Elizabeth-Hata

User's Manual
ElizaTest 3+ Tablet Testing System
Version 3.22

Document Number: EH-UM-ET3PLUS-32200 (R0)
Revision: 0
Revision Date: 073101

User's Manual-
ElizaTest 3+ Tablet Testing System
Version 3.22

Document Number:
EH-UM-ET3PLUS-32200 (R0)

Revision:
0

Revision Date:
073101

Table of Contents

Table of Contents (con't)

Table of Contents (con't)

Table of Contents (con't)

1 Introduction

This manual contains information on the use, operation, and calibration of the ElizaTest 3+ Tablet Testing System. Both the single-test and optional magazine modes of operation are described.

This manual assumes that the ElizaTest 3+ is being used as a stand-alone unit. Instructions for using the ElizaTest 3+ as an integrated inline production tablet tester (in conjunction with a tablet press) are included in a separate section of this manual which will note the major operational differences, and are also contained in the *TabSys Tableting Press Interface User Manual*.

2 System Overview

The standard ElizaTest 3+ Tablet Testing System is housed in one free-standing unit, containing the Tablet Testing Module (which may be equipped with an optional magazine feeder), computer, and printer. The monitor, keyboard, and mouse are attached by cables to the rear of the system. A 3.5" 1.44 MB floppy disk and

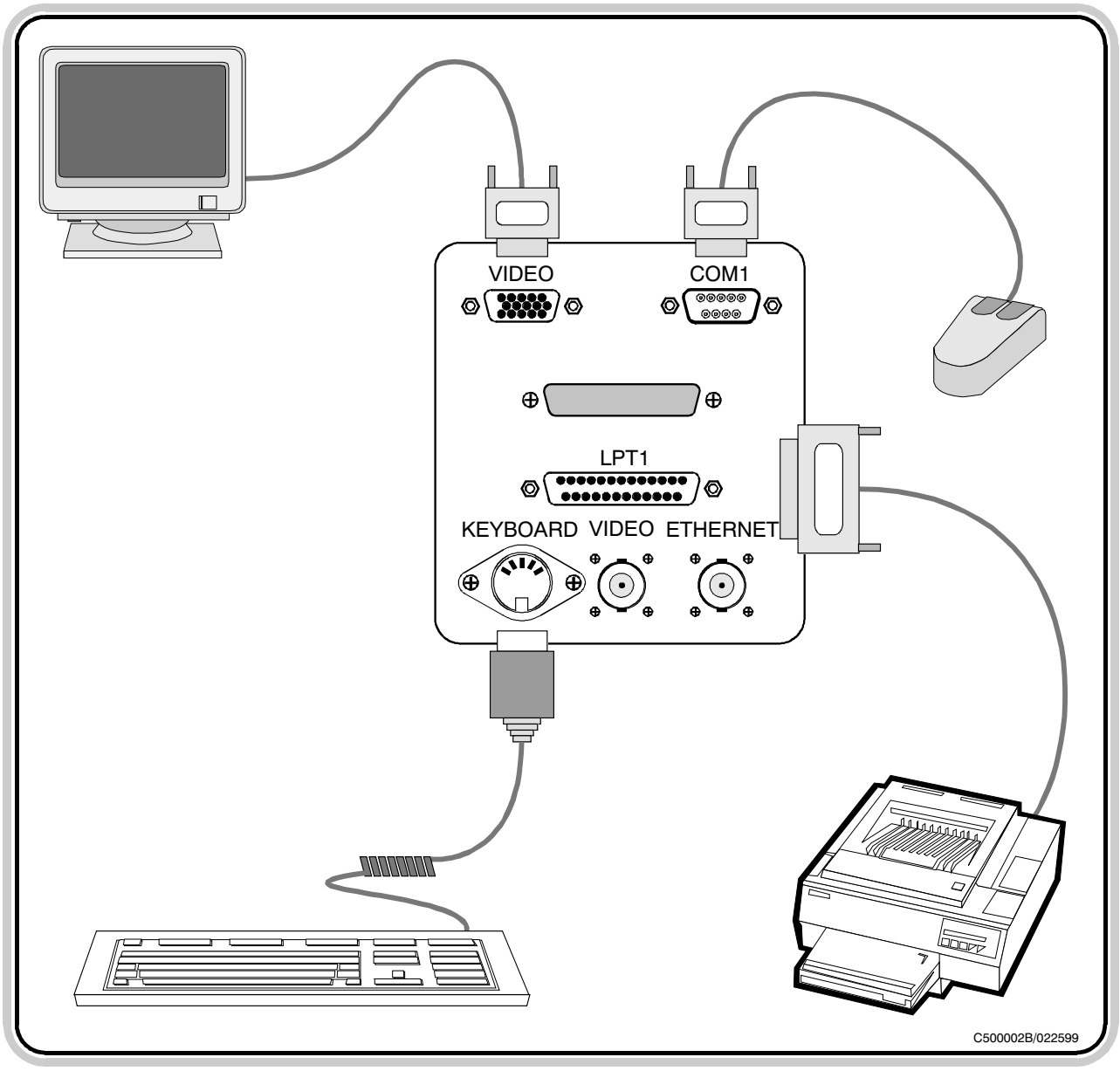

Figure 2.1- General components and connections

Ethernet networking adapter are provided for convenient access to the ElizaTest 3+ database. Figure 2.1 shows the components and their connections.

2.1 Tablet Testing Module

The Tablet Testing Module occupies the top portion of the Tablet Testing System. The Tablet Testing Module performs the actual thickness, weight, and hardness tests on the tablets. The Tablet Testing Module houses the tablet feeder, tablet indexer, thickness encoder, balance, and hardness testing mechanism. It also contains the camera and ring light used to illuminate the tablet during the hardness test. Inside the Tablet Testing Module are the mechanical components needed to perform the testing functions.

The Tablet Testing Module also contains provisions for attaching an optional magazine tablet feeder. Using a magazine allows multiple preconfigured tablet tests to be run consecutively, with no operator intervention required between tests.

2.1.1 Tablet Feeder

The tablet feeder receives and holds the tablets to be tested. The tablet feeder contains a rotating 'screw' that separates and moves the tablets into the first testing station. The angle of the tablet feeder is adjustable, allowing tablets of different sizes to be accommodated. At the end of a tablet test, the screw turns in the opposite direction, causing any tablets that remain in the tablet feeder to be emptied out the bottom of the feeder into the excess tablet bin at the rear of the machine.

2.1.2 Tablet Indexer

The tablet indexer is the mechanism that transports individual tablets through the tester, from one testing station to the next. The tablet

indexer consists of a horizontal slide and a vertical slide. To transport a tablet, the horizontal slide moves the tablets forward, then the vertical slide moves up, lifting the horizontal slide. The horizontal slide then moves backward, over the top of the tablets in the testing stations. The vertical slide then returns to its down position, carrying the horizontal slide with it. The horizontal slide then moves forward a small distance, then back. The net result is that each tablet has been pushed forward to the middle of the next testing station.

NOTE:

A special adherent tablet feature can be enabled which will modify the standard tablet indexing motion, allowing the tablet indexer to dislodge tablets that may have a tendency to stick to the bottom of the thickness measurer. This feature is covered in further detail later.

2.1.3 Thickness Encoder

The first testing station is the thickness testing station. The thickness encoder utilizes a linear optical glass scale encoder. This device works by counting microscopic lines that are etched into the glass scale of the encoder as the thickness measurer moves down to contact the top surface of the tablet.

2.1.4 Balance

The second testing station is tablet weight. Tablet weight is measured to a tenth of a milligram by a Mettler Toledo AB54 balance. The balance transmits the weight of the tablet directly to the computer when commanded to do so. This balance also has a numeric display that may be viewed on the front of the unit.

2.1.5 Hardness Test

The third and final testing station is the hardness test. After a tablet has been pushed into the station, the camera mounted above the sta-

tion transmits a picture of the tablet to the computer. The computer compares this image with the desired alignment image that was previously defined, then rotates the hardness platform that the tablet is resting on to achieve this same alignment. When the tablet is properly oriented, the ram and anvil move in towards the tablet. The anvil stops just before it reaches the tablet. The ram continues to move (at a slower rate) until the tablet fractures. The maximum amount of force applied during the test is then recorded as the value of the tablet's hardness. Finally, both the ram and anvil retract, and the tablet is then pushed into the waste bin at the right of the machine.

2.2 Computer Overview

The computer occupies the middle portion of the ElizaTest 3+ Tablet Testing System. The computer consists of the main processor and memory, and several additional circuit cards for the camera control, motor controller, sensor input and output, printer, and video monitor.

2.2.1 Central Processor and Operating System

The central processing unit (CPU) is a current-generation Intel Pentium CPU, which represents the state-of-the-art in computing power. The computer contains 32 (or more) megabytes of high-speed memory, and has a large capacity hard disk drive internal to the unit. The hard disk drive stores the ElizaTest program, operating system, and all setups, magazines, and data generated during the tablet tests. The computer also has a single 3.5" 1.44 megabyte floppy disk drive that can be used for program updates or retrieving test data from the system.

The ElizaTest 3+ Tablet Testing System uses the Windows NT operating system, Workstation Version 4.0. The operating system is responsible for coordinating the operations of the computer system, such as gathering keyboard

and mouse data, displaying information, and managing the hard disk and optional network connection. The Windows NT 4.0 operating system also manages the computer-level security.

This user's manual is not intended to act as a tutorial for the Windows NT operating system, networking operations, or the Microsoft Access database. For information beyond the scope of this manual, refer to the Microsoft Windows NT or Microsoft Access User Guides or on-line documentation shipped as part of the system documentation package.

WARNING:

All functions of, and data maintained by, the Elizabeth-Hata ElizaTest 3+ Vision Tablet Testing System is intended to be accessed only by the methods provided expressly by the ElizaTest 3+ and/or TabSys Tableting Press Interface software. Elizabeth-Hata International makes no guarantee concerning the validity or consistency of data that has been altered outside the scope of the ElizaTest 3+ software.

USERS ARE STRONGLY CAUTIONED AGAINST DIRECTLY ALTERING ANY DATA CONTAINED IN THE ELIZATEST 3+ DATABASE (OR TABSYS DATABASE, WHEN THE UNIT IS PART OF AN INTEGRATED TABLETING PRESS SYSTEM). USERS ARE STRONGLY CAUTIONED AGAINST MOVING, DELETING, OR RENAMING OF ANY FILES, EXECUTABLE PROGRAMS, CONFIGURATION FILES, WINDOWS NT SYSTEM REGISTRY ENTRIES, AND OTHER ELIZATEST 3+ SOFTWARE COMPONENTS THAT COULD RENDER THE SOFTWARE UNABLE TO PERFORM ITS INTENDED TASK.

ELIZABETH-HATA INTERNATIONAL ASSUMES NO LIABILITY FOR THE LOSS OF USE OF THE SOFTWARE OR SYSTEM, PRODUCTION OF UNSELLABLE PRODUCT, CONSEQUENTIAL OR INCONSEQUENTIAL DAMAGES, AND ALL OTHER CLAIMS ARISING FROM THE UNAUTHORIZED ALTERATION OF SOFTWARE COMPONENTS (BOTH DATA AND EXECUTABLE). THE END USER ASSUMES ALL RISKS ASSOCIATED WITH THE UNAUTHORIZED ALTERATION OF THE ELIZATEST 3+ SOFTWARE COMPONENTS, DATA FILES, AND CONFIGURATION FILES (INCLUDING SYSTEM REGISTRY ENTRIES) OUTSIDE THE SCOPE OF THE ELIZATEST 3+ SOFTWARE.

2.2.2 Analog Input and Output

An analog circuit card gathers the signal from the load cell used during the hardness test. This analog signal is converted to a digital form that the computer can use by the circuit card. The opposite occurs to control the intensity of the ring light that illuminates the hardness testing station. A digital value sent by the computer is converted to an analog signal that varies the brightness of the ring light. The voltage of the internal power supplies is also monitored by the analog circuit card.

2.2.3 Digital Input and Output

The many sensors and limit switches used in the ElizaTest 3+ Tablet Testing System communicate their status to the computer using digital (on or off) signals. The switches are connected to the computer by means of a digital input/output card. The computer examines the card to determine the states of the sensors and switches. The card also performs the opposite function to control relays and other devices. The computer sends information to the digital input/output card, which then turns the controlled device on or off as desired.

Another type of digital input card is devoted to the counting of pulses from the thickness encoder.

2.2.4 Stepper Motor Control

Two motor control cards are present in the system. All of the motors used in the tablet tester are a type of motor known as a stepper motor. A stepper motor rotates an exact amount in response to pulses sent to the motor. By sending a known number of pulses, the motor can be precisely positioned. This method eliminates the need for extra sensors to verify the motor's position.

2.2.5 Frame Grabber

The camera used for aligning the tablet during a hardness test is connected to a video frame-grabber card inside the computer. This card takes the video signal from the camera and converts it into a series of numbers that the computer can use.

2.2.6 Ethernet Network Adapter

On the rear of the tablet tester is a BNC-style Ethernet connector (not to be confused with the Video connector) that can be used to transfer the tablet test results to another computer for later analysis. The Ethernet link is also used when the ElizaTest 3+ is used as an integrated in-line production tester.

2.2.7 Printer

Included as standard equipment is a current-generation Hewlett-Packard LaserJet series printer. The printer occupies the lower portion of the tablet testing system. The printer is mounted on a drawer slide base to allow easy access. Simply slide the printer in or out of the Tablet Tester as desired. This printer is used for all the reports generated by the system.

NOTE:

The printer is not included in systems that are intended to be used solely as an in-line production tester in conjunction with a tablet press. All printing is redirected to the printer that is included with the tablet press.

2.2.8 Keyboard, Mouse, and Monitor

A keyboard, mouse, and monitor complete the computer system. These items are connected to plugs on the rear of the tablet testing system. The keyboard is a standard Windows NT compatible unit. It is used to enter data into the computer, and can also be used to navigate through the various screens of the ElizaTest 3+ software. The mouse is a standard Microsoft-compatible two-button mouse that is used to navigate through the screens, and to select many of the software features. The mouse and the Windows NT 4.0 operating system software work together to make data entry and display easy and consistent. The monitor is a color VGA monitor.

2.3 Software Overview

There are three major software components that make up the ElizaTest 3+ Tablet Testing System. All three components work together to provide the ElizaTest 3+ Tablet Testing System all its functionality.

2.3.1 ElizaTest 3+ Program

This software is the actual tablet tester control software. It is responsible for the overall function and control of the system, including motion control, tablet testing procedures, database operations, and report generation.

2.3.2 Microsoft Windows NT Version 4.0

This is the operating system software. This 32-bit, multitasking operating system coordinates all computer operations, such as the disk drives, network adapter, monitor, keyboard, mouse, and printer.

2.3.3 Microsoft Access Database

The ElizaTest 3+ Tablet Testing System uses the Microsoft Access Database to store and maintain the tablet setup definitions, magazine configurations, tablet test results, and the product/batch information. This industry-standard database is Open Database Connectivity (ODBC) compliant, which allows other programs to use the information stored in the database directly. The data stored by the Access Database can be copied off the system's hard disk (by the Ethernet connection provided) and analyzed by other programs that can read the data format.

3 System Startup

The ElizaTest 3+ Tablet Testing System is designed to run on standard 110 volt AC 50/60 Hertz power. Three-wire grounded receptacles are required for safety. Do not defeat the safety ground, or attempt to use two-wire adapters for ungrounded outlets ('cheater plugs').

The main unit (the Tablet Testing Module and the computer section) are connected to the AC line by an IEC-style power cord that connects to the power inlet at the rear of the tester. A short IEC-style power cord is connected between the lower and middle sections of the tester unit. Two additional IEC-style power cords are used to connect the printer and the video monitor to the power source. The printer power cord is routed through an opening in the rear of the lower printer compartment of the tester unit. A short BNC-style cable is used to connect the video jacks on the upper and lower sections of the tester unit. Do not confuse these BNC connectors with the Ethernet connector, which is also a BNC-style connector.

If an optional magazine is being used, one of the cables from the bottom of the magazine is attached to the 15-pin D-subminiature magazine connector located on the rear of the upper section of the tester unit. The other cable is attached to the 9-pin D-subminiature connector. The cables and connectors are passed through a slot located at the bottom of the rear Tablet Testing Module cover. Tighten the jack screws on the cables to secure the connections.

WARNING:

Always turn the power to the entire system off before connecting or disconnecting any cables. Failure to do so may cause damage to the electronic components.

A parallel printer cable (bi-directional Centronics compatible) connects the Centronics-compatible parallel port on the rear of the printer to the 25-pin D-subminiature LPT1 port on the rear of the tester unit. This cable is routed through an opening in the rear of the lower printer compartment of the tester unit. Push the wire locking clips up to secure the cable to the printer, and tighten the jack screws on the tester end of the cable to secure the connections.

The keyboard is attached to the tester unit by plugging in the round DIN connector at the end of the keyboard cable to the 5-pin keyboard socket on the rear of the tester unit.

The mouse is attached to the tester unit by connecting the mouse to the 9-pin D-subminiature COM1 port of the rear of the tester. Tighten the jack screws on the cable to secure the connections.

The video monitor is connected to the system with the supplied video cable. One end is connected to the 15-pin high-density D-subminiature Video connector on the tester unit, and the other end is connected to the 15-pin high-density D-subminiature connector on the rear of the video monitor itself. Tighten the jack screws on the cable to secure the connections.

3.1 System Power-Up Sequence

When power is applied to the system, the computer will start by performing its power-on self-test (POST). During the POST, the computer checks its memory, verifies that a working keyboard is attached, and checks that the disk drives and other components are functioning. The progress can be observed on the video monitor. When the POST is complete, the Windows NT operating system will then begin to load.

3.1.1 Windows Log-On

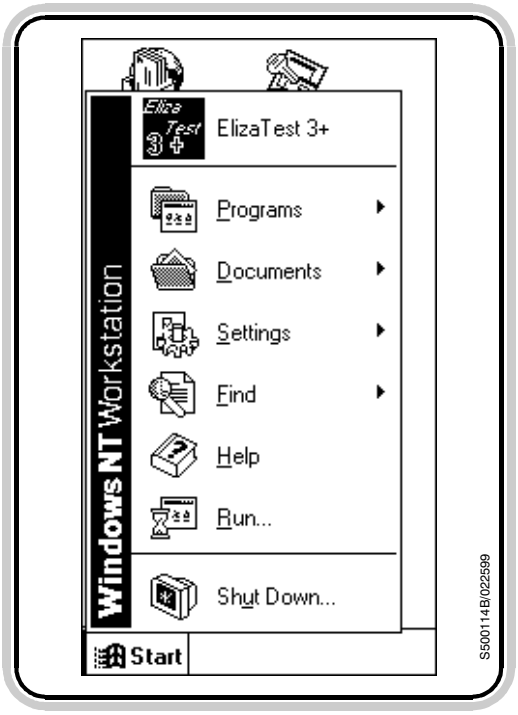

Figure 3.1- Windows Start Menu bar

After the Windows NT operating system loads, the message "Press Ctrl+Alt+Del to log on" will be displayed. To begin actually using the computer, an operator must first log on. This is a security feature of Windows NT 4.0 that ensures only authorized people can gain access to the computer. To log on, simultaneously press the **Control** (Ctrl or CTRL), the **Alternate** (Alt or ALT), and the **Delete** (Del or DEL) keys on the keyboard. Next, enter the user name and password. The password is not displayed on the screen as it is typed; it appears instead as asterisks to prevent others from viewing the password. When the system is first delivered, the default user name is "**TabletTester**" and the default password is "**eh**". Other Windows NT user accounts may be added, although this is not required for normal system operation. Refer to the Microsoft Windows NT User's Guide for more information on NT user accounts, password assignments, and system-level privileges.

3.1.2 ElizaTest 3+ Program Start-up

Figure 3.2- Start-Up Initialization screen

To start the ElizaTest 3+ Tablet Testing System program, select the **Start** button at the lower left of the screen, then select the **ElizaTest 3+** button that appears at the top of the Start Menu bar (figure 3.1). The ElizaTest 3+ icon may also be double-clicked to start the program. As the ElizaTest 3+ program starts, the Start-Up Initialization screen will be displayed (figure 3.2). This screen tracks the progress of the program start-up as the vision system, database, and both motion system are initialized. If any problems are detected during the initialization, a message box similar to figure 3.3 will appear, describing the nature of the problem.

After the program initialization has completed, the Tablet Testing Module will perform its mechanical initialization (homing). If the optional magazine is installed, it will be detected auto-

Figure 3.3- A message box will appear if problems are detected during initialization

matically. The tablet feeder will find its home position, and the tablet feeder will attempt to empty any tablets that may be present. The thickness encoder will move to its full-up home position. The ram and anvil will then move to their retracted home positions. Finally, the tablet indexer cycles a total of 4 times to clear any residual tablets that may be present. The thickness encoder will then perform a zeroing operation. Finally, either the Tablet Test Setup screen or the Magazine Configuration screen will appear on the monitor, depending on whether or not a magazine has been installed.

NOTE:

For the most accurate measuring, it is suggested that the system be allowed to warm up for approximately 30 minutes prior to performing any tablet tests. This warm-up time is required to give the balance, hardness load cell and amplifier, and light source time to reach a stable operating temperature. This will reduce any drift in the measurements.

3.1.3 ElizaTest 3+ Operator Log-On

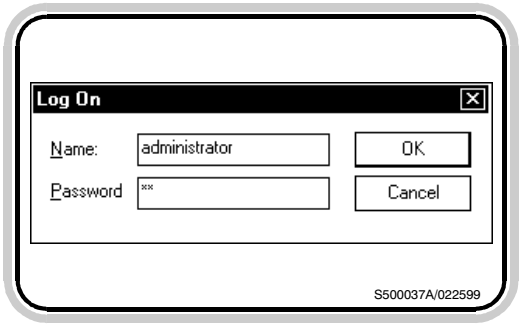

Figure 3.4- Log-On dialog box

The ElizaTest 3+ Tablet Testing System requires that all operators log onto the system prior to using it, with both a name and password. This allows the software to track which operator has entered or changed setups and magazine configurations, and who has performed any tablet tests, calibrations, or other functions. It also ensures that only authorized persons can use the system, and restricts the functions each class of users can perform.

After the ElizaTest 3+ initialization completes, the **Log-On dialog box** will appear on the monitor (figure 3.4). The Log-On dialog box will initially show the name of the last user. To log on, type the user name into the **Name** field in the Log-On dialog box. Then type the password into the **Password** field. As the password

Figure 3.5- The name and/or password was not correct

is typed, asterisks are displayed instead of the actual characters. This prevents others from viewing the password. When both the name and password are entered, select the **OK** button to log on. If both the name and password are correct, the Log-On dialog box will close, and either the Tablet Test Setup screen or the Magazine screen will be visible, depending upon the system configuration. If either the name and/or password was not correct, a message box will appear describing the situation (figure 3.5). Select the **OK** button in the message box, and retype the user name or password. If any difficulty logging onto the system is experienced, consult a person with Administrator access privileges to confirm that the user name and password are valid.

A note about security:

Throughout the ElizaTest 3+ Tablet Testing System software, some functions are available only if the current user has the appropriate security level. Functions that cannot be used at lower security levels will appear grayed or dimmed on the screens if they cannot be used at the current user's security level. If such an item is selected, it will have no effect. A similar instance exists when a function cannot be used because of the current state of the machine. For instance, it is not possible to pause a test before it has started, so the Pause button will appear grayed or dimmed, and cannot be selected. When no user is currently logged on, no function (except the **Security/Log On...** menu item and help) is available.

3.1.4 Shutting Down the System

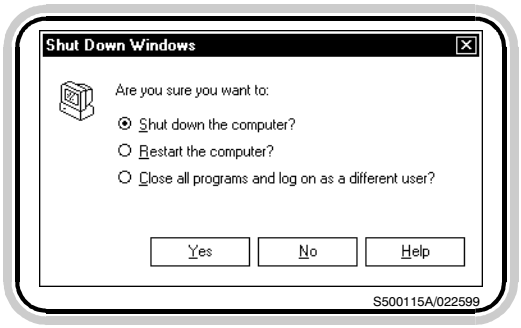

Figure 3.6- Shut Down dialog box

To exit the ElizaTest 3+ software, select either the **Setup/Exit** menu option in Tablet Test Setup screen or the **Magazine/Exit** menu option in the Magazine screen. The ElizaTest 3+ software will stop running.

To actually shut down the computer itself, select the **Start** button at the lower left of the screen. Select the **Shut Down...** button at the bottom of the Start Menu bar. The **Shut Down dialog box** then appears, as shown in figure 3.6. Choose the **Shut Down Computer** option, then select the Yes button to begin the shutdown process. The computer will take a few moments to prepare for shutdown. When the message box stating "***It is now safe to turn off your computer.***" appears, the system may be powered off.

WARNING:

Do not turn off the main power switch of the unit without first shutting down the Windows NT operating system. Failure to perform this operation can result in degraded performance or corrupted data.

4 Tablet Test Setup Screen

The Tablet Test Setup screen, shown in figure 4.1 is used to enter and view the information to be used when testing tablets, and also provides a means to define product and batch names. This screen also allows access to the other screens and features of the system through the use of the menu bar at the top of the screen. The Tablet Test Setup screen will be the first screen shown after starting the ElizaTest 3+ program if the optional magazine was not detected. If a magazine has been installed, the Magazine Configuration screen will be displayed first.

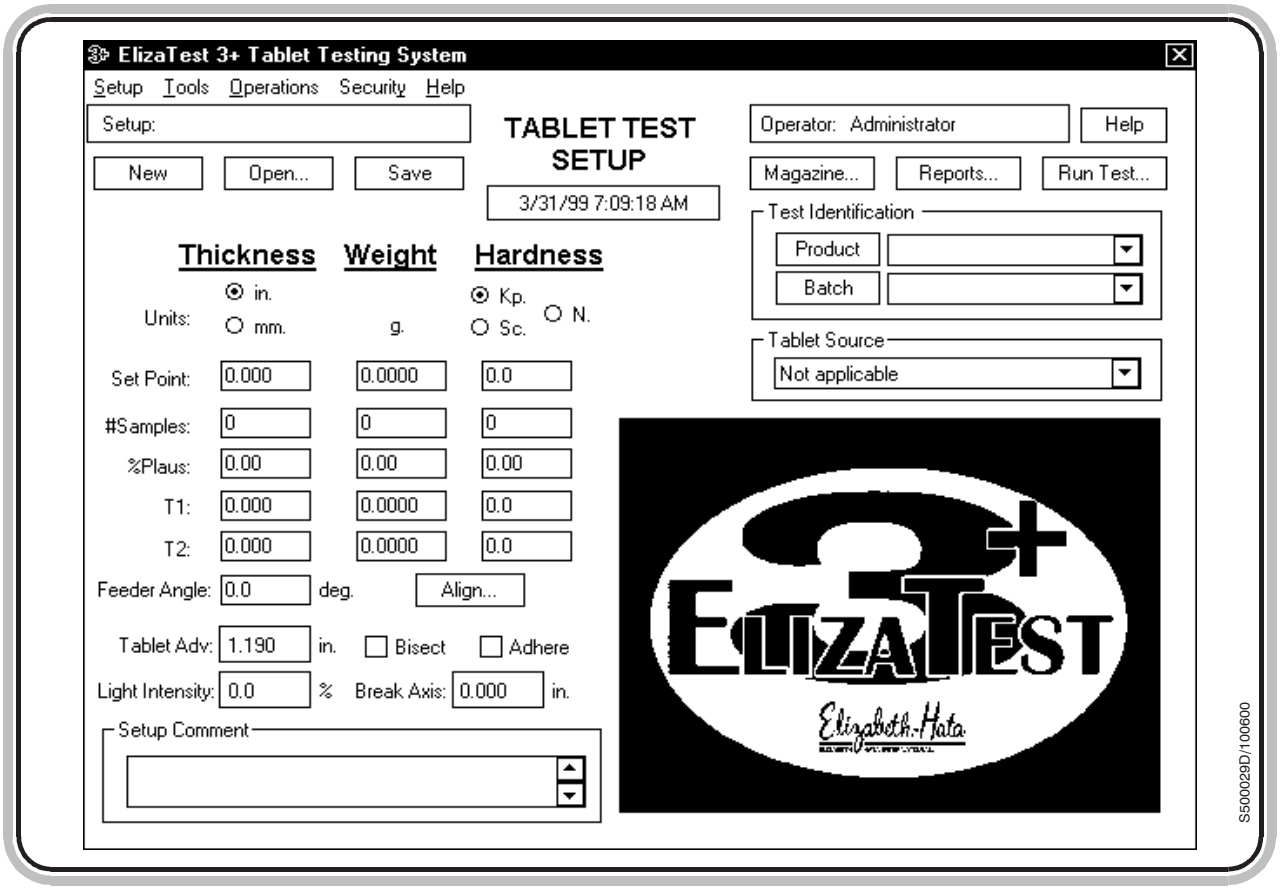

Figure 4.1- Tablet Test Setup screen

4.1 Title Bar

The title bar is the blue bar at the very top of the screen. It shows the name, if any, given to the current tablet test setup, as well as other information. The first time the system is used, an empty untitled setup will be displayed. After that, the last setup that was used will be the first one displayed when the system is started.

4.2 Menu Bar and 'Hot' Buttons

Directly below the title bar is the menu bar. The menu bar allows access to the other features of the system. To choose a menu item, first select one of the general menu categories (which are **Setup**, **Tools**, **Operations**, **Security**, and **Help**). When a menu item is selected, a drop-down menu list appears that shows each of the options available under that general category. Select the item desired by moving the mouse to the item (the selected item is highlighted on the monitor), then click the primary (usually the left) mouse button to invoke the command.

For convenience, 7 common menu commands may be invoked by selecting their corresponding 'hot' buttons in the screen. These commands are:

- **New** (same as **Setup/New**)
- **Open** (same as **Setup/Open...**)
- **Save** (same as **Setup/Save**)
- **Magazine** (same as **Operations/Magazine...**)
- **Reports** (same as **Operations/Reports...**)
- **Run Test** (same as **Operations/Run Test...**)
- **Align** (same as **Tools/Align Tablet...**)

Each 'hot' button functions exactly as if the same command were chosen from the menu bar.

On-line help is available by selecting the **Help/Index** menu command. It is also available by pressing the **F1** key on the keyboard, and most screens and dialog boxes contain a **Help** button that can be selected to explain the function of the dialog box.

4.3 Operator and Time Displays

The name of the currently logged-on operator, as well as the name of the current setup are shown on the screen. If there is no logged-on user, the **Operator** field will display "none". If the setup is currently untitled, the **Current Setup** field will be blank. The upper middle portion of the screen displays the current time and date in the standard system format. Refer to the Windows NT User's Guide for information on changing the time and date, and also how to change the displayed format.

4.4 Tablet Alignment Image

The lower right portion of the screen displays the alignment image for the current setup. The alignment image is the image of the tablet as it would appear when correctly oriented for a hardness test. Refer to the section "Alignment Screen" for information on creating alignment images and aligning a tablet for hardness testing. If the current setup has not yet been given an alignment image, the ElizaTest 3+ logo will appear here.

4.5 Product and Batch Test Identification

The upper right portion of the screen is the Test Identification area. Before a single-test mode tablet test can begin, the setup definition that will be used for the test must be associated with a batch name, and that batch name must be associated with a product. When the ElizaTest 3+ program is started, the product and batch identifiers displayed will be the ones that were last used. Refer to the section "Creating and Maintaining Product and Batch Information" for complete information concerning products and batches.

4.6 Tablet Source

This area is used to specify (optionally) the side or layer of the press that the tablets associated with this setup were created on. You may choose from side A or B, or layer 1, 2, or 3 by selecting the desired assignment from the drop-down list. The Not Applicable option (the default setting) can be used if it is irrelevant where the tablets were produced, such as from a single-sided tablet press.

4.7 Tablet Test Setup Data

The middle left portion of the screen contains the tablet test setup data (figure 4.2). Most of the data is entered from the Tablet Test Setup screen; a few items are entered from the Tablet Alignment screen. The items set in the Tablet Alignment screen are always shown with a gray background since they cannot be directly changed from this screen. They are shown here for reference, as they are considered part of the tablet test setup definition. Each item that comprises a setup will be explained, one at a time, in the sections that follow.

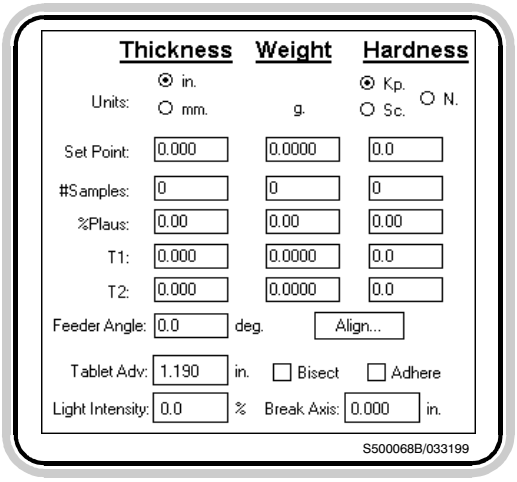

Figure 4.2- Tablet test setup data

4.8 What is a Setup?

Briefly speaking, a tablet test setup (also called a setup definition) is the entire set of data needed to perform a tablet test and classify the resulting data. A setup consists of 4 broad categories; thickness, weight, hardness, and tablet alignment. The first three categories have the properties of setpoint (ideal or target value), a unit of measurement, tolerance limits, and the number of measurements to be made. The alignment image is used to orient the tablet during a hardness test to ensure consistent placement and testing. Four other parameters (Feeder Angle, Tablet Advance, Light Intensity, and Tablet Adherence) are used to control how the Tablet Testing Module moves and illuminates the tablets. Each item will be described in detail in following sections of this manual.

