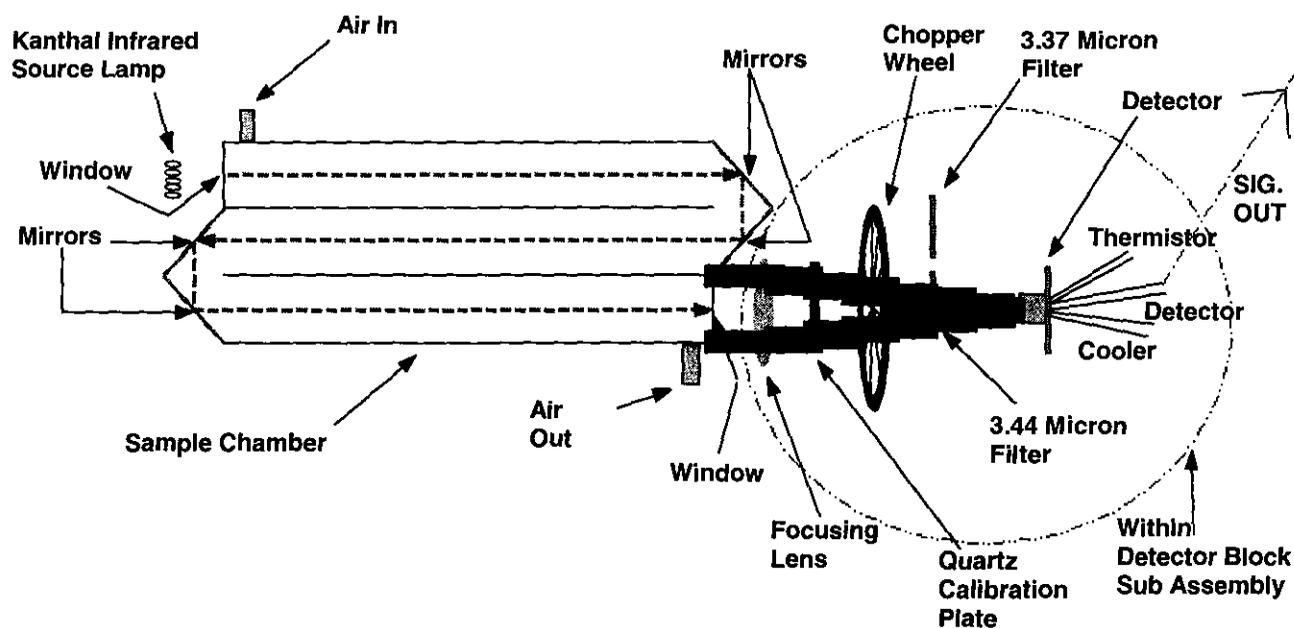


Figure 6: BAC DataMaster Optical Bench

EXTERNAL FEATURES OF THE BAC DATAMASTER

- 1) **LCD:** The liquid crystal display identifies each part of the test procedure as it occurs and provides information to the instrument operator to complete the test.
- 2) **Supervisor Panel/Keys:** A separate keypad on the 88 models or the top row of keys on the 95 and newer models which contain special functions.
- 3) **Evidence Ticket Slots:** The evidence ticket is inserted into the lower slot on the front cover. Upon completion of the test sequence the ticket is ejected from the upper slot.
- 4) **RFI Antenna:** An antenna on the back of the instrument used to detect radio frequency in the instrument's environment during testing.
- 5) **Power ON/OFF Switch:** Located on the back of the instrument and only to be used under special circumstances as the normal mode for the instrument is to have the power on.
- 6) **Heated Breath Tube:** The breath tube is electrically heated and provides a path for the breath sample from the mouth piece to the sample chamber.
- 7) **CPY Button:** The copy button is used to re-print the most recent test run on the instrument assuming that the power has not been turned off in the interim.

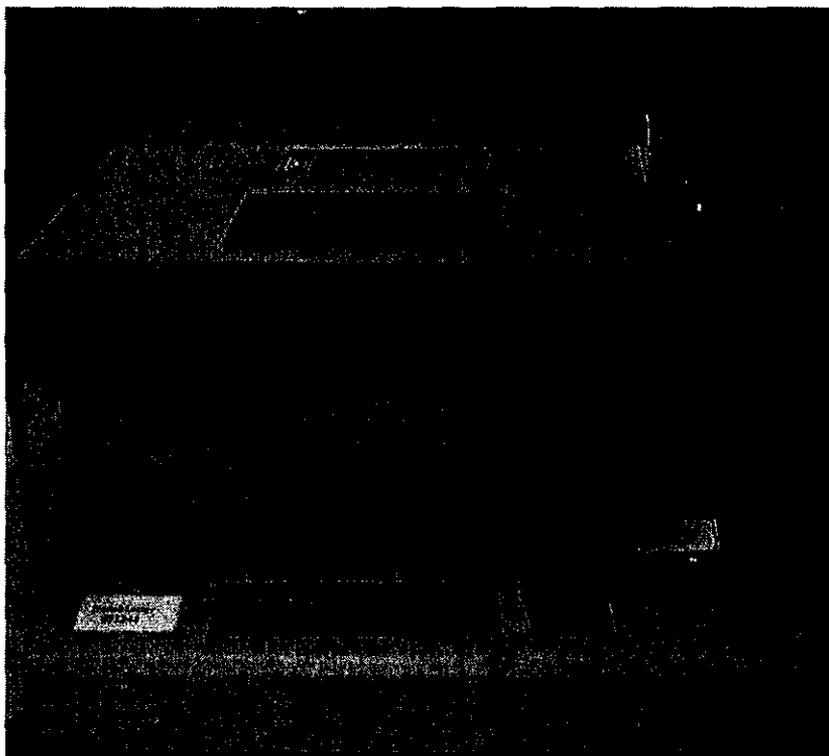


Figure 7:
95 and newer models with built-in
keyboard

Figure 8:
88 model with external keyboard

BAC DATAMASTER OVERVIEW

The BAC DataMaster breath testing instrument is designed to undergo a number of processing steps to ensure a fair and accurate analysis of a breath sample introduced to it. These steps include checking components for function, checking detector response, adjusting a measurement baseline to ambient air, introducing an external standard of simulated breath containing alcohol vapor, measuring the quality of breath and monitoring heated zones within the system.

The figure below is a general graphic example of the monitoring of a breath sample to ensure that what is measured meets the minimum criteria. As a sample is introduced into the instrument the flow rate is continually monitored. When the minimum flow rate is achieved it must remain at or above that rate for enough time to account for delivery of at least 1.5 liters of breath. Simultaneously the alcohol concentration in the sample is monitored four times per second. A valid breath sample is expected to show a fairly constant amount of alcohol as breath continues to flow. If these criteria are met the instrument will report a breath alcohol concentration.

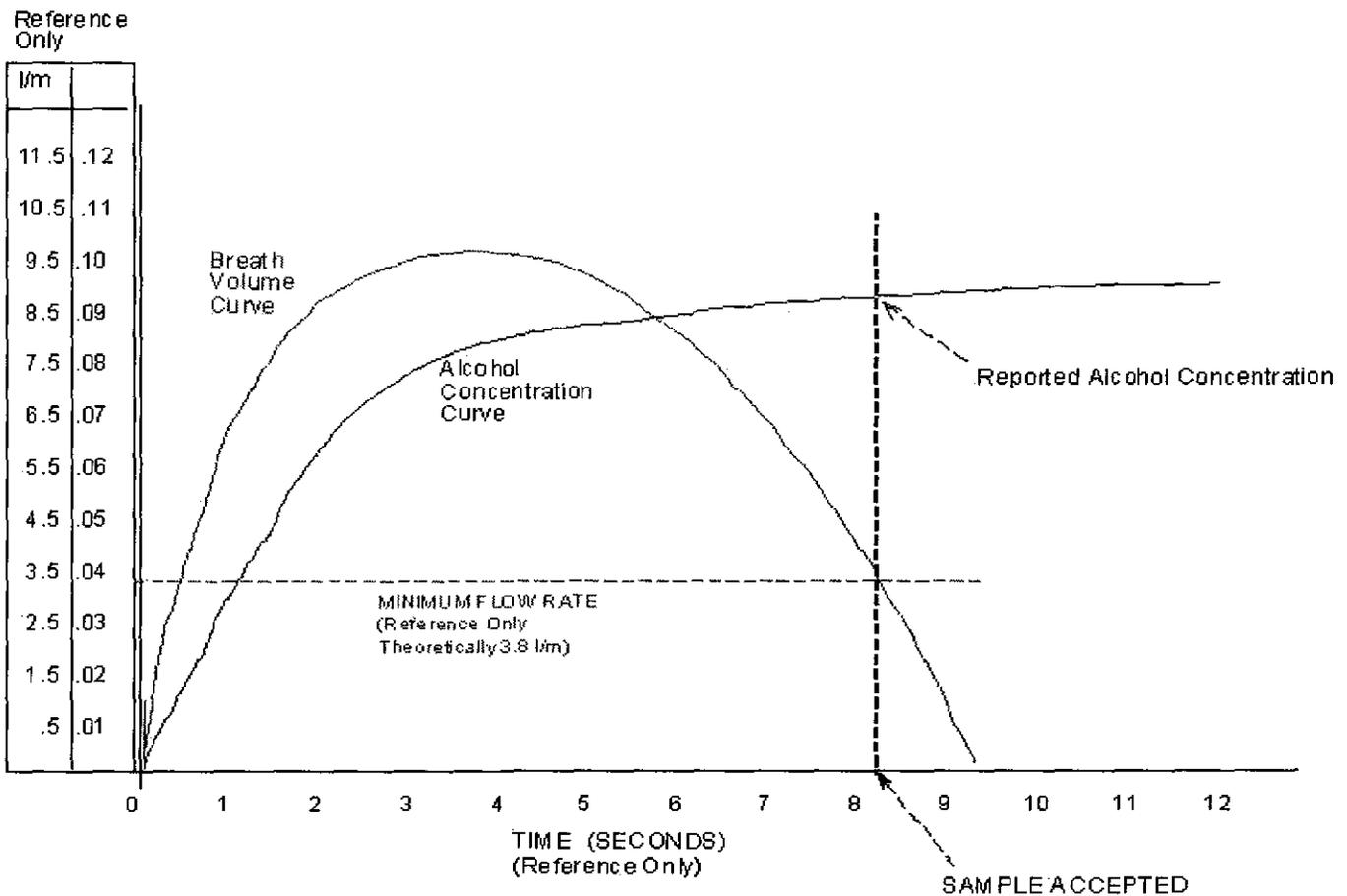


Figure 9: Typical Breath Profile

SECTION III

PROCESS FOR OBTAINING AN EVIDENTIAL SAMPLE

PROCESS FOR OBTAINING AN EVIDENTIAL DATAMASTER TEST

PREPARATION:

- STEP 1:** Confirm that the power to the BAC DataMaster is on and that the instrument displays "READY, PUSH RUN." If the instrument is turned off or if it displays "OUT OF SERVICE," proceed to a different DataMaster site.
- STEP 2:** Visually observe the subject for any evidence of food, gum, tobacco or any other foreign matter in the mouth. Ask the subject if he/she has anything in their mouth. Have anything in their mouth removed prior to starting the next step. Tongue piercings and dentures may remain in the mouth.
- STEP 3:** Observe the subject for 15 uninterrupted minutes. The subject must be within visual and audio proximity for the entire 15 minutes preceding the test. If at any time the subject burps, belches or vomits, the observation period must be restarted. If at any time the subject puts something into their mouth, the item must be removed and the observation period started again.
- STEP 4:** The DataMaster clock may be used to time the observation period. If another time piece is used, record which one is used and any discrepancy from the time displayed on the DataMaster. The DataMaster will document the time the test is taken on the ticket.

