

USTER® HVI 900

Instruction Manual

HIGH VOLUME FIBER TEST SYSTEM



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English

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Think quality

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Table of Contents

Chapter 1 Introduction 1-1

1	HVI 900 Equipment.....	1-1
2	General System Drawings.....	1-2
3	HVI 900 System Modules.....	1-3
3.1	Length/Strength Module.....	1-3
3.2	Micronaire Module.....	1-4
3.3	Color/Trash Modules.....	1-5
3.4	Software Version 4.0 Features	1-6
3.5	Error Messages	1-6
4	Keyboard Commands.....	1-7
4.1	Exit From Operation	1-7
4.2	Changing Selections/Parameters.....	1-7
4.3	Visual Cues Used in this Manual	1-8
4.4	Special Function Keys	1-9
5	Safety Warning Labels	1-10
5.1	Label Locations.....	1-10
5.2	Example Labels	1-11

Chapter 2 Installation2-1

1	Electrical Power Requirements.....	2-2
2	Compressed Air.....	2-3
3	Floor Space Requirements	2-4
4	Connections	2-5

Chapter 3 System Startup3-1

1	Explanation of the Startup Menu	3-2
1.1	Go to Main Menu	3-2
1.2	Go to Dos (C:>)	3-2
2	Explanation of the Main Menu.....	3-3
2.1	System Testing	3-4
2.2	Module Testing	3-4
2.3	Calibration	3-5

2.4	Diagnostics.....	3-5
2.5	940 DataManager	3-6
2.6	Synthetic Testing.....	3-6
2.7	Shutdown	3-7
2.8	Quit.....	3-7
3	Resetting the HVI 900 System	3-7

Chapter 4 Status-Defining Parameters4-1

1	Entering Parameter Information	4-2
2	Explanation of the Status Menu.....	4-3
2.1	System Testing Results	4-3
2.2	Grade Entry.....	4-4
2.3	Trashmeter.....	4-5
2.4	Color Tray	4-5
2.5	Transmission Timeout	4-5
2.6	Date	4-5
2.7	Number of Micronaire Tests (8 max)	4-6
2.8	Number of Color/Trash Tests (2,4,6,8)	4-6
2.9	Number of Length/Strength Tests (10 max)	4-7
2.10	Color Grade.....	4-7
2.11	Edit Color Chart	4-8
2.12	Lot Limits	4-16
2.13	Edit Lot Limits	4-17
2.14	Retest Tolerances	4-25
2.15	Uster® SCI Regression Coefficients	4-26
2.16	CSP Regression Coefficients.....	4-28
2.17	Temperature and Humidity Constants	4-30
2.18	Company Name	4-31
2.19	Status Listing	4-32

Chapter 5 HVI 900 System Calibration5-1

1	Overview of System Calibration.....	5-2
2	Length /Strength Calibration	5-3
2.1	Length Standard Calibration	5-4
2.2	Length/Strength Setup.....	5-7
2.3	Cotton Calibration.....	5-7
2.4	Calibration Mode.....	5-13
2.5	Length Units	5-14
2.6	ICC SL1%.....	5-14
2.7	ICC SL2%.....	5-15

2.8	Calibration Constants	5-16
2.9	Calibration Cotton Standard Values	5-17
2.10	Calibration Check Tolerances	5-18
3	Calibrating for Micronaire	5-19
3.1	Micronaire Cotton Calibration.....	5-20
3.2	Air Calibration	5-22
3.3	Micronaire Status Menu	5-23
4	Calibrating for Color	5-24
4.1	Color Calibration	5-25
4.2	Standard Tile Values	5-27
4.3	Rd and +b Tolerance	5-28
5	Calibrating for Trash	5-29
5.1	Tile Area and Tile Count.....	5-29
5.2	Starting Sample Code and Number of Samples.....	5-30
5.3	Tile Calibration	5-31
5.4	Sample Calibration.....	5-32
5.5	Trash Setup	5-33
6	Calibrating the Temperature and Relative Humidity Probe	5-33
6.1	Trend Calibration	5-34
6.2	Set Current Value	5-36
6.3	Show Current Value.....	5-36
6.4	Temperature Slope and Temperature Offset	5-36

Chapter 6 HVI 900 System Testing6-1

1	Overview of Testing Sequence.....	6-2
2	Explanation of the Sign-On Menu	6-5
2.1	Proceed with Testing	6-5
2.2	Identifier.....	6-6
2.3	Reset Sample Counter	6-6
3	System Testing.....	6-6
3.1	ID.....	6-8
3.2	Grade.....	6-8
3.3	Leaf, Area % and Count	6-9
3.4	Rd and +b.....	6-9
3.5	Color Grade.....	6-9
3.6	Micronaire (MIC).....	6-10
3.7	Length (Len), Strength (Str), Uniformity (Unif), and Elongation (Elong)	6-10
3.8	Short Fiber Index (S.F.I.)	6-10

3.9	Samples	6-11
3.10	Test Status Box	6-11
3.11	Message Box	6-11
4	Sample Testing Procedures	6-12
4.1	Measurement Procedures for Micronaire.....	6-13
4.2	Measurement Procedures for Color/Trash	6-15
4.3	Testing Procedures for Length, Uniformity, Strength, and Elongation	6-17
5	Exit from Testing	6-19
6	Printing the Test Results	6-21
7	System Testing Diagnostics	6-23

Chapter 7 Module Testing7-1

1	Module Testing Menu	7-1
1.1	Length/Strength Module Testing	7-2
1.2	Explanation of the Length/Strength Module Testing	7-10
1.3	Length/Strength Module Testing Procedures	7-11
2	Micronaire Module Testing.....	7-14
2.1	Micronaire Module Testing Menu	7-14
2.2	Explanation of Micronaire Module Testing Screen	7-19
2.3	Micronaire Testing Procedures	7-20
3	Color/Trash Module Testing	7-22
3.1	Color/Trash Module Testing Menu	7-22
3.2	Explanation of the Color/Trash Module Test Screen	7-28
3.3	Color/Trash Module Testing Procedures	7-29

Chapter 8 940 DataManager8-1

1	Categories	8-2
1.1	Category Definition Screen	8-3
1.2	Highest Value of First Category	8-3
1.3	Interval.....	8-4
1.4	Number of Categories	8-4
1.5	How the Category System Works	8-4
2	Reports	8-6
2.1	Overview	8-6
2.2	Report Header Abbreviations	8-8
2.3	Selecting the Identifier(s) to Appear on the Report.....	8-9

2.4	Selecting Fiber Properties to Appear on the Report.....	8-11
2.5	Limits to Selecting Properties	8-12
2.6	Selecting the Type of Report.....	8-12
2.7	Tests Included on the Report.....	8-14
2.8	Selecting the Destination for the Report.....	8-15
2.9	Make Report.....	8-15
3	Histograms.....	8-18
3.1	Overview	8-18
3.2	Select Identifier	8-18
3.3	Property	8-19
3.4	Make Histogram	8-20
4	Data Export.....	8-21
4.1	Overview	8-21
4.2	Select Identifier	8-21
4.3	Test Included When Data is Exported.....	8-22
4.4	Destination for Exported Files	8-23
4.5	Communications Settings.....	8-26
4.6	Export Data	8-29
5	Edit Database.....	8-29
5.1	Add Test Data to the Database.....	8-30
5.2	Change Test Data in the Database.....	8-32
5.3	Remove Test Data from the Database	8-33

Chapter 9 HVI Applications9-1

1	HVI Applications.....	9-1
2	Importance of Testing Fiber	9-2
2.1	Fiber Properties that Influence Yarn Strength.....	9-2
3	Applications of HVI Results for Spinning Mills	9-3
3.1	Influence of Staple Length and Yarn Strength.....	9-6
3.2	Influence of Fiber Strength on Yarn Strength.....	9-6
3.3	Influence of Micronaire and Yarn Strength	9-7
3.4	Weaving Efficiency	9-8
4	9-8
5	Using HVI Cotton Merchandising	9-9
5.1	Invention of Fiber Testing Instruments.....	9-9
5.2	Using the Fibrograph	9-9
5.3	Example of the Fibrograph Used by a Merchant.....	9-11
5.4	Example of the Fibrograph Used by a Mill Buyer	9-11

Chapter 10 Synthetic Fiber Testing10-1

1	Length/Strength Setup	10-3
1.1	Synthetic Fiber Calibration.....	10-3
1.2	Length Standard Calibration Menu	10-4
2	Status	10-16
2.1	Synthetic Fiber Status Menu	10-16
2.2	Fiber Dependent Instrument Constants	10-17
2.3	Synthetic Fiber Standard Values	10-20
2.4	Synthetic Fiber Calibration Constants	10-20
2.5	Synthetic Fiber Calibration Tolerances.....	10-20
2.6	Motor Constants Menu	10-21
2.7	Print Status Listing	10-22
3	Synthetic Fiber Testing	10-23
3.1	Explanation of the Fiber Testing Menu.....	10-23
3.2	Explanation of the Synthetic Fiber Testing Screen.....	10-28
3.3	Synthetic Fiber Testing Procedures	10-29

Chapter 11 System Diagnostics11-1

Chapter 12 HVI 900 System Maintenance12-1

1	Cleaning the System.....	12-1
1.1	As Required.....	12-1
1.2	After Each Shift	12-1
1.3	Daily	12-2
1.4	Weekly.....	12-2
2	Service	12-3

Chapter 13 Fibrosampler 19213-1

1	General Information	13-1
1.1	Purpose of the Instrument.....	13-1
1.2	Description	13-1
1.3	Theory of Operation	13-3
1.4	Safety Warning Labels	13-4
2	Operation.....	13-5
2.1	Sample Preparation	13-5
2.2	Cleaning the Fibrosampler Card Cloth	13-7

3	Installation/Maintenance	13-8
3.1	Installation	13-8
3.2	Maintenance	13-12
3.3	Accessories	13-14
3.4	Technical Specification.....	13-15

Chapter 14 Appendix14-1

1	Specifications	14-1
1.1	Length/Strength Cabinet Physical Dimensions	14-1
1.2	Micronaire/Color/Trash Cabinet Physical Dimensions	14-1
1.3	Power	14-1
1.4	Air	14-1
1.5	Vacuum	14-2
1.6	CRT	14-2
1.7	Force Transducer	14-2
1.8	Balance	14-2
1.9	Pressure Transducer	14-3
1.10	Lamps	14-3
2	Disk Information.....	14-4
2.1	Diskettes.....	14-4
2.2	Disk Operating System.....	14-4
3	Monitor Information	14-5
4	Printer Information.....	14-6
4.1	Printer Switch Settings	14-6
4.2	Okidata 520 Printer	14-7
5	Balance Configuration	14-8
6	Recommended Lot Limits for Cotton	14-10
7	Calibration Cotton Standards for the HVI 900 System.....	14-11
8	Initial Category Setup	14-13
8.1	How the Category System Works	14-13
8.2	Initial Category Definition for Inventory Analysis	14-15
8.3	Initial Analysis of the Inventory	14-17
8.4	Define Categories to Cover the Range of Your Cotton	14-18
9	Format Used When Data is Exported.....	14-19
10	Generic Instrument Transmission	14-21
10.1	Transmission Architecture	14-21
10.2	Universal Record Format.....	14-23
10.3	HVI Record Formats	14-25

11 Error Messages.....	14-34
12 HVI 900A System Installation Guide/Report.....	14-41
Chapter 15 Glossary.....	15-1
Chapter 16 Index	16-1

Chapter 1 Introduction

The USTER® HVI 900™ Instrument measures the seven physical characteristics defined by the United States Department of Agriculture (USDA) in its cotton marketing system. It measures fiber length, strength, length uniformity, elongation, micronaire, color, and trash. All of these properties are important in fiber research, in the development of improved fiber blends, and in verifying that purchased fiber meets specifications.

The HVI 900 fiber test system offers precise and reliable automated operation with computer controlled calibration and diagnostics. All functions are controlled by dedicated microprocessors to simplify operation and to provide flexibility in testing parameters. The computer system has both a 3.5-inch and a hard disk drive.

3 HVI 900 Equipment

The following features are available on the HVI 900 unit:

- ◆ VGA color monitor
- ◆ Keyboard
- ◆ IBM-compatible computer chassis
- ◆ Hard disk drive loaded with the necessary interface, operations, calculation, and reporting packages (a licensed version of MS-DOS is also provided)
- ◆ 3.5-inch floppy drive
- ◆ 486 CPU type, 4 meg of memory
- ◆ Balance
- ◆ Printer
- ◆ Bar Code Reader (optional)
- ◆ Relative Humidity/Temperature Probe

4 General System Drawings

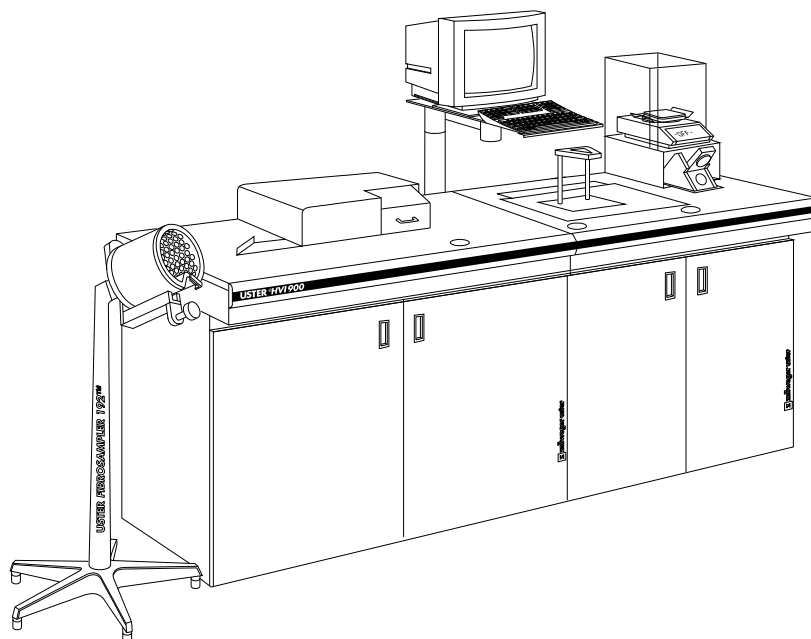


Figure 1-1 HVI 900 Instrument

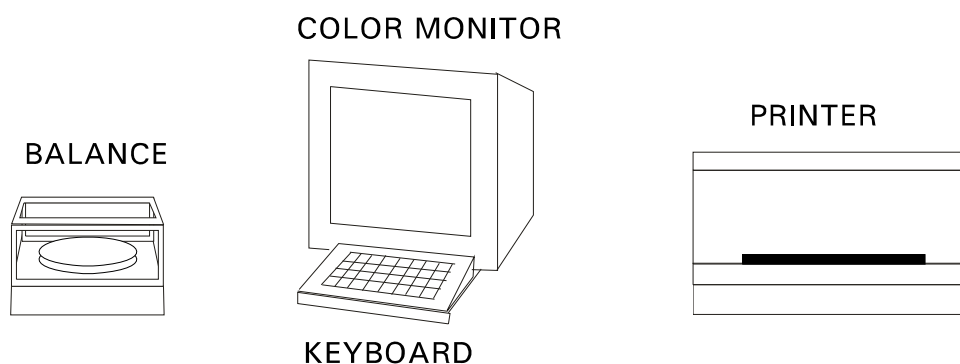


Figure 1-2 HVI System Peripherals

5 HVI 900 System Modules

The HVI 900 system is housed in two floor-standing cabinets: the larger cabinet contains the Length/Strength Module and the smaller cabinet contains the Micronaire and Color/Trash Modules. Included with the system are an alphanumeric keyboard, a monitor and a balance. The monitor displays the menu selections, operating instructions and test results. As tests are completed for each sample, the results can be transmitted to a printer and/or an external computer system, if available. The HVI 900 system consists of modules that can be combined in a variety of ways. Your system may include any or all of the following components: the Length/Strength Module, the Micronaire Module and the Color/Trash Module.

5.4 Length/Strength Module

The Length/Strength Module optically determines fiber lengths and associated uniformities. The length, known as the "elongation," is calculated by averaging the length of distance the fibers will extend before breaking. The Strength is determined by measuring the force that is required to break a sample of a known mass.

The Length/Strength Module of the HVI 900 consists of a brushing mechanism, an optical system for measuring length and uniformity, and a clamping jaw system for measuring strength and elongation. It is operated by placing a sample prepared using the Fibrosampler 192 in the comb track of the Fibrograph Plus where it is automatically brushed and moved into position for testing.

The brushing and measurement mechanisms are located on the top of the left cabinet. A lint/waste box and blower system is located underneath the left cabinet.

Version 3 (automatic) instruments operate differently than previous HVI 900 Semi-Automatic systems as a result of the following features being added to the instrument.

- ◆ The comb track is now enclosed within the Length/Strength cover. To access it, lift the door located on top of the brusher and place the fibrocomb in the track. The Length/Strength start button is then pressed to initiate the measuring process, or it can be automatically prompted using the software.
- ◆ The main power and blower switches are located on the Length/Strength Module plexiglass cover.
- ◆ The vacuum box has been replaced with a lint/waste box and blower system. The lint/waste box is located behind the left door of the Length/Strength Module cabinet. The blower can be turned off when not required for measurements.
- ◆ Two buttons, located on both sides of the Color/Trash mechanism, must be pressed simultaneously to initiate the Color/Trash Test.

5.5 Micronaire Module

Micronaire is measured by relating air flow resistance to the specific surface of fibers. An air stream is passed through a known mass of fiber confined in a chamber of fixed volume. The pressure differential across the chamber is then related to the specific surface of the fiber to determine the micronaire value for cotton.

Before a sample is placed in the micronaire chamber, it must be weighed. A precision electronic balance is provided to weigh the sample and is protected by an acrylic guard (the optional bar code reader can be attached to it). The testing chamber for micronaire measurements is located directly below the electronic balance.

5.6 Color/Trash Modules

The Color/Trash instrument for measuring cotton color (reflectiveness and yellowness) and trash is located in the smaller cabinet that also houses the Micronaire Module. The color/trash tray is mounted on the tabletop. A pneumatic-powered automatic pressure plate that applies a consistent amount of pressure during testing is located directly above the tray.

Color and trash are measured by placing a sample on top of the tray and by pressing the start button(s) (mounted flush with the tabletop on either one or both sides of the color/trash tray). This will cause the pressure plate to descend to the test tray.

The HVI 900 system uses two lamps to measure a sample during testing. The two color components of cotton—reflectiveness and yellowness—are measured when the light reflected passes through the filters and is deflected by photo diodes. This reflectiveness is expressed as a percent reflectance (%Rd).

The yellowness is expressed in Hunter's scale (+b) values. These values are converted into the equivalent USDA color grade codes that are based on the universal standards for grading American Upland and/or Pima cottons.

The Trash Module is an automated video image processor that measures the amount of visible leaf or trash in a sample of cotton. The digitized image produces results for three measurements:

- ♦ **Trash area**—the percent of the sample viewing area occupied by trash.
- ♦ **Trash count**—an indication of the number of trash particles •0.01 inch in diameter or larger.
- ♦ **Trash code or leaf**—a code value related to the trash area ($10 * \text{trash area}$, example: area = 0.37%, leaf = 04).

5.7 Software Version 4.0 Features

The HVI 900 system's version 4.0 software uses a pop-up menu structure. This allows you to select the procedures to be performed from options displayed on the screen. Once a selection has been entered, the screen reflects the choice and displays the next menu or procedure level. In this way, the screen provides the step-by-step information needed to proceed.

5.7.1 Menus

Menu items are selected using the arrow keys to move the cursor to highlight the name of the item or procedure to be performed. Then the **ENTER** key is pressed to "select" the item. Some menu items may have a word in the right column. This word indicates the current selection for the item. Refer to the section entitled "Changing Selections/Parameters" in this chapter for additional details on using menus.

5.8 Error Messages

Error messages are usually preceded by an audible tone that signals an instrument or test malfunction. Audio tones also sound if test parameters have been exceeded. A message statement displays on the monitor to indicate the nature of the problem. Refer to the Appendix for a list of possible error messages and the actions required to correct them.

6 Keyboard Commands

Pressing the **ENTER** key on the keyboard registers an entry into the computer. An entry can be erased any time before pressing this key and corrected using the **backspace** key.

If the keyboard does not respond to input or if the system halts in mid-operation, reset the system (refer to Resetting the HVI 900 System in Chapter 3). If there is still no response, turn off the main power switch located on the front of the Length/Strength cover.

6.4 Exit From Operation

Occasionally, you may wish to escape an operation without completing the sequence. Generally, pressing the **ESCAPE** key can do this.

6.5 Changing Selections/Parameters

Selections are made and parameters changed depending on specific screens. Use the appropriate method below to change parameter options and/or make selections.

- If an arrow appears to the right side of an item, this indicates that this selection accesses a submenu. When you press **ENTER** in such cases, the submenu will display the items pertaining to that selection.
- If an item contains alternative choices, the **ENTER** key can be used to move the cursor from choice to choice. Each press of the **ENTER** key will display the next choice. To return to the original choice, press **ENTER** continuously until the screen displays the initial information. The choices are displayed in a looping-type sequence; stop when the one you want is displayed.

- When an item requires that free-form information (values) be entered, an entry box is displayed when you press **ENTER**. Enter the new value(s) in the entry box using the keyboard.

Avoid typos by double-checking the accuracy when you enter information using the keyboard. Do this **before** pressing the **ENTER** key. Press the **ESCAPE** key to save the options once the correct choices are made.

6.6 Visual Cues Used in this Manual

What You See What It Means

BOLD

Bold capital letters are used for the names of the keys on your keyboard (e.g., **ENTER**, **ESCAPE**, **F5**, etc.).

CAPITALS

Small capital letters are used for menu names (e.g., MAIN MENU).

Italics

Italicized, non-capital letters indicate a placeholder for information must be provided for the menu item to be selected (e.g., *filename*—the operator would enter the actual name of the file to be used; *tile calibration*—the operator would highlight the item and press **ENTER**).



CAUTION:

These statements, which always appear in a box, emphasize areas where bodily damage could occur if the instrument is operated improperly.

Attention: These statements are in bold type. They provide information regarding the proper use of the instrument.

***Note:** Notes appear in italics type. They give special emphasis, tips, or information about the section.*

For the most part, the figures in this manual are screens, as they appear when you have performed the tasks discussed in that section. They represent what you see on the monitor if you have an HVI 900 with the Length/Strength, Micronaire, and Color/Trash Modules. If you have a different system configuration, the screens you see displayed on your monitor may differ.

6.7 Special Function Keys

The following function keys may be useful during System/Module Testing.

- !** Reject a sample's test results (Module Testing).
- #** Set or reposition motors (Module Testing and Length/Strength Calibration).
- F1** List the Function keys available.
- F5** Reset (clear) all fields that have entries via the keyboard or bar code reader. **F5** can be used at any point on the Measurement Screen. The bar code reader can be used to re-enter the ID number.
- F8** Interactive diagnostics.
- F10** Reset the motors.

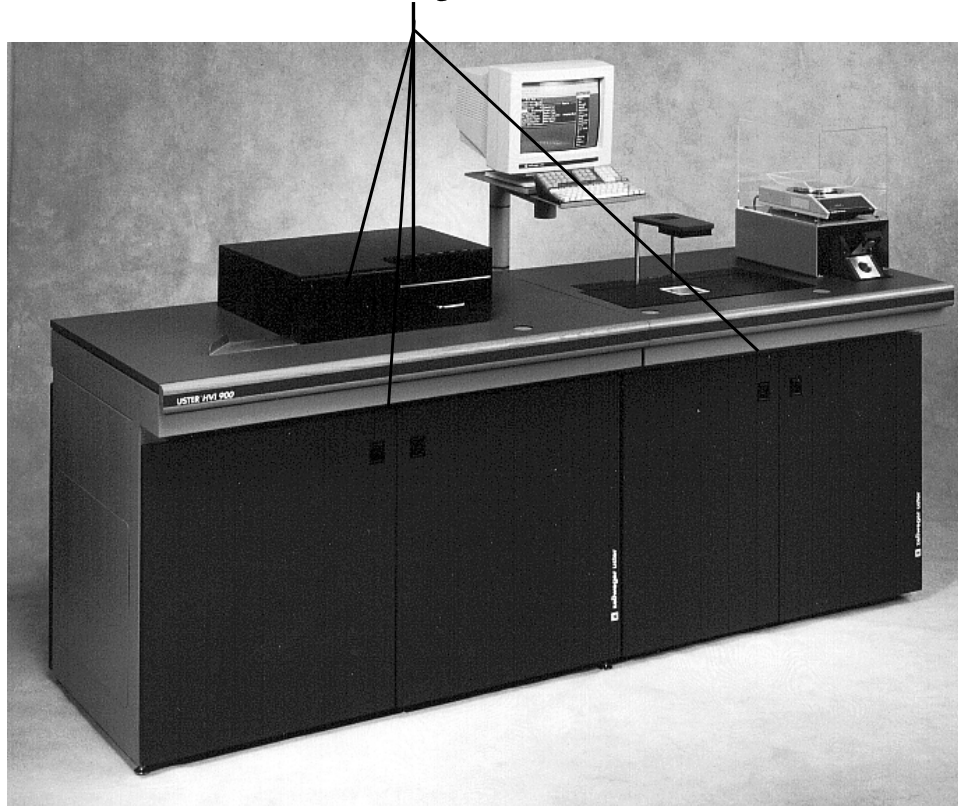
7 Safety Warning Labels

This section depicts examples of the warning labels used on the Version 3 HVI 900 instruments. The HVI is safe to operate in a normal manner; however, there are certain conditions that warrant cautionary statements. The following warning labels have been used to inform the operator and service personnel of the hazardous areas and conditions in the instrument.

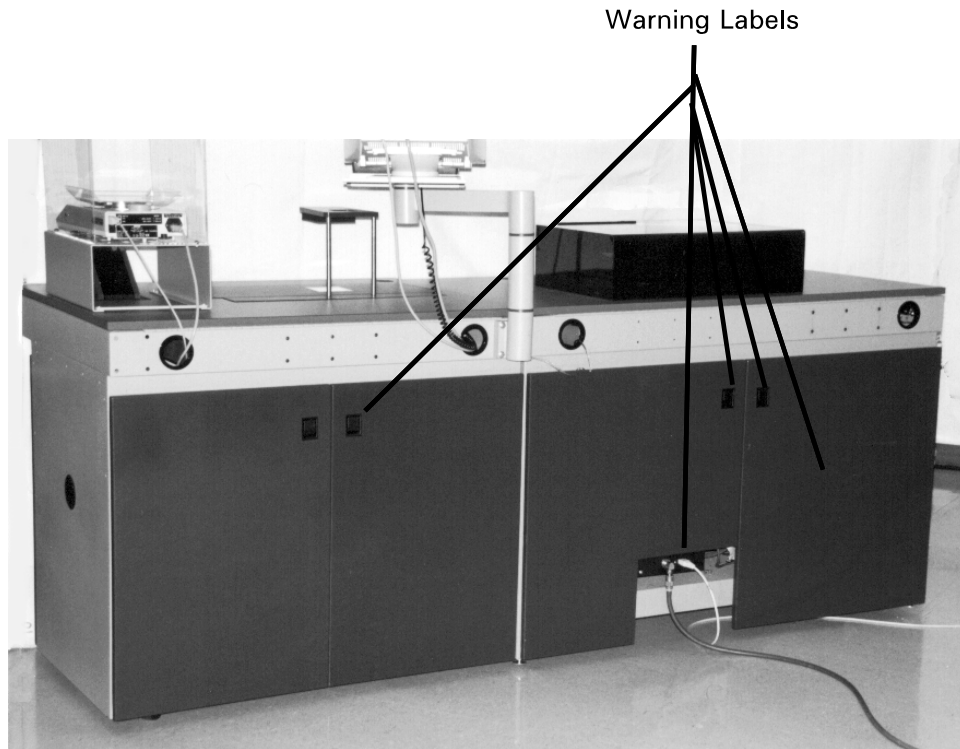
7.4 Label Locations

Warning labels are located behind doors or under the cabinet top in the area closest to the hazard. The following pictures show the general location of the warning labels.

Warning Labels



7.5 Example Labels



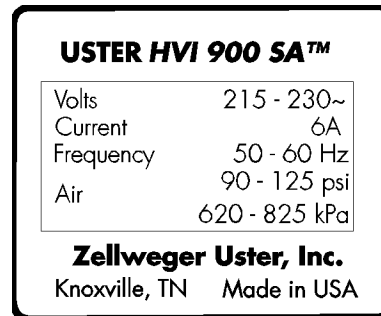
7.5.1 Micronaire and Color/Trash Cabinet

This label is located behind the front and rear doors on the frame of the micronaire and color/trash cabinet. Caution should be taken to avoid pinching your hand under the cabinet top in the area of the micronaire chamber when the micronaire mechanism is activated.

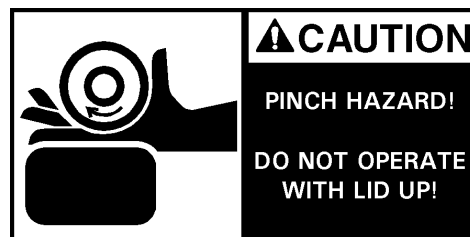


7.5.2 Length/Strength Cabinet

An equipment label is located on the rear enclosure (behind the rear doors).



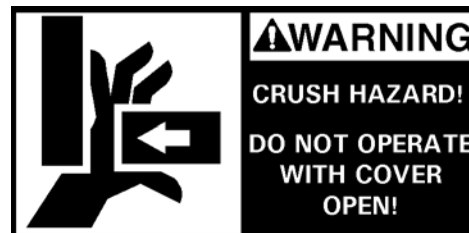
A label is located on the brushing assembly indicating where the pinch hazard could occur if your hand is in the area of the brusher. The door should remain closed during length/strength measurement operations.



A label is located on the comb track assembly indicating the where a crush hazard could occur if your hand is in the area of the comb transport. The door should remain closed during length/strength measurement operations.



A label is located on the comb transport assembly indicating where a crush hazard could occur if your hand is in the area of the comb transport. The instrument should not be operated with the cover raised.

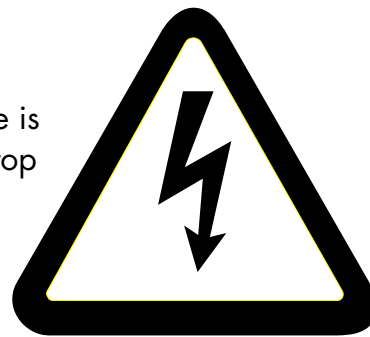


A warning label with the hand/wire/flash is located on the top of the power distribution box (control box). This indicates that hazardous voltage is under this cover. Operators should **NEVER** be allowed in here.



This label is also located on the frame of the instrument behind each of the front and rear cabinet doors.

The label with a flash symbol inside a triangle is located inside the power distribution box on top of the power connector blocks on the plastic shield. This indicates to the service person that hazardous voltage exists behind this cover.



The warning label portraying a hand being cut is located on the breaker arm in the rear of the length/strength cabinet. This indicates a shearing hazard if the instrument is operated with the interlock switch defeated.



Chapter 2 Installation

The HVI 900 System is shipped in three separate crates containing the module cabinets, peripherals, and some of the internal parts of the system. Any loss or damage should be immediately reported to the carrier.

- When the system is received (or shortly thereafter) an Uster Technologies, Inc. technician will arrive to install it. Do not attempt to set up the system by yourself. Refer to the Appendix, HVI 900 System Installation Guide/Report, during the installation procedure. This report, along with a copy of the Status Listing, should be returned to Uster Technologies, Inc., Knoxville, once installation has been completed.

Attention: If the system is to be stored before being used, inside storage *is required* in a location that is protected from excess moisture, corrosive atmospheres, and chance of physical damage. Conditioned storage is recommended, but is not required. If the instrument has been exposed to a cold environment, condensation may form on cold surfaces when the instrument is moved into a warm area. In such situations, allow the instrument to warm and dry thoroughly before proceeding with installation.

The following procedures are to be performed for each cabinet with the assistance of Uster Technologies' personnel or an authorized Uster Technologies, Inc. agent. Detailed installation procedures for connecting the cables and setting up the system are provided to authorized personnel in the Service Manual.

3 Electrical Power Requirements

All the system components are plugged into the power strips in the back of each of the cabinets. The Version 3 HVI 900 instrument operates on 230 volts (50 to 60 Hz) and requires a separate dedicated 15-amp circuit breaker at the facility's electrical load center. During normal operation, the HVI draws approximately six (6) amps; the startup current is sufficiently high to require the larger breaker. A power cord is provided that will connect to the HVI. The opposite end must be fitted with connections compatible with the facility's electrical system.

- Check that all power switches on the instrument are **OFF**.
- Connect the system to an AC outlet:
 - 215 -230 volts
 - 6 amps
 - 50-60 Hz
- Turn ON the power:
 - Open the right front door of the Length/Strength cabinet. Verify that the red switch on the Control Box (labeled Main) is in the ON position.
 - Verify that the white switch on the Control Box is in the ON position.
- Close the door and turn on the HVI:
 - Press the red switch located on the front of the length/strength plexiglass cover.
- Turn **ON** the monitors and the balance.
- Allow the system to warm up for at least four (4) hours before performing calibrations for the first time.

The instrument must be operated in a controlled environment in the range of 20°C \pm 2°C (65°F to 72°F). The relative humidity should be 65%, \pm 2%. For consistent results, fiber samples should be conditioned in the laboratory environment.

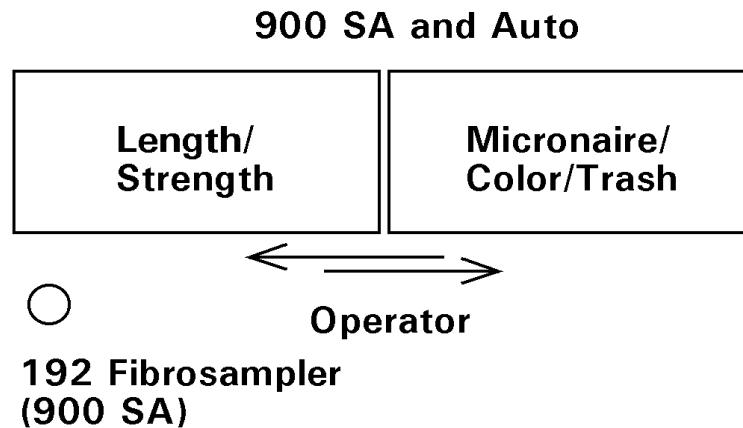
4 Compressed Air

The system requires 90-125 psi (620-825 kPa) of clean, dry, unregulated compressed air. The unit is provided with an air line for connections to the facility's air supply. Failure to supply air that is free of water, oil, or particles will increase maintenance and void the warranty.

Attention: Damage caused by connecting the instrument to improper power and air sources is not covered under the warranty.

5 Floor Space Requirements

The 900 SA is always installed in a straight-line configuration. The Length/Strength cabinet physically occupies a space of 137 cm (54 inches) long by 80 cm (31.5 inches) deep. The working surface is 98 cm (38.5 inches) from the floor. The 900 SA Length/Strength cabinet weighs approximately 295kg (650 pounds). The Micronaire and Color/Trash cabinet is 107 cm (42 inches) wide, and the same height and depth as the Length/Strength Cabinet. It weighs approximately 190kg (420 pounds).



6 Connections

The balance, monitor, keyboard, temperature/relative humidity probe and bar code reader should be connected before the HVI 900 is turned ON.

- **Balance**

Connect the balance to the cable labeled COM1 (located in the Micronaire cabinet).

- **Monitor**

Connect the monitor to the connector labeled VGA on the back of the HVI. Additional information on the monitor is available in the Appendix.

- **Keyboard**

The keyboard is attached to the connector labeled KB on the back of the HVI.

- **Temperature/Relative Humidity Probe**

The probe cable is attached to a connector on the back of the HVI computer.

- **Bar Code Reader (if this option is purchased)**

Connect the bar code reader to the cable labeled COM2 (located in the Micronaire cabinet).

The HVI 900 system is now ready for use. Allow the system to warm up for at least four (4) hours before performing calibrations for the first time. After 4 hours, calibrate according to the instructions in this manual.

Most cotton standards organizations recommend that the temperature be in the range of 20°C \pm 2°C (65°F to 72°F) for a testing cotton environment. The relative humidity should be 65%, \pm 2%. It is suggested that fiber samples be conditioned in the laboratory environment for consistent testing results.

Chapter 3 System Startup

The HVI 900 is a sophisticated instrument that requires specific instruction and training to be used properly. Only operators that have received proper training should use the HVI system.

Before beginning to use the instrument, make sure the system has been properly installed (see Chapter 2). Power should be ON for the instrument, monitor, and balance.

Attention: If the instrument's power has been OFF, allow at least four (4) hours for the colorimeter to warm up before calibrating and testing.

The top switch on the front of the length/strength plexiglass cover for Version 3 hardware that is using Version 4 software is the power switch.

- Press the power switch to turn ON the instrument power.
- Before testing, you must turn on the blower. The blower switch is located just below the main power switch. A warning message is displayed during system startup if the blower has not been turned on previously.

Most of the screens shown in this manual were taken from a Version 3 900 Semi-Automatic instrument with Length/Strength, Micronaire, and Color/Trash. The software is Version 4.

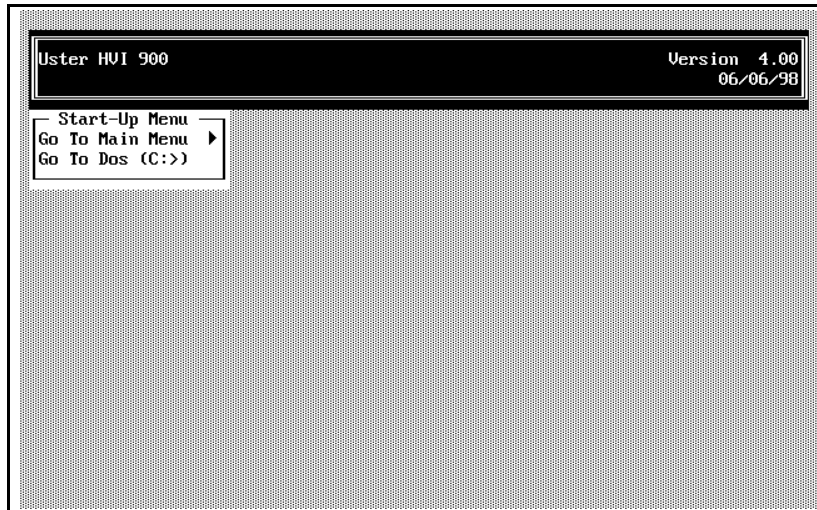


CAUTION:

Keep hands, jewelry, and clothing away from the color trays and color hand. Make sure the area around the Length/Strength and the Color/Trash start buttons remains clear so that the buttons are not accidentally pressed.

3 Explanation of the Startup Menu

The Version 4 software of the 900 SA System is installed on the hard disk drive (C:\). When the system is powered, the software performs a series of checks before it displays the START-UP MENU.



3.4 Go to Main Menu

This is the default selection for this menu. When you press **ENTER** while this selection is highlighted, the instrument automatically goes through a diagnostics routine, checking the brusher, breaker, and comb motors. A notation appears on the screen as the system makes these checks. You may observe this sequence, however, do not halt it by pressing any keys.

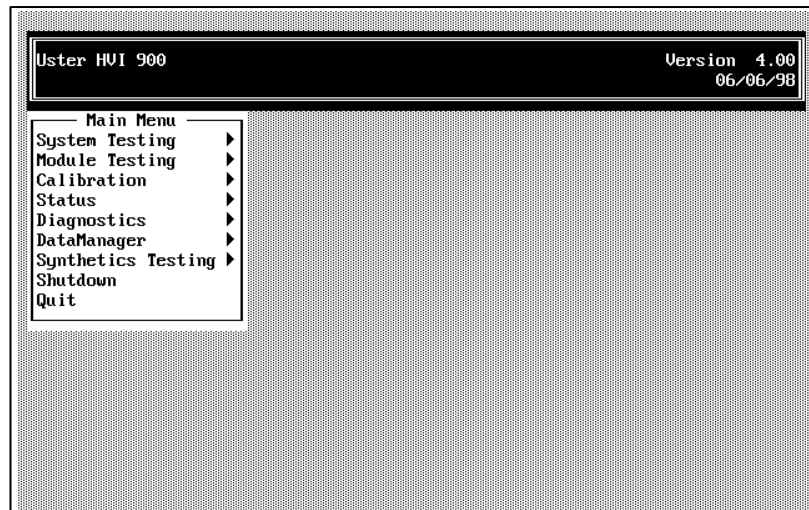
3.5 Go to Dos (C:>)

This menu exits to the computer's Disk Operating System (DOS). If you want to exit to DOS, highlight *Go to DOS* on the Main Menu and press

ENTER. Service technicians use this selection for troubleshooting purposes.

4 Explanation of the Main Menu

Note: In case of a brownout, a blackout, or a power surge, the power interrupts main switch automatically switches to the **OFF** position.



When this occurs, turn the switch to the **ON** position to restore power to the system. Next, follow the steps in the section titled, "Resetting the 900 SA System" located in this chapter.

Note: Depending on the modules in your system and/or the selections made on the **STATUS MENU**, the menu items you see displayed may be different from those shown in this manual.

The HVI 900 system name is displayed in the box at the top of the screen. The software version notation (4.0) is located in the right corner of this box. To begin using the system, highlight the selection for the operation to be performed using the arrow keys, then press the **ENTER** key.

4.4 System Testing

This selection is used during normal system testing of fibers and is the default selection for this menu. It is selected simply by pressing the **ENTER** key after highlighting *System Testing*. The SIGN-ON MENU will be displayed. The following selections are available from the SIGN-ON MENU.

- ◆ **Proceed with Testing**
- ◆ **Identifier**
- ◆ **Reset the Sample Counter**

Refer to Chapter 6, HVI 900 System Testing, for detailed information on the system testing procedures used for an HVI 900 system.

4.5 Module Testing

Module Testing should be used when only one of the Modules in the HVI system is required for testing. It is selected by highlighting MODULE TESTING and pressing the **ENTER** key. The MODULE TESTING MENU will be displayed. The MODULE TESTING MENU can include any of the following selections depending on the modules installed in your system.

- ◆ **Length & Strength**
- ◆ **Micronaire**
- ◆ **Color & Trash**

Refer to Chapter 7, Module Testing, for detailed information on the using these menu items.

4.6 Calibration

Calibration is a routine procedure that is normally performed at the beginning of the day or according to your company practice. When the CALIBRATION item is highlighted on the Main Menu and the **ENTER** key is pressed, the CALIBRATION MENU will be displayed. The following selections can be made from the CALIBRATION MENU.

- ◆ **Length/Strength**
- ◆ **Micronaire**
- ◆ **Color**
- ◆ **Trash**
- ◆ **Temperature**
- ◆ **Relative Humidity**

Refer to Chapter 5, HVI 900 System Calibration, for detailed information on the calibration procedures.

4.7 Diagnostics

This section is used for troubleshooting and maintenance of the system. **ONLY** Authorized Uster Technologies Service Technicians should access this selection. These menu items are described in Chapter 11, Diagnostics, and in the *HVI 900 Service Manual*.

4.8 940 DataManager

Test results from the HVI system are collected, sorted, and stored. They can be reviewed, interpreted, and prepare the files for use with Uster Technologies' BIAS using the 940 DataManager. It is selected by highlighting the 940 DATAMANAGER MENU item and pressing **ENTER** key. The following selections can be made from this menu.

- ♦ **Reports**
- ♦ **Histograms**
- ♦ **Data Export**
- ♦ **Categories**
- ♦ **Edit Database**

Refer to Chapter 8, 940 DataManager, for instructions on using the 940 DATAMANAGER MENU.

4.9 Synthetic Testing

The HVI 900 system can be used for testing synthetic fibers. It is selected by highlighting SYNTHETIC FIBER MENU item and pressing the **ENTER** key. The following items can be selected from this menu.

- ♦ **Synthetic Fiber Testing**
- ♦ **Synthetic Fiber Calibration**
- ♦ **Length Standard Calibration**
- ♦ **Length/Strength Setup**
- ♦ **Status**
- ♦ **Diagnostics**

Refer to Chapter 10, Synthetic Fiber Testing, for instructions on testing synthetic fibers.

4.10 Shutdown

This item should be used to leave the system on, but not in use, for long periods of time. It clears the monitor screens, leaving the message, "Press any key to restart." When any key on the keyboard is pressed, the monitor is reactivated and the MAIN MENU is displayed.

It is recommended that at the end of each day of testing the printer and monitors be turned OFF but the instrument be left ON. This is because if the instrument's main power switch has been OFF, at least 4 hours must be allowed for the colorimeter to warm up before calibrating and testing can begin.

4.11 Quit

This selection exits the HVI system software and goes to the DOS prompt.

5 Resetting the HVI 900 System

The main purpose of resetting the HVI 900 system is to clear the software of unnecessary information. Resetting erases old values from the system's memory buffer. If the system is reset in the middle of a testing sequence, the result will be a loss of test data.

The system can also be reset if it is not responding to keyboard strokes. Rest the instrument (reload the program) as follows while in any part of operation with the exception of *Testing*.

- Open the front doors of the Length/Strength cabinet, and press the button labeled **RESET**.

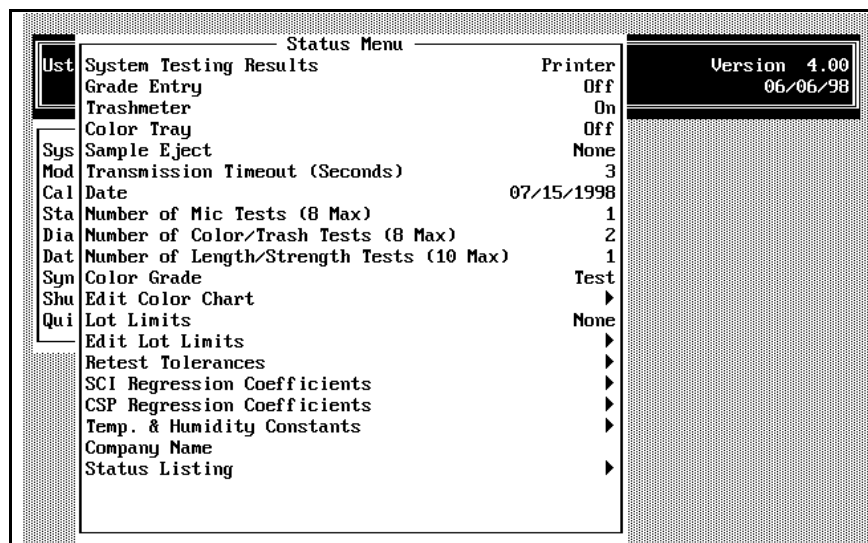
- The system will reset and delete any measurement values that were interrupted when the reset procedure was initiated. The START-UP MENU will appear.

Chapter 4 Status-Defining Operating Parameters

This Status chapter explains how to define a number of important operating parameters. Typically, most of the items on the STATUS MENU will not need to be changed after this initial installation and definition. However, some items may be used occasionally to add new definitions or to modify existing definitions.

This section describes each item listed on the STATUS MENU.

- Access the *Status* menu by highlighting the *Status* item from the MAIN MENU using the arrow keys, and then pressing the **ENTER** key.



3 Entering Parameter Information

Each menu item on the STATUS MENU will display either the option currently selected or an arrow indicating that another menu can be accessed to display the parameter options. Each of the parameter options can be changed using any of the following methods.

- If an arrow appears to the right side of an item, this indicates that this selection accesses a submenu. When you press **ENTER** in such cases, the submenu will display the items pertaining to that selection.
- If an item contains alternative choices, the **ENTER** key can be used to move among the choices. Each press of the **ENTER** key will display a new choice. To see each one, press **ENTER** until the screen repeats the initial information. The choices are displayed in a looping-type sequence.
- When an item requires that free-form information (values) be entered, an entry box displays when you press **ENTER**. Type the new value(s) in the entry box using the keyboard.

Check the accuracy when you enter information using the keyboard before pressing **ENTER**. If a typo is made, it can only be corrected by pressing the **backspace** key before pressing the **ENTER** key. The characters are removed one at a time.

- Press the **ESCAPE** key to save the options and return to the Main Menu once the STATUS MENU reflects your choices.

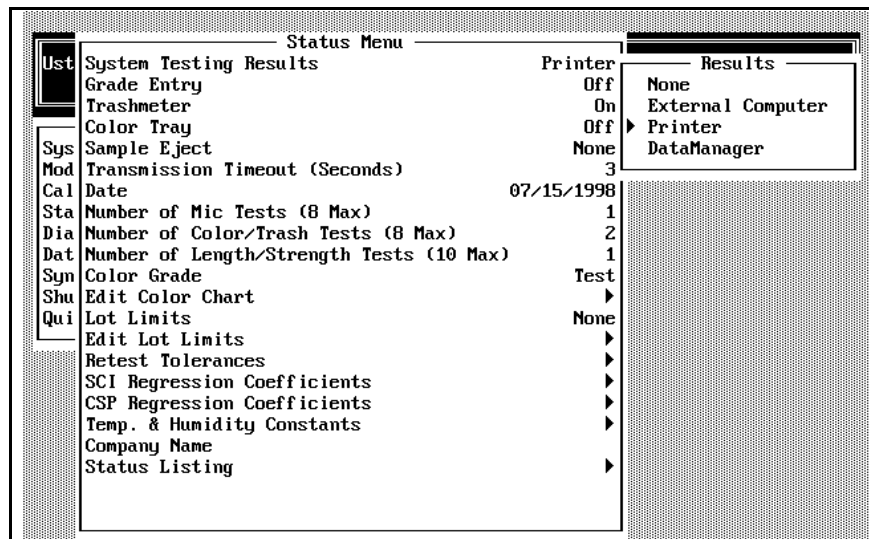
Note: *The menus and screens you see displayed may be different from those in this manual depending on the selections made on the Status Menu. This manual reflects screen captures taken from an HVI 900 system with the Length/ Strength, Micronaire, and Color/Trash Modules using version 4.0 Software. Your monitor may have certain menu items dimmed. If so, the dimmed items are not pertinent to your software configuration.*

4 Explanation of the Status Menu

4.4 System Testing Results

This menu item is used to indicate where the testing results are to be sent. The following options are displayed when the **ENTER** key is pressed.

- ◆ **None**—The test results are displayed on the screen only.
- ◆ **External Computer**—The test results are sent to an external computer via a serial cable. This selection should be chosen if the 940 DataManager resides on an external computer.
- ◆ **Printer**—The test results are sent to the system printer.
- ◆ **DataManager**—The test results are stored for later access by the 940 DataManager. This selection should be chosen if you use the integrated version of the 940 DataManager.



Highlight each item that applies by using the arrow keys and pressing the **ENTER** key. An arrow is displayed to the left of each selected choice. Test results can be sent to multiple locations. For example, if you want the test results to be sent to both a printer and to the 940 DataManager, highlight *Printer*, and press **ENTER**. Then, highlight *DataManager*, and press **ENTER** again. Arrows will be displayed beside both the Printer and DataManager items. Press **ESCAPE** to save the settings and return to the STATUS MENU.

- Select a single item by highlighting it in the list using the arrow keys, then press the **ENTER** key. This will remove the arrow displayed to the left of the item. Press **ESCAPE** to save the settings and return to the STATUS MENU.
- Select all items by highlighting *None*, then pressing the **ENTER** key. The arrow will be removed from all the selections and be positioned by *None*. Press **ESCAPE** to save the settings and return to the STATUS MENU.

4.5 Grade Entry

The Grade Entry option can be turned Off or On. When Grade Entry is turned ON, it is required that a cotton grade value be entered by the operator for each sample test.

- ◆ **Off** — The cursor will not stop on the Grade field during System Testing.
- ◆ **On** — The cursor will stop in the Grade field during System Testing where the operator should enter up to six (6) alphanumeric characters using the keyboard. This can be a grade code or other information that should be stored about the sample.

There is not a Grade field in Module Testing.

4.6 Trashmeter

The Trashmeter option can be turned Off or On to indicate whether a trash analysis should or should not be performed during System Testing.

- ◆ **Off** — No trash analysis is performed during System Testing.
- ◆ **On** — The Trashmeter performs a trash analysis during System Testing.

4.7 Color Tray

The Color Tray option is applicable to the HVI 900 Automatic only. It appears shaded (grayed out) on the HVI 900, Version 4 software.

4.8 Transmission Timeout

The Transmission Timeout option is used to control the amount of time in seconds that the instrument should wait for an acknowledgment from the external computer. Any number between 1 and 100 is valid.

4.9 Date

The Date menu item is used to control the system date. It defaults to the current date but can be changed by highlighting the selection and pressing the **ENTER** key. An entry box is displayed where the date should be entered in Month/Day/Year (MM/DD/YY) format.

4.10 Number of Micronaire Tests (8 max)

This item is used to indicate the number of micronaire tests that are to be performed on each sample. Enter the amount using the number keypad, then press **ENTER**. It is recommended that only one (1) micronaire test be performed. If no tests should be performed, set the number of micronaire tests to zero (0).

Note: *If you enter a number greater than the maximum (8), an error message will be displayed. Press **ANY KEY** to clear the error message and then enter a valid number.*

4.11 Number of Color/Trash Tests (2,4,6,8)

This item is used to indicate the number of color and trash tests that are to be performed on each sample.

- Enter the amount using the number keypad, then press **ENTER**.

It is recommended that four (4) Color/Trash Tests be performed. If no tests should be performed set the number of Color/Trash Tests to zero (0).

Note: *If you enter a number other than 2, 4, or 8, an error message will be displayed. Press **ANY KEY** to clear the error message and then enter a valid number.*

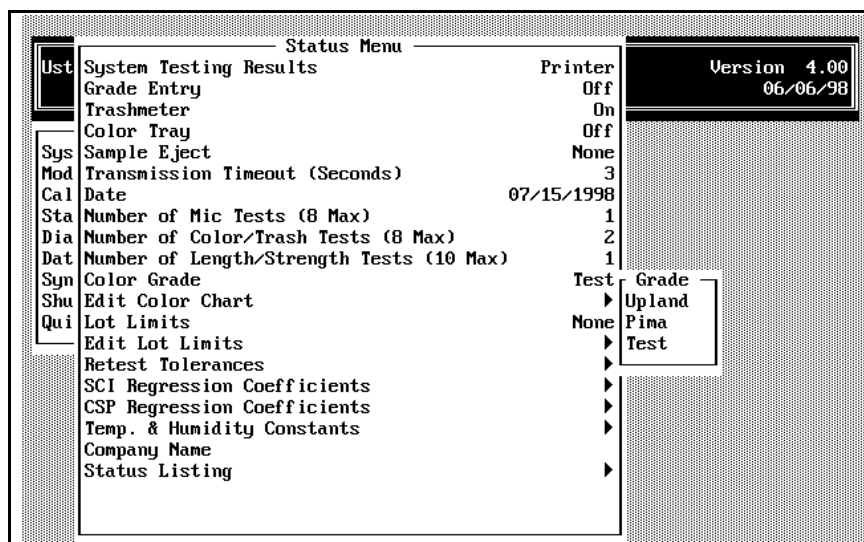
4.12 Number of Length/Strength Tests (10 max)

This item is used to indicate the number of length and strength tests that are to be performed on each sample. Enter the amount using the number keypad, then press **ENTER**. It is recommended that two (2) Length/Strength Tests be performed. If no tests should be performed, set the number to zero (0).