4.9 Entering Setup Data

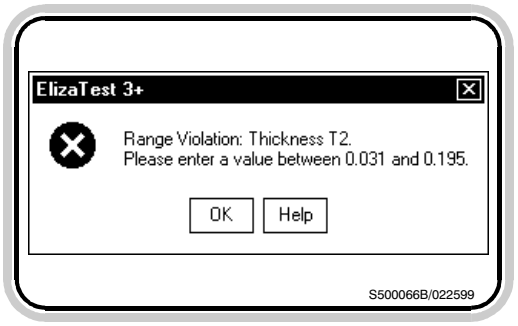

Figure 4.3- Range violation message box

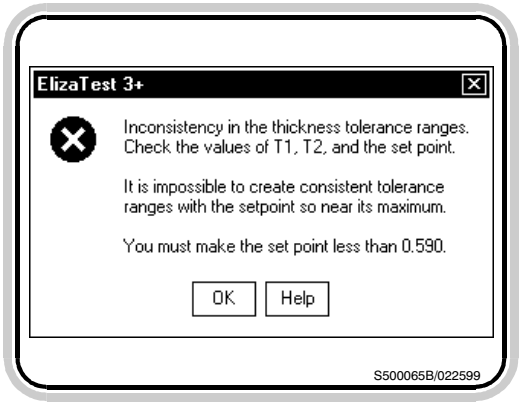

Figure 4.4- Inconsistencies in the setup data need to be corrected

To enter data into one of the setup data fields, first select the field by either positioning the mouse pointer on the field and clicking on the primary (usually the left) button, or by repeatedly pressing the **Tab** or **Shift+Tab** keys until the desired field is highlighted (a highlighted field has a blue background). Then use the keyboard to enter data into the field. Numeric fields have been designed to accept only numbers and decimal points. Alphanumeric fields may accept any characters. To correct mistakes (before the data is actually entered), simply use the **backspace**, **delete**, or **arrow** keys as needed and type the corrected information. The data is not actually entered into the field until the **Enter** key is pressed, or until another field is selected. An entry can be canceled before it is entered by pressing the **Esc** (escape) key on the keyboard. The value in the field will then return to what it was before editing began. If invalid data is entered (valid data for each field is described in the section pertaining to that field), a message box will appear describing the problem (figure 4.3). Select the **OK** button in the message box and correct the problem. Setups cannot be saved, and tablet tests using the setup cannot be run, if they contain invalid data. Any inconsistencies in the setup data will be checked prior to saving a setup or running a test, and a message box describing the problem will be displayed (figure 4.4). Select the **OK** button in the message box and correct the problem.

4.10 Setpoint Tips

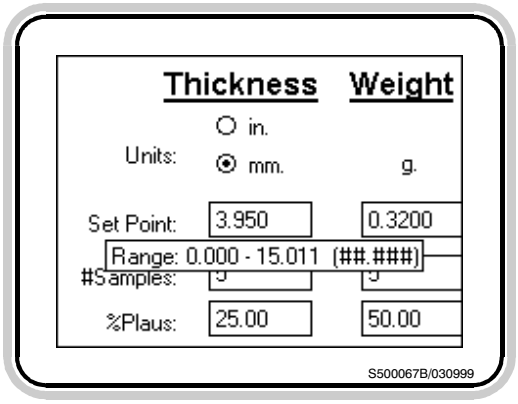

Figure 4.5- Setpoint tip

When the mouse pointer is positioned over one of the data fields for a moment, a box will appear below the mouse pointer that shows what the valid range and formatting for the selected field currently is (figure 4.5). The Thickness, Weight, and Hardness Setpoints are given wide latitude with respect to the allowable range; the T1 and T2 values are more limited. The Setpoint Tip will also indicate when a range violation of the field has occurred.

4.11 Units Selection

Thickness and hardness may be expressed in different units of measurement. Tablet thickness may be measured in either inches (in.) or millimeters (mm.). The conversion factor used is 1.000 inch = 25.400 millimeters. Tablet hardness may be measured in kiloponds (Kp.), Strong-Cobbs (Sc.), or Newtons (N.). The conversion factors used are 1.0 Kp = 1.4 Sc = 9.81 N. Tablet weight can only be expressed in grams (g.). This cannot be changed.

To change the unit of measurement, select the radio button (the circle) next to the desired thickness or hardness unit. The radio button for the selected unit will have a dot in the center. Changing the unit of measurement will cause an immediate conversion in the displayed Setpoint, T1, and T2 values. The Thickness Unit also changes the Tablet Advance and Break Axis Length setting.

4.12 Set Point

The setpoint is used to define the measurements of an ideal tablet. They represent the target thickness, weight, and hardness that the T1 and T2 tolerance bands and plausibility values will be based on. Each setpoint is independent of the others.

The **Thickness Setpoint** has a range of 0.000 to 15.011 millimeters, or from 0.000 to 0.591 inches, depending on the chosen unit. Up to 3 decimal places can be entered. Although not required for entry, the value will always be displayed to 3 decimal places, and will have a leading zero for values less than 1.

The **Weight Setpoint** can vary from 0.0000 to 50.0000 grams. Although not required for entry, the value will always be displayed to 4 decimal places, and will have a leading zero for values less than 1.

The **Hardness Setpoint** may range from 0.0 to 45.0 kiloponds, 0.0 to 63.0 Strong-Cobbs, or 0.0 to 441.6 Newtons, depending on the chosen unit. Although not required for entry, the value will always be displayed to 1 decimal place, and will have a leading zero for values less than 1.

Even though the setpoints can be assigned any value in the ranges listed above, the setpoint value plus the T2 value cannot exceed the maximum range of measurement, nor can the setpoint value minus the T2 value be less than zero. The T2 value is described below. These restrictions are not enforced when the number of samples (described later) is set to zero, since these values will not be used during the testing process.

4.13 # Samples (Number of Samples)

This value determines how many individual tablets, subject to passing the plausibility check (described later), are to be tested for each of the three properties. Each value is set independently, and may range from 0 to 1000; however, all three may not be zero. If the number of samples for a property is set to zero, this particular property will not be tested.

The number of samples refers to the number of tablets that will be recorded that have plausible test results. Any tablet that fails a plausibility check will not be counted towards this number. For example, if 10 samples are selected for the weight test, the Tablet Testing Module will continue to weigh tablets as needed until 10 tablets with plausible weights have been measured. This may mean that more tablets than requested are actually tested, but only those having plausible weights will be recorded.

4.14 % Plaus (Percent Plausibility)

The plausibility setting can be used to instruct the tablet tester to ignore unreasonable or 'impossible' tablet test results. Unreasonable results can occur due to the weighing of double-fed or broken tablets, measuring the thickness of a tablet that is standing on edge, and other unpredictable events that can generate false or misleading test result data. By properly setting the plausibility value, values that would otherwise influence and skew the test result statistics will be ignored. During the tablet testing process, if a value is measured that is outside the range of plausible results, all data for that tablet will be discarded from the test results table, and will not be used in the statistical summary. A tablet that has failed the plausibility check will be indicated in white color when shown in the test results table, and prefixed with the symbol '<>'. This tablet's test results will be discarded as the next tablet is fed from the tablet feeder.

Plausibility is set as a percentage of the set-point, and can range from 0.00 to 100.00 percent. Although not required for entry, the value will always be displayed to 2 decimal places, and will have a leading zero for values less than 1.

A few examples will serve to illustrate the action of the Percent Plausibility setting. Suppose that tablets are being tested whose target weight is 0.2000 grams. With a Percent Plausibility setting of 50.00 %, any measured weight value that is greater than 0.3000 grams (the setpoint plus 50 percent of the setpoint), or less than 0.1000 grams (the setpoint minus 50 percent of the setpoint) will be ignored. If two tablets were accidentally fed into the tester, their combined weight would be approximately 0.4000 grams, which is outside the range of plausible values. This double-fed tablet would then be ignored. The same action would occur if a broken tablet were fed into the machine. If the weight of the piece were less than 0.1000 gram, it too would not be included in the test results.

The same situation can be applied to the thickness and hardness values as well. A point to note is that if the Percent Plausibility is set to **EXACTLY** 0.00, the plausibility check will **NOT** be done, and **ALL** measured values, reasonable or not, will be included in the results.

4.15 T1 Value

The T1 values set a tolerance range around the setpoint for the test measurements. In any manufacturing process, there is some variation in the items being produced. The T1 value determines how much variation is to be considered normal or acceptable. The T1 value is added to and subtracted from the setpoint, and any measurements that fall within these two extremes are considered acceptable, normal values. Normal values have no special markings when shown in the test results table and the printed reports. Measurements that fall outside of this range (but inside the T2 range, discussed below) are indicated in yellow color when shown in the test results table. Values less than the T1 range are prefixed with the symbol '<' and val-

ues greater than the T1 range are prefixed with the symbol '>' in both the test results table and on the printed reports. Values outside of the T1 range generally indicate marginally acceptable product; the tablets are still considered acceptable, but some factor in the tablet-making process may require adjustment. The T1 values are absolute values; they are not percentages of the setpoint.

The T1 value is set in the same way, with the same number of decimal places, as the corresponding setpoint is, but the T1 value is more restricted in its range. Specifically, the maximum value of T1 is approximately one-half the maximum range of the measurement, T1 must be less than T2 (described later), and T1 must be greater than zero. The Setpoint Tip shown below the mouse pointer will display the currently acceptable ranges for the T1 value.

4.16 T2 Value

The T2 value sets an upper and lower limit of acceptability to a tablet's measured value. The T2 value is added to and subtracted from the setpoint, and any values that fall outside of this range are considered unacceptable (rejects). Unacceptable tablet test results are not to be confused with implausible test results; values that fall outside the T2 range **WILL BE** included in the test results table and the statistical summaries. Implausible results are simply discarded.

Measurements that fall outside the T2 range are indicated in red color when shown in the test results table. Values less than the T2 range are prefixed with the symbol '<<' and values greater than the T2 range are prefixed with the symbol '>>' in both the test results table and on the printed reports.

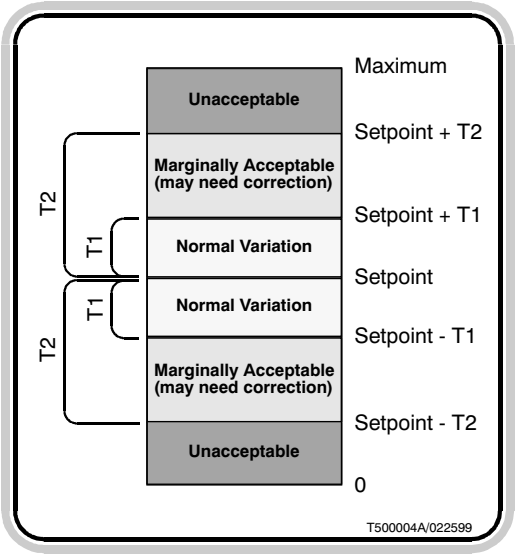

Figure 4.6- The relationship between the setpoint, T1, and T2 values

The T2 value is set in the same way, with the same number of decimal places, as the corresponding setpoint is, but the T2 value is more restricted in its range. Specifically, the maximum value of T2 is limited to approximately one-half the maximum range of measurement, the T2 value must be greater than the T1 value, the sum of the setpoint plus T2 cannot exceed the maximum range of measurement, nor can the setpoint minus the T2 value be less than zero. The Setpoint Tip shown below the mouse pointer will display the currently acceptable ranges for the T2 value. Figure 4.6 shows the relationships between the setpoint, T1, and T2 values. As with the T1 values, T2 values are absolute; they are not percentages of the setpoint.

4.17 Feeder Angle

The Feeder Angle determines how steep of an angle the tablet feeder will move to when it feeds tablets into the Tablet Testing Module. This angle is measured in degrees from the horizontal, and can range from 10.0 to 40.0. Although not required for entry, the value will always be displayed to 1 decimal place.

The Feeder Angle setting allows the tablet feeder to move to an angle that allows tablets to be consistently fed one at a time, reducing the number of double-fed tablets. Although there is no set rule to determine the optimum angle for any particular tablet, a general rule is that smaller tablets require a steeper angle than larger tablets do.

As a tablet test is proceeding, the feeder will automatically decrease its angle over time. A smaller angle is required when fewer tablets are in the feeder. The feeder angle will automatically begin to decrease when no tablets have been fed for a few seconds.

4.18 Tablet Advance Value

The Tablet Advance value sets the distance required to push the tablets to the center of the tablet testing stations during the testing process. The tablets should be positioned very near the center of the stations for the most reliable operation. This value is used to compensate for different tablet sizes. The Tablet Advance value shown in the Tablet Test Setup screen is displayed for reference only; the value is actually changed or tested by using the controls in the Tablet Alignment screen.

4.19 Light Intensity

The Light Intensity value determines how brightly to illuminate the hardness testing station when performing hardness tests. It is expressed as a percentage, with 100.0% representing full brightness. As with the Tablet Advance value described above, this value is displayed for reference only in the Tablet Test Setup screen; the value is actually changed by using controls in the Tablet Alignment screen.

4.20 Bisect

This item is an indicator that shows whether or not the tablet bisect detection feature is turned on. If bisect detection is turned on, a check mark will appear in this box; otherwise, the box will not be marked. Bisect detection is turned on or off by a control in the Tablet Alignment screen. It is shown in the Tablet Test Setup screen for reference only.

When the bisect detection feature is turned on, the Tablet Testing Module will include the tablet's bisect line or other surface features as it orients the tablet for the hardness test. No such surface features are used for tablet alignment purposes when the bisect detection feature is turned off.

4.21 Adhere

This item is an indicator that shows whether or not the adherent tablet modified indexer motion is enabled. A check mark will appear in the box when this feature is enabled. When this modified tablet indexer motion is turned on, the thickness measurer and indexer motion is altered in such a way that tablets that might have a tendency to stick to the bottom of the thickness measuring foot are scraped off by the horizontal indexer slide and kept in the proper testing chamber. If this feature is not turned on, tablets that stick to the thickness measurer will end up being pushed rearward by the indexer, instead of forward to the next station. Adherent tablet indexer motion is turned on or off by a control in the Tablet Alignment screen. It is shown in the Tablet Test Setup screen for reference only.

4.22 Break Axis

This value sets the length of the axis that the tablet will be broken on when a hardness test is performed. This value is used to position the anvil so it stops just short of touching the tablet during the hardness test. The break axis is measured in the same unit as the tablet thickness, either inches or millimeters. The actual value is set by a control in the Tablet Alignment screen. It is shown here for reference only.

4.23 Setup Comment

This area allows the assignment of a comment to the current setup. The comment is saved along with the setup, but the use of, or lack of, a comment will in no way impact any function of the tablet testing system. To assign or edit a comment, simply select the Setup Comment field, then type any desired information into the field. Comments have no restrictions placed on them regarding length or acceptable characters. The comment can be edited by using the arrow keys, mouse, backspace key, etc. The Setup Comment is different from other fields in that the Enter key will move the cursor

to the next line. The comment is 'entered' into the setup when another field is selected or the setup is saved. This allows the operator to freely format the comment, including adding blank lines, if desired.

5 Tablet Alignment Screen

5.1 Overview

The Tablet Alignment screen, shown in figure 5.1, is used to set the desired orientation for a tablet during the hardness testing process. This screen enables the Tablet Testing System to learn tablet alignments, and provides several tools to test the alignment. To access the Tablet Alignment screen, either select the **Align...** button in the Tablet Test Setup screen, or choose the **Tools/Align Tablet...** menu option. Each of the controls and indicators in the Tablet Alignment screen are described, one at a time, in the following sections.

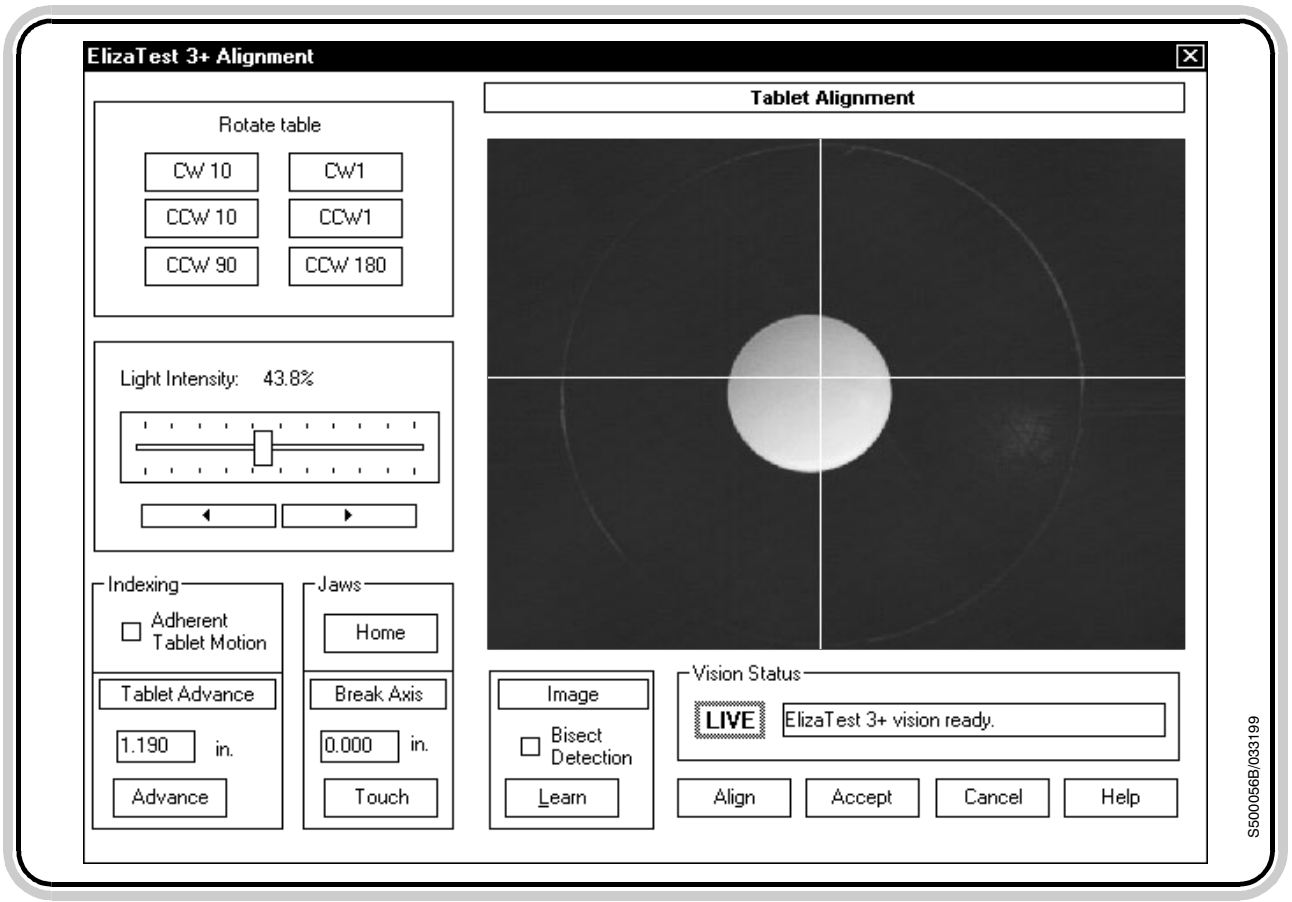

Figure 5.1- Tablet Alignment screen

5.2 Camera View Image

The largest portion of the Tablet Alignment screen is taken up by the camera view image. This image may be either a real-time live view of the hardness testing station, as the camera views it, or the most recently learned tablet alignment image. The **Vision Status indicator** below the image will read LIVE when a live, real-time image is displayed, and will read OFF if the image is a static, learned alignment image.

5.3 Rotate Table Buttons

These six buttons, when selected, will cause the hardness platform to rotate the amount and direction shown on the button. The platform performs one rotation step each time a button is selected. The platform can be rotated to any position needed in order to align the tablet along the desired break axis, and can be changed at any time before the alignment is learned and accepted.

5.4 Light Intensity Slider

This control is used to vary the intensity of the ring light that illuminates the hardness testing station. To use this slider, position the mouse pointer over the slider, then while holding down the primary mouse button (usually the left), 'drag' the slider left or right as needed until the light intensity setting is as desired. Sliding the control to the left will decrease the brightness, and sliding it to the right will increase the brightness. The left and right arrow buttons below the slider, when selected, will also decrease and increase, respectively, the light intensity value. These buttons provide a fine control over the light intensity value by adjusting it 0.1% at a time. The arrow buttons will continually adjust the light intensity for as long as they are selected. The number directly above the slider displays the value of light intensity as a percentage of full brightness. The intensity should be ad-

justed so that the tablet image shown has good contrast against the background, and does not appear 'washed out'. If the camera image begins to show portions of the tablet that are colored light purple (magenta) or red, the image is too bright. Small areas of color or some random dots should not cause any undesirable effects.

5.5 Bisect Detection

The Bisect Detection feature causes the ElizaTest 3+ Tablet Testing System to consider the tablet's bisect line or other surface features when it aligns tablets for the hardness test. To enable or disable the bisect detection, select the Bisect Detection box. A check in the Bisect Detection box indicates the feature is turned on. The box is blank when bisect detection is turned off.

Bisect detection should be used only when the tablet's bisect must be considered when the tablet is aligned for the hardness test. Bisect detection alignment is not as fast as shape-only perimeter alignment. This is due to the fact that it takes longer to analyze the tablet's entire surface than it does to analyze just its outline, and also the possibility that tablets may enter the Tablet Testing Module upside down so a bisect cannot be located, thus increasing the time necessary for the entire test to run. Any tablet that cannot be aligned properly during a hardness test will be treated as if the tablet had a hardness of zero. If the hardness plausibility check is being used, it will fail the plausibility check and its data will be discarded from the test results table.

5.6 Adherent Tablet Motion

Check this box to enable or disable the Adherent Tablet modified indexer motion. When this modified tablet indexer motion is turned on, the thickness measurer and indexer motion is altered in such a way that tablets that might

have a tendency to stick to the bottom of the thickness measuring foot are dislodged by the horizontal indexer slide and kept in the proper testing chamber. This is accomplished by the thickness measurer moving only partially up after a thickness measurement is taken, instead of fully up. While in this position, the horizontal slide of the tablet indexer moves forward, and will knock any tablet that may be stuck to the bottom of the thickness foot off into the proper testing chamber. The thickness measurer then moves to its fully-up position, and the tablet indexer continues as usual. The modified motion is used only during the actual tablet testing process.

If this feature is not turned on, tablets that stick to the thickness measurer will end up being pushed rearward when the horizontal slide retracts at the end of its cycle, instead of forward to the next station.

5.7 Break Axis Length

The Break Axis Length is the length of the tablet along the axis it will be broken on during a hardness test. This value is used to position the anvil to a point just short of touching the tablet. As the ram continues to move and applies force to the tablet, having the anvil positioned immediately behind the tablet will prevent the tablet from turning or slipping between the jaws as the tablet is broken.

The Break Axis Length is measured in the same unit as is set by the Thickness Unit in the setup definition. The value can range from 0.010 to 1.375 inches, or from 0.254 to 34.925 millimeters, depending on the chosen unit. Although not required for entry, the value will always be displayed to 3 decimal places, and will have a leading zero for values less than 1.

To determine the value to enter for the Break Axis Length, measure the tablet (using calipers or micrometers) along the axis that will be used to break the tablet when the hardness test is performed, and enter that number in the Break Axis Length field.

5.8 Touch and Home Buttons

These buttons allow for simulation of the hardness test without actually breaking the tablet. When the **Touch** button is selected, the ram and anvil will move out towards the tablet as they would during the actual hardness test, but will stop short of actually breaking the tablet (provided that the Break Axis Length value is set correctly). This can be used to verify that the system 'sees' the tablet correctly, and that the Break Axis Length is appropriately set. After the Touch operation is performed, it will then be necessary to select the **Home** button, which will move the ram and anvil back to their retracted home positions.

5.9 Tablet Advance Distance and Advance Button

The Tablet Advance value sets the distance required to push the tablets to the center of the tablet testing stations during the testing process. The tablets should be positioned very near the center of the stations for the most reliable operation. This value is used to compensate for different tablet sizes. A value of 1.190 inch (30.226 millimeter) is given as a starting point, which should be adequate for average size tablets. Very small tablets will require that this value be increased, and larger tablets require that this value be reduced. The Tablet Advance Distance may be set to any value between 0.750 and 1.500 inches, or 19.050 and 38.100 millimeters. Although not required for entry, the value is always shown to 3 decimal places, and a leading zero will be displayed for values less than 1.

The Tablet Advance Distance is measured in the same unit as is set by the Thickness Unit in the setup definition.

Selecting the **Advance** button will cause the tablet indexer to index once. A tablet can be conveniently placed in the weight testing station, then pushed into the hardness testing station by using the Advance button. This also allows for checking the Tablet Advance Distance setting. Increase the setting if the tablet is not pushed far enough to place it near the center of station, or decrease the value if the tablet is pushed past the center.

5.10 Learn Button

Select the **Learn** button to cause the tablet tester to analyze the current image of the tablet and use this reference image for aligning tablets during future hardness tests. When Learn is selected, the **Vision Status indicator** will read

OFF to indicate that the displayed image is no longer in real-time, but is instead a snapshot of the tablet.

As the computer is analyzing the image, it will draw certain lines that indicate where the computer has found the tablet. A red rectangle (bounding box) will appear around the entire tablet. A small red crosshair will appear at the center of the bounding box. If bisect detection is turned on, purple (magenta) lines will appear that indicate concentric contours of the tablet. If bisect detection is off, a single blue outline will appear that indicates the outer edge of the tablet, and other lines will be drawn from the center of the tablet to the outer edge. See figure 5.2. Please note that because of the way the computer image is displayed, not all of the lines may be visible, particularly those of the bounding box. The line of text below the Vision Status indicator will indicate if any problems were detected during the analysis. If all went well, the message will read 'ElizaTest 3+ Vision Ready'. Should a problem be encountered, a

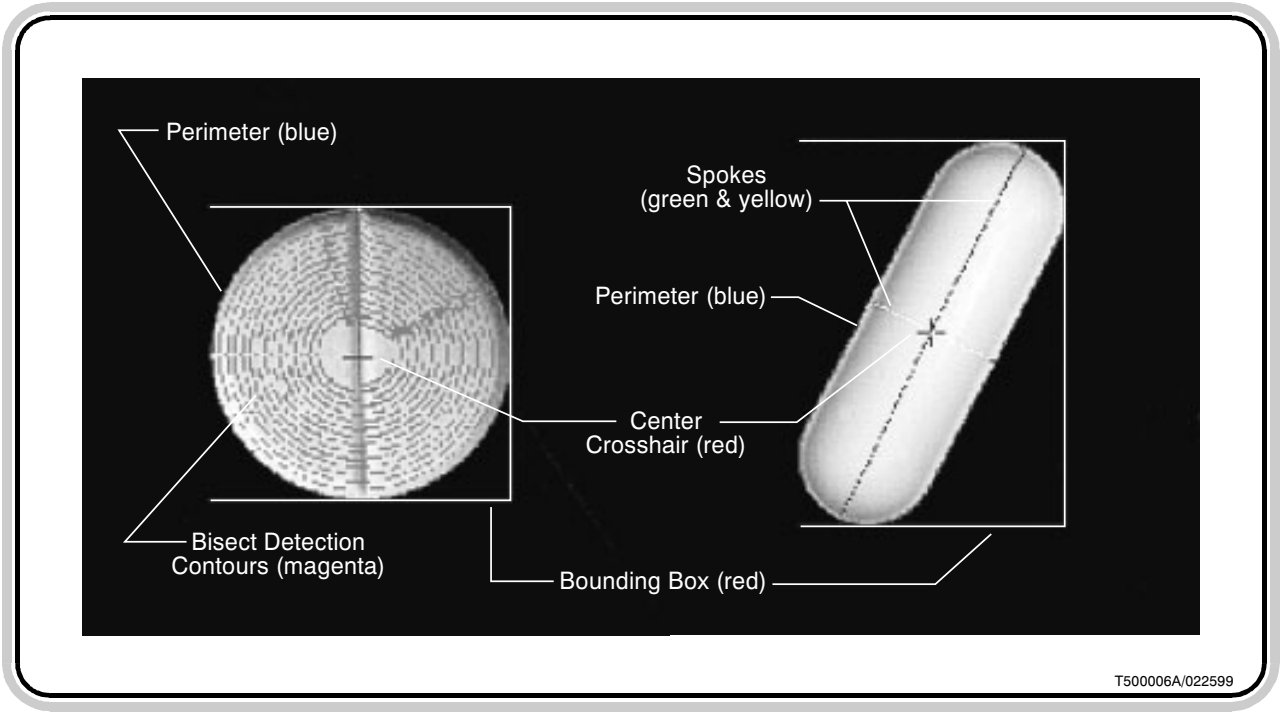

Figure 5.2- Computer-drawn tablet image analysis lines

Figure 5.3- Any vision problems will be shown in a message box

message box will appear indicating the trouble (figure 5.3). The appendix "Vision System Errors" describes the types of problems that can occur and how to rectify them. The computer-drawn tablet analysis lines can aid in this procedure. Select the **OK** button to close the message box.

5.11 Align Button

The Align button can be used to simulate the tablet orientation phase of the hardness test, without actually breaking the tablet. The alignment simulation will use the most recently learned alignment image for this test. To simulate the tablet orientation, first place the tablet to be aligned onto the hardness platform. This may be more conveniently done by first placing the tablet into the weight testing station, then using the **Advance** function previously described to push the tablet into the hardness testing station. This method has the advantage of giving a more accurate simulation; because the tablet is pushed by the indexer, the orientation will start from the position the tablet is most likely to end up in during the actual testing process.

After the tablet has been positioned on the hardness platform, select the **Align** button. The computer will analyze the tablet's position, then will attempt to orient the tablet as specified by the most recently learned alignment image, which may be the alignment image already saved as part of the current setup. It is not necessary to re-learn an image to test the alignment. Should any problems be encountered during the tablet alignment, a message box will appear which describes the trouble, and the description will also be listed in the text below the **Vision Status indicator**. If all went well, the message will read 'ElizaTest 3+ Vision Ready'. See the appendix "Vision System Errors" for more information concerning these messages. After alignment, the tablet indexer

may be ADVANCEd again to push the tablet into the waste bin at the right of the Tablet Testing Module.

5.12 Accept and Cancel Buttons

The **Accept** button will cause any changes that have been made in the Alignment screen to be incorporated into the current setup, and then return control to the Tablet Test Setup screen. The most recently learned image will be shown in the lower right portion of the Tablet Test Setup screen. An image must be learned before it can be accepted. The **Cancel** button will cancel any changes that have been made in this screen (including changes to the Tablet Advance Distance, Light Intensity, and Break Axis Length settings), and will return to the Tablet Test Setup screen. Any changes to the settings or any new alignment image will not be recorded, as if the Alignment screen was never entered.

5.13 Setting a Tablet's Alignment

Begin the procedure by placing the tablet to be aligned into weight testing station, then close the cover on the Tablet Testing Module. If the tablet has a bisect or other surface feature that is to be considered during the alignment, be sure that the tablet is facing right side up. Select the **Advance** button to push the tablet into the hardness testing station. The tablet should now be visible in the camera view area of the Alignment screen.

Adjust the **Light Intensity** to a setting that provides the highest contrast (the difference between the brightest and darkest areas) of the image. The tablet should be as bright as possible without appearing to be 'washed out'. The bottom of the hardness testing station should appear to be as dark as possible, providing the highest contrast between the tablet and the hardness platform. Areas of the image that are too bright will appear in a light purple (magenta)

or red color. Small areas or individual dots of color will generally not cause difficulties, but large areas should be avoided.

Next, use the **Rotate Table** buttons in the upper left corner of the screen to rotate the tablet to its desired position. During the hardness test, the ram and anvil will come in from the top and bottom of screen to break the tablet; therefore, when setting the tablet alignment, orient the tablet so the desired break axis is vertical in the Tablet Alignment screen.

When the tablet is oriented as desired and the image quality is good, select the **Learn** button. The computer will analyze the image (as described in the description above of the Learn button), and the resulting learned image will appear. The Vision Status indicator will remain OFF until some other action occurs. The Vision Status Indicator may be selected to return the vision to LIVE again, showing a real-time image. At this point, the Tablet Advance setting and alignment may be tested, as previously described, if desired. When the alignment process is finished, select the **Accept** button to incorporate this image into the tablet setup definition and return to the Tablet Test Setup screen.

6 Setup Operations

This section describes the various operations, such as saving, deleting, and renaming that can be performed on the tablet test setup definitions.