OPERATING THE INSTRUMENT:

- STEP 1:** Push "Run" to begin the test process.
- STEP 2:** The instrument will then display "INSERT TICKET." Follow the instructions on the ticket and insert the ticket into the lower slot on the instrument.
- STEP 3:** The DataMaster will then sequentially prompt the operator to enter the information for twelve programmed questions which pertain to the subject and circumstances of the incident. The questions are addressed in Section IV of this manual, *Data Entry and Review*.

10 am

 **VERMONT**
DEPARTMENT OF HEALTH

**BAC DataMaster
Operator Course**

*Presented by the Vermont
Department of Health
Laboratory*

Vermont Department of Health Feb 06

Contact Information

Robert Drawbaugh
Toxicology Program Chief
(802)863-7622
rdrawba@vdh.state.vt.us

Darcy Richardson
Public Health Chemist
(802)863-7412
drichar@vdh.state.vt.us

Amanda Bolduc
Public Health Chemist
(802)863-7413
abolduc@vdh.state.vt.us

Steve Hamois
Electronics Technician
(802)863-7641
shamois@vdh.state.vt.us

Vermont Department of Health Feb 06

 **VERMONT**
DEPARTMENT OF HEALTH

**Why the Health
Department?**

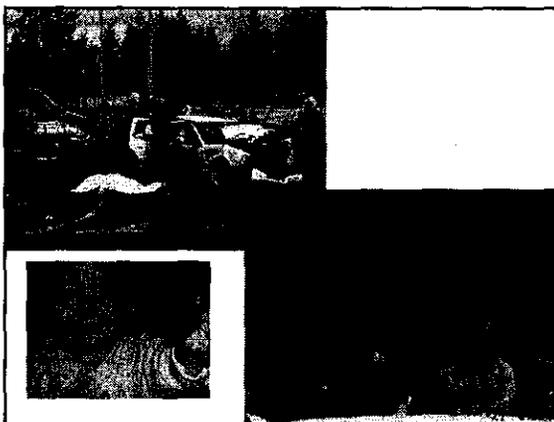
- Approves instruments for use in the state
- Sets criteria for instruments to be used
- Promulgates statutory Rules and Regulations
- Tests and certifies all evidential instruments
- Maintains all evidential instruments

Vermont Department of Health Feb 06

Why are we here?

*To certify Vermont Police Officers in the
proper operation of the BAC DataMaster
and to enable them to obtain an
evidential breath sample from a DUI
subject.*

Vermont Department of Health Feb 06



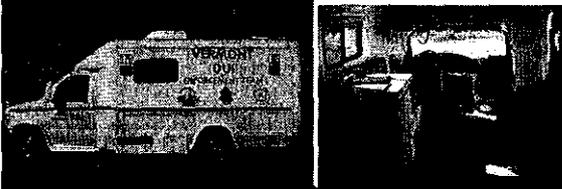
General DataMaster Information

- The DataMaster is an infrared breath testing instrument approved for evidential use in the state of Vermont.
- Originally developed in the early 1980's as the BAC Verifier. Evolved into the BAC DataMaster.
- Installed in Franklin County in 1990 as a test county. Used exclusively Jan 1st 1996.
- The BAC DataMaster is used in many other states and in several countries.

Vermont Department of Health Feb 06

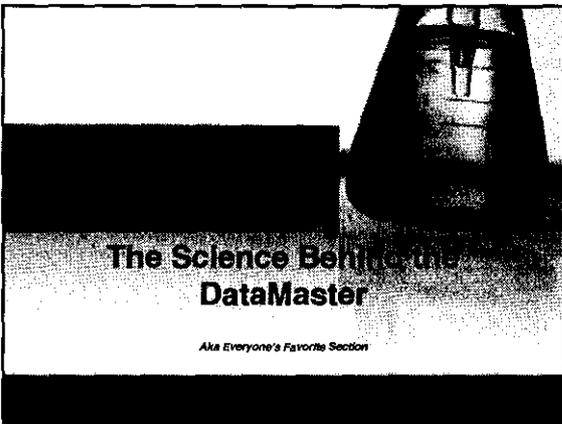
How many do we have?

63 are in current evidential use at various agencies
5 at the VPA for training
4 BATmobiles



Where are they?

- 11 in Chittenden County + 1 BATmobile
- 1 in Grand Isle County
- 4 in Franklin County
- 2 in Orleans County
- 7 in Windham County
- 2 in Essex County
- 2 in Caledonia county + 1 BATmobile
- 4 in Lamoille County
- 4 in Addison County
- 6 in Washington County
- 4 in Orange County
- 4 in Rutland County + 1 BATmobile
- 7 in Windsor County + 1 BATmobile
- 5 in Bennington County

The Science Behind the DataMaster

Aka Everyone's Favorite Section

What are we doing?

draw EtOH

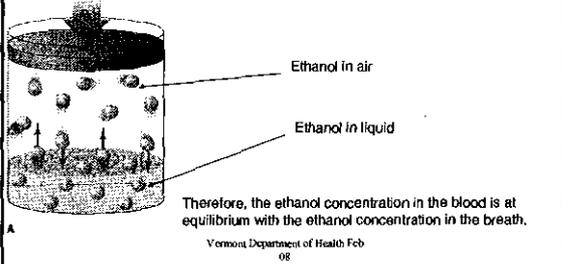
- Ethanol is volatile
- Readily moves from liquid to air
- Readily moves from blood to breath
- The BAC DataMaster measures the concentration of ethanol in breath
- Less invasive than drawing blood

-C-C-OH

Vermont Department of Health Feb 08

Henry's Law

- In a closed system, at a given temperature, there is a fixed ratio between the concentration of a volatile in a liquid and in the air above the liquid.



Ethanol in air

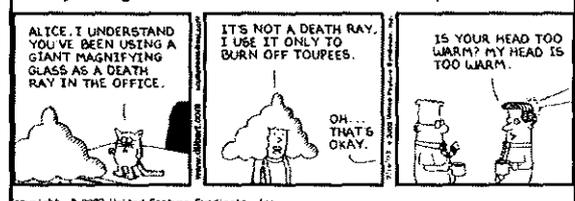
Ethanol in liquid

Therefore, the ethanol concentration in the blood is at equilibrium with the ethanol concentration in the breath.

Vermont Department of Health Feb 08

Infrared Spectroscopy

- IR energy is one small portion of the electromagnetic spectrum typically felt as heat.
- Infrared (night vision) goggles makes heat visible by using various colors for different temperatures.



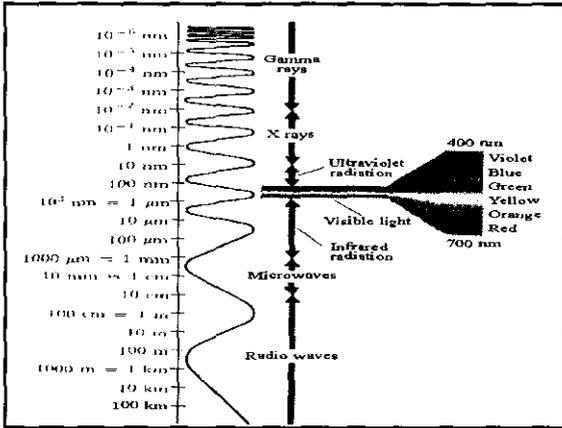
ALICE: I UNDERSTAND YOU'VE BEEN USING A GIANT MAGNIFYING GLASS AS A DEATH RAY IN THE OFFICE.

IT'S NOT A DEATH RAY. I USE IT ONLY TO BURN OFF TOUPEES.

OH... THAT'S OKAY.

IS YOUR HEAD TOO WARM? MY HEAD IS TOO WARM.

copyright © 2003 United Feature Syndicate, Inc.



IR energy and EtOH

CCO

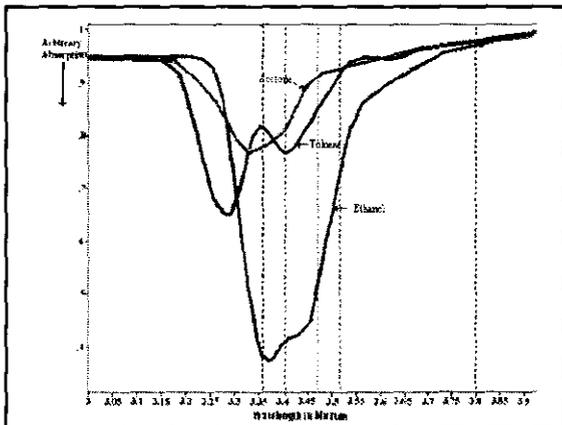
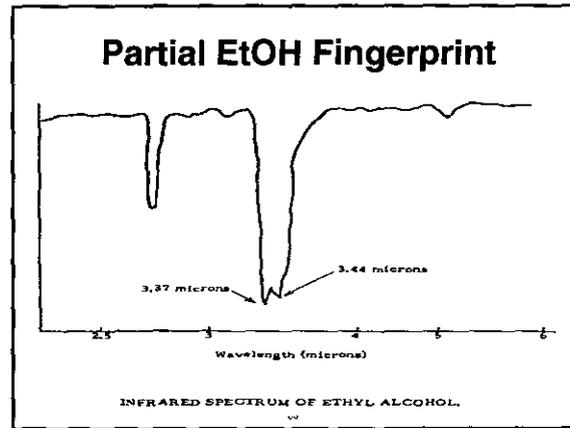
- In a molecule atoms are held together by bonds
- When subjected to IR energy of the correct frequency the bonds will move from one vibrational state to the next highest
- DataMaster targets the C-H bond in the methyl group

Vermont Department of Health Feb 08

Infrared Absorption

- Different molecules absorb IR energy differently
- Different IR "fingerprints" exist for different compounds
- The "fingerprints" allow the DataMaster to be specific for ethanol

Vermont Department of Health Feb 08



"Qualify"

Beer-Lambert Law

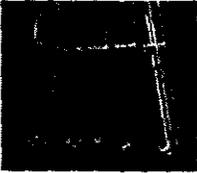
- The Beer-Lambert law states that there is a direct relationship between the concentration of a substance and the amount of infrared energy it absorbs.

The DataMaster can measure the amount of ethanol in a breath sample by detecting how much IR energy reaches the detector.

Vermont Department of Health Feb 08

"Quantify"

- The more ethanol present in the breath, the more infrared energy is absorbed, the less IR energy that reaches the detector.