Note: If you enter a number greater than the maximum (10), an error message will be displayed. Press **ANY KEY** to clear the error message and then enter a valid number.

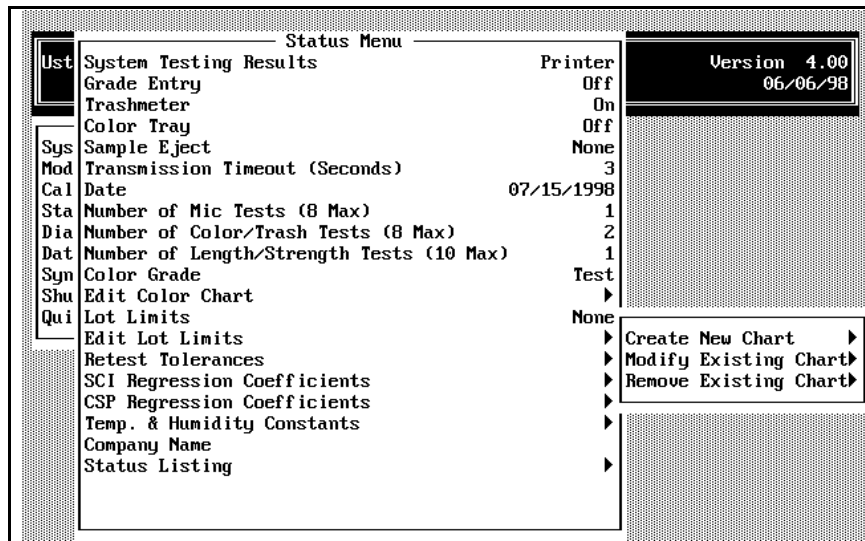
4.13 Color Grade

The Color Grade item is used to select the color grade chart to be used during testing. Upon system installation, Upland and Pima are the only choices of color grade. As additional charts are created, they will be displayed as Color Grade options. Highlight the name of the chart to be used and press **ENTER**.



4.14 Edit Color Chart

The Edit Color Chart item is used to create a new chart, modify an existing chart, or remove an existing color chart.

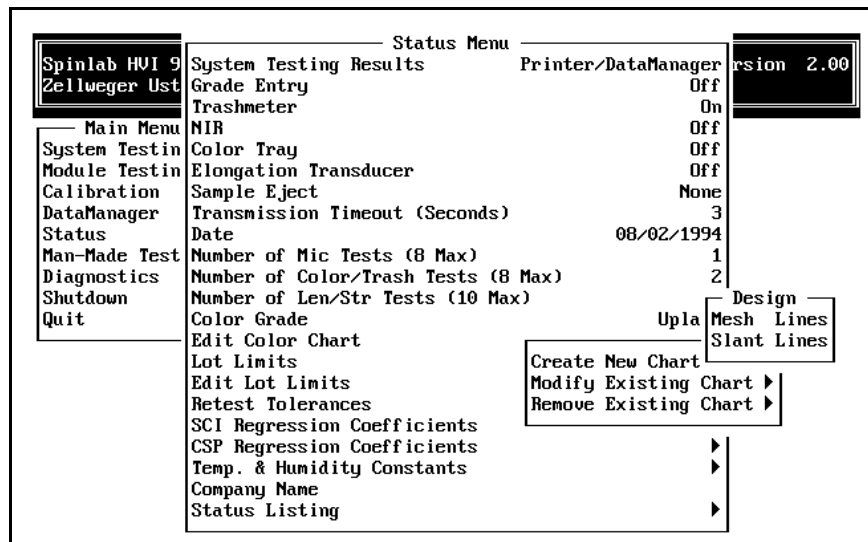


Note: Upland cannot be modified or removed from the list. If Upland is the current selection (displayed to the left on the Color Chart line) when this option is selected in the menu, the only option available will be to Create a New Chart.

4.14.1 Create a New Chart

The DESIGN MENU is used to select whether the lines on the chart will be Mesh style or Slant style.

- ♦ **Mesh Lines**— The chart consists of a user-defined number of evenly spaced vertical and horizontal lines.
- ♦ **Slanted Lines**— The parallel lines that form the chart are not necessarily the same distance apart. They may be sloped at a user-defined angle.

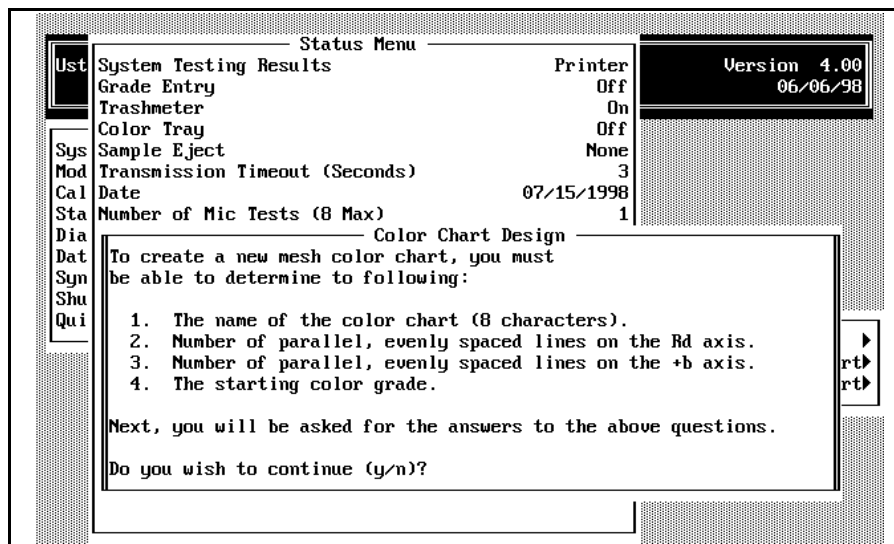


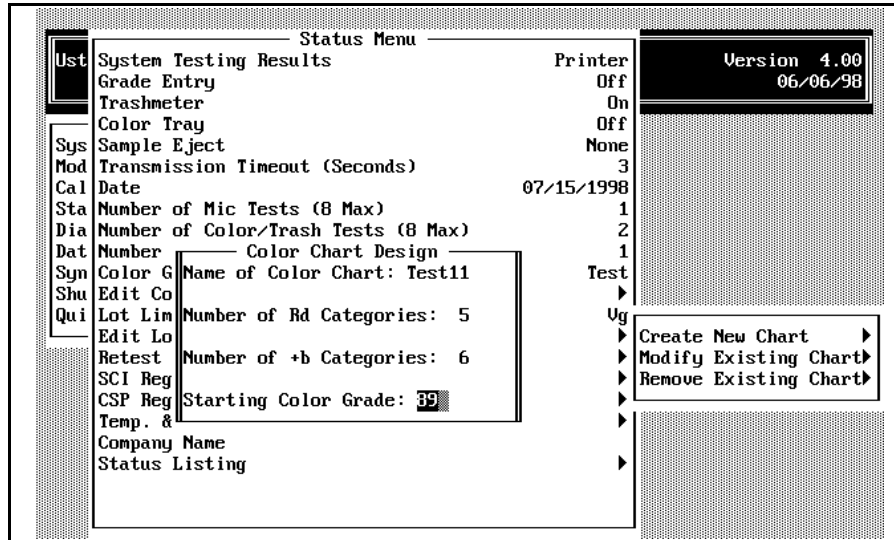
4.14.1.1 Creating a Mesh Lines Color Chart

A Mesh Lines chart consists of a series of vertical and horizontal lines that are evenly spaced from each other. To create a new Mesh Lines Color Chart, highlight *Mesh Lines* from the DESIGN MENU, then press the **ENTER** key.

The COLOR CHART DEFINE MENU will appear. To define the chart, you must know the number of Rd categories, number of +b categories, and the starting color grade. If you do not know or don't want to continue with the creation of the new chart, press N to answer the question at the bottom of the screen "Do you wish to continue (y/n)?" This will close the menu and return the cursor to the MAIN STATUS MENU. To continue with the chart creation, press **Y**.

The defining questions will display one at a time on the COLOR CHART DESIGN MENU. Answer each question, then press the **ENTER** key to move to the next question field. Once all questions have been answered, the COLOR CHART DESIGN MENU will close and the new chart name will be displayed in the *Edit Color Chart* field on the STATUS MENU.

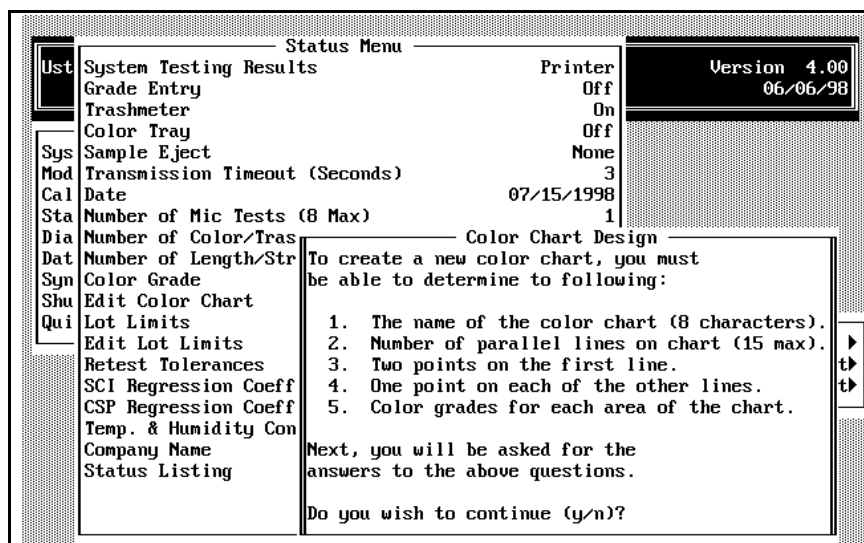




4.14.1.2 Creating a Slant Line Color Chart

The Slant Line Color Chart consists of a series of parallel slanted lines that are not necessarily the same distance apart. The Pima chart is an example of the Slant Line-type chart.

- To create a new Slant Lines Color Chart, highlight *Slant Lines* from the DESIGN MENU, then press the **ENTER** key.



The COLOR CHART DESIGN MENU will appear. To define the chart, you must know the number of parallel lines on the chart, the first and second Rd and b+ column numbers for each line, and the color grades for each area of the chart. If you do not know or don't want to continue with the creation of the new chart, press N to answer the question at the bottom of the screen "Do you wish to continue (y/n)?" This will close the menu and return the cursor to the MAIN STATUS MENU. To continue with the chart creation, press **Y**.

The defining questions will display one at a time on the COLOR CHART DESIGN MENU. Answer each question, then press the **ENTER** key to move to the next question field. Once all questions have been answered, the COLOR CHART DESIGN MENU will close and the new chart name will be displayed in the *Edit Color Chart* field on the STATUS MENU.

Color Chart Design						
Ust	System	Name of Color Chart: Xxxx				on 4.00
	Grade E	Number of Chart Lines (1-15): 12				06/06/98
	Trashme					
	Color T	Line #	+b	Rd	+b	Rd
	Sample					
Sys	Transni	1				
Mod	Date	2				
Cal	Number	3				
Sta	Number	4				
Dia	Number	5				
Dat	Color G	6				
Syn	Edit Co	7				
Shu	Lot Lin	8				
Qui	Edit Lo	9				
	Retest	10				
	SCI Reg	11				
	CSP Reg	12				
	Temp. & Company					
	Status					

art ▶
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The following information was used to create the Pima Chart. It can be used as a guideline for designing the Pima chart or other Slant Line-type charts.

- Name of Color Chart: Type **PIMA**, press **ENTER**.
- Number of Chart Lines (1-15): Type **5**, press **ENTER**.
- Line 1, First +b column: Type **4**, press **ENTER**.
- Line 1, First Rd column: Type **80.7**, press **ENTER**.
- Line 1, Second +b column: Type **18**, press **ENTER**.
- Line 1, Second Rd column: Type **60.7**, press **ENTER**.
- Line 1, Label: Type **1**, press **ENTER**.
- Line 2, First +b column: Type **4**, press **ENTER**.
- Line 2, First Rd column: Type **78.2**, press **ENTER**.
- Line 2, Label: Type **2**, press **ENTER** (cursor does not stop in 2nd +b or Rd columns).
- Line 3, First +b column: Type **4**, press **ENTER**.
- Line 3, First Rd column: Type **75.5**, press **ENTER**.
- Line 3, Label: Type **3**, press **ENTER** (cursor does not stop in 2nd +b or Rd columns).
- Line 4, First +b column: Type **4**, press **ENTER**.
- Line 4, First Rd column: Type **72.9**, press **ENTER**.
- Line 4, Label: Type **4**, press **ENTER** (cursor does not stop in 2nd +b or Rd columns).
- Line 5, First +b column: Type **4**, press **ENTER**.
- Line 5, First Rd column: Type **69.4**, press **ENTER**.
- Line 5, Label: Type **5**, press **ENTER** (cursor does not stop in 2nd +b or Rd columns).
- Label for area below last line: Type **6**, press **ENTER**.

4.14.2 Modify an Existing Chart

- Select *Modify an Existing Chart* when you want to change a chart that you have created.

The chart selected is displayed on screen showing the current values.

- Using the arrow keys to move the cursor, edit the data as necessary.

Every field can be modified with the exception of the chart name field.

- When you have finished editing the chart, press the **ESCAPE** key.

A box will displayed with the following options:

- ♦ **Save**—will prompt the system to save the changes you have made to the chart.
- ♦ **Do Not Save**—will discard the changes made to the chart and save its original format.
- ♦ **Continue Editing**—will return to the edit mode to allow you to make additional changes to the chart.

Color Chart Edit							
Ust	System	Name of Color Chart: Pima					on 4.00
	Grade E	Number of Chart Lines (1-15): 5					06/06/98
	Trashme						
	Color T	Line #	+b	Rd	+b	Rd	Label
Sys	Sample						
Mod	Transmi	1	4	80.7	18	60.7	1
Cal	Date	2	4	78.2			2
Sta	Number	3	4	75.5			3
Dia	Number	4	4	72.9			4
Dat	Number	5	4	69.4			5
Syn	Color G	6	4	66			6
Shu	Edit Co						
Qui	Lot Lim	Label for area below last line: 7					
	Edit Lo						
	Retest						
	SCI Reg						
	CSP Reg						
	Temp. &						
	Company						
	Status						

art Chart▶
 ng Chart▶
 ng Chart▶

4.14.3 Remove an Existing Chart

Color Charts can be removed (with the exception of the PIMA and Upland charts) using the *Remove Existing Chart* option. The color chart that is currently displayed in the Edit Color Chart field will be removed. When this option is selected, a confirmation box displays requiring you to confirm that the selected chart is to be deleted.

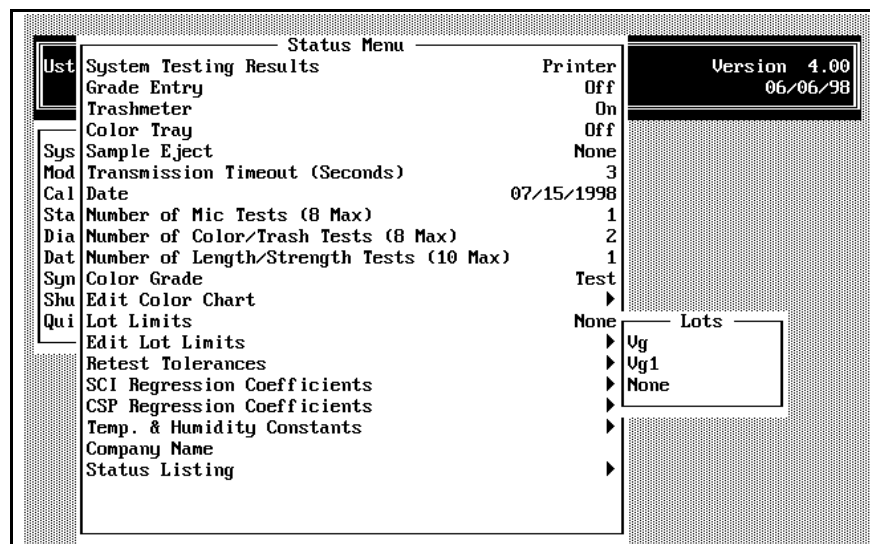
<p style="text-align: center;">Confirmation</p> <p style="text-align: center;">Remove Color Grade Chart “<i>chartname</i>” (y/n)?</p>

- Press **Y** to delete the *chart name* listed in the box. After the chart is deleted, the confirmation box will close and the STATUS MENU will reappear.
- Press **N** to exit the *Remove Existing Chart* mode without deleting *chart name*. The confirmation box will close, and the STATUS MENU will reappear. The same *chart name* will display as the current Color Grade selection.

4.15 Lot Limits

The Lot Limits menu item is used to establish a range of legitimate property values to be used during System Testing. When a sample property is measured during System Testing and it falls outside the valid Lot range, the system will produce a warning message. This will alert the operator that the sample is not acceptable.

Lot Limits are not used during Module Testing.



The software is shipped with one set of Lot Limits named "Default" and a selection for "None." Multiple sets of Lot Limits can be established for use with different cottons during System Testing. As additional Lot Limit specifications are defined and named, those names will be displayed on the LOTS MENU. The HVI Version 4.0 software allows up to twenty-two (22) sets of lot limits to be saved.

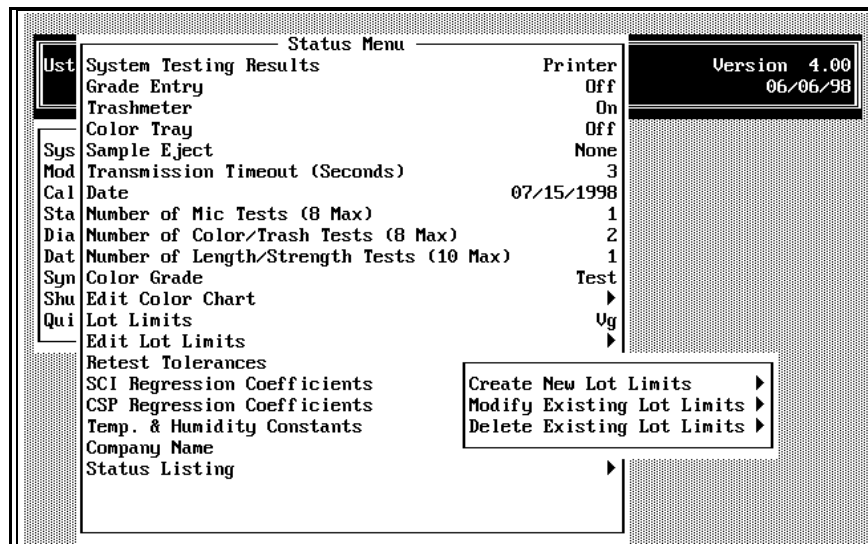
Select a set of Lots by using the arrow keys to highlight the *Lot Limits Name* from the LOTS MENU, then pressing the **ENTER** key. If no Lot Limits are to be used, choose *None* from the LOTS MENU.

The menu will close and the STATUS MENU will reappear with the selected lot limits name displayed to the right of item. This is also the specification that will be used if you select *Edit Lot Limits*.

4.16 Edit Lot Limits

- Select *Edit Lot Limits* to create a new lot limits specification, modify an existing specification, or delete an existing specification.

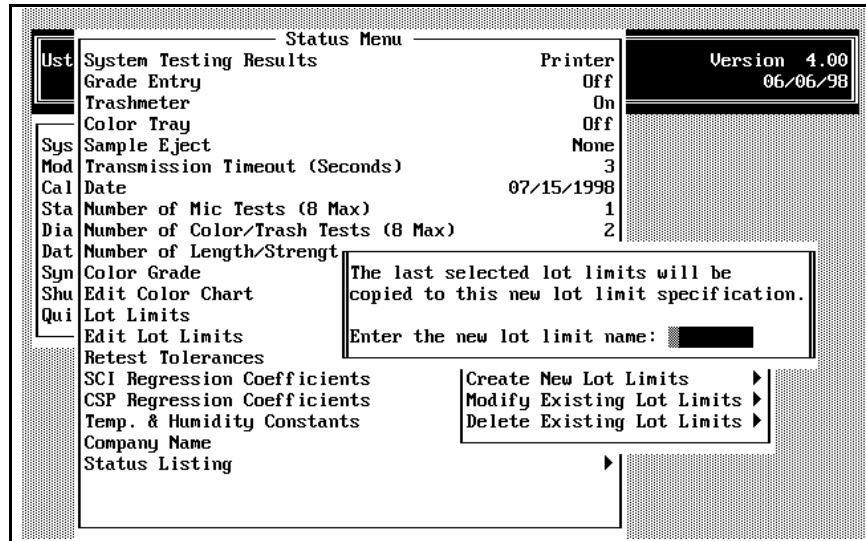
The name displayed on the STATUS MENU Lot Limits line is the one that will serve as the basis for creating a new lot limits specification. It is also the one that will be modified or deleted during Edit Lot Limits.



Note: The "None" option cannot be modified or deleted from the list of lot limits. If it is the current Lot Limits selection when Edit Lot Limits is selected, the only option that will be available is Create New Lot Limit.

4.16.1 Create New Lot Limits

The Create New Lot Limits item is used to define new lot limits. When selected, a box is displayed requesting that you enter a name for the new lot limits specification. You cannot use an existing name; the lot limits name must be unique.

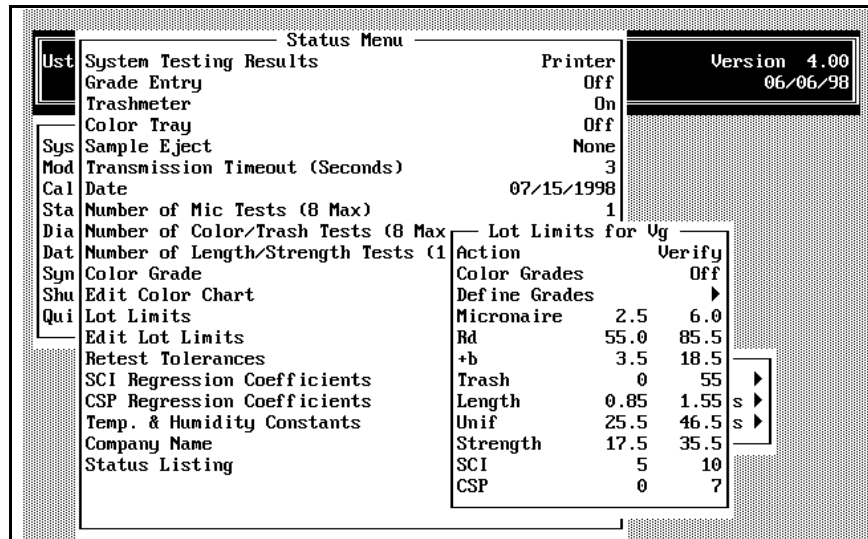


After you type the name and press **ENTER**, the specifications for the currently selected Lot Limits name are displayed.

Note: If "None" is selected as the Lot Limits type when you are creating a new lot limits specification, the last specification that was selected will be used as the basis for creating the new definition.

The following paragraphs describe various fields on the Lot Limits Definition menu. Only provide answers to the questions that apply. It is not necessary to enter limits for all properties; simply enter 0.0 for values that don't apply.

Lot Limits are not checked during Module Testing.



4.16.2 Determining the Action when Cotton Fails to Meet Lot Limits

This selection is used to determine which retest action(s) will take place when a sample is rejected as a result of one of its properties.

- ◆ **Verify** — This option prompts a warning message to appear when a property fails to meet one of the Lot Limits specifications. When this message appears, the operator must select "R (Reject)" when requested to retest the sample if appropriate.
- ◆ **Retest** — This option requires that the operator perform one (1) retest when a property is out of specification. If the sample is still out of specification, another test will not be performed. The property that is out of specification is marked as a lot limit rejection.

4.16.3 Defining Lot Limit Color Grades

If Color Grades are set to "Off," all color grades are considered to be acceptable even if a list of acceptable grades has been defined. Also, the *Define Grades* menu item is shaded. When Color Grades is set to "On," a list of the color grades that will be acceptable should be specified.

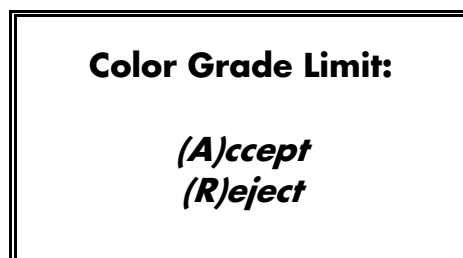
- To enter the acceptable grades, select the *Define Grades* menu item.
Space is provided to enter the value for up to 75 acceptable grades according to your color grade chart.

System Testing Results		Status Menu				Printer		Version 4.00	
Grade	#	Grade	#	Grade	#	Grade	#	Grade	#
Trash	1	16	31	46	61				
Color	2	17	32	47	62				
Sys Sampl	3	18	33	48	63				
Mod Trans	4	19	34	49	64				
Cal Date	5	20	35	50	65				
Sta Numbe	6	21	36	51	66				
Dia Numbe	7	22	37	52	67				
Dat Numbe	8	23	38	53	68				
Syn Color	9	24	39	54	69				
Shu Edit	10	25	40	55	70				
Qui Lot L	11	26	41	56	71				
	12	27	42	57	72				
	13	28	43	58	73				
	14	29	44	59	74				
	15	30	45	60	75				
Statu									

CSP 0 7

Enter each valid color grade in the appropriate Color Grade field, and then press **ENTER** to position the cursor in the next grade field. Continue to enter the applicable grades; then save the data and exit from the Acceptance list by pressing the **ESCAPE** key.

Once the Lot Limits are in effect, any cotton tested during System Testing that has a color grade not included in the Acceptance list will result in the following question being displayed (if the *Action* field is set to "Verify.")



4.16.4 Changing Specifications for Properties

The upper and lower limits for each of the fiber properties can be set or changed by highlighting the property to be changed, then pressing the **ENTER** key.

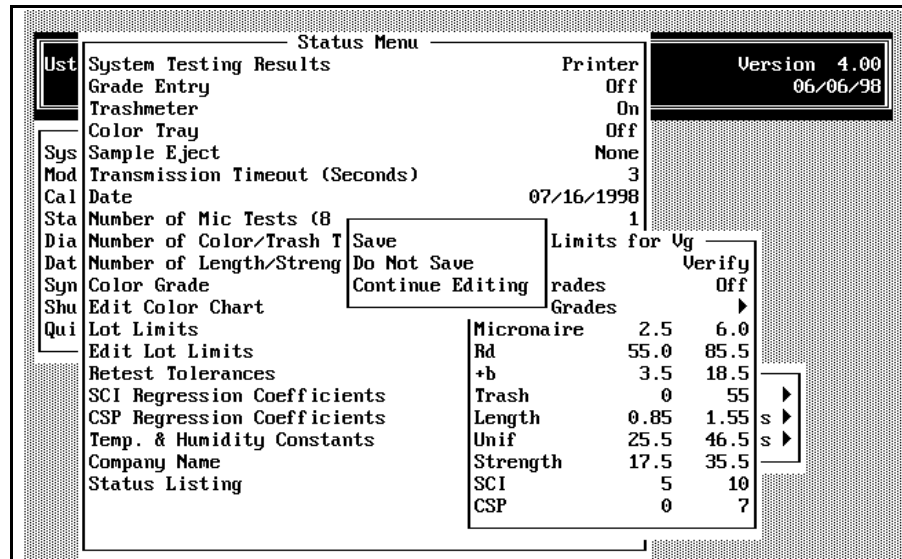
Status Menu		Printer		Version 4.00 06/06/98	
Ust	System Testing Results		Off		
	Grade Entry		On		
	Trashmeter		Off		
	Color Tray		None		
Sys	Sample Eject		3		
Mod	Transmission Timeout (Seconds)		07/16/1998		
Cal	Date		1		
Sta	Number of Mic Tests (8 Max)				
Dia	Number of Color/Trash Tests (8 Max)				
Dat	Number of Length/Strength Tests (1				
Syn	Color Grade				
Shu	Edit Color Chart				
Qui	Lot Limits				
	Edit Lot Limits				
	Retest Tolerances				
	SCI Regression Coefficients				
	CSP Regression Coefficients				
	Temp. & Humidity Constants				
	Company Name				
	Status Listing				

Lot Limits for Ug			
Action			Verify
Color Grades			Off
Define Grades			▶
Micronaire	2.5	6.0	
Rd	55.0	85.5	
*b	3.5	18.5	
Trash	0		
Length	0.85		
Unif	25.5		
Strength	17.5		
SCI	5	10	
CSP	0	7	

Limits	
Lower	0
Upper	55

Each property will display a Limits window where the lower and upper values can be set/changed.

- Select the value to set/edit, then press **ENTER**. A box will be displayed where the new value should be entered. Press **ESCAPE** when you have completed setting/editing the values.



A box will display listing the following options:

- ◆ **Save** — Changes made to the specification are saved.
- ◆ **Do Not Save** — Changes made to the specification are discarded and the lot limit is saved with the original data.
- ◆ **Continue Editing** — The screen returns to the edit mode where additional changes can be made to the specification.

4.16.5 Modify Existing Lot Limits

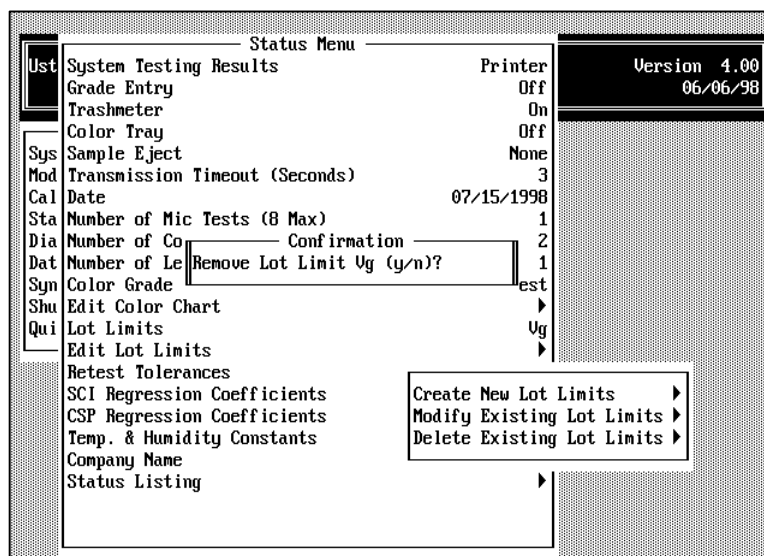
The *Modify Existing Lot Limits* item is used to change a specification that has been previously created. The lot limit name currently listed on the Lot Limits line of the STATUS MENU is the one that will be modified.

- Use the arrow keys to move the cursor to the Limits to be changed. When you have finished modifying the specification, press **ESCAPE**.

If you did not make any changes, the STATUS MENU will reappear. If any changes were made, a box is displayed with the following options.

- ♦ **Save** — Changes made to the specification are saved.
- ♦ **Do Not Save** — Changes made to the specification are discarded, and the lot limit is saved with the original data.
- ♦ **Continue Editing** — The screen return to the edit mode where additional changes can be made to the specification.

4.16.6 Remove Existing Lot Limits Specification



Expired or invalid Lot Limits can be removed from the Lot Limits list using the Delete Existing Lot Limits item. When this item is selected, a confirmation box is displayed requiring you to confirm that the selected specification is to be deleted.

- Press "Y" to delete the item. After the specification is deleted, the STATUS MENU will display, and "None" appears as the current selection.
- Press "N" to exit the without deleting the item. The STATUS MENU will display, and the same lot limit is displayed as the current selection.

4.17 Retest Tolerances

If the Length/Strength, Color, or Trash test results indicate that the measurements from the two sides of the bale are not within the Retest Tolerance limits, an error message is displayed beside the measured value out of tolerance. When this occurs, the test for that property must be performed again. If, after the sample is retested, the values are still outside the retest tolerance limits, this is an indication that the sample came from a "two-sided" bale.

Status Menu		
Ust	System Testing Results	Printer
	Grade Entry	Off
	Trashmeter	On
	Color Tray	Off
Sys	Sample Eject	None
Mod	Transmission Timeout (Seconds)	3
Cal	Date	07/15/1998
Sta	Number of Mic Tests (8 Max)	1
Dia	Number of Color/Trash Tests (8 Max)	2
Dat	Number of Length/Strength Tests (10 Max)	1
Syn	Color Grade	Test
Shu	Edit Color Chart	▶
Qui	Lot Limits	
	Edit Lot Limits	
	Retest Tolerances	
	SCI Regression Coeffici	
	CSP Regression Coeffici	
	Temp. & Humidity Consta	
	Company Name	
	Status Listing	

Retest Tolerances	
Retest	Off
Length	1.524
Uniformity	5.000
Strength	4.000
Rd	20.000
+b	5.000
Trash Area	0.500

4.18 Uster® SCI Regression Coefficients

Uster® Spinning Consistency Index (SCI) is a calculated value based on multiple regression analyses that compare fiber properties to yarn properties. Each equation takes into account all HVI properties, and calculates one value to be used on each test sample. The standard equation for SCI is based on the following information.

- ◆ Many samples that contain a wide range of fiber properties
- ◆ Yarn strength, appearance, elongation, neppiness, and spinning potential yarn numbers
- ◆ The samples represent a wide range of cottons

<u>Property</u>	<u>Range</u>
Length	15/16 - 1 3/8 inches (23.8 - 34.9 mm)
Strength	18 - 36 grams/tex
Micronaire	2.8 - 5.8

These ranges of fiber properties represents more than 90% of the cottons produced worldwide. This equation can be used on cottons produced in any growth area in the world. Several research institutes also have done multiple regression analyses and have published results for their specific varieties of cotton. Currently, the following equations are used for SCI.

Uniformity Index (where UHML and ML in inches are used):

$$\begin{aligned} & - 412.7 + 2.9 * \text{Strength} - 9.32 * \text{Micronaire} + 49.28 * \text{Length} \\ & + 4.80 * \text{Uniformity} + 0.65 * \text{Rd} \end{aligned}$$

Uniformity Ratio (where 2.5% Span Length and 50% Span Length in inches are used):

$$\begin{aligned} & - 412.7 + 2.9 * \text{Strength} - 9.32 * \text{Micronaire} + 49.28 * \text{Length} \\ & + 8.72 * \text{Uniformity} + 0.65 * \text{Rd} \end{aligned}$$

Inter-relationships exist among all cotton fiber properties. The SCI equation uses these similarities to analyze the effects groups of bale samples may have on yarn spinning consistency.

Status Menu			
Ust	System Testing Results	Printer	Version 4.00
	Grade Entry	Off	06/06/98
	Trashmeter	On	
	Color Tray	Off	
Sys	Sample Eject	None	
Mod	Transmission Timeout (Seconds)	3	
Cal	Date	07/15/1998	
Sta	Number of Mic Tests (8 Max)	1	
Dia	Number of Color/Trash Tests (8 Max)	2	
Dat	Number of Length/Strength Tests (10 Max)	1	
Syn	Color Grade	Test	
Shu	Edit Color Chart		
Qui	Lot Limits		
	Edit Lot Limits	Constant	Std.Val. Current
	Retest Tolerances	Strength	-412.70 -412.70
	SCI Regression Coeffici	Micronaire	2.90 0.00
	CSP Regression Coeffici	Length (mm)	-9.32 -9.32
	Temp. & Humidity Consta	Unif Index	1.94 1.94
	Company Name	Rd	4.80 4.80
	Status Listing	+b	0.65 0.65
		Trash	0.00 0.00

A screen is displayed that lists the standard values recommended by Uster Technologies, Inc. and the current values used for calculating SCI. The standard values listed in the first (left) column are the values recommended by Uster Technologies. These standard values cannot be changed and are listed so that you can compare the current values with the standard values. The second column shows the coefficients that are active in calculating the SCI. When the software is shipped, the second column is set equal to the standard values. **The regression formula will use those values listed in the second column for the calculation.**

- The current values can be changed individually. Using the arrow keys, move the cursor to the value to be changed. Press **ENTER** for an entry box to be displayed.
- Type the new value, then press **ENTER**. The value will be displayed in the current value column.
- When you have finished entering values, press **ESCAPE** to save the information and return to the STATUS MENU.

The Uniformity standard value will change depending on whether ICC (ratio) or HVI (index) cotton has been selected as the Calibration Mode.

The Length standard value will change depending on whether English or Metric has been selected as the Length Units measuring system. The choices are shown in parentheses beside uniformity and length.

4.18.1 Changing the SCI Equation

The SCI Equation may be modified for installations where no Rd color data are available. This requires that the following actions be taken.

1. Estimate a typical average value for the R_d of your cotton.
2. Multiply that R_d value by 0.65 (e.g., $74.0 \times 0.65 = 48.1$)
3. Add the results to the -412.7 constant (e.g., $-412.7 + 48.1 = -364.6$)
4. Change the Constant Coefficient (from -412.7 to -364.6)
5. Replace the R_d Coefficient with zero.

4.19 CSP Regression Coefficients

Count Strength Product (CSP), or Break Factor, is a calculated value that is based on regression analyses and is used to predict yarn strength.

Status Menu		Printer	Version 4.00
Ust	System Testing Results	Off	06/06/98
	Grade Entry	On	
	Trashmeter	Off	
	Color Tray	None	
Sys	Sample Eject	3	
Mod	Transmission Timeout (Seconds)	07/15/1998	
Cal	Date	1	
Sta	Number of Mic Tests (8 Max)	2	
Dia	Number of Color/Trash Tests (8 Max)	1	
Dat	Number of Length/Strength Tests (10 Max)	Test	
Syn	Color Grade		
Shu	Edit Color Chart		
Qui	Lot Limits		
	Edit Lot Limits		
	Retest Tolerances		
	SCI Regression Coeffici		
	CSP Regression Coeffici		
	Temp. & Humidity Consta		
	Company Name		
	Status Listing		

The CSP Regression Coefficients screen displays the standard values recommended by Uster Technologies, Inc. and the current values used for calculating CSP. The standard values listed in the first (left) column are those values recommended by Uster. These standard values cannot be changed and are listed so that you can compare the current values with the standard values. The second column shows the coefficients that are active in calculating the CSP.

When the software is shipped, the second column is set to the standard values. **The regression formula will use the values listed in the second column for the calculation.**

- The current values can be changed individually. Using the arrow keys, move the cursor to the value to be changed. Press **ENTER** for to view an entry box.
- Type the new value and press: **ENTER**. The value is displayed in the current value column.
- When you have finished entering values, press **ESCAPE** to save the data and return to the STATUS MENU.

The Uniformity standard value will change depending on whether ICC (ratio) or HVI (index) cotton has been selected as the Calibration Mode. The Length standard value will change depending on whether English or Metric has been selected as the Length Units measuring system. The choices are indicated in parentheses beside uniformity and length.

Currently, the following equations are used for calculating CSP.

Uniformity Ratio (where 50% Span Length and 2.5% Span Length in inches are used):

$$- 741.08 + 8.24 * \text{Strength} - 97.80 * \text{Micronaire} + 850.9 * \text{Length} + 27.64 * \text{Uniformity} + 14.84 * \text{Rd} - 27.87 * b - 5.02 * \text{Leaf}$$

Uniformity Index (where UHML and ML in inches are used):

$$- 741.08 + 8.24 * \text{Strength} - 97.80 * \text{Micronaire} + 850.9 * \text{Length} + 15.20 * \text{Uniformity} + 14.84 * \text{Rd} - 27.87 * b - 5.02 * \text{Leaf}$$

Once you have established the regression coefficient values, they should not be changed.

4.19.1 Using mN/tex Instead of CSP

If you want to use mN/tex instead of CSP, enter the following coefficient values.

Constant	-41.02
Strength (g/tex)	0.53
Mic	- 6.37
Length (mm)	2.17
Length (inch)	55.11
Uniformity (Index)	0.98
Uniformity (Ratio)	1.78
Rd	0.96
b	- 1.81
Trash	0.00

4.20 Temperature and Humidity Constants

The optional Temperature and Relative Humidity probe checks the stability of the testing environment, gives constantly updated readings on screen during testing, and reports the testing conditions on the test results printout. The system allows you to set limits for temperature and relative humidity and it signals an alarm when conditions are outside those limits.

For testing cotton, most cotton standards organizations recommend that the instrument be operated in a controlled environment in the range of 20°C ±2°C (65°F to 72°F). The relative humidity should be 65%, ±2%. The accuracy of the relative humidity and temperature probe is ±2% RH from 0-100% RH at 77°F and ±1.0°F from 20 to 130°F.

For the relative humidity and temperature probe to be activated, the *R.H. & Temp* item must be set to "On." If you want an alarm to sound when the relative humidity or temperature exceeds the set limits, the *R.H. & Temp Alarm* item must also be set to "On."

The values for R.H. Low Limit, R.H. High Limit, Temp Low Limit, Temp High Limit are entered here to set the high and low limits for temperature and relative humidity.

Status Menu			Version
Ust	System Testing Results	Printer	06.
	Grade Entry	Off	
	Trashmeter	On	
	Color Tray	Off	
Sys	Sample Eject	None	
Mod	Transmission Timeout (Seconds)	3	
Cal	Date	07/15/1998	
Sta	Number of Mic Tests (8 Max)	1	
Dia	Number of Color/Trash Tests (8 Max)	2	
Dat	Number of Length/Strength Tests (10 Max)	1	
Syn	Color Grade	Test	
Shu	Edit Color Chart		
Qui	Lot Limits		
	Edit Lot Limits		
	Retest Tolerances		
	SCI Regression Coeffici		
	CSP Regression Coeffici		
	Temp. & Humidity Consta		
	Company Name		
	Status Listing		

Temp. & Relative Humidity	
R.H. & Temp	Off
R.H. & Temp Alarm	On
R.H. Low Limit	55.00
R.H. High Limit	75.00
Temp Low Limit	15.00
Temp High Limit	35.00

4.21 Company Name

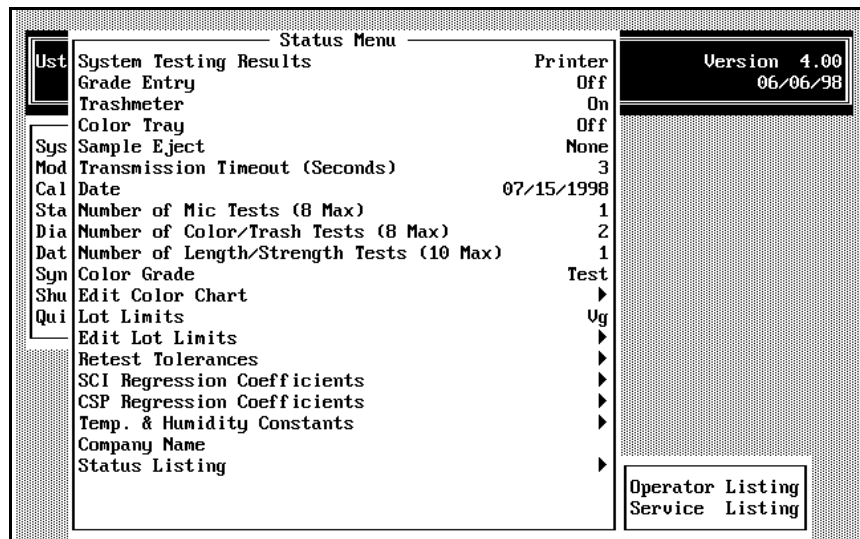
The *Company Name* item on the STATUS MENU is used to enter the name that will appear on the top of the screens and reports. You may enter up to 25 characters.

4.22 Status Listing

The *Status Listing* item maintains a list of all the software values, including calibration standard values, offsets, lot limits, system constants, motor constants, correction constants, calibration constants, etc.

Two types of reports can be generated to list this data. When *Status Listing* is selected, a window is displayed. The Operator Listing, the most commonly printed report, can be printed to display useful setting data. It should be printed after initial installation and after any software updates.

The Service Listing is typically used by Uster Technologies, Inc. Service Technicians to help troubleshoot any problems that you may be experiencing.



Once you select the type of report to be generated, press **ENTER**. A window will display that allows you to generate the report to a file or to the printer.

- When *File* is selected, an entry box is displayed requesting that a filename be entered. The filename can be up to eight (8) alpha characters. Enter a filename that you will remember, and press

ENTER. The data is automatically written to the hard disk and stored by the name assigned.

- Before you select *Print*, make sure a printer is connected to the system, that it is turned "ON," and that it is on-line. The printout automatically begins when *Printer* is selected.

Note: *We recommend that both reports be printed after the initial installation and calibration are completed. One copy of these reports should be returned to Uster Technologies, Knoxville, with the HVI 900 System Installation Guide/Report. Another copy of the reports should be stored with the original system diskettes in a safe place. These reports will serve as a reference if a new version of the software is received and values need to be re-entered.*

Chapter 5 HVI 900 System Calibration

All measuring modules of the HVI 900 system must be calibrated prior to initial startup. After initial startup, the modules should be calibrated as calibration standards change. Calibration cottons and the standard color tiles provided with the instrument must be used to calibrate and to check calibrations. Because the moisture content of cottons affects its length, strength, and micronaire values, calibration cotton must be stored in an environment in the range of 20°C \pm 2°C (65°F to 72°F). The relative humidity should be 65%, \pm 2%.

Calibration cotton samples can be ordered from:

Standards Preparation and Distribution Section
Cotton Division, AMS
U.S. Department of Agriculture
3275 Appling Road
Memphis, TN 38133

Note: For important information on using calibration cottons with the HVI 900 System, refer to the Appendix section, Calibration Cotton Standards for the 900 HVI System.

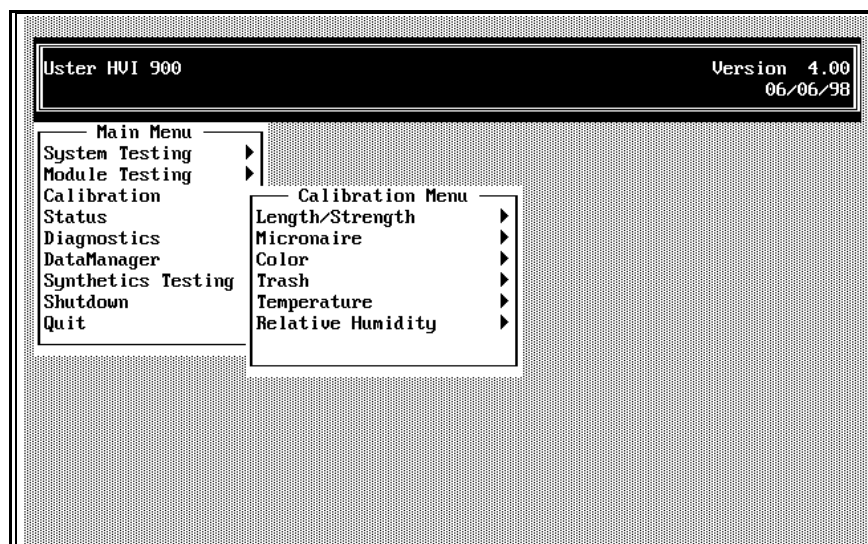
3 Overview of System Calibration

Calibration should be performed for each individual module of the HVI (Length/Strength, Micronaire and Color/Trash). Start by selecting the module item from the CALIBRATION MENU. Access the CALIBRATION MENU by selecting the *Calibration* item from the MAIN MENU.

Select each of the modules, highlight the name of the module to be calibrated, and press **ENTER**. The procedures used for calibrating each of the modules are explained in the following sections.

- Length/Strength Calibration — Refer to Section 2
- Micronaire Calibration — Refer to Section 3
- Color Calibration — Refer to Section 4
- Trash Calibration — Refer to Section 5
- Temperature Calibration — Refer to Section 6
- Relative Humidity Calibration — Refer to Section 7

Calibrations are discussed in this manual in the suggested order for performing an initial calibration.



Note: Depending on the configuration of your instrument, the menu displayed on your screen may differ from the figure shown in this manual.

4 Length /Strength Calibration

The Length/Strength Calibration menu item is used to set the following:

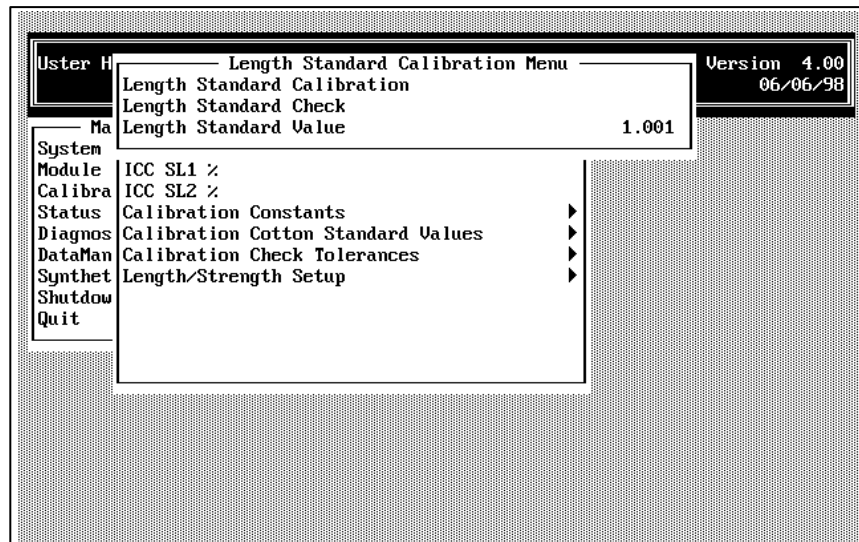
- Length Standard Calibration
- Calibration Mode
- Length Units
- Cotton Calibration
- ICC SL1%
- ICC SL2%
- Calibration Constants
- Calibration Cotton Standard Values
- Calibration Check Tolerances
- Length/Strength Setup

Each of these items is discussed in this section.

4.4 Length Standard Calibration

The Length Standard Calibration item is used to check and update the accuracy of the value that measures the distance from the comb transport's home position to the center of the optics.

- Access the LENGTH STANDARD CALIBRATION screen from the LENGTH STANDARD CALIBRATION MENU by using the arrow keys to highlight the item, then press ENTER.



Note: The metal length standard must always be entered in inches even though the fiber measurements may be made in millimeters.

Length Standard Calibration is performed following these steps.

- Use the arrow keys to highlight the LENGTH STANDARD CALIBRATION item from the LENGTH STANDARD CALIBRATION MENU, then press **ENTER**.
- Insert the metal length standard into the right side of the comb track of the Length/Strength module. Press the comb in a left direction through the opening at the right side of the track to position it in front of the clamping mechanism.

- Remove your hands and other objects from the area and press **ENTER** to begin the test. The instrument will perform the test using the length standard and it will display the results indicating whether the value measured Passed or Failed.
- After the test is complete, remove the metal length standard by pushing it from the left side of the track the right side using your fingers or another narrow object such as another fibrocomb until it can be pulled from the right side and removed.

If the metal length standard will not slide in/out from the track easily, refer to the following instructions to raise the cabinet top and insert/remove the comb.

- Swing the monitor to the side so that the cabinet top can be lifted. Make sure no loose objects are lying on the cabinet top. Lift the cabinet top, making sure that the brace on the rod spring lock is engaged when the cabinet top is raised. The blower will automatically shut off when the top is lifted.
- Slide the length standard along the track into the comb holder, and position it in front of the clamping mechanism.
- Flip the brace from the locked position, and lower the cabinet top to its original position. The blower will automatically turn on after the top is closed.
- Slide the length standard along the track into the comb holder, and position it in front of the clamping mechanism.
- Press **ENTER** to begin the test. The instrument will perform the test using the length standard and then it will display the results indicating whether the value measured Passed or Failed.

- After the test is complete, raise the cabinet top, and slide the metal length standard to the right along the track to remove the length standard. Lower the cabinet top to its original position.

If the standards measurement is within ± 0.004 inches of the actual standard value, the instrument returns to the LENGTH/STRENGTH CALIBRATION MENU when you press: **ENTER**.

If the value is greater than ± 0.004 inches of the actual value, a "Fail" indication is displayed. The instrument adjusts the software and stores the new data. The test must be repeated until the length standard value is within ± 0.004 inches of the actual standard length standard value, which is indicated by a "Pass" on the screen.

**CAUTION:**

When the calibration procedure has been completed, manually slide the length standard to the right and out of the comb track. This is an **important** step!

Attention: If the instrument is not able to bring the length standard calibration within tolerance after several cycles (i.e., if there is a continuous Fail), reset the instrument, and try the length standard procedure again. REMOVE THE METAL LENGTH STANDARD FROM THE COMB TRACK BEFORE RESETTING.

4.4.1 Length Standard Check

The Length Standard Check screen gives the repeatability of the length standard value to the service technicians. This measures, but does not change, the total travel. This screen should not be accessed or modified by HVI Operators

4.4.2 Length Standard Value

The value for the metal length standard is listed on the standard that is provided with the instrument. **Do Not** use a metal length standard other than the one provided with the instrument. If, for some reason, a new metal length standard is required - a service technician will use this menu and enter the new value.

4.5 Length/Strength Setup

The Length/Strength Setup menu item is to be used by service technicians only to perform the Lens to Break and Deflection Calibration, and the Short Fiber setup. **THE LENS TO BREAK AND THE DEFLECTION CALIBRATION MUST BE DONE PRIOR TO CALIBRATING FOR COTTON/SYNTHETIC FIBERS.**

Cotton/Synthetic Fiber calibration is invalid if the Length Standard or Lens to Break values are modified. Contact an authorized Uster Technologies, Inc. Service Technician to perform these setup features, if necessary.

4.6 Cotton Calibration

In order to better understand the theory behind the calibration procedures, it is important to understand the instrument/software principles of calibration. As described in the Appendix, Calibration Cottons for the Uster Technologies HVI 900 System, calibration is performed following engineering principles using hardware devices. Adjustments are then made within the instrument to the unadjusted, raw values through software manipulations. These adjustments cause the test values to agree with designated values of laboratory cotton samples. In this sense, the word "calibration" refers to the adjustment of *values* rather than to true calibration.