6.1 Saving Setups

Although setups can be created for one-time use when the system is being operated in single-test mode, an important feature of the ElizaTest 3+ Tablet Testing System is its ability to save tablet test setups on the computer's hard disk for reuse at any time in the future. The Save/Save As functions of the software accomplish this.

There are two types of save functions, the **Save** and the **Save As**. The basic Save function will save the current setup definition with its current name. The Save As function allows the operator to give a different name to an already-named setup, effectively making a new copy of it. The Save As is also used when saving an untitled setup, in order to give an initial name to the setup.

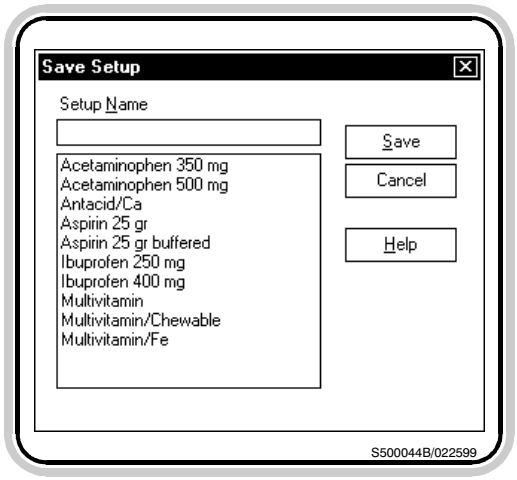

Figure 6.1- Save Setup dialog box

To save an as-yet untitled setup, select either the **Save** button in the Tablet Test Setup screen, or choose the **Setup/Save** menu option. The Save Setup dialog box appears (figure 6.1).

The Save Setup dialog box contains a list of all currently saved setups in the lower portion of the dialog box. To save the current setup, type the name desired for the setup into the **Setup Name** field in the Save Setup dialog box, then select the **Save** button in the dialog box.

Setup names can be up to 32 characters, and can contain any keyboard character except **'** (single quote), **"** (double quote), **[** or **]** (left/right square bracket), and **`** (grave accent). Also, leading and trailing spaces are not permitted,

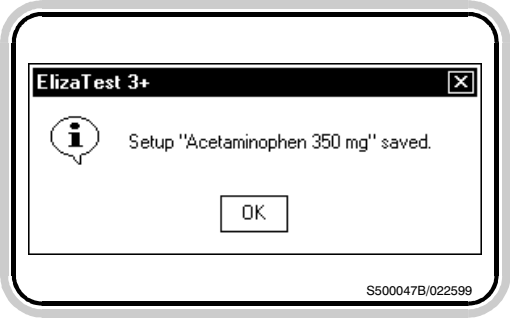

Figure 6.2- The setup has been saved

but spaces in the middle of names are perfectly acceptable. Setup names are not case-sensitive; upper case and lower case characters are treated the same.

A message box will then appear informing that the setup has been saved (figure 6.2). Select the **OK** button in the message box to close the box and return to the Tablet Test Setup screen. Once a tablet test setup has been given a name, any future savings of the same setup will not prompt for a setup name. The setup (along with any changes made since the last save) will be saved under its current name.

NOTE:

If the system is using the optional magazine, changes made to setups that are part of the current magazine configuration must be saved in order to incorporate those changes when the magazine is run. Unsaved changes will not be reflected during the magazine run, since each setup is recalled from the computer's hard disk as it is needed, and changes that have not been expressly saved will not be recalled.

The Save As option allows an existing named setup to be saved under another name. To use the Save As feature, select the **Setup/ Save As...** menu option. Again, the Save Setup dialog box will appear, as if the current setup is untitled. Instead of being blank, however, the Setup Name field will contain the setup's current name. Type a new name for the setup in the field, and select the **Save** button in the dialog box. The current setup will now be saved under the new name, with the original setup remaining unchanged under its initial name. This allows for maintaining a basic setup 'template' with one name, then modifying (perhaps for different numbers of samples) and saving the changed setup under a new name, keeping the original setup template intact.

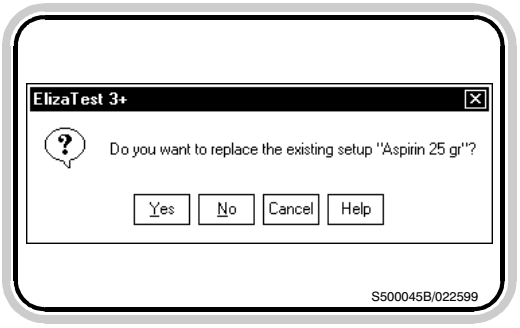

Figure 6.3- Confirmation is required to replace an existing setup

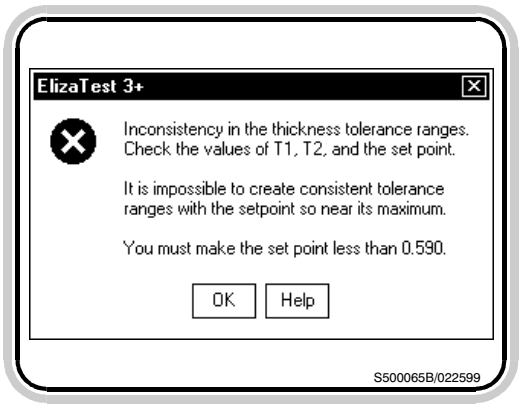

Figure 6.4- Any errors must be corrected before the setup definition can be saved or used

All setup names must be unique. Should the attempt be made to save a setup using a name that already exists, a confirmation message box will appear (figure 6.3), asking of the original set-up is to be replaced. Selecting the **Yes** button will cause the new setup to replace the original setup. Select the **No** button if the original setup is not to be replaced. Selecting No will return to the Save Setup dialog box. Select the **Cancel** button to cancel the save attempt and return to the Tablet Test Setup screen. Under some limited circumstances, overwritten setups can be recovered.

It must be noted that only valid, complete setups can be saved or used to run tests. Just prior to actually using or saving the setup, the software performs a validity check on all the values to ensure that the setpoint/T1/T2 ranges are consistent, and that a valid alignment image is present. Any errors or inconsistencies will be noted in a message box (figure 6.4). These errors must be corrected before the setup definition can be saved or used.

6.2 Creating New Setups

There are two basic options that be used to create new setups. The first has already been described above- editing a 'template' setup, then saving the setup under a different name. The second is by creating a setup from scratch using the New Setup command. Select the **New** button in the Tablet Test Setup screen (or select the **Setup/New** menu option). Selecting the New command will zero out all the setup data fields (including the alignment image and setup comment) and prepare for a new tablet test set-up to be defined.

If the New command is selected while there are any unsaved changes in the currently displayed setup, a message box will appear (figure

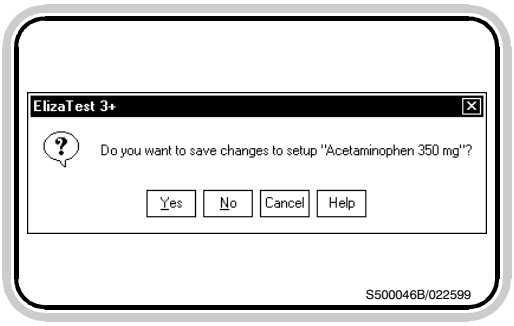

Figure 6.5- Changes were made to the setup, but the setup has not been saved yet

6.5), asking if these changes should be saved or discarded. Choose the **Yes** button to save the changes made to the current setup (using the Save/Save As functions described above), or choose the **No** button to discard any changes and proceed with the New command. Choosing No will only discard changes made to the setup. The setup still exists on the computer's hard disk drive, but the changes made to the setup since it was last saved will be lost.

6.3 Deleting Setups

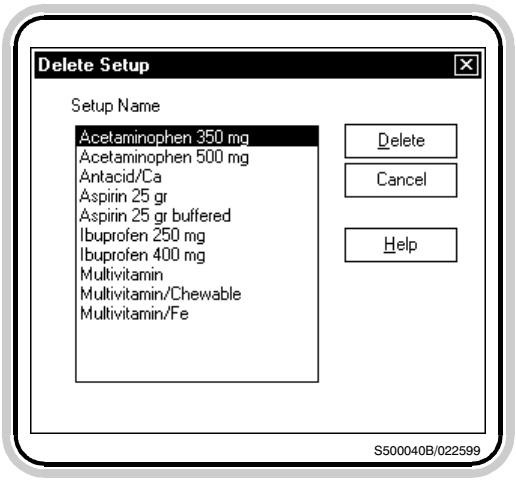

Figure 6.6- Delete Setup dialog box

Setups that are no longer required can be deleted from the computer's hard disk by using the **Setup/Delete...** menu option. When Setup/ Delete is chosen, the Delete Setup dialog box will appear (figure 6.6). The Delete Setup dialog box contains a list of all saved setups. Choose the name of the setup to delete by selecting it from the list. The selected setup will be high-lighted. Then select the **Delete** button. (Select the **Cancel** button at this point to return to the Tablet Test Setup screen without deleting any setups.) A message box asking to confirm the deletion will then appear (figure 6.7). Select the **Yes** button to confirm the deletion and erase the setup from the hard disk, or select the **No** button to return to the Delete Setup dialog box without deleting the setup. In some circumstances, de-leted setups can be recovered.

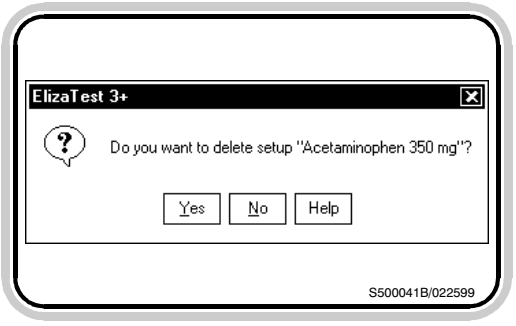

Figure 6.7- Confirmation is required to delete a setup

6.4 Renaming Setups

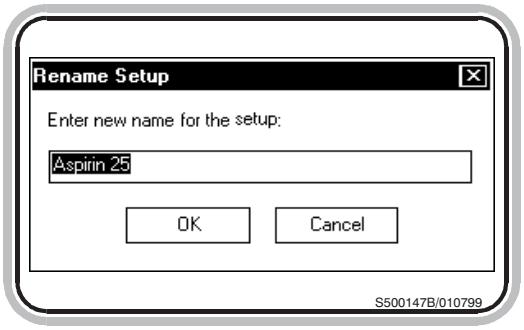

Figure 6.8- Rename Setup dialog box

If the current setup has been given a name by saving it, it may be given a different name by selecting the **Setup/Rename...** menu option. The Rename Setup dialog box will appear (figure 6.8). The current name of the setup will be shown in the dialog box. To rename the setup, type a new name for the setup into the dialog box, then select the **OK** button. The **Cancel** button may be selected before renaming to return to the Tablet Test Setup screen without changing the setup's name.

Setup names must be unique. If a setup is given an existing name, a message box will appear stating that the name already exists. Select the **OK** button in the message box, then enter a unique name for the setup. Note that changing a setup's name will not affect any test runs that may have been performed using the original name, but any reports printed after a setup name has been changed, or any magazine configurations that may use this setup, will show the new name, not the original name.

6.5 Opening Setups

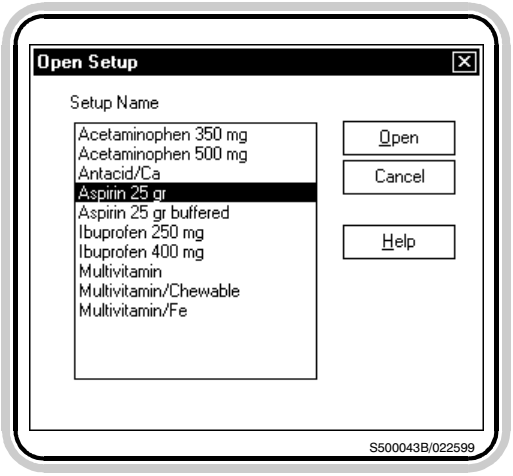

Figure 6.9- Open Setup dialog box

Tablet Test Setup definitions that have been previously saved can be recalled for use by opening them. Opening a setup retrieves the setup definition data from the hard disk, and makes it available for running tablet tests or for editing. To open a setup, select the **Open...** button in the Tablet Test Setup screen, or choose the **Setup/Open...** menu option. The Open Setup dialog box will appear (figure 6.9). The names of all saved setups appear in a list in the dialog box. To choose a setup to open, select the name from the list, then select the **Open** button in the dialog box. The chosen setup will now become the current setup.

If the Open command is selected while there are any unsaved changes in the currently displayed setup, a message box will appear asking

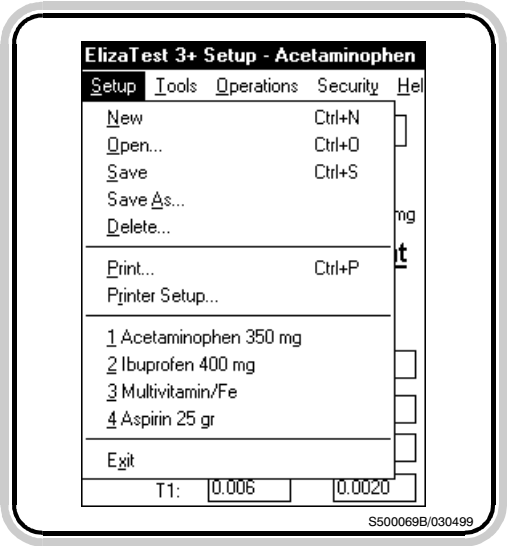

Figure 6.10- The four most-recently used set-up names

if these changes should be saved or discarded. Choose the **Yes** button to save the changes made to the current setup (using the Save/Save As functions previously described), or choose the **No** button to discard any changes and proceed with the Open command. Choosing No will only discard changes made to the setup. The setup still exists on the computer's hard disk drive, but any changes made since it was last saved will be lost.

In addition to the Open command, the Setup menu option also contains a list of the four most-recently used setup names (figure 6.10). The setups listed here can be opened directly by selecting their names from the Setup menu.

6.6 Printing the Current Setup Report

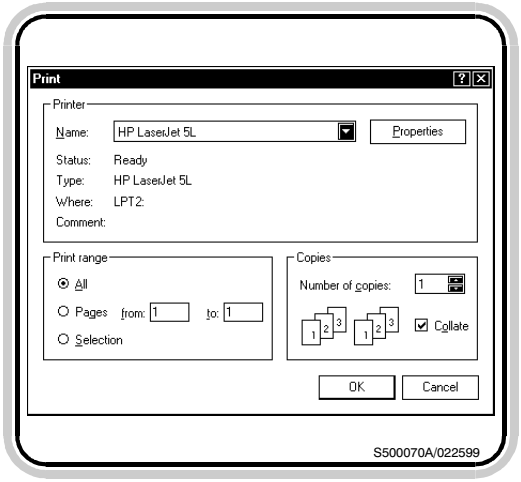

Figure 6.11- Print dialog box

The ElizaTest 3+ Tablet Testing System has the capability to print many different types of reports. One of these is the Current Setup report. The Current Setup report contains a list of all the setup parameters, as well as a picture of the current alignment image and administrative data. This report is generated by selecting the **Setup/ Print...** menu option. Selecting this menu option will cause the Print dialog box to appear (figure 6.11). This dialog box indicates the model of the current system printer, the location of the printer, and other items. The discussion that follows applies to the Hewlett-Packard LaserJet series printer, which is supplied as standard equipment. If another printer is being used, refer to the printer manufacturer's documentation for specific details not addressed here.

When the Print dialog box appears, several settings are pre-selected as default settings. These settings should not be changed from their default values, or the format of the printed reports may not be correct. The only setting that should be changed is the number of copies, if

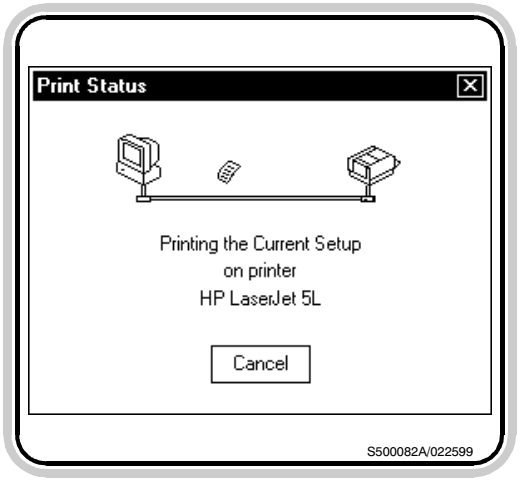

Figure 6.12- Print Status message box

more than one copy of a report is desired. To change the number of copies, either enter the number desired directly into the Number of Copies field, or select the small up and down arrows in the field until the correct number of copies is displayed.

To print the Current Setup report, select the **OK** button in the Print dialog box. The Print Status message box appears briefly, indicating the report is being prepared and sent to the printer (figure 6.12). After printing is complete, the Print dialog box will close, and the Tablet Test Setup screen will appear.

7 Creating and Maintaining Product and Batch Information

This section of the ElizaTest 3+ User's Manual describes to the procedures required to define products and batches. The product and batch associations are an integral part of the tablet tester database.

7.1 Products and Batches

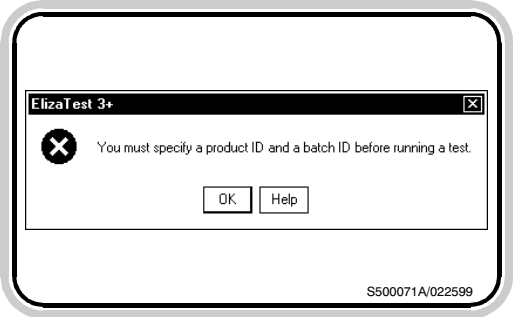

Figure 7.1- Each test must be associated with a product and a batch

The ElizaTest 3+ Tablet Testing System maintains an elaborate database of individual tests, along with the product and batch each test is associated with. Before beginning a tablet test, either in single-test mode, or by using a magazine, the test must be assigned to a batch, and that batch must be associated with a product. If a single test run is attempted without first assigning a product and batch, a message box stating that this must be corrected will appear (figure 7.1). Choose the OK button in the message box, then select a product and batch from the Test Identification area of the Tablet Test Setup screen before running the test.

7.1.1 Relationship Between Products, Batches, and Tests

Figure 7.2 shows the basic relationship between products, batches, and tests. A bottom-up view of the organization shows that every test is associated with a batch, and every batch is associated with a product. Each product name must be unique (no two products can have the same name). Within each product, every batch name must also be unique, but the same batch name can exist for different products. Referring again to the figure, it can be seen that a batch called JA97-01 is duplicated, but each is assigned to different products. Two batches named JA97-01 cannot exist for the same product, but may exist for different products. Within each batch, the test numbers are automatically incremented as each test is started, so duplication of test numbers within a single batch will not occur.

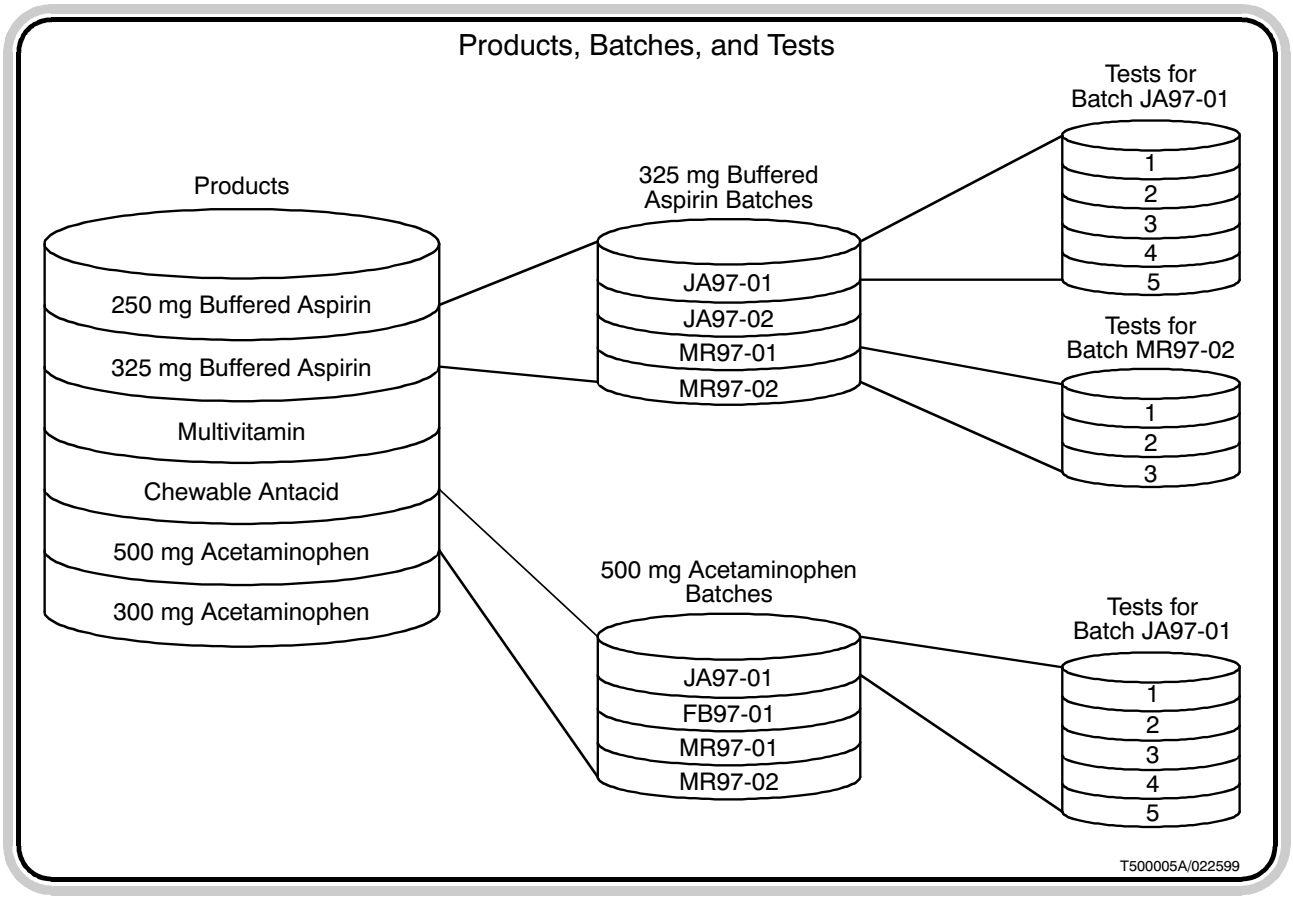

Figure 7.2- The relationship between products, batches, and tests

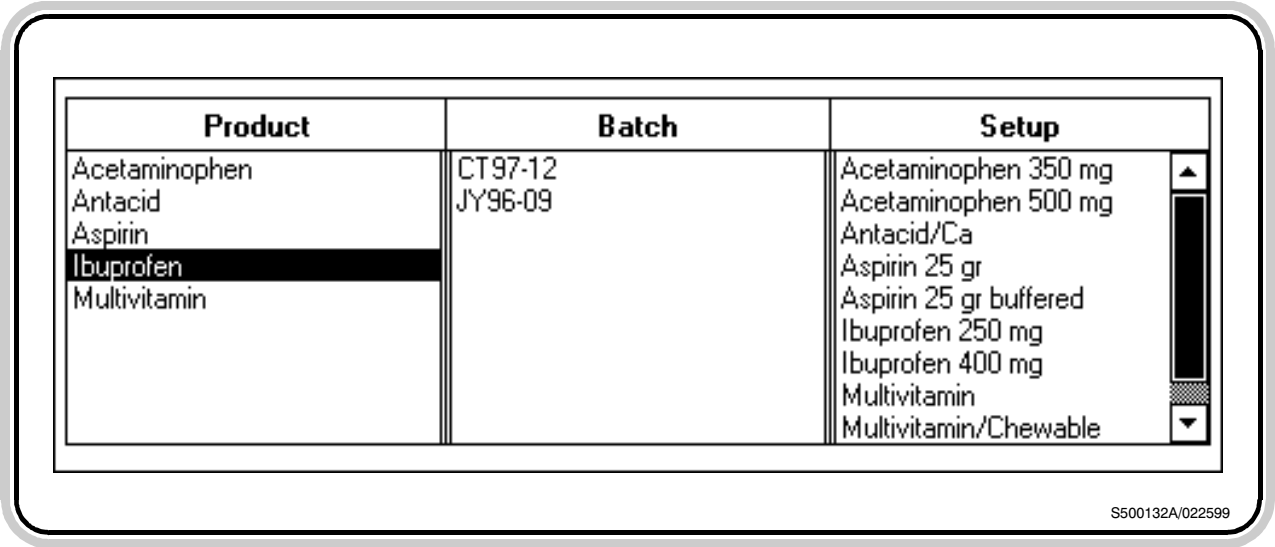

Figure 7.4- Magazine Screen Product and Batch buttons

7.1.2 Selecting and Creating Products

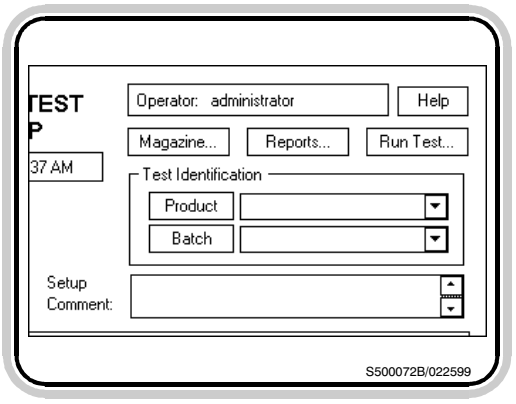

Figure 7.3- Tablet Test Setup screen Test Identification area

The Test Identification area (figure 7.3) in the Tablet Test Setup screen and the **Product** and **Batch** buttons in the Magazine Screen (figure 7.4) provide access to controls that are used for creating and editing the products and batches. The Magazine screen is described in detail in the section "Magazine Screen". To choose an existing product for running a tablet test in single-test mode, select the down-arrow at the right of the Product field in the Tablet Test Setup screen. A list of existing products will then appear. Choose the desired product by selecting it from the list. The name of the product just chosen then appears in the Product field. This product will remain the current product for single-test mode tablet testing until another one is chosen to replace it.

To add a new product, or to delete or rename an existing product, choose the **Product** button in the Tablet Test Setup or Magazine screens, or select the **Operations/Product...** menu option. The Products dialog box will appear (figure 7.5).

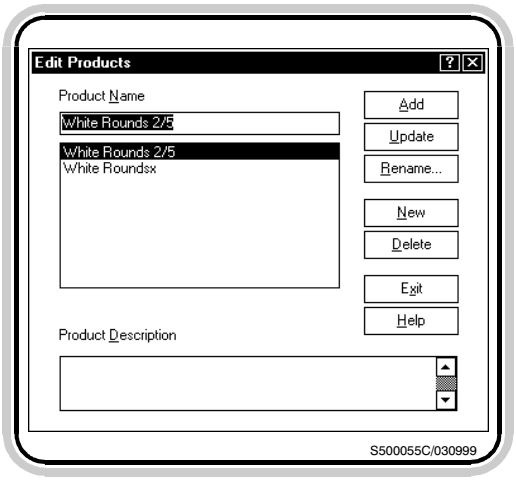

Figure 7.5- Products dialog box

The Products dialog box allows for adding new products, deleting or renaming existing products, and updating an optional description (comment) for products. The Products dialog box also shows a list of all currently available products. When finished with the Products dialog box, select the **Exit** button in the dialog box to return to the Tablet Test Setup screen or the Magazine screen, as appropriate.

To create a new product, select the **New** button at the right of the dialog box. This will clear out the existing data. Type the name of the new product into the **Product Name** field. Product names can be up to 64 characters long, and can contain any keyboard character except **‘** (single quote), **“** (double quote), **[** or **]** (left/right square bracket), and **‘** (grave accent). Also, leading and trailing spaces are not permitted, but spaces in the middle of names are perfectly acceptable. Product names are not case-sensitive; upper case and lower case characters are treated the same. If a description for the product is desired, type the comment into the **Product Description** field at the bottom of the dialog box. The Product Description is entirely optional, and in no way affects any operations of the system. When the name and description are correct, select the **Add** button in the dialog box. The name of the new product will then appear in the list of available products.

7.1.4 Renaming Products

Figure 7.6- Rename Product dialog box

Figure 7.7- Product names must be unique

7.1.5 Updating a Product's Description

Any existing product can be given a new name at any time. To rename a product, select the product to be renamed from the list of available products, then select the **Rename...** button. The Rename Product dialog box will appear, with the product's current name displayed (figure 7.6). Type the new name for this product in the dialog box, then select the **OK** button. The product will then be shown with its new name in the product list. The **Cancel** button may be selected before renaming to return to the Products dialog box without changing the product's name.

Product names must be unique. If the name of an existing product is entered, a message box will appear alerting the operator of this fact (figure 7.7). Choose the **OK** button in the message box, then type a unique name for the product.

Note that changing a product's name will not affect any batches that may already exist for the product, or any test runs that may have been performed. The same batches and tests will still be associated with this particular product, but any reports printed after a product name has been changed, or any magazine configurations that may use this product, will reflect the new name, not the original name.

The optional description for a selected product can be changed at any time. To change the description, select the **Product Description** field, and edit the description as desired. Select the **Update** button in the Products dialog box to enter the new description.

7.1.6 Deleting Products

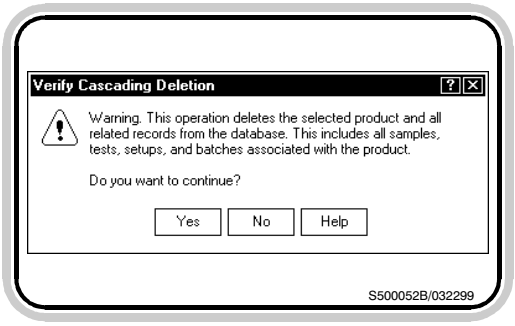

Figure 7.8- Confirmation is required to delete a product

Any product can be deleted from the database if it is no longer needed. When a product is deleted, all of the test data associated with this product will also be deleted. This includes all batches assigned to the product, and all tablet tests run on these batches. Use caution when deleting products; deleted products cannot be recovered.

To delete a product, select the product from the list in the Products dialog box, then select the Delete button. A confirmation message box (figure 7.8) will appear. Choose the **OK** button in the message box to perform the deletion, or choose the **Cancel** button to return to the Products dialog box without deleting the product.

7.1.7 Selecting and Creating Batches

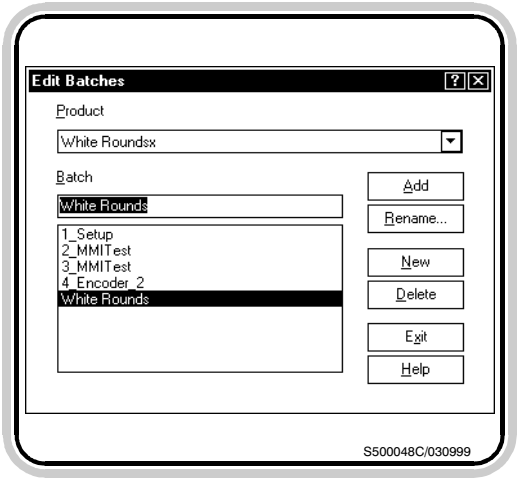

Figure 7.9- Batches dialog box

Each tablet test to be run must also be associated with a batch. To choose an existing batch for running a tablet test in single-test mode, select the down-arrow at the right of the Batch field in the Tablet Test Setup screen. A list of existing batches assigned to the currently selected product will then appear. Choose the desired batch by selecting it from the list. The name of the batch just chosen then appears in the Batch field. This batch will remain the current batch for single-test mode tablet tests until another one is chosen to replace it.

To add a new batch, or to delete or rename an existing batch, choose the **Batch** button in the Tablet Test Setup or Magazine screens, or select the **Operations/Batch. . .** menu option. The Batches dialog box will appear (figure 7.9). The Magazine screen is described in detail in the section "Magazine Screen".

The Batches dialog box allows for adding new batches, deleting existing batches, or renaming batches. Before any operations can be done on batches, the product which the batch is

to be associated with must first be selected. This is done by selecting the down-arrow on the right of the Product field in the Batches dialog box. A list of available products will appear. Choose a product by selecting it from the list. The Batches dialog box then displays a list of all currently available batches assigned to the selected product. When finished with the Batches dialog box, select the **Exit** button in the dialog box to return to the Tablet Test Setup screen or the Magazine screen, as appropriate.

7.1.8 Creating a New Batch

To create a new batch, select the **New** button at the right of the dialog box. Type the name of the new batch into the Batch Name field. Batch names can be up to 64 characters long, and can contain any keyboard character except **‘** (single quote), **“** (double quote), **[** or **]** (left/right square bracket), and **‘** (grave accent). Also, leading and trailing spaces are not permitted, but spaces in the middle of names are perfectly acceptable. Batch names are not case-sensitive; upper case and lower case characters are treated the same. When the name is correct, select the **Add** button in the dialog box. The name of the new batch will then appear in the list of available batches.