08

Quantitation

- The DataMaster is calibrated with a sample of known concentration
- Known concentration = known absorption



Vermont Department of Health Feb 08

↙
up to
0.60

- IR energy absorbed by the KNOWN sample is compared to IR energy of UNKNOWN sample
- From this comparison the alcohol concentration of the unknown can be determined



Vermont Department of Health Feb 08

External Components

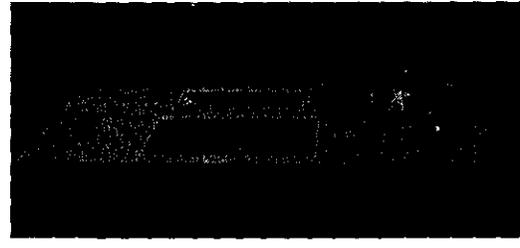
Vermont Department of Health Feb 08

1988 Model

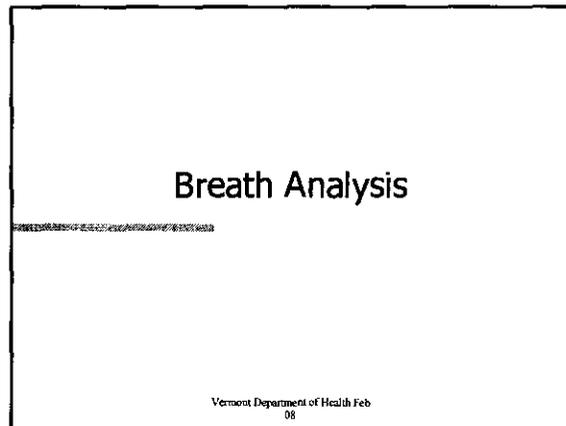
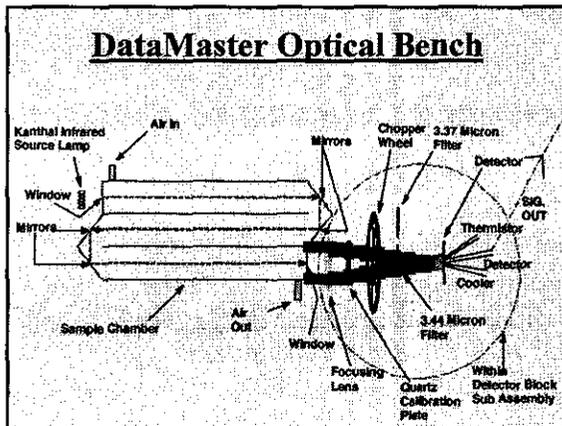
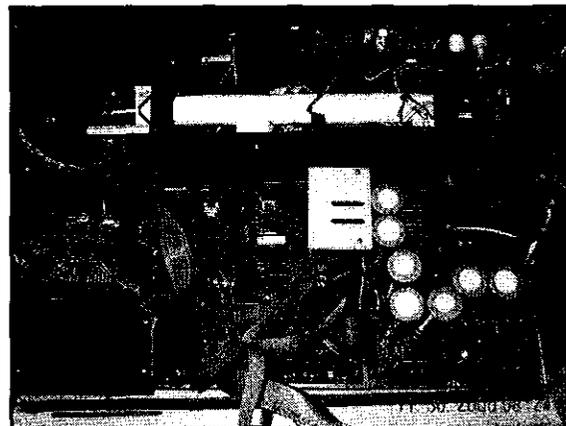
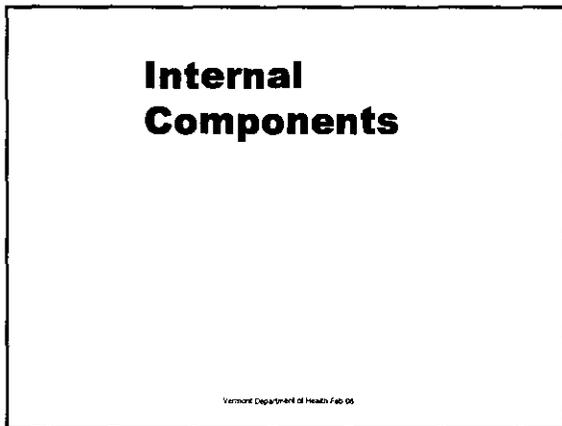
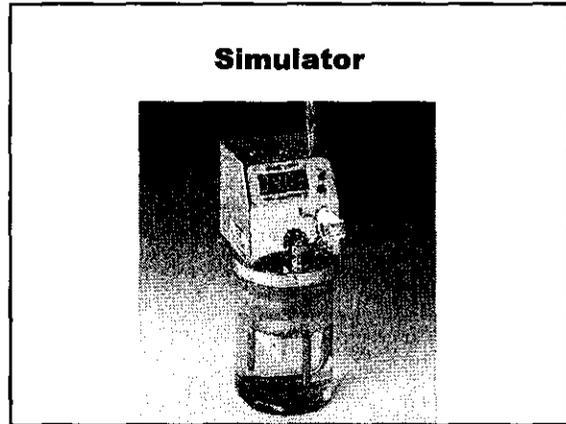
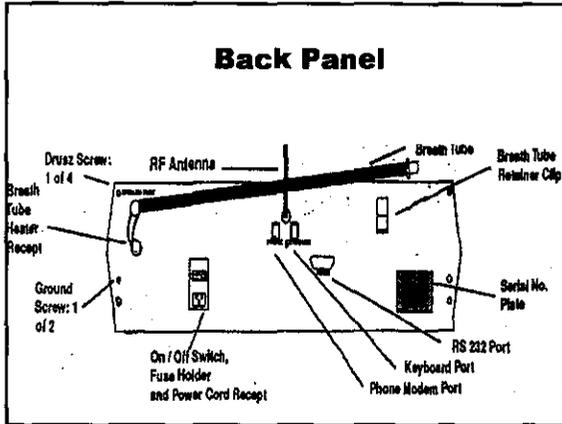


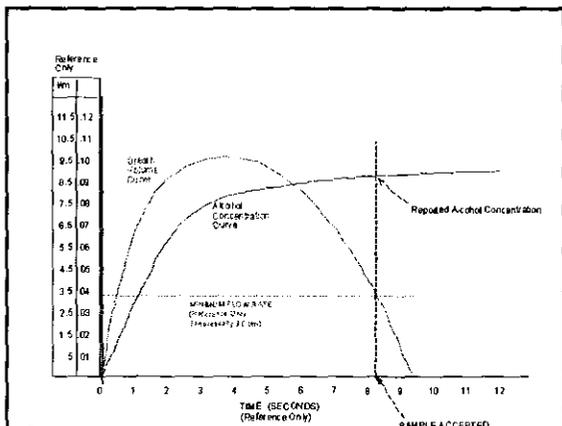
Vermont Department of Health Feb 08

1995-2000 Models



Vermont Department of Health Feb 08





Steps Taken to ensure Accurate Testing

- DataMaster checks it's components for function
- Checks detector response
- Adjusts baseline to room air
- Checks Simulated Breath Alcohol Sample
- Checks Quality of Introduced Breath

Vermont Department of Health Feb 08

QC Parameters

- Simulator Temperature 33.5C → 34.5C
- External Standard Result 0.090 → 0.110
- Internal Standard Result Verified
- Blank Test 0.000

• *Breath Tube Temperature* *Warm to the Touch*

Vermont Department of Health Feb 08

Proper and Improper Breath Samples

Vermont Department of Health Feb 08

Mouth Alcohol vs. Deep Lung Air

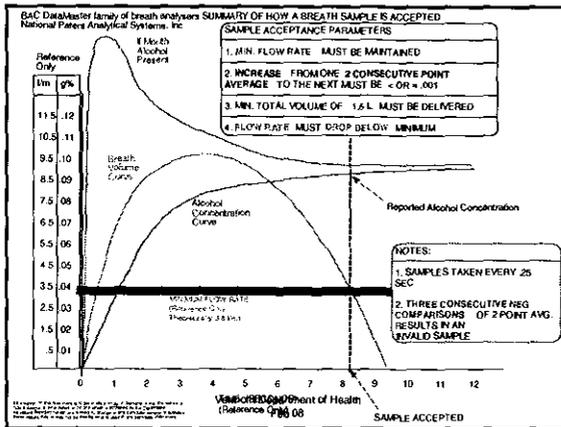
- DataMaster is designed to sample deep lung air
- The human body is not a closed system
- Therefore, the air in the bottom of the lungs will be closest in concentration to that found in the blood.
- We want to sample the air closest to the blood, highest in concentration.
- Air in the upper portion of the lungs is constantly being diluted by room air and is biased low.

Vermont Department of Health Feb 08

How do we know?

- DataMaster reads the sample every 0.25 second.
- When deep lung air is sampled a plateau is reached rather than a sharp increase.

Vermont Department of Health Feb 08



SLIP

What is Mouth Alcohol?

- Mouth Alcohol is alcohol that is not a reflection of the alcohol in the blood



Drinking or rinsing with alcohol, some remains in the mouth.

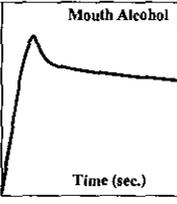
Vomiting if there is alcohol in the stomach will leave mouth alcohol.

Vermont Department of Health
Feb 08

How do we know?

- The same methods it uses to know that it is reading deep lung air enables it to see mouth alcohol.

- Assume beer is 5% alcohol.
- The legal limit is 0.08.
- The high EtOH concentration in the beer causes the peak to overshoot the concentration in the breath.
- The DataMaster detects this and declares it an "invalid sample".



BrAC

Vermont Department of Health
Feb 08

go back

Preventing Mouth Alcohol

- 15 Minute Observation Period
(nothing into the mouth, nothing out)
- Most Studies show that mouth alcohol dissipates within 10-12 minutes, so 15 minutes is more than enough to ensure that no mouth alcohol will be present in the breath sample.

Vermont Department of Health
Feb 08

Substances Other Than EtOH

- How would other substances be present?

- Diabetics and fasting people may produce acetone in their bodies in small amounts.
- Alcoholics have been known to ingest other alcohols besides ethanol. Rubbing alcohol (isopropanol), Wood alcohol (Methanol). Both are very toxic to humans.
- Inhaling volatile substances which remain on the breath and absorb IR.

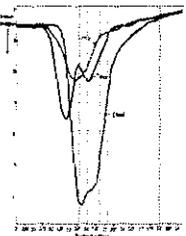


Vermont Department of Health
Feb 08

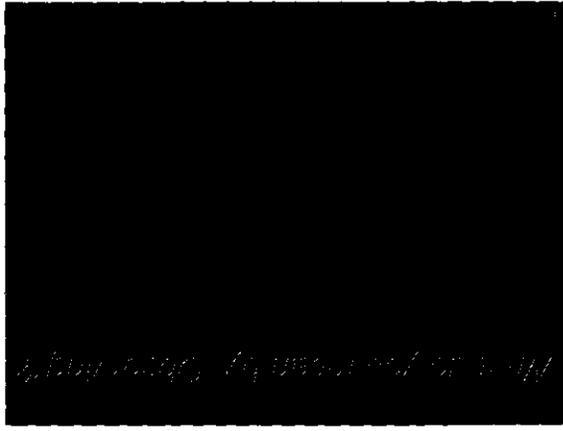
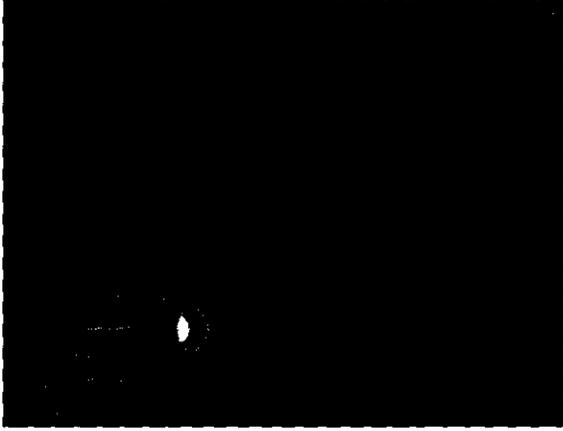
How do we know?