Adjusting the values is accomplished by two-point regression analysis of individual test data points. The mathematics of the simple regression will show relationships defined by "slopes" and "offsets." If, by chance, the unadjusted values of the instrument tests agree exactly with the designated values of the two-calibration cottons, the software "slope" will be 1.0 and "offset" will be zero. However, this perfect agreement will rarely ever exist. Therefore, in order for measured values to agree with designated values of calibration cottons, slopes and offsets are calculated from tests performed during calibration, and comparisons are made with the 1.0 slope/zero offset conditions. This results in corresponding adjustments to obtain agreement between measured values and designated values of calibration cottons.

If nothing changes over an extended period of time—calibration cotton samples do not change, operator techniques and procedures do not change, fiber moisture content (temperature and relative humidity of laboratory air) does not change, or the instrument does not change—the slopes and offsets that were obtained from the initial calibration do not need to be changed. The long-term stability in testing will exist.

The objective of calibration is to have slopes and offsets remain constant for long periods of time. This is achieved through management of laboratory conditions, following accepted procedures and techniques, and performing routine instrument maintenance.

When a "Fail" condition occurs during a calibration, changes are made to the parameters. However, **ONLY** those parameters that are critical for calibration to be brought to a "Pass" condition will change. In other words, no changes are made to those parameters that pass calibration originally.

For example, assume that length and uniformity pass the original calibration, but there is a "Fail" condition for strength (perhaps as a result of a change in the relative humidity). During the next calibration procedure, the slope and offset for strength are all that would be changed. The slopes and offsets for length and uniformity would remain at their original values.

Calibration for Short and Long Cotton are performed in the same manner using the Cotton Calibration Check screen. Two different checks are performed one at a time.

4.6.1 Calibration for Short Cotton

The Calibration for Short Cotton is performed first. The standard values of the calibration cotton are displayed in the middle of the screen. The lower section of the screen displays the procedure's instructions. It also displays the sample counter (XX of 12 samples) and the constantly updated instrument readings on optics and force. If the optics and force measurements are not within a predetermined limit (± 10 for optics and $+1.0$, -2.0 for force), an error message will display in the lower right corner.

Before beginning the test series (12 samples), check the standard values of the short calibration cotton against the values listed on the box of calibration cotton being tested. If these values are not identical to the values on the box, locate the correct box of calibration cotton. If a new box of calibration cotton is being tested, change the standard values to reflect the values on the new box. Refer to the Calibration Cotton Standard Values section in this chapter for instructions on changing these values.

If the elongation standard value is 0.0 for Short or Long Cotton, no elongation calibration will be performed during Cotton Calibration, nor will elongation standard values display on the screen.

HVI Cotton Calibration Check (Upper Half Mean Length, Unif. Index)			
4 - Wait Comb			
Standard Values			
Mic		3.73	
Length		25.04	
Uniformity		79.6	
Strength		23.6	
Length/Strength Calibration Procedures -----			
Test 1 of 12 for Short Cotton		Press <Esc> to exit	
		Press < # > to set motors	
Len/Str Status -----			
Optics	4	Force	.68

Note: *If the size of the sample beard is too large or small for the measurement mechanisms, an error message saying "Large Sample" or "Small Sample" will be displayed. When either of these messages appears, simply perform another repetition.*

- Make a beard using the Fibrosampler and the correct calibration cotton. The proper technique for using the Fibrosampler is described in Chapter 13, Fibrosampler 192-1, in this manual.
- Place the sample in the comb track of the Length/Strength console with the beard extending toward the black brushing surface. Press the green Length/Strength start button to initiate the test.

The brusher removes loose fibers and cleans and aligns the fibers for measurement. After the brushing operation is completed, a mechanical finger slides the sample into the comb holder. The sample is measured, and the instruction statement directs you to perform Test 2 of 12 for Short Cotton.

Note: *Once the test is completed, the comb will be pushed to the far left of the console when the next sample is tested.*

- Follow the instruction statements to perform tests 2 through 12 with the short calibration cotton. If needed, press "ESC" to exit and to reject a sample. The LENGTH/STRENGTH CALIBRATION MENU will reappear and the calibration procedure can be restarted.
- After every other comb is made, rotate the cotton in the Fibrosampler.
- If the error message "Reject—Check Sample" appears in the lower right corner of the screen, recheck to see that the correct box of calibration cottons is being tested (the values listed on the box and on the screen must be identical).
- After the last Short Cotton test, the display changes to request that 12 tests be performed on Long Cotton.

- Check that the standard values for Long Cotton displayed on the screen are the same as the values on the box of Long Cotton being used for calibration.

		Cotton Calibration				Right	25
		0.722	0.916	78.8	20.0	5.0	Mic=4.40
#	1	0.742	0.928	80.0	21.7	2.6	737
#	2	0.734	0.940	78.1	20.8	2.6	766
#	3	0.738	0.924	79.9	21.1	2.4	668
#	4	0.729	0.927	78.7	19.7	2.7	770
#	5	0.747	0.931	80.2	21.5	2.6	708
#	6	0.713	0.909	78.4	20.2	2.5	696
#	7	0.721	0.910	79.2	20.6	2.5	673
#	8	0.722	0.919	78.6	20.4	2.5	709
#	9	0.732	0.925	79.1	20.7	2.7	670
#	10	0.711	0.907	78.5	20.4	2.7	663
#	11	0.722	0.909	79.4	21.0	2.5	711
#	12	0.732	0.920	79.6	20.2	2.7	669
AUG		0.729	0.921	79.1	20.7	2.6	703
SD		0.011	0.010	0.7	0.5	0.1	36
Len/Str Calibration Procedures -----							
Press <Enter> to continue							
Len/Str Status -----							
Optics		5	Force	-.33			

- Perform Test 1 of 12 for Long Cotton. Repeat the steps for testing Short Cotton using the Long Cotton, rotating and exchanging the cottons in the same order.

4.6.2 Cotton Calibration Test Results-Pass Condition

When the tests are completed, the software calculates the test results and determines if they are within the check tolerance levels. The average values and the range of those values for the different parameters tested are displayed. If a parameter's average value or range falls within the prescribed tolerance level, the calibration for that parameter has "Passed."

If all parameters are within the tolerance levels (passed), the instrument is properly calibrated. The LENGTH/STRENGTH CALIBRATION MENU will reappear when the **ENTER** key is pressed

Len/Str Cotton Calibration					
Short Cotton	Standard Values	Average	Tolerance		
Mic	4.40				
Length	0.916	0.919	0.010	Pass	
Uniformity	78.8	78.5	1.5	Pass	
Strength	20.0	20.2	1.0	Pass	
Elongation	5.0	4.7	1.0	Pass	
Long Cotton	Standard Values	Average	Tolerance		
Mic	4.00				
Length	1.144	1.144	0.010	Pass	
Uniformity	83.1	83.2	1.5	Pass	
Strength	30.8	30.8	1.0	Pass	
Elongation	6.9	7.1	1.0	Pass	
Range	Standard Values	Average	Tolerance		
Length	0.228	0.225	0.020	Pass	
Uniformity	4.3	4.7	4.0	Pass	
Strength	10.8	10.6	1.5	Pass	
Elongation	1.9	2.4	1.6	Pass	
Press < Enter > to continue					

4.6.3 Cotton Calibration Test Results—Fail Condition

If there is a difference of one or more between the Standard Values and Average measured values that exceeds the Tolerance values, a "Fail" condition will result.

The "Fail" condition may be a result of one or more of the following situations.

- ◆ The calibration cottons may have been mixed or contaminated with other cottons by mistake.
- ◆ Calibration cotton moisture content may have changed since the previous calibration.

- ♦ The chosen tolerance value may not be realistic when consideration is given to the fact that cotton, even calibration cotton, is variable.

If a "Fail" condition exits, the Cotton Calibration for Short Cotton Screen reappears, and 12 more tests for short cotton must be performed until all samples pass.

If needed, pressing the **ESCAPE** key can interrupt the calibration procedure.

4.7 Calibration Mode

This selection alternates between ICC and HVI.

- ♦ **HVI (Upper Half Mean Length, Uniformity Index)**

Measurements are reported in terms of mean lengths.

- ♦ **ICC (Spanlength, Uniformity Ratio)**

Measurements are reported in terms of span lengths.

The software automatically changes the regression coefficient uniformity value for the Calibration Mode selected.

Note: *When the calibration mode is set at ICC, use International Calibration Cottons for Length/Strength calibration. When the calibration mode is set at HVI, use HVI Calibration Cottons for the Length/Strength calibration. Both calibrations are stored on disk, and the proper calibration is retrieved to match the selected mode.*

Cotton calibration is invalid if the Length Standard or Lens to Break values are modified.

4.8 Length Units

This selection alternates between English (inches) and Metric (millimeters).

- ◆ **English** — The reporting units are in inches.
- ◆ **Metric** — The reporting units are in millimeters.

The software automatically changes the regression coefficient length value for the Length Units selected.

- Change the option by using the arrow keys to highlight the item, then by pressing the **ENTER** key to toggle between options. Press ESCAPE to save the change.

Note: *It is not necessary to calibrate after changing the length units. The instrument makes all necessary conversions.*

4.9 ICC SL1%

The cotton industry has chosen 50 percent for the ICC mode. When this item is selected, an instruction line is displayed on the screen asking you to enter a value for ICC SL1 %. You may enter a value other than 50 percent, if desired.

When the Calibration Mode is set to HVI, no information is displayed in this field. A warning message is displayed indicating that Calibration Mode must be changed to ICC to set ICC SL1%.

- Change the values, if needed, by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt and then press ESCAPE to save the data.

4.10 ICC SL2%

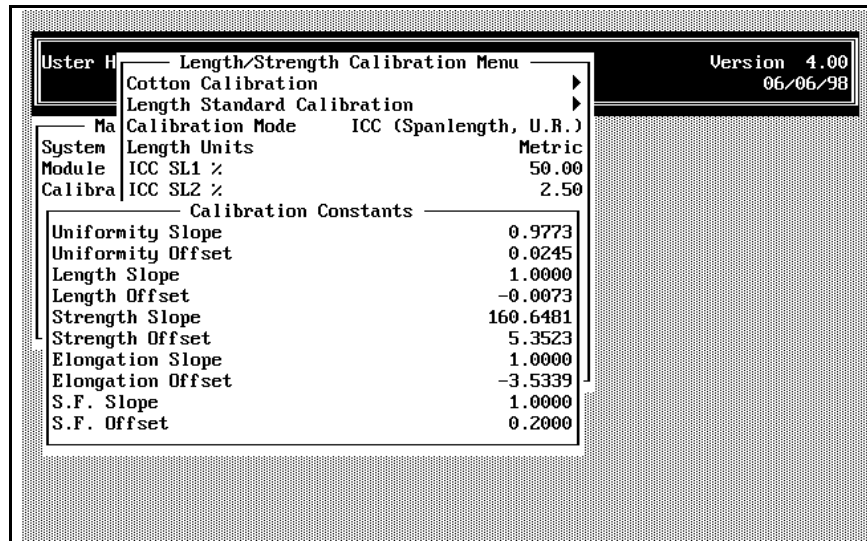
The cotton industry has chosen 2.5 % for the ICC mode. When this item is selected, an instruction line is displayed on the screen where a value for ICC SL2 % should be entered. You may enter a value other than 2.5 percent, if appropriate.

When the Calibration Mode is set to HVI, no information is displayed in this field. A warning message is displayed indicating that Calibration Mode must be changed to ICC to set ICC SL2%.

- Change the values, if needed, by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt, and then press ESCAPE to save the data.

4.11 Calibration Constants

To access Calibration Constants from the CALIBRATION STATUS MENU, highlight the item using the arrow keys, then press **ENTER**.



Slope and offset values for uniformity, length, strength, elongation, and S.F. are entered from the CALIBRATION STATUS MENU. Typically, a service technician makes any alterations to these constants. This is because Cotton Calibration calculates the correct values for the slope and offset based on these constants, and the test results may be skewed if these constants are changed.

- If needed, change the values by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt and then press **ESCAPE** to save the data.

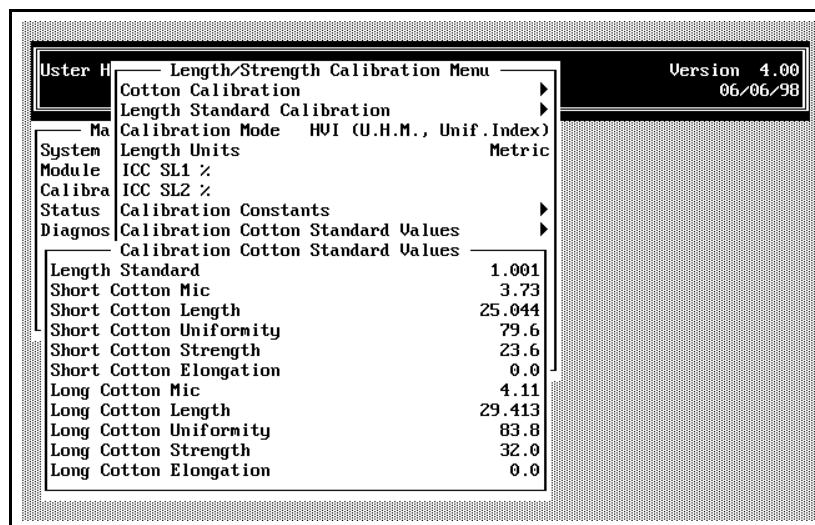
Note that there is one screen for the ICC Calibration Mode and one screen for the HVI Calibration Mode. After the initial calibration, the HVI automatically calculates these values. At this point, you should simply observe them only. Do not change them manually or the test results will be skewed.

Attention: When calibrating for the first time, the values should be set as shown on the previous two screens.

4.12 Calibration Cotton Standard Values

- To access Calibration Cotton Standard Values from the CALIBRATION STATUS MENU, highlight the item using the arrow keys, then press **ENTER**.

They should be set based on the values that are listed on the boxes of calibration cottons currently in use.

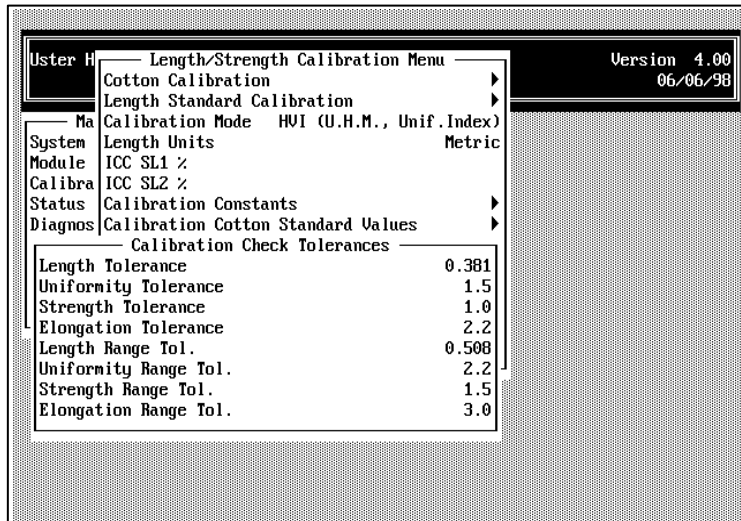


- If needed, change the values by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt and then press ESCAPE to save the data.

If the elongation value for Short or Long Cotton is 0.0, no Elongation calibration will be performed during Cotton Calibration, nor will Elongation values be displayed on the screen.

4.13 Calibration Check Tolerances

- To access Calibration Check Tolerances from the CALIBRATION STATUS MENU, highlight the item using the arrow keys, then press **ENTER**.



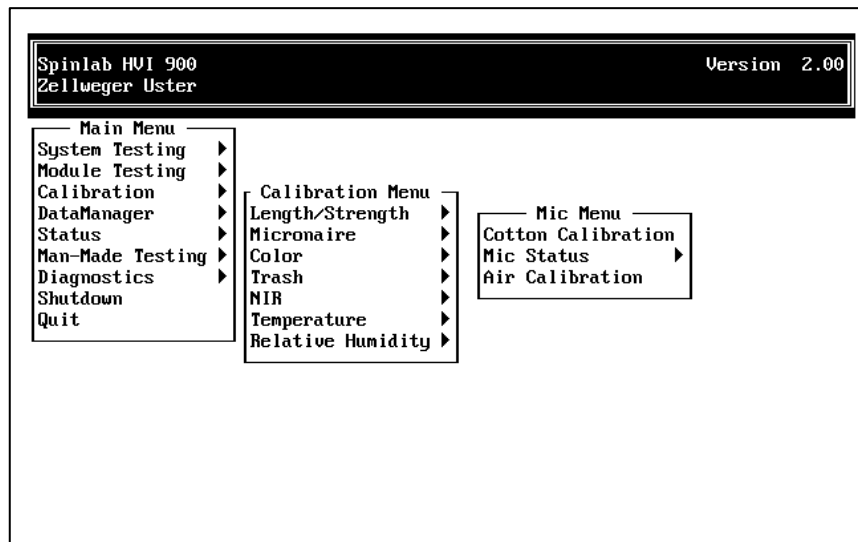
This menu is used to set the tolerance and the tolerance range for length, uniformity, strength, and elongation.

- If needed, change the values by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt, and then press **ESCAPE** to save the data.

5 Calibrating for Micronaire

The calibration procedure for micronaire involves the regulation of airflow through the micronaire chamber when 10.0-gram samples of cotton with low and high micronaire values are in the chamber.

- To access the MICRONAIRE CALIBRATION MENU from the CALIBRATION MENU, highlight the item using the arrow keys, then press **ENTER**.

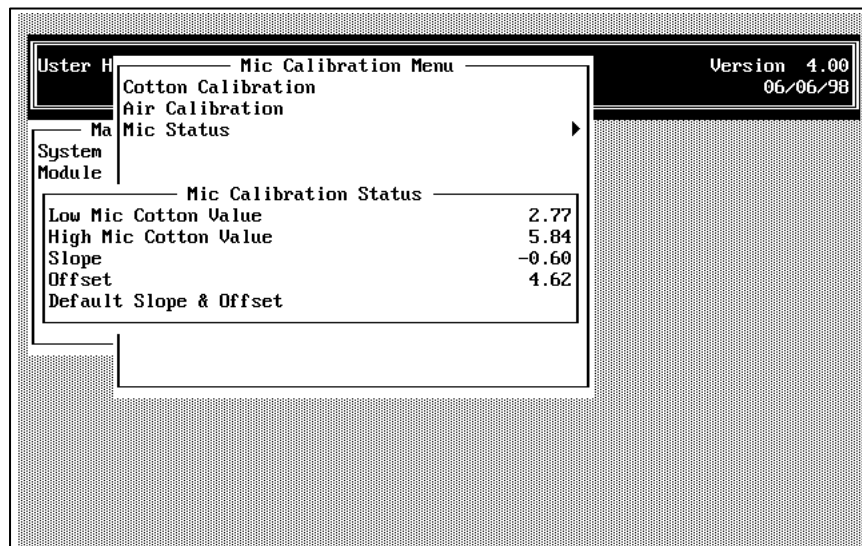


This menu is used to check the Micronaire status and perform cotton and air calibration. Each is discussed below.

Note: Only ICC cottons are available for micronaire calibration. Both low and high micronaire value cottons are required for this procedure.

5.4 Micronaire Cotton Calibration

Select the *Cotton Calibration* item from the MICRONAIRE MENU using the arrow keys, then press **ENTER**.



On-screen instructions for testing samples of low- and high-value calibration cottons lead you through the calibration procedure.

There should be a difference of at least 2.5 between the low and high value of the cotton used for micronaire calibration.

- Weigh the sample of low-micronaire cotton. Make sure the balance readout is 0 (zero) before weighing the sample. If it is not, press the front bar of the balance to re-zero.

The sample mass should be 10 grams, ± 0.03 grams, for calibration (between 9.97 and 10.03 grams). Calibration checks and testing are performed with samples that weigh 10.00 grams, ± 1.5 grams.

- Place the weighed sample into the micronaire chamber and close the lid.

- The test is automatically performed, the lid opens, and the sample is ejected from the chamber. The screen displays the mass for the sample.
- Weigh the sample of high-micronaire cotton, and place it in the chamber.

The test is automatically performed, the lid opens, and the sample is ejected from the chamber. The screen displays the mass for the sample.

After both samples are tested, the MICRONAIRE CALIBRATION MENU will reappear if the samples "Passed." If the calibration was not successful, an error message will display indicating that the sample is out of tolerance.

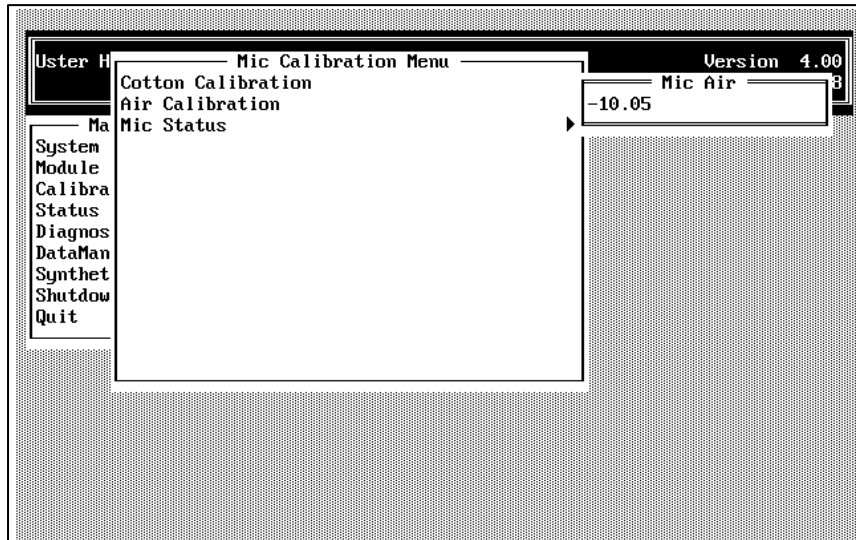
If necessary, the micronaire calibration process may be interrupted at any time by pressing the **ESCAPE** key. The MICRONAIRE CALIBRATION MENU will reappear.

Attention: The balance is extremely sensitive to air currents, vibrations, etc. To ensure accuracy, prevent any ventilation fans from blowing directly on the balance. Also, to ensure accurate sample weights, make sure the sample does not touch the sides of the balance's enclosure or hang over the balance pan.

After this initial calibration, use Micronaire Module Testing to check calibration each day.

5.5 Air Calibration

Air Calibration typically is only used if an error occurs during cotton calibration. In such cases, first check to make certain the correct cotton was used. Next, check that the cotton values on the box match the values in the system.

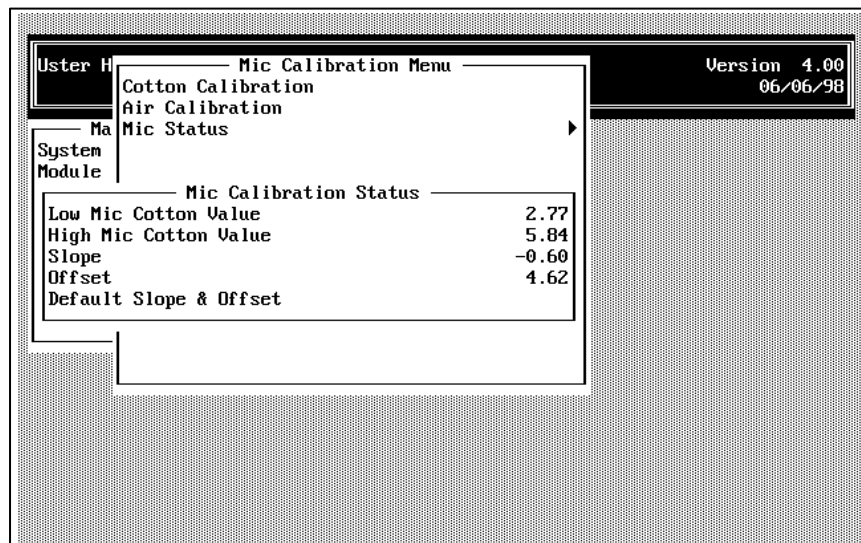


If both of these are correct, contact a service technician, who may suggest that you perform an Air Calibration. The service technician will instruct you on how to perform this process.

5.6 Micronaire Status Menu

The Micronaire Status Menu is used to enter the low and high cotton standard values, the slope, offset, default slope, and offset values.

- Select the *Micronaire Status* item from the MICRONAIRE MENU using the arrow keys, then press **ENTER**.

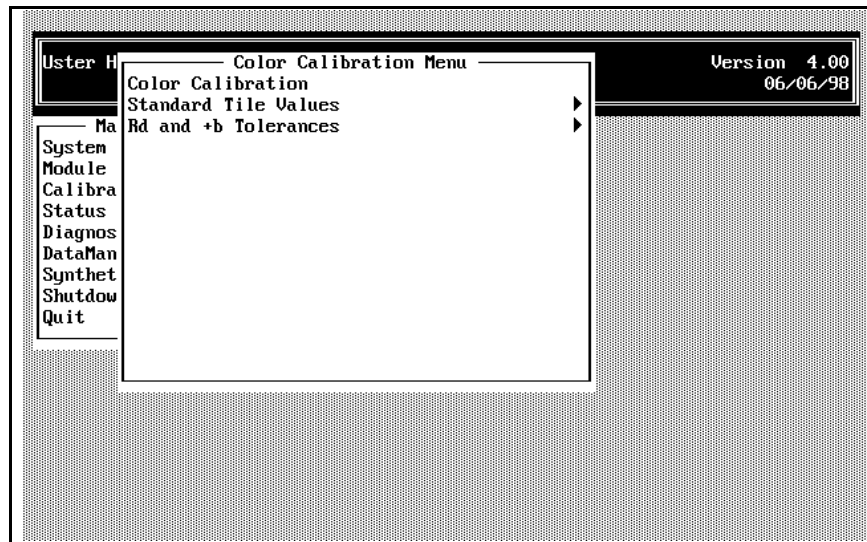


Note: You must have samples of both low and high micronaire value cottons for Micronaire Calibration. The low and high micronaire values are obtained from the boxes of ICC standards. There should be a difference of at least 2.5 micronaire between the low value and high value cotton.

- If needed, change the values by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt, and then press **ESCAPE** to save the data.

6 Calibrating for Color

- To access the COLOR CALIBRATION MENU from the CALIBRATION MENU, highlight the item using the arrow keys, then press ENTER.

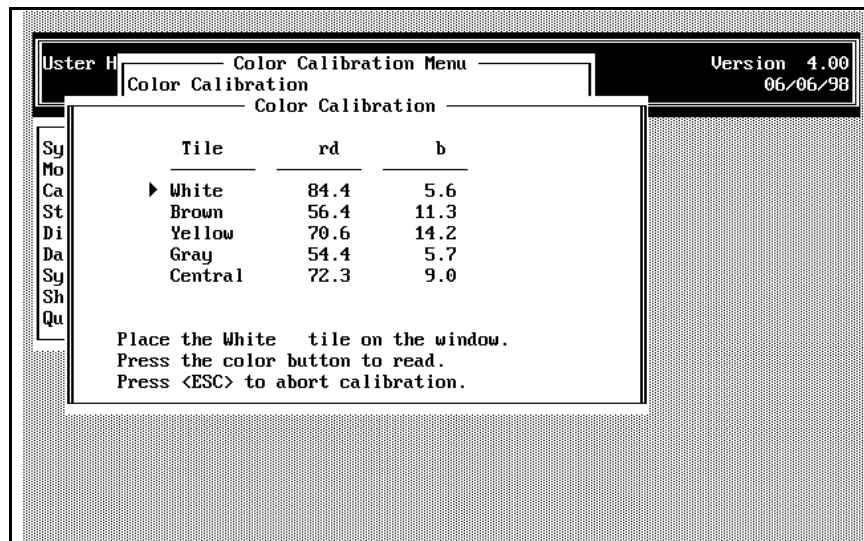


The calibration procedure for the color testing mechanism is simple. The system observes a series of five tiles of known color values, and compares the values read from those tiles to the calibration constants stored in the system. If the values do not agree, the system alters the constants to bring all color measurements back to known standards.

6.4 Color Calibration

The steps listed below outline the procedure for calibrating color for the first time.

- Select the *Color Calibration* item from the COLOR CALIBRATION MENU using the arrow keys, then press **ENTER**.



The standard Rd and +b values for each color tile are displayed. An arrow points to the White tile and an instruction statement is displayed requesting that the white tile be placed on the color window. After you complete this measurement, the arrow moves to the brown tile and the instruction statement requests that you place the brown tile on the color window. This process continues until all the tiles have been observed.

Make sure the tiles are observed in the order requested on the screen. During this procedure, the tile being measured is compared to the standard value stored for that tile. If the values are different, the system adjusts the constants. This could cause measurements to be skewed if the incorrect tile is tested.

Note: The pressure plate will not move (descend) during calibration when you press the color/trash button(s). You must watch the instruction statements on the screen to see when the instrument is ready to observe the next tile.

Always use the same set of tiles for daily calibration that were used for the initial color calibration. Do not mix tile sets.

6.4.1 Steps for Tile Calibration

- Remove the requested tile from the box of tiles supplied with the instrument. Carefully place the tile (with the glossy side down) squarely on the window. Be sure the tile covers the window.
- Press the color/trash button(s). The software automatically compares the color of the tile to the standard values recorded for that tile. If necessary, it adjusts the system constants.
- After the first tile observation is completed, repeat the procedure for the remaining four tiles.

Once the color head has observed all five tiles, a Pass/Fail screen will appear. A warning message may appear requesting service if the reading for the central tile is out of tolerance. Pressing **ENTER** will return to the COLOR CALIBRATION MENU. The new calibration values are saved in the system.

After this initial calibration, use Color/Trash Module Testing to check calibration each day.

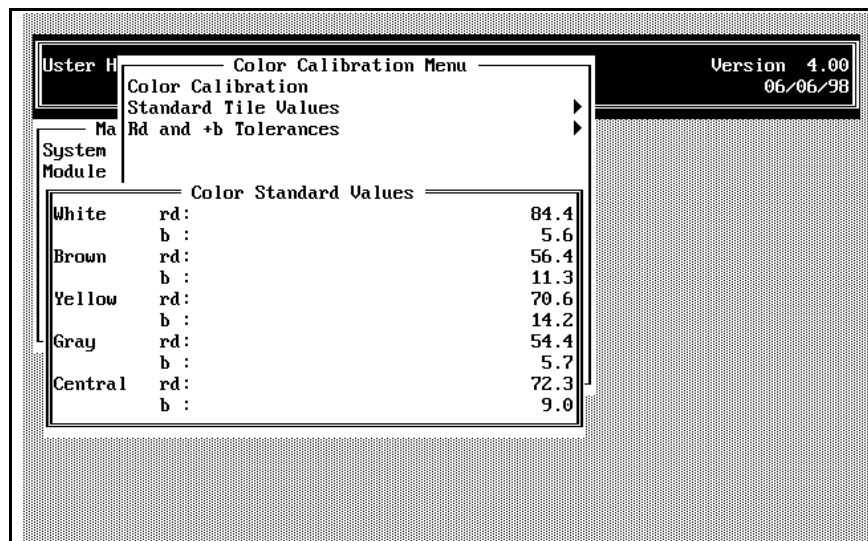
6.5 Standard Tile Values

- To access the STANDARD TILE VALUES MENU, highlight the item from the COLOR MENU, then press **ENTER**.

A window is displayed listing each color tile with its Rd and +b values. The values to be entered for each of the five color tiles are on the box of tiles provided with the system.

Attention: The system does not alert you to values that fall outside a reasonable range. For example, if you enter an unacceptable value by mistake, you will calibrate the instrument with the wrong values. You must read the display carefully to prevent mistakes while entering the standard values.

- Enter an Rd value for each tile color by pressing **ENTER** and then type the value from the box of tiles supplied with the system. Press **ENTER** again to continue to the next color. When all the values are correct, press **ESCAPE** to return to the COLOR CALIBRATION MENU.



6.6 Rd and +b Tolerance

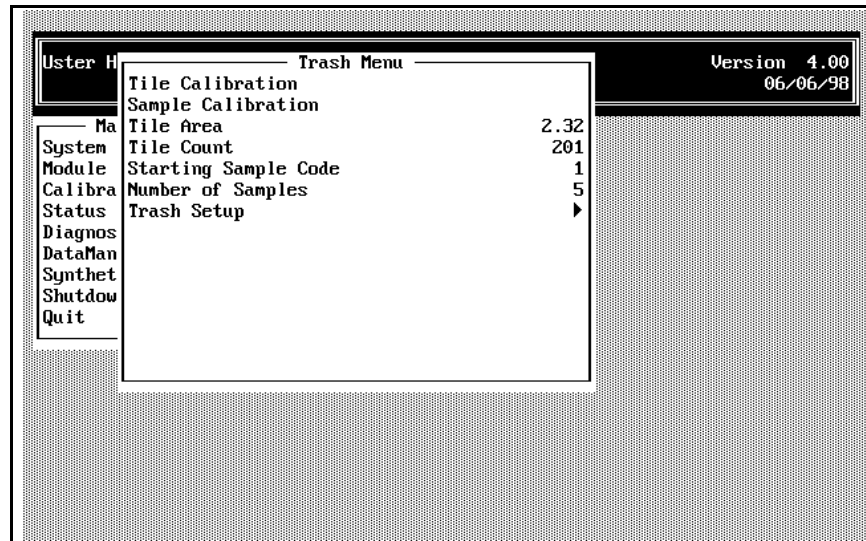
- To access the RD AND +B TOLERANCE MENU from the CALIBRATION MENU, highlight the item using the arrow keys, then press ENTER.

This item is used to enter the tolerance values for the Rd and +b. These values are used to determine the Pass/Fail during color calibration.

- Enter the Rd tolerance value for each tile color by pressing **ENTER**, then typing the value. Press **ENTER** again to enter the +b tolerance value. When the tolerance values are correct, press **ESCAPE** to return to the COLOR CALIBRATION MENU.

7 Calibrating for Trash

- To access the TRASH CALIBRATION MENU from the CALIBRATION MENU, highlight the *Trash* item using the arrow keys, then press **ENTER**.



This menu has selections for performing Tile and Sample Calibration, for entering the Tile Area and Tile Count values, the Number of Samples, the Starting Sample Code, and for Trash Setup.

7.4 Tile Area and Tile Count

The values that are marked on the trash calibration tile supplied with the instrument should be entered for Tile Area and Tile Count.

- Enter the values for Trash Area or Trash Count by pressing **ENTER**, then typing the value. Press **ENTER** again to enter next value. Once the values are correct, press **ESCAPE** to save the data. You can now perform the Tile Calibration procedure.

7.5 Starting Sample Code and Number of Samples

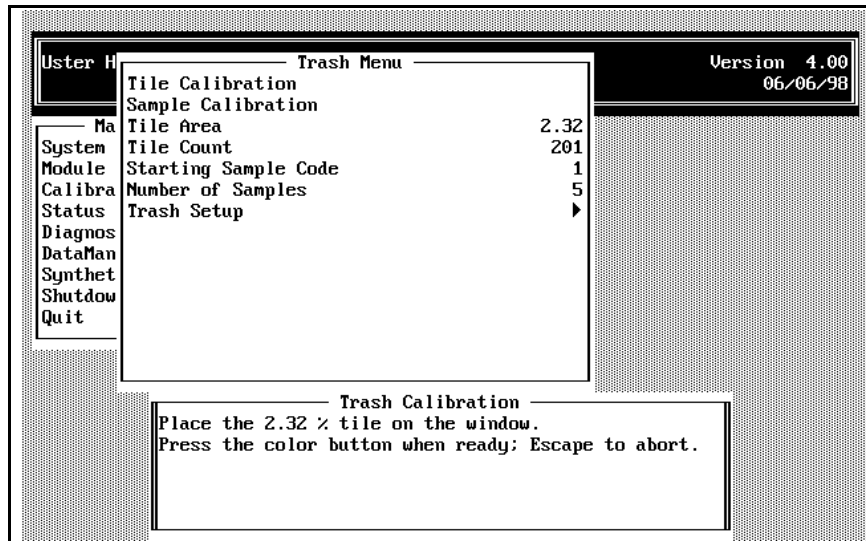
The number entered for Number of Samples determines how many samples the software will request to test during Sample Calibration. The Starting Sample Code should be the code for the first sample to be viewed during Sample Calibration. After the Starting Sample Code is entered, the software will assign sample codes to the remaining samples.

Use the calibration samples that are supplied with the HVI instrument.

- Enter the values by pressing **ENTER**, then typing the value. Press **ENTER** again to enter next value. Once the values are correct, press **ESCAPE** to save the data.

7.6 Tile Calibration

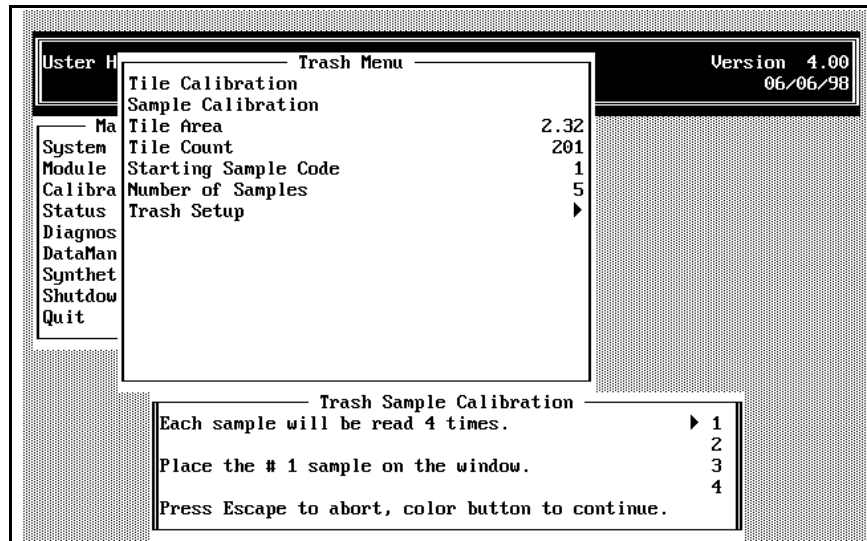
- To access the TILE CALIBRATION MENU from the TRASH MENU, highlight the item using the arrow keys, then press **ENTER**.



- Place the requested trash calibration tile on the window and press the color/trash button(s).
- The software automatically reads the trash tile until the trash calibration value stored is within 0.05 % of the target area value.
- After the observations have been made and the instruction box indicates that calibration is complete, the TRASH MENU will reappear.

7.7 Sample Calibration

- To access the SAMPLE CALIBRATION MENU from the CALIBRATION MENU, highlight item using the arrow keys, then press **ENTER**.



- Place the first sample on the window, and press the color/trash button(s). The hand will descend, the sample will be viewed, and the hand will lift. Each sample must be viewed four (4) times. Turn the sample a quarter turn after each observation.
- Continue turning the cotton and pressing the color button(s) until all four (4) views of the sample are complete.
- The software will read the sample and associate the Starting Sample Code with this sample.
- Place the second sample on the window and press the color/trash button(s). Turn the sample before pressing the button(s) for each of the four (4) views.
- The software calculates the code for this sample.
- Continue viewing the samples in the order requested.

The TRASH MENU will reappear when the sample calibration is complete.

7.8 Trash Setup

This selection is for service technicians only. None of the information displayed on this screen should be altered, except by authorized Uster Technologies personnel. When this selection is chosen a warning message is displayed.

When you press a key, the warning message is cleared from the screen, and the highlight bar is positioned on *Analyze* in the Trash SETUP MENU.

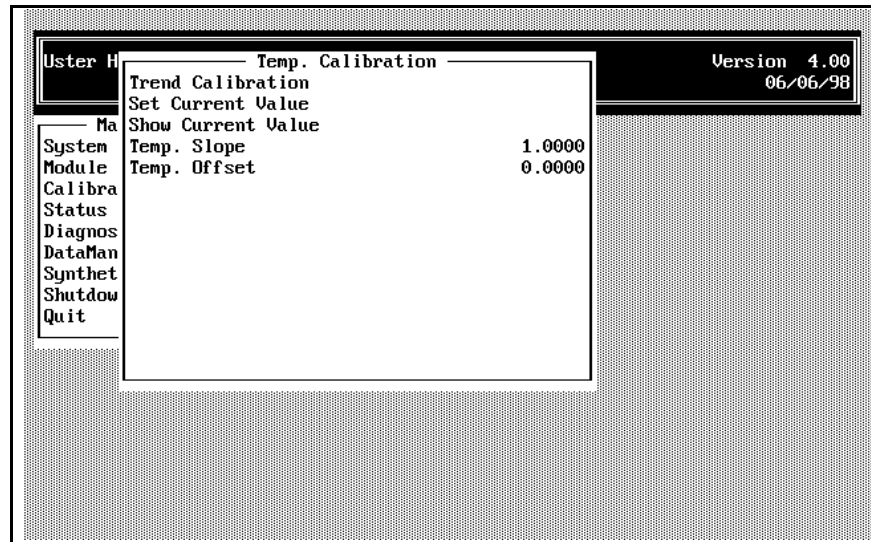
Using the arrow keys, highlight the *Quit* item and press **ENTER**. The CALIBRATION MENU will reappear.

8 Calibrating the Temperature and Relative Humidity Probe

Most cotton standards organizations recommend that the temperature be in the range of 72° and 76°F (22° and 24°C) and the relative humidity at 65%, $\pm 2\%$ when testing cottons. At 77°F (25°C), the accuracy of the relative humidity and temperature probe is $\pm 2\%$ RH from 0-100% RH and $\pm 1.0^\circ\text{F}$ from 20 to 130°F.

The CALIBRATION MENU has two selections for calibrating the Temperature and Relative Humidity Probe—one for Temperature and one for Relative Humidity. Because the procedures used for calibration are similar, only the temperature calibration is discussed below.

- To calibrate for Temperature, select the *Temperature* item using arrow keys, then press **ENTER**. The TEMPERATURE CALIBRATION MENU is displayed. Follow the same procedures discussed below for calibrating for Relative Humidity.



From this menu you can calibrate temperature by Trend Calibration. You can see the current value or set the current value when you have a reasonably good value for the slope. Any time values for Trend Calibration or Set Current Value are changed, the Slope and/or Offset is changed.

Note: *If you enter a value that is greater than the system can recognize, a % sign is shown in front of the invalid entry.*

8.4 Trend Calibration

Trend Calibration is used if the information for the probe has been measured at two or more ambient values. These could be unit values for degrees Fahrenheit, degrees Centigrade, or voltage as long as both the desired and current values are in the same units.

- Enter the number of trend points to be used (between 2 and 10). The screen provides entry points for the desired and current value for each of the points. As each value is entered, the cursor moves to the next entry. To correct erroneous values that are entered on the Trend Calibration Screen, press the **BACKSPACE** key before pressing **ENTER**.
- To exit the Trend Calibration screen and return to the TEMPERATURE CALIBRATION MENU without altering the current Slope and Offset values, press **ESCAPE**. A message is displayed on the screen that reads "Abort?" Enter **"Y"** to return to the Temperature Calibration screen; the values entered for Trend Calibration are ignored. If you press **"N"** at the "Abort" message, the Trend Calibration screen remains, and the cursor goes to the next field for the value to be entered.

Status Menu		Printer	Version 4.00 06/06/98
Ust	System Testing Results	Off	
	Grade Entry	On	
	Trashmeter	Off	
	Color Tray	None	
Sys	Sample Eject	3	
Mod	Transmission Timeout (Seconds)	07/15/1998	
Cal	Date	1	
Sta	Number of Mic Tests (8 Max)	2	
Dia	Number of Color/Trash Tests (8 Max)	1	
Dat	Number of Length/Strength Tests (10 Max)	Test	
Syn	Color Grade		
Shu	Edit Color Chart		
Qui	Lot Limits		
	Edit Lot Limits		
	Retest Tolerances		
	SCI Regression Coeffici		
	CSP Regression Coeffici		
	Temp. & Humidity Consta		
	Company Name		
	Status Listing		

Temp. & Relative Humidity	
R.H. & Temp	Off
R.H. & Temp Alarm	On
R.H. Low Limit	55.00
R.H. High Limit	75.00
Temp Low Limit	15.00
Temp High Limit	35.00

Once the cursor has moved to the next calibration point, the entry cannot be corrected. You must exit the Trend Calibration screen by entering "Y" at the "Abort" prompt, and then select *Trend Calibration* again.

8.5 Set Current Value

An entry box is displayed to enter the current temperature. When this selection is used, only one point is used to adjust the slope from the current value. The slope must be reasonably correct when this selection is used.

8.6 Show Current Value

This selection displays the current temperature.

8.7 Temperature Slope and Temperature Offset

These values are automatically calculated and updated based on the information entered for calibration. Both Slope and Offset values are updated when Trend Calibration is used. Only the Slope is changed when Set Current Value is the basis.

Chapter 6 HVI 900 System Testing

The HVI 900 System is designed to allow a linear measuring procedure that includes the Length/Strength, Micronaire, and Color/Trash Modules. The streamlined testing procedure allows one or two operators to perform all tasks—from identification entry to sample disposal. After a test series is completed, the results are compiled by the system's microprocessors and relayed to the desired external devices.

An important part of the HVI 900 system's efficiency is the smooth, step-saving linear testing sequence. An operator can begin a second test sample while the first test series is still being performed. For example, the Micronaire and Color/Trash operator can test a second bale although the Length/Strength operator has not yet finished testing the first bale. This continuous test cycle allows the operators to simultaneously test two different samples without having to wait for one another.

The 940 DataManager collects, sorts, and stores data received from the HVI 900 instruments. It is used to export selected test data, as well as edit the database. Each user can determine how the fiber test results will be arranged, sorted, and stored for review and interpretation. Because the data for the 940 DataManager is generated from the sample tests described in this section, references have been made to the DataManager where appropriate.

3 Overview of Testing Sequence

This manual has been written using Length/Strength, Micronaire, and Color/Trash modules. On that basis, the following is a summary of the suggested testing sequence that may be used when testing cotton fibers.

- ◆ **Sample ID**—The cursor is positioned in the ID field where the ID for the sample should be entered using the bar code reader (if you have purchased that option) or via the keyboard.
- ◆ **Micronaire**—Because the micronaire value is used to calculate the length/strength values and the fineness value, it is suggested that the Micronaire Test be completed first.
 - Weigh the sample on the balance.
 - Place it in the micronaire chamber and close the door.
 - The test is performed and the sample ejected.
 - Discard the cotton sample.
- ◆ **Color/Trash**—These tests can be performed simultaneously (if the STATUS MENU selections are set to "On").
 - Place a cotton sample on the Color Tray.
 - Press the start buttons that are located on both sides of the Color Tray. (If the HVI serial number ends with "UZ," it will only have one start button located to the right of the color tray.)
 - The sample is compressed to eliminate air pockets, and the measurements are made. The Color Tray Arm returns to its resting position and repeats the process the number of repetitions specified by the STATUS MENU.

- Discard the cotton sample.

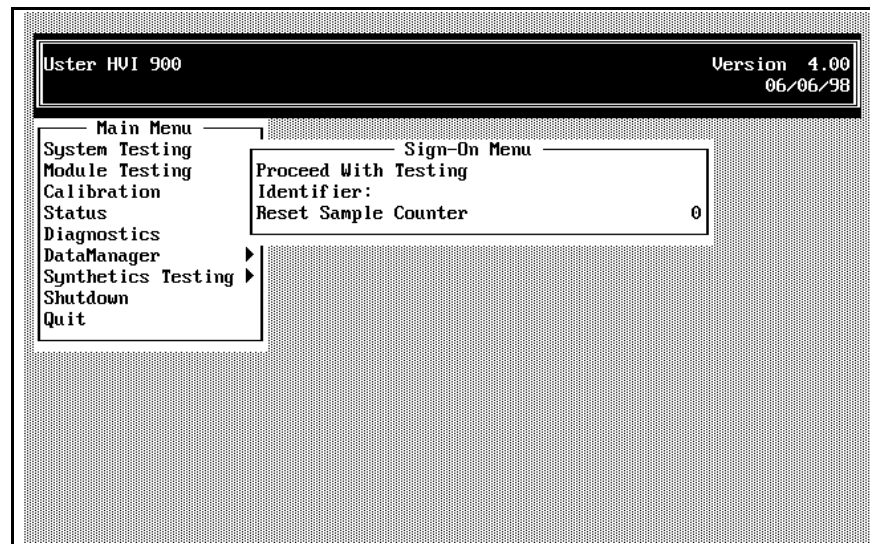
- ◆ **Length/Strength**—These tests should be conducted after the color, trash, and micronaire tests are completed. This will allow the Micronaire and Color/Trash operator to begin testing the next sample.
 - The Length/Strength operator places the first sample in the Fibro-sampler 192 to prepare a sample beard in the Fibrocomb (comb).
 - The comb with the sample beard is then placed in the comb track for brushing.
 - A mechanical finger moves the comb into position for measuring length, strength, and elongation.
 - The beard can be discarded from the Fibrocomb and the next sample prepared.

Once all samples have been taken, the test results displayed on the screen are averaged. (The number of samples to be tested is determined by the number entered using the STATUS MENU, which is discussed in Chapter 4.) If, according to the selections made on the STATUS MENU, the results are to be sent to a printer and/or external computer, they are then transmitted.

4 Explanation of the Sign-On Menu

The Sign-On screen begins the testing sequence, as well as entering the sample ID and setting the Sample Counter.

- Access the SIGN-ON MENU by selecting *System Testing* from the MAIN MENU.



4.4 Proceed with Testing

This item is highlighted when the SIGN-ON MENU is first displayed. If no changes are required to the other menu items, press **ENTER** to proceed to the System Testing Screen. If no Identifier has been entered, an entry box will display where the *Identifier* should be entered (when test results are to be sent to a printer or an external computer).

4.5 Identifier

This is a system-required field when test results are to be sent to a printer or an external computer. You cannot proceed with the *Continue with Testing* until you have entered information in this field. An entry box is displayed where up to 30 alphanumeric characters can be entered.

This identifying information can define the lot or merchant for a particular group of samples. Generally, each lot should have a specific identifier assigned. If you are using the 940 DataManager, the Data File Name should be the same as the first eight (8) characters of the Identifier (refer to Chapter 8, 940 DataManager, for further information).

Once the Identifier has been entered, it remains the same for both System Testing and Module Testing until you exit the testing mode.

4.6 Reset Sample Counter

The Sample Counter tracks the number of tests that have been performed by the instrument since the sample counter was last reset. When this item is selected, the counter automatically resets to zero (0). The sample counter should be reset during initial startup.

5 System Testing

- To access the System Testing screen from the SIGN-ON MENU, highlight *Proceed with Testing* and press **ENTER**.

The large letters on the test display screen enable the operator to quickly read all the essential information. The data required for the information fields on the System Testing screen depend on the way the system was set up using the STATUS MENU (see Chapter 4).

For this reason, the System Testing screen displayed may vary from the one shown below. The screen displayed depends on the modules to be tested and the optional equipment installed for the system.

The System Testing screen is split vertically allowing you to view the test results from two samples simultaneously. Test results for the first sample are displayed on the left side of the screen and those for the second sample are displayed on the right of the screen.

ID █ GRADE LEAF AREA% COUNT RD +b C.GRADE MIC LENGTH UNIFORM STRENGTH ELONG S.F.I. SAMPLES 20	-11 Optics
HUI Mode=	COLOR/LEAF: 0 OF 2 MICRONAIRE: 0 OF 1 LENGTH/STR: 0 OF 2

The list of properties (field labels) appears down the left side of the screen, the results of the measurement for the first sample will be displayed to the immediate right of the field label. The test results for the second sample are to the right of the center bar. If there is an error message pertaining to the property, it is displayed on the far right side of the screen.

The box in the bottom left provides information regarding the number of repetitions to be performed for each property as it was set in Status; the count is updated as the repetitions are performed.

The box in the bottom right of the screen will display various messages that involve the external computer system, retests, lot limits, rejecting sample test results, and leaving System Testing.

When the System Testing Screen is first displayed, many field labels that require action—either by operator entry or from system test results—are shaded. As a test or entry for the field is completed, the field label is **highlighted**. Testing for a sample is finished when all the field labels have been highlighted.

When entering information from the keyboard, check the accuracy of the keyboard entry before pressing **ENTER**. If you discover a mistake, use the backspace key to erase and correct the entry. Once you are sure the information is correct, press **ENTER**. The **F5** key will clear all fields of the information that has been entered via the keyboard (i.e., ID and Grade) so that they can be re-entered.

5.4 ID

This is the bale identification number. It can be entered through the keyboard or from the bar code reader. The field can contain up to 12 alphanumeric characters of information.

If you are using the keyboard, enter the ID. If you are using the bar codes reader, hold the bale tag with the code facing up. Slide the tag toward the reader until the beam is centered over the bar code on the tag. When the code has been read, the bar code reader beeps and the beam turns **OFF**.

Check the ID field to see that the identification number is displayed. If it is not, try again.

5.5 Grade

When the STATUS MENU SELECTION for Grade is "On," the cursor stops on this field after the ID number is entered. The Grade information must be entered through the keyboard. This field is used to enter up to six alphanumeric characters for the grade code. If you do not want to store/use the grade code information, the field can be used to enter other relevant information you want to keep on each sample.

When the STATUS MENU selection for Grade is "Off," the cursor does not stop on the Grade field.

5.6 Leaf, Area % and Count

The measurement results for each property as they were measured by the trashmeter are displayed by the field name.

Leaf — The Leaf Code assigned is based on where the sample falls according to the levels determined during calibration.

Area % — This is the ratio of the total accumulated area of all the trash particles to the area of the viewing window of the instrument.

Count — The number of individual particles of trash in the sample that are 0.01 inch in diameter or larger.

5.7 Rd and +b

These fields contain the color test results for % Rd (lightness) and +b (yellowness). The three-digit (xx.x) Rd number represents the average of the color observations for Rd, and the three-digit (xx.x) +b number is an average of the +b values.

5.8 Color Grade

The color grade is represented by up to four (4) alphanumeric characters from the USDA, Upland, Pima, or user-defined color charts.

5.9 Micronaire (MIC)

When the sample being weighed reaches a weight within tolerance (8.5 to 11.5 grams) the airflow to the micronaire chamber is initiated, and the sample weight is displayed to the right of MIC. Once the sample has been tested, the micronaire test results are displayed (the weight is no longer shown on the screen).