7.1.9 Renaming Batches

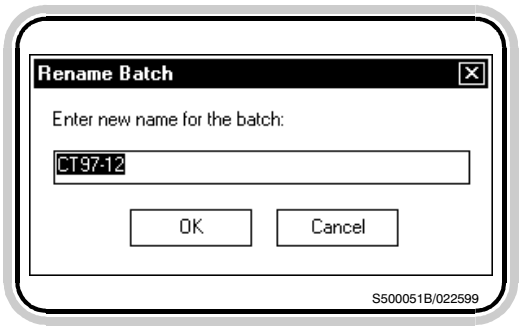

Figure 7.10- Rename Batch dialog box

Any existing batch can be given a new name at any time. To rename a batch, select the batch to be renamed from the list of available batches, then select the **Rename...** button. The Rename Batch dialog box will appear, with the selected batch name displayed (figure 7.10). Type the new name for this batch in the dialog box, then select the **OK** button. The batch will then be shown with its new name in the batch list. The **Cancel** button may be selected before renaming to return to the Batches dialog box without changing the batch name.

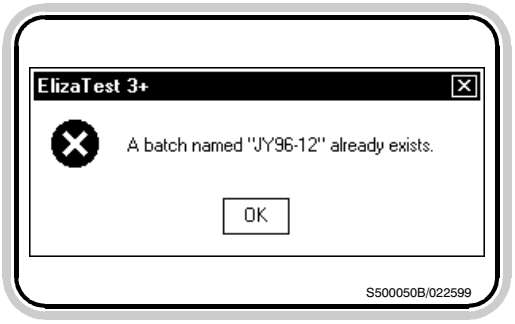

Figure 7.11- Batch names within a given product must be unique.

All batch names within a given product must be unique. Batch names may be duplicated if each is assigned to different products. If the name of an existing batch is entered, a message box will appear alerting the operator of this fact (figure 7.11). Choose the **OK** button in the message box, then type a unique name for the batch.

Note that changing the name of a batch will not affect any test runs that may have been performed. The same tests will still be associated with this particular batch, but any reports printed after a batch name has been changed, or any magazine configurations that may use this batch, will reflect the new name, not the original name.

7.1.10 Deleting Batches

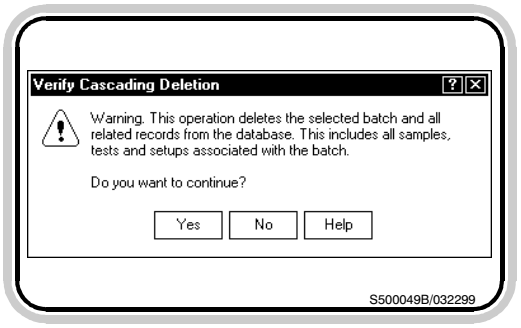

Figure 7.12- Confirmation is required to delete a batch

Any batch can be deleted from the database if it is no longer needed. When a batch is deleted, all of the data associated with this batch will also be deleted. This includes all tablet tests run on this batch. Use caution when deleting batches; deleted batches cannot be recovered.

To delete a batch, select the batch from the list in the Batches dialog box, then select the Delete button. A confirmation message box (figure 7.12) will appear. Choose the **OK** button in the message box to perform the deletion, or choose the **Cancel** button to return to the Batches dialog box without deleting the batch.

7.2 The Setup/Test Relationship

When any tablet test is started, the information from the tablet test setup definition used to run the test is stored along with the data generated from the test itself. In this way, every test can be associated with a specific setup, even if that setup is later deleted. This method allows unsaved or unnamed setups to be used, since the setup definition data becomes part of the test itself, and remains part of the test even if the setup definition is deleted at a later time. The

setup definition data used at the time of the test can be printed by using the Test Reports feature (described later). This data is permanent, and does not change even if the setup is later changed or deleted.

8 Magazine Screen

The Magazine screen (figure 8.1) is used to configure the optional magazine for running multiple tests. With a magazine installed on the Tablet Testing Module, it is possible to run several consecutive tests, and each test may use a different product, batch, or tablet test setup. The Magazine screen is used to select the products, batches, and setups to be used in each magazine vial, and allows for saving magazine configurations for reuse at a later time. The Magazine screen is accessed by selecting the **Magazine...** button in the Tablet Test Setup screen, or by choosing the **Operations/Magazine...** menu option from the Tablet Test Setup screen. It is also available during actual tablet testing by selecting the Magazine button in the

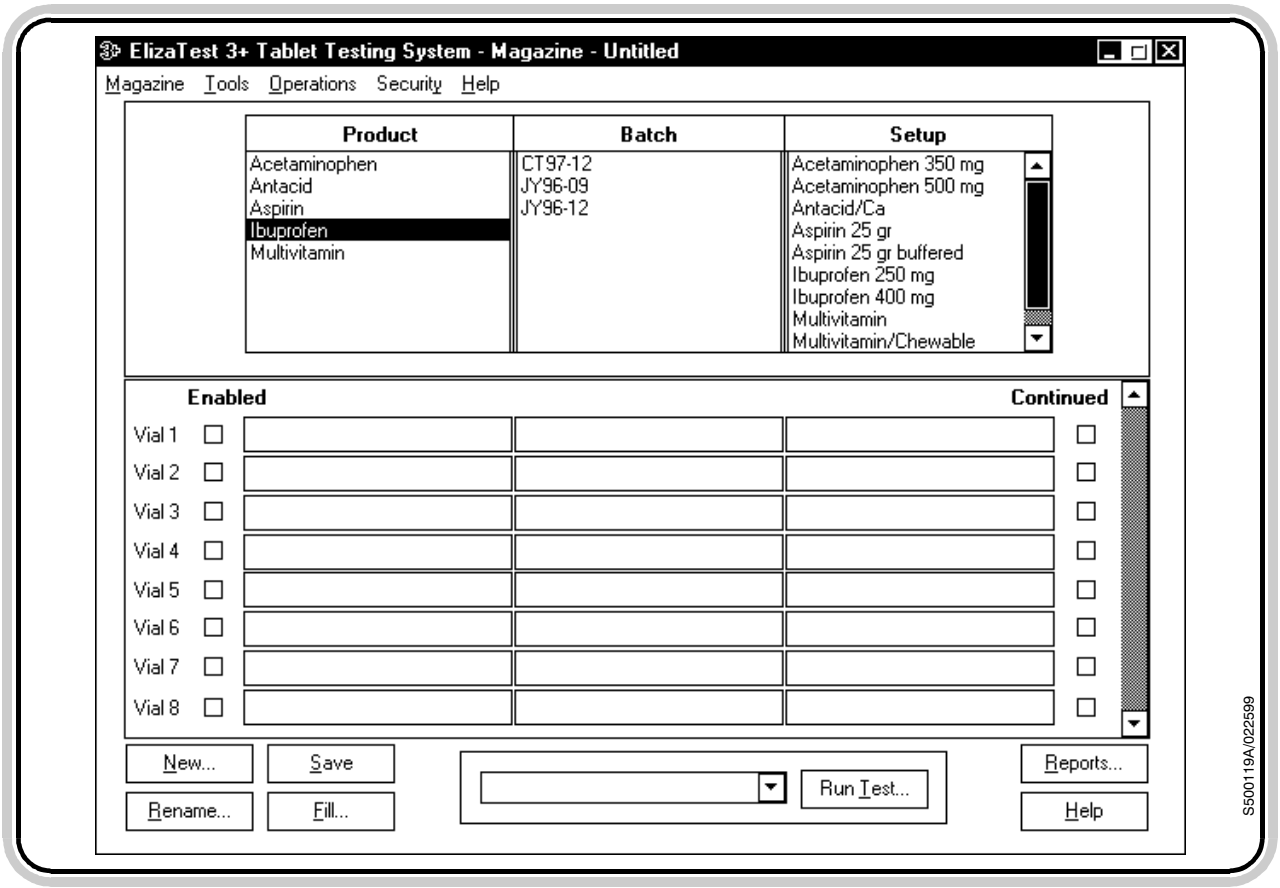

Figure 8.1- Magazine screen

Tablet Test Run screen. If the optional magazine is detected during program start-up, the Magazine screen will be the first screen displayed. The last magazine configuration used (if any) will be displayed when the screen is first shown.

8.1 Title Bar

The title bar is the blue bar at the very top of the screen. It shows the name given to the current magazine configuration, if any, as well as other information. The first time the system is used, an empty untitled magazine configuration will be displayed. After that, the last configuration that was used will be the first one displayed when the system is started.

8.2 Menu Bar and 'Hot' Buttons

Directly below the title bar is the menu bar. The menu bar allows access to other screens and features of the system. To choose a menu item, first select one of the general menu categories (which are **Magazine**, **Tools**, **Operations**, **Security**, and **Help**). When a menu item is selected, a drop-down menu list appears that shows each of the options available under that general category. Select the item desired by moving the mouse to the item (the selected item is highlighted on the monitor), then click the primary (usually the left) mouse button to invoke the command.

For convenience, 6 common menu commands may be invoked by selecting their corresponding 'hot' buttons in the screen. These commands are:

- **New** (same as **Magazine/New...**)
- **Save** (same as **Magazine/Save**)
- **Rename** (same as **Magazine/Delete...**)
- **Fill** (same as **Tools/Fill...**)
- **Run Test** (same as **Operations/Run Test...**)

- **Reports** (same as **Operations/Reports...**)

Each 'hot' button functions exactly as if the same command was chosen from the menu bar.

On-line help is available by selecting the **Help/Index** menu command. It is also available by pressing the **F1** key on the keyboard, and most screens and dialog boxes contain a **Help** button that can be selected to explain the function of the dialog box.

If the optional magazine is installed, the Tablet Test Setup screen can be displayed if a test cycle is not currently running by selecting the **Setup** button at the top of the Setup List, or by choosing the **Operations/Setup...** menu option. When the Tablet Test Setup screen is displayed, setups can be freely edited as previously described. When finished with the Tablet Test Setup screen, select the **Magazine...** button in the screen to return to the Magazine screen. If the optional magazine is not installed, the Magazine screen can be used to create and edit magazine configurations, but no tests may be started from this screen. Only single-test mode tablet tests can be run when no magazine is present, and these must be initiated from the Tablet Test Setup screen.

8.3 Product, Batch, and Setup Lists

The top portion of the Magazine screen (figure 8.2) contains three lists that the products, batches, and setups for each test are chosen from. Every magazine vial that is to be tested must be identified using these three items. The creation of products and batches is discussed in the section "Creating and Maintaining Product and Batch Information". When Magazine Configurations are created or edited, the product, batch, and setup to use for a particular magazine vial are selected from these lists.

The Product list shows the names of all currently defined products. To choose a product, click on the name of the product. If an item is not

visible in the list, use the scroll bar on the right side of the list to bring the desired item into view. The selected product will be highlighted in the list. Only one product may be selected at a time. When a product has been selected, the Batch list will then display the names of all the batches that are associated with it. To choose a batch, click on the name of the desired batch. The Set-up list shows the names of all currently defined setups. To choose a setup, click on the name of the desired setup.

The **Product**, **Batch**, and **Setup** labels that appear at the top of the lists are also buttons that can be used to access the Products dialog box, Batches dialog box, and Tablet Test Setup screen, respectively. These items are also available through commands in the Operations menu.

8.4 Magazine Vial List

The vial list occupies the lower portion of the Magazine screen (figure 8.3). The vial list is used to define the product, batch, and setup to be used for each vial in the magazine. It also contains controls that turn each vial on or off, and allows for linking vials together if more sam-

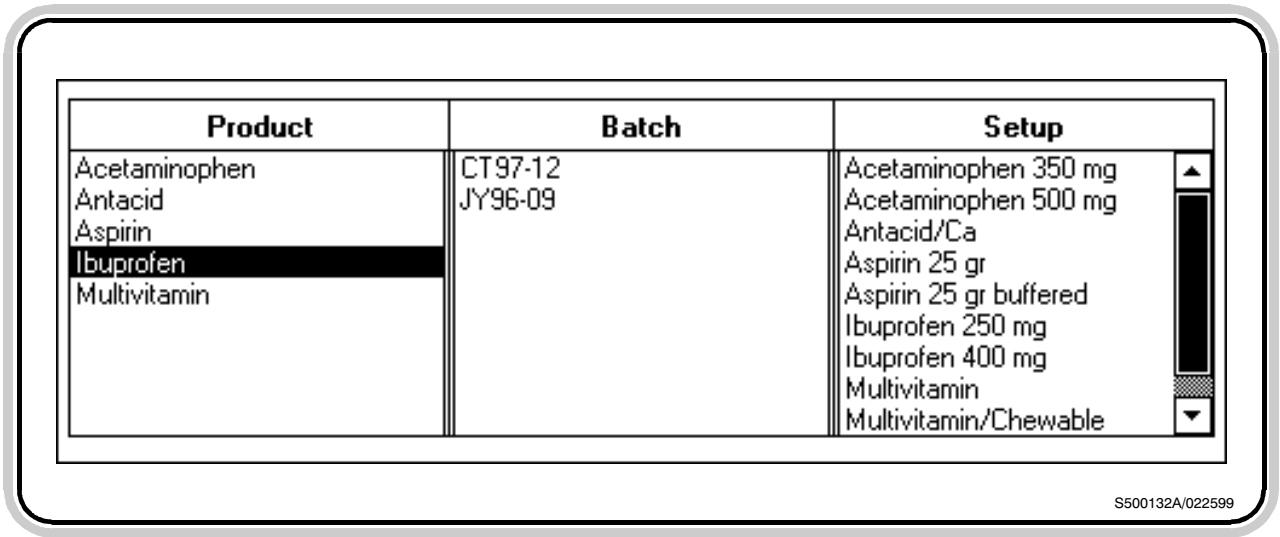

Figure 8.2- The Magazine screen product, batch, and setup selection lists

ples need to be tested than will fit in a single vial. Up to 8 vials are displayed at one time, and their numbers appear at the left side of the list. If a magazine with more than 8 vials is being used, use the scroll bar on the right side of the list to bring the desired vials into view. The **Page Up**, **Page Down**, and **arrow** keys on the keyboard may also be used to scroll through the vial list.

8.5 Defining the Test Identification Information for a Magazine Vial

Before a vial can be tested, it is necessary to supply the product, batch, and setup information that is to be associated with the tablet test. As with the single-test mode of operation, every tablet test run using a magazine must also be associated with these items.

To set the test identification for a magazine vial, or to change the existing information, make the desired vial active by selecting it with the pointing device, or by using the keyboard as described above. The active vial is indicated by being highlighted with a blue background. Only the active vial is affected by changes in the product, batch, or setup lists. As the active vial is changed, the product, batch, and setup lists in

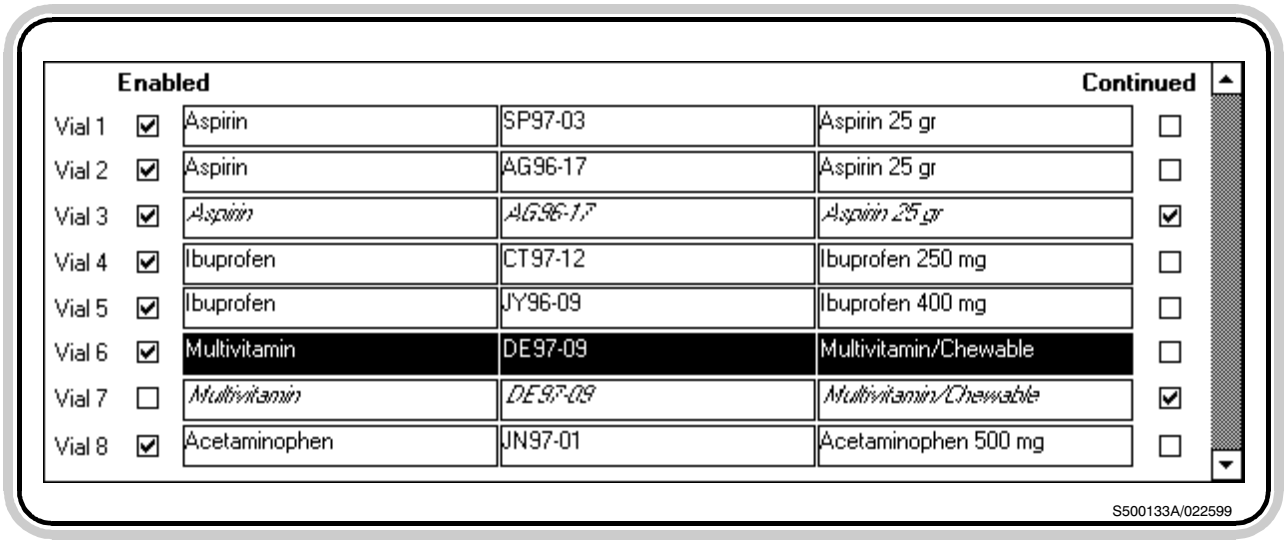

Figure 8.3- Magazine Vial List

the upper portion of the screen will also change to reflect the information that is contained in the vial.

When the correct vial is active, choose the product, batch, and setup desired by selecting them from the appropriate lists. The items may be selected either by double-clicking on them, or by selecting the item and, while holding down the primary button on the pointing device, 'drag' the item onto the desired vial in the list. Release the button to 'drop' the item on the vial. Please note that a dragged item can be dropped onto any vial, not just the highlighted active vial. As the item is being dragged, the cursor will change appearance to indicate if the item can be dropped at the cursor location. A slashed circle cursor indicates that the item cannot be dropped. This prevents accidentally dropping the wrong type of item, such as a setup name into a Batch field. If a batch name is selected or dragged, the batch's associated product will also be carried with it.

It is not necessary to use all the vials of the magazine, or to use the vials in consecutive order. Information for a vial can be cleared by making the vial active then pressing the **Delete** key on the keyboard.

When a tablet test is not currently running, any item in the vial list can be freely changed (subject to certain restrictions described later). It is possible to pause a test and return to the Magazine screen in order to make limited changes to a magazine configuration, which is described in the section "Magazine Operations Available During a Tablet Test Run".

8.6 Enabling a Vial to be Tested

In order for the contents of a particular vial to be tested, it must first be marked as enabled. Along the left side of the vial list is a series of

check boxes that are used to enable or disable individual vials. When a vial is enabled, a check mark will appear in the box, and the vial's row in the list will have a white background. Vials that are not enabled will have no mark in the box, and will have a gray background. To change a vial's enabled/disabled status, select the **Enabled** check box to toggle it between enabled and disabled.

When a vial is marked as enabled, the contents of the magazine vial will be tested in numerical order by the Tablet Testing Module during the test run. As each vial is completed, it will automatically be marked as disabled in the vial list. When all vials have been disabled, either by manually disabling them or by stopping them during a test cycle, or because all the vials have been tested, the tablet test cycle is complete. It is possible to pause a test and return to the Magazine screen in order to re-enable a previously-tested vial. The section "Magazine Operations Available During a Tablet Test Run" describes how to use the Magazine screen while a tablet test is in progress.

8.7 Vial Continuation

If more tablets than can fit in a single vial need to be tested, it is possible to link several consecutive vials together in a chain by using the vial continuation feature. A series of check boxes along the right side of the vial list allows a vial to be a continuation of the preceding one. To continue a vial, select the **Continued** check box. When a vial is continued, a check mark will appear in the box, and the text in the identification boxes will be italicized gray type. Vials that are not continued will have no mark in the box, and will have normal black text. To change a vial's continuation status, select the Continued check box to toggle it between continued and not continued.

When a vial is marked as continued, the test identification information from the preceding vial is automatically entered into it. This information cannot be changed directly unless the Continued status is cleared first. Because the magazine is circular, vial 1 is preceded by the highest numbered vial in the magazine. When vials are continued, they are treated as a single tablet test. As many consecutive vials as are needed may be continued in the chain. Any changes made to the test identification information to first vial in the chain will automatically be made to the remaining vials in the chain.

A point to note is that even though all vials in the magazine may be continued as one test, one vial will need to have its Continued status cleared in order to make it first in the chain. Only the first vial in a chain can have its test identification information changed. Changes made to this one vial will then be reflected in the rest of the vials in the chain.

It is not necessary to enable all the vials in a continued chain. Only enabled vials will actually be tested by the Tablet Testing Module. Because all the vials in a continued chain are treated as a single test, it is possible that enough samples will be successfully tested before all the vials in the chain have been used. In this case, the extra vials will simply be skipped, and the next enabled vial that is not part of the continued chain will start a new test. If there are no more enabled vials, the tablet test cycle is complete.

9 Magazine Operations

Although magazine configurations can be created for one-time use, and important feature of the ElizaTest 3+ allows magazine configurations to be saved on the computer's hard disk drive and recalled for later use. This section describes how to save configurations, recall existing configurations, and how to delete or rename them.

9.1 Saving Magazine Configurations

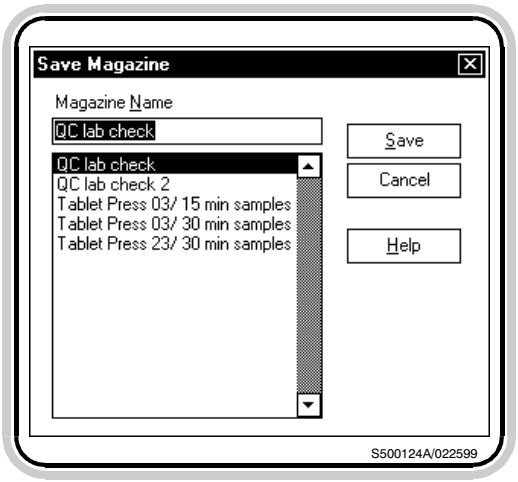

Figure 9.1- Save Magazine dialog box

To save an as-yet untitled magazine configuration, select the **Save** button in the Magazine screen, or choose the **Magazine/Save** (or **Save As...**) menu option. The Save Magazine dialog box appears (figure 9.1).

The Save Magazine dialog box contains a list of all currently saved magazines in the lower portion of the dialog box. To save the current magazine configuration, type the desired name for the magazine into the Magazine Name field in the Save Magazine dialog box, then select the Save button. The name given to the magazine will now appear in the title bar of the Magazine screen. Magazine names can be up to 32 characters, and can contain any keyboard character except **'** (single quote), **"** (double quote), **[** or **]** (left/right square bracket), and **`** (grave accent). Also, leading and trailing spaces are not permitted, but spaces in the middle of names are perfectly acceptable. Magazine names are not case-sensitive; upper case and lower case characters are treated the same

The Save As... option also allows an existing named magazine configuration to be saved under another name. To use this feature, select the **Magazine/Save As...** menu option. Again, the Save Magazine dialog box will appear, as if the current magazine is untitled. Instead of being blank, however, the Magazine Name field will contain the magazine's current name. Type

a new name for the magazine in the field, and select the Save button in the dialog box. The current magazine will now be saved under the new name, with the original configuration remaining unchanged under its initial name. This allows for maintaining a basic magazine configuration 'template' with one name, then modifying and saving the changed magazine configuration under a different name, keeping the original configuration intact. To save changes to a magazine configuration under its original name, simply select the **Save** button without supplying a different name.

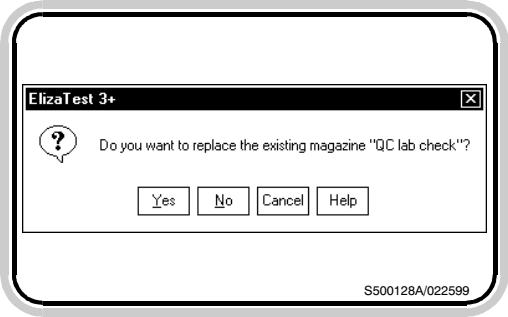

Figure 9.2- Confirmation is required to replace an existing magazine

All magazine names must be unique. Should the attempt be made to save a magazine using a name that already exists, a confirmation message box will appear asking if the new magazine should replace the old one (figure 9.2). Select the **Yes** button to cause the new magazine configuration to replace the original one. Select the **No** button if the original magazine is not to be replaced. Selecting No will return to the Save Magazine dialog box. Select the **Cancel** button to cancel the save attempt and return to the Magazine screen.

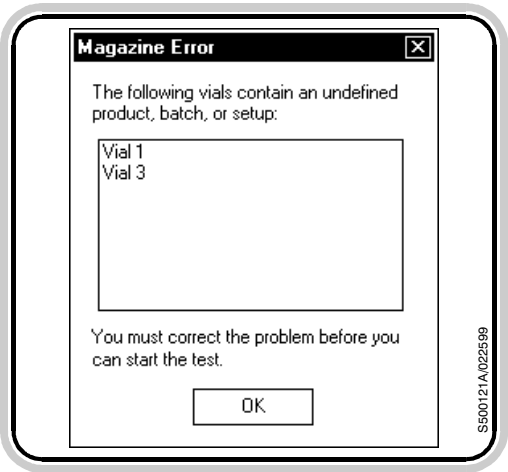

Figure 9.3- Magazine Error dialog box

When a magazine is saved, the configuration is checked for inconsistencies in the vial list, and any errors that are found will be shown in the Magazine Error dialog box (figure 9.3). A common cause of this error is enabling a vial for testing without supplying all of the product, batch, and setup information required to run the test. The Magazine Error dialog box will list which vials contain incorrect data. Select the **OK** button in the dialog box, then make the necessary corrections to the magazine configuration.

A similar check is performed prior to running tablet test using the magazine, and also when a magazine configuration is first being opened.

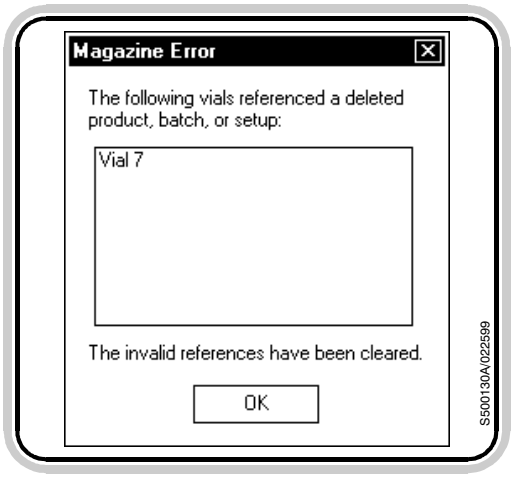

Figure 9.4- An invalid reference has been detected

However, if a magazine error is detected when opening the configuration (figure 9.4), any invalid references to products, batches, or setups will be cleared from the vial list. Invalid references occur when a magazine configuration contains items that are no longer available for use, such as a setup or batch that has been deleted. When these types of errors occur, the information in the vial list will be cleared from the display, but the configuration saved on the computer's hard disk is not changed. Thus, if the magazine configuration is not re-saved after the invalid information has been cleared, the same error will occur the next time the configuration is used.

9.2 Creating New Magazine Configurations

There are two basic options that be used to create new magazines. The first has already been described above- editing a 'template' magazine configuration, then saving the magazine under a different name. The second is by creating a new magazine from scratch using the New Magazine command. Select the **New...** button in the Magazine screen or select the **Magazine/ New...** menu option.

When the New... command is chosen, the New Magazine dialog box will appear requesting the number of vials that are in the magazine (figure 9.5). Choose the number of vials that are physically present in the magazine to be used from the list in the dialog box. Magazines can be purchased that have either 8 or 12 vials. It is very important to select the number of vials actually present on the magazine- this number cannot be changed later. When the number of vials is chosen, select the **OK** button in the dialog box to begin working with an empty vial list. Select the **Cancel** button to close the New Magazine dialog box and return to the previous magazine configuration.

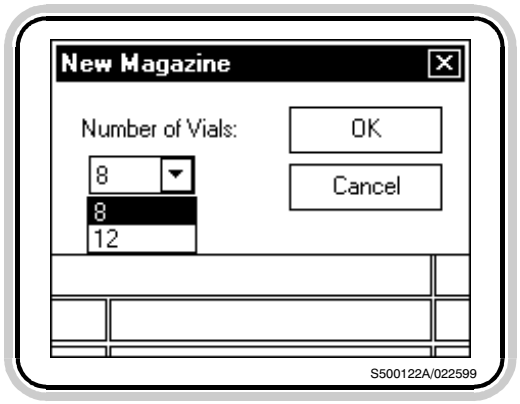

Figure 9.5- New Magazine dialog box

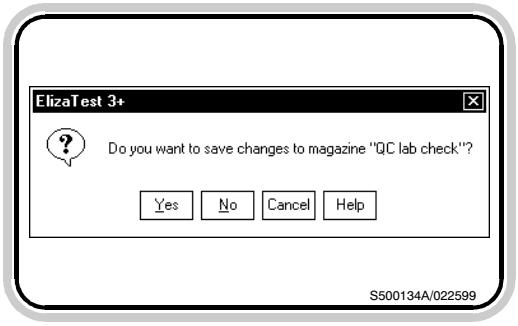

Figure 9.6- Changes have been made to the magazine but those changes have not been saved

If the New command is selected while there are any unsaved changes in the currently displayed magazine configuration, a message box will appear (figure 9.6), asking if these changes should be saved or discarded. Choose the **Yes** button to save the changes made to the current magazine (using the Save function described above), or choose the **No** button to discard any changes and proceed with the New command. Choosing No will only discard changes made to the magazine. The magazine still exists on the computer's hard disk drive, but the changes made to it since it was last saved will be lost.

9.3 Renaming Magazines

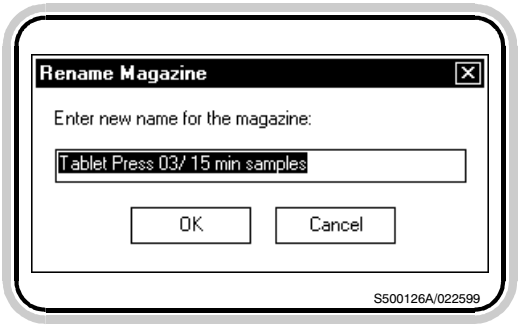

Figure 9.7- Rename Magazine dialog box

If the current magazine configuration has been given a name by saving it, it may be given a new name by selecting the **Rename...** button, or by choosing the **Magazine/Rename...** menu option. The Rename Magazine dialog box will appear (figure 9.7). The current name of the active magazine will be shown in the dialog box. To rename the magazine, type a new name for the magazine into the dialog box, then select the **OK** button. The **Cancel** button may be selected before renaming to return to the Magazine screen without changing the magazine configuration's name.

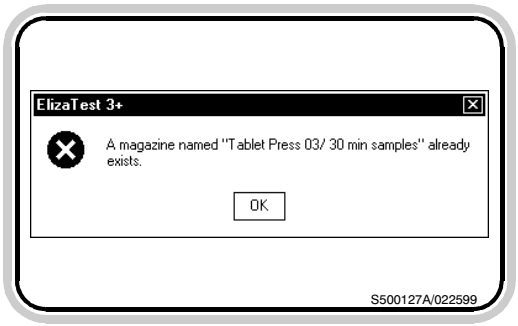

Figure 9.8- Magazine names must be unique

Magazine names must be unique. If a magazine is given an existing name, a message box will appear stating that the name already exists (figure 9.8). Select the **OK** button in the message box, then enter a unique name for the magazine configuration. Note that changing a magazine's name will not affect any test runs that may have been performed, but any reports printed after a magazine name has been changed will show the new name, not the original name.

9.4 Deleting Magazines

Figure 9.9- Delete Magazine dialog box

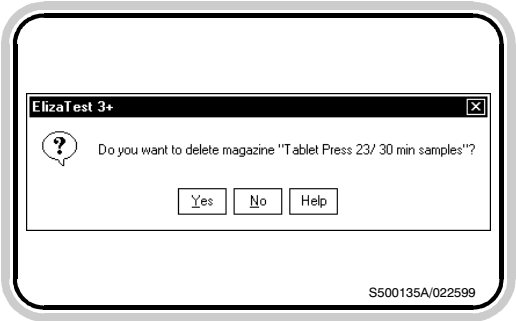

Figure 9.10- Confirmation is required to delete a magazine configuration

A magazine configuration that is no longer required can be deleted from the computer's hard disk by selecting the **Delete...** button, or by choosing the **Magazine/Delete...** menu option. When the Delete command is chosen, the Delete Magazine dialog box will appear (figure 9.9). The Delete Magazine dialog box contains a list of all saved magazine configurations. Choose the name of the magazine to delete by selecting it from the list. The selected magazine will be highlighted. Then select the **Delete** button. (Select the **Cancel** button at this point to return to the Magazine screen without deleting any magazine configurations.) A message box asking to confirm the deletion will then appear (figure 9.10). Select the **Yes** button confirm the deletion and erase the magazine from the hard disk, or select the **No** button to return to the Delete Magazine dialog box without deleting the selected magazine. Deleted magazine configurations cannot be recovered.

9.5 Opening Existing Magazine Configurations

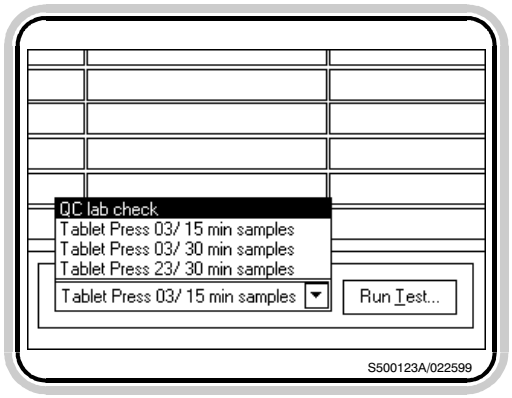

Figure 9.11- Magazine Name list

Magazine configurations that have been previously saved can be recalled for use by opening them. Opening a magazine retrieves the magazine configuration data from the hard disk, and makes it available for running tablet tests or for editing. To open a magazine, select the **Magazine Name** drop list at the bottom center of the Magazine screen. The Magazine Name list will then expand to show the names of all the available magazine configurations (figure 9.11). To choose a magazine to open, select the name from the list. If the name is not visible in the list, use the scroll bar at the right of the list to make

the desired name visible. The chosen magazine configuration will now become the current magazine.