- Different Substances have different IR "fingerprints".

- The DataMaster uses two filters at different wavelengths to look for ethanol. (3.37, 3.44 microns)
- Ethanol generates characteristic peaks at these wavelengths which differentiate it from other substances.
- If the DataMaster detects a ratio inconsistent with ethanol it will declare it as "interference detected."
- You will have to get a blood sample.



Vermont Department of Health
Feb 08



Beginning the Test

- Instrument is on and displaying "Ready, Push Run"
- Feel the breath tube to make sure it is warm to the touch
Body temp humans: 37°C Breath temp: 34°C Breath tube: 40°C



- Push "Run"
- Insert Ticket
- Answer the questions asked by the instrument

Vermont Department of Health
Feb 06

The Questions

Q #1: "CASE NUMBER"
Agency case number. Any #, letter, or hyphen
Ex: A2518-34
RETURN to continue

Q #2: "TOWN CODE"
See Appendix A pages 35-36 in your student manual for
Town/County table of codes
Input code for area where **offense** happened, NOT place of
processing.
Four (4) numbers are required.
RETURN to continue

Vermont Department of Health
Feb 06

Q #3: "SUBJECT'S NAME"
Last/First/Middle Initial
Use **slashes** between parts of name.
Ex: Richardson/Darcy/M
Hyphens should only be used if the subject's name is
hyphenated, not to separate names.
Ex: Anderson-Lee/Pamela
Unknown? Enter "Unknown"
RETURN to continue

Vermont Department of Health
Feb 06

Q #4: "SUBJECT'S DOB"
Subject's date of birth
Format: mm/dd/yy
Ex: 11/19/77
Unknown? Enter the current date.
RETURN to continue

Q #5: "SUBJECT'S SEX"
M or F only
One character required
RETURN to continue

Vermont Department of Health
Feb 06

Q #6: "LOCATION OF STOP"
Accident location or location of stop. 40 characters are allowed.
Ex: Corner of Church St and Main St
RETURN to continue

Q #7: "TIME OF STOP"
Format: hhmm
(2400 hour time)
Ex: 0300, 1506
RETURN to continue

Q #8: "ACCIDENT?"
Was this a motor vehicle crash?
Y or N
RETURN to continue

Vermont Department of Health
Feb 06

Q #9: "TEST OPERATOR'S NAME"
Last/First/Middle Initial
Ex: Richardson/Darcy/M
Use slashes as above
RETURN to continue

Q #10: "OFFICER ID NUMBER"
Your Vermont Traffic Complaint (VTC) #
5 characters - numbers and letters
Ex: A2510
RETURN to continue

Vermont Department of Health
Feb 06

Q #11: "DEPARTMENT"

Test Operator's Agency- *Not the DataMaster's agency*
30 characters which can be: letter, number, space, hyphen, or slash

Ex: PD/Colchester, VSP/Bethel, SD/OrangeCty
This format must be used!! **RETURN to continue**

Q #12: "REVIEW DATA (Y/N)"

Type "Y" to review data.

All data must be reviewed after initial entry

Press "RETURN" to advance through fields.
Make corrections as needed.

Enter "N" when data has been reviewed to continue with processing.
Vermont Department of Health
Feb 06

Instrument Checks

After data review is answered 'N' the DataMaster will begin the test process and display the following:

"PURGING .###"
The instrument is pulling room air through the sample chamber.

"AMBIENT ZEROING"
The instrument is adjusting the baseline for ambient air

"BLANK TEST"
The instrument is checking that the room air is indeed alcohol free. This will read 0.000 for an accepted blank test.

"INTERNAL STANDARD"
The instrument is checking the quartz standard. This will read verified for an acceptable check.

Vermont Department of Health Feb 06

"EXTERNAL STANDARD"

The instrument performs a test on the simulator sample. The sample must be between **0.090-0.110**.

If it is not within range the instrument will abort the test and display
"Simulator out of range."

If the External Standard is within range (**0.090-0.110**) the instrument will display...

"PURGING"
"AMBIENT ZEROING"
"BLANK TEST"

Vermont Department of Health Feb 06

"SUBJECT TAKE TEST (Y/N)"

If subject consents to take test, type "Y"

If subject refuses, type "N".

"N" will end the test and the refusal will be documented on the evidence ticket which will print now.

All refusals should be documented this way!

Vermont Department of Health Feb 06

"PLEASE BLOW"

If the subject consents to take the test, this display message will be flashing and an intermittent tone will sound.

Insert a **new** mouthpiece into the breath tube.

Assure it is free from obstruction.

Instruct subject to take a normal breath and provide a **slow, consistent, and continuous** breath through the mouthpiece.

Officer: "Take a normal breath and blow steadily until I tell you to stop."

"Forget" to tell them to stop-We want a deep lung air sample.

"PLEASE BLOW" will stop flashing and a steady tone will sound.

Vermont Department of Health Feb 06

When subject stops blowing, instrument will "clunk," accepting the sample if all parameters have been met.

"TEST RESULTS ALCOHOL" .###
ex: 0.214

BrAC result will appear on the display for only a few seconds.

Make note of it and Inform subject of result.

REMOVE MOUTHPIECE !

Officer: "Your test was a 0.214, would you like another test?"

The instrument will display:

"PURGING"

"2nd TEST REQUESTED (Y/N)"

Vermont Department of Health Feb 06

The state of Vermont requires **one (1)** breath test for evidentiary purposes. The second test is not required for prosecution.

This is not to be confused with the independent test.

If subject **declines** 2nd test, type "N" and the evidence ticket will be printed.

Subject **requests** 2nd test, type "Y"

"PURGING"
 "AMBIENT ZEROING"
 "BLANK TEST"
 "INTERNAL STANDARD CHECK"
 "EXTERNAL STANDARD"
 "TEST RESULTS, ALCOHOL"
 "PURGING"
 "AMBIENT ZEROING"
 "BLANK TEST"

Vermont Department of Health Feb 08

Following "BLANK TEST"

"PLEASE BLOW" will flash

Operator will insert a new mouthpiece and instruct subject to blow as before.

"TEST RESULTS ALCOHOL" .### will display

Remove mouthpiece right away!

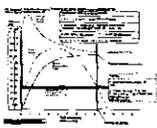
The pump will turn on and "PURGING" will occur

Evidence ticket will now print showing both tests

Vermont Department of Health Feb 08

What about this?

Test 1: 0.119
 Test 2: 0.138



Vermont requires **one (1)** test. Hence there are no requirements that the two tests be within any amount. There is human variability in giving a breath sample.

Meeting minimum sample acceptance requirements vs. **Exceeding** minimum sample acceptance requirements.

Test 1: 0.073

Continue with your processing. Many agencies have this policy posted by their DataMaster. The Health Department will be contacted for a relation back.

Feb 08

Data Entry Time Restrictions

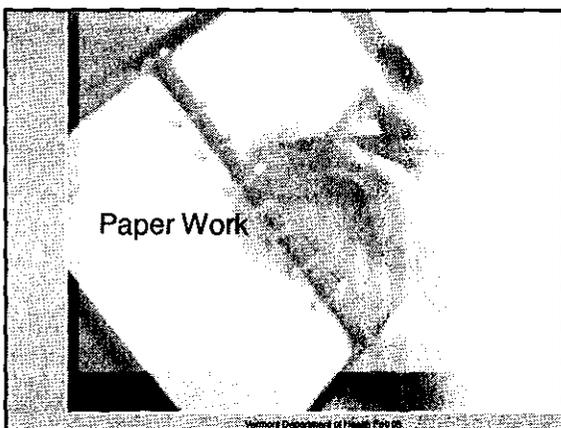
When prompted to enter data, approximately **5 minutes** is allotted. After **5 minutes**, instrument will go to "Ready Push RUN".

When prompted to make decision (Subject Take Test, Review Data, Use Previous Data) **1 minute** is allotted for reply.

When prompted "PLEASE BLOW" **2 minutes** is allotted to collect sample.

Failure - TIMED OUT.

Vermont Department of Health Feb 08



The Ticket

When Ticket Has Printed:

- *Verify all user input information
- *Verify results

```

"----BREATH ANALYSIS----"
BLANK TEST                .000
INTERNAL STANDARD         VERIFIED
EXTERNAL STANDARD        .098 ←----- 0.090-0.110
BLANK TEST                .000
SUBJECT SAMPLE           ###
SIMULATOR TEMPERATURE   34.0c ←----- 33.5°C-34.5°C
    
```

Refer to pages 42-46 in your Student Manual for examples of tickets.

Vermont Department of Health Feb 08

Evidence Ticket is Printed in Triplicate

Top white sheet = State's Attorney

Middle yellow sheet = arresting officer (YOU)

Bottom pink sheet = subject

DO NOT LOSE THE TICKET!

Vermont Department of Health Feb 06

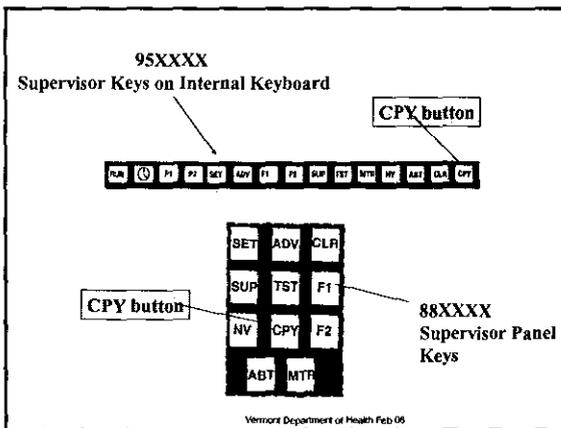
Incomplete Printout or Unreadable Ticket?

Do you have to re-run the test? **NO!**

Find the "CPY" button on the Supervisor Panel or keyboard
Insert new ticket when prompted
A copy of the most recent information will be printed.

WARNING! If you turn the DataMaster off or if you run another test, you will lose your test!

Vermont Department of Health Feb 06



Document test in the Operator's Log

- Each DataMaster has an Operator's Log associated which has every test run on the instrument documented.
See page 41 in the Student Manual.

Document the test in *your* IR Breath Testing Log

- Each Officer has a log to keep track of every test performed by them including practice runs.
See page 40 in the Student Manual.

Vermont Department of Health Feb 06

CRIME BEA

■ DUI

A man arrested for DUI on July 31 told a cop the stop sign turned red too fast for him to stop.

At 3 p.m., police responded to a call about a possible drunken motorist in the drive-through of a restaurant in North Main Market

BREAK

Possible Problems!

Vermont Department of Health Feb 06

Each DataMaster has a DataMaster Supervisor.

The DataMaster Supervisor handles routine maintenance.

You, *the operator*, are not responsible for this and most of the time you will not be able to fix the problem.

If you cannot correct the problem you will need to use another DataMaster or, if this is not reasonably possible you will need to obtain a blood sample.

Major repairs will require the Health Department.