5.10 Length (Len), Strength (Str), Uniformity (Unif), and Elongation (Elong)

The test results for Length, Strength, Uniformity, and Elongation are displayed to the right of the field names. The Micronaire measurement must be completed before these values can be calculated and displayed.

5.11 Short Fiber Index (S.F.I.)

This is an estimate of the short fiber content in the cotton. Normally, the fibers less than 0.5 of an inch are not useful in producing yarn and are removed in the process as waste. The percent by weight of fibers less than 0.5 of an inch is usually referred to as the short fiber content. Typical values range from 2% to 20%.

The HVI can estimate the distribution of fiber lengths from the fibrogram. This distribution can be used to estimate the percentage of fibers less than 0.5 of an inch. This estimated percentage is referred to as short fiber index (SFI). SFI correlates to the short fiber content as measured by Suter-Webb data or AFIS.

5.12 Samples

This is the number of samples tested since the sample counter was reset on the SIGN-ON MENU. The number increments after all the tests have been completed and the data are sent to the printer or the external computer system.

5.13 Test Status Box

The box at the bottom left of the screen contains the number of repetitions to be performed for each module listed. The first number is the number of repetitions that have been performed for the sample. The second number is the number of repetitions that was designated on the STATUS MENU TO be performed for the sample.

5.14 Message Box

The box at the bottom left of the screen displays messages that involve the external computer system, retests, lot limits, rejecting sample test results, and leaving the System Testing mode. The current Calibration Mode (ICC or HVI) is displayed in the message box header. The messages displayed in this box vary when the **ESCAPE** key is pressed depending on whether the test results are sent to a printer, or to the printer and external computer (refer to the section, How to Exit from System Testing, in this chapter).

6 Sample Testing Procedures

Note: *If the instrument has been turned OFF and allowed to cool, a 4-hour warm up is required before testing begins.*

When the System Testing Screen is first displayed, many field labels that require action—either by operator entry or from system test results—are shaded. As a test or entry for the field is completed, the field label is highlighted. Testing is completed when all field labels have been highlighted. The highlight is removed when the first action is taken for the next sample.

Scan or enter the ID of the sample that is being tested.

If the system is configured for operator entry of Grade, the cursor will stop at this field for keyboard entry by the operator. If you do not want to enter data for a particular sample, press ENTER to leave the field blank.

If you will never be entering information in the field, the STATUS MENU selection should be changed to "NO" so that the cursor will not stop on the Grade field.

6.4 Measurement Procedures for Micronaire

At this point the operator can enter the micronaire code from the keyboard if the value is known, or the micronaire test can be made to obtain the value.

Either manually enter the MIC by entering a 3-digit number (e.g., 2.5, 6.0, 7.3, etc.), or follow the steps below for micronaire testing. If you do not enter a 3-digit micronaire value, a message "Invalid MIC" will be displayed on the MIC line.

Follow the steps below for micronaire testing.

- Place the fiber on the balance to be weighed. The sample must weigh between 8.5 and 11.5 grams for the micronaire test to be performed. Add or subtract fiber until the sample weight is within the acceptable limits. The sample weight is displayed on the balance display. When the sample weight is within range, the air flow in the micronaire chamber is initiated, and the weight is displayed on the System Testing Screen to the right of MIC.

Occasionally re-zero the balance to get rid of any drift from zero that might occur. To re-zero, press the bar on the front of the balance.

Note: *The 900 Semi-Automatic only accepts a stabilized weight between 8.5 and 11.5 grams. Therefore, you must observe the balance display to determine if the sample weight is acceptable or listen for the MIC air to turn on. If the weight is acceptable, check to see that it appears on the MIC line of the test display. You can change the mass of the sample after the weight is displayed on the monitor; however, the software uses the last acceptable mass for calculating the micronaire value.*

The balance must stabilize before the system will accept the results. There is a "O" symbol on the balance display that disappears when the balance is stable. **You must wait for the balance to stabilize before removing the cotton from the balance!**

- Insert the weighed sample into the micronaire chamber, and close the lid. The micronaire test begins automatically.
- Once the test is completed, the chamber lid opens and the sample is ejected from the chamber.

The sample weight disappears, the micronaire value is displayed to the right of "MIC," and "MIC" is highlighted on the screen. If the micronaire value is less than 2.0 (<2.0) or if it is greater than 8.0 (>8.0) the message "Invalid MIC" is displayed, even if lot limits are not set. If this occurs, the micronaire test must be repeated.

ID 49768	
GRADE	
LEAF	
AREA%	
COUNT	
RD	
+b	
C.GRADE	
MIC	4.4
LENGTH	
UNIFORM	
STRENGTH	
ELONG	
S.F.I.	
SAMPLES	188
COLOR/LEAF :	0 OF 2
MICRONAIRE :	1 OF 1
LENGTH/STR :	0 OF 2

If the micronaire value is outside the limits set during Lot Limits, "Mic Limit: (A)ccept, (R)eject" is displayed in the error message box at the bottom of the screen. Press "**A**" to accept the value and proceed with testing, or "**R**" to reject the value. If you reject the value, it is cleared from the screen, and you must perform the micronaire test again.

Note: *If this message appears repeatedly, it could mean there is an air leak in the micronaire chamber. In such case, contact an Uster Technologies service technician.*

Note: The Micronaire measurement is used to calculate the values for Strength. Although the Micronaire measurement does not have to be completed before the Length, Uniformity, Strength, and Elongation tests are run, it must be complete before the test results can be displayed on the System Testing Screen.

6.5 Measurement Procedures for Color/Trash

- Place a sample on the color/trash window.

Be sure that the sample is large enough to block all the light from the colorimeter lamps and that it will cover the window completely.

- Remove your hands from the area of the color hand.
- Press the start button(s) located on both sides of the color window to begin the measurement process. The color hand is activated and will apply 20 pounds of pressure to the sample while the measurements are being made.
- When the buttons are released and the color hand rises, the first observation has been made. Again, press the start button(s) to initiate the second observation. Continue this process until the required number of observations have been made. The status box at the bottom left of the screen counts the number of observations made for each sample and the number of observations required for the sample. For example, "COLOR/LEAF: 1 OF 2" means that one of the two required repetitions has been completed.
- When all the color/trash tests have been made, remove the sample. If the Rd value is less than 40 (<40) or if it is greater than 87 (>87), or if the +b value is <4 or >18, the message "Invalid Color" is displayed, even if lot limits are not set. If this occurs, the color test must be repeated.

You can begin the tests for the second sample after the color/trash and micronaire tests have been completed for the first sample.

ID 49768	
GRADE	
LEAF 5	
AREA% 0.3	
COUNT 62	
RD 70.6	
+b 12.2	
C.GRADE 23-4	
MIC 4.4	
LENGTH	
UNIFORM	
STRENGTH	
ELONG	
S.F.I.	
SAMPLES 188	
COLOR/LEAF: 0 OF 2	
MICRONAIRE: 0 OF 1	
LENGTH/STR: 0 OF 2	

As the repetitions are made, the individual test results are calculated. Once all the repetitions are completed, the microprocessor calculates the *averages* of the test results and displays them on the screen. The color test results appear on the Rd and +b lines, and the USDA (or user-defined) color grade code is displayed on the next line (C.GRADE).

The Leaf Code test results are displayed on the Leaf line, the Area % on the next line, and the trash Count on the following line.

<u>Property Name</u>	<u>Valid Results</u>
Area %	0 to 5%
Count	0 to 999

6.6 Testing Procedures for Length, Uniformity, Strength, and Elongation

The Micronaire/Color/Trash operator passes the sample to the Length/Strength operator for the length, uniformity, strength, and elongation tests. When READY is displayed, use the following steps to perform the length/strength tests.

- The Length/Strength operator prepares a test specimen (beard) of the sample for length/strength testing using the Fibrosampler and Fibrocomb (refer to Chapter 13, Fibrosampler 192, for instructions on preparing the sample beard).

Note: *If the size of the sample beard is too large or too small for the measurement mechanisms to take an accurate reading, error messages of "Large Sample" or "Small Sample" are displayed. When either of these messages appears, prepare another comb using the cotton sample.*

- Place the Fibrocomb in the comb track with the fiber beard extending toward the black brushing surface.

The brusher will remove loose fibers from the beard while simultaneously cleaning and aligning the remaining fibers. After the brushing phase is completed, a mechanical finger slides the sample along the comb track to the fixed lens and jaw system where the tests for length, uniformity, strength, and elongation are performed.

- While the above tests are automatically performed on the first beard, prepare a second beard of the sample, and insert it into the brushing station after the first beard has cleared it. It is not necessary to remove the comb from the comb holder manually once the length/strength test is completed. The comb is pushed onto the metal tray to the far left of the console when the next sample is tested.

After the measurements are completed, the results are displayed to the right of Length, Uniformity, Strength, and Elongation. Each of the field labels is highlighted to indicate that the test is finished. The microprocessor averages the results of the repetitions and displays them on the screen.

ID	49768	
GRADE		
LEAF	5	
AREA%	4.3	
COUNT	59	
RD	71.2	
+b	12.1	
C.GRADE	23-4	
MIC	4.4	10.38
LENGTH	1.10	
UNIFORM	46.4	
STRENGTH	14.2	
ELONG	3.1	
S.F.I.	51.8	
SAMPLES	189	
COLOR/LEAF:	0 OF 2	
MICRONAIRE:	0 OF 1	
LENGTH/STR:	0 OF 2	

The Color/Trash and Micronaire tests can be performed in a different sequence than described here. However, keep in mind that a micronaire value is required to calculate Length/Strength and Fineness test results and that an identification number (ID) must be entered before the test results are printed or transmitted.

7 Exit from Testing

When the test series for the second sample is completed (both the right and left sides of the screen are filled with data), the cursor flashes in the ID field on the left side of the screen. With the first keystroke, the left screen is cleared of data to make room for the third sample's test results.

- If you have completed System Testing and want to exit, press **ESCAPE**.

The box at the bottom left of the screen displays messages that involve the exit process. The messages displayed in this box vary depending on whether the test results are sent to a printer or to the printer and external computer.

ID 49768			
GRADE			
LEAF	5	5	
AREA%	4.3	4.3	
COUNT	59	59	
RD	71.2	77.1	
+b	12.1	8.3	
C.GRADE	23-4	31-1	
MIC	4.4	4.2	
LENGTH	1.10	1.11	
UNIFORM	46.4	47.3	
STRENGTH	14.2	13.8	
ELONG	3.1	3.2	
S.F.I.	51.8	50.6	
SAMPLES	189		
COLOR/LEAF:	2 OF 2	<ESC> to Exit	
MICRONAIRE:	1 OF 1		
LENGTH/STR:	2 OF 2		

**Test Results
To the Printer****Meaning**

<ESC> to Exit

Press **ESCAPE** to Exit System Testing

R to Reject

Press R to Reject the test results of the last sample
to the Printer or Printer/External

S to Sign-off

Press S to Sign-off to the External computer

Attention: Be sure that you do not exit system testing until the test series for the last sample is completely finished. If you press ESCAPE too soon, you will lose test results that have not been transmitted and must repeat all tests on that sample to regain the results.

8 Printing the Test Results

If the Status selection for System Test Results is either Printer or Printer/External, the printer should be ON and On-line before testing begins. If the printer is Off-line (the light indicating the printers' status is not illuminated), the system displays the error message, "Printer not ready, press any key." The user is given three opportunities to correct the problem. After the third time the message is displayed without the problem being resolved, the test results will not be sent to the printer, and system testing will resume. If the problem is not fixed, the message will display after each sample has been tested. If you cannot fix the printer problem, System Testing Results should be set to "None" or "External Computer" on the STATUS MENU until the problem is resolved.

The figures below are samples of the test results printouts. When using the HVI Calibration Mode (the first example), length is reported in UHM (upper-half mean length) and ML (mean length). In ICC Calibration Mode (the second example), length is reported in columns labeled 2.5 % and 50 %. Because each sample can be tested multiple times for any given parameter as defined during Status, the test results printed are an average of the observations for that parameter.

HVI Calibration Mode

Identifier ->testhvi											Date: 06/15/95 HVI Calibration Mode			
Id	Grade	T	%Area	Cnt	UHM	ML	Un	SFI	Str	El	Mic	Rd	B	C-G
45784	42	5	0.78	17	0.94	1.13	83.4	6.5	28.4	5.9	4.4	68.6	9.3	42-1
45786	42	4	0.66	11	0.90	1.09	82.3	8.1	26.0	5.8	4.2	68.4	9.3	42-1
45793	42	5	1.02	15	0.91	1.12	81.4	8.8	25.7	6.0	4.9	70.6	9.0	41-1
45794	42	4	0.65	9	0.93	1.11	84.0	5.8	27.0	5.9	4.8	70.7	8.9	42-1
45769	43	4	0.68	12	0.91	1.09	83.4	6.8	25.0	5.8	4.8	71.0	9.3	42-1

ICC Calibration Mode

Identifier ->testicc													Date: 06/15/95	
ICC Calibration Mode														
Id	Grade	T	%Area	Cnt	2.5%	50%	Un	SFI	Str	El	Mic	Rd	B	C-G
45689	42	5	0.78	8	33.40	14.55	43.6	6.5	28.4	5.9	4.4	68.6	9.3	42-1
45677	42	4	0.66	7	33.74	15.44	45.8	8.1	26.0	5.8	4.2	68.4	9.3	42-1
45673	42	5	1.02	14	33.77	15.05	44.6	8.8	25.7	6.0	4.9	70.6	9.0	41-1
45685	42	4	0.65	10	33.59	14.71	43.8	5.8	27.0	5.9	4.8	70.7	8.9	42-1
45691	43	4	0.68	9	34.16	15.28	44.7	6.8	25.0	5.8	4.8	71.0	9.3	42-1

Test Results Printouts from the System Printer

PRINTOUT SUBHEADS	SUBHEADS INTERPRETED	SOURCE OF DATA
ID	Identification Number	Entered via the keyboard or bar code reader
GRADE	Grade	Entered via the keyboard
T	Trash Code	Entered via the keyboard
%AREA	% of Sample Area Covered by Trash	Trash test results
CNT	Trash Count	Trash test results
UHM	Upper Half Mean Length	Trash test results
ML	Mean Length	Length test results (HVI Mode)
2.5%	2.5% Span Length	Length test results (HVI Mode)
50%	50% Span Length	Length test results (ICC Mode)
UN	Uniformity	Length test results (ICC Mode)
SFI	Short Fiber Index	Uniformity test results
STR	Strength	Calculated
EL	Elongation	Strength test results
MIC	Micronaire	Elongation test results
RD	Lightness (% of Reflectance)	Micronaire test results or keyboard entry
B	Yellowness (on Hunter's scale)	Color test results
C-G	Color Grade (Upland, Pima, or User Defined)	Color test results
		Color test results

Printout Interpretation

9 System Testing Diagnostics

The **F8** key displays the current action of the instrument in the information box in the lower right corner. The message is constantly replaced as the operation of the instrument changes to complete the measurement process. This information is particularly helpful if there is a problem with the instrument and the measurement process is halted in mid-operation. The message displayed indicates the state of the instrument when the problem occurred. The following information is a guideline for diagnostic purposes.

<u>Message</u>	<u>What It Means</u>
Comb Home	<ul style="list-style-type: none"> — Comb home sensor not functional — Sequence error*
New Comb	<ul style="list-style-type: none"> — New comb sensor not functional — Brusher busy — Sequence error*
Comb Read	<ul style="list-style-type: none"> — Problem in communicating with the motor controller. First, try resetting the motor. If this does not work, reset the system.
Length Done	<ul style="list-style-type: none"> — Length timeout has occurred — Problem in communicating with the motor controller. First, try resetting the motor. If this does not work, reset the system. — Sequence error*
Comb Ready for Ret	<ul style="list-style-type: none"> — Sequence error*
Comb Return	<ul style="list-style-type: none"> — Problem in communicating with the motor controller. First, try resetting the motor. If this does not work, reset the system. — Waiting on motor to complete movement
Return Done	<ul style="list-style-type: none"> — Waiting on motor to complete movement
Length Interrupt	<ul style="list-style-type: none"> — Waiting on length data
Comb Rdy for Brk	<ul style="list-style-type: none"> — Sequence error*
Comb to Break	<ul style="list-style-type: none"> — Waiting on motor to complete movement
Strength Interrupt	<ul style="list-style-type: none"> — Waiting on strength data — Clamp sensors not functional

- | | |
|--------------|---|
| Unclamp | — Unclamp sensors not functional |
| | — Sequence error* |
| Track Run | — Waiting for comb movement on the track |
| | — Sequence error* |
| Track Stop | — Appropriate track stop sensor not functional (left or right) or positional bumpers loose. |
| Wait for Mic | — Mic data needed for strength |

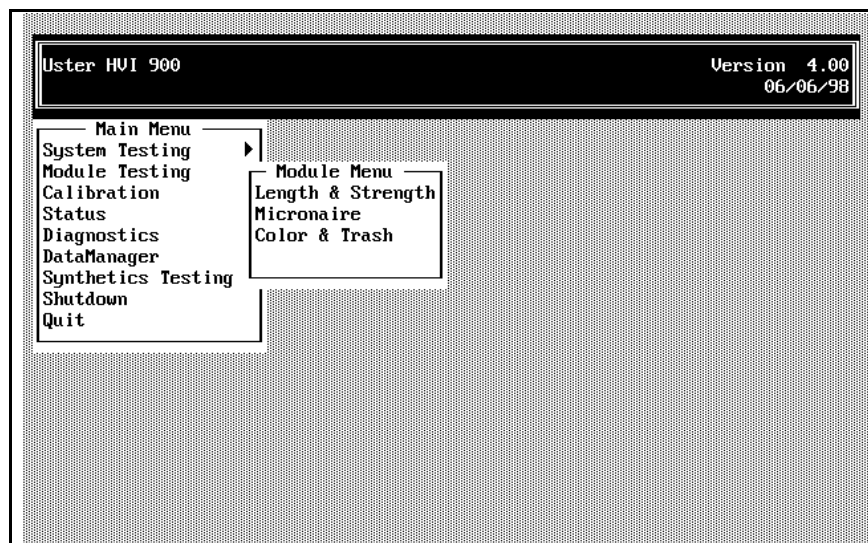
* A sequence error means that one of the computers has gone to its next step before receiving permission from the other computer. If this occurs, reset the system.

Chapter 7 Module Testing

3 Module Testing Menu

The purpose of Module Testing is to test individual samples outside the normal System Testing sequence. Module Testing can be performed for Length/Strength, Micronaire, and Color/Trash. Because each test is performed independently from the other modules, only the data for the selected module are collected and reported (with the exception that micronaire *may* be tested during Length/Strength Module Testing).

- To access the MODULE MENU from the MAIN MENU highlight *Module Testing* and press **ENTER**.

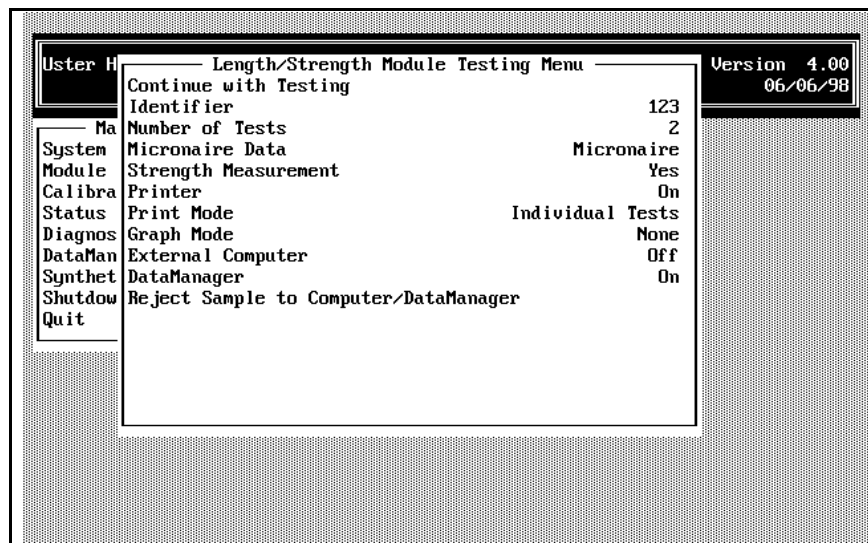


The main difference between System Testing and Module Testing is the way the test results are reported; Module Testing produces individual results whereas System Testing produces an average of all test results. The procedures for Module Testing are essentially the same as in System Testing.

3.4 Length/Strength Module Testing

- To access Length and Strength Module testing from the MODULE MENU, use the arrow keys to highlight *Length & Strength*, then press **ENTER**.

The LENGTH/STRENGTH MODULE TESTING MENU is used to make any necessary adjustments to the Length/Strength Testing settings, as well as to initiate the testing procedure.



Each of the options on the LENGTH/STRENGTH MODULE TESTING MENU is described in the sections that follow. Select each option using the arrow keys to highlight the item, then press the **ENTER** key.

3.4.1 Continue with Testing

- This selection displays the Length/Strength Test Results Screen that is used to initiate the testing procedure.

3.4.2 Identifier

The Identifier field is used to enter an identification number that defines the lot or merchant number for a particular group of samples. This identifying information should be entered when test results are to be transmitted to a printer, the 940 DataManager, or an external computer. Otherwise, you can proceed to *Continue with Testing* without entering information in this field.

The Identifier number entered remains in effect until the next time the Identifier field is changed in one of the modules. In Module Testing, changing the Identifier field in one of the modules changes the identifier number in all of the modules.

For example: The same identifier entered during Length/Strength Testing will be displayed in the Micronaire and Color/Trash Module Testing menus.

- When you have finished entering the Identifier information, press **ENTER** to save the information and move to the next field.

3.4.3 Number of Tests

- This selection is used to indicate the number of Length/Strength tests to be performed on each sample (maximum: 10 per sample).
- Enter the desired number of tests and press **ENTER**.

This number will remain in effect in Length/Strength Module Testing until it is changed. The number entered in Length/Strength Module Testing does not affect the number entered in the Status Mode for System Testing.

3.4.4 Micronaire Data

This selection is used to indicate how the micronaire value will be entered. It alternates between None, Micronaire, and Keyboard. Use the **ENTER** key to toggle between options.

- **None** — No micronaire value will be entered. The system default micronaire value of 4.0 will be used whenever a micronaire value is needed.
- **Micronaire** — The micronaire value will be determined by the Micronaire test.
- **Keyboard** — The operator enters the micronaire value by using the keyboard.

3.4.5 Strength Measurement

This selection is used to indicate whether a Strength measurement will be made during testing. It alternates between No and Yes using the **ENTER** key.

- **No** — No strength measurement will be made during Length/Strength Module Testing and the fiber will not be broken. This enables the length and uniformity tests to be repeated on the same fibrocomb.
- **Yes** — The strength measurement will be made at the same time length, and uniformity measurements are made. The fiber will be broken for the strength measurement.

3.4.6 Printer

This selection is used to indicate whether the test results will be sent to a printer. It alternates between No and Yes using the **ENTER** key.

- **No** — Test results are not sent to the printer.
- **Yes** — Test results will be sent to the printer.

3.4.7 Print Mode

This field is used to select the type of data that will be printed from the test results. The options include the following and are selected using the **ENTER** key.

- **Averages** — Only the average of all the repetitions will be printed.
- **Individual Tests** — The data for each individual test will be printed.
- **Extended Measurements** — Addition calculations for work peak, work total, percent crimp, and modules will be printed.

3.4.8 Graph Mode

The Graph Mode option is used to indicate if and what type of graph should be printed to display the test results. The following options can be selected:

- **Fibrogram** — The average fibrogram will be printed. The test data is printed on one page and the fibrogram on the next page.
- **Stress/Strain** — The average stress/strain curve will be printed. The test data is printed on one page and the stress/strain curve on the next page.
- **Fibrogram/Stress/Strain** — Both the fibrogram and the stress/strain curves are printed. The test data is printed on a separate page.
- **None** — No graphs will be displayed.

To print a graph when it is displayed on the screen. Press "P."

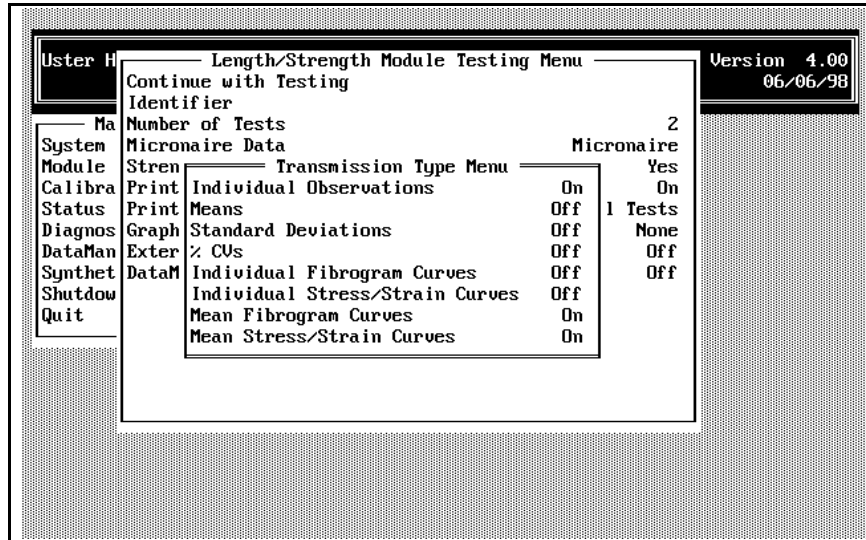
3.4.9 External Computer

This selection determines whether or not the test results will be sent to an external computer system via a serial cable. It alternates between OFF and ON using the **ENTER** key.

- **OFF** — The test results will not be transmitted to an external computer system.
- **ON** — The test results will be transmitted to an external computer.

When the **ENTER** key is pressed while the *External Computer* item is highlighted, the TRANSMISSION TYPE MENU will appear (thus selecting the ON option). It is used to indicate which data should be transmitted. Each of the options is described below.

- **Individual Observations** - Data on the individual observations for each module will be transmitted. For example, if the system is set up to perform two Length/Strength tests, one Micronaire test, and four Color/Trash tests, the data for each of these seven tests will be transmitted.



- **Means** - The mean value of the total number of tests for each module will be transmitted. Using the example above, the mean value of the two Length/Strength tests would be transmitted. In addition, the MIC will be transmitted if it is either entered from the keyboard or measured by the Micronaire Module.
- **Standard Deviations** - The standard deviation of the total number of observations will be transmitted.
- **% CVs** - The percent CV of the total number of observations will be transmitted.
- **Individual Fibrogram Curves** - The data points that make up the fibrogram for each observation will be transmitted.
- **Individual Stress/Strain Curves** - The data points that make up the Stress/Strain Curve for each observation will be transmitted.

- **Mean Fibrogram Curves** - The data points that make up the fibrogram for the mean of all observations will be transmitted.
- **Mean Stress/Strain Curves** - The data points that make up the Stress/Strain Curve for the mean of all observations will be transmitted.

When you **ESCAPE** from the TRANSMISSION TYPE MENU after selecting one or more of the items on the menu, the *External Computer* is automatically turned "ON."

When *External Computer* is "ON," two additional items are displayed on the LEN/STRENGTH SAMPLE TESTING MENU. They are *Reject Sample to Computer/DataManager* and *Sign-off External Computer*. If the External Computer is ON, the reject is displayed. Neither is displayed if both are OFF. Each is described below.

3.4.10 DataManager

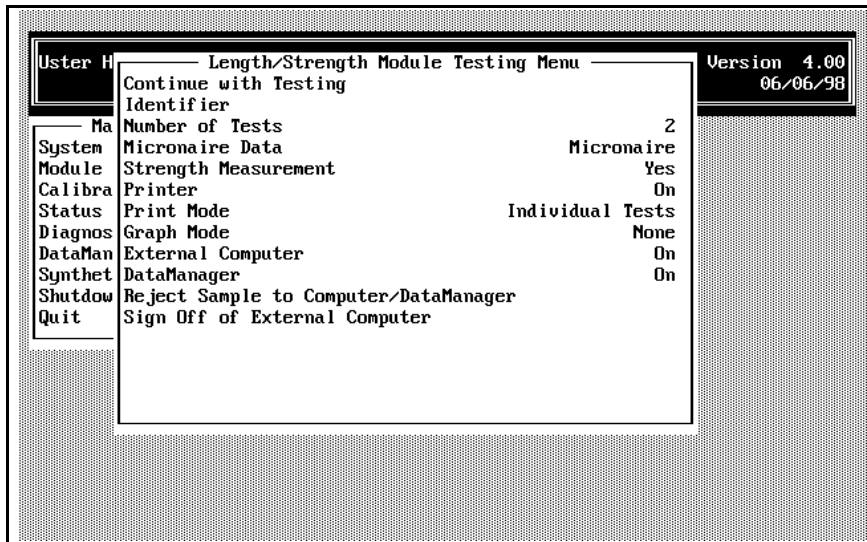
This selection alternates between Off and On using the **ENTER** key.

- **Off** — No test data will be available to the internal 940 DataManager.
- **On** — Test data will be available to the internal 940 DataManager.

An additional menu selection, *Reject Sample to Computer/DataManager*, is added to the LENGTH/STRENGTH ONLY SAMPLE TESTING MENU when DataManager is "On." If both *DataManager* and *External Computer* are "On," two items are added to the LENGTH/STRENGTH ONLY SAMPLE TESTING MENU. They are *Reject Sample to Computer/DataManager* and *Sign-off External Computer*. Each of these items is discussed below.

3.4.11 Reject Sample to Computer/ DataManager

When the test results for the last sample tested should be rejected, **ESCAPE** from the Module Testing Screen, and select *Reject Sample to Computer/ DataManager*. This sends a signal to the external computer and/or to DataManager that the previous sample tested is to be rejected. The test results for the rejected sample will not be included in any mathematical analyses performed on the samples listed for that identifier.



Immediately upon selecting *Reject Sample to Computer/ DataManager*, the test results for the last sample are rejected. If a problem occurs while transmitting the data, the error message "Computer Not Responding" is displayed on the screen.

3.4.12 Sign Off External Computer

When this is selected, a signal is sent to the external computer that the current Identifier is to be closed. Use this selection to close out a lot when testing is completed for the day.

- Once all of the options have been set as is appropriate, the testing procedures can begin. Each of the testing sequences is described in the sections that follow.

3.5 Explanation of the Length/Strength Module Testing Screen

- To begin the Length/Strength testing sequence, select the *Continue with Testing* item from the LENGTH/STRENGTH MODULE TESTING MENU. Then, press **ENTER**.

Length/Strength Test Results for 123						
HVI Calibration Mode	Len 1	Len 2	Uniformity	Strength	Elongation	Amount
Mic=						
Length/Strength Module Procedures ----- OPERATIONS-----						
Enter I.D. ?						
Len/Str Status -----						
Optics			Force			

The Length/Strength Module Testing screen will appear. This screen differs from the one used for System Testing in that the Module Testing Screen displays the results for each test, as well as the average of all the tests for each sample.

The Optics and Force values, as well as the Temperature and Relative Humidity values, are continuously updated and displayed at the bottom of the screen.

3.6 Length/Strength Module Testing Procedures

- If test results will be sent to a printer or transmitted to a host computer, an ID must be entered on the test screen. If the data will not be printed or transmitted, no ID is requested.
- If a micronaire value is required (via the keyboard or micronaire), "Enter MIC:" is displayed on the screen. Enter a micronaire value between 2.0 and 8.0, and press **ENTER**. If the micronaire value has been established, use that value; if it is unknown, use the standard value of 4.0.

If the micronaire value is to be determined via the micronaire test, "Mic" from 8.5 to 11.5 grams of fiber. Mass:" is displayed. Weigh the sample on the balance and then place the sample in the chamber for the test.

If the Micronaire Value is set to *None*, the Operations options (listed below) are displayed immediately after the ID has been entered. If None is selected, the system default value of 4.0 is used.

- The following Operation options will display after the ID and Micronaire value (if required) have been entered.
 - Press **ESCAPE** to exit
 - Press <!**I**> to reject (To reject the last test)
 - Press <#> to set motors

Note: If the Micronaire value is to be entered via keyboard, a value between 2.0 and 8.0 **MUST** be entered. Once a micronaire value has been entered, the Operations selections (listed above) will be displayed. At this point, you can press **ESCAPE** to exit Length/Strength Module Testing or press **ENTER** to continue.

- Using the Fibrosampler, make the sample comb and then place it on the track. Refer to the Length/Strength test procedures in Chapter 6, 900 HVI 900 System testing, for further details.
- When the tests have been completed, the results are displayed on the Length/Strength Module Testing Screen. Perform each test until the required number of tests has been completed.

When all the tests on a sample have been completed, the average (AVG) will display. The standard deviation is displayed if the number of tests is five or more. After pressing **ENTER** to accept the test results, the screen is cleared of the test results. The data is printed and transmitted if required, and either "Enter ID" or "Enter Mic" is displayed on the instruction line for the next sample.

Length/Strength Test Results for test1							26
ID #	345678	ICC Calibration Mode			SFI =	9.0 %C=	4.50
	Len 1	Len 2	Uniformity	Strength	Elongation	Amount	
# 1	0.493	1.066	46.3	29.7	11.4	705	
# 2	0.483	1.061	45.5	28.1	11.4	599	
# 3	0.499	1.061	47.0	28.4	11.4	511	
# 4	0.476	1.049	45.4	27.9	11.0	617	
# 5	0.499	1.047	47.7	28.8	11.0	588	
AVG	0.490	1.056	46.4	28.6	11.2	604	
SD	0.010	0.008	1.0	0.7	0.2	69	

Length/Strength Module Procedures ----- OPERATIONS-----

Press <Enter> to continue

Press < ↑ > to reject

Length/Strength Status -----

Optics

6

Force

.36

3.6.1 Exiting Length/Strength Module Testing

When you are finished with Length/Strength Module Testing use the following steps to exit the screen.

- After a test series is complete, a blank Test Results Screen is displayed requesting that you either "Enter ID" or supply the micronaire value (if required). Press: **ENTER** at "Enter ID" (if required).
- If entering the fineness value via the keyboard, "Enter Fineness" is displayed. Enter any value between two (2) and eight (8). If the value is to be determined via the micronaire test, "Weight from 8.5 to 11.5 grams of fiber. Mass" is displayed. Press: **ENTER**. "Enter" is displayed. Type any value between two (2) and eight (8), then press **ENTER**. Once a value has been entered, the Operations options are displayed.
 - Press **ESCAPE** to exit
 - Press **<! >** To reject (To reject the last test)
 - Press **<#>** to set motors
- Press **ESCAPE** exiting.

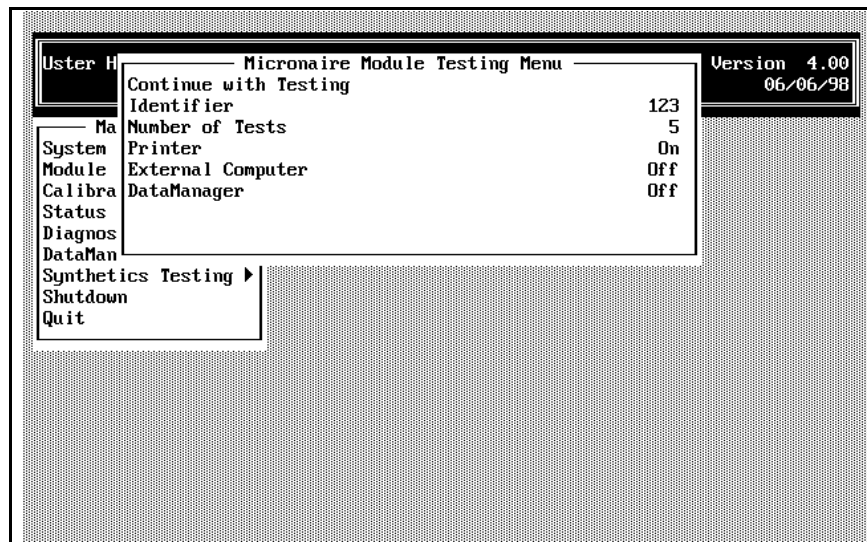
4 Micronaire Module Testing

4.4 Micronaire Module Testing Menu

- To access the MICRONAIRE MODULE TESTING MENU from the MODULE MENU, highlight *Micronaire*, then press **ENTER**.

The MICRONAIRE MODULE TESTING MENU is used to make any necessary adjustments to the Micronaire Testing settings, as well as to initiate the testing procedure.

Each of the options on the MICRONAIRE MODULE TESTING MENU is described in the sections that follow. Select each option using the arrow keys to highlight the item, then press the **ENTER** key.



4.4.1 Continue with Testing

This selection displays the Micronaire Module Testing Screen.

4.4.2 Identifier

This information is not required and may already be provided if the ID was entered during another module test. You can proceed to *Continue with Testing* without entering information in the Identifier field. However, if this item is selected, it becomes required and a value must be entered before continuing. You can enter up to 30 alphanumeric characters to define the lot or merchant for a particular group of samples.

As with other modules, the Identifier entered remains in effect until the next time the Identifier field is changed in another module.

- When you have entered the Identifier information, press **ENTER** to exit the instruction statement.

4.4.3 Number of Tests

This selection is used to indicate the number of Micronaire tests that are to be performed on each sample (maximum: 10 per sample).

- Enter the desired number of tests, then press **ENTER**.
- The number entered here does not affect the number entered in Status Mode for System Testing.

4.4.4 Printer

This selection alternates between Off, On, and Averages using the **ENTER** key.

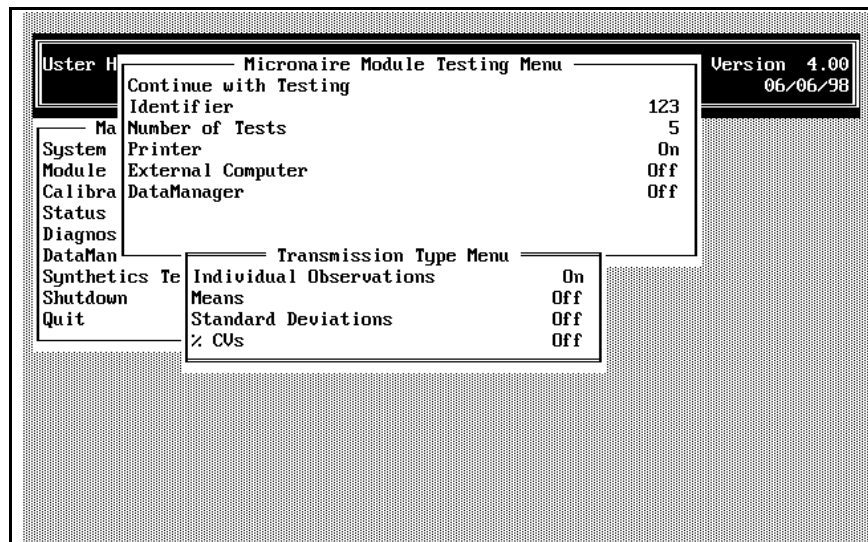
- **Off** — No test results will be sent to the printer; the information will only be displayed on the screen.
- **On** — All test results will be sent to the printer.
- **Averages** — Only the averages of the test results will be sent to the printer.

4.4.5 External Computer

This selection determines whether or not the test results will be sent to an external computer system via a serial cable. It alternates between OFF and ON using the **ENTER** key.

- **OFF** — The test results will not be transmitted to an external computer system.
- **ON** — The test results will be transmitted to an external computer.

When the **ENTER** key is pressed while the *External Computer* item is highlighted, the TRANSMISSION TYPE MENU will appear (thus selecting the ON option). It is used to indicate which data should be transmitted. Each of the options is described below.



- **Individual Observations** - Data on the individual observations for each module will be transmitted. For example, if the system is set up to perform two Length/Strength tests, one Micronaire test, and four Color/Trash tests, the data for each of these seven tests will be transmitted.

- **Means** - The mean value of the total number of tests for each module will be transmitted. Using the example above, the mean value of the two Length/Strength tests would be transmitted rather than individual data for each (two) Length/Strength test.
- **Standard Deviations** - The standard deviation of the total number of observations will be transmitted.
- **% CVs** - The percent CV of the total number of observations will be transmitted.

When you **ESCAPE** from the TRANSMISSION TYPE MENU after selecting one or more of the items on the menu, the *External Computer* is automatically turned "ON."

When *External Computer* is "ON," two additional items are displayed on the LEN/STRENGTH SAMPLE TESTING MENU. They are *Reject Sample to Computer/DataManager* and *Sign-off External Computer*. If the External Computer is ON, the reject is displayed. Neither is displayed if both are OFF. Each is described below.

4.4.6 Reject Sample to Computer/DataManager

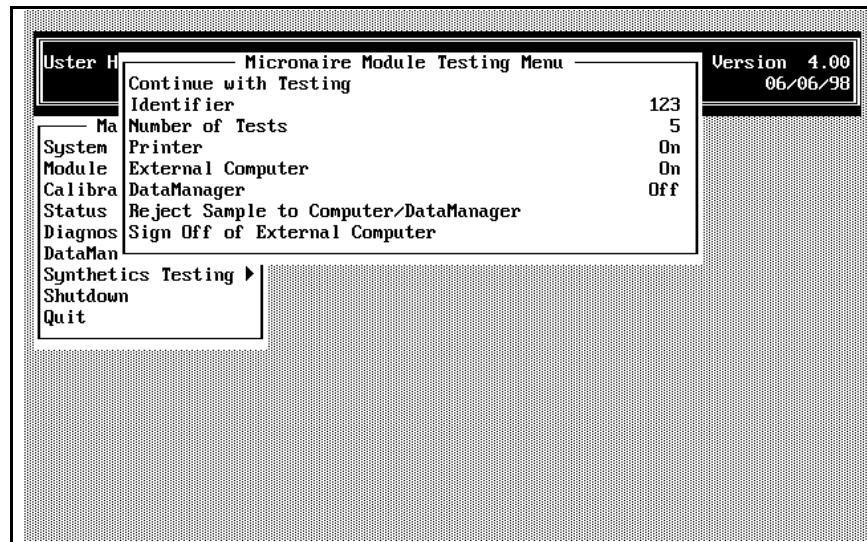
When the test results for the last sample tested should be rejected, **ESCAPE** from the Module Testing Screen, and select *Reject Sample to Computer/DataManager*. This sends a signal to the external computer and/or to DataManager that the previous sample tested is to be rejected. The test results for the rejected sample will not be included in any mathematical analyses performed on the samples listed for that identifier.

Immediately upon selecting *Reject Sample to Computer/ DataManager*, the test results for the last sample are rejected. If a problem occurs while transmitting the data, the error message "Computer Not Responding" is displayed on the screen.

4.4.7 Sign Off External Computer

When this is selected, a signal is sent to the external computer that the current Identifier is to be closed. Use this selection to close out a lot when testing is completed for the day.

Once all of the options have been set as is appropriate, the testing procedures can begin.



4.5 Explanation of Micronaire Module Testing Screen

- To begin the Micronaire Module testing sequence, select the *Continue with Testing* from the MICRONAIRE MODULE TESTING MENU. Then, press **ENTER**.

```

Mic Test Results for 123

Mic      Mass

Mic Module Procedures ----- OPERATIONS -----
Enter I.D.  ?

Mic Status -----

```

The Micronaire Module Testing screen will appear. This screen differs from the one used for System Testing in that the module testing screen displays the results for each test, as well as the average of all the tests for each sample.

Mic Test Results		
ID # test2	Mic	Mass
# 1	3.70	8.72
# 2	3.65	9.32
# 3	3.65	9.82
AUG	3.67	9.29
Mic Stand Alone Procedures ----- OPERATIONS-----		
Press <Enter> to continue		
Press < ! > to reject		
Mic Status -----		
Door is Open		

If test results will be sent to a printer or transmitted to a host computer, an ID must be entered on the test screen. If the data will not be printed or transmitted, no ID is requested.

Once the ID number (if required) has been entered, the instruction line says "Test 1 of X."

4.6 Micronaire Testing Procedures

- If an ID is required (because the data will be printed or transmitted), enter up to 12 alphanumeric characters for the bale identification number via the keyboard or scanner. Be sure the number is entered correctly, and then press **ENTER**.
- The highlighted instruction line will display "Test 1 of XX," with XX being the total number of tests that are to be performed for each sample.

- Weigh the sample on the balance. The sample must weigh between 8.5 and 11.5 grams. When the sample is within the valid weight range, the air is turned on, and the sample weight is displayed on the screen. Refer to the chapter on system testing (Chapter 6, HVI 900) for the proper procedures to follow for the micronaire measurement.
- Place the cotton in the micronaire chamber and close the door.
- When the test is completed, the sample is ejected, and the results are displayed on the screen. Perform the required number of tests by repeating this procedure until all tests have been performed.
- When all tests have been completed, the average (AVG) is displayed. The standard deviation is displayed if the number of tests is five or more. After pressing **ENTER** to accept the test results, the screen is cleared of the test results. The data is printed and transmitted if required. "Enter ID" is displayed on the instruction line.

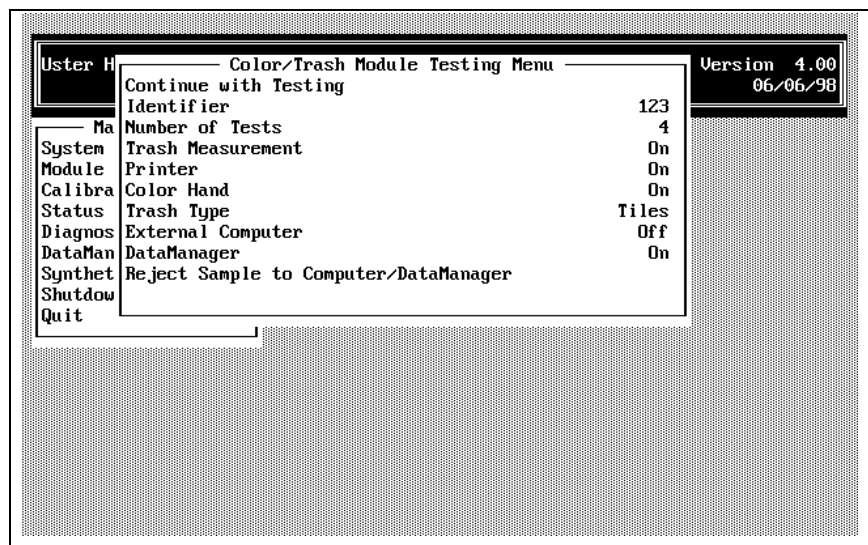
4.6.1 Exiting Micronaire Module Testing

- To exit from Micronaire Module Testing, press **ENTER** from the Micronaire Module Testing Results Screen. Press **ENTER** again when the instruction line requests "Enter ID," then press **ESCAPE**.

5 Color/Trash Module Testing

5.4 Color/Trash Module Testing Menu

To access Color and Trash Module Testing from the MODULE MENU, highlight *Color & Trash*, then press **ENTER**.



5.4.1 Continue with Testing

This selection displays the Color and Trash Module Testing Screen.

5.4.2 Identifier

This information is not required and may already be provided if the ID was entered during another module test. You can proceed to *Continue with Testing* without entering information in the Identifier field. However, if this item is selected, it becomes required and a value must be entered before continuing. You can enter up to 30 alphanumeric characters to define the lot or merchant for a particular group of samples.

As with other modules, the Identifier entered remains in effect until the next time the Identifier field is changed in another module.

- When you have entered the Identifier information, press **ENTER** to exit the instruction statement.

5.4.3 Number of Tests

This selection is used to indicate the number of Color and Trash tests that are to be performed on each sample (maximum: 10 per sample).

- Enter the desired number of tests, then press **ENTER**.

The number entered here does not affect the number entered in Status Mode for System Testing.

5.4.4 Trash Measurement

This selection alternates Off and On.

- **Off** — No trash test will be made by the trashmeter.
- **On** — The trashmeter will test the sample and the results will be displayed on the screen.

5.4.5 Printer

This selection alternates between Off, On, and Averages using the **ENTER** key.

- **Off** — No test results will be sent to the printer; the information will only be displayed on the screen.
- **On** — All test results will be sent to the printer.
- **Averages** — Only the averages of the test results will be sent to the printer.

5.4.6 Color Hand

This selection alternates between Off and On.

- **Off** — The color hand remains in the upper position when the start button(s) is pushed. The *Off* selection should be used when tiles are measured.
- **On** — The color hand will move up and down to compress the sample on the sample window when the start button(s) is pushed.

Note: *The Color Hand selection should be "On" for Color/Trash Module Testing of cotton.*

5.4.7 Trash Type

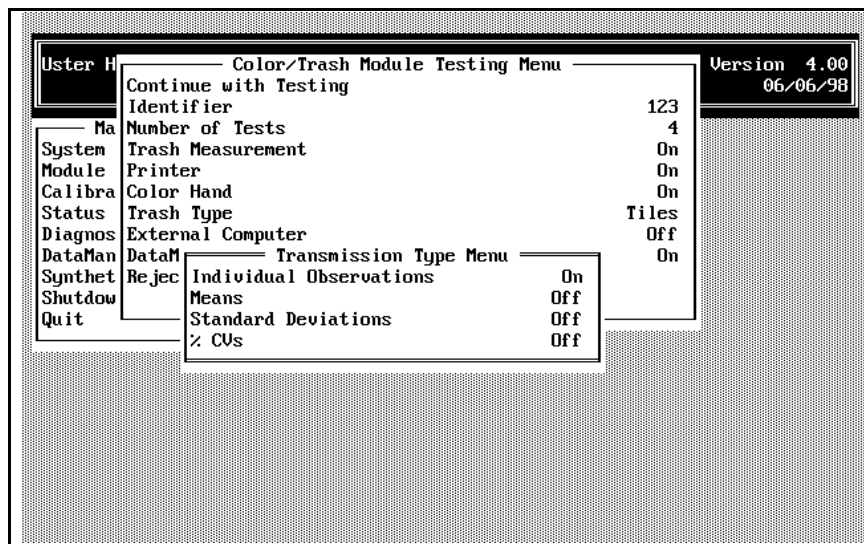
This toggles between Cotton and Tiles for the appropriate calibration values. Cotton is the default value.

5.4.8 External Computer

This selection determines whether or not the test results will be sent to an external computer system via a serial cable. It alternates between OFF and ON using the **ENTER** key.

- **OFF** — The test results will not be transmitted to an external computer system.
- **ON** — The test results will be transmitted to an external computer.

When the **ENTER** key is pressed while the *External Computer* item is highlighted, the TRANSMISSION TYPE MENU will appear (thus selecting the ON option). It is used to indicate which data should be transmitted. Each of the options is described below.



- **Individual Observations** - Data on the individual observations for each module will be transmitted. For example, if the system is set up to perform two Length/Strength tests, one Micronaire test, and four Color/Trash tests, the data for each of these seven tests will be transmitted.

- **Means** - The mean value of the total number of tests for each module will be transmitted. Using the example above, the mean value of the two Length/Strength tests would be transmitted rather than individual data for each (two) Length/Strength test.
- **Standard Deviations** - The standard deviation of the total number of observations will be transmitted.
- **% CVs** - The percent CV of the total number of observations will be transmitted.

When you **ESCAPE** from the TRANSMISSION TYPE MENU after selecting one or more of the items on the menu, the *External Computer* is automatically turned "ON."

When *External Computer* is "ON," two additional items are displayed on the LENGTH/STRENGTH SAMPLE TESTING MENU. They are *Reject Sample to Computer/DataManager* and *Sign-off External Computer*. If the External Computer is ON, the reject is displayed. Neither is displayed if both are OFF. Each is described below.

5.4.9 Reject Sample to Computer/DataManager

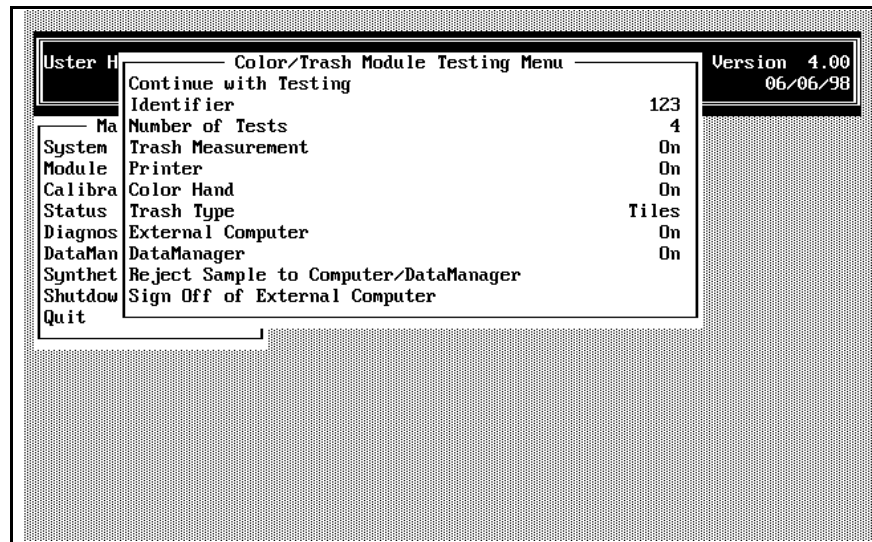
When the test results for the last sample tested should be rejected, **ESCAPE** from the module testing screen, and select *Reject Sample to Computer/DataManager*. This sends a signal to the external computer and/or to DataManager that the previous sample tested is to be rejected. The test results for the rejected sample will not be included in any mathematical analyses performed on the samples listed for that identifier.

Immediately upon selecting *Reject Sample to Computer/ DataManager*, the test results for the last sample are rejected. If a problem occurs while transmitting the data, the error message "Computer Not Responding" is displayed on the screen.

5.4.10 Sign Off External Computer

When this is selected, a signal is sent to the external computer that the current Identifier is to be closed. Use this selection to close out a lot when testing is completed for the day.

Once all of the options have been set as is appropriate, the testing procedures can begin.



5.5 Explanation of the Color/Trash Module Test Screen

If you entered an Identifier on the COLOR/TRASH MODULE TESTING MENU, it is displayed on the top line of the Color/Trash Module Test Screen.

A color test is always performed on each sample and the test results displayed in the Rd, +b, and Color Grade columns. If the Trash Measurement is selected *On* from the COLOR AND TRASH MODULE TESTING MENU, these test results will be displayed in the Leaf, Area, and Count columns.

```

Color/Trash Test Results for 123
TILES Only!
      Rd      b      Color Grade      Leaf      Area      Count

Color/Trash Module Procedures ----- OPERATIONS-----
Enter I.D.      ?

Color/Trash Status -----

```

5.6 Color/Trash Module Testing Procedures

- If an ID is required (because the data will be printed or transmitted), enter up to 12 alphanumeric characters for the bale identification number via the keyboard or scanner. Be sure the number is entered correctly, and then press **ENTER**.
- The highlighted instruction line will display "Test 1 of XX," with XX being the total number of tests that are to be performed for each sample.
- Place the sample on the sample window.
- Press the start button(s).
- When the test is completed, the results are displayed on the Color and Trash Module Testing Screen. Perform the remaining tests, until the required number of tests has been performed.