Existing magazines can also be opened by choosing the **Magazine/Open...** menu option, which will then display the Open Magazine dialog box. Choose the magazine to open from the list in the dialog box, then select the **Open** button. Select the **Cancel** button to return to the Magazine screen without opening a magazine.

If opening a magazine is attempted while there are any unsaved changes in the currently displayed magazine configuration, a message box will appear asking if these changes should be saved or discarded. Choose the **Yes** button to save the changes made to the current magazine (using the Save function previously described), or choose the **No** button to discard any changes and proceed with the opening of the magazine. Choosing No will only discard changes made to the magazine. The magazine still exists on the computer's hard disk drive, but any changes made to it since it was last saved will be lost.

In addition to opening a magazine as described above, the Magazine menu option contains a list of the four most-recently used magazine configurations (figure 9.12). The magazines listed here can be opened directly by selecting them from the Magazine menu.

9.6 Printing the Current Magazine Configuration

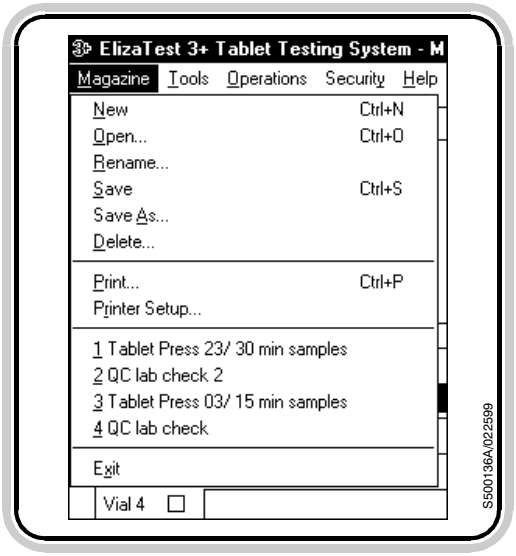

Figure 9.12- The four most-recently used magazines

The ElizaTest 3+ Tablet Testing System has the capability to print many different types of reports. One of these is the Current Magazine report. The Current Magazine report contains a listing of the Test Identification information for each vial in the magazine, the vial's enabled/disabled status, continued status, and administrative data. This report is generated by selecting the **Magazine/Print...** menu option. Selecting this menu option will cause the Print dialog box to appear. This dialog box indicates the model of the current system printer, the location of the printer, and other items. The discussion that follows applies to the Hewlett-Packard LaserJet series printer, which is supplied as standard equipment. If another printer is being used, refer to the printer manufacturer's documentation for specific details not addressed here.

When the Print dialog box appears, several settings are pre-selected as default settings. These settings should not be changed from their default values, or the format of the printed reports may not be correct. The only setting that should be changed is the number of copies, if more than one copy of a report is desired. To change the number of copies, either enter the number desired directly into the Number of Copies field, or select the small up and down arrows in the field until the correct number of copies is displayed.

To print the Current Magazine report, select the **OK** button in the Print dialog box. The Print Status message box appears briefly, indicating the report is being prepared and sent to the printer. After printing is complete, the Print dialog box will close, and the Magazine screen will appear.

9.7 Magazine Fill Controls

Select the **Fill...** button in the Magazine screen, or choose the **Tools/Fill...** menu option to display the Magazine Fill Control dialog box (figure 9.13). This feature is only available if the magazine is actually installed on the Tablet Tester Module. This dialog box is used to rotate the magazine to a desired position in order to fill the vials prior to (or during) a test, and also allows for purging the vials to empty them of tablets. In addition to using the controls in this dialog box, the top acrylic plate on the magazine may also be rotated by hand to position the filling funnel over the desired vials.

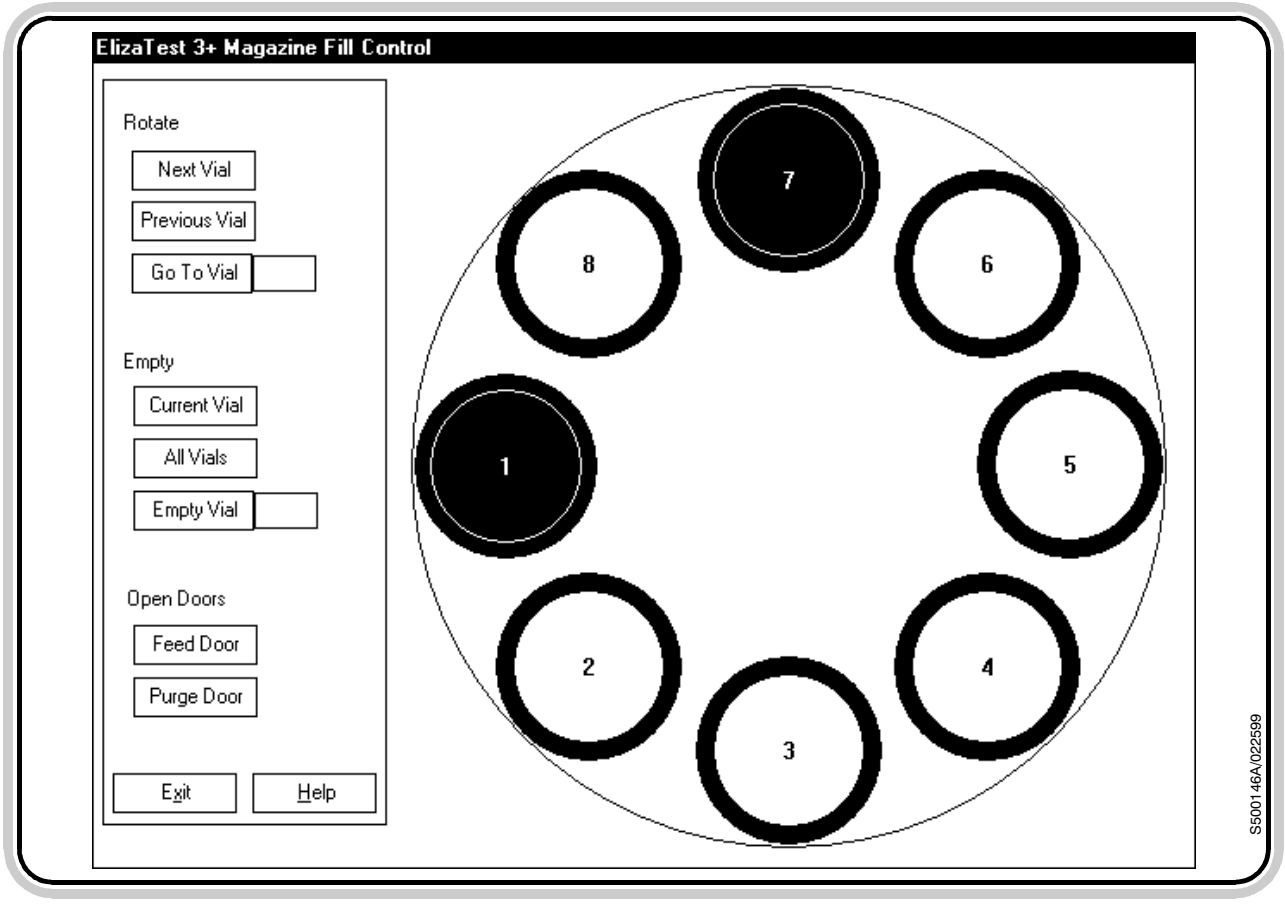

Figure 9.13- Magazine Fill Control dialog box

9.7.1 Magazine Schematic

The right side of the Magazine Fill Control dialog box contains a top view schematic of the magazine, shown in its current position. This schematic is updated as the magazine rotates. The magazine schematic will show the number of vials as has been set in the current magazine configuration being used in the Magazine screen. The number of vials may be either 8 or 12. Each vial is numbered in the schematic. The green circle at the 9 o'clock position indicates the location of the feed door, where tablets will be dropped into the tablet feeder inside the Tablet Testing Module, and the red circle at the 12 o'clock position indicates the location of the purge door, where a vial may emptied through a chute into the excess tablet bin located at the rear of the machine.

9.7.2 Rotate Controls

Selecting the **Next Vial** and **Previous Vial** buttons will rotate the magazine until the next or previous adjacent vial is centered over the feed door. Selecting Next Vial will rotate the magazine clockwise, and selecting Previous Vial will rotate the magazine counter-clockwise. Since the magazine is circular, the highest-numbered vial is adjacent to vial 1. The **Go To Vial** button allows for moving to a specific vial. Enter the number of the vial to move to into the field, then select the button. Please note that only valid vial numbers can be entered.

9.7.3 Empty Controls

This group of controls allows for emptying any or all of the vials by means of the purge door and chute located at the rear of the Tablet Testing Module. Selecting the **Current Vial** button will empty the vial the that is positioned over the purge door. The purge door will open for a few seconds to empty the contents of the vial, then close. If a vial is not centered over the purge door, this button cannot be selected. Selecting the **All Vials** button will open the purge door,

and while the door remains open, the magazine will rotate one revolution, briefly pausing as each vial passes over the open door to give the vial time to empty. After all vials have passed over the door, the purge door will close. The **Empty Vial** button allows for emptying a specific vial. Enter the number of the vial to be emptied into the adjacent field, then select the button. Please note that only valid vial numbers can be entered. When the Empty Vial button is selected, the desired vial will move over the purge door, which will then open for a few seconds.

9.7.4 Open Doors

These buttons can be selected to manually open either the feed door or purge door. The door will open for as long as the button is selected. Please note that the doors cannot be opened if the magazine is currently rotating.

10 The Tablet Test Run Screen

The Tablet Test Run screen is used for both the single-test and magazine modes of operation. To perform a single tablet test, a valid tablet test setup must first have been created or opened in the Tablet Test Setup screen, and the test must have been assigned to a product and batch. If the system is being operated without the optional magazine, select the **Run Test...** button in the Tablet Test Setup screen, or choose the **Operations/Run Test...** menu option to display the Tablet Test Run screen, shown in figure 10.1. If the system is using the optional magazine, the Tablet Test Run screen is displayed from the Magazine screen by se-

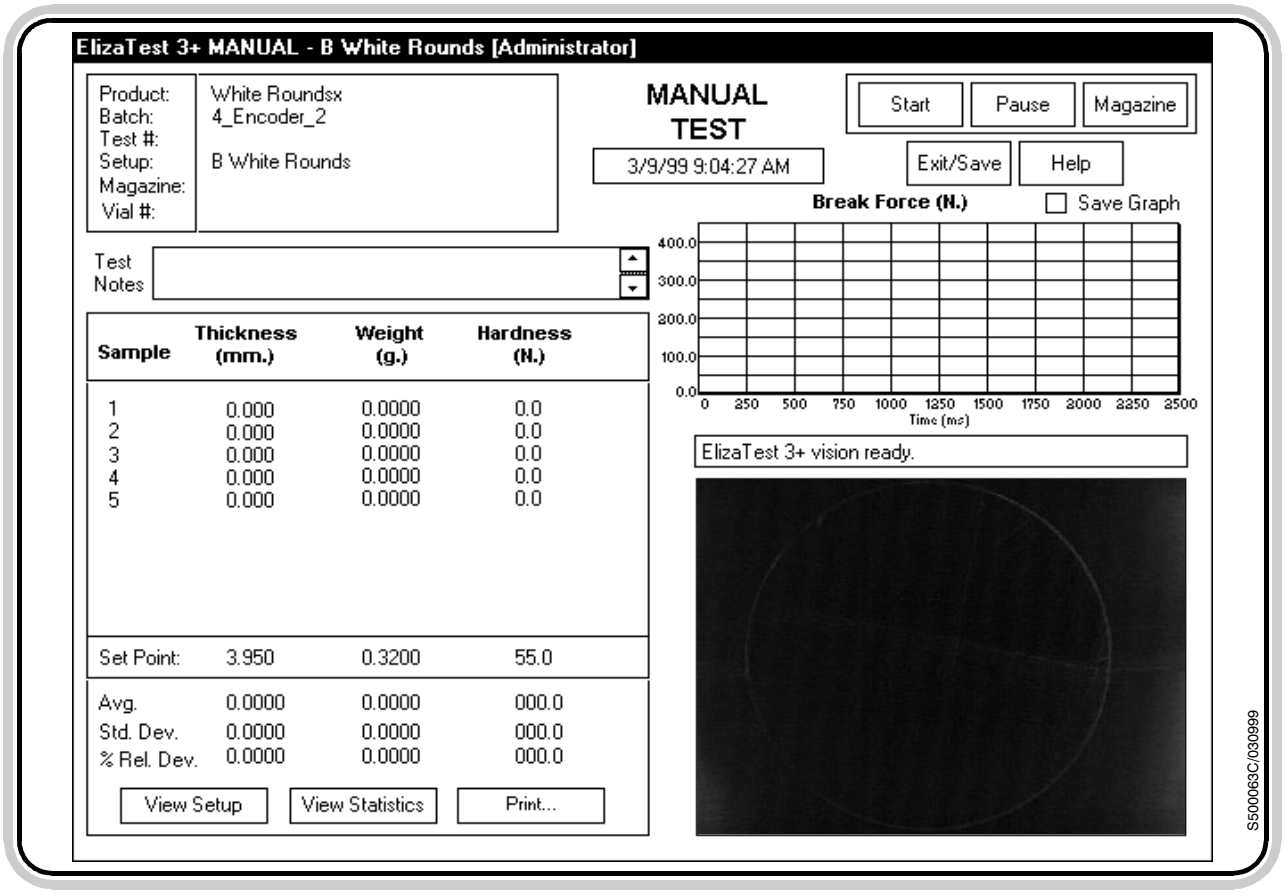

Figure 10.1- Tablet Test Run screen

lecting the **Run Test...** button or the **Operations/Run Test...** menu item available in that screen. The Tablet Test Run screen contains the controls necessary to start, stop, pause, and resume tablet tests, and displays the data generated from each tablet tested during the test cycle. The following is a discussion of the major items associated with this screen.

10.1 Test Identification Information

The upper left portion of the Tablet Test Run screen contains test identification information for the current tablet test. The product, batch, and setup name that are assigned to the current test or magazine vial are displayed. The test number displayed is automatically assigned and updated by the software as each test begins. If a magazine is being used, the name of the magazine and the current vial will be shown. The magazine name, current vial, and the name of the operator is also displayed in the title bar of the Tablet Test Run screen. The **Test Notes** field may be used to give an optional comment to the test run. This comment will appear on the printed reports. When running in single-test mode, the Test Notes may be entered or changed any time prior to saving the test results. If using a magazine, the Test Notes can be changed at any time during the current test. The use of the Test Notes is entirely optional. The Test Notes have no impact on the tablet test.

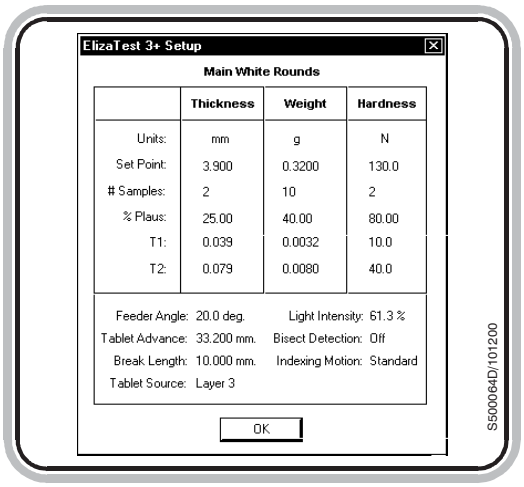

Figure 10.2- View Setup dialog box

All the items listed above (except the Test Notes) are displayed for reference only. None of these items can be changed from the Tablet Test Run screen.

10.2 View Setup Button

Selecting the **View Setup** button at the bottom left of the screen displays a pop-up window that shows the values of the current setup definition, less the alignment image (figure 10.2). If a magazine is being used, the setup definition of

the current magazine vial being tested is displayed. Select the **OK** button in the pop-up window to close the window and return to the Tablet Test Run screen. The View Setup button can be used before a test is started, while a test is paused or stopped, or after the test is completed. It cannot be used when a test is actually being performed.

10.3 Test Results Table

The remainder of the left portion of the Tablet Test Run screen contains the test results table. This area of the screen is filled in with the results of the individual tablet tests as they are performed. The measurements are shown in whatever unit was specified in the tablet test setup definition. When using a magazine, the test results table is cleared prior to starting each new test.

The results of up to 10 individual tablets can be shown in the table at one time. If more than 10 tablets are being tested, a scroll bar will appear at the right side of the test results table. The scroll bar can be moved with the mouse and the up/down arrows can be selected to show whatever portion of the test results table is desired. The table will be filled in from top to bottom.

As the test results are written to the table, they are identified as to their relationship to the T1 and T2 values defined in the setup. Results that fall within the range of the setpoint plus or minus the T1 value have no special characteristics. Values that are greater than the setpoint plus T1 are shown in yellow, prefixed with the symbol '>'. Values less than the setpoint minus T1 are shown in yellow, prefixed with the symbol '<'. Results that are greater than the setpoint plus T2 are shown in red, prefixed with the symbol '>>'. Values less than the setpoint minus T2 are shown in red, prefixed with the symbol

'<<'. Tablets that have failed the plausibility check will be shown in white, prefixed with the symbol '<>' until they are discarded.

The lower section of the test results table displays the setpoints and summary statistics about the results gathered so far. The average, standard deviation, and percent relative deviation are calculated and updated as the test proceeds. Please note that standard deviation and relative deviation cannot be computed for fewer than 2 tablets, and cannot be displayed until at least 2 tablets have been tested.

10.4 View Statistics

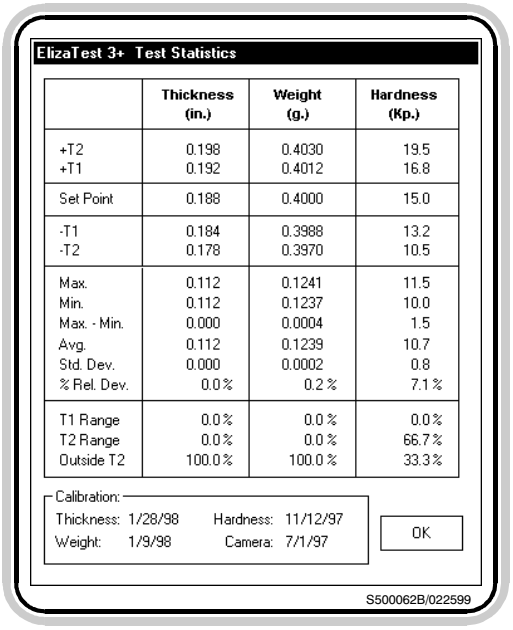

Figure 10.3- Statistics window

When a test has been paused, stopped, or completed, select the **View Statistics** button at the bottom of the test results table to display a pop-up window that lists more detailed test statistics (figure 10.3).

The Statistics window shows the actual values used for the T1 and T2 calculations, the maximum, minimum, and maximum minus minimum values of the results gathered so far, as well as the average, standard deviation, and percent relative deviation of the values. Also calculated are the percentages of results whose values fall inside the T1 range, inside the T2 range (but outside of T1), and outside the T2 range. Calibration dates for the various instruments of the Tablet Testing Module are shown here for reference. Select the **OK** button in the statistics window to close the window and return to the Tablet Test Run screen.

10.5 Printing Test Results

Choose the **Print...** button at the bottom of test results table to generate a printed report (the Unsaved Test Results report) of the test results. The Unsaved Test Results report contains the individual measurements of each tablet and the complete set of summary statistics. The

test results report can only be printed after a test has been stopped or run to completion. Printing cannot be done while the Tablet Testing Module is paused.

10.6 Break Force Graph

This graph shows the amount of force that was applied to the tablet during the last hardness test. The force is displayed in the same unit that hardness is measured in, as defined in the setup for the current test. Force is measured along the vertical axis of the graph, and time is measured along the horizontal axis. The graph displays a total of 2.5 seconds. The vertical axis of the graph is automatically scaled to provide the best resolution and easiest interpretation of the values.

NOTE:

If the current operator has logged onto the system with a security level of Administrator, a check box labeled "**Save Graph**" will appear above the Break Force graph. When this box is checked, the Break Force graph data will be saved as a text file on the computer's hard disk drive, where it may be used for later analysis. The text file contains a list (in standard text format, readable by most word processor-type programs and spreadsheets) of each point in time and the corresponding hardness value. All measured points are stored in the folder Temp\Hardness Data\All Points, and the points that are actually displayed in the graph are stored in the folder Temp\Hardness Data\Displayed Points. A timestamp is used as the filename for the data. It is recommended that this feature not be used except when it is expressly desired to save the graph data. This function can rapidly consume large amounts of disk space.

10.7 Vision System Image

The lower right portion of the Tablet Test Run screen contains a live image of the camera's view of the hardness testing station. Just above the image is a line of text used to indicate the status of the vision system. This line will read "ElizaTest 3+ vision ready" if the system is able to correctly 'see' the tablets. Other messages will appear if some type of problem is detected. This line also reports to the operator if three consecutive tablets have failed a plausibility check for one of the tests. These messages are described in an appendix of this manual.

10.8 Beginning the Single-Test Mode Tablet Testing Process

Single-test mode is available only if the optional magazine has not been installed on the Tablet Testing Module. Prepare for a single tablet test by first ensuring that the current tablet test setup is correct, and that the correct product and batch have been selected. Begin by loading the tablets to be tested through the funnel in the cover of the Tablet Testing Module into the tablet feeder. The tablet feeder should be at most one-third full. If more tablets are to be tested than will fit into the tablet feeder, the Tablet Testing Module will pause when it runs out of tablets (when no tablets have been fed for 40 seconds). Simply load in more tablets and continue testing. Pausing and resuming tests is covered in a later section. After the tablet feeder has been loaded, select the **Start** button in the Tablet Test Run screen.

10.9 Beginning the Magazine Mode Tablet Testing Process

Magazine mode is available only if the optional magazine has been installed on the Tablet Testing Module. Prepare for the magazine test run by ensuring that the correct magazine configuration has been selected in the Magazine screen. Load the sample tablets into the magazine vials, paying careful attention that the correct tablet samples are placed in the proper vials. The top cover plate of the magazine may

be rotated by hand to place the tablet loading funnel in the proper position over the vials, or the **Fill...** button in the Magazine screen can be selected to display a dialog box containing controls that can be used to move the magazine. Each vial should contain only enough tablets to ensure that the tablet feeder will not be overfilled when the vials empty into the tablet feeder. As described in the section pertaining to the Magazine screen, if more tablets need to be tested than will fit in the tablet feeder, two or more consecutive vials can be linked together in a continued chain, which is treated as one test. When the tablet feeder runs out of tablets supplied by one vial (when no tablets have been fed for 40 seconds), the vial just tested will be marked as disabled in the Magazine screen, the next vial in the continued chain will be automatically moved into position and its contents will be loaded into the tablet feeder, continuing the test without the need for operator intervention. Once the magazine vials have been loaded with the correct sample tablets, select the **Start** button in the Tablet Test Run screen.

10.10 Hardware Checks Performed Prior to Each Test

Before the start of each tablet test, including tests run as an inline production tester, a hardware check is performed to ensure that the tablet feeder door and the thickness encoder are in their proper positions.

10.10.1 Feeder Positioning Error

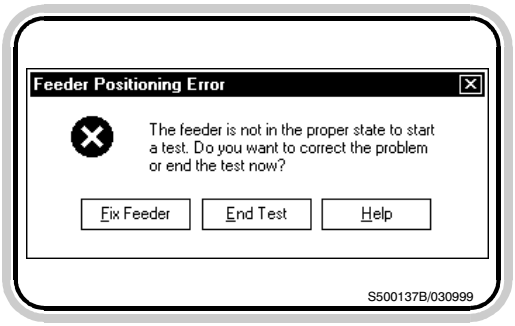

Figure 10.4- The tablet feeder has not been properly homed

If the tablet feeder has not been properly homed, a dialog box will appear alerting the operator of the problem (figure 10.4). At this point, there are two options that can be exercised. The test may be ended by selecting the **End Test** button (the opportunity will be given to save any tests that may have already been performed), or the tablet feeder can be homed now by selecting the Fix Feeder button in the dialog box. When this button is selected, the Tablet Testing Module will attempt to home the feeder angle motor and the feeder door, which will cause any tablets that may be in the tablet feeder to be dumped into the excess tablet bin at the rear of the machine. If the attempt to home the feeder succeeded, the Tablet Test Run screen will appear, and the test may now be started or resumed. If the tablet feeder could not be homed, a message box will appear stating this fact. Choose the **OK** button to close the message box. If the door cannot be homed after three attempts, the test cycle will automatically end.

When the feeder door cannot be properly homed, this usually indicates that the tablet feeder must be disassembled and cleaned.

10.10.2 Encoder Position Error

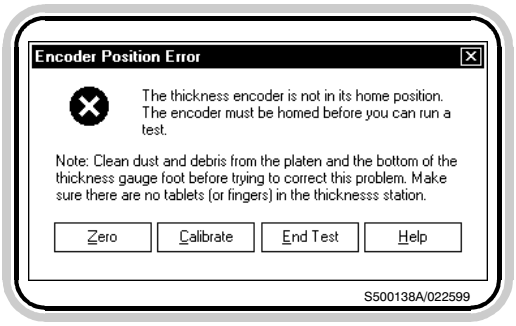

Figure 10.5- The thickness encoder is not properly homed

If the thickness encoder is not properly homed, a dialog box will appear alerting the operator of the problem (figure 10.5). At this point, there are three options that can be exercised. The test may be ended by selecting the **End Test** button (the opportunity will be given to save any test that may have already been performed). An attempt to zero the thickness encoder may be tried by selecting the **Zero** button in the dialog box. When this button is selected, the Tablet Testing Module will attempt to zero the encoder by lowering the measuring foot down to the floor of the testing station to determine the zero point. Before choosing this op-

tion, clean any dust or debris that may be on the bottom of the thickness encoder foot or the floor of the testing chamber. If the attempt to zero the encoder succeeded, the Tablet Test Run screen will appear, and the test may now be started or resumed. If the encoder could not be zeroed properly, a message box will appear stating this fact. Choose the **OK** button to close the message box. The third option is to perform a complete calibration of the thickness encoder by selecting the Calibrate button. Calibration of the thickness encoder is described in the section "Thickness Calibration" of this manual. If the calibration was successful, the Tablet Test Run screen will appear, and the test may now be started or resumed.

10.11 The Tablet Testing Sequence

Once the **Start** button in the Tablet Test Run screen has been selected, the tablet test cycle will begin. The Start button will now change to read **Stop**. If an optional magazine is being used, the magazine will rotate the first enabled vial into position, then the door on the bottom of the magazine will open, dropping tablets into the tablet feeder. The door will then close. The tablet feeder will pivot up to the desired angle, and the inner sleeve of the tablet feeder will rotate, moving the tablets up the spiral groove in the feeder sleeve. The first tablet will fall out of the feeder into the receiving station of the Tablet Testing Module. The Tablet Trigger sensor detects the tablet and signals the computer that a tablet is now in the machine.

The first tablet will be pushed forward by the tablet indexer to the thickness testing station. If thickness tests are to be performed, the thickness encoder will move down until it contacts the tablet's surface, where the thickness of the tablet will be measured and entered into the test

results table. The tablet feeder will then insert a second tablet into the now-empty receiving station.

The tablet indexer will push the first tablet to the weight testing station, and the second tablet will be placed in the thickness testing station. If weight tests are to be performed, the first tablet is now weighed, the second tablet is measured for thickness, and the measurements are entered into the test results table. The tablet feeder will then insert a third tablet into the now-empty receiving station.

The first tablet will now be pushed onto the hardness testing platform. If hardness tests are to be performed, the camera will send a picture of the tablet to the computer, where it will be analyzed and compared to its stored reference alignment image. If the orientation of the tablet does not agree with the alignment image, the tablet will be rotated until it does.

Should any problems be encountered during the alignment, a message will be displayed above the camera image describing the problem. These messages are described in the appendix "Vision System Errors".

After the tablet has been oriented according to its alignment image, the ram and anvil will move rapidly from their retracted home positions towards the center of the hardness platform. The anvil will stop just short of the tablet. The ram continues to move at its slower working speed for 5 seconds, during which time the tablet will be fractured. The ram and anvil will then retract to the their home positions. The maximum amount of force applied during the 5 second period is then recorded as the tablet's hardness.

The test results of the first tablet are now checked against the plausibility percentages defined in the tablet test setup. If all the test results fall within the plausibility limits, the tablet's results will remain in the table, and the testing process will continue. Should one or more of the results not fall within the plausibility, the test results for that tablet will be discarded from the test results table, and will not be included in any of the statistical calculations.

When testing tablets in the single-test mode, the testing process will continue in this manner until the required number of tablets having plausible results are tested, or until the operator manually stops the test or refuses to refill an empty tablet feeder. If a magazine is being used, once one tablet test is finished, the next test will automatically be started after the Tablet Testing Module and tablet feeder are first cleared of any remaining tablets. The magazine will rotate the next enabled vial into position and load its contents into the tablet feeder. The next test will automatically begin. The magazine test will stop after all enabled vials have been tested, or if the operator manually stops all pending tests. Refer to the section "Magazine Operations Available During a Tablet Test Run" of this manual for details on changing magazine configurations while testing is in progress.

10.12 Pausing, Resuming, and Stopping the Test

Once a test has been started, it may be paused by the operator at any time by selecting the **Pause** button in the upper right corner of the Tablet Test Run screen. When the test is paused, the Tablet Testing Module will finish performing whatever operation it may doing (a hardness test will not be interrupted, an indexing move will complete, etc.).

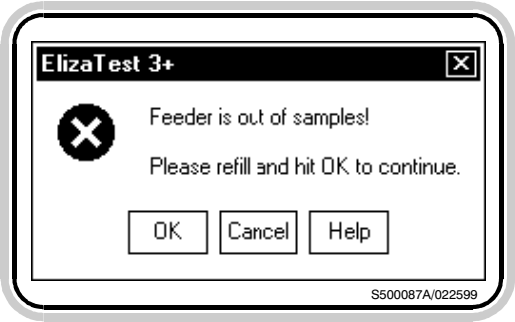

Figure 10.6- The tablet feeder has run out of tablets

While a test is paused, the label in the Pause button will change to read '**Resume**'. When a tablet test is paused, it is possible to change the current magazine configuration by selecting the Magazine button in the upper right of the screen, as described in another section of this manual. Select the Resume button to continue testing from the point it was paused (the Resume button now changes back to 'Pause'). When running in single-test mode, the Tablet Testing Module will also 'pause' if the tablet feeder has run out of tablets (no tablets have been fed for 40 seconds). Should this occur, a message box indicating this condition will appear (figure 10.6). Load more tablets into the tablet feeder and select the **OK** button in the message box to continue testing.

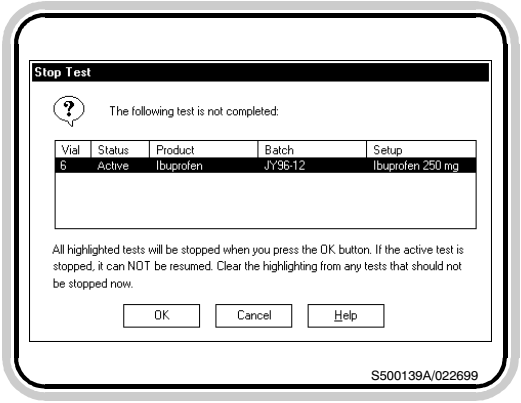

Figure 10.7- Stop Test dialog box

A tablet test can be stopped by selecting the **Stop** button. Once again, the Tablet Testing Module will finish up whatever operation it may be doing before it actually stops. The Stop Test dialog box will appear (figure 10.7), listing which tests have not yet been completed, their status (active or pending), and the product, batch, and setup associated with the test. When running in single-test mode, only one test will be displayed, but several could appear when a magazine is being used. If a magazine is being used, the first vial of each test will also be shown. The Stop Test dialog box allows the operator to stop some, all, or none of the tests.

Initially, all tests shown in the Stop Test dialog box are highlighted in blue, indicating that they will all be stopped if the operator selects the **OK** button. If the active (current) tablet test is stopped, it cannot be restarted. Pending tests, which are tests using the magazine that are scheduled but have not yet been run, may also be stopped. A pending test that is stopped will not be run, but it is possible by using the Magazine screen to re-enable these stopped tests.

This is described in the section "Magazine Operations Available During a Tablet Test Run". When a magazine is being used, please be aware that stopping a test that is part of a continued chain will stop **ALL** vials in that chain. Continued chains are treated as one test.

If it is desired to stop only some of the tests, use the pointing device to select which tests, if any, should **NOT** be stopped. Multiple tests may be chosen by holding the **Shift** or **Control** keys on the keyboard while selecting them. A test that will **NOT** be stopped will **NOT** be highlighted in blue. When the list of tests to stop is correct, select the **OK** button in the Stop Test dialog box. Select the **Cancel** button to continue testing without stopping any tests.