Vermont Department of Health File 06

Fatal Error Conditions

When encountering any of these conditions, post "OUT OF SERVICE" on the instrument and leave a message for your DataMaster Supervisor

- A black bar in the upper half of the display
- The built in keyboard does not function on 95 or higher models
- The instrument does not accept a ticket

Vermont Department of Health File 06

Fatal Error Messages

If any of these Error Messages are displayed, post "OUT OF SERVICE" on the instrument and leave a message for your DataMaster Supervisor

- NOT SET UP
- SIMULATOR OUT OF RANGE
- SIMULATOR TEMPERATURE ERROR
- NOT CALIBRATED
- TEMPERATURE TOO LOW
- TEMPERATURE TOO HIGH
- FILTER ERROR
- DETECTOR OVERFLOW

← If DUI subject has a BrAC of 0.60 or greater, this will cause a detector overflow

Vermont Department of Health File 06

<<A Brief Side Note>>

Driver Has 18 Times Legal Alcohol Limit
By LIUDAS DAPKUS, Associated Press Writer Tue May 23, 2006

Lithuanian legal limit is 0.04. Driver registered a 0.73!

No, not a 0.073, a 0.73!!!!

"Lithuanian police were so astonished by a breath test that registered 18 times the legal alcohol limit, they thought their device must be broken or wasn't."

"Sungaila, who was slapped with a \$1,110 fine and the loss of his license for up to three years, told police he had been drinking the night before and tried to freshen up by downing a pint of beer for breakfast."

"He was of high spirits and enjoying the whole time he was questioned."

Vermont Department of Health File 06

Non-Fatal Errors

The following errors may be remedied by the test operator. If after following these instructions the error remains, post "OUT OF SERVICE" and leave a detailed message for the DataMaster Supervisor regarding when the error occurred and what steps were taken to try to remedy it. Proceed to a different DataMaster, if one is not reasonably available you may have blood drawn.

Vermont Department of Health File 06

Non-Fatal Errors

- **Keyboard does not function (external 88 Models)**
 - Disconnect/Reconnect at back of instrument. Be sure to use the correct jack!
- **"SYSTEM WON'T ZERO"**
 - Remove the mouthpiece from the instrument
 - Remove possible contamination sources from the processing area
 - Open windows or use a fan to draw fresh air into the room if possible

Vermont Department of Health File 06

Non-Fatal Errors

- **"PLEASE BLOW"** flashes and the intermittent tone continues but won't accept a sample
 - Watch subject to make sure they are trying to deliver a proper breath
 - Replace the mouthpiece
 - Have subject provide another sample
 - If error remains, turn instrument off for one minute and turn back on

Vermont Department of Health Feb 06

Non-Fatal Errors

- **"PRINTER ERROR"**
 - If this message occurs before you have begun a test, turn the instrument off for one minute and turn back on
- **"PUMP ERROR"**
 - Place a fresh mouthpiece on the breath tube
 - Alternately blow and suck back strongly and rapidly on the mouthpiece 5 or 6 times to free a possibly sticking valve

Vermont Department of Health Feb 06

Non-Fatal Errors

- **"RADIO INTERFERENCE"**
 - Turn radio off and ensure that there are no active transmitters in the processing area
 - Ensure that the radio antenna is free of any physical contact

Vermont Department of Health Feb 06

Non-Fatal Errors

- **"INVALID SAMPLE"**
Start 15 minute observation period over
 - Instruct the subject again on proper delivery of a breath sample
 - Re-run test (Use Previous Data and review)
May consider a blood test if this keeps occurring

Vermont Department of Health Feb 06

Non-Fatal Errors

- **"INTERFERENCE DETECTED"**
 - Remove possible contamination sources from the processing area
 - Open windows or use a fan to draw fresh air into the processing room if possible
 - If "INTERFERENCE DETECTED" message appears again you may have the subject's blood drawn

Vermont Department of Health Feb 06

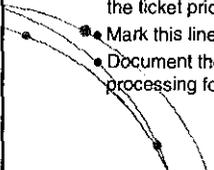
Other Error Conditions

The following error conditions should be documented, but may not necessitate moving to a different DataMaster. A detailed message should be left for the DataMaster Supervisor to remedy the situation for future use

Vermont Department of Health Feb 06

Other Error Conditions

- The breath tube is cold to the touch
 - Make a note on your processing form
- Incorrect Time appears
 - When the ticket prints, place a single line through the time printed and hand write the correct time on the ticket prior to separating the three copies
 - Mark this line with your initials and the date
 - Document the time discrepancy on your processing form



Vermont Department of Health Feb 06

Other Error Conditions

- Incorrect date appears on the DataMaster
 - When the ticket prints, place a single line through the time printed and hand write the correct date on the ticket prior to separating the three copies
 - Mark this line with your initials and the date
 - Document the date discrepancy on your processing form

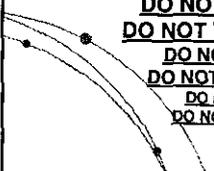


Vermont Department of Health Feb 06

Other Error Conditions

- Ticket incomplete or unreadable or ticket won't print

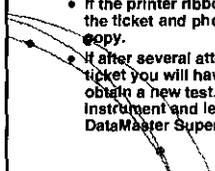
DO NOT RUN ANOTHER TEST
DO NOT TURN INSTRUMENT OFF
DO NOT RUN ANOTHER TEST
DO NOT TURN INSTRUMENT OFF
DO NOT RUN ANOTHER TEST
DO NOT TURN INSTRUMENT OFF
DO NOT RUN ANOTHER TEST
DO NOT TURN INSTRUMENT OFF



Vermont Department of Health Feb 06

Other Error Conditions

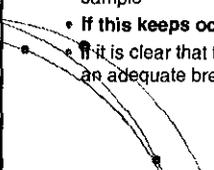
- Ticket incomplete or unreadable or ticket won't print
 - If the ticket is jammed, gently remove the ticket. Insert a new ticket and press the copy button (CPY)
 - As long as the instrument is not turned off, the copy button can be used repeatedly to obtain the last test run
 - If the printer ribbon is out of ink, remove the top layer from the ticket and photocopy the next layer to obtain your third copy.
 - If after several attempts you are unable to get a readable ticket you will have to proceed to a new DataMaster and obtain a new test. Post "OUT OF SERVICE" on the instrument and leave a detailed message to your DataMaster Supervisor



Vermont Department of Health Feb 06

Other Error Conditions

- "INCOMPLETE" prints on ticket across from SUBJECT SAMPLE-->"
 - The instrument has timed out three times while waiting for the subject to provide an adequate breath sample
 - Instruct the subject again on proper delivery of a breath sample
 - If this keeps occurring, it *may* be treated as a refusal
 - If it is clear that the subject is physically unable to provide an adequate breath sample, have blood drawn



Vermont Department of Health Feb 06

After the Test

Vermont Department of Health Feb 06

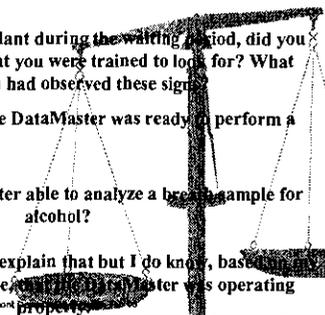
* Make note re:
Keep ticket

Example Questions

- Have you received training in the operation of the DataMaster?
- How many times have you administered a breath test utilizing the DataMaster?
- As you watched the defendant during the waiting period, did you observe any of the signs that you were trained to look for? What would you have done if you had observed these signs?
- How did you know that the DataMaster was ready to perform a test?

Q: How is the DataMaster able to analyze a breath sample for alcohol?

A: "I am not qualified to explain that but I do know, based on my training and experience, that the DataMaster was operating properly."

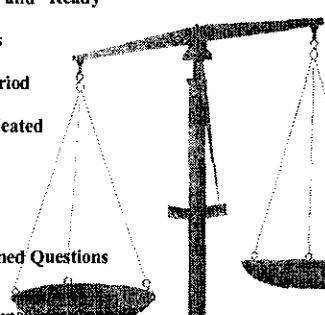


Let's Review

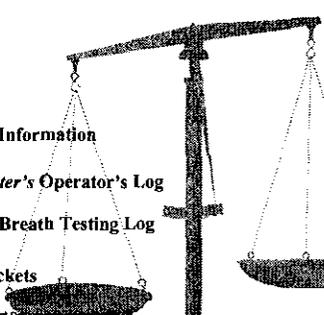


Steps of Operation

- Confirm Instrument is On and "Ready"
- Check for Foreign Objects
- 15 minute Observation Period
- Confirm Breath Tube is Heated
- Press "Run"
- Insert Ticket
- Answer the Pre-programmed Questions
- Review Your Answers



- Verify Instrument Checks
- Subject Take Test (Y/N)
- 2nd Test Requested (Y/N)
- Inspect Ticket for Correct Information
- Document Test in *DataMaster's Operator's Log*
- Document Test in *Your IR Breath Testing Log*
- Distribute Copies of the Tickets



Things to Remember

- External Standard (simulator) result must be *0.090-0.110*
- Simulator Temperature must be between *33.5°C-34.5°C*
- Confirm Breath Tube is *Warm to the Touch*
- Remove the Mouth Piece Immediately after the test, *before purging begins*
- Watch for the Subject's Result, it will only remain on screen for a *couple of seconds*
- The Copy (CPY) button is your friend
- If you need to post "Out of Service" *Leave a Detailed Message*
- Feel free to contact us with any questions/problems



Practice Tests

Run at least 5 test sequences

Record testing in your personal log & in the Operator's Log of the instrument

Recommended: Use different style instruments

Do a variety of tests (e.g. 1 test; 2 tests; etc.)

do a 6th test as a refusal

Vermont Department of Health
Feb 08



Practice Test Data Entry

Case Number: 00000
Town Code: 1116
Subject's Name: TEST
Subject's DOB: Today's Date MMDDYY
Subject's Sex: M or F
Location of Stop: VCJTC
Time of Stop: Current Time HHMM
Accident?: Y or N
Test Operators Name: YOUR NAME Last/First/M
Department: YOUR DEPARTMENT
PD/Bristol VSP/New Haven SD/Addison

Vermont Department of Health
Feb 08

STEP 4: Review the information entered into the DataMaster. Correct any errors if necessary and answer “N” when the Review Data question prompts for a second time. The test sequence will automatically begin.

STEP 5: The instrument will sequentially display the following.

| | |
|--------------------------|---|
| “PURGING” .### | Room air is being pumped into the sample chamber through the breath tube. |
| “AMBIENT ZEROING” | Establishing zero reference based on room air in the sample chamber. |
| “BLANK TEST” .### | Confirms that the air in the sample chamber is alcohol free. |
| “INTERNAL STANDARD” .### | The quartz plate is analyzed to verify that the calibration performed in the laboratory is still valid. |
| “EXTERNAL STANDARD” .### | A simulated breath sample is analyzed as a quality control check standard. |

The results of the external standard test should be between 0.090 and 0.110. After the external standard is analyzed, the instrument will then display as before:

“PURGING”
“AMBIENT ZEROING”
“BLANK TEST”

STEP 6: After the instrument completes its quality control checks it will display “SUBJECT TAKE TEST (Y/N).”

- A) If the subject consents to provide a breath test, type “Y.”
- B) If the subject refuses to provide a breath sample, type “N” for the refusal. The evidence ticket will document the refusal and the breath testing sequence will automatically end. All refusals should be documented with an evidence ticket.

STEP 7: If the subject has consented to provide a breath test, the display will flash “PLEASE BLOW” and an intermittent tone will be heard.

- A) Insert a new mouthpiece into the breath tube. For sanitary purposes, avoid directly touching the mouthpiece.