- When the required number of tests has been completed, the average (AVG) is displayed. The standard deviation is displayed if the number of tests is five or more. After pressing **ENTER** to accept the test results, the screen is cleared of the test results and the data is printed and transmitted if required. "Enter ID" is displayed on the instruction line again.

Color/Trash Test Results for 2						
ID # 1	Rd	b	Color Grade	Leaf	Area	Count
# 1	75.4	10.0	22-2	3	0.29	40
# 2	75.3	9.9	22-2	3	0.25	45
# 3	75.2	9.8	31-3	3	0.25	42
# 4	75.2	9.8	31-3	2	0.24	48
AVG	75.3	9.9		3	0.26	44
Color/Trash Stand Alone Procedures ----- OPERATIONS-----						
Press <Enter> to continue						
Press < ! > to reject						
Color/Trash Status -----						

5.6.1 Exiting Micronaire Module Testing

- After all of the tests are completed, press **ENTER** at "Enter ID" (if required) prompt. When the screen displays the message "Press <ESC> to Exit," press **ESCAPE**.

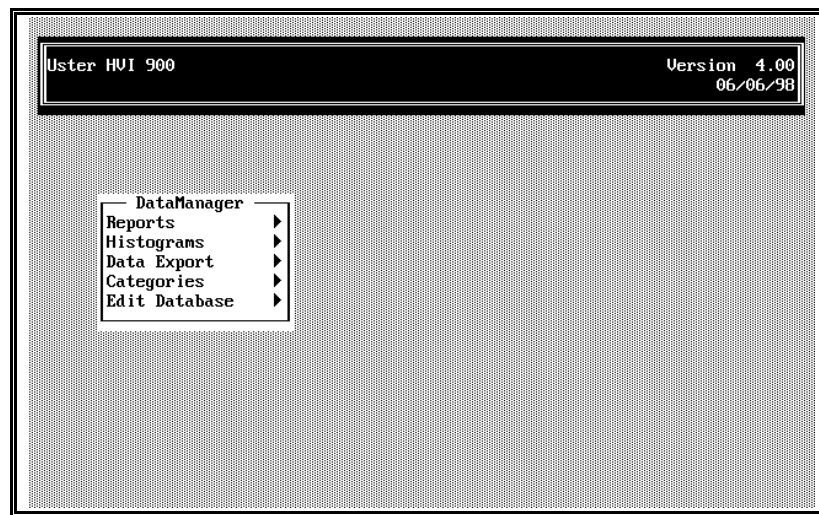
The COLOR AND TRASH MODULE TESTING MENU will appear.

Chapter 8 940 DataManager

The 940 DataManager collects, sorts, and stores data received from the HVI 900 instruments. It is used to export selected test data, as well as edit the database. Each user can determine how the fiber test results will be arranged, sorted, and stored for review and interpretation.

- To access the 940 DataManager, select *DataManager* from the MAIN MENU using the arrow keys, then press **ENTER**.

The 940 DATAMANAGER MENU is displayed with options for generating reports and histograms.



3 Categories

One of the methods of analyzing data and warehousing cotton for spinning is by Category. If this is the method you use, the Categories should be defined before utilizing the 940 DataManager. The Reports and Histograms that are generated by the 940 DataManager use these Category definitions. It is important to define Categories prior to creating a Histogram so that you can look at them to analyze data graphically.

Though each of the fiber properties should have a Category definition, if the number of categories equals zero (0), no categories are calculated.

3.4 Category Definition Screen

When the Categories are defined, the highest value of the first Category is the starting point to which the increment (interval) between the Categories is added. You must determine what that interval will be and how many Categories are necessary to cover the range of measured fiber properties. Cotton is categorized based on where the property's measured value falls within the established Categories.

The screen below shows the initial category values that are shipped from the Uster Technologies factory. If you are unsure what values should be entered for a Category Definition to reflect the range of your cotton, refer to the Appendix chapter of this manual for instructions on how to determine this information.

Uster HVI 900		Version 4.00 06/06/98		
		Categories		
		Highest Value of First Category	Interval	Number of Categories
DataManager Reports Histograms Data Export Categories Edit Database	S.C.I.	87.0	5.0	20
	Mic	2.2	0.2	20
	Strength	18.5	1.0	20
	Length	0.86	0.03	20
	Uniformity	70.5	1.0	20
	S.F.I.	0.0	10.0	10
	Elongation	0.0	10.0	10
	Trash	0	10	10
	C.S.P.	1550	100	20
	Rd	46.0	2.0	20
	+b	4.5	0.6	20
	Maturity	0.0	10.0	10
	Sugar	0.0	10.0	10
	Fineness	0	10	10

3.5 Highest Value of First Category

This is the value at which the fiber property's first Category should end. All samples that have a measured value at or below this value will be included in this Category.

3.6 Interval

This is the range or width between Categories. 940 DataManager uses intervals to determine where each Category begins and ends. Sample test results are assigned to Categories according to where they fit in the Categories.

Intervals between Categories differ according to the fiber property. If the intervals are small, an excessive number of Categories might be created. For yarn spinners, large intervals between the Categories may not allow good control of the variation within a mix or between mixes.

3.7 Number of Categories

Each fiber property can have up to 20 categories. In order for yarn spinners to keep warehousing as simple as possible, the number of Categories should be limited to the smallest number reasonable for the range of cotton in inventory.

- Using the arrow keys to move among the fields, enter the Category Definitions for all fiber properties. When finished, press the **ESCAPE** key to save the information and return to the DATAMANAGER MENU.

3.8 How the Category System Works

Each sample is placed into a Category for each fiber property. The Category Definitions require an estimate of the average value and range of each property for the samples that will be tested. As previously mentioned, the steps used to determine these values are explained in the Appendix section of this manual.

Note: If you export the data to BIAS, you should use the same Category Definitions for 940 DataManager and BIAS Categories.

It is important for yarn spinners to keep in mind that the number (quantity) of Categories for each property should be kept to the minimum required to adequately cover inventory. This will also allow for the small shifts the average inventory might make over a period of time.

Once the Categories are defined, the Category Definition should not be changed unless the bales physically remaining in the warehouse are changed accordingly. A change in Category Definition will cause the histograms review to be incorrect. Because the consequences of making changes in Category Definition are so great, careful consideration should be given to the Categories as they are defined.

Each property has an *Initial* Category Definition (shown in the screen above) that was set up at the Uster Technologies factory. This definition most likely does not correctly represent your inventory. Therefore, follow the instructions in the Appendix section to define your Categories.

Note: *These initial values are not the recommended **Category Definition** values. Use these values only during the initial setup to study the distributions of each measured fiber property. Follow the instructions outlined in the Appendix to determine Category Definitions to cover the range of your cotton.*

Once you determine the categories that cover the range of your cotton, return to the Category Definition screen and define the Categories accordingly. Remember, once the categories have been defined, there are far-ranging implications if categories are redefined. Therefore, the initial evaluation of your cotton is an important step.

Note: *As stated previously, you should give a great deal of thought to the Category Definition before you initially assign the definition so that you will not have to change the definition.*

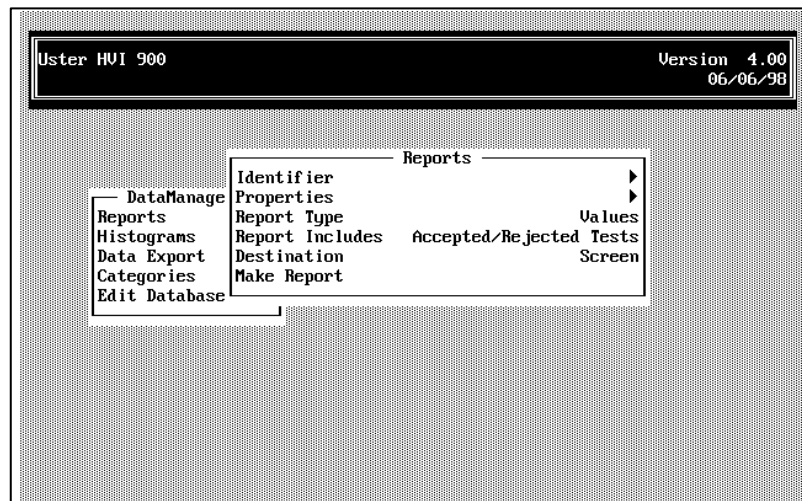
4 Reports

4.4 Overview

This section is used to design and generate reports to be displayed on the screen or printed on the system printer. These reports contain a variety of information according to your specifications for identifiers, properties, and report types.

Reports generated on the screen are limited to 78 characters; reports that are sent to the printer are limited to 131 characters. It is suggested that you select the report destination prior to selecting the properties to be included in the report because of the impact on the amount of characters that can be displayed or printed. If you select more properties than can be legitimately used for your destination and report type specifications, the 940 DataManager will display a warning message.

For example, reports generated by category require fewer character spaces; therefore, more properties can be selected. The property list can be divided into separate parts, and two reports can be generated if you must have all fiber properties listed by category and by value. If the report is generated by values and categories, more character spaces are required to report data for each property. This means that you cannot choose as many properties to appear on the report.



4.5 Report Header Abbreviations

The following is a list of the abbreviations used in the header for the fiber properties.

Grade

SCI

Mic

Str

Len

Unf

SFI

Elg

T

Cnt

Area

CSP

CG

Rd

+b

Mat

Sug

Fin

Grade

Spinning Consistency Index

Micronaire

Strength

Length

Length Uniformity

Short Fiber Index

Elongation

Trash

Trash Count

Trash Area

Count Strength Product

Color Grade

Rd

+b

Maturity

Sugar

Fineness

4.6 Selecting the Identifier(s) to Appear on the Report

Reports are generated by the sample Identifier.

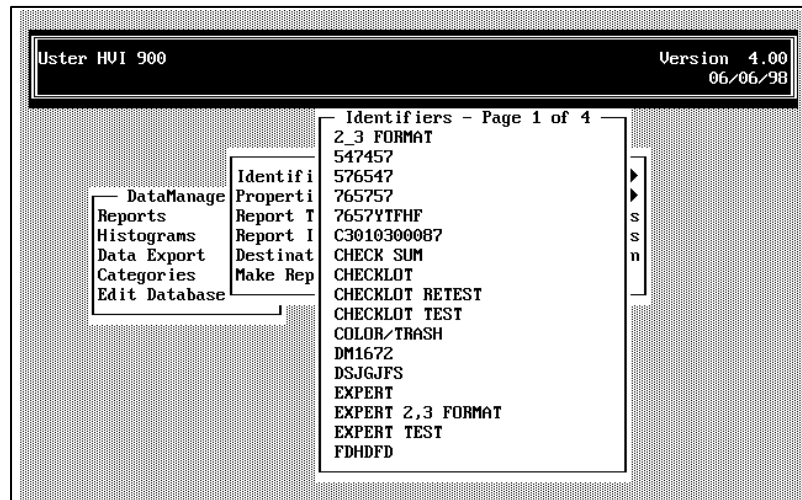
- When you highlight *Identifier* and press **ENTER**, the Identifier window is displayed with all the identifiers that are stored in 940 DataManager.

The identifiers for the most recently completed tests are listed first (reverse chronological order). The current page number and the total number of pages are displayed in the upper right corner of the window (e.g., Page 1 of 6). The first number is the number of the page that is currently displayed and second number is the total number of pages (screens) that are required to display all the identifiers. Use the **Page Up** and **Page Down** keys to view the different pages (screens) of identifiers.

When multiple identifiers are on the list, the last entry will be "*All Identifiers*." When it is selected, the entire list of identifiers will be included in the report.

- Select the Identifier(s) that should be included in the report (up to 10) using the arrow keys to highlight the item, then press the **ENTER** key. An arrow points to the identifier when it is selected. De-select an Identifier by pressing the **ENTER** key again to remove the arrow.
- When you have completed the selection of identifier(s), press **ESCAPE** to save the information and return to the REPORT MENU.

If you selected only one identifier, that identifier name is displayed to the right of Identifier. If multiple identifiers are to be used for the Report, an arrow is displayed on the Identifier line. If you selected *All Identifiers*, "All Identifiers" is displayed to the right of the Identifier field.



The next time Identifier is selected, all previous Identifier selections are canceled. However, the identifier(s) displayed on the REPORTS MENU window will be used for generating all reports as long as the REPORTS MENU screen is active. Once you **ESCAPE** from the REPORTS MENU, all identifier selections are canceled.

Note: If you select "Make Report" when no identifier has been selected, a warning message window is displayed on the screen. You must select an identifier(s) before selecting "Make Report."

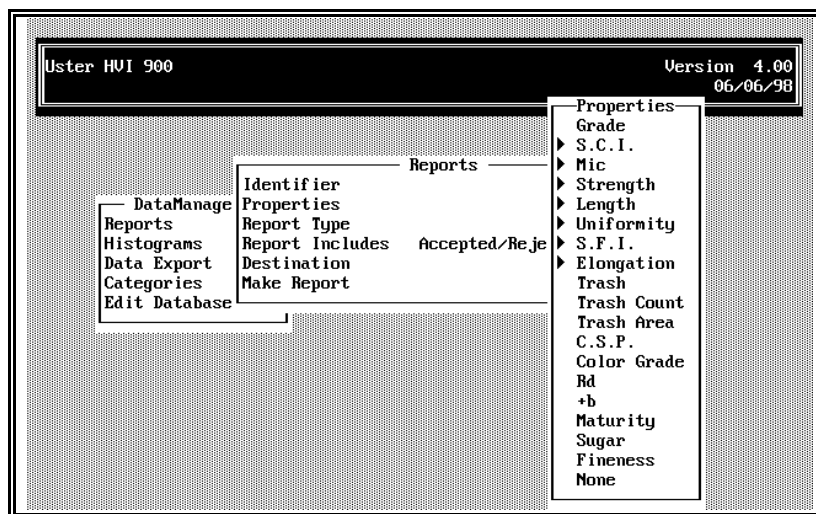
4.7 Selecting Fiber Properties to Appear on the Report

The information that appears on the report is determined by the properties chosen. A list containing all the available fiber properties is displayed in a window.

- Highlight the items to be included on the report using the arrow keys, then press **ENTER**.

An arrow will position beside the property indicating that it has been selected. Repeat this process to select all the properties that should appear on the report.

The arrow that indicates that an item has been selected; can be toggled off by pressing **ENTER** while the property is highlighted. If you press **ENTER** while *None* is highlighted, the selection arrows will be removed from all properties that have been selected. This is useful when you want to change many of the properties selected for the report.



- After you have chosen all of the properties that are to appear on the report, press **ESCAPE** to save the information and return to the REPORTS MENU.

Property selections remain the same until they are changed.

4.8 Limits to Selecting Properties

If the report is to be displayed on the screen as opposed to being printed, the size of the screen limits the number of properties that can be displayed on one line (maximum of 79 characters).

A report that is printed is limited to 131 characters per line. If the number of characters for your selections exceeds 131, a warning message is displayed on the screen. Divide the report into two sections if the report must contain more information than will fit on the report according to your report specifications—use the same specifications, but divide the properties between the two reports.

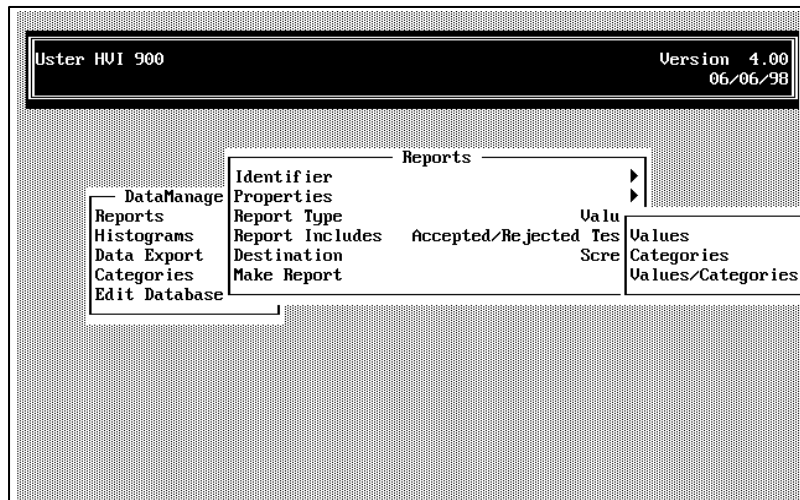
4.9 Selecting the Type of Report

Reports can be displayed or printed in three different ways:

- **Value**—The test values from the HVI are reported for samples in each identifier for the properties selected.
- **Categories**—The test values are assigned to a category according to the category definitions specified in the STATUS MENU. The assigned category is displayed/printed on the report.
- **Values/Categories**—Both the test values and the assigned category number are displayed/printed.

Access the REPORT TYPE screen by highlighting the *Report Type* item, then pressing **ENTER**.

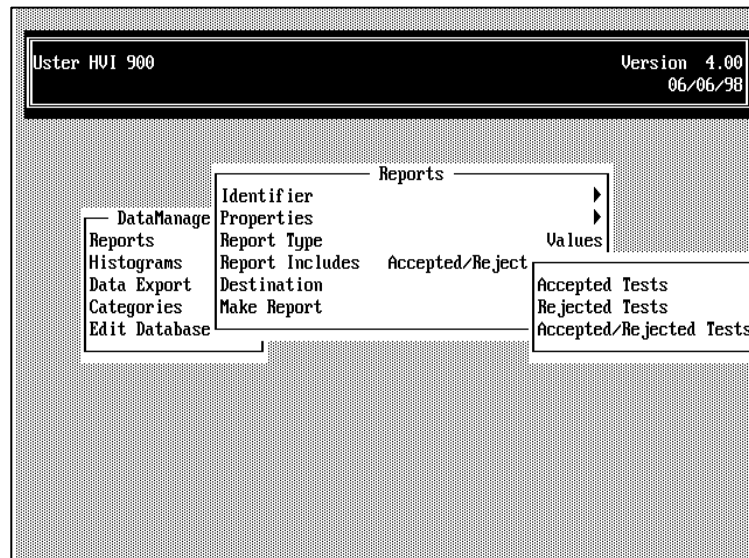
The REPORTS MENU will reappear where the type of report that is After you have chosen all of the properties that are to appear on the report, press **ESCAPE** to save the information and return to the REPORTS MENU. Property selections remain the same until they are changed. Currently selected is displayed. Because the number of characters and spaces required to display or print the data for each Report Type varies, the number of properties that can be selected for the report are impacted by the report type choice. For example, it requires fewer character spaces for a report by category than it does for a report with values and categories data.



4.10 Tests Included on the Report

When the report is generated, it can include:

- **Accepted Tests**—Only tests that are acceptable according to the Lot Limit specification at test time will be included in the report.
- **Rejected Tests**—Only tests that are rejected according to the Lot Limit specification at test time will be included in the report.
- **Accepted/Rejected Tests**—All tests are included in the report, whether or not they were accepted or rejected according to the Lot Limit specification.



Accepted and rejected tests are determined by the Lot Limits as they were at the time of testing. Properties that are rejected are shown in bold on a report to the screen. Rejected properties are in bold and underlined on a printed report.

4.11 Selecting the Destination for the Report

Reports can be generated for two destinations:

- **Screen**—The report will be displayed on the screen. Up to 78 characters and spaces can be displayed per line.
- **Printer**—A report that is printed is limited to 131 characters. If the number of characters for your selections exceeds 131, a warning message is displayed on the screen.

Highlight the destination for the report, and press **ENTER**.

The REPORTS MENU will reappear and the current destination for the report will display.

Note: *Select the destination for the report prior to selecting the properties to be included in the report!*

4.12 Make Report

The *Make Report* item is used to generate the report according to the current report specifications.

- Highlight *Make Report*, then press **ENTER**.
- The report is automatically generated.

Note: *If you select Make Report when no identifier has been selected, a warning message window is displayed on the screen. You must select an identifier(s) before you select Make Report.*

The current time, date, company name, Identifier, relative humidity and temperature (if available), and report properties are in the report header. The tests and the data for the report properties are listed for each identifier. An average of the data for the tests is calculated and displayed/printed at the end of the ID list.

If multiple identifiers are selected for the report, the identifiers are listed in reverse chronological order. The average of the data for the tests associated with a particular identifier is given before the next identifier is listed.

The tests for each identifier are listed in alphabetical order.

4.12.1 Report Generated to Screen

If the report destination is the screen, the report is immediately displayed on the monitor. Those properties that are not within Lot Limit specifications at test time are highlighted on the screen.

If the entire report cannot be displayed on one screen, use the keys listed below to move quickly through the report.

- ◆ Down Arrow scrolls to display the next line of data
- ◆ Up Arrow scrolls to display the previous line
- ◆ Page Down displays the next screen of data
- ◆ Page Up displays the previous screen of data
- ◆ End displays the last screen of data
- ◆ Home displays the first screen of data

When are done reviewing the report, press **ESCAPE** to return to the REPORTS MENU. If you want to print the report after you have viewed it on the screen, follow these steps.

- Change the destination to *Printer*. Select *Make Report*. The report will be printed.

4.12.2 Report Generated to Printer

- Before selecting *Make Report*, ensure that the printer is Epson compatible, ON, on-line, and has paper inserted properly.

The report will automatically generate based on your report criteria with the Lot Limit Rejections underlined and in bold print.

The example screen report (shown below) reports values for one identifier with Grade, SCI, Micronaire, Strength, Length, Color Grade, Rd, and +b as the selected properties. Because the report contains more than five tests for the identifier, the summary information includes the Average, Standard Deviation, and C.V. for each property.

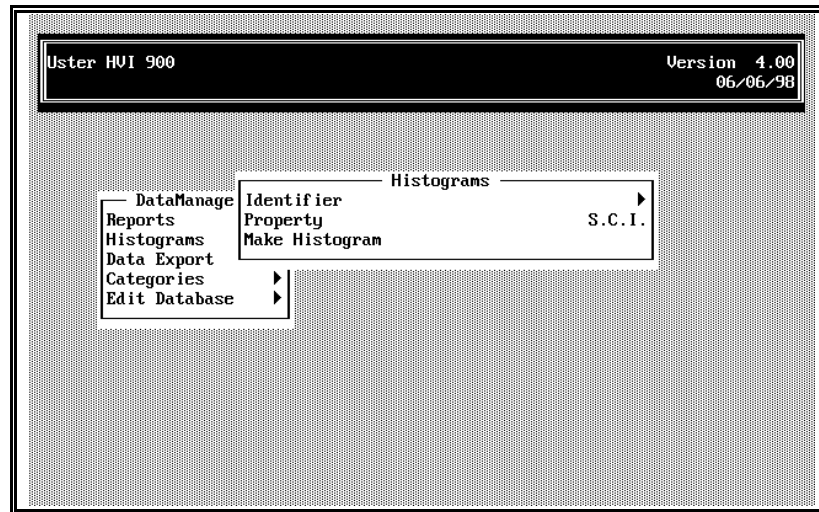
Spinlab Zellwege	ID											Grade	SCI	Mic	Str	Len	Unf	Elg	T	Rd	+b	on 2.00																			
	Identifier: CAROLINA CTIN																																								
	418815											31	107	5.4	25.7	1.07	82.3	8.4	3	74.1	10.6																				
	418817											31	102	5.5	25.0	1.10	81.4	9.0	3	74.2	10.6																				
	418819											31	161	2.7	35.3	1.08	82.3	8.5	4	74.1	10.6																				
	418821											31	173	2.7	36.8	1.13	83.3	10.1	4	74.2	10.6																				
	418826											31	106	5.5	24.6	1.13	82.3	9.6	4	74.2	10.6																				
	418855											31	113	5.5	25.9	1.12	83.0	9.8	4	74.3	10.6																				
	418856											31	165	2.7	34.9	1.11	83.0	9.3	5	74.3	10.5																				
	419759											31	161	2.7	35.7	1.10	81.9	8.9	5	74.3	10.5																				
	421170											31	156	2.7	36.1	1.08	80.8	9.0	5	74.4	10.5																				
Summary Information																																									
Total Tests: 9																																									
<table><tr><td>Property</td><td>Mean</td><td>S.D.</td><td>% CV</td></tr><tr><td>SCI</td><td>138</td><td>30.66</td><td>22.22</td></tr><tr><td>Mic</td><td>3.9</td><td>1.51</td><td>38.72</td></tr><tr><td>Str</td><td>31.1</td><td>5.58</td><td>17.94</td></tr><tr><td>Len</td><td>1.10</td><td>0.06</td><td>5.45</td></tr></table>																						Property	Mean	S.D.	% CV	SCI	138	30.66	22.22	Mic	3.9	1.51	38.72	Str	31.1	5.58	17.94	Len	1.10	0.06	5.45
Property	Mean	S.D.	% CV																																						
SCI	138	30.66	22.22																																						
Mic	3.9	1.51	38.72																																						
Str	31.1	5.58	17.94																																						
Len	1.10	0.06	5.45																																						

5 Histograms

5.4 Overview

Histograms can be plotted for one or for multiple identifiers for a particular fiber property.

- Select the identifier(s) and the property to be plotted, then choose *Make Histogram*.



5.5 Select Identifier

The identifiers for the most recently completed tests are listed first (reverse chronological order). The current page number and the total number of pages are displayed in the upper right corner of the window (e.g., Page 1 of 6). The first number is the number of the page that is currently displayed, and second number is the total number of pages (screens) that are needed to display all the identifiers. Use the **Page Up** and **Page Down** keys to display different pages (screens) of identifiers.

When multiple identifiers are on the list, the last entry will be "All Identifiers." When it is selected, the entire list of identifiers will be included in the report.

- Select the Identifier(s) that should be included in the report (up to 10) using the arrow keys to highlight the item, then press the **ENTER** key. An arrow points to the identifier when it is selected. De-select an Identifier by pressing the **ENTER** key again to remove the arrow.
- When you have completed the selection of identifier(s), press **ESCAPE** to save the information and return to the REPORT MENU.

If you selected only one identifier, that identifier name is displayed to the right of Identifier. If multiple identifiers are to be used for the Report, an arrow is displayed on the Identifier line. If you selected *All Identifiers*, "All Identifiers" is displayed to the right of the Identifier field.

Note: *If you select Make Histogram when no identifier has been selected, a warning message window is displayed on the screen. You must select an identifier(s) before you select Make Histogram.*

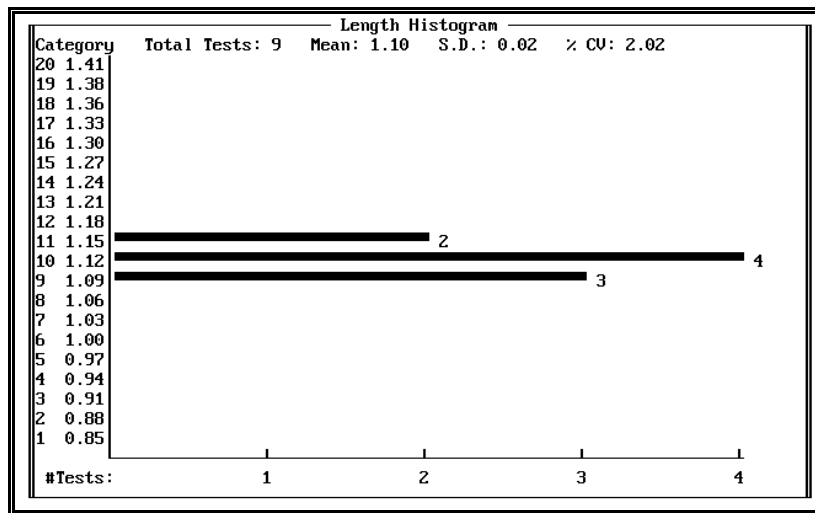
5.6 Property

A window containing a list of all the fiber properties is displayed. Use the **Arrow** keys to highlight the *property* to be plotted. The HISTOGRAM MENU will appear and the property name will be displayed and remain as the selection until it is changed.

5.7 Make Histogram

When you select *Make Histogram*, the parameters selected will be used to compose the histogram, which will display on the monitor. The category numbers and category midpoints for the property being plotted appear on the Y-axis in ascending order. The number of tests is on the X-axis. The total number of tests, average, standard deviation, and % C.V. are listed across the top of the histogram.

- After you have completed viewing the histogram, press **ESCAPE**.
- A window will display with the options to print the histogram and/or exit the report.
- **Print Histogram**—The histogram that was displayed is printed. The printout contains the Property name, time, date, company name, and the identifiers used for the histogram. You must have an Epson compatible printer that has been set to display the IBM graphics character set for the histogram to print.



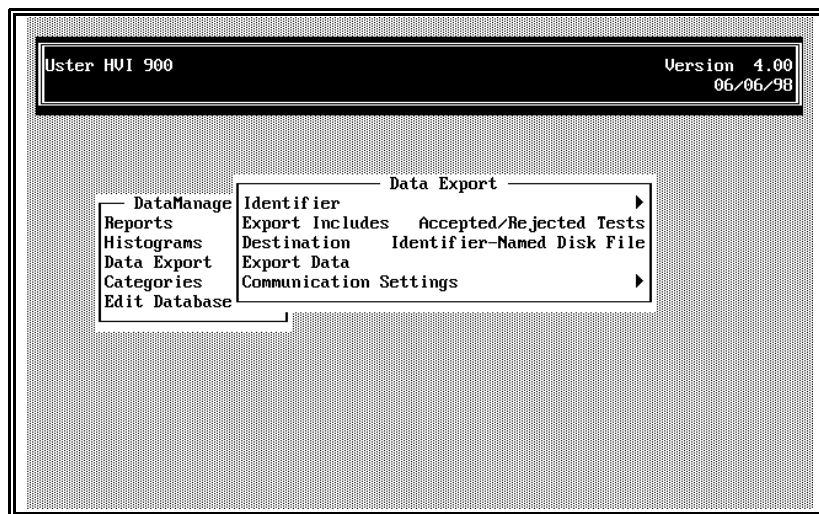
- **Exit**—Returns to the HISTOGRAM MENU window. (**ESCAPE** also returns to the HISTOGRAM MENU).

6 Data Export

6.4 Overview

The 940 DataManager can be used to export test data from the database in a format that is suitable for other computers. This is useful for moving test data to the Uster Technologies BIAS program or to your mainframe.

- Fiber Property values can be exported for one or multiple identifiers by selecting the *identifier(s)*, the property(ies) to be exported, and by checking the *Destination* and *Communications* settings. Then, choose *Export Data*.



6.5 Select Identifier

The identifiers for the most recently completed tests are listed first (reverse chronological order) in the window that is displayed. The current page number and the total number of pages are displayed in the upper right corner of the window (e.g., Page 1 of 6). The first number is the number of the page that is currently displayed, and the second number is the total number of pages (screens) that are needed to display

all the identifiers. Use the **Page Up** and **Page Down** keys to display different pages (screens) of identifiers.

When multiple identifiers are on the list, the last entry will be "*All Identifiers*." When it is selected, the entire list of identifiers will be included in the report.

- Select the Identifier(s) that should be included in the report (up to 10) using the arrow keys to highlight the item, then press the **ENTER** key. An arrow points to the identifier when it is selected. De-select an Identifier by pressing the **ENTER** key again to remove the arrow.
- When you have completed the selection of identifier(s), press **ESCAPE** to save the information and return to the EXPORT DATA MENU.

If you selected only one identifier, that identifier name is displayed to the right of Identifier. If multiple identifiers are to be used for the Report, an arrow is displayed on the Identifier line. If you selected *All Identifiers*, "All Identifiers" is displayed to the right of the Identifier field.

6.6 Test Included When Data is Exported

When data is exported, the data can include the following.

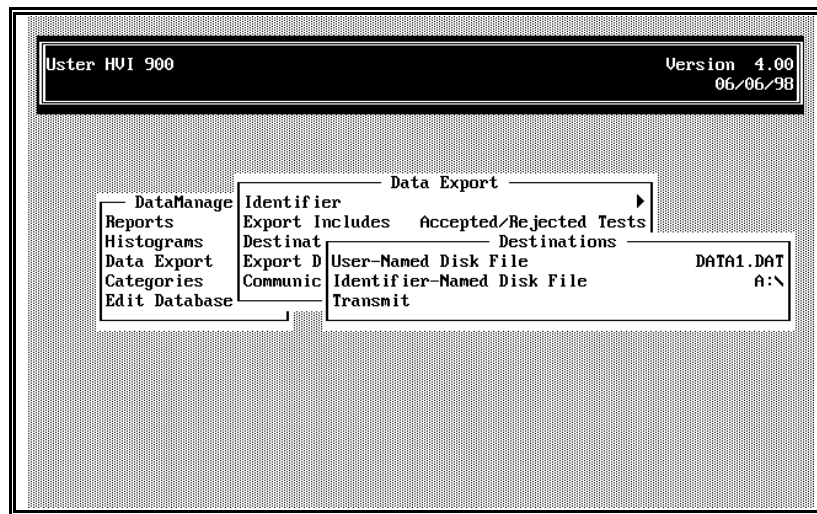
- **Accepted Tests**—Only tests that are acceptable according to the Lot Limit specification at test time are exported.
- **Rejected Tests**—Only tests that are rejected according to the Lot Limit specification at test time are exported.
- **Accepted/Rejected Tests**—All tests are exported, whether or not they are accepted or rejected according to the Lot Limit specification.

6.7 Destination for Exported Files

A window containing a list of the three options for exporting data is displayed.

- Use the **Arrow** keys to highlight your choice, then press **ENTER**.

The selected choice is displayed to the right of Destination on the DATA EXPORT MENU.



6.7.1 User-Named Disk File

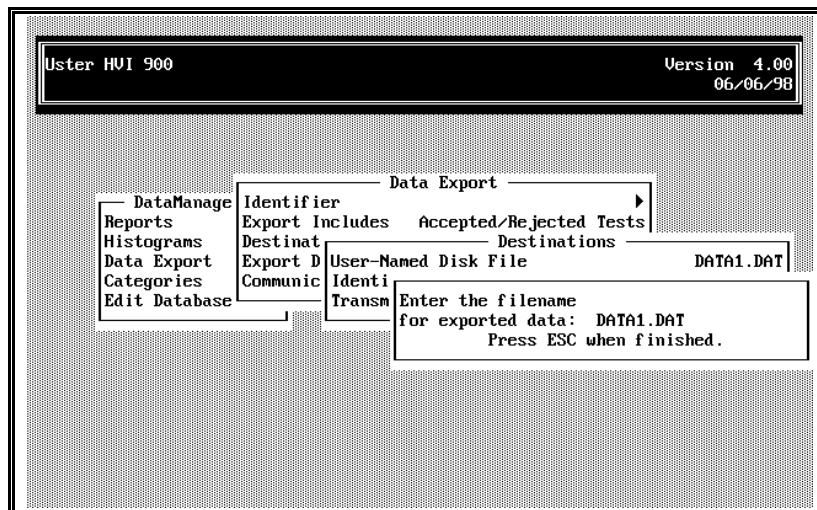
- To enter the name of the file where data will be exported, select *User-Named Disk File* and press **ENTER**.

A window is displayed where the filename (and path, if required) should be entered (e.g., if you want the exported data to be stored in a file named EXPORT.DAT and written to a floppy disk in the A:\ drive, you would type: **A:\EXPORT.DAT**).

If no path is entered, the software will put the file in the directory where the 940 DataManager program files are located.

- After entering the filename, press **ESCAPE** to return to the DATA EXPORT MENU.

User-Named Disk File is displayed on the Destination line. When *Export Data* is selected, all the data for the selected Identifiers will be placed in one file.



6.7.2 Identifier-Named Disk File

Data for each identifier that has been selected will be exported to a separate file. The filename(s) will be the same as the identifier name(s).

- If you want to use the identifier as the filename when data is exported, select *Identifier-Named Disk File* and press **ENTER**. Then, enter the path to the location where the files are to be written. After you have entered the path, press **ESCAPE** to return to the DATA EXPORT MENU.
- Identifier-Named Disk File is displayed on the Destination line.

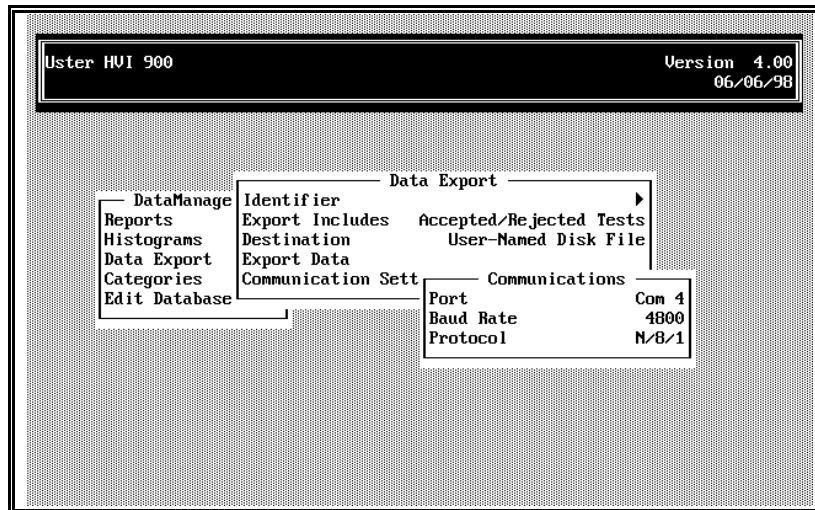
6.7.3 Transmit

The *Transmit* item on the DESTINATION MENU is used to export data over the serial port. When it is selection, the Data Export window reappears, and "Transmit" is displayed on the Destination line. When *Export Data* is selected, the data for the selected identifiers is transmitted from a serial port. The particular port and the settings are determined by the Communications Settings, which are discussed in the next section.

6.8 Communications Settings

If 940 DataManager is stored on one computer and you want to move the data to another computer, you must make sure that the communications settings are configured so that the computers can understand one another.

Once these are defined, if nothing changes in your hardware configuration, the settings will not need to be changed. During the initial configuration, you will need to define the Port to be used, the Baud Rate, and the Protocol imposed. Refer to the supplier's manuals for the computers that are to be used in the data transfer.



6.8.1 Port

The Port is the connection on the computer where the cable that carries data to another device is inserted. The following are the port options available:

- **Com 1**
- **Com 2**
- **Com 3**
- **Com 4**

- Select the *communications port* to be used for exporting data. After making your selection, press **ENTER**.

The COMMUNICATIONS MENU will reappear, and the selected communications port will be listed to the right of Port.

The internal 940 DataManager can only export to Com 4. If you select *Port* while using the internal DataManager, a message box is displayed on the screen indicating that the HVI can only export to Com 4. If you use DataManager on an external computer, all ports are available.

6.8.2 Baud Rate

This is the rate (in bits per second) at which information is transmitted over a serial path. For successful serial communication, the baud rate of the computer and peripheral must be the same. The following options are available:

- **300**
- **1200**
- **2400**
- **4800**
- **9600**
- **19200**
- **38400**
- **56000**

Select the *baud rate* to be used for exporting data and press **ENTER**.

The COMMUNICATIONS MENU will reappear, and the selected baud rate is listed to the right of Baud Rate.

6.8.3 Protocol

Protocol is a set of rules that defines how computers communicate with each other when they transmit and receive data. A window is displayed with the following options:

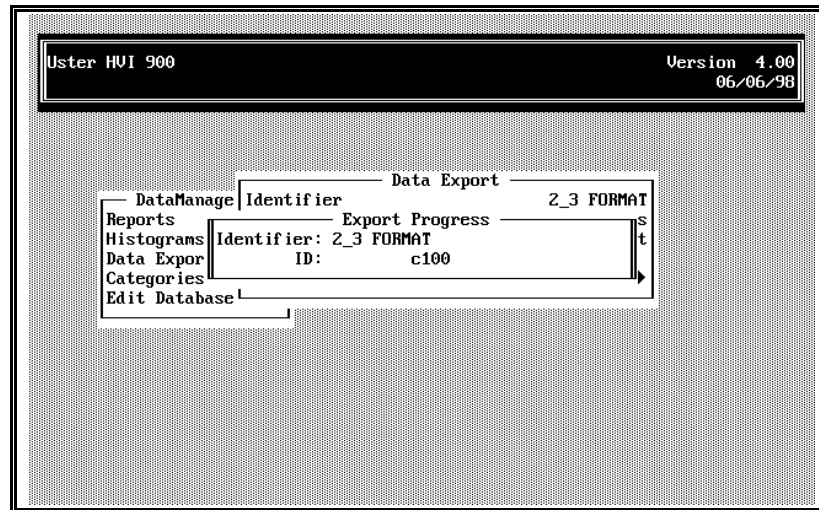
- **No Parity, 8 Data, 1 Stop**
N/8/1 appears on the COMMUNICATIONS MENU
- **Even Parity, 7 Data, 1 Stop**
E/7/1 appears on the COMMUNICATIONS MENU
- Select the *protocol* to be used for exporting data and press **ENTER**.

The COMMUNICATIONS MENU will reappear, and the selected protocol is listed to the right of Protocol.

6.8.4 Settings for Transmitting to BIAS

Baud Rate: 9600
Protocol: Even Parity, 7 data, 1 stop

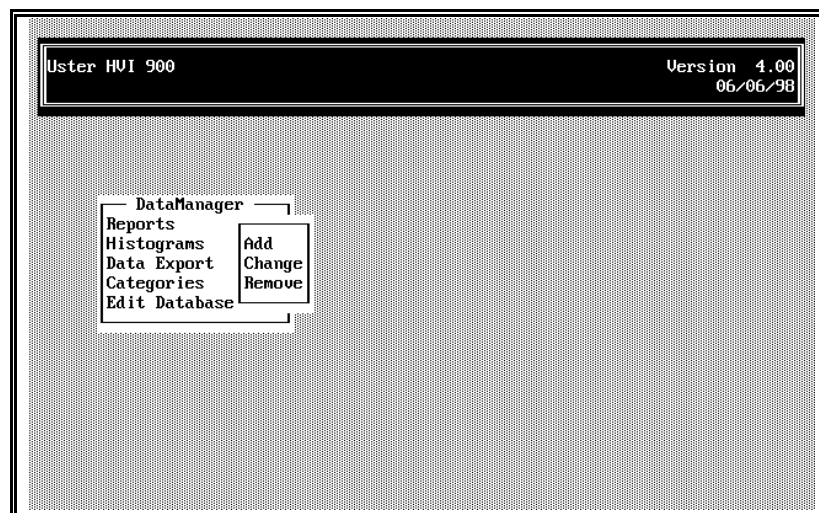
6.9 Export Data



The identifier and ID for each test that is being exported is displayed on the screen in a window labeled Export Progress. When the export process is complete, the window closes and the DATA EXPORT MENU is displayed.

7 Edit Database

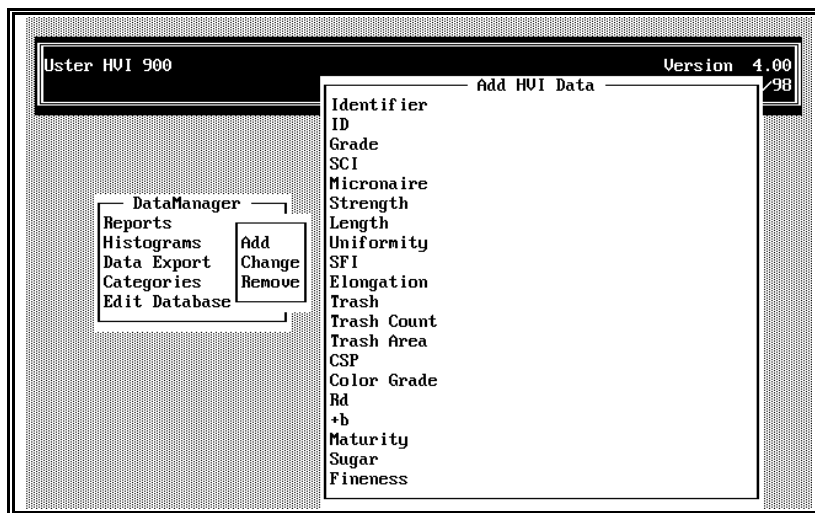
Information can be added to, changed, or removed from the database.



7.4 Add Test Data to the Database

If you have test data from a sample and want to add it to an existing identifier or create a new identifier for the data, you can do this without re-testing the sample. This selection provides two modes for adding data to the database:

- Add an ID (test) to an existing identifier, and
- Add a new identifier and an ID (test) for the new identifier.
- Select *Add* from the selection window and press **ENTER**.



7.4.1 Add an ID to a Currently Existing Identifier

To add a test (ID) to a currently existing identifier, follow these steps.

- Enter the identifier name exactly as it is in the database. Enter a new ID and all the test information. Press **ESCAPE**.

The new test is written to the database. To check that the new test is where you want it, follow these steps.

- Select *Change*. Select the *identifier name* you just entered.

All the IDs associated with the selected identifier are listed, including the one you just entered.

- Press **ESCAPE** to exit to the EDIT DATABASE MENU.

7.4.2 Add a New Identifier

To add a new identifier, follow these steps.

- Enter a new identifier name. Then, enter a new ID and all the test information. Press **ESCAPE**.

The new identifier and new test are written to the database. To check that the new identifier has been included in the database, follow these steps.

- Select *Change* and then select the *identifier name* you just entered.

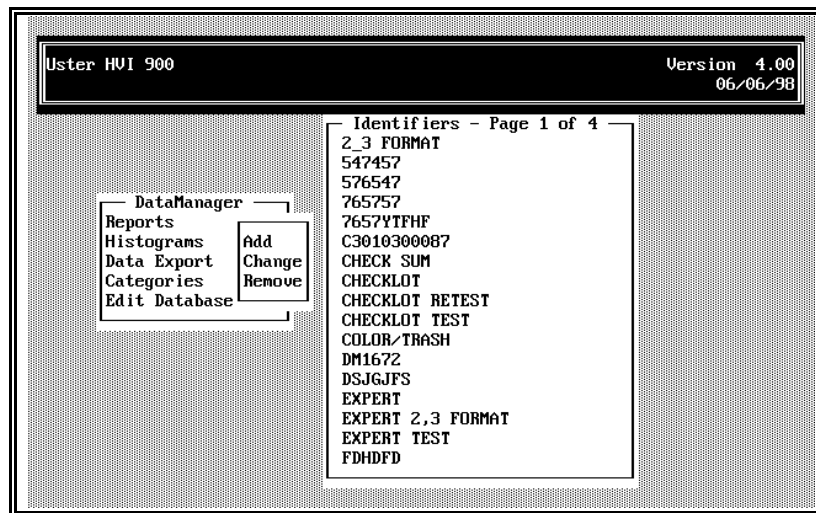
The test you just entered is listed for the new identifier.

- Press **ENTER** to review the data for the ID. Press **ESCAPE** to exit to the EDIT DATABASE MENU.

7.5 Change Test Data in the Database

This selection provides a mode for changing specific test data.

- Highlight *Change* from the selection window and press **ENTER**.



The Identifier window is displayed on the screen. All fiber property values can be changed; however, the identifier and ID cannot be changed. Use the **Arrow** and **Page Up/Page Down** keys to highlight the identifier that is to be changed; then press **ENTER**. A window listing all the tests that are associated with the selected identifier is displayed.

- Highlight the ID (test) that is to be edited and press **ENTER**.

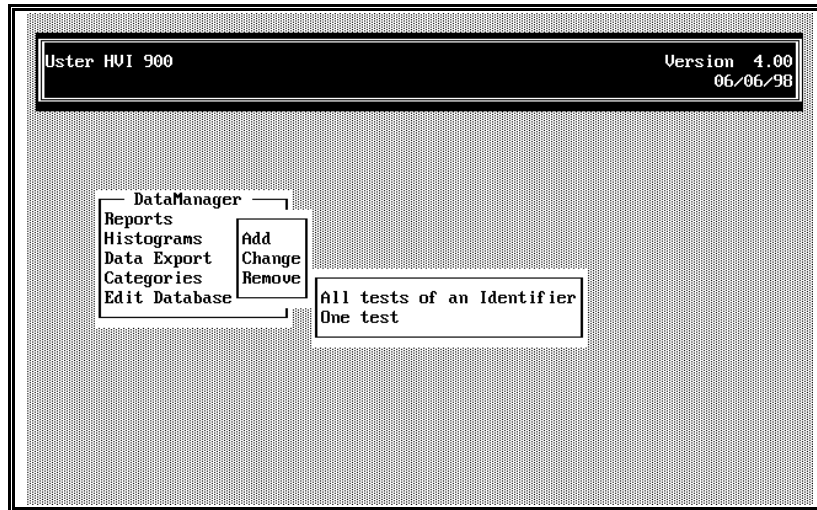
CHANGE HVI DATA window is displayed containing the current values for all the fiber properties.

- Move the cursor to the property to be changed, and enter the new value. Press **ENTER** to move to the next property. When you have completed all the changes, press **ESCAPE**.

7.6 Remove Test Data from the Database

This selection provides a mode for deleting data from the database.

- Highlight *Remove* from the selection window and press **ENTER**.



Tests can be removed from an identifier by one of two methods:

- **All Tests for an Identifier**—All tests for a particular identifier are deleted at the same time.
- **One Test**—A single test is deleted from a particular identifier.

7.6.1 Remove All Tests for an Identifier

To remove an identifier (or multiple identifiers) and all tests for the selected identifier(s), follow these steps.

- Select one or more identifier name from the window listing the all identifiers, and press **ESCAPE**.

A confirmation window is displayed for each identifier that was selected.

- Press "**Y**" to delete an identifier and all its associated tests, or press "**N**" to abort the deletion process without deleting the identifier.
- Check that the identifier has been deleted by selecting Remove.

The identifier is no longer in the identifier list.

- Press **ESCAPE** to exit to the EDIT DATABASE MENU.

7.6.2 Remove One Test from an Identifier

To remove one test from an identifier, follow these steps.

- Highlight the identifier name from the window listing all the identifiers, and press **ENTER**.
- Highlight the test to be deleted from the window listing the IDs for the identifier, and press **ENTER**.

A window is displayed with the identifier name, and the ID.

- Press "**Y**" to delete the test, or press "**N**" to abort the deletion process without deleting the test.
- Check that the test has been deleted by selecting *Remove*, then *identifier*.

The ID list is displayed. The deleted test is not included.

- Press **ESCAPE** to exit to the EDIT DATABASE MENU.

Chapter 9 HVI Applications

3 HVI Applications

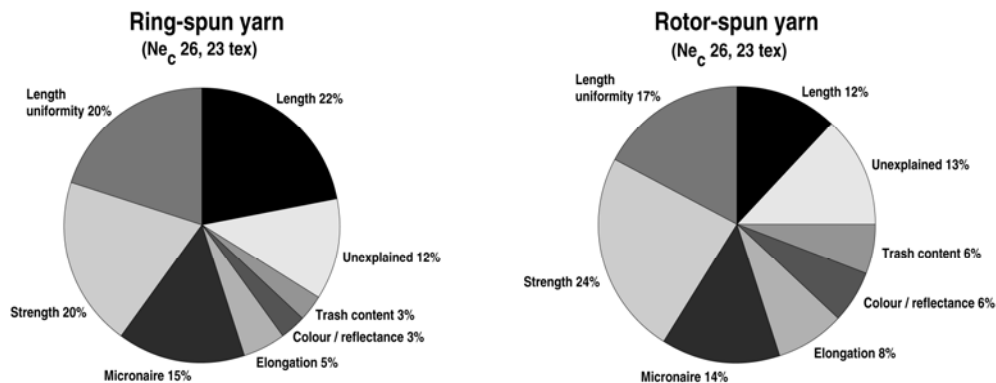
The HVI can be used in a variety of applications in the cotton industry. Some of these applications are listed below.

- ◆ **Cotton Seed Breeders** — Verify progress in attaining goals in development of new varieties of cotton.
- ◆ **Cotton Producers and Government Standards** — Grading and Classification for use in establishing the loan value and spot market price of cotton.
- ◆ **Cotton Merchants/Shippers Cotton Consumers/Spinners** — Verify published data on cotton classification and assemble even-running lots for spinning.
- ◆ **Cotton Research** — Basic research and investigation of various physical properties of textile fibers.

4 Importance of Testing Fiber

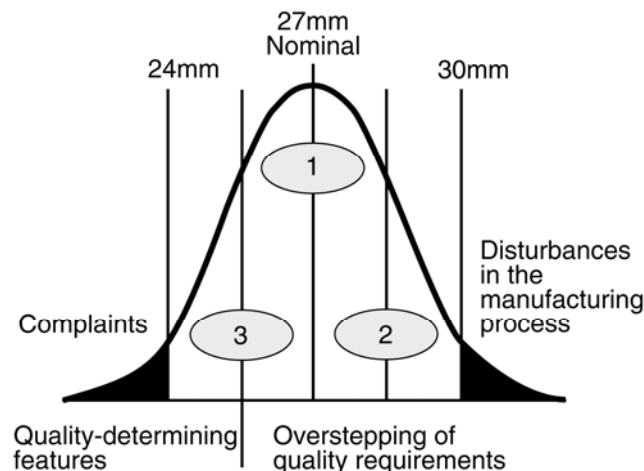
4.4 Fiber Properties that Influence Yarn Strength

Research has concluded that there is a relationship between fiber properties and yarn properties. For this reason the testing of raw fiber properties is important to the cotton spinning mill to predetermine yarn strength and spinning production. Research conducted by Cotton Incorporated (USA) and Uster Technologies indicates the influence of HVI measured fiber properties on yarn strength. When spinning a Ne 26, one can see that length, length uniformity, strength, and micronaire predict over 75% of possible variation in yarn strength. It is evident that length combined with length uniformity account for between 30 to 44% of the variation in yarn strength in both rotor and ring spun yarns. The unexplained 12 to 13% portion is variation resulting from the process or the measurement of other fiber properties not yet measured.