If the active test is stopped, the tablet feeder and Tablet Testing Module will be cleared of any remaining tablets. In the single-test mode of operation, the test cycle is now finished. When using a magazine, the next enabled test, if any, will be started. If there are no remaining tests, the test cycle is finished.

10.13 Magazine Operations Available During a Tablet Test Run

When using a magazine, some elements of the magazine configuration can be changed on-the-fly while a tablet test cycle is in progress. The vial list can be edited, vials can be enabled or disabled, intermediate magazine configurations can be saved, etc. The Magazine Fill Controls (described in the section "Magazine Screen") are also available by selecting the **Fill...** button. The Magazine Fill Controls allow for easy refilling and emptying of magazine vials while the test cycle is paused. To use these features, select the **Magazine** button in the upper right of the Tablet Test Run screen. If a test is currently in progress, first pause the test. The Magazine button is not available while a tablet

test is currently being performed, or if the magazine is not installed on the Tablet Testing Module.

During testing, the Magazine screen has a different look (figure 10.8). Because certain operations are not possible during a magazine run, the buttons that initiate those actions are not displayed on the screen while testing is in progress. Also, it is not possible to perform any product or batch maintenance, nor is it possible to edit any tablet test setups.

When the Magazine screen is displayed during a paused test cycle, the vial list shows the current state of the magazine as it presently ex-

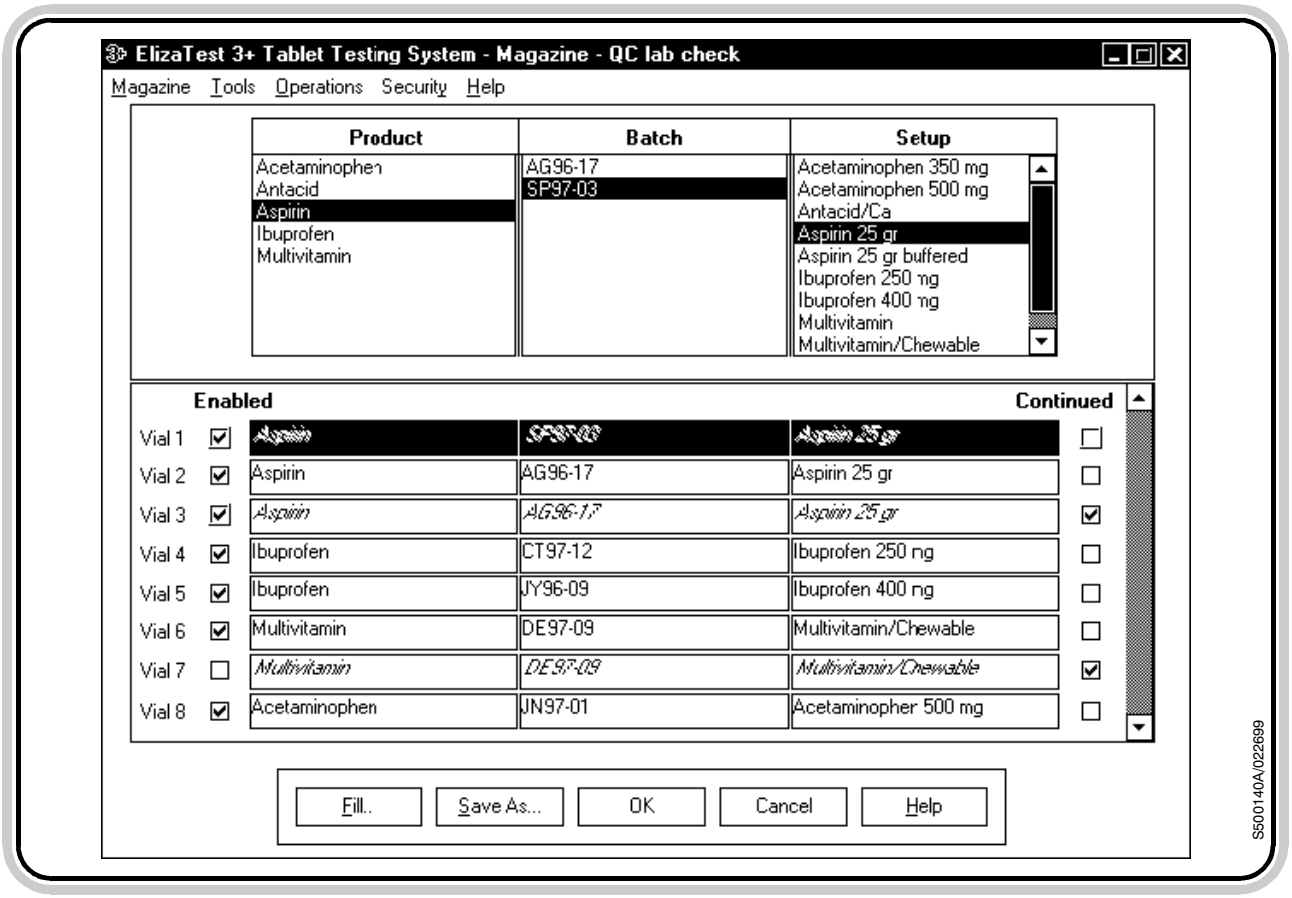

Figure 10.8- The Magazine screen has a different look during a test

ists. Tests that have run to completion, or have been stopped, are marked as disabled, and have a gray background. Any pending tests are marked as enabled with a white background. The current test will have its vial (or vials, if the test is a continued chain) shown in gray italicized type as an indication that no changes to the current test are possible.

While the tablet test is paused, any of the vials in the magazine (except for vials that make up the current test) can have different existing products, batches, or setups assigned to them, as previously described in the section "Magazine Screen". Also, vials in the list can be enabled or disabled, as desired. Vials that have been disabled because they were stopped in the Tablet Test Run screen can also be enabled. The current magazine configuration may be saved in its present form by selecting the **Save As...** button. Saving magazine configurations is described in another section of this manual. Note that saving the magazine configuration under a new name during a test run will not change the name of the magazine that is shown in the Tablet Test Run screen. The magazine name that was used to begin the test cycle will continue to be used throughout the test.

Select the **OK** button in the Magazine screen to return to the Tablet Test Run screen, preserving any changes that may have been made to the magazine configuration. When testing is resumed, the paused test will continue from the point is was interrupted, and the remainder of the magazine will proceed using the magazine configuration that was last present in the Magazine screen when the OK button was selected. The magazine run will resume using any new product, batch, or setup information that had been changed, any vials that were disabled will not be tested, and any vials that were enabled will be tested in order, even if they precede the

current vial. The entire vial list is examined, and all enabled vials will be run (unless they are later stopped in the Tablet Test Run screen). Select the **Cancel** button in the Magazine screen to discard any changes that were made to the magazine configuration. The tablet test will resume using the magazine configuration that was originally displayed when the magazine screen was first entered.

NOTE:

If vials that have been previously tested are re-enabled, don't forget to load the correct sample tablets into them before resuming the test.

10.14 Saving the Test Results

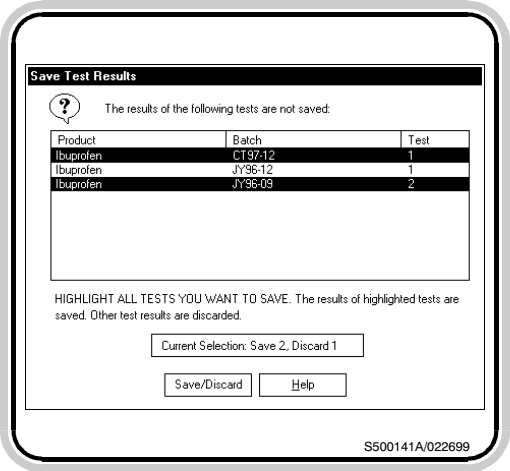

Figure 10.9- Save Test Results dialog box

Once the single-test mode tablet test or the magazine run has finished, either because it ran to completion or was stopped by the operator, the results of the tablet test or tests may be saved to the computer's hard disk. Select the **Exit/Save** button in the Tablet Test Run screen to display the Save Test Results dialog box (figure 10.9).

The Save Test Results dialog box displays a list of all the tests that have been run for this test cycle (single-test mode operation will show only the one test). Each test is listed with its test number and the product, batch, and setup associated with the test. The Save Test Results dialog box allows for choosing which tests to save the results for, and which tests (if any) to discard the results of. There is no obligation to save any results.

When the Save Test Results dialog box is initially shown, all tests will be highlighted in blue (all tests will be saved). To choose which tests to discard the results of, select those tests with the pointing device. Tests that will have their results saved will be highlighted in blue; tests that are **NOT** highlighted will have their results **dis-**

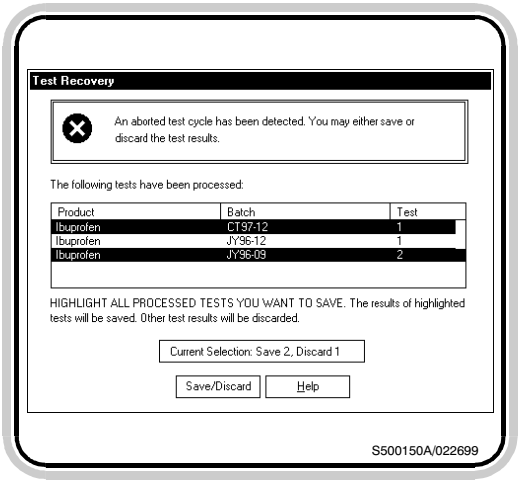

Figure 10.10- Test Recovery dialog box (single-test mode)

carded. The dialog box will change to indicate how many tests are selected for saving and how many are selected for discarding. Select each test as needed to toggle the save/discard state. Multiple tests can be chosen by holding the **Shift** or **Control** keys on the keyboard as they are selected. When the tests are marked as desired, select the **Save/Discard** button in the dialog box to save the highlighted tests and discard the non-highlighted ones. At this point a message box will appear showing how many tests have been saved and how many have been discarded. Select the **OK** button in the message box to continue.

When a test is discarded, no sample data generated by the test will be saved to database. A record of discarded tests is maintained in the database, but there will be no measurements recorded for any of the tablets in the test. Discarded tests can be identified in the Test Results reports by the phrase "Test canceled by operator." appended to the Test Notes item in the report.

An important feature of the system is its ability to recover test results from an interrupted test cycle. As a single-test mode tablet test or a magazine test cycle progresses, the results from each tablet in the sample are immediately written to a temporary disk file. If a power failure or other interruption occurs that causes the test or magazine run to abort, these partial results will not be lost. During the start-up of the ElizaTest 3+ program, the system checks to see if an incomplete test cycle is found. Should it find one, the Test Recovery dialog box will appear after an operator has logged-on, which will indicate the product, batch, and test number of each test that was processed prior to the interruption (figure 10.10). If a magazine was used to run

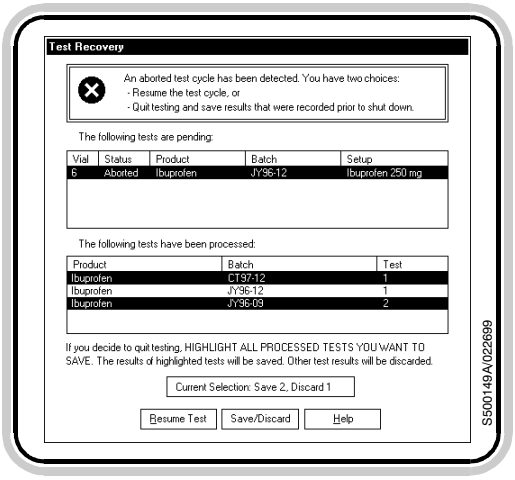

Figure 10.11- Test Recovery dialog box (magazine test mode)

the test cycle and some tests are still pending (have not yet been run), these will also be listed (figure 10.11).

The results of the processed tests may be saved or discarded as described above. Highlight the tests that are to be saved, then choose the **Save/Discard** button in the dialog box to record the selected results as finished tests. Clear the highlight from all the tests in the list if none of the results are to be saved. If the aborted test cycle occurred while a magazine was being used, the option will also be given to allow the magazine run to be resumed from the point it was aborted (the test that was in progress when the interruption occurred cannot be restarted, however). Select the **Resume Test** button to display the Tablet Test Run screen, where the magazine test cycle may be continued with the configuration that was in use when the test aborted. When the test cycle is finished, the results of the entire test cycle may then be saved or discarded using the usual process, as previously described.

11 System Security

Access to the various operations and functions of the ElizaTest 3+ Tablet Testing System is governed by the built-in security features. Each authorized user of the system is assigned a security access level, and only users with the proper access level are permitted to perform certain functions.

11.1 Overview

The system allows only one user to be logged in at a time, and this user is tracked when setups and magazines are created or changed, when tests are run, and reports are printed.

There are 4 levels of security provided by the Tablet Testing System; **operator access**, **extended operator access**, **supervisor access**, and **administrator access**. Users with operator access are permitted to open setups and magazine configurations, run tests, and print reports. Extended operators are also given access to a very limited set of batch operation functions. Supervisors have access to all the functions operators may use, and are also permitted to create, delete, edit, and save setups, products, batches, and magazines, perform calibrations, and may use the controls in the Diagnostics screen. Administrators have access to all the features of the system that supervisors have, plus the ability to maintain the list of authorized users (security administration) and perform system maintenance functions regarding the database. The Diagnostics screen and database maintenance are covered in other sections of this manual.

If the current user does not have the appropriate security access level to use a function, the button or menu option that provides access to that function will appear grayed or dimmed, and cannot be selected.

When the system is initially delivered, there are 4 default user names: '**Operator**', '**OperatorEx**', '**Supervisor**', and '**Administrator**'. The default password for each is '**eh**'. The names and passwords are not case-sensitive; upper case and lower case letters are treated the same. It is suggested that a person who is to have administrator access to the system change these default passwords using the Configure Users option (described later) shortly after the system is initially delivered.

11.2 Log On/Log Off

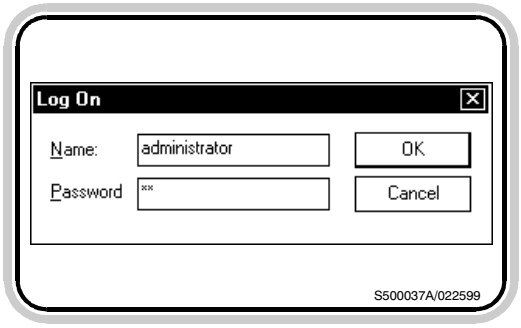

Figure 11.1- Log On dialog box

Figure 11.2- The log-on was not accepted

Before any features of the tablet testing system can be used, the user must first log on to the system. Choose the **Security/Log On...** menu option from either the Tablet Test Setup screen or the Magazine screen to display the Log On dialog box (figure 11.1). The name of the last logged-on user will appear in the Name field. To log on, type the user name into the Name field, then type the password into the Password field. When the password is being entered, the characters are not displayed; instead, asterisks appear. This prevents others from seeing the password as it is typed. When the name and password have been entered, choose the **OK** button in the Log On dialog box. If the information entered is correct, the system will log the user on, and the features available for that user's access level will become available. If the information was not correct, the user will not be logged on, and a message box will appear stating the log-on was not accepted (figure 11.2). Choose the OK button, then try logging on again. If the log on attempt repeatedly fails, contact a person with administrator privileges to verify the name and password do exist in the user list.

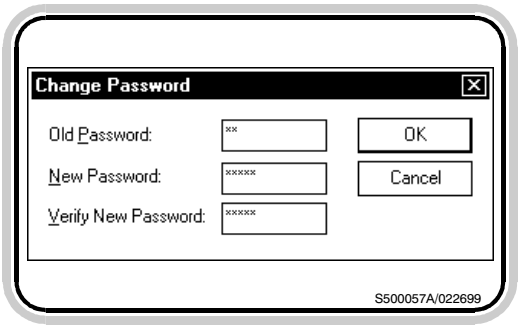

Figure 11.3- Change Password dialog box

When a user performs a successful log-on, the previous user (if any) is logged off automatically. To specifically log off the system, choose the **Security/Log Off** menu option. The current user will then be logged off, and no system features, except for the **Security/Log On...** menu item and help, will be available.

11.3 Changing Passwords

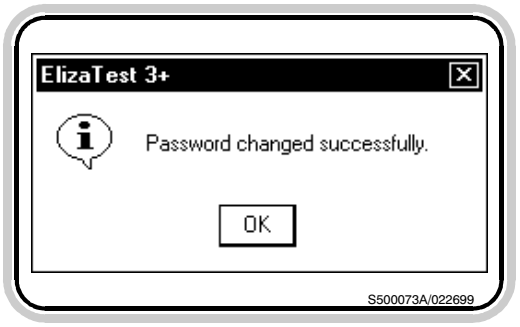

Figure 11.4- The password was changed

Each user may change their own password while they are logged on to the system. To change the password, choose the **Security/Change Password...** menu option. The Change Password dialog box will appear (figure 11.3). To change a user's password, enter the current password in the Old Password field, then type the new password in both the Password and Verify Password fields. The new password must be entered twice to prevent a typing error from becoming the new password. Note that asterisks are displayed instead of the characters actually typed. Passwords may be up to 16 characters in length. When all three password fields have been entered, choose the **OK** button in the Change Password dialog box. If all three fields have been entered correctly, a message box will appear stating that the password has been changed (figure 11.4). Choose the **OK** button in the message box to return to the Tablet Test Setup screen. The new password will take effect at the next log on of the user.

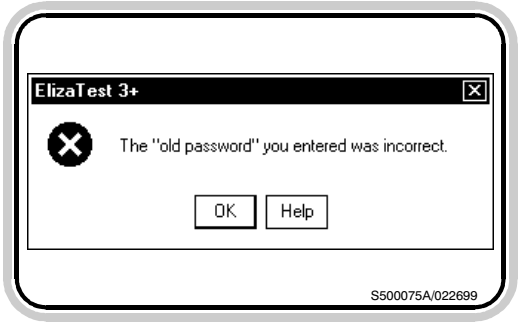

Figure 11.5 The old password was incorrect

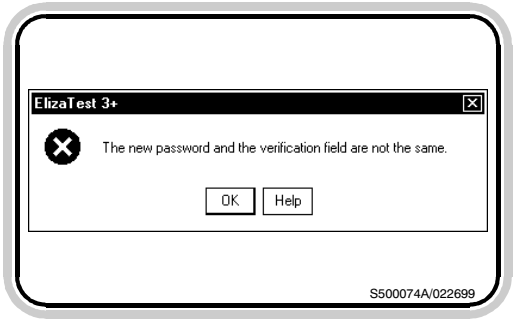

Figure 11.6- The New Password and Verify New Password fields did not match

If the old password was incorrectly entered, a message box stating this fact will appear, and the password will not be changed (figure 11.5). Choose the **OK** button in the message box, and reenter the old password. If the Password and Verify Password fields did not match, another message box will appear, and again the pass-

word will not be changed (figure 11.6). Choose the **OK** button in the message box, then reenter both password fields.

11.4 Configuring Users

Administrators have the capability to assign user names and access levels to persons who will be using the ElizaTest 3+ Tablet Testing System. Select the **Security/Configure Users...** menu option to display the Configure Users dialog box (figure 11.7). Select the **Exit** button in the Configure Users dialog box to close the dialog box and return to the Tablet Test Set-up screen or the Magazine screen, as appropriate.

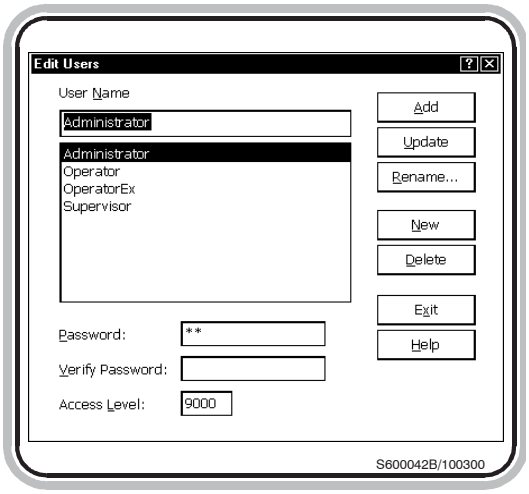

Figure 11.7- Configure Users dialog box

11.4.1 Adding New Users

To add a new user to the system, select the **New** button at the right of the dialog box. This will clear all the existing data shown. Type the name of the new user into the User Name field. This is the name that will be requested during log on. A user name may be up to 14 characters in length, and can contain any keyboard character except **'** (single quote), **"** (double quote), **[** or **]** (left/right square bracket), and **`** (grave accent). Also, leading and trailing spaces are not permitted, but spaces in the middle of names are perfectly acceptable. User names are not case-sensitive; upper case and lower case characters are treated the same. Assign the user a password by entering it into both the Password and Verify Password fields. Passwords may be up to 16 characters in length, and cannot contain any spaces. Thirdly, assign a security access level by entering a number into the Access Level field. The access levels range from 0 to 9999, and are assigned the following meaning:

- Levels 1000 to 1499 provide Operator access privileges.
- Levels 1500 to 1999 provide Extended Operator access privileges.
- Levels 2000 to 8999 provide Supervisor access privileges.
- Levels 9000 to 9999 provide Administrator access privileges.

Levels less than 1000 provide no access, but may be assigned if desired. This could be used, for instance, to temporarily prohibit access by a certain operator without deleting their account. More than one user may have the same access level. Select the **Add** button in the Edit Users dialog box to add the user to the list.

Figure 11.8- User names must be unique

User names must be unique. If a name is added that already exists, a message box will appear stating this fact (figure 11.8). Choose the **OK** button in the message box, and assign a different name to the user.

NOTE:

If the ElizaTest 3+ Tablet Testing System is integrated with an Elizabeth-Hata tableting press, it will be necessary to make the same changes to the user list maintained by the TabSys Tableting Press Interface. There is currently no automatic method of keeping the two user lists synchronized. Each tablet press user must also be a tablet tester user.

11.4.2 Updating User Information

The passwords and access levels of existing users can be changed at any time. To change an existing user's information, select the user name from the list in the Configure Users dialog box, or type the name directly into the User Name field. Once a name has been selected, type a new access level and/or password into the appropriate fields. When the new data is

correct, select the **Update** button in the dialog box. The changes made will take effect the next time this user is logged on.

As stated previously, the system is delivered with 4 default users, each with the password '**eh**'. At the earliest convenience, a responsible individual should change the default passwords of these reserved names to prevent unauthorized use. Please note that only the passwords of reserved names may be changed; the access levels and names themselves cannot be updated.

11.4.3 Renaming Users

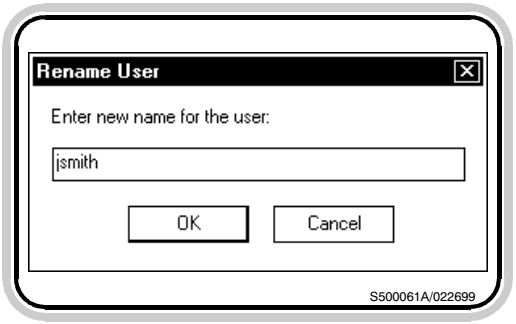

Figure 11.9- Rename User dialog box

An existing user name can be changed by using the Rename function. To rename a user, select the user name from the list, or type the desired name into the User Name field, then select the **Rename...** button. The Rename User dialog box will appear (figure 11.9). Type the new name for user into the dialog box, then select the **OK** button to return to the Configure Users dialog box. Note that only the user name is changed; the password and security access level remain as they were. The name change will take effect the next time the user logs on.

11.4.4 Deleting Users

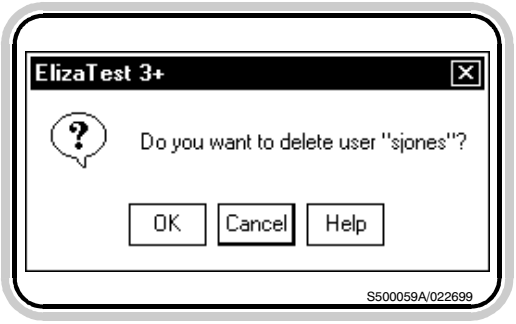

Figure 11.10- Confirmation is required to delete a user

An existing user can be deleted from the user list. To delete a user, select the user name from the list, or type the name directly into the User Name field, then select the **Delete** button. A message box will appear, asking to confirm the deletion (figure 11.10). Choose the **OK** button in the message box to delete this user name from the list of authorized users and return to the Configure Users dialog box. Select the **Cancel** button in the message box to return to the Configure Users dialog box without deleting the user.

12 Tester Calibration

Tester calibration is accomplished by following the on-screen step-by-step instructions that appear in the Tester Calibration screen. Each instrument (thickness encoder, balance, hardness load cell, and camera) is calibrated individually. To access the Tester Calibration screen, choose the **Tools/Calibrate...** menu option. The Tester Calibration screen will then appear (figure 12.1).

The Tester Calibration screen is divided into two parts. The left half of the screen contains a group of buttons that, when selected, will start the calibration procedure for a particular instrument. The right half of the screen shows a live

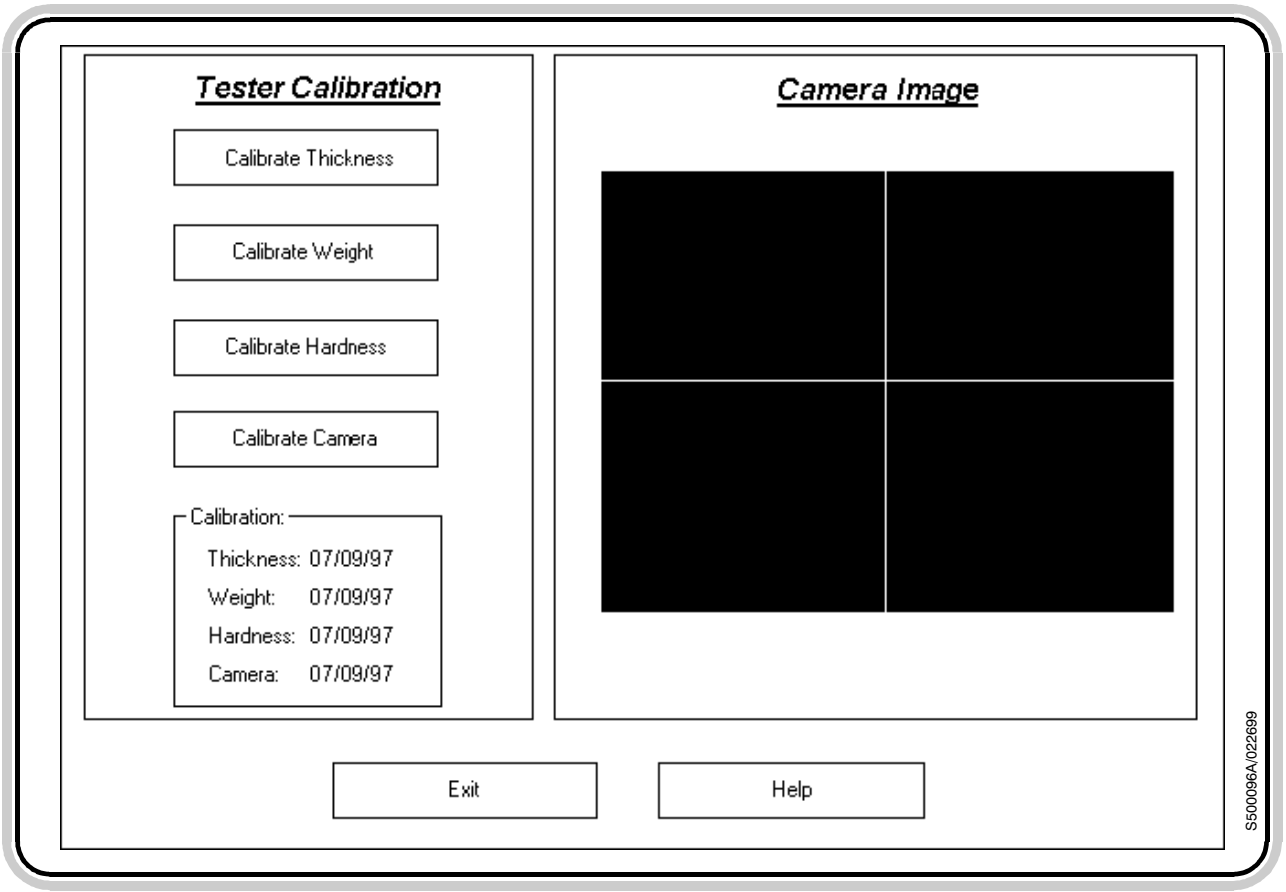

Figure 12.1- Tester Calibration screen

image from the camera. This area is used when the camera is being calibrated. Select the **Exit** button at the bottom of the screen to return to the Tablet Test Setup or Magazine screen, as appropriate.

12.1 Thickness Calibration

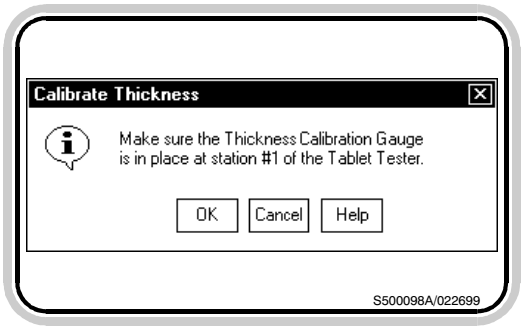

Figure 12.2- Place the thickness calibration gauge in the first station

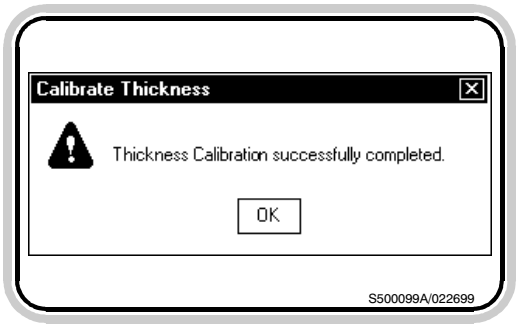

Figure 12.3- Thickness calibration was successful

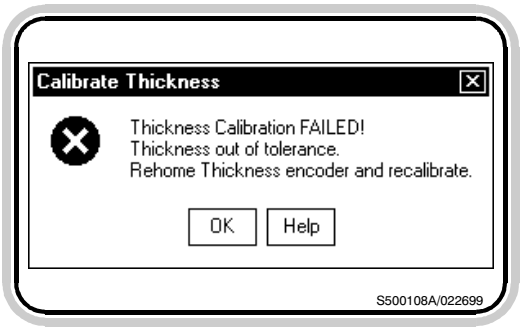

Figure 12.4- Thickness calibration failed

To calibrate the thickness encoder, select the **Calibrate Thickness** button in the Tester Calibration screen.

When the Calibrate Thickness button is selected, the thickness encoder will move down to contact the bottom of the testing station. This will determine the zero point. The thickness encoder will then move back up. A message box will appear on the screen, instructing the operator to place the thickness calibration gauge in the first station (figure 12.2).

Place the supplied thickness calibration gauge in the first station of the Tablet Testing Module (at the bottom of the tablet chute), then select the **OK** button in the message box. The tablet indexer will move the calibration gauge to the thickness testing station. The thickness encoder will then move down to measure the thickness of the gauge, then will move back up. If the measured thickness is correct, the monitor will display a message box stating that the calibration was successful (figure 12.3). Select the **OK** button in the message box, and the tablet indexer will push the calibration gauge out of the Tablet Testing Module into the waste bin on the right of the machine. The current date will be recorded as the Calibration Date for the thickness encoder.

Should the measured thickness not equal the expected actual thickness of the calibration gauge, a message box will appear stating that the thickness calibration failed (figure 12.4). The supplied thickness encoder measures

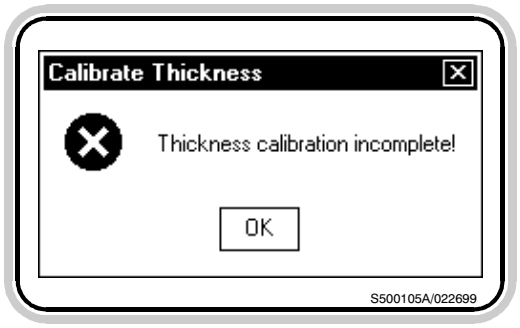

Figure 12.5- Thickness calibration was not completed

0.375 inches. Select the **OK** button in the message box, then another message box will appear stating the calibration was not completed successfully (figure 12.5). Select the **OK** button in the message box, and the tablet indexer will push the calibration gauge out into the waste bin on the right of the machine. Refer to the appendix "Resolving Calibration Errors" of this manual for information on why an unsuccessful calibration may have occurred, and possible corrective actions to take. An incomplete thickness calibration will not change the Calibration Date for the thickness encoder.