- B) Instruct the subject to provide a slow, continuous breath sample through the mouthpiece attached to the breath tube of the instrument. This may take 6 seconds or longer depending on the individual. The internal electronics of the instrument determine when an adequate sample has been obtained. It is not necessary to instruct the subject to take a deep breath.
- C) The test operator should hold the breath tube during delivery of the breath sample and confirm that the breath tube is warm to the touch.
- D) As the subject provides an appropriate breath sample the words "PLEASE BLOW" will no longer flash, but remain steady on the screen and a steady tone will be heard. An individual should be allowed to deliver a sample until they are unable to do so.
- E) After an adequate breath sample is obtained the message "TEST RESULTS ALCOHOL .###" will be displayed on the LCD. This number will only be displayed for a few seconds in the right hand corner of the display. The test operator must inform the subject of the results of the evidentiary test and ask the subject if they wish to have a second test.
- F) The operator should immediately remove the mouthpiece and discard it.

STEP 8: The following displays will then appear on the LCD:

"PURGING"

"2nd TEST REQUESTED (Y/N)"

- A) If the subject declines the second test, the operator should enter "N" and an evidence ticket will be printed. The evidence ticket will indicate the results of the evidentiary test and will also show "SECOND TEST NOT REQUESTED" and "SIMULATOR TEMPERATURE" with the specific temperature of the simulator at the time of the test sequence.
- B) If the subject requests a second test, the operator should enter "Y." The instrument will then display:

"PURGING"

"AMBIENT ZEROING"

"BLANK TEST"

"INTERNAL STANDARD"

"EXTERNAL STANDARD"

"TEST RESULTS ALCOHOL"

“PURGING”

“AMBIENT ZEROING”

“BLANK TEST”

Following completion of the blank test the instrument will display:

“PLEASE BLOW”

- C) The operator should insert a new mouthpiece into the breath tube and instruct the subject to provide a breath sample as before. Once an adequate breath sample is provided the instrument will display “TEST RESULTS ALCOHOL .###.”
- D) The operator should immediately remove the mouthpiece and discard it.

STEP 9: The evidence ticket is printed in triplicate at completion of the test sequence and will include all information entered in Step 3, the test sequence(s) and “SIMULATOR TEMPERATURE” with the specific temperature of the simulator at the time of the test sequence.

- A) The top white sheet should go with the rest of the case paperwork to the State’s Attorney.
- B) The middle, yellow sheet, is retained by the arresting officer.
- C) The bottom, pink sheet, should be given to the subject.

STEP 10: Make entries regarding the test in the DataMaster Operator Use log as well as your own personal Infrared log, if one is maintained.

SECTION IV

DATA ENTRY AND REVIEW

INSTRUMENT QUESTION DISPLAYS AND FORMAT

QUESTION 1: CASE NUMBER

This is the agency case number. The field allows up to 20 characters.

Press the RETURN key to continue.

QUESTION 2: TOWN CODE

This is the assigned code for the county/town in which the incident took place, not where the processing is done. Four characters are required for this field. Refer to Appendix A for a list of county/town codes.

Press the RETURN key to continue.

QUESTION 3: SUBJECT'S NAME

Forty characters are allowed for the subject's name. The subject's name should be entered in the following format:

Last Name/First Name/Middle Initial.

Hyphens should only be used when they are a part of the subject's name. If there is no middle name leave it blank.

Examples: Allen/Douglas/M

St.John-Smythe/Carlynn/A

If the subject's name is unknown enter "Unknown."

Press the RETURN key to continue.

QUESTION 4: SUBJECT'S DOB

The subject's date of birth must be entered in the following format:

MM/DD/YY

All six digits must be entered. They must be numeric and provide a valid date. If the birth date is unknown, type in the date the sample is being collected. The slashes will appear automatically.

Press the RETURN key to continue.

QUESTION 5: SUBJECT'S SEX

One character is required and must be either "M" or "F."

Press the RETURN key to continue.

QUESTION 6: LOCATION OF STOP

This is the location where the vehicle was stopped or where the crash occurred. A maximum of 40 characters is allowed. Be as specific as possible.

Example: Corner of Church and Main St Burlington

Press the RETURN key to continue.

QUESTION 7: TIME OF STOP

Type in the time the vehicle was stopped or a reported time of operation. The time should be recorded in 24 hour time as HHMM.

Press the RETURN key to continue.

QUESTION 8: ACCIDENT?

If the incident involved a motor vehicle crash, enter "Y" otherwise enter "N."

Press the RETURN key to continue.

QUESTION 9: TEST OPERATOR'S NAME

Operator refers to the operator of the BAC DataMaster. Forty (40) characters are allowed and the name should be entered in the same format as the subject's name.

Last Name/First Name/Middle Initial.

Press the RETURN key to continue.

QUESTION 10: OFFICER ID NUMBER

This is the above test operator's Vermont Traffic Complaint (VTC) number used in traffic violation cases.

Press the RETURN key to continue.

QUESTION 11: DEPARTMENT

This refers to the officer's department, not the department where the DataMaster is located. Thirty (30) characters are allowed and the department should be entered as in the following examples.

Examples: PD/Colchester

VSP/Bethel

SD/ Orleans

FW/Chittenden

DMV/CVE (Commercial Vehicle Enforcement)

Constable/Essex

Press the RETURN key to continue.

QUESTION 12: REVIEW DATA (Y/N)

Type "Y" to review the data entered in the previous 11 questions. All data should be reviewed at least once. Enter "N" once you have reviewed your data and you wish to proceed to the test sequence.

DATA REVIEW PROCEDURES

When you answer the last question and press the RETURN key, the display will ask "REVIEW DATA (Y/N)." All data should be reviewed at least once.

Upon answering "Y" the first question will reappear with the information you have entered. Pressing the RETURN key advances the display to the next question. If you find that data has been entered incorrectly, the following methods are available to correct it.

| Press Key(s) | Enter Mode | Review Mode |
|---------------------|--|---|
| BACKSPACE | Erases one character at a time and moves cursor to the left. | Does not erase but moves cursor left, one space at a time. |
| CONTROL and X | Erases the entire line and puts the cursor at the start. | Does not function. |
| CONTROL and I | Does not function. | Does not erase but moves cursor right, one space at a time. |
| DELETE | Does not function | Deletes the character the cursor is on without leaving a space. |

As you type each character you will hear a beep. If a disallowed character is typed, you will hear a louder beep and the character will not be displayed.

After editing the data the instrument will again display "REVIEW DATA (Y/N)." If you are satisfied that the information is correct, type "N" and the testing procedure will begin.

TIME RESTRICTIONS ON DATA ENTRY AND PROCESSING

When prompted to enter data approximately five minutes is allotted. If data entry is not finished within the five (5) minutes the instrument will return to "READY, PUSH RUN."

When prompted to make a decision such as "SUBJECT TAKE TEST (Y/N)" or "USE PREVIOUS DATA," one (1) minute is allotted.

When prompting "PLEASE BLOW" the subject will have two (2) minutes to provide an adequate breath sample. If at the end of this time an adequate breath sample has not been provided the instrument will again prompt "SUBJECT TAKE TEST (Y/N)." After three failures to obtain an adequate breath sample the instrument will time out and print a ticket reflecting an incomplete test.

SECTION V

ERROR MESSAGES AND RESPONSES

ERROR MESSAGES AND RESPONSES

If at any time the instrument displays an error message and is unable to clear the problem to resume processing, place a notice on the instrument stating "OUT OF SERVICE" and leave a detailed message to your DataMaster Supervisor regarding the message and any steps taken to clear that message.

FATAL ERRORS:

Although a DataMaster supervisor or the Vermont Department of Health Laboratory may be able to remedy these error messages, for the purpose of processing, the officer should consider these "fatal errors" and proceed to a different DataMaster.

If another DataMaster is not reasonably available, blood may be drawn.

When encountering fatal error messages, post "OUT OF SERVICE" on the DataMaster and leave a message for your DataMaster supervisor.

- 1) A black bar appears in the upper half of the display.
- 2) Built in keyboard does not function on 95 models or higher.
- 3) Instrument does not accept a ticket.
- 4) "NOT SET UP" The default options cannot be located.
- 5) "SIMULATOR OUT OF RANGE" Simulator concentration is not within 0.090 and 0.110.
- 6) "SIMULATOR TEMPERATURE ERROR" Simulator temperature is not within 33.5 and 34.5°C.
- 7) "NOT CALIBRATED" The instrument has lost calibration.
- 8) "TEMPERATURE LOW" Sample chamber is below 45°C.
- 9) "TEMPERATURE HIGH" Sample chamber is above 55°C.
- 10) "FILTER ERROR" The filter solenoid is not activating properly.
- 11) "DETECTOR OVERFLOW" Dust or debris is located in the sample chamber or the subject's BrAC is greater than 0.600.

NON FATAL ERRORS:

The following errors may be remedied by the test operator. If after following these instructions the error remains, post "OUT OF SERVICE" and leave a detailed message to your DataMaster supervisor regarding when the error occurred and what steps were taken to try to remedy it.

Proceed to a different DataMaster, if one is not reasonably available you may have blood drawn. If the error has been cleared, begin the testing procedure again.

- 1) External Keyboard does not function on the 88 models.
 - A) Disconnect keyboard from the back of the instrument.
 - B) Reconnect the keyboard into the terminal marked "keyboard" at the back of the instrument.
- 2) "**SYSTEM WON'T ZERO**" The instrument is unable to reach zero apparent alcohol.
 - A) Remove the mouthpiece from the breath tube.
 - B) Remove possible contamination sources from the processing area.
 - C) Open windows or use a fan to draw fresh air into the room if possible.
- 3) "**PLEASE BLOW**" flashes but instrument does not accept a sample.
 - A) Remove the mouthpiece from the breath tube and replace with a new mouthpiece.
 - B) Have the subject attempt to provide another breath sample.
 - C) If error remains, turn instrument off for one minute and turn back on.
- 4) "**PRINTER ERROR**" The printer has malfunctioned.
 - A) Turn the instrument off for one minute and turn back on.
- 5) "**PUMP ERROR**" The flow detector does not detect pump operation or the pump speed is incorrect.
 - A) Place a fresh mouthpiece on the breath tube.

- B) Alternately blow and suck back strongly and rapidly on the mouthpiece 5 or 6 times to free any sticking valve.
- 6) **“RADIO INTERFERENCE”** A radio frequency transmission has been detected in the testing environment.
- A) Turn radio off and ensure that there are no active transmitters in the processing area.
 - B) Ensure that the radio antenna is free of any physical contact.
 - C) After beginning a new test, answer “Y” to “USE PREVIOUS DATA (Y/N).”
- 7) **“INVALID SAMPLE”** An abnormal breath profile has been obtained during sample delivery.
- A) Start the fifteen minute observation period again.
 - B) Instruct the subject again on proper delivery of a breath sample.
- 8) **“INTERFERENCE DETECTED”** The ratio between the measurements at the two filters is not what is expected for ethanol.
- A) Remove possible contamination sources from the processing area.
 - B) Open windows or use a fan to draw fresh air into the room if possible.
 - C) After beginning a new test, answer “Y” to “USE PREVIOUS DATA (Y/N).”
 - D) If “INTERFERENCE DETECTED” message appears again you may have subject’s blood drawn.

OTHER ERROR CONDITIONS:

The following error conditions should be documented but may not necessitate moving to a different DataMaster. A detailed message should be left for the DataMaster Supervisor to remedy the situation for future use.

1) The breath tube is cold to the touch.

- A) The breath tube should be heated to slightly higher than body temperature which makes it feel warm to the touch.
- B) If it is cold, please make note on your processing form.