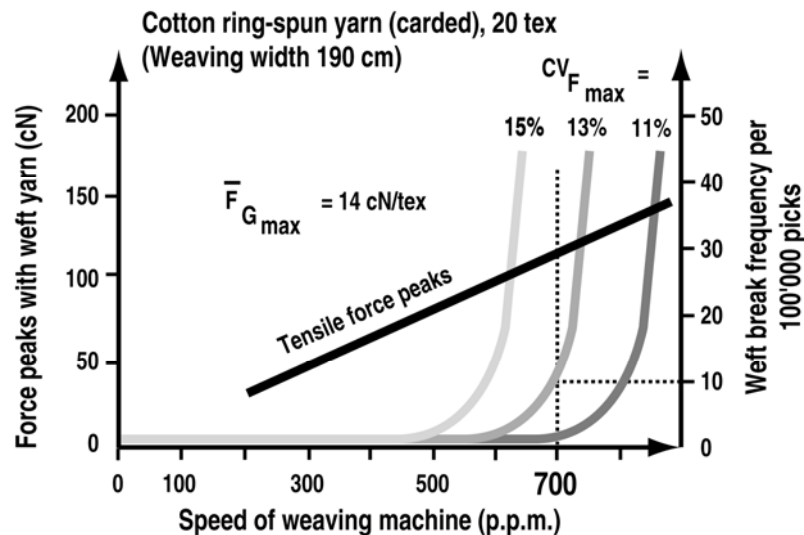
5 Applications of HVI Results for Spinning Mills

The speed of the HVI instrument allows every bale of cotton to be tested. The challenge then becomes how to effectively use the information to improve the spinning process. All cotton has a natural variation of fiber properties. Some of these variations are small but others may be quite large. This variation is greatest between bales of cotton grown with different seed varieties. We also find variation of fiber properties within a cotton seed variety. Many factors influence the variation of fiber properties. These include growth area, climate, planting and harvesting practices. A typical distribution of the length variation of cotton with a 27-mm staple length is shown below. These types of normal distributions apply to almost all of the fiber properties measured by the HVI instrument.



Yarn must finally either be knitted or woven into fabric. The increase of weaving speeds and efficiency has placed new demands on the yarn produced by modern spinning mills. The graph below shows what happens when new high-speed looms are put into production without an accompanying improvement of yarn quality. Because of the higher loom speeds, yarn that produced acceptable end breaks per 100,000 picks now becomes unacceptable, producing very low weaving efficiency. Single end yarn strength is one vital influence in yarn end breaks in weaving.

The next graph shows the influence of yarn strength, as well as yarn strength CV%, on the weaving end breaks. Higher speed weaving machines need yarn that is not only stronger but also yarn that has a better yarn strength CV%. This improvement in CV% is needed to reduce the strength variation and reduce the number of weak places in the yarn.



According to research, a correlation between many fiber and yarn properties exists. For ring spun yarns, one can see that neps, trash and fiber fragments influence yarn imperfection values the most. This is because of the yarn construction, which causes foreign matter to be on the exterior of the yarn core. For rotor spun yarns, it is evident that neps, trash and fiber fragments influence imperfection values and breaking tenacity. Again, this is due to the construction of rotor spun yarns, where foreign particles and neps tend to be on the inside of the yarn core.

Ring Spinning

Yarn Fiber	Evenness (U%/CV%)	Thin places Thick places Neps/100 m yarn Classimat faults/100 km yarn	Breaking tenacity	Breaking elongation (E_{Fmax} %)	Hariness (H)
Fiber length	1	2	3	4	5
Micronaire value	6	7	8	9	10
Nep content Leaf content Trash content Microdust content Fiber fragments content	11	12	13	14	15
1/8" Breaking strength	16	17	18	19	20
1/8" Elongation	21	22	23	24	25
Color/Reflectance	26	27	28	29	30

Significant correlation
 Good correlation
 Little or no correlation

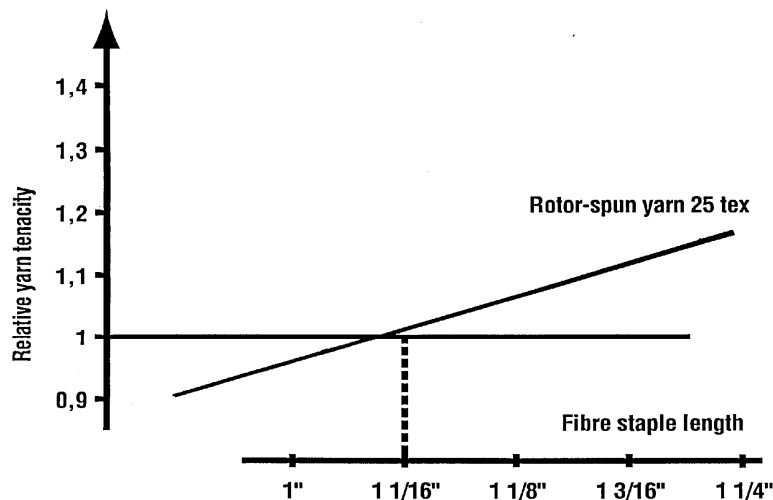
Rotor Spinning

Yarn Fiber	Evenness (U%/CV%)	Thin places Thick places Neps/100 m yarn Classimat faults/100 km yarn	Breaking tenacity	Breaking elongation (E_{Fmax} %)	Hariness (H)
Fiber length	1	2	3	4	5
Micronaire value	6	7	8	9	10
Nep content Leaf content Trash content Microdust content Fiber fragments content	11	12	13	14	15
1/8" Breaking strength	16	17	18	19	20
1/8" Elongation	21	22	23	24	25
Color/Reflectance	26	27	28	29	30

Significant correlation
 Good correlation
 Little or no correlation

5.4 Influence of Staple Length and Yarn Strength

Textile research further indicates that as cotton staple length increases so does the strength of the resulting yarn. Generally, longer staple cottons tend to be finer, thereby allowing a greater number of fibers per cross-section in yarn.

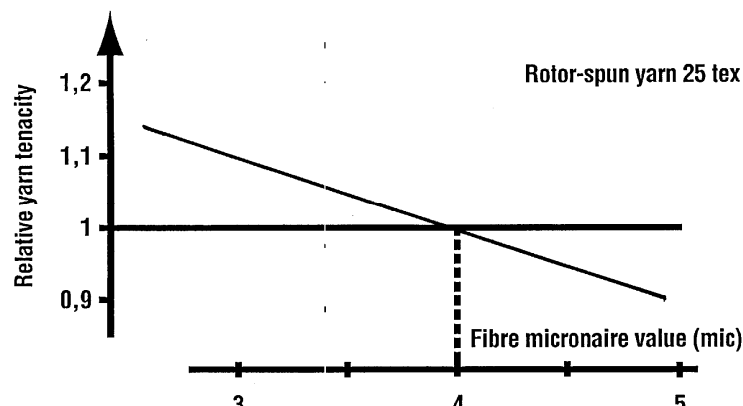
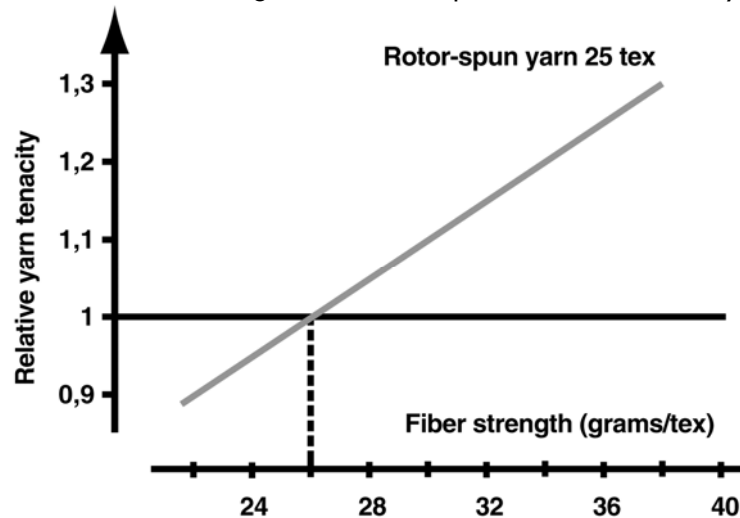


5.5 Influence of Fiber Strength on Yarn Strength

Textile research indicates that as cotton staple strength increases so does the strength of the resulting yarn. Generally, longer staple cottons tend to be finer and therefore stronger.

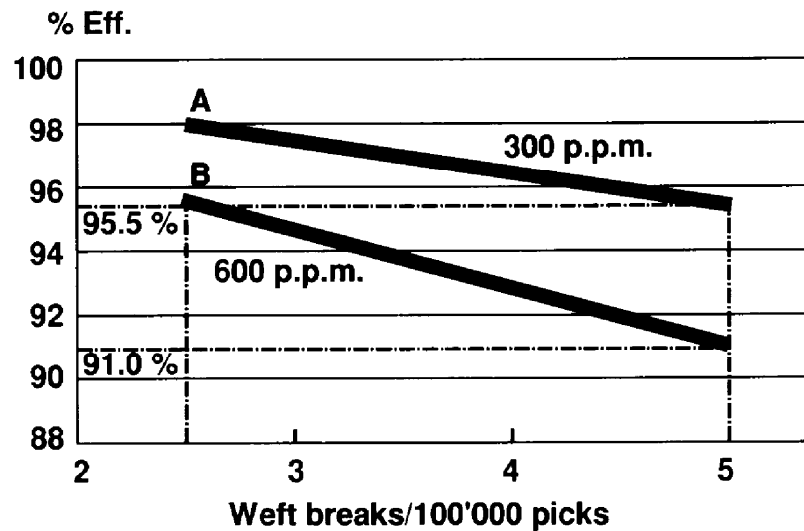
5.6 Influence of Micronaire and Yarn Strength

Textile research indicates that micronaire influences the amount of fibers per cross-section, thereby affecting yarn strength. Generally, lower micronaire fibers are smaller in perimeter, and thus finer, allowing more fibers per cross-section. Conversely, as micronaire increases, fibers become coarser allowing fewer fibers per cross-section in yarn.



5.7 Weaving Efficiency

The efficiency of weaving is affected by the speed of modern looms. The attached graph indicates a Picks Per Minute (PPM) increase from 300 to 600. This results in a decrease in overall efficiency from 95.5 % to 91.0 %. In addition, the corresponding weft breaks are indicated. This information was obtained from European Weaving mills, which produce various products (source: Sulzer-Ruti, Switzerland).



6 Using HVI Cotton Merchandising

6.4 Invention of Fiber Testing Instruments

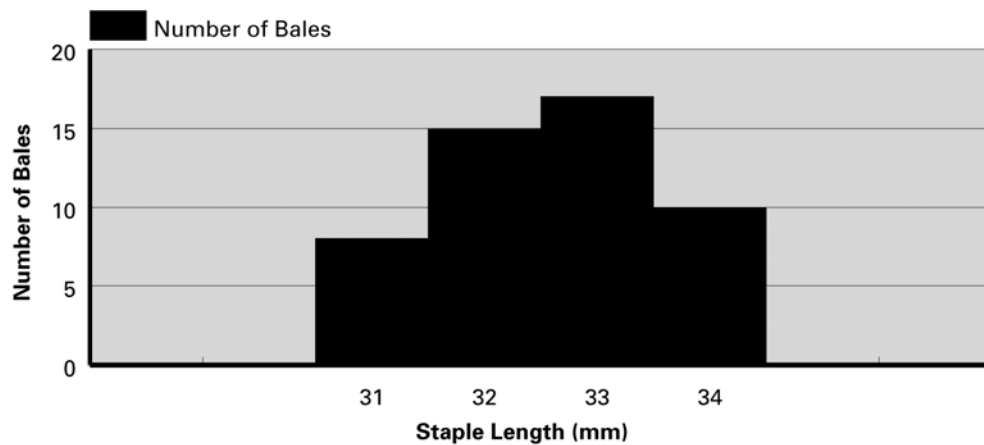
During the 1940's, several innovations in fiber instrumentation were developed. These include the micronaire, which estimates fineness; the Spinlab Hunter-Nickerson Cotton Colormeter; the Pressley and Spinlab Stelometer, which estimates fiber strength; and the Spinlab Fibrograph, which estimates fiber length. In 1982, cotton was subjected to length measurements by the Suter-Webb Fiber Sorter and, if found to have proper length, selected cotton was used to produce the official standards. For the past 30 years, staple length standards have remained amazingly constant as verified by the Suter-Webb Sorter and the Uster Fibrograph.

6.5 Using the Fibrograph

The Fibrograph has long been established as the instrument to measure fiber length for purchasing and setting machinery in the spinning mill based on a combination of visual and quantitative analyses.

A fundamental principle of marketing is to put yourself in the place of your customers and to consider problems from the customer's point of view. The most common problem to all cotton spinners is the desire to purchase fibers that will allow them to select even running nixes. Although we cannot physically change the fiber characteristics in bales, we can group bales together so that they may spin consistently. This concept is generally termed by the spinning mill as bale management. Upon testing several bales for fiber length, one will quickly see a distribution. In other words, there will be an average with bales below or above that average.

The Liverpool Cotton Association Circular reports world cotton by its variety, grade, and staple length. Most spinning mills purchase cotton by variety, staple length, and trash content – usually in that order of importance. By segregating the bales within a variety based on staple length, one gains vital knowledge of fiber length.



Segregation of these bales into length categories allows the cotton to be evaluated prior to selling. This method increases the value added of each lot by the merchant and provides the mills cotton with tighter specification and less variation. The spinning mill can segregate lots by length for purchase verification, which will allow them to channel the various length groups for the appropriate cotton count or end product specification.

The two examples below use the length data from the following graph. The first example describes how a cotton merchant can utilize the data and the second example describes how a mill buyer might use the data.

6.6 Example of the Fibrograph Used by a Merchant

Fifty bales (one lot) of cotton were spot purchased at a gin by a merchant. One to two bales of this lot were visually checked and identified to be an MCU-5 variety, fine grade with a staple length of 31 mm ($1 \frac{1}{4}$ "). Following the purchase, the merchant took several bale samples from the lot and a fiber length distribution was plotted. The average staple length was found to be 33 mm ($5 \frac{5}{16}$ "). It was found that several bales were above the average, at staple lengths of 34 mm ($1 \frac{1}{8}$ ") and 36 mm ($1 \frac{7}{16}$ "). These bales could be sold at premium.

By segregating these bales, the merchant was more accurately able to market cotton within a variety to mills desiring those particular lengths. Since several of the bales within the lot could be sold at premium length, the entire lot increased in value. This increased the potential revenue to the merchant and provided the mill with a cotton lot having less total variation.

6.7 Example of the Fibrograph Used by a Mill Buyer

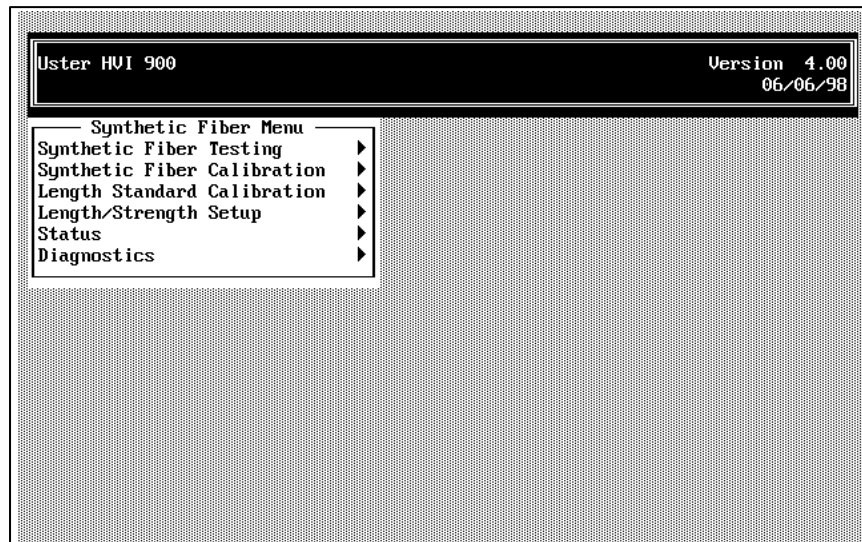
A lot (50 bales) of cotton was spot purchased by the mill cotton buyer with a minimum staple length of 33 mm ($1 \frac{5}{16}$ "), MCU-5 variety with fine grade. Following the purchase, the mill buyer took several bale samples from the lot and a fiber length distribution was plotted. The average staple length was found to be above the average at 36 mm ($1 \frac{7}{16}$ "). These bales were segregated and placed into a mix producing a finer cotton count.

By segregating these bales, the mill buyer was more accurately able to segregate the cotton by staple length into appropriate mixes. This provided the mill with cotton having less overall variation. Over time, this mix uniformity will improve spinning production and improve product consistency.

Chapter 10 Synthetic Fiber Testing

The Synthetic Fiber Testing mechanism for the HVI 900 SA is accessed by selecting *Synthetic Fiber Testing* from the MAIN MENU.

As it is selected, the Motor Controller information window is displayed, and a series of tests is performed. When the tests are complete, the SYNTHETIC FIBER MENU is displayed. This menu includes the items used to initiate the testing process, perform calibration and setup procedures, change the status, and check the diagnostics. Each of these items is discussed in this section.



The philosophy behind synthetic fiber testing differs from cotton in that cotton is tested to compare an individual sample to the absolute values of the calibration standards. The test results determine the natural *quality* of the cotton. Synthetic fiber testing determines if the quality has been maintained in the *production or use* of the fiber. When using synthetic fibers, it is important to know whether or not they will perform the same when processed as the same type of fiber has performed in the past. The relative measurements determined by synthetic fiber testing provide this information.

Generally, when testing synthetic fibers on the HVI, strength and elongation measurements are used to determine whether or not quality has been maintained.

Calibration for synthetic fibers differs from calibration for cotton in two ways.

- Calibration standards are not determined by an outside source. The calibration and testing values are keyed in during initial setup for each designated type of synthetic fiber that is to be tested (typically at the same time calibrations for cotton are performed). The values for Elongation and Strength are usually determined by testing the fiber on a different instrument, such as a Stelometer.
- Only a single calibration standard exists per fiber.

Calibration is a routine procedure that each operator should perform once per shift per fiber tested. The HVI automatically performs a calibration check at startup. As a general rule, when the type of fiber being tested is changed, another calibration procedure should be performed. If changes are made during this re-calibration process, the Pass/Fail screen reads "Calibration" in the header. If nothing has changed, the header of the Pass/Fail screen reads "Calibration Check."

If fiber types are changed frequently, and thus re-calibration is performed frequently, yet no changes occur, it might not be necessary to re-calibrate as often. This is a judgment call that should be based on experience with fiber testing on the HVI instrument.

If only one type of synthetic fiber is tested, the HVI should be re-calibrated daily as a minimum.

3 Length/Strength Setup

Length/Strength Setup menu item is to be used by Service Technicians only to perform the Lens to Break and Deflection Calibration, and the Short Fiber setup.

IMPORTANT

THE LENS TO BREAK AND THE DEFLECTION CALIBRATION MUST BE DONE PRIOR TO CALIBRATING FOR COTTON/SYNTHETIC FIBERS. Cotton/Synthetic Fiber calibration is invalid if the Length Standard or Lens to Break values are modified. Contact an authorized Uster Technologies Service Technician to perform these setup features if necessary.

3.4 Synthetic Fiber Calibration

All fiber types must be calibrated during initial setup in the following order: length standard, lens to break and then calibration to the various fiber types (e.g., cotton). If these have been performed for cotton at the time of setup, there is no need to repeat these calibrations for synthetic fibers; the same values are used in both programs.

However, if these have not been set up during initial calibrations, do so using the instruction that follow in this section.

The SYNTHETIC FIBER CALIBRATION MENU is used to perform synthetic fiber calibration. It contains the following menu options: Fiber Calibration, Number of Tests, and Calibration Status.

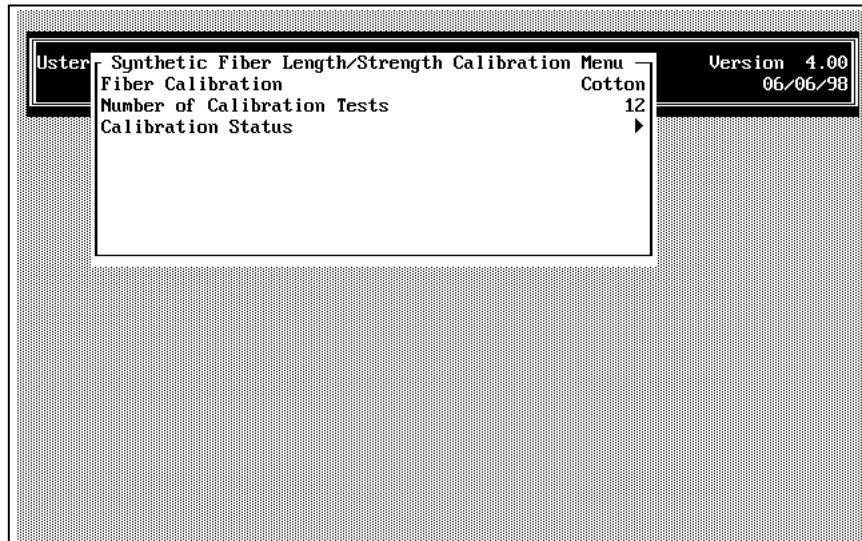
Note: *Micronaire cannot be calibrated for synthetic fibers. It must be calibrated during the cotton calibration process.*

3.5 Length Standard Calibration Menu

- Use the arrow keys to highlight the LENGTH STANDARD CALIBRATION MENU item from the SYNTHETIC FIBER MENU, then press **ENTER**.

Note: *The metal length standard must always be entered in inches even though the fiber measurements may be made in millimeters.*

The metal length standard is used to check and update the accuracy of the value that measures the distance from the comb transport's home position to the center of the optics.

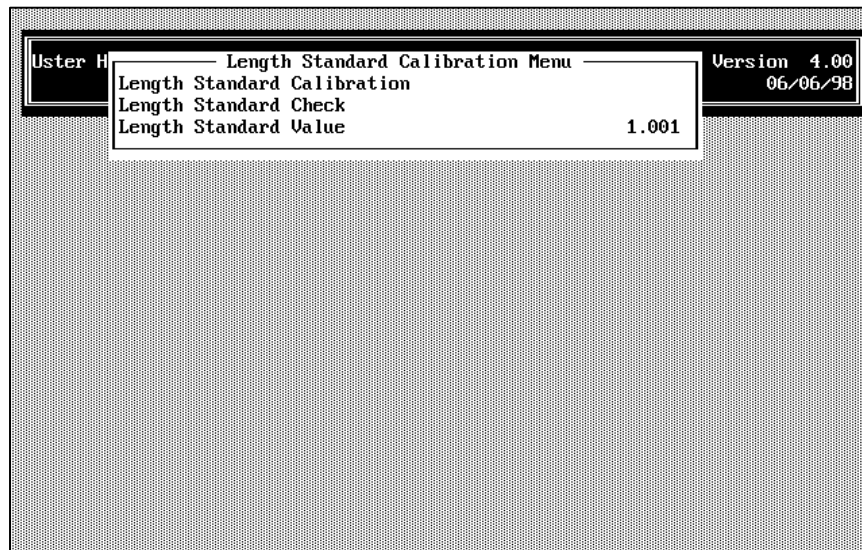


Only use the metal length standard that is provided with the instrument for this calibration. If the metal length standard is changed, a corresponding change must be made in the values entered in the software.

In typical daily operation, the metal standard does not need to be used. It should only be done when there is a Fail situation in the Calibration procedure every time a test is performed.

3.5.1 Length Standard Calibration

Length Standard Calibration is performed following these steps.



- Use the arrow keys to highlight the LENGTH STANDARD CALIBRATION item from the LENGTH STANDARD CALIBRATION MENU, then press **ENTER**.
- Insert the metal length standard into the right side of the comb track of the Length/Strength module. Press the comb in a left direction through the opening at the right side of the track to position it in front of the clamping mechanism.
- Remove your hands and other objects from the area and press **ENTER** to begin the test. The instrument will perform the test using the length standard and then display the results indicating whether the value measured *Passed* or *Failed*.
- After the test is complete, remove the metal length standard by pushing it from the left side of the track the right side using your

fingers or another narrow object such as another fibrocomb until it can be pulled from the right side and removed.

If the metal length standard will not slide in/out from the track easily, refer to the following instructions to raise the cabinet top and insert/remove the comb. Swing the monitor to the side so that the cabinet top can be lifted. Make sure no loose objects are lying on the cabinet top. Lift the cabinet top, making sure that the brace on the rod spring lock is engaged when the cabinet top is raised. The blower will automatically shut off when the top is lifted.

- Slide the length standard along the track into the comb holder, and position it in front of the clamping mechanism.
- Flip the brace from the locked position, and lower the cabinet top to its original position. The blower will automatically turn on after the top is closed.
- Press **ENTER** to begin the test. The instrument will perform the test using the length standard and then display the results indicating whether the value measured *Passed* or *Failed*.
- After the test is complete, raise the cabinet top, and slide the metal length standard to the right along the track to remove the length standard. Lower the cabinet top to its original position.

If the standard measurement is within 0.004 inches of the actual standard value, the instrument returns to the Length/Strength Calibration Menu when you press **ENTER**.

Len/Str Length Standard Analysis			
Standard Value	Measured	Tolerance	
1.100	1.100	0.004	Pass
Press < Enter > to continue			

If the value is greater than ± 0.004 inches of the actual value, a Fail indication is displayed. The instrument adjusts the software and stores the new data. The test must be repeated until the length standard value is within ± 0.004 inches of the actual standard length standard value, which is indicated by a "Pass" on the screen.

If the standards measurement is within ± 0.004 inches of the actual standard value, the instrument returns to the LENGTH/STRENGTH CALIBRATION MENU when you press: **ENTER**.



CAUTION:

When the calibration procedure has been completed, manually slide the length standard back to the right and out of the comb track. This is an important step!

Attention: If the instrument is not able to bring the length standard calibration within tolerance after several cycles (i.e., if there is a continuous Fail), reset the instrument, and try the length standard procedure again. BEFORE YOU RESET, REMOVE THE METAL LENGTH STANDARD FROM THE COMB TRACK.

3.5.2 Length Standard Check

The Length Standard Check screen is used by Service Technicians to give the repeatability of the length standard value. This measures, but does not change, the total travel.

3.5.3 Length Standard Value

The value for the metal length standard is listed on the standard that is provided with the instrument. Do **not** use a metal length standard other than the one provided with the instrument. If, for some reason, a new metal length standard is required, this menu item is used by Service Technicians to enter the new value.

3.5.4 Number of Calibration Tests

Before performing a calibration, the number of repetitions that should be performed per test should be established. This is done using the *Number of Calibration Tests* item on the SYNTHETIC FIBER TESTING MENU.

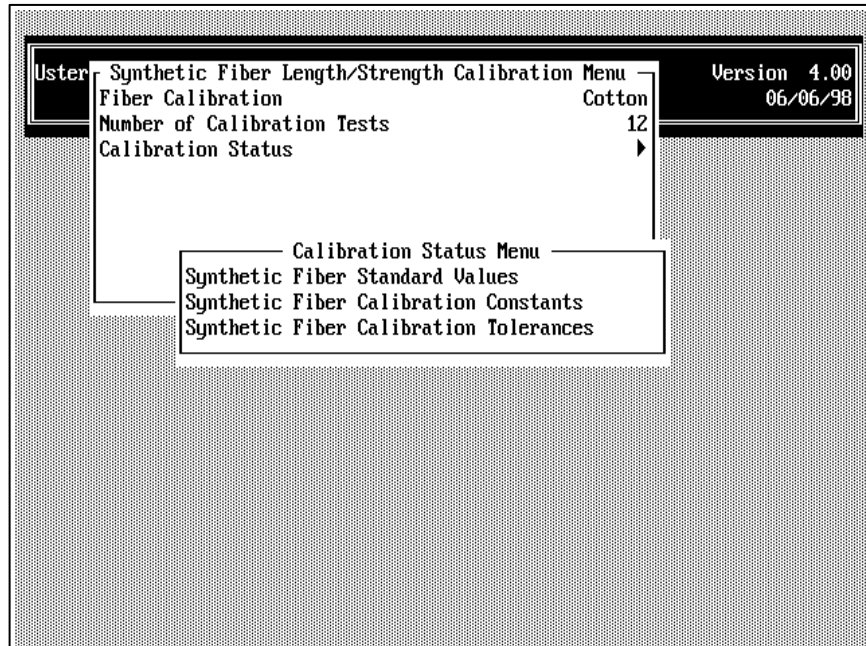
- Select the *Number of Tests* item using the arrow keys, then press the **ENTER** key.
- Each calibration will consist of 4, 8 or 12 tests. To change the number of tests, enter 4, 8 or 12 at the prompt, then press ENTER.

Although performing four (4) tests is an option, it is advised that at least eight be performed, particularly if there is a great deal of variation in the fiber or the sampling of the fiber.

3.5.5 Calibration Status

Once the number of tests to be performed has been established, the Calibration Status data should be entered.

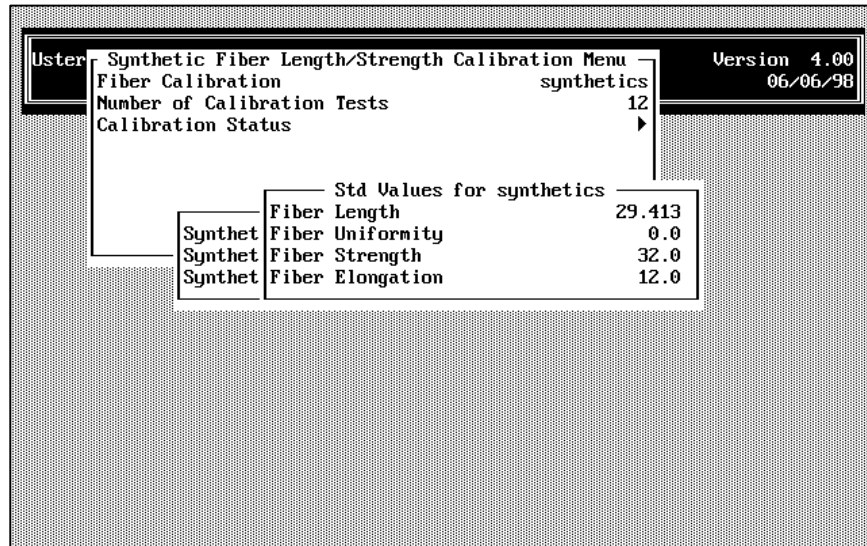
- Select the *Calibration Status* item from the SYNTHETIC FIBER CALIBRATION MENU.



It contains three menu options: Synthetic Fiber Standard Values, Synthetic Fiber Calibration Constants, and Synthetic Fiber Calibration Tolerances. Each is discussed below.

3.5.5.1 Synthetic Fiber Standard Values

The values entered on Synthetic Fiber Standard Values screen will be displayed and used as the Standard Values for Calibration. If no value is entered for Elongation, Uniformity, or Strength, that property will not be calibrated.

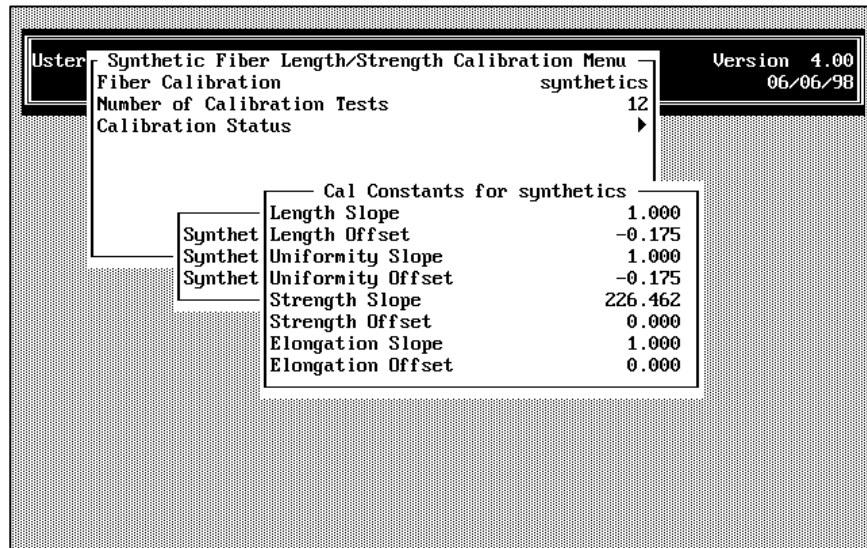


The Fiber Length value entered here will be displayed on the Calibration Test Screen as the Len 2 standard value. Len 1 is calculated by multiplying Len 2 times Uniformity divided by 100.

- Change the values by using the arrow keys to highlight the item, then press the **ENTER** key. Enter the value at the prompt, and then press **ESCAPE** to save the data.

3.5.5.2 Synthetic Fiber Calibration Constants

- Change the values by using the arrow keys to highlight the item, then by pressing the **ENTER** key. Enter the value at the prompt, and then press **ESCAPE** to save the data.

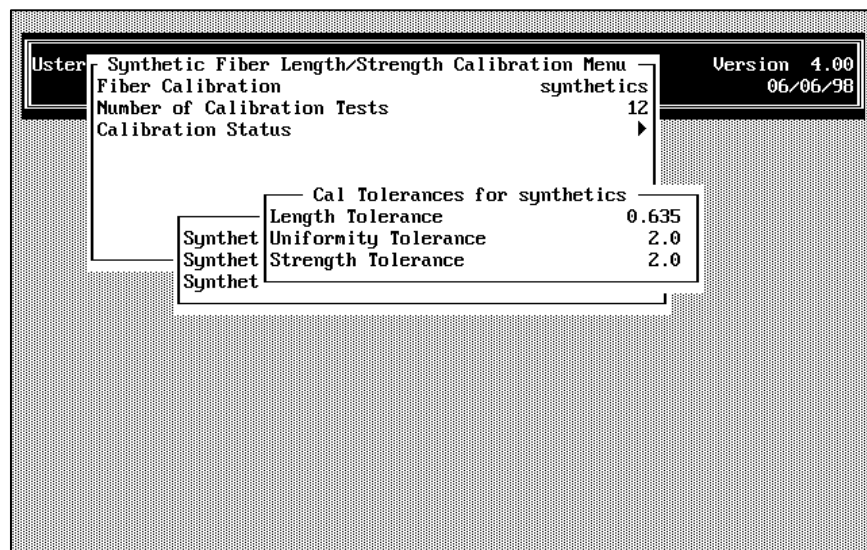


The system is shipped with the following default values:

- ◆ All offsets are 0
- ◆ All slopes are 1 except for strength slope. The strength slope default value is 200.

3.5.5.3 Synthetic Fiber Calibration Tolerances

The Synthetic Fiber Calibration Tolerance values should be about 1.5 to 2.0 times the standard deviations obtained during testing. If the standard deviation for strength is 1 gram per tex, the strength tolerance should be set to 1.5. If this method does not work for the fiber being tested, the strength tolerance should be increased to 2.0.



3.5.6 Fiber Calibration

Once the number of tests has been established, the fiber calibration can begin.

- Select the Fiber Calibration item from the SYNTHETIC FIBER CALIBRATION MENU.

The top of the Synthetic Fiber Calibration screen lists the current calibration values for Len 1, Len 2, Uniformity, Strength, and Elongation.

The standard values that were entered on the SYNTHETIC FIBER STANDARD VALUES screen are listed above each property name.

The screen will prompt you to perform the number of calibration tests that was established on the SYNTHETIC FIBER CALIBRATION MENU.

As the tests are completed, the results are displayed and the test counter (i.e., Test X of XX) is incremented until the specified number of tests has been completed.

Synthetic Fiber Test Results for rayon						
ID # 321	Len 1	Len 2	Uniformity	Strength	Elongation	4 - Wait Comb Amount
<div style="display: flex; justify-content: space-between;"> <div> Length/Strength Module Procedures ----- Test 1 of 8 Len/Str Status ----- Optics -7 Force -1.34 </div> <div> OPERATIONS----- Press <Esc> to exit Press < ! > to reject Press < # > to set motors </div> </div>						

- After you have completed the test series (4, 8 or 12 tests), the average values are calculated. Press **ENTER** to continue.

A Pass/Fail screen is displayed with the Standard Values, Average, and Tolerance. Any necessary adjustments are made to the Slope and Offset for the properties so that the calibration will be within tolerance.

As long as the difference between the Average and the Standard Values are within Tolerance, the calibration will pass.

- To continue, press **ENTER**. A printout containing individual test data, low, high, range, average, and standard values will be generated.

Note: *If you did not enter a calibration value for uniformity or elongation, the calibration procedure will not calibrate that property.*

If one or more of the properties fail calibration, the following message is displayed.

You have failed Calibration Check.
Press **C** to continue calibration or **E** to exit.

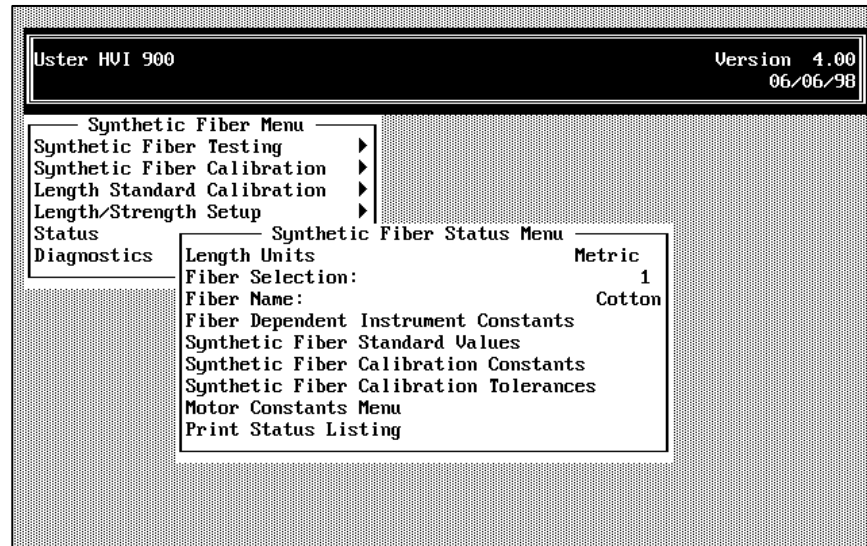
- If you press C to Continue, the Calibration screen will re-appear and the tests must be run again. Only the properties that failed calibration will be affected by this re-calibration.
- If you press E to Exit, the CALIBRATION MENU will appear.

The calibration process will continue indefinitely as long as calibration continues to fail. However, no changes are made to the calibration file until all properties pass.

4 Status

4.4 Synthetic Fiber Status Menu

Access the SYNTHETIC FIBER STATUS MENU by selecting the *Status* item from the SYNTHETIC FIBER MENU by using the arrow keys to highlight the item, then press **ENTER**.



4.4.1 Length Units

This menu item is used to select the unit of measurement to be used during synthetic fiber testing. It can be set to English or Metric using the **ENTER** key.

4.4.2 Fiber Selection

This item is used to select the fiber number that is to be tested. Parameters are set during definition that can vary based on the type of fiber being tested. Allowable values are from 1 to 100.

4.4.3 Fiber Name

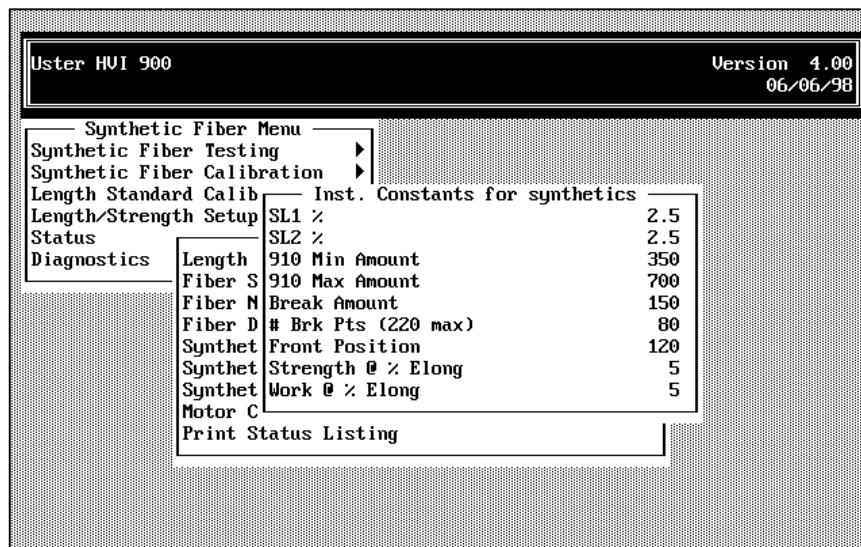
This selection allows you to enter the name for a new fiber. The name you type will overwrite the current name for the fiber number. You can enter type up to sixteen (16) characters for the fiber name. Fiber names that contain all blanks will be excluded from the Status Listings.

4.5 Fiber Dependent Instrument Constants

Each of the items defined on this menu will be associated with the fiber that is named in the header of the window. The items on this menu should be defined for each fiber selection. Type the values, which are appropriate for the selected fiber.

4.5.1 SL1% & SL2%

SL1% and SL2% are the percentages used to calculate Len1 and Len2 as reported in calibration and testing. Uniformity is 100 times the ratio of Len1 and Len2.



For fibers cut to the same length, it is recommended that SL1% and SL2% be set to the same value (for instance 2.5). For fibers that contain a distribution of lengths, it is recommended that SL1% be 50.0 and SL2% be 2.5.

4.5.2 910 Min Amount & 910 Max Amount

These numbers define the minimum and maximum sample size to be tested for each fiber. Because of the distinct optical properties of various fibers, an amount of 200 does not denote the same sample size for different fibers. Therefore, experience with a particular fiber is necessary to determine the amount.

4.5.3 Break Amount

This number represents the amount of fiber to be broken. As with 910 Min and Max Amounts, because of the distinct optical properties of various fibers, the same number (such as 100) does not denote the same mass for different fibers.

A value of 100 should be used as an initial value and the sample tested. The breaking force should be observed, and the break amount adjusted so that the breaking force is in the 30 to 60 pound range.

4.5.4 # Break Points

If you change the number of Break Points (220 max), the motors will be re-loaded when you exit the STATUS MENU. The break points determine the travel of the breaker system, and thus, the measurable elongation. A large value will allow you to measure high elongations, but will require additional time in the measurement test cycle.

4.5.5 Front Position

Front Position should be left at 120 unless the sample near the comb prevents the beard from entering the optics cleanly (i.e., thick areas may jam). In this case, the front position can be changed to 160 to provide more room for the sample near the comb to enter the optics.

4.5.6 Strength @ %Elongation

This is the percent elongation at which the secondary strength measurement is calculated. In some situations, this may indicate the blend ratio of the sample.

4.5.7 Work @ %Elongation

This is the percent elongation at which the secondary work measurement is calculated. In some situations, this may indicate the blend ratio of the sample.

To change the value of any of the items on this menu, follow these steps.

- Select the item from the menu using the arrow keys, then press the **ENTER** key.
- A window is displayed with the name of the parameter to be defined. Type the new value, then press **ENTER**. The window will close and the FIBER DEPENDENT INSTRUMENT CONSTANTS MENU will display with the new value displayed beside the parameter.
- If you want the value to remain unchanged and have not typed anything in the blue box, simply press **ENTER** to return to the FIBER DEPENDENT INSTRUMENT CONSTANTS MENU.
- If you accidentally enter a value in the window, use the backspace key to delete the information you typed, then press **ENTER**. The original value will remain.

4.6 Synthetic Fiber Standard Values

This menu item is used to enter the standard Fiber Length, Fiber Uniformity, Fiber Strength, and Fiber Elongation.

- Change the values using the same procedure that is used to change the Fiber Dependent Instrument Constants.

4.7 Synthetic Fiber Calibration Constants

This menu is used to enter the values for Length Slope and Offset, Uniformity Slope and Offset, Strength Slope and Offset, and Elongation Slope and Offset.

- Change the values using the same procedure that is used to change the Fiber Dependent Instrument Constants.

4.8 Synthetic Fiber Calibration Tolerances

This menu is used to enter the tolerance values for Length, Uniformity, Strength, and Elongation.

- Change the values using the same procedure that is used to change the Fiber Dependent Instrument Constants.

4.9 Motor Constants Menu

This menu is used to define the motor constants that are the same for all types of fibers. **Most of these menu items should not be modified without consulting a Uster Technologies Service Technician.**

- Change the values using the same procedure that is used to change the Fiber Dependent Instrument Constants.

When values are changed on the MOTOR CONSTANTS MENU, the motors will be re-loaded when you exit the SYNTHETIC FIBER STATUS MENU.

Uster HVI 900		Version 4.00 06/06/98	
— Motor Constants for synthetics —			
— Synthetic Fiber		Breaker Slope	100
Synthetic Fiber Testi		Breaker Read Rate	100
Synthetic Fiber Calib		Breaker Move Rate	500
Length Standard Calib		Breaker St. Count	30000
Length/Strength Setup		Brusher Forward	1400
Status		Brusher Reverse	50
Diagnostics		Brusher Time Brush	100
Length		Brusher Time Clean	250
Fiber S		Brusher Rate	1500
Fiber M		Brusher Slope	80
Fiber D		Brusher St. Count	20000
Synthet		Comb Read Rate	1700
Synthet		Comb Move Rate	1700
Motor C		Comb Slope	90
Print S		Comb St. Count	20000

Note: *Brusher Forward, Breaker Read Rate, and Comb Read Rate are the only items that should be changed without consulting Uster Technologies.*

In general, the comb and breaker rates for synthetic fiber must be lower than for cotton. The lower comb rate is a result of the fact that static electrical forces are higher in Synthetic fiber than in cotton. Thus, more time should be allowed for the fibers to position themselves in the air stream. The lower breaker rate results in greater torque available from the breaker motor.

4.9.1 Brusher Forward

This controls the distance the brusher moves forward. A change of 100 represents a change of 0.125" (inches) in travel.

4.9.2 Breaker Read Rate & Comb Read Rate

This controls the speed of the motors when data is taken.

4.10 Print Status Listing

This item is used to print the current system parameters, which includes all the synthetic fibers that have been defined, as well as their current definitions.

Make sure that your printer is plugged in, has paper, and is on line before selecting *Print Status Listing*. When this item is selected, and the **ENTER** key is pressed, the printout will start immediately.

Use the printout as a reference for determining fiber numbers and the values associated for each fiber's parameters.

If the status listing will not print correctly (the data seems corrupt or you experience an overflow error), you might need to re-start the system with the initial values. To do this:

- Exit from the program, but remain in the same directory.
- Delete the file 900FIBER.DAT.
- reset the system.

As the software is loaded, it will automatically recreate the 900FIBER.DAT file with the initial values if this file does not exist.

5 Synthetic Fiber Testing

5.4 Explanation of the Fiber Testing Menu

Generally, if an item is selected from this menu and an instruction line is displayed below the menu requesting information, you must enter information for that field. This is true even if you decide that the information already displayed on the screen does not need to be changed.

Uster H Synthetic Fiber Sample Testing Menu for synthetics		Version 4.00
Continue with Testing		06/06/98
Identifier	123	
Number of Tests	8	
Fineness Data	Micronaire	
Strength Measurement	Yes	
Printer	On	
Print Mode	Extended Measurements	
Graph Mode	None	
External Computer	Off	
DataManager	On	
Reject Sample to Computer/DataManager		

5.4.1 Continue with Testing

This selection displays the screen (Synthetic Testing Screen) that is used for testing Synthetic fibers.

5.4.2 Identifier

This is a required field if the test data is to be printed or transmitted. You cannot proceed to *Continue with Testing* without entering information in the Identifier field.

When *Identifier* is selected, a window will display where the identifying number (up to 30 alphanumeric characters) of the fiber to be tested should be entered. The identifier information is displayed to the right of *Identifier*. This number remains in effect until the next time the Identifier field is changed. Data is stored for the 940 DataManager or transmitted to an external computer based on the identifier. Each identifier is a separate file.

- When you have finished entering the identifier information, press **ENTER** to leave the instruction statement.

5.4.3 Number of Tests

This selection displays an instruction statement below the menu requesting the number of tests that are to be performed on each sample (maximum of 10 per sample). Enter the desired number of tests and press **ENTER**. This number will remain in effect for all Synthetic Fiber Testing until it is changed.

5.4.4 Fineness Data

Micronaire is a measurement of specific surface [the ratio of surface area (mm^2) to the fiber volume (mm^3)]. For cotton fibers, it is useful in determining the cell wall thickness (volume of cellulose) within varieties that have the same fiber perimeter. For Synthetic fibers, the measurement is useful in determining if there is a change in denier, in fiber finish, or in the cross-section shape (surface area). Therefore, it is a useful measurement for screening variations in production. Unlike in cotton where Micronaire is used for calculating strength, micronaire has no influence on the strength measurement in Synthetic fibers.

The *Fineness Data* selection alternates between None, Micronaire and keyboard.

- ◆ **None** — No fineness value will be required for testing.
- ◆ **Micronaire** — The fineness value will be determined by performing the micronaire test. A message line is displayed on the test screen requesting that the sample be weighed and tested. This value is not used in strength calculation, but will be reported on the screen, transmitted, and/or printed.
- ◆ **Keyboard** — The fineness value will be entered via the keyboard. A message line is displayed requesting that you enter the micronaire value to be used.

If you have determined fiber size using some other instrument, such as a fibroscope, you can enter the test value via the keyboard. This value is not used in the strength calculation, but will be reported, transmitted, and/or printed.

5.4.5 Strength Measurement

This selection alternates between No and Yes.

- ◆ **No** — Strength will not be measured during testing.
- ◆ **Yes** — Strength will be measured during testing.

5.4.6 Printer

This selection alternates between Off and On.

- ◆ **Off** — Test data will not be sent to the printer.
- ◆ **On** — Test data will be printed as the test is completed.

5.4.7 Print Mode

You can select the type of data printed from the test results. The selections alternate between:

- ◆ **Averages**
- ◆ **Individual Tests**
- ◆ **Extended Measurements**

5.4.8 Graph Mode

You can select the type of graph to be printed from the test results. The selections alternate between the following.

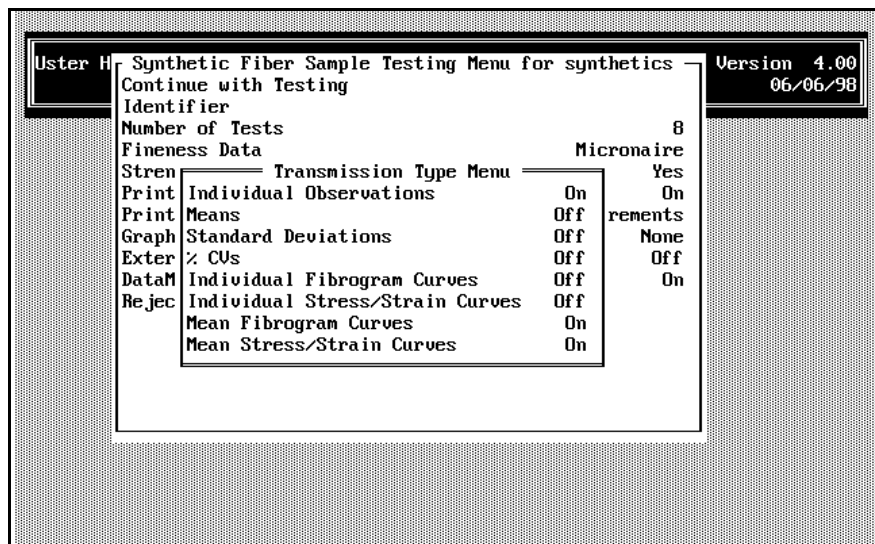
- ◆ **None**
- ◆ **Fibrogram**
- ◆ **Stress/Strain**
- ◆ **Fibrogram & Stress/Strain**

5.4.9 External Computer

This selection alternates between Off and On.

- ◆ **Off** — Test data will not be transmitted to an external computer.
- ◆ **On** — Test data will be transmitted to an external computer. A new screen, Transmission Type, is displayed. Two additional items are added to the SYNTHETIC FIBER SAMPLE TESTING MENU if one or more items on the TRANSMISSION TYPE MENU are set to On. The two items are: *Reject Sample to Computer/DataManager* and *Sign-off External Computer*.

If all items on the TRANSMISSION TYPE MENU are set to **OFF**, no additional items are displayed on the TRANSMISSION TYPE MENU.



5.4.10 DataManager

This selection alternates between Off and On.

- ◆ **Off** — Data will not be available for use by the 940 DataManager.
- ◆ **On** — All test data will be available to the 940 DataManager where it can be used in the future.

5.4.11 Reject Sample to Computer/DataManager

This selection is available when the External Computer and/or DataManager is On.

When the test results for the last sample tested should be rejected, a signal is sent to the computer/DataManager that the previous sample tested is to be rejected. The test results for the rejected sample will not be included in any mathematical analyses performed on the samples listed for that identifier.

5.4.12 Sign-off External Computer

This selection is available when External Computer is ON if one or more items on the TRANSMISSION TYPE MENU is set to ON. If External Computer is ON, but all items on the TRANSMISSION TYPE MENU are set to OFF, this selection is not displayed.

5.5 Explanation of the Synthetic Fiber Testing Screen

Access the Synthetic Fiber Testing Screen by selecting the *Continue with Testing* item from the SYNTHETIC FIBER SAMPLE TESTING MENU AND then **ENTER**.

The Synthetic Fiber Testing Screen displayed is similar to the one used for Module Testing. This screen displays the results from each test as well as the average of all the tests for each sample. You can perform up to 10 tests per sample, depending on the number set on the SYNTHETIC FIBER SAMPLE TESTING MENU.

The Optics and Force (and Temperature and Relative Humidity if selected) values are continuously updated and displayed at the bottom of the screen.

5.6 Synthetic Fiber Testing Procedures

- If the testing options have been set up so that an ID is required, enter up to 12 alphanumeric characters for the bale identification number via the keyboard or scanner. Be sure the number is entered correctly, and then press **ENTER**.
- If a fineness value is required (via either Keyboard or Micronaire), "Enter Fineness:" is displayed on the screen. Enter a micronaire value between 2.0 and 8.0, and press **ENTER**.

Synthetic Fiber Test Results for synthetics					
Len 1	Len 2	Uniformity	Strength	Fin= Elongation	Amount
Length/Strength Module Procedures ----- OPERATIONS-----					
Enter I.D. ?					
Len/Str Status -----					
Optics		Force			

If the fineness value is to be determined via the micronaire test, "Mic from 8.5 to 11.5 grams of fiber. Mass:" is displayed. Weigh the sample on the balance, and then place the sample in the chamber for the test.

If the Fineness Value is set to None, the Operations options (listed below) are displayed immediately after the ID has been entered. If None is selected, the system default value of 4.0 is used.

- The following Operation options will display after the ID and fineness value (if required) have been entered.
 - Press **ESCAPE** to exit
 - Press <!> to reject (To reject the last test)
 - Press <#> to set motors

Note: *If the fineness value is to be entered via keyboard, a value between 2.0 and 8.0 MUST be entered. Once a fineness value has been entered, the Operations selections (listed above) will be displayed. At this point, you can press **ESCAPE** to exit Length/Strength Module Testing or press **ENTER** to continue.*

- To proceed with testing, make a sample beard using a Fibrocomb and the Fibrosampler. The proper technique for preparing sample combs is described in the Fibrosampler chapter.
- Place the sample in the comb track on the Length/Strength console with the beard extending toward the black brushing surface; the instrument performs the Length/Strength tests.
- When the tests have been completed, the results are displayed on the Synthetic Fiber Test Results for xxx screen. Perform the remaining tests, until the required number of tests have been completed.