12.2 Weight Calibration

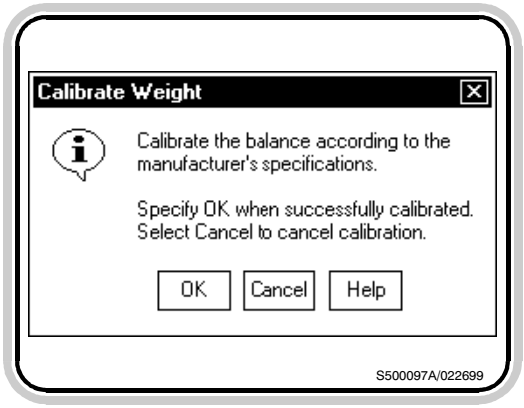

Figure 12.6- Calibrate the balance according to the manufacturer's specifications

To calibrate the balance, select the **Calibrate Weight** button in the Tester Calibration screen.

When the Calibrate Weight button is selected, a dialog box instructing to calibrate the balance according to the manufacturer's specifications will appear (figure 12.6). The full calibration instructions are contained in the Operating Instructions for the Mettler Toledo balance, which is included with the system documentation package, and are summarized below.

To calibrate the balance, press and hold the **CAL/MENU** button on the front of the balance until the balance displays **CAL**, then release the button. The balance display will then flash **50.0000**. Open the cover of the Tablet Testing Module, and place the 50 gram calibration mass that was supplied with the system on the center of the balance weighing pan. The balance will then perform a self-calibration. While the balance is calibrating, the balance display will show **- - - - - -**. When the balance has finished, the display will then flash **0.0000**. When this happens, remove the 50 gram mass, and select the **OK** button in the Calibrate Weight

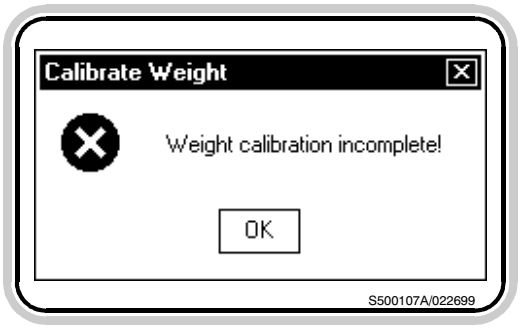

Figure 12.7- The balance calibration was not completed

dialog box. Calibration of the balance is now complete, and the current date will be recorded as the Calibration Date for the balance. Refer to the Instruction Manual for the balance for additional information.

Select the **Cancel** button in the Calibrate Weight dialog box to cancel the balance calibration. If this is done, a message box will appear stating that the balance calibration was not successfully completed (figure 12.7). A canceled weight calibration will not change the Weight Calibration Date.

12.3 Hardness Calibration

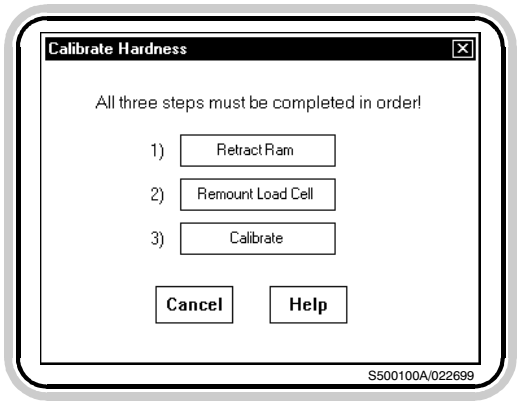

Figure 12.8- These steps need to be performed during hardness calibration

To calibrate the hardness load cell, select the **Calibrate Hardness** button in the Tester Calibration screen. A dialog box will then appear listing the steps that need to be performed during the calibration (figure 12.8).

Prior to calibrating the hardness, the camera and ring light assembly must be lifted up out of the way. Unscrew and remove the small thumbscrew on the cover plate and swing the cover plate upright. (***Caution- Do this gently as not to disturb the camera alignment.***) The load cell is now exposed. When this is completed, select the **Retract Ram** button in the Calibrate Hardness dialog box. When the Retract Ram button is selected, the ram will move back approximately one-half inch.

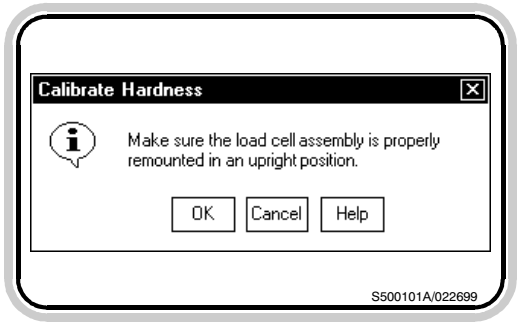

Figure 12.9- Hardness calibration, step 1

When it stops, select the **Remount Load Cell** button. A message box will appear stating to make certain the load cell assembly is mounted in an upright position (figure 12.9). To remount the load cell assembly for calibration, use a 3/8" open-end wrench and loosen the nut that secures the load cell to its mounting plate (figure 12.10). Remove the load cell cable from the clips, carefully pull the load cell off its mounting plate, and snug up the nut against the rear of the

load cell. Place the load cell vertical by inserting the pin on the rear of the load cell down into the hole on the top of the mounting plate as far as it will go. Select the **OK** button in the message box when this is complete. Selecting the **Cancel** button will stop the calibration procedure.

Now select the **Calibrate** button in the Calibrate Hardness dialog box. A message box will appear stating to make certain the 5 kg calibration mass, supplied, is placed on the upright load cell assembly. To do this, carefully position the calibration mass on the face of the ram. When the calibration mass is properly positioned, select the **OK** button in the message box. Selecting the **Cancel** button will stop the calibration procedure.

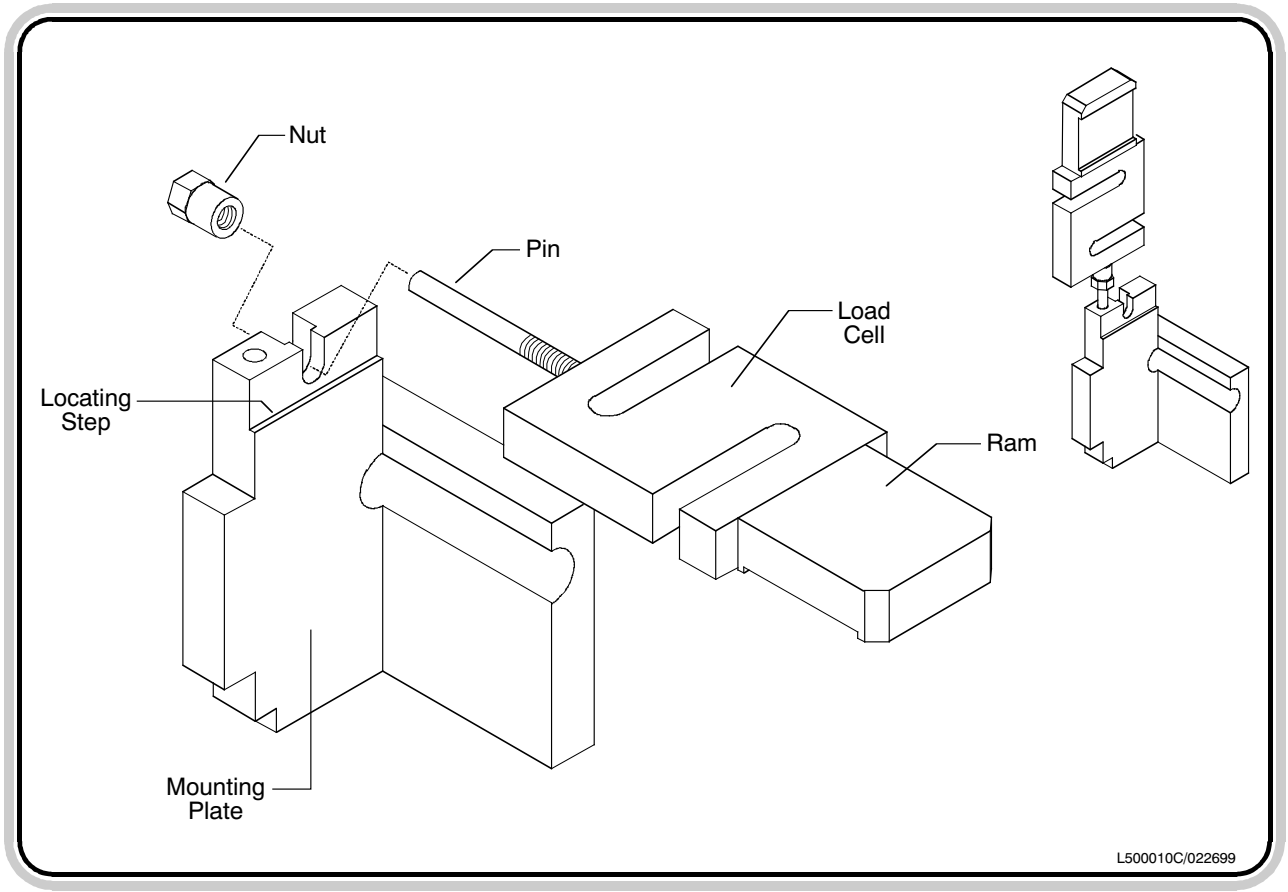

Figure 12.10- Remounting the load cell for calibration

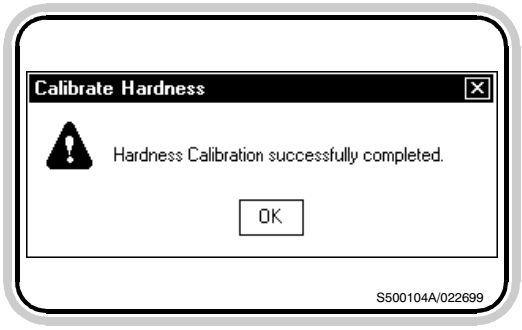

Figure 12.11- Hardness calibration was successful

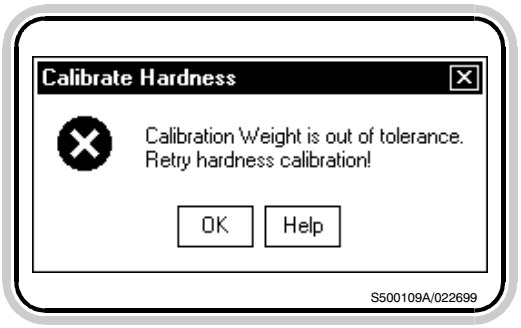

Figure 12.12- The calibration mass was measured incorrectly

Figure 12.13- The hardness calibration was not completed

When the OK button is selected, the computer will read the current value of the load cell as 5 kg, and if this value is within a preset tolerance, the calibration is successful, and the value will be used to compute future tablet hardness readings. A message box will also appear stating that the calibration was successful (figure 12.11). Select the **OK** button in the message box to close the box. The current date will be recorded as the Calibration Date for the hardness load cell.

If the value read for the 5 kg calibration mass was not within the preset tolerance, a message box will appear stating that fact (figure 12.12). Select the **OK** button to close the message box. Another message box will then appear stating that the hardness calibration was not completed successfully (figure 12.13). Refer to the appendix "Resolving Calibration Errors" of this manual for information on why an unsuccessful calibration may have occurred, and possible corrective actions to take. An incomplete hardness calibration will not change the Calibration Date for the hardness load cell.

After calibration has been performed, it is then necessary to return the load cell assembly to its horizontal position. A message box appears prior to exiting the hardness calibration procedure stating to replace the load cell assembly (figure 12.14). Remove the 5 kg calibration mass, and pull the load cell assembly out of the hole in the mounting plate. Loosen the nut several turns, and place the load cell assembly back on the mounting plate, firmly resting the load cell on the locating step. Tighten the nut up against the rear of the mounting plate, making certain that the load cell has not twisted and is still square and firmly placed on the locating step. Snap the load cell cable back into the clips. After this has been done, select the **OK** button in the message box. The ram will then

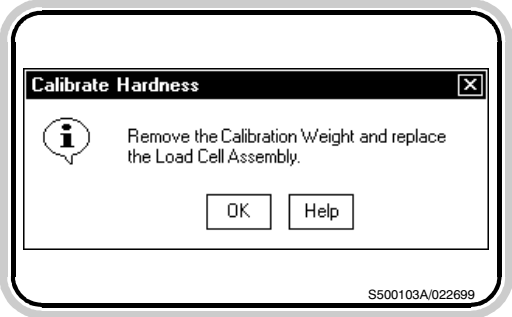

Figure 12.14- Replace the load cell assembly after calibration

move to its home position. Double-check that the ram is parallel to the bottom of the hardness testing station, and that the ram is not dragging on the bottom. Lower the camera and ring light assembly carefully, then tighten the small thumbscrew through the cover plate.

12.4 Camera Calibration

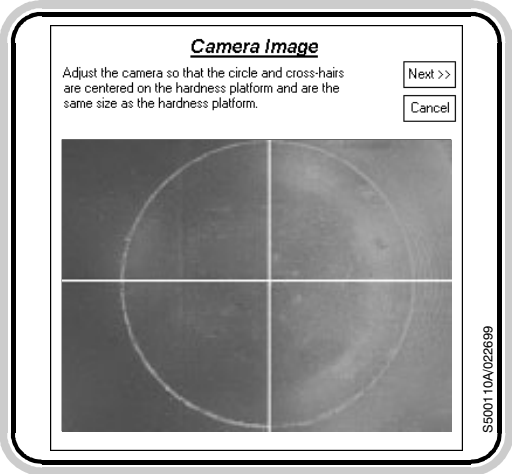

Figure 12.15- Camera calibration, step 1

To calibrate the camera and vision system, select the **Calibrate Camera** button in the Tester Calibration screen. The upper right half of the screen will show the first instruction for calibrating the camera (figure 12.15). Throughout the camera calibration procedure, the light intensity will be controlled automatically by the computer.

WARNING:

The camera has been properly aligned prior to shipment. Improper adjustment of the camera can cause poor or erratic operation of the system. Do not attempt to adjust the camera's alignment unless the camera alignment has been disturbed. The focus and aperture settings have also been set prior to shipment. These settings should also not be adjusted, as they will affect any tablet test setup definitions that have been saved, requiring changes to the Light Intensity values.

With the Tablet Testing Module cover closed, examine the image on the right half of the screen. For proper operation, the round hardness platform must fill the image on the screen, top to bottom. The spacing at the sides is less critical. If the disk formed by the hardness

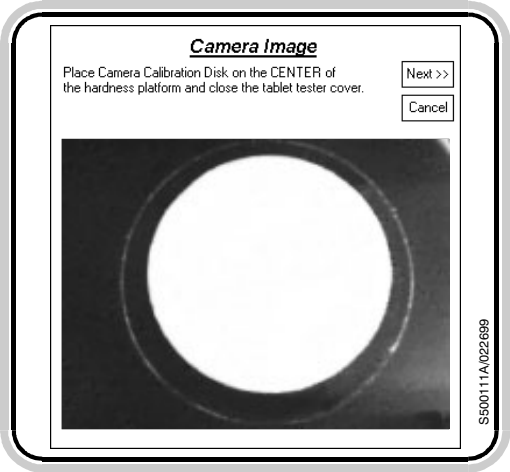

Figure 12.16- Camera calibration, step 2

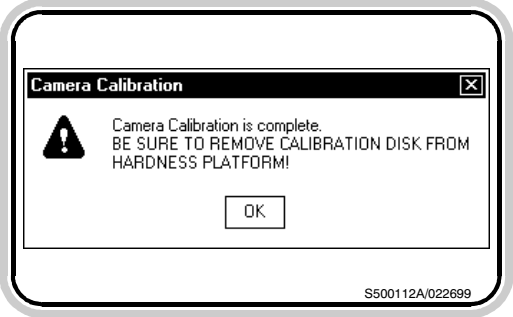

Figure 12.17- The camera calibration was successful

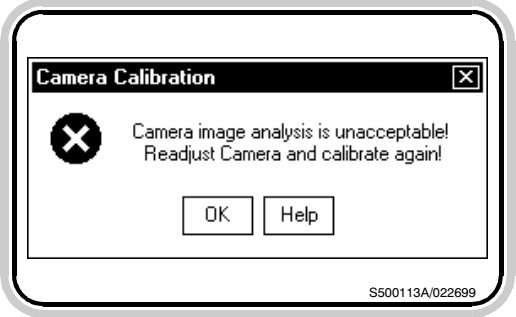

Figure 12.18- The camera image was not acceptable

platform does not appear to touch the top and bottom of the camera image frame, adjust the height of the camera by loosening the allen head screw on the rear of the camera's vertical support. Move the camera up or down as needed until the hardness platform disk is touching the top and bottom of the camera image frame. Then tighten the allen screw. **DO NOT OVER-TIGHTEN**. Make sure that the camera is parallel to its vertical support after tightening, so it is truly vertical.

When the camera is properly aligned, or if it did not need adjusting, select the **Next >>** button in the upper right corner of the screen to proceed to the second step. The **Cancel** button may be selected to return to the main Tester Calibration screen.

The second step in the camera calibration is verifying the pixels per inch distance calculation. The system counts the pixels (the individual dots that comprise an image), and uses the pixels per inch value to measure distances. The second step is shown in figure 12.16. To verify the pixels per inch calculation, lift the cover of the Tablet Testing Module, and place the supplied camera calibration disk on the center of the hardness platform. Close the cover, then select the **Next >>** button in the upper right corner of the screen. The computer will analyze the image of the calibration disk and compute a new pixel per inch value. If the new value is within a preset tolerance, the calibration is successful, and a message box will appear stating that fact (figure 12.17). The current date will be recorded as the Camera Calibration date. Remove the calibration disk from the hardness platform.

If for some reason the pixel per inch calculation is not within the preset tolerance, a message box will appear stating that the camera image was not acceptable (figure 12.18). Refer

to the appendix "Resolving Calibration Errors" of this manual for information on why an unsuccessful calibration may have occurred, and possible corrective actions to take. Choose the **OK** button in the message box to close the box.

13 Administration Operations

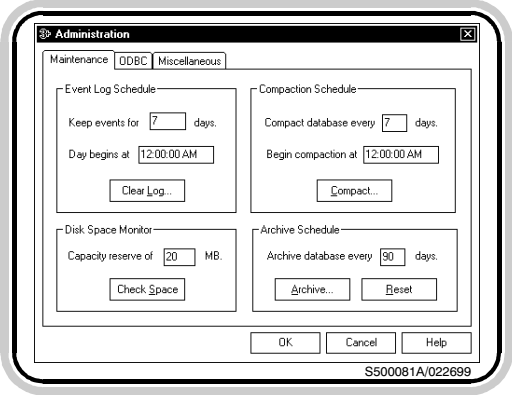

Figure 13.1- Administration dialog box

The **Administration** command from the Operations menu allows control over some of the more advanced features of the ElizaTest 3+ Tablet Testing System. There are three main areas of administration that are available. The first is Maintenance. Maintenance administration controls the Event Log, Archiving, and Compaction schedules. A tool for determining remaining and required free disk space is also in this group. The second area is the ODBC administration. This part contains controls for using databases that exist on networks, or for using a database other than Microsoft Access. The third area is a set of miscellaneous controls for recovering deleted setups, changing the optional system description that appears on the printed reports, controlling some aspects of the security system, and for integrating the ElizaTest 3+ with an Elizabeth-Hata tableting press system. To select which group of controls to work with, choose one of the three 'tabs' at the top of Administration dialog box (figure 13.1).

13.1 Maintenance Administration

This dialog box is used to control the automatic scheduling of the Event Log, database compaction, and database archiving. It also contains a tool for viewing the required and available hard disk space.

NOTE:

While the tablet tester is being used as an inline production tester, only the Event Log controls are available for use. The other areas are controlled automatically by the tablet press.

13.1.1 Event Log Schedule

The Event Log is a disk file that records certain events that occur during the use of the ElizaTest 3+ Tablet Testing System. Information such as when the system was started and stopped, when tests were run, and operator log-

ons are recorded. Any errors encountered during the operation of the system are also noted in the log. The Event Log can be viewed by generating an Event Log report, described later.

To prevent the log from becoming too large, the Event Log can be scheduled to remove any log entries that are older than a certain number of days. Type the number of days that log entries are to be kept in the Keep events for... field. This value can range from zero to 730. Any log entries that are older than this value will be automatically deleted from the log. A setting of zero indicates that the log entries are to be kept indefinitely; they will not be automatically removed. There is also an option to set the time that a new 'day' of entries is to begin. This can be used to prevent one day's worth of log entries from spanning two shifts, for example.

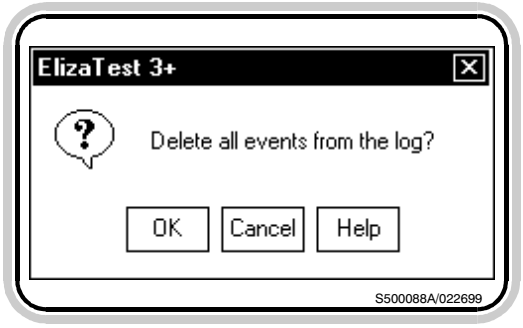

Figure 13.2- Confirmation is required to delete the event log

The **Clear Log** button can be selected to delete all the entries from the log immediately. When the Clear Log button is selected, a message box will appear asking for confirmation (figure 13.2). Choose the **OK** button to clear the log, or select the **Cancel** button to return to the Maintenance Administration dialog box without clearing the log.

13.1.2 Disk Space Monitor

This area is used to set the amount of disk space (reserve capacity) to keep free. As tablets are tested and setups are saved, the amount of disk space used by the database increases. The reserve capacity sets the amount of disk space to set aside and not use for the database. A value of 100 megabytes (MB) should prove adequate in most instances. The disk capacity is checked once each hour, and if the disk space required for the database plus the amount of reserved space exceeds the available free space on the disk, the Low Capacity Warning dialog box will appear (figure 13.3),

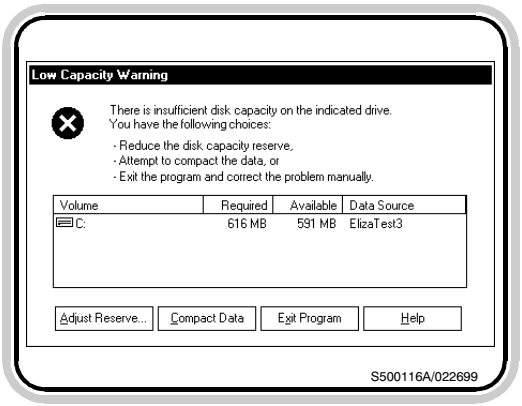

Figure 13.3- Low Capacity Warning dialog box

and the operator will be prompted to either adjust the spare capacity setting or compact the database.

This dialog box displays a list of the options that are currently available that can be tried to correct the low disk capacity problem, and also which disk drive (or drives, in case the database exists on multiple drives) is experiencing the low capacity. Depending on the circumstance that caused the warning, all of the options may not be available.

To correct this problem, either the amount of free reserve space may be reduced, the database can be compacted, or some type of manual file removal must be performed. Compacting the database is suggested as the first option to try. To compact the database, select the **Compact Data** button in the dialog box. The database will then be compacted as described in the section "Compaction Schedule".

If compacting the database produced sufficient free disk space, operation of the system can continue normally. If there is still insufficient disk space, the Low Capacity Warning dialog box will reappear. At this point, if it is possible, attempt to reduce the amount of reserve disk capacity needed by selecting the **Adjust Reserve...** button in the dialog box.

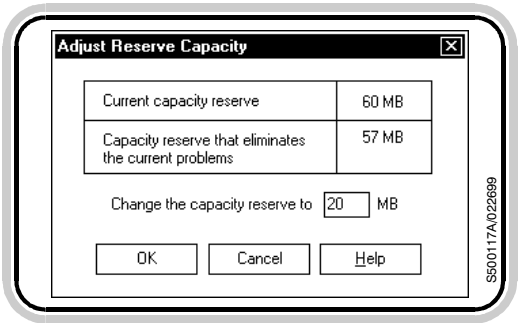

Figure 13.4- Adjust Reserve Capacity dialog box

Selecting the Adjust Reserve... button will display the Adjust Reserve Capacity dialog box (figure 13.4). The dialog box shows the present value of the reserve capacity and the setting that is required to alleviate the current low disk capacity problem. To change the reserve capacity, enter a new value into the Change Reserve Capacity To... field. Then choose the **OK** button to register the new setting.

Please note that compacting the data and changing the reserve capacity are only temporary solutions to the problem. For a permanent

solution, the database will need to be archived, or some unneeded products and/or batches will need to be deleted.

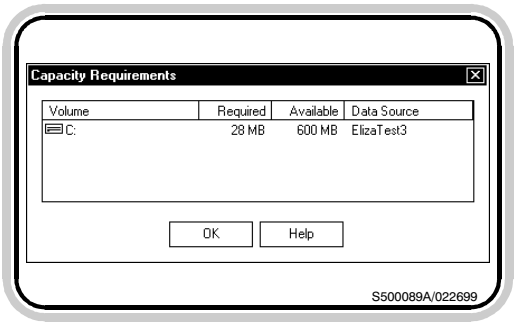

Figure 13.5- Pop-up window showing the disk space requirements for each disk in use

Select the **Check Space** button to see how much disk space is available and how much is currently required by the database. A pop-up window will appear showing the disk space requirements for each disk in use (figure 13.5). The Volume is the name of the disk drive or network drive. On the basic stand-alone unit, there is only one drive named C:. In cases where the database is stored on more than one drive, such as in a networked database, each drive will appear. The Required value is the amount of disk space (including the reserve capacity) needed for the database. The Available value indicates the amount free space on the disk drive. The Data Source is the name of the database (as it is registered with the ODBC Data Source Administrator) on the listed drive. The standard data source name for the tablet testing system is ElizaTest3.

The Required Capacity reflects not just the current size of the database, but also the amount of space that is needed to perform the compacting and archiving operations. The Required Capacity shown will be approximately twice the physical size of the database, plus the amount that is reserved.

13.1.3 Compaction Schedule

This area sets the automatic database compaction schedule. As items are entered into and deleted from the database, the database can develop 'holes' in it that use up disk space, but do not contain any actual information. Compacting the database removes these holes and frees up the unused disk space. The controls in this area determine how often, and at what time, to automatically compact the database.

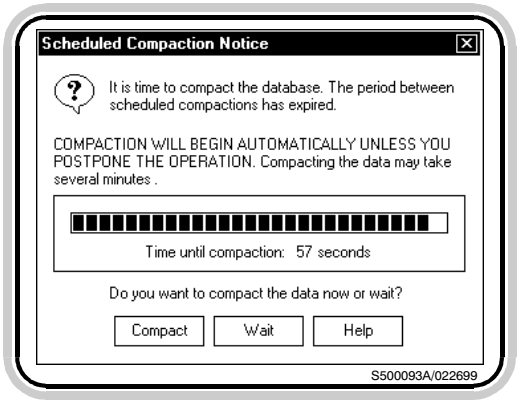

Figure 13.6- A scheduled compaction is about to be performed

The Compact database every... item sets the number of days between compactions. Once every 7 to 14 days is adequate for most uses. The Begin compaction at.... field sets the time of day to perform the compaction. The ElizaTest 3+ program must be running for the automatic compaction to occur. If the system is not running, or if the compaction has been otherwise postponed, a dialog box will appear (figure 13.6) the next time the program is started, or after one hour has elapsed, informing the operator that a scheduled compaction has not been performed, and will give the operator the choice of performing the compaction now, or postponing it again. Choose the **Compact** button in the dialog box to perform the compaction now, or choose the **Wait** button to postpone the compaction for one hour. If no selection is made in one minute, the compaction will automatically take place. During the database compaction, a temporary duplicate of the database is made, during which time the holes in the database are removed. Sufficient free disk space must be available for this copy to made. A database cannot be successfully compacted if there is not enough free space.

The **Compact** button may be selected at any time to force a database compaction to occur. This should be done when large amounts of data are deleted from the database, such as when products with large numbers of tests are removed. As the compaction is taking place, a message box will appear showing that the compaction is occurring. This may take many minutes for a large database.

13.1.4 Archive Schedule

Archiving the database removes test data from the active ElizaTest 3+ database, and moves this data into another off-line database.

This off-line database is then removed from the computer, where it can be stored as a permanent record, if desired.

The Archive database every... field sets how often the database (or a selected portion of it) is to be archived. The archive scheduler will display a reminder message when it is time to archive the database. The actual archiving procedure requires an operator to be present; it will not begin automatically. The **Archive** button can be selected at any time to perform an unscheduled archive. The **Reset** button is used to restart the archive scheduler timer at day zero. The next scheduled archive will then occur the number of days in the future as set by the Archive database every... field, effectively skipping the archive period.

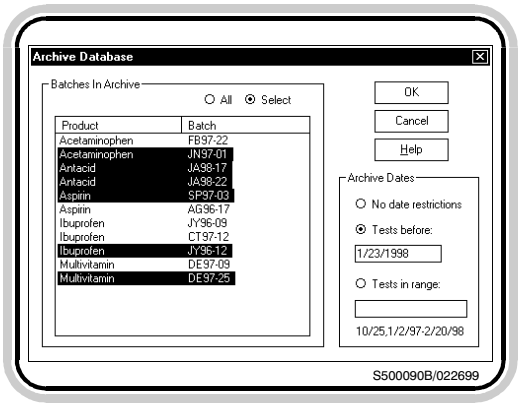

Figure 13.7- Archive Database Options dialog box

When an archive (scheduled or unscheduled) is to occur, the Archive Database Options dialog box will appear (figure 13.7). This dialog box allows the selection of which tests to archive. Tests may be archived according to batches, dates, or a combination of each. All the options are cumulative; they add together, and only test results meeting all the selected criteria will be archived.

Before archiving can occur, the batches to archive and dates the tests were run must be selected. To archive tests in all batches, choose the **All** radio button above the product/batch list. To individually select the batches, choose the **Select** radio button, then pick the desired product/batch combinations from the list. To pick several batches from the list, hold the **Control** key (CTRL or Ctrl) on the keyboard, and choose each batch as desired. Selected batches are highlighted in the list. Select a highlighted batch again to deselect it. A range of batches can be selected by choosing the first batch in the range,

then hold the **Shift** key and select the last batch in the range. All batches between the two will be selected (highlighted).

After the batches to archive have been selected, it is necessary to choose the dates that the tests were performed. Select the **No date restrictions** radio button to archive the tests regardless of date. To archive all tests before a certain date, choose the **Tests before:** radio button, and enter the cutoff date in the date field. All tests performed prior to this date will be included. To specify a range of dates to archive the test results data for, choose the **Tests in range:** radio button, and enter the desired range of dates in the field. To specify the range, type the first date in the range, a hyphen, then the last date in the range. Dates must be in the form of MM/DD/YY or MM/DD/YYYY (month, day, year). If the year is not entered, the current year is assumed. Individual dates may be combined with date ranges.

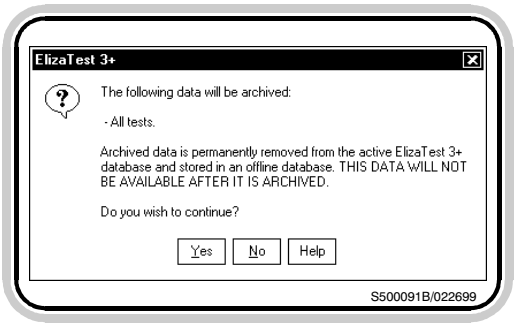

Figure 13.8- Verification of the archive list is required

When all the archiving options are set as desired, select the **OK** button to continue the archiving operation. The **Cancel** button may be selected to return to the Maintenance Administration dialog box without performing an archive.

When the OK button is selected, a dialog box will appear listing the batches and dates that were selected for archiving, and requests a verification before actually archiving the data (figure 13.8). Review the list carefully to ensure that the listed tests and batches are correct. ***Once the data has been archived, it is no longer available for use.*** Choose the **Yes** button if the list is correct, or choose the **No** button

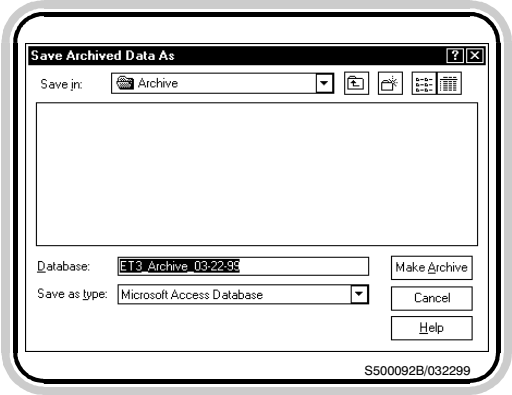

Figure 13.9- This dialog box allows specifying where the archive is to be stored

to return to the Archive Database dialog box, where the archive selections can be modified.

When the Yes button is selected, another dialog box will appear, asking where the archived data is to be stored (figure 13.9). When the database is archived, the selected tests are removed from the active database, and copied into another (off-line) database file. This dialog box allows choosing the name and location for the archive database file. Under normal circumstances, the default settings are to be used. The default settings provide for a Microsoft Access database named ET3_ARCHIVE (with a datestamp appended) stored in the Archive folder on the computer's internal hard disk. More advanced users may change this to another name or to a network disk drive. Generally speaking, the default settings should be accepted unless the operator is experienced in networking and database operations.

To continue with the archiving process, select the **Make Archive** button. The selected data will be removed from the active database, and stored in the chosen archive database file. A pop-up window will appear, showing that the archive operation is taking place. When the archive is complete, the archive file must be removed from the hard disk. If the size of the archive file is larger than 1.44 megabyte, the file will need to be removed through the network connection. An archive sent to a network disk drive will have already been moved off the internal drive to the specified network drive.