2) Incorrect time appears on the DataMaster.

- A) When the DataMaster ticket prints, place a single line through the time printed and hand write the correct time on the ticket prior to separating the three copies.
- B) Mark this line with your initials and date.
- C) Document on your processing form the time discrepancy.

3) Incorrect date appears on the DataMaster.

- A) When the DataMaster ticket prints, place a single line through the date printed and hand write the correct date on the ticket prior to separating the three copies.
- B) Mark this line with your initials and date.
- C) Document on your processing form the date discrepancy.

4) Ticket is incomplete or unreadable.

- A) If the ticket is jammed, gently remove the ticket. Insert a new ticket and press the copy button (CPY).
- B) As long as the instrument is not turned off, the copy button can be used repeatedly to obtain the last test run.
- C) If the printer ribbon is out of ink, remove the top layer from the ticket and photocopy the next layer to obtain your third copy.

- D) If after several attempts you are unable to get a readable ticket you will have to proceed to a new DataMaster and obtain a new test. Post "OUT OF SERVICE" on the instrument and leave a detailed message to your DataMaster Supervisor.
- 5) "INCOMPLETE" prints on the evidentiary ticket across from "SUBJECT SAMPLE."
- A) The instrument has timed out three times while waiting for the subject to provide an adequate breath sample.
 - B) Instruct the subject again on proper delivery of a breath sample.
 - C) If it is clear that the subject is unable to provide an adequate breath sample, have blood drawn.

TESTIMONY PREPARATION

SECTION VI

**EXAMPLES OF DIRECT EXAMINATION QUESTIONS FOR A
POLICE OFFICER TESTIFYING TO AN INFRARED BREATH TEST
RESULT**

Preliminary questions regarding the officer's training, experience, basis for the stop, investigation, field sobriety testing and other observations will precede testimony regarding the test.

TEST SEQUENCE QUESTIONS:

- 1) Where did you take the defendant to administer the breath test?
- 2) Were you the person who administered the breath test to the defendant?
- 3) What instrument did you use to obtain a breath test from the defendant?
- 4) Have you received training in the operation of the DataMaster?
- 5) Where did you receive this training?

(Questions 6-10 are leading but should be permitted as foundational only)

- 6) Did your training include the procedures for operating the DataMaster?
- 7) Did you receive any practical experience for operating the DataMaster during your training?
- 8) Did you pass a written examination as part of your training for operating the DataMaster?
- 9) Did you pass a proficiency test for operating the DataMaster during your training?
- 10) How many times have you administered a breath test utilizing the DataMaster?

OBSERVATIONS OF DEFENDANT:

- 1) Prior to administering the test, did you observe the defendant?
- 2) For how long did you observe the defendant?
- 3) During this observation, what were you looking for?

- 4) As you watched the defendant during the waiting period, did you observe any of the signs that you were trained to look for?
- 5) If you had observed any of these signs, what would you have done?

ADMINISTERING THE TEST:

- 1) After observing the defendant, were you prepared to run a test?
- 2) Was the DataMaster ready to perform a test?
- 3) How did you know?
- 4) After ensuring that the DataMaster was ready, what did you do?
- 5) Did you enter the defendant's name and date of birth into the DataMaster?
- 6) Did you provide all of the information as requested by the DataMaster?
- 7) What did the DataMaster do next?
- 8) Did you attach a new mouthpiece for the subject to give a breath sample through?
- 9) After the defendant gave a breath sample, did a BrAC value appear on the display?
- 10) Did a BrAC value print on the evidence ticket?
- 11) Was the number on the evidence ticket the same value that was displayed on the DataMaster?
- 12) Was the printed evidence ticket, which displays the defendant's results, attached to the case?
- 13) Do you recognize that printed evidence ticket?
- 14) How do you recognize the printed evidence ticket?
- 15) Did the instrument encounter any problems in completing the test?

ADDITIONAL INFORMATION:

The officer should be prepared to testify to how he/she knew that the instrument was operating properly when the test was given.

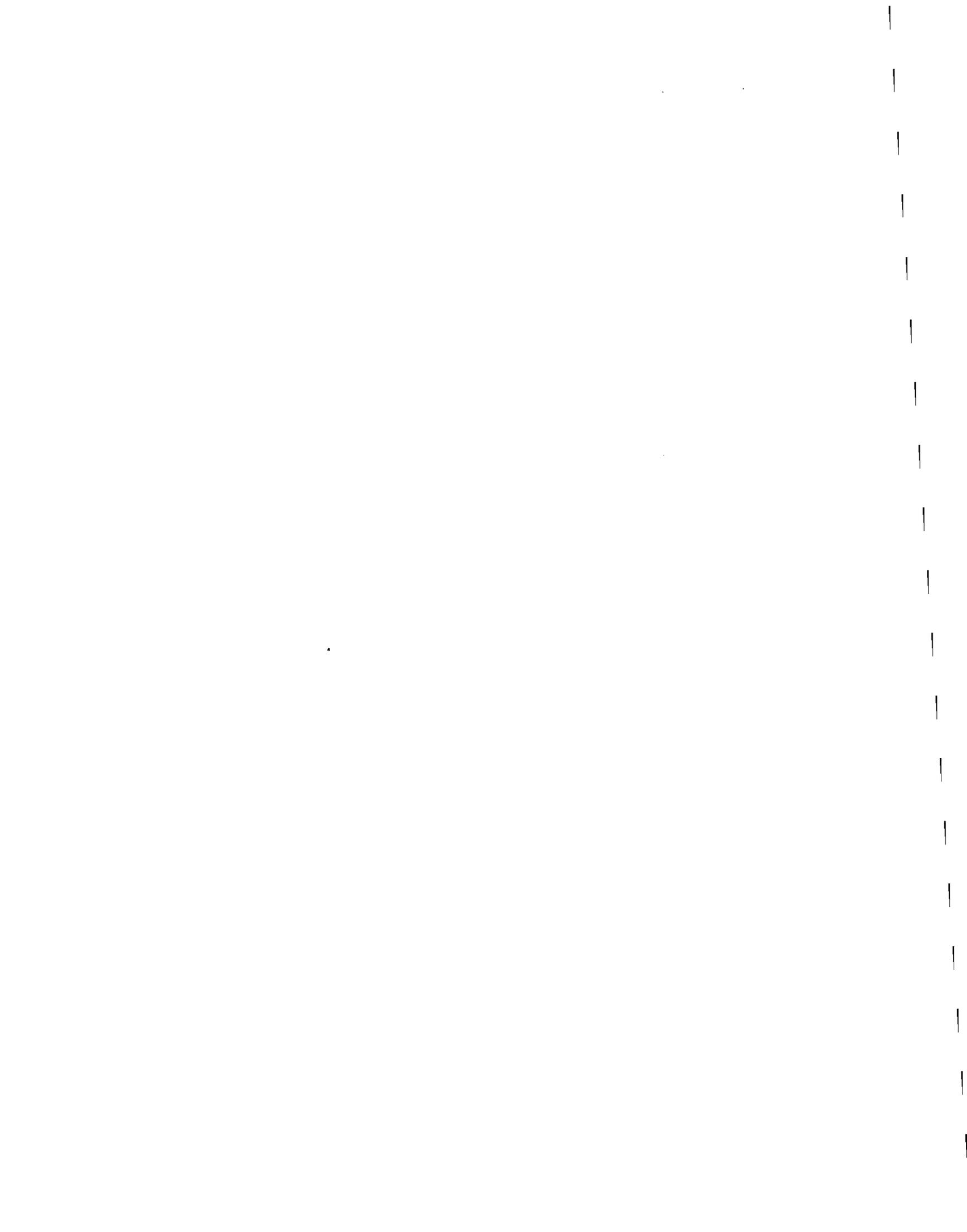
The best testimony here would be to state that the DataMaster went through its normal procedures of checking itself and that, based on the officer's training and experience, he/she determined the instrument was operating properly.

An officer may be asked to explain how the DataMaster functions. As this class is focused on instructing officers on the proper operation of the instrument and not in the technology behind it, officers should respond to those questions beyond the scope of this training in the following manner:

“I am not qualified to explain that but I do know based on my training and experience that the DataMaster was operating properly at the time of the test.”

APPENDICES

SECTION VII



APPENDIX A**COUNTY/TOWN CODES**

| ADDISON | BENNINGTON | CALEDONIA | CHITTENDEN |
|------------------|-------------------|--------------------|----------------------|
| 0101 Addison | 0201 Arlington | 0301 Barnet | 0401 Bolton |
| 0102 Bridport | 0202 Bennington | 0302 Burke | 0402 Burlington |
| 0103 Bristol | 0203 Dorset | 0303 Danville | 0403 Charlotte |
| 0104 Cornwall | 0204 Landgrove | 0304 Groton | 0404 Colchester |
| 0105 Ferrisburgh | 0205 Manchester | 0305 Hardwick | 0405 Essex |
| 0106 Goshen | 0206 Peru | 0306 Kirby | 0406 Hinesburg |
| 0107 Granville | 0207 Pownal | 0307 Lyndon | 0407 Huntington |
| 0108 Hancock | 0208 Readsboro | 0308 Newark | 0408 Jericho |
| 0109 Leicester | 0209 Rupert | 0309 Peacham | 0409 Milton |
| 0110 Lincoln | 0210 Sandgate | 0310 Ryegate | 0410 Richmond |
| 0111 Middlebury | 0211 Searsburg | 0311 Sheffield | 0411 St. George |
| 0112 Monkton | 0212 Shaftsbury | 0312 St. Johnsbury | 0412 Shelburne |
| 0113 New Haven | 0213 Stamford | 0313 Stannard | 0413 So. Burlington |
| 0114 Orwell | 0214 Sunderland | 0314 Sutton | 0414 Underhill |
| 0115 Panton | 0215 Winhall | 0315 Walden | 0415 Westford |
| 0116 Ripton | 0216 Woodford | 0316 Waterford | 0416 Williston |
| 0117 Salisbury | 0217 Glastenbury | 0317 Wheelock | 0417 Winooski |
| 0118 Shorham | | | 0418 Ft. Ethan Allen |
| 0119 Starksboro | | | 0419 Buell's Gore |
| 0120 Vergennes | | | |
| 0121 Waltham | | | |
| 0122 Weybridge | | | |
| 0123 Whiting | | | |

ESSEX

0501 Bloomfield
0502 Brighton/Island Pond
0503 Brunswick
0504 Canaan
0505 Concord
0506 East Haven
0507 Granby
0508 Guildhall
0509 Lemington
0510 Lunenburg
0511 Maidstone
0512 Norton
0513 Victory
0514 Averill
0515 Avery's Gore
0516 Ferdinand
0517 Lewis
0518 Warner's Grant
0519 Warren's Gore

FRANKLIN

0601 Bakersfield
0602 Berkshire
0603 Enosburg
0604 Fairfax
0605 Fairfield
0606 Fletcher
0607 Franklin
0608 Georgia
0609 Highgate
0610 Montgomery
0611 Richford
0612 Sheldon
0613 St. Albans City
0614 St. Albans Town
0615 Swanton