When all the tests on a sample have been completed the average (AVG) is displayed. The standard deviation is displayed if the number of tests is five or greater. If you want to reject the last sample, even though it was within tolerances according to the current Lot Limits specification, press **<! >**. The last sample will be rejected and another test requested. Otherwise, press **ENTER** to accept the data.

The screen is cleared of the test results and either "Enter ID" or "Enter Fineness" is displayed on the instruction line for the next sample. Each time a test series is completed, you must enter a new ID number (if required) and fineness value (if requested) for the next sample.

5.6.1 To Exit Testing

The test cycle is continuous. When you are finished with testing, use the following steps to exit.

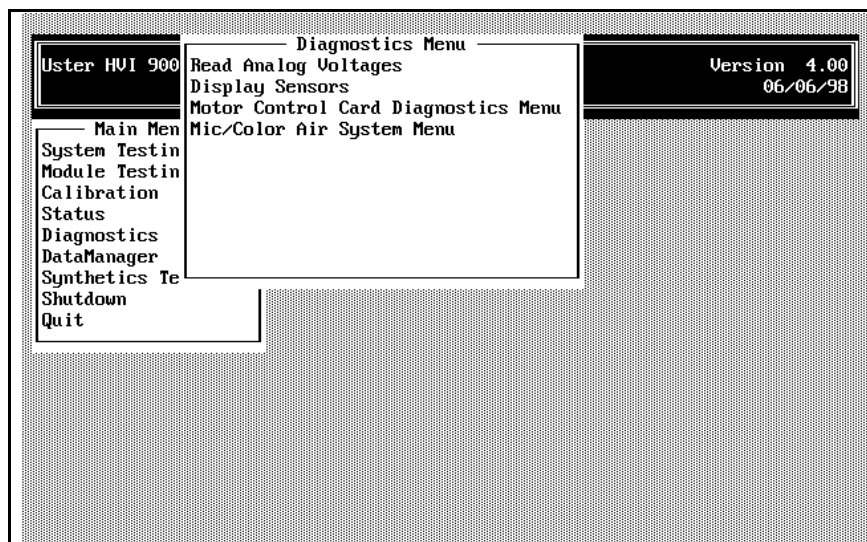
- After a test series is complete, a blank Test Results Screen is displayed requesting that you either "Enter ID" or supply the micronaire value (if required). Press **ENTER** at "Enter ID" (if required).
- If entering the fineness value via the keyboard, "Enter Fineness" is displayed. Enter any value between 2 and 8. If the value is to be determined via the micronaire test, "Weight from 8.5 to 11.5 grams of fiber. Mass" is displayed. Press **ENTER**. "Enter" is displayed. Type any value between 2 and 8, then press **ENTER**. Once a value has been entered the Operations options are displayed.
 - Press **ESCAPE** to exit
 - Press **<!>** to reject (To reject the last test)
 - Press **<#>** to set motors
- Press **ESCAPE** to exit.

Chapter 11 System Diagnostics

The HVI 900 System provides software for testing individual instrument circuits and components. The Diagnostics section is intended to be used by Service Technicians during routine checks, troubleshooting, and maintenance. However, at some point you might be directed to access the DIAGNOSTICS MENU by Uster Technologies personnel. This chapter explains how to access the System Diagnostics.

- Highlight *Diagnostics* from the MAIN MENU, and press **ENTER**.

Note: Depending on the configuration of your system, the menus and screens shown may be different from those in this manual. The manual reflects a system with Length, Strength, Micronaire, Color, and Trash Modules.



The Diagnostics Menu contains the following items that are used to troubleshoot problems.

- ◆ Read Analog Voltages — This screen displays various system information such as: system pressure, b, Rd, temperature, etc.
- ◆ Display Sensors — This screen lists the setup information.

- ◆ Motor Control Card Diagnostics Menu — This screen is used to individually test each component of the Strength/Length hardware.
- ◆ Micronaire/Color Air System Menu — This screen is used to individually test each component of the Micronaire/Color and air system hardware.

Chapter 12 HVI 900 System Maintenance

The HVI 900 System has been designed to reduce maintenance to a minimum. However, to keep the instruments in top condition, a few tasks must be performed routinely.

3 Cleaning the System

Maintenance can be divided into four categories:

- ◆ As required
- ◆ After each shift
- ◆ Daily
- ◆ Weekly

3.4 As Required

Excess cotton should be removed from the Fibrosampler 192-1 carding plate as required. Refer to the chapter titled "Fibrosampler 192" for details on cleaning and maintaining the Fibrosampler.

3.5 After Each Shift

After each shift, the excess fiber that has gathered in the instrument during the measurement procedures should be removed using a vacuum cleaner.

- Swing the monitor arm away from the Length/Strength cabinet so

that the top of the cabinet can be lifted.

- Lift the top of the Length/Strength cabinet, and vacuum all areas under the cover. Pay particular attention to cleaning the comb track area.
- After cleaning, close all doors and covers to their original positions.

3.6 Daily

The Lint Waste Box on Version 3 instruments should be cleaned daily.

- The vacuum on the box is relieved using the vacuum ON/OFF switch on the front panel, by opening the instrument doors, or by raising the top. Use the handles to open the lint/waste box doors and remove all fibers from the lint box by hand. Clean the filter inside the waste box with a brush (or vacuum cleaner) removing all loose material. Upon completion, close the door. Both doors must be closed for proper operation.
- Using a clean, dry cloth; wipe off the two rails on which the comb assembly moves left and right.
- Clean the Color Window.
- Inspect the computer's Cooling Fan Filters, and clean if necessary.

3.7 Weekly

Check the Inlet/Filter air filters at least once a week to see if water has collected in the filter. If so, remove the water by pushing the release valve on the bottom of the glass bulb.

4 Service

A qualified Uster Technologies Service Technician should perform Service on the HVI 900 System. Factory service is available at the home office and field service is available worldwide. Contact Uster Technologies, Inc. for current service rates.

We will gladly provide technical assistance by telephone, telefax, or telex. Refer to the title page of this manual for the appropriate phone numbers.

Chapter 13 Fibrosampler 192

3 General Information

3.4 Purpose of the Instrument

The Uster Technologies' Fibrosampler 192 is an instrument that uses a Fibrocomb to form a sample beard of randomly selected fibers. The beard, which is held by the Fibrocomb, is placed in Uster Technologies' Fibrograph to test for span length or the HVI Semi-Automatic to test for span length, length uniformity, and strength (tenacity).

The instrument responds to operator technique so that with a little experience, high-quality samples can be produced time after time for statistically reliable and repeatable results.

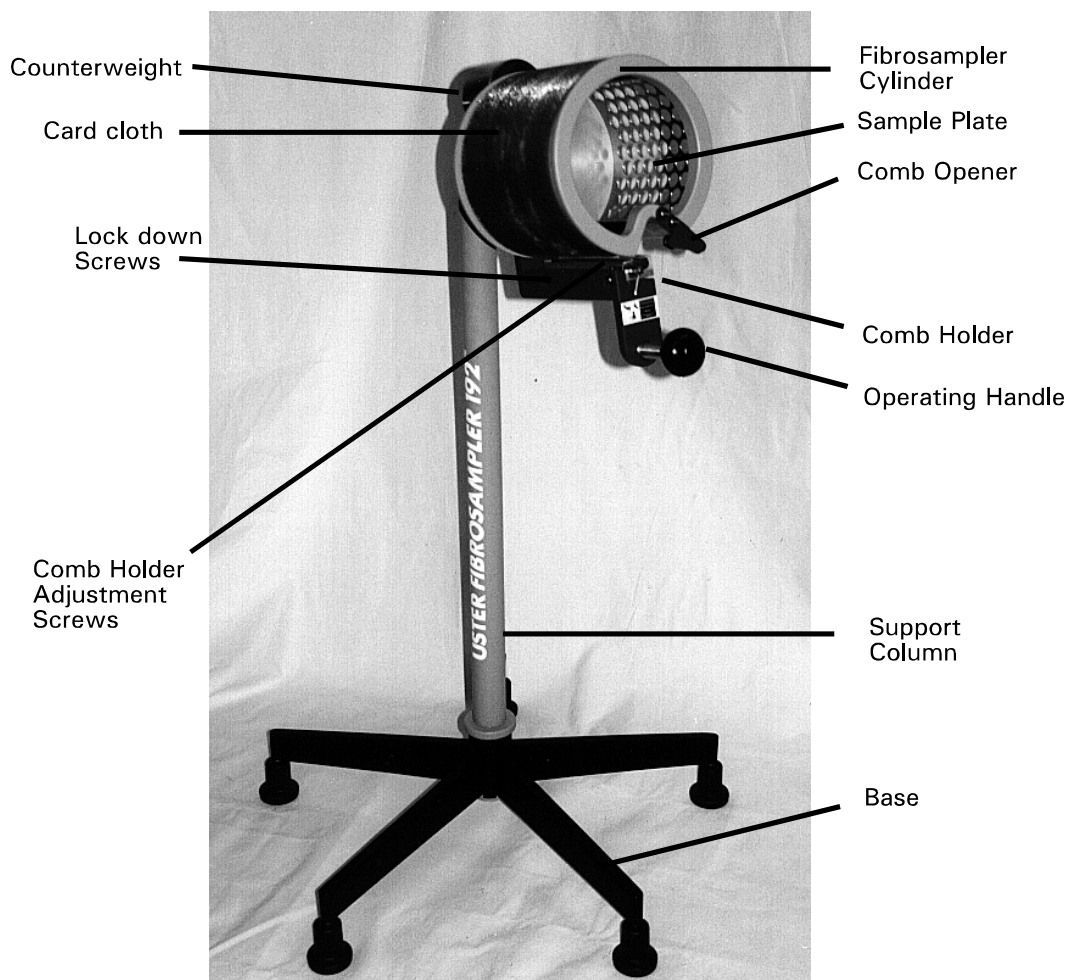
3.5 Description

The Fibrosampler 192 is a floor-standing unit that consists of a heavy base, a support column, and a sample preparation mechanism.

The sample preparation mechanism consists of a stationary cylinder that is open at the operator's end with a sample plate on one side and card cloth on the other. The counter-weighted Fibrocomb holder is attached co-axially to and rotates around the cylinder.

A sample beard is gathered and prepared by first placing a Fibrocomb in the holder and a sample of fiber into the drum. While the left hand presses the fiber through the holes in the sample plate, the right hand rotates the comb randomly gathering fiber in the Fibrocomb's needles. Once past the sample plate, the left hand is withdrawn while the right hand continues to rotate the sample beard over the card cloth, which aligns and cleans it of loose fiber.

When the comb holder has completed one revolution, the Fibrocomb is ready for removal.



3.6 Theory of Operation

Sample beard preparation is a critical step in any scientific test procedure that strives to achieve statistically valid and repeatable results. The Fibrosampler 192 selects a random sample by presenting to the Fibrocomb a series of small staggered tufts. These are created by the hole pattern in the sample plate against which the fiber is pressed. The result is that the comb does not select fiber only at the point of initial contact with the sample, but it continues to select fibers from each tuft as it passes over the entire sample.

The sample beard is cleaned of loose fiber and combed by the card cloth. The card cloth is positioned at a gradually decreasing distance from the Fibrocomb as it passes. This ensures the gradual cleaning and parallelization of the sample while minimizing fiber damage.

The Fibrosampler is responsive to operator technique, allowing an experienced technician to use variations in hand opening and pressure against the sample plate to achieve consistent high-quality sample beards. The technician's recognition of a given sample's need for opening and quantity of pressure, along with the ability to inspect and add fibers in additional passes, ensures control of the sample beard quality.

The Fibrosampler 192 is mechanically simple and durable. It will produce top-quality samples for the testing of span length, length uniformity, and strength.

3.7 Safety Warning Labels

There is one Safety Warning label on the Fibrosampler 192. It is located on the front near the Fibrosampler handle.



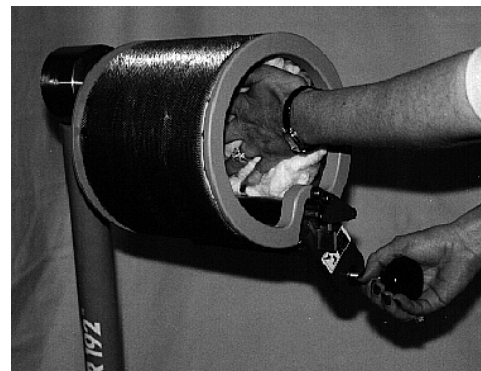
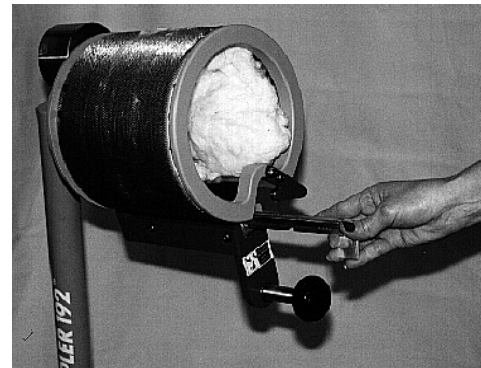
4 Operation

4.4 Sample Preparation

4.4.1 Using the Fibrosampler 192 to Prepare Samples

To use the Fibrosampler 192 to form the sample beard, follow these steps:

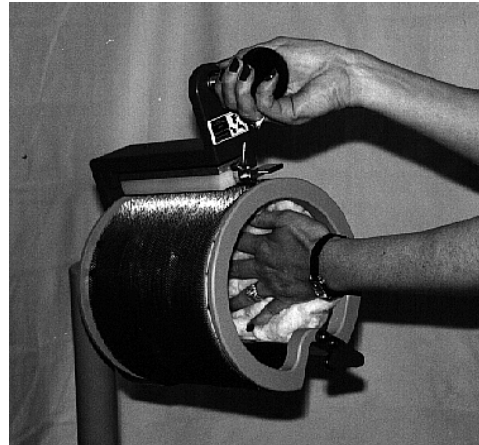
- Select from a sample of fibers a sub-sample of approximately 25 grams or more (about two handfuls), and place it in the Fibrosampler cylinder.
- Insert the comb into the Fibrosampler combholder.
- With a circular motion of the left hand, press the fibers so they protrude through the holes of the sample plate. Then relax the pressure of the left hand so the fibers can be easily pulled through the plate holes by the teeth of the comb.



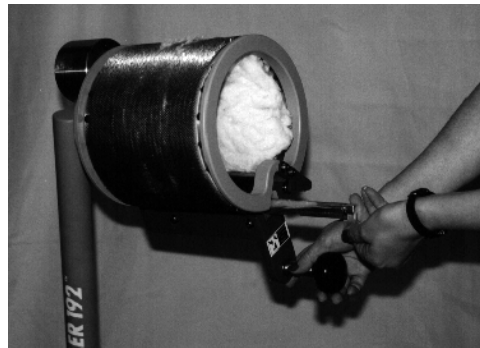

CAUTION:

Do not let your fingers protrude through the holes of the sample plate where they may be caught by the teeth of the Fibrocomb.

- With the right hand, rotate the operating handle counter-clockwise one complete turn. The comb will open as it moves up to the sample plate. To make the complete turn, remove the left hand from inside the cylinder after the comb passes the sample plate.



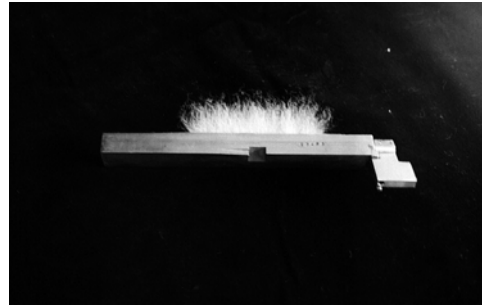
- Close the comb by rotating the handle counter-clockwise against the stop and remove the comb to see if the teeth are uniformly full of fiber. If not, return the comb with the sample to the comb holder.
- When adding fiber to a sample, adjust the sample in the Fibrosampler drum so the fibers protrude through the sample plate holes at the right place to fill the empty spot in the comb.



- Again, rotate the operating handle counterclockwise one complete turn. Close and remove the comb to see if the comb teeth are uniformly full of fiber.

For short fibers several turns may be necessary to fill the comb completely.

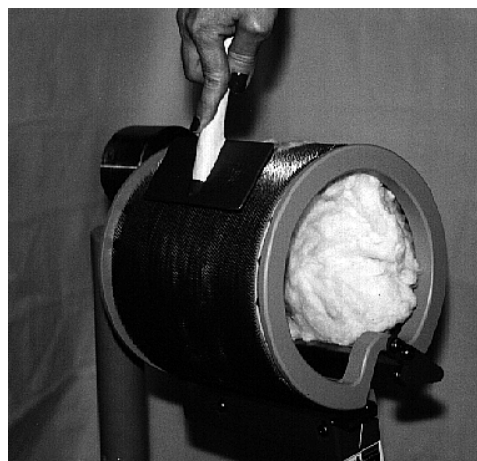
The photo at the right depicts a properly prepared sample. The sample in the comb is now ready for measurement.



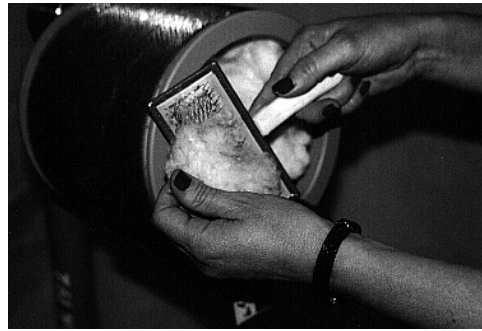
Note: The operator can alter the sample only by changing the amount of pressure used to force the sample against the plate or by changing the face of the sample presented to the plate. A full comb results from a lot of pressure; an empty comb, from little pressure. However, when too much pressure is applied, long fibers might be broken when pulled from the sample. If a second comb is to be taken, the sample should be opened and a new face presented to the sample plate. It is recommended that the card cloth be cleaned with the cleaning brush after four to six combs have been prepared or when you change sample cotton.

4.5 Cleaning the Fibrosampler Card Cloth

- Each time you change samples, you should use the cleaning brush to clean the card cloth on the Fibrosampler. This will prevent the cotton that has built up on the card cloth from contaminating a new sample and possibly skewing test results.



- Cotton should be removed from the cleaning brush as required.



5 Installation/Maintenance

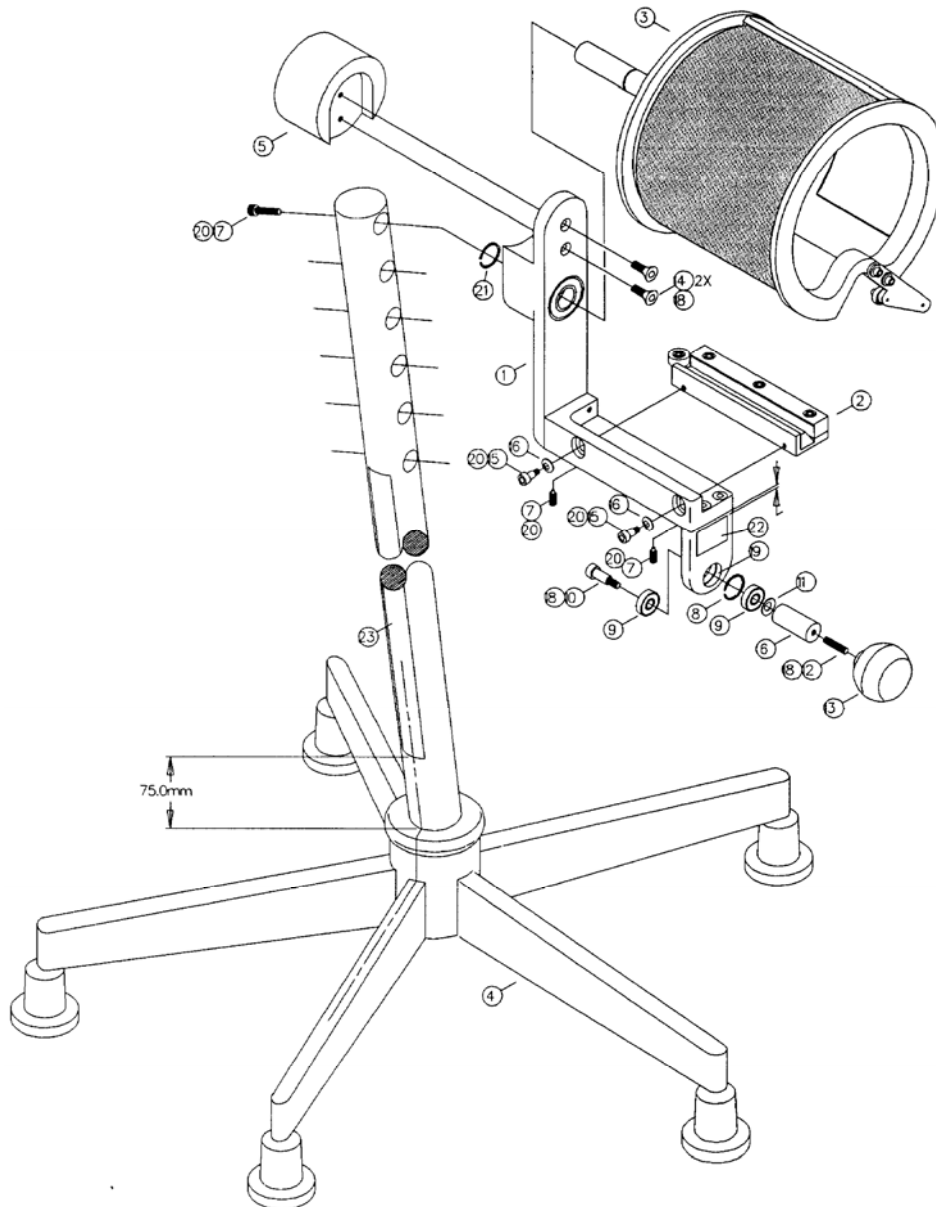
5.4 Installation

5.4.1 Uncrating and Inspecting

Upon delivery, inspect the outside of the shipping container for signs of damage. Any damage should be immediately reported to the carrier. Failure to adequately describe such external evidence of loss or damage may result in the carrier refusing to honor a damage claim.

Carefully remove the packing from around the instrument, and check the contents against the packing list. Store the shipping container and all packaging materials in a safe place in the event that re-shipment is necessary. If the instrument is to be stored before being placed in service, inside storage is required in a location protected from excess moisture, corrosive atmosphere, and chance of physical damage.

5.4.2 Instrument Assembly



Position	Description	Position	Description
1	Fibrosampler Pivot Assembly	13	Plastic Handle
2	Fibrosampler Comb Holder Assembly	14	M6 x 25mm FHSCS
3	Sample Chamber Assembly	15	M5 Shoulder Screw
4	Fibrosampler Stand Assembly	16	Bellville Washer
5	Fibrosampler Counterweight	17	M6 x 25mm SHCS
6	Fibrosampler Spool	18	Loctite 262 Adhesive
7	M6 x 12mm Brass Tipped Set Screw	19	Loctite 609 Retaining Compound
8	Bearing Retainer	20	Loctite 242 Adhesive
9	Ball Bearing	21	Shaft Retainer
10	M6 Shoulder Screw	22	Warning Label
11	Bellville Washer	23	Column Label
12	M6 x 25mm Set Screw		

- Remove the Fibrosampler carefully from the packing case.
- Attach the base to the column with the M10 socket head capscrew (SHCS) and washer provided. Orient the sockets in the column toward one side of the base. The screw should be tight enough to prevent rotation of the post during operation.
- Attach the drum assembly to the column with the M6 socket head cap screw provided.
- Inspect the card cloth on the left of the sample drum for shipping damage. Notify the carrier and Uster Technologies if there is any damage.
- Slowly, rotate the operating handle completely around the drum to ensure that it has free movement.

5.4.3 Height Adjustment

There are six sockets on the support column that control the height of the Fibrosampler. To change the height location, follow these steps.

- Remove the M6 socket head cap screw.
- Relocate the Fibrosampler to a new height.
- Replace the screw and tighten it securely.

5.4.4 Check the Sample Plate Clearance

The Fibrosampler may be operated on any firm horizontal floor. The clearance between the comb and the sample plate and card cloth should be carefully maintained. It is recommended that it be checked during installation and on a monthly basis thereafter.

A check of this clearance is accomplished by first placing the Fibrocomb in the comb holder with the teeth uppermost and the handle pointing down. Holding the comb clearance gauge in your left hand and the Fibrosampler operating handle in your right, rotate the comb until it is opposite the first section of the sample plate.

Slide the gauge between the sample plate and comb moving it back and forth along the length of the comb. The gauge should just touch both the comb face and sample plate. The gauge should not be forced (too tight) or be able to rotate (too loose). Repeat this at selected points around the sample plate checking the clearance as illustrated.

Note: Consistent pressure must be maintained against the Fibrocomb while gauging clearances. This will eliminate variation in comb position resulting from play between the Fibrocomb and the Fibrocomb holder.

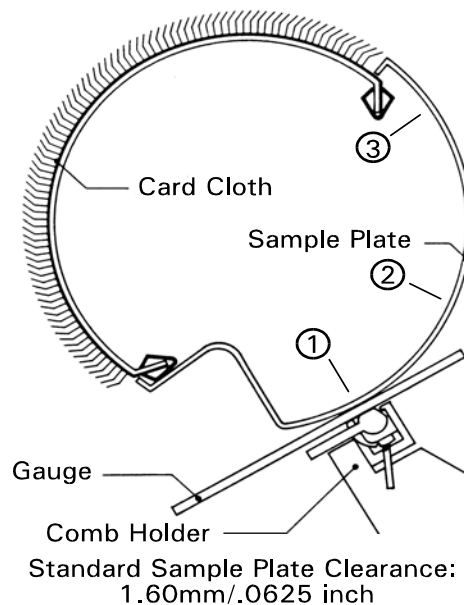
5.5 Maintenance

The Fibrosampler is designed to provide years of trouble-free service. Periodic checking and, if required, adjustment of combholder to drum clearance is necessary to ensure consistent sample preparation.

The sample plate clearance should be checked on a monthly basis or when there are unexplainable changes in the beard size. Refer to the Installation section above for details.

5.5.1 Cleaning the Card Cloth

The card cloth will become loaded with fiber stripped from the beard with continued use. A brush for cleaning the card cloth is supplied with the Fibrosampler 192. It is recommended that the card cloth be cleaned after four to six sample beards have been prepared and/or each time the sample material is changed.



5.5.2 Comb Holder Adjustment

Use the comb clearance gauge to check the clearance between the sample plate and Fibrocomb as described in the Installation section.

1. To adjust the comb holder, first loosen the large retaining screws on the left side of the comb holder.

Note: *The retaining screws should not be loosened to the extent that the comb holder loses friction with the arm.*

2. Find the two smaller adjusting screws located 90° from the larger retaining screws on the bottom of the instrument.
3. Drive the comb holder close to the sample plate by turning the adjusting screws clockwise. Increase the distance by turning the screws counter clockwise and pushing the comb holder away from the sample plate.
4. Re-tighten the retaining screws.

5.5.3 Concentricity

The Fibrosampler cylinder may need to be adjusted to make the sample plate concentric with the operating handle.

Note: *If any adjustment is made for concentricity, all other adjustments must be checked.*

1. Slip a Fibrocomb in the comb holder.
2. Check that the distance between the Fibrocomb and cylinder rim remains the same as the Fibrocomb is rotated around the cylinder.

Note: *The 1.60-mm (.0625-inch) gauge fits loosely between the Fibrocomb and cylinder rim and can be used as a guide for concentricity.*

3. If adjustment is needed, find the four mounting screws and the four socket set adjusting screws that are located inside the drum in the center of the end plate.
4. Use these screws to tilt the drum side to side or up and down as necessary.

5.6 Accessories

<u>Spare Part/Accessory</u>	<u>Article Number</u>
Cleaning Brush	256-899-00120
Comb Clearance Gauge	255-120-00180
Fibrocomb Assembly	255-130-00130

5.7 Technical Specification

Size

61 cm W x 81 cm H x 61 cm D (24" W x 32" H x 24" D)

Net Weight

17.5 kg (38 pounds)

Shipping Weight

27.5 kg (60 Pounds)

Sample Plate

16 mm holes (cotton)

Fibrocombs

4 ½ in/110 mm teeth, brass (Fibrograph 730 and HVI Semi-Automatic)

Chapter 14 Appendix

3 Specifications

3.4 Length/Strength Cabinet Physical Dimensions

- ◆ 54 inches long x 38.5 inches high x 31.5 inches deep (measured from floor) (137 cm x 98 cm x 80 cm)
- ◆ 900 Semi-Automatic: 650 pounds (295 kilograms)

3.5 Micronaire/Color/Trash Cabinet Physical Dimensions

- ◆ 42 inches long x 38.5 inches high x 31.5 inches deep
- ◆ (107 cm x 98 cm x 80 cm); 420 pounds (190 kilograms)

3.6 Power

215 - 230 Volts, 50/60 Hz, 1080 Watts, 6 amps

3.7 Air

External air source required: 90-125 psi, 620 - 825 kPa

3.8 Vacuum

Self-contained

3.9 CRT

14-inch color screen, anti-glare face

Resolution	800 dots x 600 lines
Character Field	2000 (80 x 25 lines)
Dimensions	359 x 356 x 395 mm (H x W x D)
Net Weight	28.2 lbs.

3.10 Force Transducer

"S" Beam full bridge type

Linearity	.03% full scale
Range	Total load 100 lbs; maximum overload 300 lbs.

3.11 Balance

Electronic

Weighing range	310 g
Readability	0.01 g
Reproducibility	0.003 g (standard deviation)

3.12 Pressure Transducer

Low differential pressure

Accuracy	+1% full scale
Range	±0-5 inches water column

3.13 Lamps

Incandescent

Expected Life — 1000 hours

4 Disk Information

4.4 Diskettes

- Store diskettes in a safe place away from dust, moisture, and magnetic fields.
- **DO NOT** place diskettes near magnets, transformers, or electric motors.
- Avoid extreme temperature ranges.
- Normally, diskettes that are supplied are not "write-protected." To write-protect, slide the built-in tab over to reveal the write-protect hole.
- To insert the diskette into the disk drive, slide it into the slot (metal toward the drive) until you hear it click into place.
- To remove the diskette, press the push button by the door of the drive.

4.5 Disk Operating System

The HVI 900 is shipped with DOS 6.2.

Refer to the DOS 6.2 User's Guide for information on the following procedures:

- ◆ Formatting (preparing the diskette to hold information)
- ◆ Copying Files
- ◆ Directories

5 Monitor Information



CAUTION !!!

No user-serviceable parts are included inside the monitor's cabinet. Please do **not** attempt to remove the back of the cabinet. You will be exposed to a shock hazard!



Prior to connecting or disconnecting any display peripheral, be sure that the AC power to the instrument is **"OFF"**. **Failure to do so may cause serious personal injury, as well as permanent damage to your computing equipment.**

In order to prevent overheating, ensure that the ventilation openings in the monitor are not covered. The monitor should not be placed near a source of heat.

DO NOT place objects on top of the monitor cabinet that could fall into vents or that could cover the vents and prevent proper cooling of the monitor's electronics.

DO NOT place the monitor where sunlight or bright room light will fall directly on the screen.

When necessary, clean the cabinet with a damp cloth. Use only mild detergents. **DO NOT** use alcohol or ammonia based products.

6 Printer Information

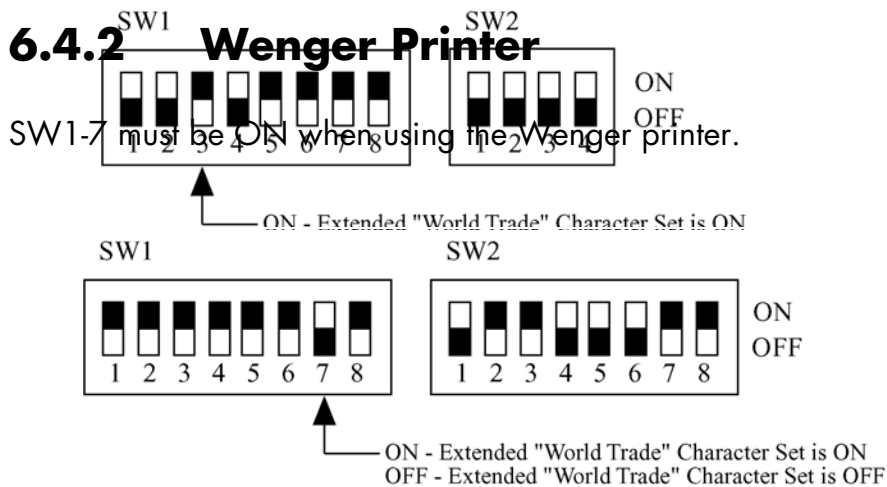
The printer for the HVI 900 must be operated in parallel mode. Connect the printer to the printer port. Consult the printer manual to change the switch settings to parallel mode.

6.4 Printer Switch Settings

The Histograms in 940 DataManager require the World Trade Character Set (International Character Set) in order to print correctly.

6.4.1 Epson Printer

SW1-3 must be ON when using the Epson printer.



6.5 Okidata 520 Printer

The Okidata 520 is a parallel printer. If a serial printer is required for your application, a serial card is available from Okidata upon request. In order for the Okidata 520 printer to communicate with the HVI, the following changes have been made to the printer software selections at the Uster Technologies factory.

Printer Control/Emulation Mode	EPSON FX
Font Pitch	12 CPI
Character Set	Set II

- To check and/or change the printer selections, check to ensure paper is loaded in the printer. Turn on the printer power. Press the **SHIFT** and **SEL** keys on the left side of the printer keypad. The menu will be illuminated. Press the **PRINT** key.

The current setup will print. Check the printout to see if the current configuration is set to "EPSON FX."

- If it is not Press the **GROUP** key to move to the "Printer Control/Emulation Mode" line if you are not in the Printer Control group.

As you press the keys, the printer will print the current line.

- Once in the Printer Control group, press the **SET** key until the Mode is set to "EPSON FX."

Check the printout to see if Font is set to "12 CPI."

- If it is not, press the **GROUP** key to move to the "Font" group. Press **ITEM** to move to the Font Pitch line. Press the **SET** key until the Font Pitch is set to "12 CPI." Check the printout to see if Character Set is set to "Set II."
- If it is not, press the **GROUP** key to move to the "Symbol Sets/Character Set" group. Press the **SET** key until the Character Set is set to "Set II."

- Press the **PRINT** key to print the new configuration. Confirm the printer software selections.
- Press the **SHIFT, SEL** keys. MENU will no longer be illuminated.

7 Balance Configuration

A Mettler balance (in most cases) is supplied with the 900 System to be used with the Micronaire Module. If so, it comes with documentation from Mettler (or the balance manufacturer's documentation). The following is the procedure Uster Technologies uses to configure the Mettler balance. This configuration cannot be changed without altering the balance hardware. Therefore, any changes to the configuration will have to be done by a Service Technician. For this reason, the following list is provided for information purposes only.

Unit	g
Trans	Continuous
Baud Rate	4800
Parity	Even
Pause	.0

- Press the bar on the front to turn it ON; continue to press it until the word "CONF" (for "configuration") appears on the balance display.
- Release the bar. "Reset" is displayed; press and hold the bar until "Yes" is displayed.
- Press and hold the bar until "End" is displayed; press once. "Scale" is displayed.
- Press and hold the bar until "ASd" appears on the display.
- Release the bar, then tap on it until the number "- 1-" is displayed next to "ASd."

- Press and hold down the bar until "d" is displayed.
- Release the bar, and then tap on it until the number ".01" is displayed next to "d."
- Press and hold the bar until "End" is displayed; press once. "Unit" is displayed. The default settings are used for all "Unit" options. Press and hold the bar to see the following options and the default values.

<u>Option</u>	<u>Default Value</u>
----------------------	-----------------------------

Unit 1	g
--------	---

Unit 2	g
--------	---

Prt	oFF
-----	-----

Status indicator	Auto
------------------	------

- Press and hold the bar until "End" is displayed; press until "I-face" is displayed.
- Press and hold down the bar until the word "S Stb" appears. Tap the bar until "Cont" is displayed.
- Hold the bar until "b 2400" is displayed. Tap the bar until "b 4800" (for baud rate) appears.
- Hold down the bar until "P - E -" appears; release the bar.
- Hold down the bar until "PAUSE" appears. Tap the bar until the ".0" shows.
- Press and hold the bar until "AU oFF" is displayed. Release the bar, and then hold it down until "End" is displayed. The display changes several times before "0.00" is displayed.

The balance is now configured and ready for use. This procedure should not have to be repeated.

8 Recommended Lot Limits for Cotton

Uster Technologies recommends that the following values be used for cotton lot limits. Of course, users may set their own values for lot limits by selecting the *Status* item from the MAIN MENU, then selecting *Lot Limits* from the STATUS MENU.

MIC LOWER LIMIT	3.2
MIC UPPER LIMIT	5.9

	<u>Inches</u>	<u>Millimeters</u>
LENGTH LOWER LIMIT	0.93	22.9
LENGTH UPPER LIMIT	1.35	34.3

	<u>Ratio</u>	<u>Index</u>
UNIFORMITY LOWER LIMIT	39	77
UNIFORMITY UPPER LIMIT	50	90

	<u>Stelometer</u>	<u>Pressley (HVI)</u>
STRENGTH LOWER LIMIT	18	24
STRENGTH UPPER LIMIT	34	45

Upper and lower limits for other properties should be set to 0 (zero).

If test results are to be transmitted to an external computer, the above limits should also be set in the DataManager 940's LOT LIMITS MENU (refer to the DataManager 940 Instruction Manual or the 940 DataManager chapter in this manual).

9 Calibration Cotton Standards for the HVI 900 System

Two kinds of calibration cottons can be used to calibrate Uster Technologies' HVI 900 System:

- ◆ International Calibration Cottons (ICC)
- ◆ High Volume Instrument Calibration Cottons (HVI)

The System can be calibrated with either of these two cottons according to the following schedule.

<u>Test</u>	<u>ICC</u>	<u>HVI</u>
Micronaire	Yes	No
Strength	Yes	Yes
2.5% Span Length	Yes	No
Uniformity Ratio	Yes	No
Upper Half Mean Length	No	Yes
Uniformity Index	No	Yes
Strength, Pressley level	Yes	No
Strength, Stelometer level	Yes	No
Strength, USDA level	No	Yes
Elongation		Yes No

It is extremely IMPORTANT that the Length/Strength Calibration Status be configured to match the calibration cottons being used. This is done by entering the correct values in the LENGTH/STRENGTH CALIBRATION COTTON STANDARD VALUES MENU.

Note: The length, uniformity, and strength values of the ICC and the HVI calibration cottons are not on the same level.

- ◆ The ICC 2.5% spanlength is not the same as the HVI (USDA) length.

- ◆ The ICC Pressley and Stelometer strengths are not the same as the HVI (USDA) strength.
- ◆ The ICC uniformity ratio (50/2.5% spanlength) is not the same as the HVI uniformity index.

The differences between ICC and HVI calibration cottons can easily be determined by calibrating the Length/Strength unit using ICC cottons, and then testing the HVI calibration cottons in the Length/Strength Module Testing mode.

Five-pound boxes of HVI Calibration Cottons and ½-pound packages of ICC are available from the U. S. Department of Agriculture at the following address:

Standards Preparation and Distribution Section
Cotton Division, AMS
U.S. Department of Agriculture
3275 Appling Road
Memphis, TN 38133

10 Initial Category Setup

10.4 How the Category System Works

Each sample is placed into a Category for each fiber property. The Category Definitions require an estimate of the average value and range of each property for the samples being tested. Steps to determine these values are explained in this section.

If you export the data to BIAS, you should use the same Category Definitions for HVI 900, 940 DataManager, and BIAS Categories.

For yarn spinners, it is important to keep in mind that the number (quantity) of Categories for each property should be kept to the minimum required to adequately cover inventory and to allow for the small shifts the average inventory might make over a period of time. The Number of Categories actually used for analyzing the cotton might not be the actual number you enter for Number of Categories.

For example, to allow for a shift in property value trends you might enter 10 as the Number of Categories. Realistically, most of your range should fall within the middle 5 categories. If you are analyzing your cotton by Category, you might put all samples with a value less than the highest value of Category 3 in Category 3 and all samples with a value greater than Category 7 in Category 7. This allows you to have only 5 Categories for the property as divisions.

From a spinning mill's warehouse storage point, it is probably not feasible to have more than three or four Categories assigned for each property. As explained above, this does not mean you must enter 3 or 4 as the Number of Categories.

The steps in the first part of this section outline the procedures that are used for gathering information for initial Category analysis. The information gathered should be analyzed to provide the information required to define the Categories based on the range in a fiber property.

10.4.1 Why Category Definitions Should

Remain the Same

For yarn spinners, once the Categories are defined, the Category Definition should not be changed unless the bales remaining in the physical warehouse can be changed accordingly.

A change in Category Definition will cause the Histograms review to be incorrect. Because the consequences of making changes in Category Definition are so great, careful consideration should be given to the Categories as they are defined.

10.4.2 How to Determine the Average and Range of a Spinning Mill's Inventory

If you do not have an estimate of the average value and the range for each of the properties, we suggest that the following method be used to determine this information.

- Take a sample from the middle of each of the bales that are in the opening room. Continue to do this for a 30-day period. At that point, if you had 40 bales in the opening room each day, would have 1200 samples.
- Use a separate identifier for each day, measure the samples on the HVI, and send the test results to the 940 DataManager.
- By looking at the data for each property, you can assume that the average and the range for all of the cotton in your warehouse is the same as that of the 1200 samples that were tested. If you continue to purchase cotton by the same purchasing standards, the cotton that you purchase should fall within the same average and range as the cotton currently in your warehouse.
- Now, you can define the categories based on the average and range of fiber property values for the bales in your warehouse.

10.5 Initial Category Definition for Inventory Analysis

Each property has a Category Definition that was set up at the Uster Technologies factory. However, typically that definition will not correctly represent your inventory. The purpose of the following steps is to determine what values to use to correctly define categories for your cotton.

The following chart should encompass all the values that may be found in normal cottons. Use the values below to initiate Histograms for each fiber property according to the procedures outlined in this section. Most spinners will find that their actual inventory covers a much smaller range. By using the suggested values for an **initial** setup to generate the histograms, you can define the categories to closely represent your cotton.

Initial Values Chart

	Highest <u>Value of 1st</u>	Interval <u>Between</u>	Number of <u>Categories</u>
SCI	87	5.00	20
Micronaire	2.2	0.20	20
Strength	18.5	1.00	20
Length (inch)	0.86	0.03	20
Length (mm)	21.8	0.8	20
Uniformity (index)	70.5	1.00	20
Uniformity (ratio)	36.5	1.00	20
CSP	1550	100	20
Rd	46.0	2.00	20
b	4.5	0.60	20

Note: These are not the recommended **Category Definition** values. Use these values only in during initial setup in order to study the distributions of each measured fiber property. To use them, make temporary changes on the Category Definition screen.

After you have analyzed the data and Histograms generated from this initial setup, define the categories based on your cotton. Once you determine the categories that cover the range of your cotton, return to the Category Definition screen, and define the categories accordingly.

Remember, after the categories have been defined to reflect the range in cotton, there are far-ranging implications if categories are re-defined. Therefore, the initial evaluation of your cotton is an important step.

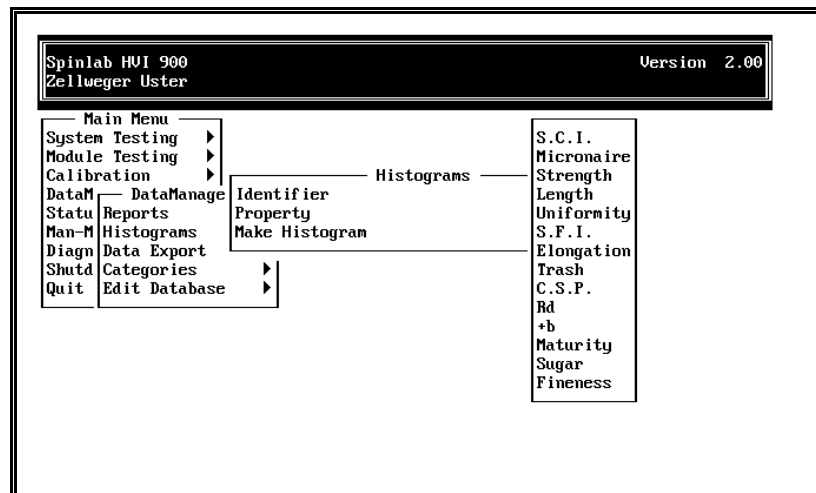
Spinlab HVI 900 Zellweger Uster		Version 2.00		
Main Menu		Categories		
System Testing	▶	Highest Value of		
Module Testing	▶	First Category	Interval	Number of
Calibration	▶			Categories
DataM	DataManager			
Statu	Reports	S.C.I.	87.0	5.0
Man-M	Histograms	Mic	2.2	0.2
Diagn	Data Export	Strength	18.5	1.0
Shutd	Categories	Length	0.86	0.03
Quit	Edit Database	Uniformity	70.5	1.0
		S.F.I.	0.0	10.0
		Elongation	0.0	10.0
		Trash	0	10
		C.S.P.	1550	100
		Rd	46.0	2.0
		+b	4.5	0.6
		Maturity	0.0	10.0
		Sugar	0.0	10.0
		Finess	0	10

10.6 Initial Analysis of the Inventory

To analyze the inventory, follow these steps.

- Select the *Histograms* item from the MAIN MENU using the arrow keys. Then, press **ENTER**.
- Select *All* for Identifier From the HISTOGRAMS MENU, and press **ENTER** again. All the Identifiers in your inventory will be used for plotting the Histogram.
- Select the property to be plotted.
- Select *Make Histogram*. The histogram for all Identifiers will be plotted using the current Category Definition for the selected property.

Note: Ultimately, all properties must be plotted and evaluated for Category Definitions.



The purpose of the following steps is to determine what to use to correctly define categories for your inventory. After all the properties have been plotted, use the average as the midpoint for determining the Category Definition.

- On a piece of paper, draw 10 boxes to represent 10 Categories.
- Enter the Average at the midpoint of the 10 Categories.
- Experiment with the numbers to determine the following the Interval that would be required to encompass all of your inventory within a 10 Category spread, and the Highest Value for the First Category.

Use the numbers determined by this process for your Category Definitions.

10.7 Define Categories to Cover the Range of Your Cotton

Once you have determined what the values are that should be entered for the Category Definitions to reflect your inventory, you are ready to define the Categories. Return to the Category Definition screen, and enter the values that cover the range of your cotton.

Note: *As stated previously, you should give a great deal of thought to the Category Definition before you initially assign the definition so that you will not have to change the definition.*

When cotton is warehoused by bale number; it is possible to change the Category Definition with less impact on the warehouse.

11 Format Used When Data is Exported

All data is exported from 940 DataManager in the following order and format.

<u>Property</u>	<u># Characters</u>	<u>Format</u>
Identifier	30	"xxx...x" (in quotes)
ID	10	"xxx...x" (in quotes)
Grade	6	"xxxxxx" (in quotes)
Trash Code	1	x
Trash Area	4	xx.x
Trash Particle Count	3	xxx
Length	4	x.xx for inches, xx.x for mm
Uniformity	4	xx.x
Short Fiber Index	4	xx.x
Strength	4	xx.x
Elongation	4	xx.x
Micronaire	3	x.x
Maturity	4	xx.x
Fineness	3	xxx
Sugar Content	4	x.xx
Rd	4	xx.x
+b	4	xx.x
Color Grade	4	"xxxx" (in quotes)
Filler	8	spaces
Temperature	4	xx.x
Relative Humidity	4	xx.x

Each record that is exported will contain information for a particular test in the following format.

```
"test Identifier      " "899874 " "54 " 0 02.5 074 1.06 80.8 10.3 37.4 05.0 5.0 65.5 238 0.36 59.7 11.5 "54-2"
20.4 68.9
```

The same record is shown below with the aid of a count line that will help you read the record. The count line is divided into three parts:

1. Character count for each property (1234)
2. Separating blanks for separating each property (b)
3. Quotation marks (q)

Count Line: q123456789012345678901234567890qbq123456789q
Record Line: "test Identifier " "899874 "

Count Line: bq123456qb1b1234b123b1234b1234b1234b1234
Record Line (cont.): "54 " 0 02.5 074 1.06 80.8 10.3 37.4

Count Line: b1234b123b1234b123b1234b1234b1234bq1234qb b b b b b b
Record Line (cont.): 05.0 5.0 65.5 238 0.36 59.7 11.5 "54-2"

Count Line: b1234b1234
Record Line (cont.): 20.4 68.9<cr><lf>

12 Generic Instrument Transmission

12.4 Transmission Architecture

This document describes the transmission format of the HVI. The instrument will transmit records of data from the serial port and can be configured to transmit particular records. The configuration must occur prior to the sample testing. All records will be transmitted after all observations of a sample are finished. Transmission records are characterized by the following:

- All records start with a standard header (discussed in Universal Record Format), followed by record specific data fields.
- The record length is variable.
- The data is transmitted as ASCII characters. In other words, the number 12.5 will be transmitted as four characters, namely "1" (0x31), "2" (0x32), "." (0x2e), and "5" (0x35).
- Records will be delimited by CR (0x0d).
- Fields will be delimited by "@" (0x40).
- A checksum is included with all records as the last field.

The checksum for a string is produced by taking the "exclusive-or" of all the characters in the string up to and including the field delimiter before the last field where the checksum is to be placed in the record. The checksum will not include the CR delimiting the records. The checksum value is formatted as a decimal value.

As an example, consider the following HVI micronaire mean record:

```
HVI@MIC@02@100@12:00@01-DEC-93@TEST RUN@1@3.5@ @53@<CR>
```

Note that <CR> in the above example is a single character, namely CR (0xd), at the end of this record. The 21 in the last field is the checksum derived by taking the xor of the 47 characters before the "53."

Interaction between instrument and external computer (transmission cycle):

- HVI will send a ready-for-transmit record upon entry into system testing.
- Only an ACK (0x06) is necessary as a reply.

Instrument will send a start-dataset record (see record types below) before the first data record of a sample.

- Instrument will send a stop-dataset record after testing for a particular sample is complete and all data records for that sample have been sent and acknowledged.
- HVI will expect to receive an ACK (0x06) upon good transmission of record.
- Instrument will expect to receive a NAK (0x15) upon bad transmission of record.
- Instrument will attempt three transmissions while receiving a NAK before failing this transmission cycle.
- HVI will wait some amount of time after transmission for a signal from the external computer. The amount of this time will be set in the Status Menu. After this time has expired, this transmission cycle will fail.
- Upon failure of the transmission-response sequence, the instrument will query the operator to either retransmit or abort. Abort will cause control of the instrument to return to the menu prior to sample testing.

- In the event that a property's observation count or "rep" is less than 5, the standard deviation and CV% will not be transmitted even if selected.

12.5 Universal Record Format

All records will contain a header that describes the information contained within the record. The fields of the record header are:

1. **Instrument Type:**

<u>Identifier</u>	<u>Description</u>
HVI	Record is from a HVI instrument

2. **Module:**

Will be empty in the case of start-dataset and stop-dataset record types.

<u>Identifier</u>	<u>Description</u>
L&S	HVI Length and Strength
Mic	HVI Micronaire
C&T	HVI Color and Trash
MAT	HVI Maturity Index
SCI	HVI Spinning Consistency Index

3. **Record Type:**

<u>Identifier</u>	<u>Description</u>
01	Individual observations
02	Means
03	Standard Deviation
04	% CV
05	Start Dataset
06	Stop Dataset
07	Ready for transmit; sent by HVI upon entry into system testing
08	Discard last Sample
09	Signoff
40	HVI Length Single Rep Curve
41	HVI Strength Single Rep Curve
42	HVI Length Mean Curve
43	HVI Strength Mean Curve

4. **Instrument ID** (0 – 12 characters)

5. **Time** (xx:xx), 24-hour format)

6. **Date** (dd-mmm-yy), where dd is day, mmm is month (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, and NOV. DEC), and yy is the last two digits of the year.

12.6 HVI Record Formats

The HVI records will be divided into Length/Strength, Micronaire, Color/Trash, Spinning Consistency Index (SCI), and Maturity data sets. The following describes specific fields.

Note that for the indicated fixed-length fields (xx or xx.xxx for example), the following applies:

- Integer fields are left-padded with spaces.
- Floating-point fields are left-padded with spaces (beyond the "0." Units representation for values less than one), and right-padded with os. For example, 0.32 in a format of "xx.xxx" would transmit "0.320".

The standard deviation and CV records are only transmitted for observation counts of 3 and above. A Mean record is sent if there are 2 or more observations.

For Mean record sets, some data types send a flag for two-sided Retest and/or a flag for Rejected. 'R' is for Retest, 'n' is for Not retested; 'L' is for a Lot limit that was accepted, 'n' for Not a Lot limit.

12.6.1 Length/Strength

01 Individual Observation

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample Id	12 alphanumerics
Rep #	xx
Total Reps	xx
Length	x.xxx (inches for English units), or xx.xx (mm for Metric units)
Uniformity	xx.x
Strength	xx.x
Elongation	xx.x
Short Fiber Index	xx.x

02 Mean of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample Id	12 alphanumerics
Length	x.xxx or xx.xx (as specified for Individual observations)
Length Retest	R or n
Length Lot Limit	L or n
Uniformity	xx.x
Uniformity Retest	R or n
Uniformity Lot Limit	L or n
Strength	xx.x
Strength Retest	R or n
Strength Lot Limit	L or n
Elongation	xx.x
Short Fiber Index	xx.x
Grade	6 alphanumerics
Temperature	xxx.x
Relative Humidity	xxx.x

03 Standard Deviation of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Length	x.xxx or xx.xx (as specified for Individual observations)
Uniformity	xx.x
Strength	xx.x
Elongation	xx.x
Short Fiber Index	xx.x

04 %CV of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Length	xxx.x
Uniformity	xxx.x
Strength	xxx.x
Elongation	xxx.x
Short Fiber Index	xxx.x

40 Length Individual Curve Data¹

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rep #	xx
Total Reps	xx
Curve Data Point #1	xxxx
...	
Curve Data Point #80	xxxx

41 Strength Individual Curve Data²

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rep #	xx
Total Reps	xx
Curve Data Point #1	xxxx
...	
Curve Data Point #80	xxxx

¹x-axis: starts at 0.15 inches (typically), increments 0.025; y-axis: normalized to the extrapolated y-intercept and multiplied by 1000.