GRAND ISLE

0701 Alburg
0702 Grand Isle
0703 Isle LaMotte
0704 North Hero
0705 South Hero

LAMOILLE

0801 Belvidere
0802 Cambridge
0803 Eden
0804 Elmore
0805 Hyde Park
0806 Johnson
0807 Morristown
0808 Stowe
0809 Waterville
0810 Wolcott

| ORANGE | ORLEANS | RUTLAND | WASHINGTON |
|-------------------|-------------------|------------------------|--------------------|
| 0901 Bradford | 1001 Albany | 1101 Bensen | 1201 Barre City |
| 0902 Braintree | 1002 Barton | 1102 Brandon | 1202 Barre Town |
| 0903 Brookfield | 1003 Brownington | 1103 Castleton | 1203 Berlin |
| 0904 Chelsea | 1004 Charlestown | 1104 Chittenden | 1204 Cabot |
| 0905 Corinth | 1005 Coventry | 1105 Clarendon | 1205 Calais |
| 0906 Fairlee | 1006 Craftsbury | 1106 Danby | 1206 Duxbury |
| 0907 Newbury | 1007 Derby | 1107 Fair Haven | 1207 E. Montpelier |
| 0908 Orange | 1008 Glover | 1108 Hubbardton | 1208 Fayston |
| 0909 Randolph | 1009 Greensboro | 1109 Ira | 1209 Marshfield |
| 0910 Strafford | 1010 Holland | 1110 Mendon | 1210 Middlesex |
| 0911 Thetford | 1011 Irasburg | 1111 Middleton Springs | 1211 Montpelier |
| 0912 Topsham | 1012 Jay | 1112 Mt. Holly | 1212 Moretown |
| 0913 Tunbridge | 1013 Lowell | 1113 Mt. Tabor | 1213 Northfield |
| 0914 Vershire | 1014 Morgan | 1114 Pawlet | 1214 Plainfield |
| 0915 Washington | 1015 Newport City | 1115 Pittsfield | 1215 Roxbury |
| 0916 West Fairlee | 1016 Newport Town | 1116 Pittsford | 1216 Waitsfield |
| 0917 Williamstown | 1017 Troy | 1117 Poultney | 1217 Warren |
| | 1018 Westfield | 1118 Proctor | 1218 Waterbury |
| | 1019 Westmore | 1119 Rutland City | 1219 Woodbury |
| | | 1120 Rutland Town | 1220 Worcester |
| | | 1121 Sherburne | |
| | | 1122 Shrewsbury | |
| | | 1123 Sudbury | |
| | | 1124 Tinmouth | |
| | | 1125 Wallingford | |
| | | 1126 Wells | |
| | | 1127 West Haven | |
| | | 1128 West Rutland | |

WINDHAM

1301 Athens
1302 Brattleboro
1303 Brookline
1304 Dover
1305 Dummerston
1306 Grafton
1307 Guilford
1308 Halifax
1309 Jamaica
1310 Londonderry
1311 Marlboro
1312 Newfane
1313 Putney
1314 Rockingham
1315 Stratton
1316 Townshend
1317 Vernon
1318 Wardsboro
1319 Westminster
1320 Whitingham
1321 Wilmington
1322 Windham
1323 Somerset

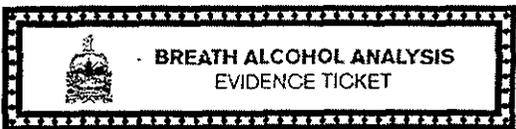
WINDSOR

1401 Andover
1402 Baltimore
1403 Barnard
1404 Bethel
1405 Bridgewater
1406 Cavendish
1407 Chester
1408 Hartford
1409 Hartland
1410 Ludlow
1411 Norwich
1412 Plymouth
1413 Pomfret
1414 Reading
1415 Rochester
1416 Royalton
1417 Sharon
1418 Springfield
1419 Stockbridge
1420 Weathersfield
1421 Weston
1422 West Windsor
1423 Windsor
1424 Woodstock
1425 Windsor Prison

APPENDIX D

EXAMPLE TICKETS

FACE THIS SIDE DOWN - THIS EDGE IN FIRST



STATE OF VERMONT
BAC DataMaster 881109

NOVEMBER 13, 2003

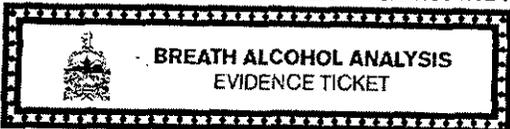
CASE NUMBER: 00000
TOWN CODE: 0000
SUBJECT'S NAME:
SB/INTER/SB/VALIDTMOX
SUBJECT'S B.O.B.: 11/13/03
SUBJECT'S SEX: M
LOCATION OF STOP:
VDHL
TIME OF STOP: 13:37
ACCIDENT?: N
TEST OPERATOR'S NAME:
HARNOLD/STEVEN/E
DEPARTMENT: VDH

--- BREATH ANALYSIS ---

| | | |
|-----------------------|-------------|-------|
| BLANK TEST | .000 | 14:05 |
| INTERNAL STANDARD | VERIFIED | 14:05 |
| EXTERNAL STANDARD | .101 | 14:05 |
| BLANK TEST | .000 | 14:06 |
| SUBJECT SAMPLE | -----> .000 | 14:07 |
| | | |
| BLANK TEST | .000 | 14:08 |
| INTERNAL STANDARD | VERIFIED | 14:08 |
| EXTERNAL STANDARD | .101 | 14:08 |
| BLANK TEST | .000 | 14:09 |
| SUBJECT SAMPLE | -----> .000 | 14:10 |
| | | |
| SIMULATOR TEMPERATURE | 34.0c | |

Figure 10:
DataMaster ticket reflecting two
subject tests.

FACE THIS SIDE DOWN - THIS EDGE IN FIRST



STATE OF VERMONT
BAC DataMaster 881109

NOVEMBER 13, 2003

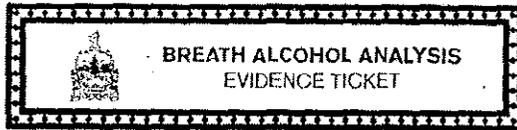
CASE NUMBER: 00000
TOWN CODE: 0000
SUBJECT'S NAME:
RADIO/INTERFERENCE
SUBJECT'S B.O.B.: 11/13/03
SUBJECT'S SEX: M
LOCATION OF STOP:
VDHL
TIME OF STOP: 13:37
ACCIDENT?: N
TEST OPERATOR'S NAME:
HARNOLD/STEVEN/E
DEPARTMENT: VDH

--- BREATH ANALYSIS ---

| | | |
|--------------------|----------|-------|
| BLANK TEST | .000 | 13:50 |
| INTERNAL STANDARD | VERIFIED | 13:50 |
| EXTERNAL STANDARD | .101 | 13:50 |
| BLANK TEST | .000 | 13:51 |
| RADIO INTERFERENCE | | |

Figure 11:
DataMaster ticket reflecting radio
interference.

FACE THIS SIDE DOWN - THIS EDGE IN FIRST



STATE OF VERMONT
BAC DataMaster 881109

NOVEMBER 13, 2003

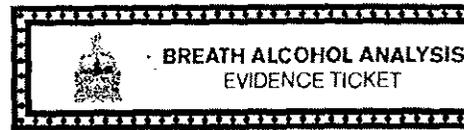
CASE NUMBER: 00000
TOWN CODE: 0000
SUBJECT'S NAME:
ACETONE/TEST
SUBJECT'S D.O.B.: 11/13/63
SUBJECT'S SEX: M
LOCATION OF STOP:
VHHL
TIME OF STOP: 13:35
ACCIDENT?: N
TEST OPERATOR'S NAME:
HARNOIS/STEVEN/E
DEPARTMENT: VHA

Figure 12:
DataMaster ticket
reflecting an
"Interference
Detected" message.

--- BREATH ANALYSIS ---

| | | |
|-----------------------|----------|-------|
| BLANK TEST | .000 | 13:35 |
| INTERNAL STANDARD | VERIFIED | 13:35 |
| EXTERNAL STANDARD | .102 | 13:35 |
| BLANK TEST | .000 | 13:36 |
| INTERFERENCE DETECTED | | |

FACE THIS SIDE DOWN - THIS EDGE IN F



STATE OF VERMONT
BAC DataMaster 881109

NOVEMBER 13, 2003

CASE NUMBER: 00000
TOWN CODE: 0000
SUBJECT'S NAME:
MOUTHALCOHOL/TEST
SUBJECT'S D.O.B.: 11/13/63
SUBJECT'S SEX: M
LOCATION OF STOP:
VHHL
TIME OF STOP: 13:37
ACCIDENT?: N
TEST OPERATOR'S NAME:
HARNOIS/STEVEN/E
DEPARTMENT: VHA

Figure 13:
DataMaster ticket
reflecting an "Invalid
Sample" message.

--- BREATH ANALYSIS ---

| | | |
|-------------------|----------|-------|
| BLANK TEST | .000 | 13:44 |
| INTERNAL STANDARD | VERIFIED | 13:44 |
| EXTERNAL STANDARD | .102 | 13:45 |
| BLANK TEST | .000 | 13:45 |
| INVALID SAMPLE | | |

FACE THIS SIDE DOWN - THIS EDGE IN FIRST



STATE OF VERMONT
BAC DataMaster 881109

NOVEMBER 13, 2003

CASE NUMBER: 0000
TOWN CODE: 0000
SUBJECT'S NAME:
ACETONE/TEST
SUBJECT'S D.O.B.: 11/13/63
SUBJECT'S SEX: M
LOCATION OF STOP:
VHHL
TIME OF STOP: 13:35
ACCIDENT?: N
TEST OPERATOR'S NAME:
HARNOIS/STEVEN/E
DEPARTMENT: VHA

Figure 14:
DataMaster ticket
reflecting a single
test sequence.

--- BREATH ANALYSIS ---

| | | |
|-------------------------------|----------|-------|
| BLANK TEST | .000 | 13:37 |
| INTERNAL STANDARD | VERIFIED | 13:37 |
| EXTERNAL STANDARD | .102 | 13:37 |
| BLANK TEST | .000 | 13:38 |
| SUBJECT SAMPLE --- .000 13:40 | | |

SECOND TEST NOT ATTEMPTED
DISCALIBRE TEMPERATURE

FACE THIS SIDE DOWN - THIS EDGE IN FIF



STATE OF VERMONT
BAC DataMaster 881109

NOVEMBER 13, 2003

CASE NUMBER: 0000
TOWN CODE: 0000
SUBJECT'S NAME:
ACETONE/TEST
SUBJECT'S D.O.B.: 11/13/63
SUBJECT'S SEX: M
LOCATION OF STOP:
VHHL
TIME OF STOP: 13:37
ACCIDENT?: N
TEST OPERATOR'S NAME:
HARNOIS/STEVEN/E
DEPARTMENT: VHA

Figure 15:
DataMaster ticket
reflecting a
"Simulator Out Of
Range" error.

--- BREATH ANALYSIS ---

| | | |
|------------------------|----------|-------|
| BLANK TEST | .000 | 13:40 |
| INTERNAL STANDARD | VERIFIED | 13:40 |
| EXTERNAL STANDARD | .102 | 13:40 |
| SIMULATOR OUT OF RANGE | | |

APPENDIX E

RESOURCES

VERMONT DEPARTMENT OF HEALTH LABORATORY

Phone: 1-802-863-7336

Fax: 1-802-863-7632

Email: lab_alc@vdh.state.vt.us

LEGAL ISSUES

DUI Resource Attorney

Phone: 1-802-828-2891

Fax: 1-802-828-2881

TRAINING AND CERTIFICATION

Vermont Criminal Justice Training Council

Phone: 1-802-483-6228

Fax: 1-802-483-2343