²x-axis: starts at 0, increments 1/1200 inch; y-axis: (pounds x 100)¹.

42 Length Average Curve Data
Field Description

Identifier
 Sample ID
 Curve Data Point #1
 ...
 Curve Data Point #80

Size/Type

40 alphanumerics
 12 alphanumerics
 xxxx
 ...
 xxxx

43 Strength Average Curve Data
Field Description

Identifier
 Sample ID
 Curve Data Point #1
 ...
 Curve Data Point #80

Size/Type

40 alphanumerics
 12 alphanumerics
 xxxx
 ...
 xxxx

12.6.2 Micronaire

01 Individual Observation

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rep #	xx
Total Reps	xx
Micronaire Observation	x.xx

02 Mean of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Micronaire	x.xx
Micronaire Lot Limit	L or n

03 Standard Deviation of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Micronaire	x.xx

04 %CV of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Micronaire	xxx.x

12.6.3 Color & Trash

01 Individual Observation

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rep #	xx
Total Reps	xx
Rd	xx.x
+b	xx.x
Color Grade	xxxx
Trash Particle Count	xxx
Trash Area	xx.xx
Trash Code	xx

02 Mean of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Color Retest	R or n
Rd	xx.x
Rd Lot Limit	L or n
+b	xx.x
+b Lot Limit	L or n
Color Grade	xxxx
Color Grade Lot limit	L or n
Trash Retest (Area only)	R or n
Trash Particle Count	xxx
Trash Area	xx.xx
Trash Area Lot Limit	L if rejected or n
Trash Code	xx
Trash Code Lot Limit	L or n

03 Standard Deviation of Observations**Field Description****Size/Type**

Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rd	xx.x
+b	xx.x
Trash Particle Count	xxx
Trash Area	xx.xx

04 %CV of Observations**Field Description****Size/Type**

Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rd	xxx.x
+b	xxx.x
Trash Particle Count	xxx.x
Trash Area	xxx.x

12.6.4 SCI

02 Mean of Observation

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
SCI	xxxx
SCI Lot Limit	L or n
CSP	xxxx
CSP Lot Limit	L or n

12.6.5 Maturity

01 Individual Observation

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Rep #	xx
Total Reps	xx
Maturity	x.xx
reserved	No characters
reserved	No characters

02 Mean of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Maturity	x.xx
Maturity Lot Limit	L or n
reserved	No characters
reserved	No characters
reserved	No characters

03 Standard Deviation of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Maturity	x.xx
reserved	No characters
reserved	No characters

04 %CV of Observations

<u>Field Description</u>	<u>Size/Type</u>
Identifier	40 alphanumerics
Sample ID	12 alphanumerics
Maturity	xxx.x
reserved	No characters
reserved	No characters

13 Error Messages

Error messages are displayed on the screen in a highlighted block, in conjunction with a long audio tone, when the microprocessor is unable to accept or process information. If any of these messages occur repeatedly, call a Service Technician. The following is a list of the error messages that you may encounter, what might have caused them to occur, and how to correct them.

<-- Large	A sample too large for an accurate reading was used to obtain length and strength properties.
<-- Limit	The property has measured outside the lot limit range. This range is set in the Status Menu.

<-- Small	A sample too small for an accurate reading was used to obtain length and strength properties.
<-- Small Sample	A sample too small for an accurate reading was used to obtain length and strength properties.
<-- Retest	The measured value is not within the lot limits set in the Status Menu.
<-Timeout) Small Sample (len)	The computer timed-out while waiting. For length data to be received from the length device driver.
<-Timeout Small	The computer timed-out while waiting.
Sample (strn)	For strength data to be received from the strength device driver.
<-- Retest	The property has been measured as a two-sided bale. A sample must be tested twice when this occurs.
Air On	The signal to the motor controller to turn the micronaire air on was ignored.
Air Off	The signal to the motor controller to turn the micronaire air OFF was ignored.
Bad Color	The measured color readings were outside of the valid range. The range is Rd: 40.0 - 87.0 and +b: 4.0 - 18.0.
Bad Read on Track Home	The motor controller produced an error while attempting to read the track home sensor.

Bad Read on	This error can occur in Length/Strength
Track Home	Calibration, Lens-to-Break, and Length/Strength Module Testing. The MC4 Motor Controller failed to detect that the comb was in the home position.
Bad Sample	When the calculated values are out of tolerance, a tone is sounded, and a new sample must be tested. Reset the instrument, then recalibrate.
Bad Send (MC4)	The computer timed-out while waiting for the motor controller to respond to a signal.
Breaker Non-Operational	The controlling program has issued a breaker request, but no data resulted from the request.
Check Force	When the force is not within +1.0 and -2.0, reset the motors. If this does not resolve the problem, call a Service Technician.
Check Lamp Voltage	The lamp voltage is outside the range established in the Setup utility.
Color Limit	When the measured value is outside the lot limit (if Lot Limits are YES on the 900 Status Menu), an instruction statement is displayed to allow you to accept or reject the value. If you reject the value, repeat the test on the sample.
Check Optics	When the optics are not within ± 10 , turn the recessed knob on the inside lip of the left console (near the middle) until the message disappears and the flashing numbers are close to 0.
Check Vacuum Manifold	The vacuum voltage is outside the range established in the Setup utility.

Color Done	The color button was pressed after the color reading was taken for the current sample.
Door Open	A micronaire reading was initiated, yet the micronaire door was open (or the door sensor was not engaged).
Error Reading Brush Home	The MC4 Motor Controller failed to detect that the brusher was in the home position.
Force	The force reading is outside the valid range (-2 to +1).
Large Sample	When the sample beard is too large to meet the limits set during the initial instrument setup, prepare another sample, and repeat the test.
Len Count	Too many length interrupts were-generated by the motor controller.
Len Error	Length calculation resulted in a value less than zero or greater than 99.9.
Mic Error	A micronaire value entered from the keyboard was outside the valid range (2.0 to 7.0).
Mic Limit	When the measured micronaire value is outside the lot limit, this message will display. It is also displayed if there is an air leak in the chamber. Contact an Uster Technologies Service Technician.
Motor Controller Not Responding	This can occur during any phase of the operation if the MC4 Motor Controller is not functioning properly.

- Motors** A problem has developed with the synchronization between the 900 HVI computer and the motor controller.
- No Motor Control** A problem has developed with the synchronization between the 900 HVI computer and the motor controller.
- No Motors** A problem has developed with the synchronization between the 900 HVI computer and the motor controller.
- Optics** The optics reading is outside the valid range (-10 to +10).
- Out of Tolerance** This message occurs if the calculated slope and offset are outside the given range during micronaire calibration. Perform calibration again. If the message reappears, zero the air system, and set the slope and offset to standard values. Perform calibration again. If the message reappears again, contact a Uster Technologies Service Technician.
- Printer Not Ready** The instrument is attempting to write to the printer while the printer is OFF, out of paper, off-line, or malfunctioning. This message is displayed only if the status parameters indicate that data are to be sent to a printer. Check to make sure the printer is "On-Line" and retransmit.
- R.H.** The relative humidity, as reported by the optional probe, is outside the range specified in the Status Menu.

**Reject -- Check
Sample**

This message will appear if the wrong cottons have been used during calibration. Check that the appropriate calibration cottons have been used, and rerun the sample. If the error continues to occur, exit and restart the calibration procedure from the beginning. If the error occurs again, discard the calibration sample and get a new sample from the reserve.

**Reject – Sample
Tolerance**

This message will appear if the cottons used do not meet the tolerances entered during calibration. Check that the appropriate calibration cottons have been used, and rerun the sample. If the error continues to occur, exit and restart the calibration procedure from the beginning. If the error occurs again, discard the calibration sample and get a new sample from the reserve.

Small Sample

This message will appear when the sample beard is too small to meet the limits that were set during the initial instrument setup. Prepare another sample, and repeat the test. If this message occurs repeatedly after several attempts, the sample fibers may be too short to be adequately clamped.

Str Count

Too many strength interrupts were generated by the motor controller.

Str Error

Strength calculation resulted in a value less than zero or greater than 99.

Tare Force

The tare value for the strength measurement is invalid. Restart System Testing.

Temperature	The temperature, as reported by the optional probe, is outside the range specified in the Status Menu.
The Valid Range Is x to x	This is displayed whenever an invalid value was entered from an entry box.
Unf Error	Uniformity calculation resulted in a value less than zero or greater than 99.
Weigh Sample	This message will display if an operator performs a micronaire test before a sample mass has appeared on the test display or if the sample weight is outside the 8.5 to 11.5 gram range. The micronaire cannot be calculated until the sample weight value is displayed on the test screen.

14 HVI 900A System Installation Guide/Report

1. General Connections

- [] Check to see that all the cables are properly seated. Refer to the Service Manual for the location of the cables to the multifunction board.

_____ Connect the AC to the instrument. Measure and record the AC voltage.

_____ Connect the air supply. Record the main inlet pressure in psi from the instrument gauge.

2. Color Module Installation

- [] Remove the lamps and burnish the contacts. Re-install the lamps.

- [] Adjust all the pots on the color head for proper voltages. Refer to the Service Manual for the location of these.

_____ Record the air pressure of the color hand (standard is 40 psi).

- [] Check the values of the color tiles in status.

- [] Calibrate with the color tiles.

3. Micronaire Module Installation

- [] The balance reading should be zero. If it is not, tare the balance by pressing the front bar once.

_____ Record the air pressure of the piston (standard is 90-100 psi).

- [] Check the electrical zero of the pressure transducer. Refer to the Service Manual if needed.

- [] Set the MIC air with the plug. Refer to the Service Manual for further instructions.

_____ Record the air pressure of the gas regulator (standard is 10 psi with air flowing through both orifices).

- [] Set the slope and offset to standard values. Refer to the Instruction Manual for the procedure.

- [] Check the chamber size. With the above setup, the high micronaire value cotton should read within ± 0.2 . Adjust the chamber size for this tolerance.

- [] Calibrate with the high and low micronaire value calibration cottons (10 grams each ± 0.03 grams).

4. Trash Module Installation

- [] Rotate the lamps for uniform light distribution. If the lamps are moved, the voltages should be re-checked for color Rd and b.

- [] Check for a good picture.

- [] Secure the camera (if it is loose).

- [] Perform the calibration procedure.

5. Length/Strength Module Installation

_____ Record the air pressure of the jaws (45 psi standard).

_____ Record the air pressure of the comb feed (35 - 45 psi standard).

[] Check the alignment of the comb transport track with the brusher track. Refer to SE/B-11.

[] Remove the optical sensor board and check for cracks in the collector lens. Re-install the optical sensor board.

[] Turn off the LED and check zero of all stages on the optical sensor board. Refer to the Service Manual for further instructions.

_____ Turn on the LED and check -8v for the sample signal on the optical sensor. Refer to the Service Manual, if needed.

_____ Check the reference voltage (-4.5v to -6.0v). Refer to the Service Manual for details.

_____ Check the optical filter setting. Refer to the Service Manual for further information, if needed.

[] Run the length standard calibration. Refer to the Instruction Manual for details.

[] Run the Lens to Break calibration. Refer to the Instruction Manual for instructions.

[] Calibrate with cotton. Refer to the Instruction Manual for the procedure.

6. Select Status Listing (refer to the Instruction Manual) and include the listing with this report. Record the customer name and serial numbers for the instrument and the combs on the report.

[] Copy of Status Listing included.

[] Customer name, instrument and comb serial numbers included.

7. Description of problems.

Chapter 15 Glossary

+b — The part of Hunter's Scale that indicates yellowness. Cotton ranges from 4 to 18. Appears as a report header.

Break Points — The number of readings taken on the stress-strain curve.

910 Max Amount — The selected maximum amount suitable for testing.

910 Min Amount — The selected minimum amount suitable for testing.

940 — Earlier versions of the 940 DataManager software were referred to as 940 or 940 Controller.

Alphanumeric — Numbers and alphabetical characters on a keyboard in upper or lower case.

Amount — Relates to the size of the prepared beard of fibers and is proportional to the number of fibers in the prepared beard.

Area — Trash area. Appears as a report header.

Arrow keys — These keys are used to move the cursor or highlight bar to the desired position. They are located on the keyboard and are labeled with an arrow for the direction in which the arrow points: Up arrow ↑, down arrow ↓, left arrow ← and right arrow →

Baud Rate — This is the rate, in bits per second, at which information is transmitted over a serial path. For successful serial communication, the baud rate of the computer and peripheral must be the same. For 940 DataManager the Baud Rate is set on the Communications screen, which is displayed when Communications Settings is selected from the Export Menu.

Beard — The sample fibers that are gathered in the comb. In length testing, the part of the specimen that has been combed and brushed which protrudes from the comb.

Break Amount — The amount values required for measurement of fiber strength.

C.G. — Color Grade. Appears as a report header.

Calibration — To check/correct the graduations of measurement on the instrument.

Calibration Constants — The slopes and offsets obtained by the two point regression in the calibration procedure.

Calibration Tolerances — In calibration procedures, the selected allowable deviations in measurement of the properties assigned to the calibration samples of fiber.

Category — A method for analyzing test data. The fiber properties are broken into defined groups for classifying the cotton. Each sample is assigned a category for each fiber property as it is imported into the system.

Category Definition — The method of assigning the number of categories, the beginning and ending values, and the interval between the categories for each of the fiber properties and calculated properties.

Category Intervals — The range between the categories.

Cnt — Trash Count. Appears as a report header.

Colorimeter — The instrument used to measure the reflectance and the degree of yellowness in cotton.

Comb (Fibrocomb) — The specimen holder that is used to gather the sample fibers (beard) from the mass of fibers. The prepared comb slides along the comb track of the Length/Strength Module for the length, strength, uniformity, and elongation tests.

Constant — The value in the SCI or CSP equation that is to be multiplied by a test value.

Count Strength Product (CSP) — In determination of yarn strength, the product of the English yarn number (Ne) and skein break value (SBr).

Cursor — A special symbol seen on the monitor screen; a flashing underline or box, that indicates the position where the next character will be entered.

Data Files — A file created within an application. In this case, generally referring to the files containing the HVI test results.

Database — A large collection of data that is organized so that it can be searched, retrieved, updated, and expanded for different purposes.

Default Settings — The predetermined action or value set in the software program that will take effect unless a value is entered. These temporary answers can be overridden by entering another value.

Destination — This determines where a report will be seen. For example, a report can be sent to either the screen or to the printer.

Elg — Elongation. Appears as a report header.

Elongation — The distance to the maximum of the stress-strain curve, less the distance attributed to crimp, multiplied by 100, and divided by the break gage (1/8 inch).

Enter — This keyboard key is sometimes labeled Return. When the key is pressed, the software interprets this as a signal to proceed to the next action.

Exit — To leave the current operation or screen.

Fibrogram — The Fibrograph curve representing the second cumulation of the length distribution of length distribution of the fibers sensed by the Fibrograph instrument in scanning the fibers.

Field — A defined area or location on the screen for entering particular information.

Field Label — The name or label associated with a field. It appears on the screen to identify the field.

File — A collection of information that has been assigned a name and is stored on disk.

Filename — The name that is assigned to a file.

Fin — Fineness. Appears as a report header.

Fineness — Fiber weight per unit length, or linear density.

Floppy disk — A device used for storing data. A floppy disk can be inserted in and removed from a floppy disk drive (typically 3.5 or 5.25 inches in diameter). Often used to backup data or to move data from one computer system to another.

Force — The pounds needed to break the yarn.

Front Position — When the needles are closest in proximity to the optics, the front position is the distance between the center of the needles and the center of the optics.

Grade — Appears as a report header.

Hard disk — A device used for storing data on a permanent or semi-permanent basis. It is a large rigid platter that is permanently mounted in its drive. It is capable of storing a large amount of data.

Hardware Configuration — The setup you have for your computer, keyboard, monitor, and printer.

Highest value for first category — The value at which the fiber property's first category should end. All bales that have a measured value at or below this value are included in the first category.

Histogram — A graphical representation of a frequency distribution. One axis plots the values of a particular characteristic while columns perpendicular to that axis contain the proportional count of the frequency with which the characteristic occurs.

ID — A name or number designating a bale or sample for testing. A series of ID numbers is usually associated with the same identifier.

Instrument Constants — Values assigned to formulae within the software and related to various internal functions of the instrument.

Identifier — A name or number that defines, or is associated with, a particular group of samples.

Interval between categories — The value of the difference between the categories within a fiber property. The value assigned as the interval varies from one fiber property to another.

Leaf — The trash content in the cotton fiber.

Len — Length. Appears as a report header.

Len1 — Either the mean length or the SL1% measured value.

Len2 — Either the upper half mean length or the SL2% measured value.

Length — In HVI testing, cotton length can be any two selected span lengths (len1 and len2); either 50% and 2.5% (ICC), or the Mean Length and Upper Half Mean Length (HVI).

Length Standard — The metal comb provided with the instrument that is used to measure the distance from the comb transport's home position to the center of the optics.

Listings — The reports that are generated by the software. There is usually a choice to display the listing on the screen or to generate a hard copy from the printer.

Lot Limits — The upper and lower limits assigned to each fiber property.

Lot Limit Rejections — When the values for the fiber property are not within the valid lot limits, a bale is rejected.

Lots — Groups of cotton bales are called "Lots".

Mat — Maturity. Appears as a report header.

Mean Length — The average length of the fibers in the sample.

Mic — Micronaire. Appears as a report header.

Micronaire — A value associated with cotton fineness (fiber perimeter) and maturity (cell wall thickness) by use of the air-flow method.

Modulus — The spring constant of a sample of fibers. The slope of a straight line that is tangent to the stress-strain curve at a point halfway to the force maximum of the curve.

Neppiness — The amount of neps that are in the cotton.

Number of Categories — A maximum of 20 categories is allowed for each fiber property. The number selected should reflect your inventory, but not exceed the requirements because you do not want an excessive number of categories in the warehouse.

Numeric — Only numbers can be used. In certain fields, a valid entry must consist of numbers (no alphabetic characters are allowed).

Observations — The number of individual tests made on a sample. During system testing, the values displayed, printed, and/or sent to a host computer are averages of the number of observations made on the sample.

On-line — The computer directly controls the equipment or devices that respond to the user's commands. A printer must be on-line before printing can occur.

Optics — The LED light source, lens, photo detector, and electronics system within the instrument.

Parameters — Characteristic elements chosen by the user such as the constant values entered and used by the software to determine the measured values of the sample.

Port — This is the connection on the computer where you plug the cable that carries data to another device. The Port is set on the Communications screen, which is displayed when Communications Settings is selected from the Export Menu.

Printer Configuration — Determines the code sent to the printer for different printer selections.

Printer Graphics Type — The type of printer that is being used (IBM Graphics, Epson, Okidata, HP, etc.).

Printout — The paper copy of a report that is printed on the printer.

Properties — The characteristics, or measured values, of a sample.

Protocol — A set of rules that defines how computers communicate with each other when they transmit and receive data. The Protocol is set on the Communications screen, which is displayed when Communications Settings is selected from the Export Menu.

Range — The variance between certain set limits.

Rd — The unit of measurement for reflectance. Higher Rd values indicate higher grades of cotton. Appears as a report header.

Reflectance — The amount of light reflected from an object. It is measured on a black and white scale of 0 to 100 in units of Rd. Cotton ranges from 40 to 85 Rd.

Regression coefficients — The coefficient related to each measured fiber property in the mathematics of regression analysis.

Reject Bales — Bales outside of Lot Limits.

Report — Information based on selected parameters that is sent to the screen or printed.

Report Type — A report can be based on actual test values or on the category that was assigned to the test value. Reports can have both value and categories.

Reverse Chronological Order — Arranged in the opposite order from occurrence. The most recent event is listed first.

Sample — The cotton fiber mass to be tested. For micronaire measurements, it must be a certain weight; for length, strength, uniformity, and elongation measurements, it must be in the form of a beard.

SCI — Spinning Consistency Index is a calculated value based on a regression equation that takes into account all HVI properties and calculates one value to be used on each sample tested. Appears as a report header.

SFI — Short Fiber Index. Appears as a report header.

Sign off — When selected from either the HVI testing screen or by pressing **ESCAPE** from the 940 DataManager Receiving HVI Data screen, sign off causes the current Identifier to be closed and a summary report to be generated. A list of rejected tests is also generated.

Skein — 120 yards of yarn wound on a 1.5-yard diameter reel.

Skein Break (SBr) — The force, in pounds, to break a skein of yarn.

SL1% — The percentage assigned to the first selected Span Length.

SL2% — The percentage assigned to the second selected Span Length.

Software — The instructions that make the computer hardware perform tasks. Programs, operating systems, and applications are all software.

Source File — Data file on floppy.

Span Length — The distance a selected percentage of fibers extend from a clamp in which they have been caught at random along their length.

Specific Surface — The relationship between total fiber surface area to the total fiber volume as measured by the resistance to air flow of a known mass of fibers confined in a fixed volume.

Specification — A set of criteria that has been established to ensure that samples are acceptable.

Spinning Potential — Based on test results, the anticipated quality of yarn after it is spun.

Standard Values — Values assigned to the calibration samples of fiber.

Status — The menu where the parameters that affect the program components are defined. The items on these menus are normally defined when the system is first set up and remain unchanged indefinitely.

Str — Strength. Appears as a report header.

Strength — The relationship of the breaking force to the mass of fibers broken, corrected for micronaire and modified by the calibration constants. The units match the standard values entered for calibration cottons, typically grams per tex (g/tex).

Strength @ % Elong — The percent elongation at which a secondary strength measurement is made for mm fibers.

Stress-Strain Curve — A graphical representation that shows the relationship of the sample's change in dimension to the force applied and the magnitude of the force.

Subdirectory — A logical division of the disk drive so that files can be grouped together for easier access.

Sug — Sugar. Appears as a report header.

T — Trash. Appears as a report header.

Test — A measurement, either a single observation or the average of several observations, taken by the instrument on a sample.

Test Series — A group of tests performed on a sample, for example, the color, trash, micronaire, length, strength, uniformity, and elongation tests performed on samples.

Trash — The non-fiber portion of cotton. It consists of stems, hulls, whole or parts of seeds, motes, grass, sand, dust, oil from machinery, etc. Using the video camera, all areas darker than a threshold level are counted as trash. The discrimination between trash and background is made on the basis of absolute reflectivity rather than trash contrast, so variations in cotton background do not affect the readings.

Trash Area — The ratio of the accumulated areas of all the trash particles to the area of the viewing window of the instrument.

Trash Code — The range where the tested sample falls according to the levels determined during calibration.

Trash Count — The number of individual particles of trash in the sample that are 0.01 inch in diameter or larger.

Unf — Uniformity. Appears as a report header.

Uniformity — The ratio, expressed in percent, of two length measurements.

Upper Half Mean Length — The average length, by number, of the longer half (50%), by weight, of the fibers in a sample.

USDA Color Grade — A three-digit code associated with the Universal Standards of American Upland Cotton.

Version — The revision level of the software.

Window — In the HVI 900 software, the windows are the sections of the screen bordered by single or double lines that present information to the user or provide a place for the user to enter information into the system.

Work @ % Elong — The percent elongation at which a secondary work measurement is made for mm fibers.

Chapter 16 Index

- +b, 6-8, 7-9
- 900 Automatic Calibration Procedure for Short Cotton, 5-19
- 900 Automatic System Testing, 6-1
 - Explanation of the Sign-on Menu, 6-3
 - How to Exit from Testing, 6-18
 - Overview of Testing Sequence, 6-1
 - Printing the Test Results, 6-19
 - Sample Testing Procedures, 6-11
 - System Testing Diagnostics, 6-21
 - System Testing Screen, 6-5
- 900 Semi-Automatic System Testing, 7-1
 - Explanation of the Sign-on Menu, 7-4
 - How to Exit from Testing, 7-19
 - Overview of Testing Sequence, 7-2
 - Printing the Test Results, 7-20
 - Sample Testing Procedures, 7-12
 - System Testing Diagnostics, 7-22
 - System Testing Screen, 7-6
- 940 DataManager, 3-6, 9-1
 - Categories, 9-2
 - Data Export, 9-18
 - Edit Database, 9-25
 - Histograms, 9-15
 - Reports, 9-6
- 940 DataManager Menu, 3-6

A

- Abbreviations
 - Report Header, 9-7
- Add a New Identifier, 9-27
- Add an ID to a Currently Existing Identifier, 9-26
- Add Information to the Database, 9-25
 - Add a New Identifier, 9-27
 - Add an ID to a Currently Existing Identifier, 9-26
- Air Calibration, 5-31
 - Micronaire Air Calibration Screen, 5-31
- Area%, 6-7, 7-8

B

- Balance Configuration, 14-6
- Baud Rate, 9-23
- Break Amount, 10-5
- Break Points, 10-5
- Breaker Arm Label, 1-16
- Breaker Read Rate, 10-10
- Brusher Crush Label, 1-14
- Brusher Forward, 10-10

Brusher Pinch Label, 1-14

C

Calibrating for Color, 5-32

Color Calibration, 5-32

Color Calibration Menu, 5-32

Standard Tile Values, 5-34

Calibrating for Micronaire, 5-27

Air Calibration, 5-31

Micronaire Calibration Status Menu, 5-30

Micronaire Cotton Calibration Menu, 5-28

Calibrating for Trash, 5-36

Sample Calibration, 5-38

Starting Sample Code and Number of Samples, 5-37

Tile Area and Tile Count, 5-36

Tile Calibration, 5-37

Trash Calibration Menu, 5-36

Trash Setup, 5-39

Calibrating the Temperature and Relative Humidity Probe, 5-46

Set Current Value, 5-48

Show Current Value, 5-48

Temperature Calibration Menu, 5-47

Temperature Slope and Temperature Offset, 5-48

Trend Calibration, 5-47

Calibration, 3-5

Calibration Cotton Standards, 14-13

High Volume Instrument Calibration Cottons (HVI), 14-13

International Calibration Cottons (ICC), 14-13

Calibration Cottons, 14-8

Conclusion, 14-12

Cotton Staple Length Standards, 14-9

HVI Calibration Cotton, 14-10

HVI Calibration Cottons, 14-9

International Calibration Cottons, 14-8

Staple Length Standards, 14-8

Calibration for Long Cotton, 5-21

Calibration for Short Cotton, 5-16

Calibration Menu, 3-5, 5-2

Categories, 9-2

Category Definition Screen, 9-2

Highest Value of First Category, 9-3

How the Category System Works, 9-4

Interval, 9-3

Number of Categories, 9-3

Category Definition, 9-2, 9-4

Store information, 9-4

Category Definition Screen, 9-2

Category System, 9-4

Average and Range of Your Inventory, 14-17

Category Definition, 9-4, 14-17

Change Test Data in the Database, 9-27

Changing Selections/Parameters, 1-9

- Cleaning the Fibrosampler Card Cloth, 13-6
- Cleaning the System, 12-1
- Color Calibration, 5-32
 - Calibrate Color Tiles Screen, 5-33
 - Steps for Tile Calibration, 5-34
- Color Chart Creation Menu, 4-10
- Color Chart Maintenance Selections Menu, 4-9
- Color Grade, 4-8, 6-8, 7-9
- Color Tile Standard Values Screen, 5-35
- Color Tray, 4-6
- Color/Trash and NIR Modules, 1-7
 - Fineness, 1-8
 - Maturity, 1-7
 - NIR Module, 1-8
 - Trash area, 1-7
 - Trash code or leaf, 1-7
 - Trash count, 1-7
- Color/Trash Module Test Screen, 8-27
- Color/Trash Module Testing, 8-21
 - Color Hand, 8-23
 - Continue with Testing, 8-21
 - DataManager, 8-25
 - Exit from Color/Trash Module Testing, 8-28
 - Explanation of the Color/Trash Module Test Screen, 8-27
 - External Computer, 8-23
 - Identifier, 8-21
 - Number of Tests, 8-22
 - Printer, 8-22
 - Reject Sample to Computer/DataManager, 8-25
 - Sign Off External Computer, 8-26
 - Testing Procedures, 8-27
 - Trash Measurement, 8-22
 - Trash Type, 8-23
- Color/Trash Module Testing Procedures, 8-27
- Comb Read Rate, 10-10
- Comb Transport Label, 1-15
- Communications Settings, 9-22
 - Baud Rate, 9-23
 - Port, 9-22
 - Protocol, 9-23
 - Settings for Transmitting to BIAS, 9-24
- Company Name, 4-31
- Compressed Air, 2-3
- Configuration for 900 SA and Auto, 2-4
- Connections, 2-5
 - Balance, 2-5
 - Barcode Reader, 2-5
 - Keyboard, 2-5
 - Monitor, 2-5
 - Temperature/Relative Humidity Probe, 2-5
- Connector Blocks Labels, 1-15
- Cotton Calibration, 5-15
 - 900 Automatic Calibration Procedure for Short Cotton, 5-19

- 900 Semi-Automatic Calibration Procedure for Short Cotton, 5-17
- Calibration for Long Cotton, 5-21
- Calibration for Long Cotton Screen, 5-21
- Calibration for Short Cotton, 5-16
- Cotton Calibration for Short Cotton Screen, 5-17
- Cotton Calibration Report Screen, 5-22
- Cotton Calibration Test Results for Short Cotton Screen, 5-21
- Cotton Calibration Test Results--Fail Condition, 5-23
- Cotton Calibration Test Results--Pass Condition, 5-22
- Cotton Calibration Report Screen, 5-22
- Cotton Calibration Test Results--Fail Condition, 5-23
- Cotton Calibration Test Results--Pass Condition, 5-22
- Cotton Calibration Test Results for Short Cotton, 5-21
- Cotton Staple Length Standards, 14-9
- Count, 6-7, 7-9
- Count Strength Product (CSP), 4-28
- Create Menu, 4-10
 - Mesh, 4-10
 - Slanted, 4-10
- Create Mesh Chart, 4-12
- Create Mesh Lines Color Chart, 4-11
- Create Slant Lines Color Chart, 4-13
- CSP Regression Coefficients, 4-28
 - Uniformity Index, 4-29
 - Uniformity Ratio, 4-29
 - Using mN/tex Instead of CSP, 4-30
- CSP Regression Coefficients Screen, 4-28

D

- Data Export
 - Communications Settings, 9-22
 - Destination for Exported Files, 9-19
 - Export Data, 9-24
 - Overview, 9-18
 - Select Identifier, 9-18
 - Tests Included When Data is Exported, 9-19
- Data Module Category Menu
 - Average and Range of Inventory, 14-17
 - Category Definition, 14-20
 - Define Categories to Reflect Inventory, 14-21
 - Estimated Average, 14-20
 - Highest Value of First Category, 14-20
 - Initial Analysis of the Inventory, 14-19
 - Initial Category Definition for Inventory Analysis, 14-18
 - Interval Between Categories, 9-3
- Date, 4-7
- Define Categories, 14-21
- Destination for Exported Files
 - Identifier Named Disk File, 9-21
 - Transmit, 9-21
 - User Named Disk File, 9-20
- Diagnostics Menu, 11-1

Disk Information, 14-2
 Disk Operating System, 14-2
 Diskettes, 14-2
Disk Operating System, 14-2
Diskettes, 14-2

E

Edit Color Chart, 4-9
 Create a New Chart, 4-10
 Create Slant Lines Color Chart, 4-13
 Mesh Lines chart, 4-12
 Modify an Existing Chart, 4-15, 4-23
 Remove an Existing Chart, 4-16, 4-24
Edit Database
 Add Information to the Database, 9-25
 Change Information in the Database, 9-27
 Remove Information from the Database, 9-28
Edit Lot Limits, 4-18
 Determining the Action When Cotton Fails to Meet Lot Limits, 4-20
 Retest, 4-20
 Verify, 4-20
Electrical Power Requirements, 2-2
Elongation (Elong), 7-9
Elongation Transducer, 4-7
Epson Printer, 14-4
Error Messages, 1-8, 14-31
Exit From Operation, 1-9
Exit from Testing, 6-18, 7-19
Export Data, 9-24

F

Fiber Dependent Instrument Constants, 10-4
 910 Max Amount, 10-5
 910 Min Amount, 10-5
 Break Amount, 10-5
 Break Points, 10-5
 Front Position, 10-6
 SL1%, 10-5
 SL2%, 10-5
 Strength @ %Elongation, 10-6
 Work @ %Elongation, 10-6
Fiber Name, 10-4
Fiber Selection Menu, 10-2, 10-3
 Fiber Dependent Instrument Constants, 10-4
 Man-Made Fiber Calibration Constants, 10-7
 Man-Made Fiber Calibration Tolerances, 10-8
 Man-Made Fiber Standard Values, 10-6
Fibrosampler 192, 13-1, 13-7
 General Information, 13-1
 Installation / Maintenance, 13-7
 Purpose of the Instrument, 13-1
 Sample Preparation, 13-4

Fineness, 1-8-7-10
Floor Space Requirements, 2-4
 Configuration for 900 SA and Auto, 2-4
Format Used When Data Is Exported, 14-22, 14-22, 14-37

G

General System Drawings
 HVI 900 Automatic in L Configuration, 1-2
 HVI 900 Semi-Automatic in L Configuration, 1-3
 HVI System Peripherals, 1-3
Generic Instrument Transmission, 14-24
 HVI Record Formats, 14-26
 Transmission Architecture, 14-24
 Universal Record Format, 14-25
Grade, 6-7, 7-8
Grade Entry, 4-5

H

Highest Value of First Category, 9-3
Histograms, 9-2, 9-15
 Exit, 9-17
 Make Histogram, 9-16
 Overview, 9-15
 Print Histogram, 9-17
 Property, 9-16
 Select Identifier, 9-15
Hunter's scale (+b), 1-7
HVI 900 Equipment, 1-1
HVI 900 System Modules, 1-4
 Color/Trash and NIR Modules, 1-7
 Error Messages, 1-8
 Length/Strength Module, 1-4
 Micronaire Module, 1-6
 Software Features, 1-8
HVI Calibration Cotton, 14-10
HVI Calibration Cottons, 14-9
HVI Record Formats, 14-26
 Color/Trash, 14-29
 Length/Strength, 14-26
 Micronaire, 14-28

I

ICC SL1 %, 5-5
ICC SL2 %, 5-6
ID, 6-7, 7-8
Identifier, 6-3, 7-4
Initial Analysis of the Inventory, 14-19, 14-19
Initial Category Definition for Inventory Analysis, 14-18
 Initial Analysis of the Inventory, 14-19
 Initial Values Chart, 14-18
Initial Category Setup, 14-16
 Category System, 14-16

- Define Categories, 14-21
- Define Categories to Cover the Range of Your Cotton, 14-21
- How the Category System Works, 14-16
- How to Determine the Average and Range of a Spinning Mill's Inv, 14-17
- Initial Analysis of the Inventory, 14-19
- Initial Category Definition for Inventory Analysis, 14-18
- Why Category Definitions Should Remain the Same, 14-17
- Installation, 2-1
 - Compressed Air, 2-3
 - Connections, 2-5
 - Electrical Power Requirements, 2-2
 - Fibrosampler 192, 13-7
 - Floor Space Requirements, 2-4
- International Calibration Cottons, 14-8
- Interval, 9-3
- Introduction, 1-1
 - HVI 900 Equipment, 1-1
 - HVI 900 System Modules, 1-4
 - Keyboard Commands, 1-9

K

- Keyboard Commands, 1-9
 - Changing Selections/Parameters, 1-9
 - Exit From Operation, 1-9
 - Special Function Keys, 1-11
 - Visual Cues Used in This Manual, 1-10

L

- Leaf, 6-7, 7-8
- Len 1, 10-7
- Len 2, 10-7
- Length (Len), 7-9
- Length and Strength Calibration Menu, 5-3
- Length and Strength Calibration Status Menu, 5-4
 - Calibration Mode, 5-5
 - HVI, 5-5
 - ICC, 5-5
 - ICC SL1 %, 5-5
 - ICC SL2 %, 5-6
 - Length and Strength Cotton Standard Values Menu, 5-8
 - Length Units, 5-5
 - Length/Strength Calibration Constants, 5-6
 - Length/Strength Calibration Cotton Standard Values, 5-8
 - Length/Strength Calibration Status Menu, 5-8
- Length and Strength Lens to Break Test Results, 5-14
- Length and Strength Lens to Break Test Screen, 5-14
- Length Standard Calibration, 5-10
- Length Standard Calibration Menu, 5-9
 - Length Standard Calibration, 5-10
 - Length Standard Check, 5-12
 - Length Standard Test Results Screen, 5-11
 - Length Standard Value, 5-12

- Length Standard Check, 5-12
- Length Standard Value, 5-12
- Length/Strength Calibration, 5-3
 - Cotton Calibration, 5-15
 - Length and Strength Calibration Menu, 5-3
 - Length and Strength Calibration Status Menu, 5-4
 - Length Standard Calibration Menu, 5-9
 - Lens to Break Calibration Menu, 5-12
 - Mechanical Elongation Calibration, 5-23
- Length/Strength Calibration Constants, 5-6
- Length/Strength Calibration Cotton Standard Values, 5-8
- Length/Strength Module, 1-4
 - 900 Automatic, 1-6
 - 900 Semi-Automatic, 1-5
- Length/Strength Module Testing, 8-2
 - Continue with Testing, 8-3
 - DataManager, 8-7
 - Exit Length/Strength Module Testing, 8-12
 - Explanation of the Length/Strength Module Testing Screen, 8-9
 - External Computer, 8-5
 - Identifier, 8-3
 - Micronaire Data, 8-4
 - Number of Tests, 8-4
 - Print Mode, 8-4
 - Printer, 8-4
 - Reject Sample to Computer/DataManager, 8-8
 - Sample Eject, 8-3
 - Sign Off External Computer, 8-8
 - Strength Measurement, 8-5, 8-5
 - Testing Procedures, 8-10
- Length/Strength Module Testing Procedures, 8-10
- Length/Strength Module Testing Screen, 8-9
- Lens to Break Calibration, 5-13
- Lens to Break Calibration Menu, 5-12, 5-13
 - Length and Strength Lens to Break Calibration Menu, 5-14
 - Length and Strength Lens to Break Test Results Screen, 5-14
 - Lens to Break Calibration, 5-13
 - Lens to Break Calibration Menu, 5-13
 - Lens to Break Value, 5-15
- Lens to Break Value, 5-15
- Limits to Selecting Properties, 9-10
- Lot Limits, 4-17, 14-15
- Lot Limits Menu, 4-1, 4-17, 4-19
- Low Cotton Value and High Cotton Value, 5-30

M

- Main Menu, 3-4
 - 940 DataManager, 3-6
 - Calibration, 3-5
 - Diagnostics, 3-7
 - Man-Made Testing, 3-6

- Module Testing, 3-5
- Quit, 3-7
- Shutdown, 3-7
- Status, 3-6
- System Testing, 3-4
- Maintenance and Calibration
 - Calibrating the Temperature and Relative Humidity Probe, 5-46
 - NIR Calibration, 5-40
- Make Histogram, 9-16
- Make Report, 9-12
 - Report Generated to Printer, 9-14
 - Report Generated to Screen, 9-13
- Man-Made Calibration, 10-11
 - Calibration Menu, 10-12
- Man-Made Calibration Menu, 10-12
 - Fiber Calibration for xxx, 10-13
 - Number of Calibration Tests, 10-12
 - Sample Eject, 10-14
- Man-Made Fiber Calibration Constants, 10-7
- Man-Made Fiber Calibration Tolerances, 10-8
- Man-Made Fiber Menu, 3-6, 10-1
- Man-Made Fiber Standard Values, 10-6
 - Len 1, 10-7
 - Len 2, 10-7
- Man-Made Fiber Status Menu, 10-2
 - Fiber Name, 10-4
 - Fiber Selection Menu, 10-2, 10-3
 - Motor Constants Menu, 10-2, 10-9
 - Print Status Listing, 10-2, 10-10
- Man-Made Fiber Testing, 10-1
 - Calibration, 10-11
 - Explanation of the Fiber Testing Menu, 10-16
 - Explanation of the Man-Made Fiber Testing Screen, 10-20
 - Man-Made Fiber Testing Procedures, 10-21
 - Status, 10-2
 - Testing, 10-15
- Man-Made Fiber Testing Menu, 10-15, 10-16
 - Continue with Testing, 10-16
 - DataManager, 10-19
 - External Computer, 10-18
 - Identifier, 10-16
 - Micronaire Data, 10-17
 - Number of Tests, 10-16
 - Print Mode, 10-18
 - Printer, 10-17
 - Reject Sample to Computer/DataManager, 10-19
 - Sample Eject, 10-16
 - Sign-off External Computer, 10-19
 - Strength Measurement, 10-18
- Man-Made Fiber Testing Procedures, 10-21
 - Exit Testing, 10-22
- Man-Made Fiber Testing Screen, 10-20
- Man-Made Testing, 3-6

- Maturity, 1-7, 6-9, 7-10
- Measurement Procedures for Color/Trash/NIR, 6-15, 7-15
- Measurement Procedures for Micronaire, 6-11, 7-12
- Mechanical Elongation Calibration, 5-23
 - Mechanical Elongation Calibration Instruction Screen, 5-24
 - Mechanical Elongation Test Screen, 5-25
- Mechanical Elongation Calibration Instruction Screen, 5-24
- Mechanical Elongation Test Screen, 5-25
- Mesh, 4-10
- Mesh Lines chart, 4-12
- Message Box, 6-10, 7-11
- Micronaire (MIC), 6-8, 7-9
- Micronaire Calibration Menu, 5-27
- Micronaire Calibration Status Menu, 5-30
 - Low Cotton Value and High Cotton Value, 5-30
- Micronaire Cotton Calibration, 5-28
- Micronaire Cotton Calibration Menu, 5-28
 - Micronaire Calibration Status Menu, 5-28
 - Micronaire Cotton Calibration, 5-28
- Micronaire Module, 1-6
- Micronaire Module Testing, 8-13
 - Continue with Testing, 8-13
 - DataManager, 8-16
 - Exit from Micronaire Module Testing, 8-20
 - Explanation of the Micronaire Module Testing Screen, 8-18
 - External Computer, 8-14
 - Identifier, 8-13
 - Number of Tests, 8-14
 - Printer, 8-14
 - Reject Sample to Computer/DataManager, 8-17
 - Sign Off External Computer, 8-17
 - Testing Procedures, 8-19
- Micronaire Module Testing Procedures, 8-19
- Micronaire Module Testing Screen, 8-18
- Modify an Existing Chart, 4-15, 4-23
 - Continue Editing, 4-15, 4-23, 4-24
 - Do Not Save Chart, 4-15, 4-23, 4-24
 - Save Chart, 4-15, 4-23, 4-24
- Modify an Existing Color Chart Screen, 4-15
- Module Testing, 3-5, 8-1
 - Color/Trash Module Testing, 8-21
 - Length/Strength Module Testing, 8-2
 - Micronaire Module Testing, 8-13
 - NIR Module Testing, 8-29
- Module Testing Menu, 3-5
- Monitor Information, 14-3
- Motor Constants Menu, 10-2, 10-9
 - Breaker Read Rate, 10-10
 - Brusher Forward, 10-10
 - Comb Read Rate, 10-10

N

- NIR, 4-6
- NIR Calibration, 5-40
 - NIR Calibration Menu, 5-41
 - NIR Calibration Status Menu, 5-41
 - NIR Cotton Calibration, 5-43
- NIR Calibration Status Menu, 5-41
 - Low Maturity and High Maturity, 5-42
 - Low Sugar and High Sugar, 5-42
 - Maturity and Sugar Offset, 5-43
 - Maturity and Sugar Slope, 5-42
 - NIR Cotton Calibration Screen, 5-43
 - NIR Status Screen, 5-41
 - Observations, 5-42
- NIR Cotton Calibration, 5-43
 - Steps for NIR Calibration, 5-44
- NIR Module, 1-8
- NIR Module Test Screen, 8-34
 - Fineness, 8-35
 - Mass, 8-34
 - Maturity, 8-34
 - Mic, 8-34
 - Sugar, 8-35
- NIR Module Testing, 8-29
 - DataManager, 8-32
 - Exit from NIR Module Testing, 8-36
 - Explanation of the NIR Module Test Screen, 8-34
 - External Computer, 8-31
 - Identifier, 8-29
 - Number of Tests, 8-30
 - Printer, 8-30
 - Reject Sample to Computer/DataManager, 8-33
 - Sign Off External Computer, 8-33
 - Testing Procedures, 8-35
- NIR Module Testing Procedures, 8-35
- Number of Categories, 9-3
- Number of Color/Trash Tests, 4-8
- Number of Len/Str Tests, 4-8
- Number of Mic Tests, 4-8

O

- Okidata 520 Printer, 14-5
- Operation
 - Sample Preparation, 13-4

P

- Parameter Entry, 4-1
- Pima chart, 4-13
- Pinch Hazard Label, 1-13
- Port, 9-22
- Power Distribution Box and Length/Strength Cabinet Label, 1-15

- Power Distribution Box Label, 1-15
- Print Histogram, 9-17
- Print Status Listing, 10-2, 10-10
- Printer Information, 14-4
 - Epson Printer, 14-4
 - Printer Switch Settings, 14-4
 - Wenger Printer, 14-4
 - Okidata 520 Printer, 14-5
- Printer Switch Settings, 14-4, 14-4
 - Epson Printer, 14-4
 - Wenger Printer, 14-4
- Printing the Test Results, 6-19, 7-20
- Property, 9-16
- Protocol, 9-23

R

- Rd, 6-8, 7-9
- Recommended Lot Limits, 14-15
- Reflectance (%Rd), 1-7
- Remove an Existing Chart, 4-16, 4-24
- Remove Information from the Database
 - Remove All Tests for an Identifier, 9-29
 - Remove One Test from an Identifier, 9-29
- Remove Test Data from the Database, 9-28
 - Remove All Tests for an Identifier, 9-29
 - Remove One Test from an Identifier, 9-29
- Report Generated to Printer, 9-14
- Report Generated to Screen, 9-12
- Report Header Abbreviations, 9-7
- Reports
 - Destination, 9-6
 - Limits to Selecting Properties, 9-10
 - Make Report, 9-12
 - Overview, 9-6
 - Report Header Abbreviations, 9-7
 - Report Type, 9-6
 - Selecting Fiber Properties to Appear on the Report, 9-9
 - Selecting the Destination for the Report, 9-12
 - Selecting the Identifier(s), 9-7
 - Selecting the Type of Report, 9-11
 - Tests Included on the Report, 9-11
- Reset Sample Counter, 7-5
- Resetting the 900 System, 3-8
- Retest Tolerances, 4-25
- Retest Tolerances Menu, 4-25

S

- Safety Warning Labels, 1-12
 - Breaker Arm Label, 1-16
 - Brusher Crush Label, 1-14
 - Brusher Pinch Label, 1-14

- Comb Transport Label, 1-15
- Connector Blocks Label, 1-15
- Equipment Label, 1-14
- Example Labels, 1-13
- Fibrosampler 192 Warning Labels, 13-3
- Label Locations, 1-12
- Pinch Hazard Label, 1-13
- Power Distribution Box Label, 1-15
- Sample Calibration, 5-38
- Sample Eject, 4-7, 5-4
- Sample Preparation, 13-4
 - Using the Fibrosampler to Prepare Samples, 13-4
- Sample Testing Procedures, 6-11, 7-12
 - Measurement Procedures for Color/Trash/NIR, 6-15, 7-15
 - Measurement Procedures for Micronaire, 6-11, 7-12
 - Testing Procedures for Length, Uniformity, Strength, Elongation, 6-13, 7-17
- Samples, 6-9, 7-10
- SCI Regression Coefficients Screen, 4-27
- Select Identifier, 9-15
- Selecting Fiber Properties to Appear on the Report, 9-9
- Selecting the Destination for the Report
 - Printer, 9-12
 - Screen, 9-12
- Selecting the Type of Report
 - Categories, 9-11
 - Value, 9-11
 - Values/Categories, 9-11
- Service, 12-5
- Settings for Transmitting to BIAS, 9-24
- Short Fiber Index (S.F.I.), 6-8, 7-10
- Shutdown, 3-7
- Sign-on Menu, 3-4, 6-3, 7-4
 - Identifier, 6-3, 7-4
 - Proceed with Testing, 6-3, 7-4
 - Reset Sample Counter, 6-4, 7-5
- SL1%, 10-5
- SL2%, 10-5
- Slant Lines chart, 4-13
 - Slant Lines Color Chart Creation Screen, 4-14
 - Slanted, 4-10
- Software Features, 1-8
 - Menus, 1-8
- Special Function Keys, 1-11
- Specifications, 14-1
 - Fibrosampler 192, 13-13
- Spinning Consistency Index (SCI), 4-26
- Standard Tile Values, 5-34
- Staple Length Standards, 14-8
- Start-Up Menu, 3-2
- Starting Sample Code and Number of Samples, 5-37
- Startup Menu
 - Go to Dos (C:>), 3-3

- Go to Main Menu, 3-3
- Status, 3-6
- Status Listing, 4-31
- Status Listing Menus, 4-32
- Status Menu, 4-1
 - Color Grade, 4-8
 - Color Tray, 4-6
 - Company Name, 4-31
 - CSP Regression Coefficients, 4-28
 - Date, 4-7
 - Edit Color Chart, 4-9
 - Edit Lot Limits, 4-18
 - Elongation Transducer, 4-7
 - Grade Entry, 4-5
 - Lot Limits, 4-17
 - NIR, 4-6
 - Number of Color/Trash Tests, 4-8
 - Number of Len/Str Tests, 4-8
 - Number of Mic Tests, 4-8
 - Retest Tolerances, 4-25
 - Sample Eject, 4-7
 - Status Listing, 4-31
 - System Testing Results, 4-3
 - Temperature and Humidity Constants, 4-30
 - Transmission Timeout, 4-7
 - Trashmeter, 4-6
 - Uster® SCI Regression Coefficients, 4-26
- Status--Defining Operating Parameters
 - Explanation of the Status Menu, 4-3
 - Parameter Entry, 4-1
- Steps for Tile Calibration, 5-34
- Strength (Str), 7-9
- Strength @ %Elongation, 10-6
- Sugar%, 6-9, 7-10
- System Calibration, 5-1
 - Calibrating for Color, 5-32
 - Calibrating for Micronaire, 5-27
 - Calibrating for Trash, 5-36
 - Length/Strength Calibration, 5-3
 - Overview, 5-1
- System Diagnostics, 11-1
- System Installation Guide / Report, 14-44
- System Maintenance, 12-1
 - Cleaning, 12-1
 - Service, 12-5
 - Vacuum Box Maintenance, 12-2
 - Vacuum Motor Maintenance, 12-3
- System Startup, 3-1
 - Explanation of the Main Menu, 3-4
 - Explanation of the Startup Menu, 3-2
 - Resetting the 900 System, 3-8
- System Structure
 - Air, 14-1

- Balance, 14-1
- CRT, 14-1
- Force Transducer, 14-1
- Lamps, 14-1
- Length/Strength Cabinet, 14-1
- Micronaire/Color/Trash Cabinet, 14-1
- Power, 14-1
- Pressure Transducer, 14-1
- Vacuum, 14-1
- System Testing, 3-4
 - Sign-On Menu, 3-4
- System Testing Diagnostics, 6-21, 7-22
 - Messages, 6-21, 7-22
- System Testing Results, 4-3
- System Testing Screen, 6-5, 7-6
 - +b, 6-8, 7-9
 - Area%, 6-7, 7-8
 - Color Grade, 6-8, 7-9
 - Count, 6-7, 7-8
 - Elongation (Elong), 6-8, 7-9
 - Fineness, 6-9, 7-10
 - Grade, 6-7, 7-8
 - ID, 6-7, 7-8
 - Leaf, 6-7, 7-8
 - Length (Len), 6-8, 7-9
 - Maturity, 6-9, 7-10
 - Message Box, 6-10, 7-11
 - Micronaire (MIC), 6-8, 7-9
 - Rd, 6-8, 7-9
 - Samples, 6-9, 7-10
 - Short Fiber Index (S.F.I.), 6-8, 7-10
 - Strength (Str), 6-8, 7-9
 - Sugar%, 6-9, 7-10
 - Test Status Box, 6-9, 7-11
 - Uniformity (Unif), 6-8, 7-9

T

- Temperature and Humidity Constants, 4-30
- Temperature and Humidity Menu, 4-31
- Temperature Slope and Temperature Offset, 5-48
- Test Status Box, 6-9, 7-11
- Testing Procedures for Length, Uniformity, Strength, Elongation, 6-13, 7-17
- Tests Included on the Report
 - Accepted Tests, 9-11
 - Accepted/Rejected Tests, 9-11
 - Rejected Tests, 9-11
- Tests Included When Data is Exported
 - Accepted Tests, 9-19
 - Accepted/Rejected Tests, 9-19
 - Rejected Tests, 9-19
- Tile Area and Tile Count, 5-36
- Tile Calibration, 5-37

- Trash Tile Calibration Screen, 5-37
- Transmission Timeout, 4-7
- Transmission Type
 - % CV, 4-5, 8-6, 8-15, 8-24, 8-32
 - Individual Fibrogram Curves, 4-5, 8-6
 - Individual Observations, 4-4, 8-6, 8-15, 8-24, 8-31
 - Individual Stress/Strain Curves, 4-5, 8-7
 - Mean Fibrogram Curves, 4-5, 8-7
 - Mean Stress/Strain Curves, 4-5, 8-7
 - Means, 4-4, 8-6, 8-15, 8-24, 8-32
 - Standard Deviations, 4-5, 8-6, 8-15, 8-24, 8-32
- Transmission Type Menu, 8-6, 8-15, 8-24, 8-31
- Transmission Types Menu, 4-4
- Trash area, 1-7
- Trash code or leaf, 1-7
- Trash count, 1-7
- Trash Setup, 5-39
- Trashmeter, 4-6
- Trend Calibration, 5-47
 - Trend Calibration of the Temperature Probe Screen, 5-48

U

- Uniformity (Unif), 7-9
- Universal Record Format, 14-25
- Using the Fibrosampler to Prepare Samples, 13-4
 - Cleaning the Fibrosampler Card Cloth, 13-6
- Uster® SCI Regression Coefficients, 4-26
 - Changing the SCI Equation, 4-28
 - Uniformity Index, 4-26
 - Uniformity Ratio, 4-26

V

- Vacuum Box Maintenance, 12-2
- Vacuum Motor Maintenance, 12-3
- Visual Cues Used in This Manual, 1-10

W

- Wenger Printer, 14-4
- Work @ %Elongation, 10-6

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