13.2 ODBC

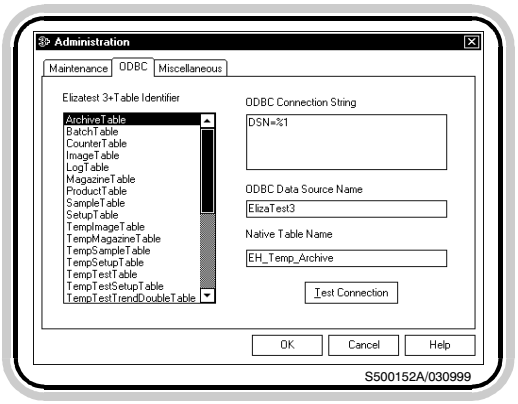

Figure 13.10- ODBC dialog box

The ODBC (Open Database Connectivity) dialog box (figure 13.10) is used to assign the database tables required by the ElizaTest 3+ software to their ODBC data sources. ODBC data sources are created by using the ODBC Data Source Administrator Windows NT control panel application. The ODBC Data Source Administrator is used to assign a data source name (DSN) to a physical database. The database need not be on the same machine as the software that is accessing it- the data source includes the complete path to the database. The ODBC dialog box is used to map each database table required by the ElizaTest 3+ to the data source that actually contains the table.

The list box at the left of the dialog box contains the table identifiers (these are the internally-used names of the database tables). Each table identifier can be assigned to a different data source. When the ElizaTest 3+ is being used as a stand-alone tablet testing system (without being integrated with an Elizabeth-Hata tableting press) there is (in the standard factory-default configuration) only one data source named ElizaTest3. Each table in the database resides in this single data source. When the system is integrated with a tablet press, the default database configuration requires that some of the database tables that are needed reside in the tablet press database. The ODBC dialog box (along with the ODBC Data Source Administrator) is then used to map these required tables to tablet press data source (which is named ElizaTest3). All ODBC information is stored in the Windows NT registry (key-HKEY_LOCAL_MACHINE\Software\Elizabeth-Hata\ElizaTest 3+) of the TabSys computer. When one of the factory default configurations is being used, these ODBC changes are accomplished automatically through the ElizaTest 3+ and TabSys software.

WARNING:

Only persons experienced in database administration and networking should make changes to ODBC information, either directly or indirectly through the registry. Improper ODBC information can cause the system to fail to operate as specified.

WARNING:

Deviations from the default factory ODBC settings and database configurations can result in the TabSys Tableting Press software being unable to properly recognize, remove, and restore the ElizaTest 3+ database information. Exercise caution when changing the ODBC settings.

The ODBC Connection String is used by the ODBC database driver when establishing the database connections. This string is dependent upon the specific database driver selected. The Microsoft Access database, the standard database used by the ElizaTest 3+ tablet tester and TabSys tableting press interface, require only a data source name (DSN) to be specified. Other databases may require additional information, such as log-in names or read/write access requests.

The Native Table Name item at the right side of the dialog box displays the name of the actual table (as it is defined in the database containing it) for the highlighted table identifier. This will change as different table identifiers are selected from the list box. The native table name may be changed if needed to correspond to the name being used in a third-party database.

The **Test Connections** button is used when changes are made to the ODBC information. Select the button to verify that all the connections can be successfully made. No changes to the ODBC information will be kept unless each

connection can be successfully made. If any connection fails, a message box will be displayed showing which connection(s) failed. Correct the ODBC information for the faulty connections. The ElizaTest 3+ software must then be restarted in order for the ODBC changes to take effect.

13.3 Miscellaneous Administration

This dialog box, shown in figure 13.11, controls some miscellaneous features of the ElizaTest 3+ Tablet Testing System. This dialog box allows for the recovery of deleted setups, provides a place to enter a description for the Tablet Tester that will appear on the printed reports, and provides a control for integrating the ElizaTest 3+ with an Elizabeth-Hata tablet press. Select the **OK** button near the bottom of the dialog box to save any changes made and return to the Tablet Test Setup or Magazine screen, or choose the **Cancel** button to return without saving any changes. Any setups that were recovered will still exist; they are not canceled.

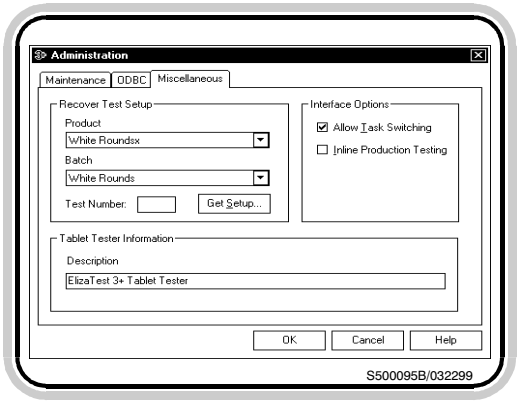

Figure 13.11- Miscellaneous Administration dialog box

13.3.1 Recover Test Setup

This area allows for the recovery of a deleted tablet test setup definition, provided a test that used the setup is currently present in the database, and the alignment image for that setup is still being used by another setup. When test results are saved, a copy of the setup data and a reference to the alignment image used to run the test are saved along with the results. The Recover Test Setup feature can extract this setup information and create a new setup definition from it.

In order to recover the setup definition, the product, batch, and test number of the test that used the setup must be supplied in the fields provided. Select the product by choosing it from the product list, then select the batch for that product by choosing it from the batch list. The test number must be entered manually into the

field provided. When all three items are set as desired, select the **Get Setup** button. If the set-up could be recovered, the Save Setup dialog box will appear, prompting the operator to give the setup a name. If the setup could not be recovered, a message box will appear explaining why. This is normally caused by the alignment image not being available.

To conserve disk space, only unique alignment images are stored, and the image itself is not saved with the test results. Instead, the saved test results only contain a reference to which image was used. If all setup definitions that use a particular image are deleted, that image is also deleted, and setups which used the image cannot be recovered. In this case it will be necessary to recreate the setup from scratch.

13.3.2 Tablet Tester Information

This area allows an optional description to be assigned to the ElizaTest 3+ Tablet Testing System that will appear on all the printed reports. The use of this description is entirely optional, and in no way affects any of the operations. The description can be used to identify which reports were generated by which tablet testing system, if more than one system is in use. To enter or change the description, type the description into the field, using the backspace or delete keys to correct any errors.

13.3.3 Interface Options

13.3.3.1 Allow Task Switching

This check box is used for enabling or disabling the Microsoft Windows NT task-switching feature. When task-switching is enabled (a check will appear in the box), the computer can switch between the ElizaTest 3+ software and other programs. When task-switching is disabled, only the ElizaTest 3+ software can run. It is suggested that task-switching be disabled for all normal operations.

13.3.3.2 Inline Production Testing

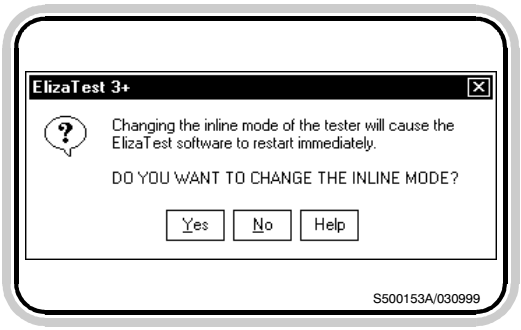

Figure 13.12- It is necessary to restart the ElizaTest 3+ software when changing Inline Mode

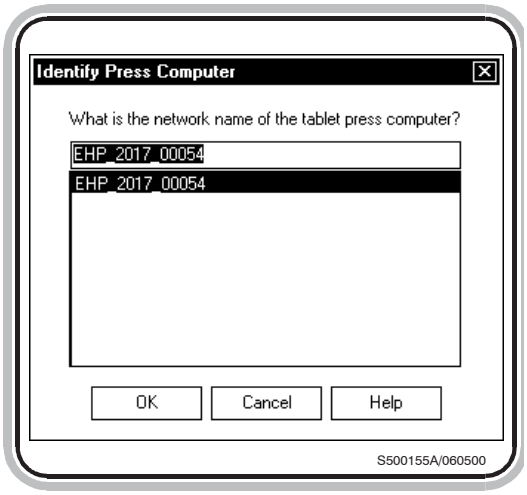

Figure 13.13- Choose the name of the computer that the tablet tester is connected to

This check box is used to inform the ElizaTest 3+ that it is being used as an inline production tablet tester, in conjunction with an Elizabeth-Hata tableting press system.

To use the ElizaTest 3+ as an inline production tester, check the **Inline Production Testing** check box. A message box will appear stating that it will be necessary to restart the ElizaTest 3+ software in order for the change to take effect (figure 13.12). Select the **OK** button to continue, or choose the **Cancel** button to return to the Miscellaneous Administration dialog box.

If OK is selected, the ElizaTest 3+ software will immediately shut itself down. The next time the software is restarted, it will automatically search the network it is connected to for any tablet presses that are present. Then you will be asked to specify which tablet press the ElizaTest 3+ will be performing inline production testing for. Choose the name from the list of detected tablet presses that will be displayed (figure 13.13). After selecting a tablet press, the ElizaTest 3+ will modify the Windows NT registry settings for its database ODBC connections, then display a message box indicating that it is ready for inline production testing. Select the **OK** button in the message box. The ElizaTest 3+ software will again shut itself down. From this point, the ElizaTest 3+ software will now always start up in the Inline Production Testing mode.

Clearing the Inline Production Testing check box will have the opposite effect. The software will reconfigure its ODBC registry settings to again use only its own internal database.

WARNING:

Data generated by the tablet tester after it has been taken out of inline production testing cannot be used by the tablet press if the two are re-integrated at some later point in time.

14 Reports

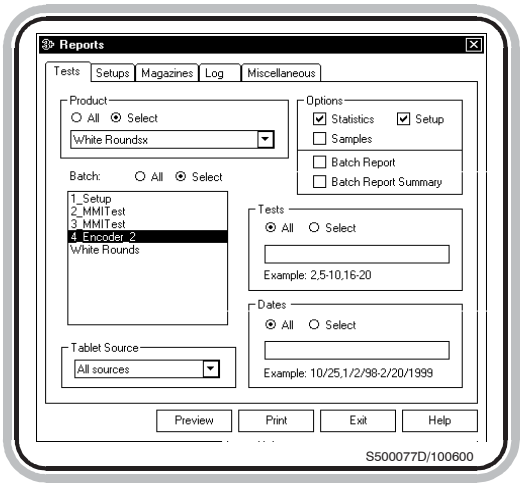

Figure 14.1- Reports dialog box

The ElizaTest 3+ Tablet Testing System can produce a wide variety of printed reports. To access the ElizaTest 3+ Report Generator, select the **Reports...** button in the Tablet Test Setup or Magazine screens, or choose the **Operations/ Reports...** menu item. The Reports dialog box will appear (figure 14.1).

Four main types of reports may be generated: **Test** reports, **Setup** reports, **Magazine** reports, and **Log** reports. Along with these, there are three other miscellaneous reports; a **Product/Batch cross reference** report, a **User List** report, and a **Machine Parameters** report. To choose what type of report to generate, select

the appropriate 'tab' in the Reports dialog box. The options for the selected type of report will then be shown.

Each type of report has 4 common controls at the bottom of the Reports dialog box. Selecting the **Preview** button will cause the report to be displayed on the screen, instead of being sent to the printer. The preview can be used to verify that the options for the report have been properly selected. The Print Preview contains controls for viewing specific pages of the report, for controlling the size of the view, and a **Print** button that can be selected to print the report while previewing it (figure 14.2). The four buttons at the upper left can be used to page forward or backward, or to move to the last page or first page of the report. To view a specific page,

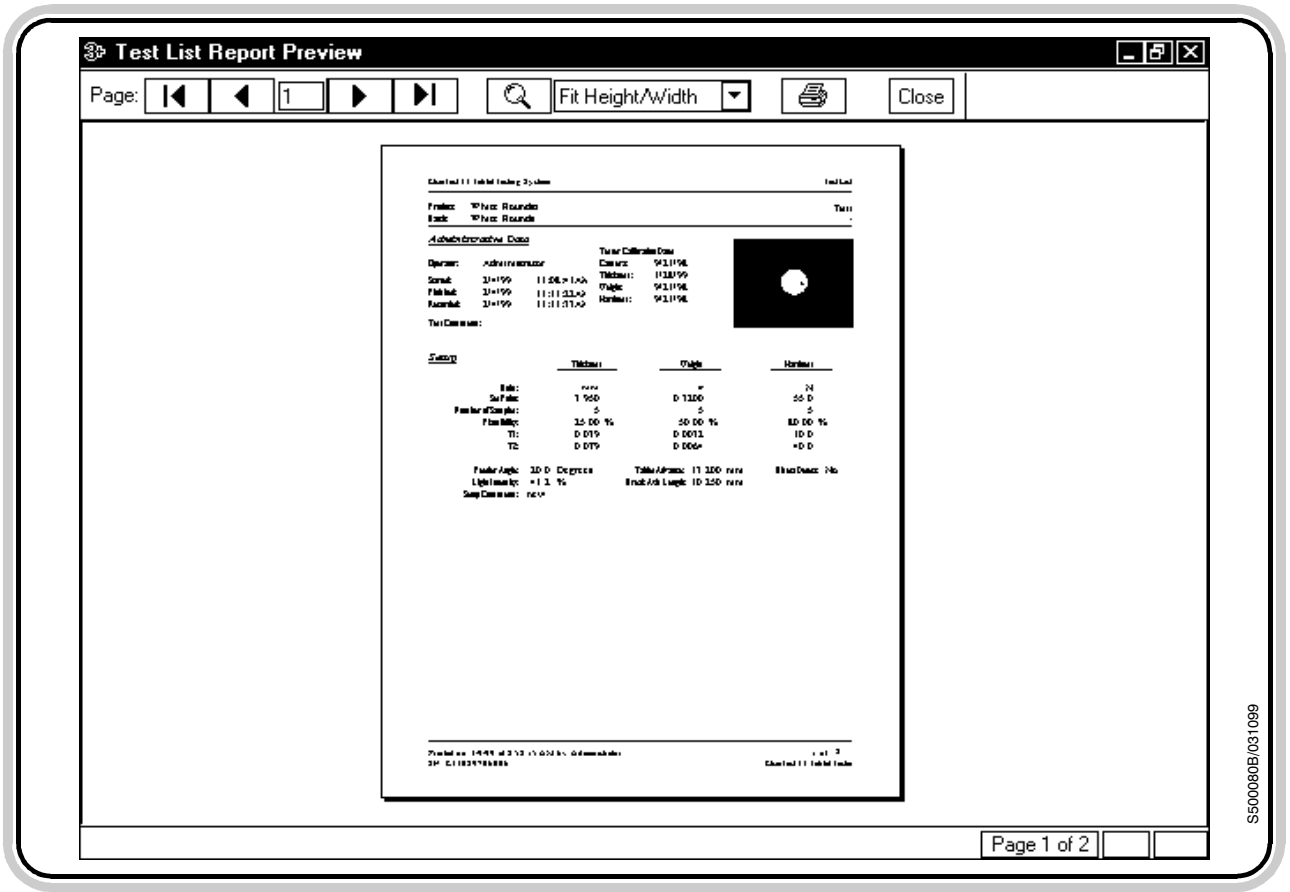

Figure 14.2- Print Preview window

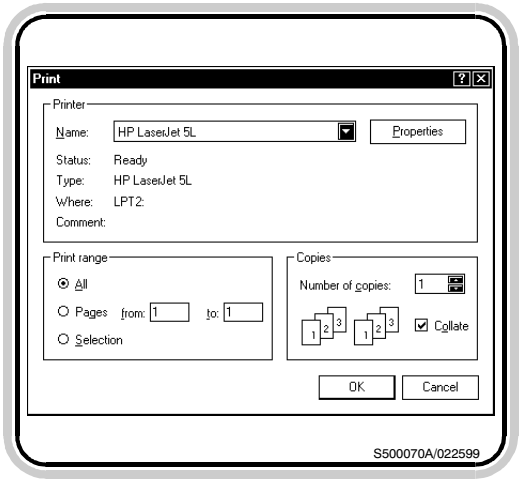

Figure 14.3- Print dialog box

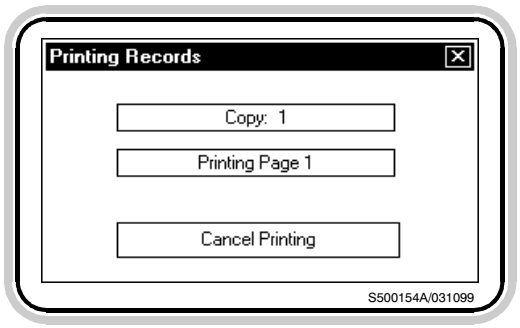

Figure 14.4- Print status window

type the desired page number in the box. Select the **Close** button in the Print Preview to leave the preview and return to the Reports dialog box.

The Print button, when selected, will cause the report to be sent to system printer. Selecting the Print button will cause the Print dialog box to appear (figure 14.3). This dialog box indicates the type of the system printer, the location of the printer, and other items. The discussion that follows applies to the Hewlett-Packard LaserJet series printer supplied as standard equipment. If another printer is being used, refer to the printer manufacturer's documentation for specific details not addressed here.

NOTE:

The Print dialog box and Print Status dialog box will not appear if printing was initiated by selected the Print button in the Report Preview window. Instead, a simple print status window will be displayed (figure 14.4).

When the Print dialog box appears, several settings are pre-selected as default settings. These settings should not be changed from their default values, or the format of the printed reports may not be correct. The only setting that should be changed is the number of copies setting, if more than one copy of a report is desired. To change the number of copies, either select the Number of Copies field and enter the number desired, or select the small up and down arrows in the field until the correct number of copies is displayed.

To print the selected report, choose the **OK** button in the Print dialog box. The Print Status message box appears, indicating the report is being prepared and sent to the printer. After printing is complete, the Print dialog box will

close, and the Reports dialog box appears. Depending on the complexity of the report, this may take a few minutes.

14.1 Tests Report

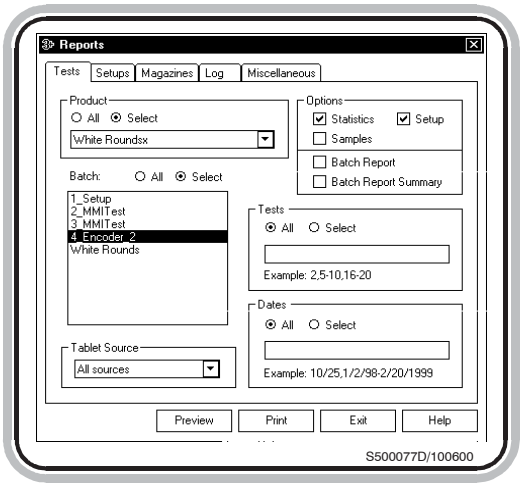

Figure 14.5- Tests Report dialog box

This report shows the results of tablet tests that have been run, and also can generate summary-type reports for batches (figure 14.5). Reports can be printed for individual tests, for entire batches or products, or according to the date they were run, depending on how the options are set up in the Reports dialog box. All the options, except Batch Report options, are cumulative; they add together, and only tests meeting all the selected criteria are printed. For example, if all batches for a certain product are selected and a date range is also specified, only the tests for the product that fall within the date range are printed, even if tests before or after the specified dates have been run. Likewise, if a test range is specified, tests that are not within the given range will not be printed. It is possible for options to be selected for which no test meets the criteria. This will result in an empty report. By carefully choosing the options, exactly the tests that are wanted can be printed.

14.1.1 Product and Batch Selection

All products or an individual product can be selected for the test report. To choose all products, select the **All** radio button (the small circle) in the Product area. The selected button will have a dot inside of it. To choose an individual product, select the **Select** radio button, then pick the product from the drop-down list of products. (The drop-down list will appear when the small down-arrow at the right of Product box is selected.)

If an individual product has been chosen, the option to specify individual batches or all batches for that product is also allowed. If all products are selected, all batches are also selected by

default. Again, select the **All** radio button to choose all the batches associated with the selected product, or choose the **Select** radio button to pick an individual batch from the list of batches. To pick several batches from the list, hold the **Control** key (CTRL or Ctrl) on the keyboard, and choose each batch as desired. Selected batches are highlighted in the list. Select a highlighted batch again to deselect it. A range of batches can be selected by choosing the first batch in the range, then hold the **Shift** key and select the last batch in the range. All batches between the two are then selected (highlighted).

14.1.2 Test Selection

Reports may be printed for all tests by selecting the **All** radio button in the Tests area. Individual tests or ranges of tests may be chosen by selecting the **Select** radio button and entering the desired range in the Tests field. To specify individual tests, type the test numbers separated by commas. To print a range of tests, type the first test number in the range, a hyphen, then the last test number in the range. Ranges may be combined with individual test numbers. Note that test selection is unavailable if the Batch Reports option is selected. Batch reports will use all the tests in the batch by default.

Example: To print reports for only test numbers 4, 6, and 12, enter 4,6,12 in the Tests field. To choose test number 23 through 45, type 23-45 in the Tests field. Typing 5,7,10-56,89 in the box will select test number 5, test number 7, test numbers 10 through 56, and test 89.

14.1.3 Date Selection

Reports may be printed for all tests regardless of the date by selecting the **All** radio button in the Dates area. Reports for tests performed on an individual date or range of dates may be chosen by selecting the **Select** radio button and entering the desired range in the Dates field. To specify individual dates, type the dates separat-

ed by commas. To print a range of dates, type the first date in the range, a hyphen, then the last date in the range. Dates must be in the form of MM/DD/YY or MM/DD/YYYY (month, day, year). If the year is not entered, the current year is assumed. Individual dates may be combined with date ranges. Note that date selection is unavailable if the Batch Reports option is selected. Batch reports will use all tests in the batch by default.

Example: To print reports for only tests performed on March 23, 1998, type 3/23/98 in the Dates field. To print reports for tests performed between September 5, 1997 and January 20, 1998, type 9/5/97-1/20/98 in the Dates field.

14.1.4 Options

This area allows selection of the options to apply to the test reports. Batch reports are a special case of the test reports containing only summary statistical information about the batch as a whole. Each test report will contain the Administrative Data section; this section contains the date the test was run, who ran the test, the time the test was started and stopped, the calibration dates, and the tablet alignment image. This section appears on all test reports.

Three other sections may optionally be included. To choose which sections to include on the report, select the check box next to the items to select or deselect the item. An item will have a check mark in the box when it is selected.

The Statistics section contains the detailed statistics about the test results, similar to the More Statistics option in the Tablet Test Run screen. The Setup section will print the tablet test setup definition used to run the test, showing the units, setpoint, T1 and T2 values, etc. The Samples section will contain the individual test results for each tablet.

If the Batch Report option is selected, the Statistics, Setup, and Samples option will not be available. Also, it is possible to restrict the reports to a specific side or layer of the press that produced the tablets by selecting the desired option from the Tablet Source drop-list. Choose the Not Applicable option (the default) if it is irrelevant which side or layer the tablets were manufactured on, such as a single-sided press.

14.2 Setups Report

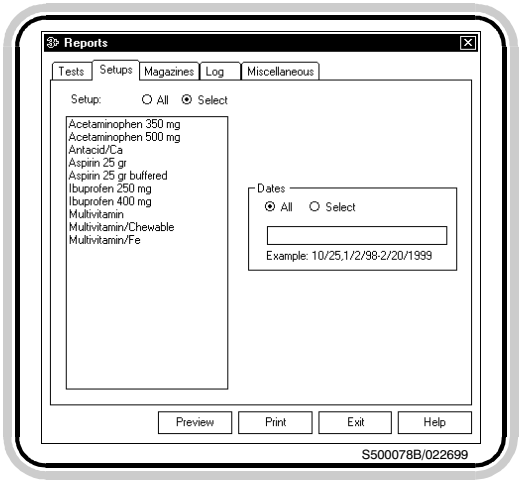

Figure 14.6- Setups Report dialog box

This report shows the tablet test setup definition of the selected setups (figure 14.6). All the information contained in the tablet test setup definition, including the alignment image, are included in this report. The report also shows the operator, time, and date of the last save. Setup reports can be generated for all setups, selected setups, or setups saved according to date by choosing the appropriate options in the Reports dialog box. All the options are cumulative; they add together, and only setup definitions meeting all the selected criteria are printed. It is possible for options to be selected for which no setup meets the criteria; in this case, an empty report will be generated.

14.2.1 Setup Selection

Any or all setup definitions may be selected for printing. To choose all the setups, select the **All** radio button in the Setups area. To print one or more specific setups, choose the **Select** radio button, then choose the individual setup(s) from the displayed list. To pick several setups from the list, hold the **Control** key (CTRL or Ctrl) on the keyboard, and choose each setup as desired. Selected setups are highlighted in the list. Select a highlighted setup again to deselect it. A range of setups can be selected by choosing the first setup in the range, then hold the **Shift** key and select the last setup in the range. All setups between the two are then selected (highlighted).

14.2.2 Date Selection

Reports may be printed for all setups regardless of the save date by selecting the **All** radio button in the Dates area. Setups saved on an individual date or range of dates may be specified by selecting the **Select** radio button and entering the desired range in the Dates field. To specify individual dates, type the dates separated by commas. To print a range of dates, type the first date in the range, a hyphen, then the last date in the range. Dates must be in the form of MM/DD/YY or MM/DD/YYYY (month, day, year). If the year is not entered, the current year is assumed. Individual dates may be combined with date ranges.

Example: To print reports for setups saved on October 9, 1998, type 10/9/98 in the Dates field. To print all setups saved between September 5, 1997 and January 20, 1998, type 9/5/97-1/20/98 in the Dates field.

14.3 Log Report

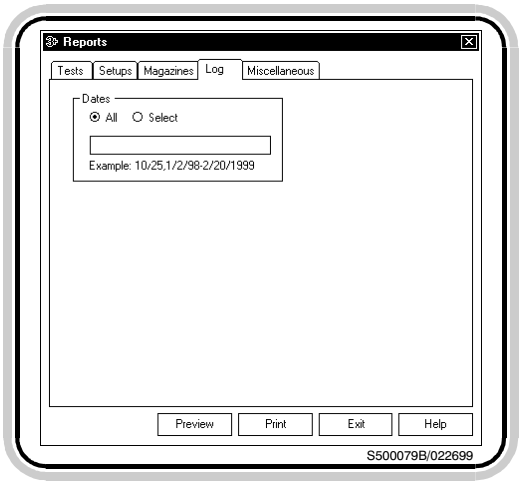

Figure 14.7- Log Report dialog box

The Log Report is a tabular listing of significant events that occur during the use of the ElizaTest 3+ Tablet Testing System (figure 14.7). Events such as when the system was started and stopped, operator log-ons, and system errors will be recorded in the log. An extensive list of logged events is contained in an appendix to this manual. The only option associated with the log report is date selection. Select the **All** radio button to print the contents of the entire log, or choose the **Select** radio button to enter a date or range of dates to print. Dates must be in the form of MM/DD/YY or MM/DD/YYYY (month, day, year). If the year is not entered, the current year is assumed. Individual dates may be combined with date ranges.

Example: To print a report for log entries made on May 19, 1997, type 5/19/97 in the Dates field. To print all entries made between December 1, 1998 and December 31, 1998, type 12/1/98-12/31/98 in the Dates field.

14.4 Magazine Report

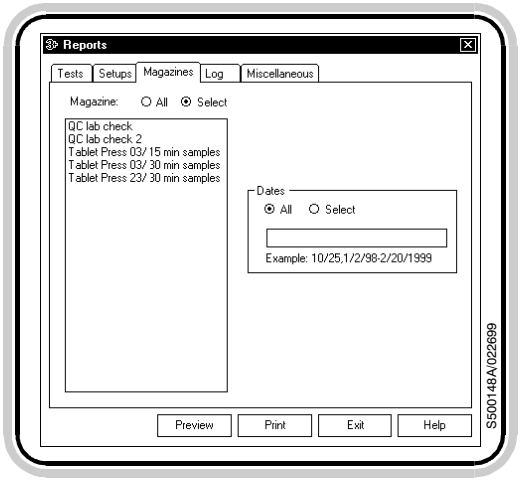

Figure 14.8 Magazine Report dialog box

This report shows the vial list and other information for the selected magazine configurations (figure 14.8). All the information contained in the magazine configuration, including the enabled and continued status, are included in this report. The report also shows the operator, time, and date of the last save. Magazine reports can be generated for all magazines, selected magazines, or magazines saved according to date by choosing the appropriate options in the Reports dialog box. All the options are cumulative; they add together, and only magazine configurations meeting all the selected criteria are printed. It is possible for options to be selected for which no magazine meets the criteria; in this case, an empty report will be generated.

14.4.1 Magazine Selection

Any or all magazine configurations may be selected for printing. To choose all the magazines, select the **All** radio button in the Magazines area. To print one or more specific magazine configurations, choose the **Select** radio button, then choose the individual magazine(s) from the displayed list. To pick several magazines from the list, hold the **Control** key (CTRL or Ctrl) on the keyboard, and choose each magazine as desired. Selected magazines are highlighted in the list. Select a highlighted magazine again to deselect it. A range of magazines can be selected by choosing the first magazine in the range, then hold the **Shift** key and select the last magazine in the range. All magazines between the two are then selected (highlighted).

14.4.2 Date Selection

Reports may be printed for all magazines regardless of the save date by selecting the **All** radio button in the Dates area. Magazine configurations saved on an individual date or range of dates may be specified by selecting the **Select** radio button and entering the desired range in the Dates field. To specify individual dates, type the dates separated by commas. To print a range of dates, type the first date in the range, a hyphen, then the last date in the range. Dates must be in the form of MM/DD/YY or MM/DD/YYYY (month, day, year). If the year is not entered, the current year is assumed. Individual dates may be combined with date ranges.

Example: To print reports for magazines saved on October 9, 1998, type 10/9/98 in the Dates field. To print all magazines saved between September 5, 1997 and January 20, 1998, type 9/5/97-1/20/98 in the Dates field.

14.5 Miscellaneous Reports

Three different types of miscellaneous reports are available in this dialog box (figure 14.9). To choose which report to generate, select the appropriate radio button in the Miscellaneous Reports box at the right of the dialog box.

14.5.1 Product/Batch Cross Reference Report

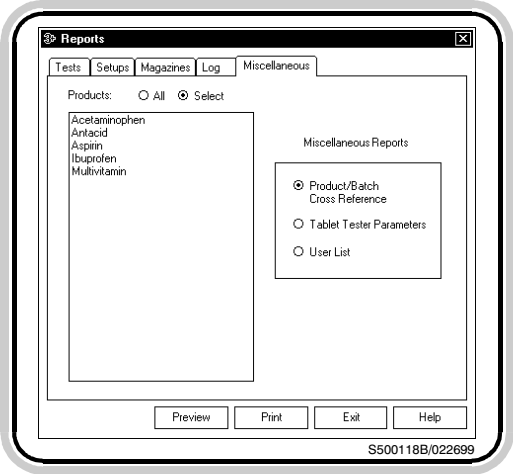

Figure 14.9- Miscellaneous reports dialog box

The Product/Batch Cross Reference report contains a list of products and the batches that are associated with them. Select the **Product/ Batch Cross Reference** radio button to generate this report.

Any or all products may be selected for including in the cross reference report. To choose all the products, select the **All** radio button in the Products area. To print a report for one or more specific products, choose the **Select** radio button, then choose the individual product(s) from the displayed list. To pick several products from the list, hold the **Control** key (CTRL or Ctrl) on the keyboard, and choose each product as desired. Selected products are highlighted in the list. Select a highlighted product again to deselect it. A range of products can be selected by choosing the first product in the range, then hold the **Shift** key and select the last product in the range. All products between the two are then selected (highlighted).

The Product/Batch Cross Reference report will list all selected products in alphabetical order. Under each product, the batches associated with that product will be listed, also in alphabetical order. The total number of batches within a product is shown in small type. Should a product with no batches exist, only the product name is given- there will be no listing or count of batches.

14.5.2 Tablet Tester Parameters Report

The Tablet Tester Parameters report shows various items that are unique to a given system. Select the **Tablet Tester Parameters** radio button to generate this report.

The Tablet Tester Parameters report lists identification information for the system (serial number, user-defined description, and database version), the most-recent calibration dates for the various instruments, the compaction, archi-

val, and event log scheduling settings, and the mechanical offset values used for positioning the tablet indexer and hardness jaws.

14.5.3 User List

The User List report shows all currently authorized system users. Select the **User List** radio button to generate this report.

The report lists in alphabetical order all currently registered users by their operator identification and security access level. No passwords are shown.

15 Diagnostics Screen

The Diagnostics screen provides controls for testing and monitoring the individual components and sensors used in the ElizaTest 3+ Tablet Testing System. The Diagnostics screen (figure 15.1) is accessed by selecting the **Tools/ Diagnostics...** menu item from the Tablet Test Setup or Magazine screens. A security access level of Supervisor is required to use the Diagnostics screen.

15.1 Motor Control

This area of the Diagnostics screen contains buttons that can be used to test individual motors and movement sequences. Each item's function is briefly described below.

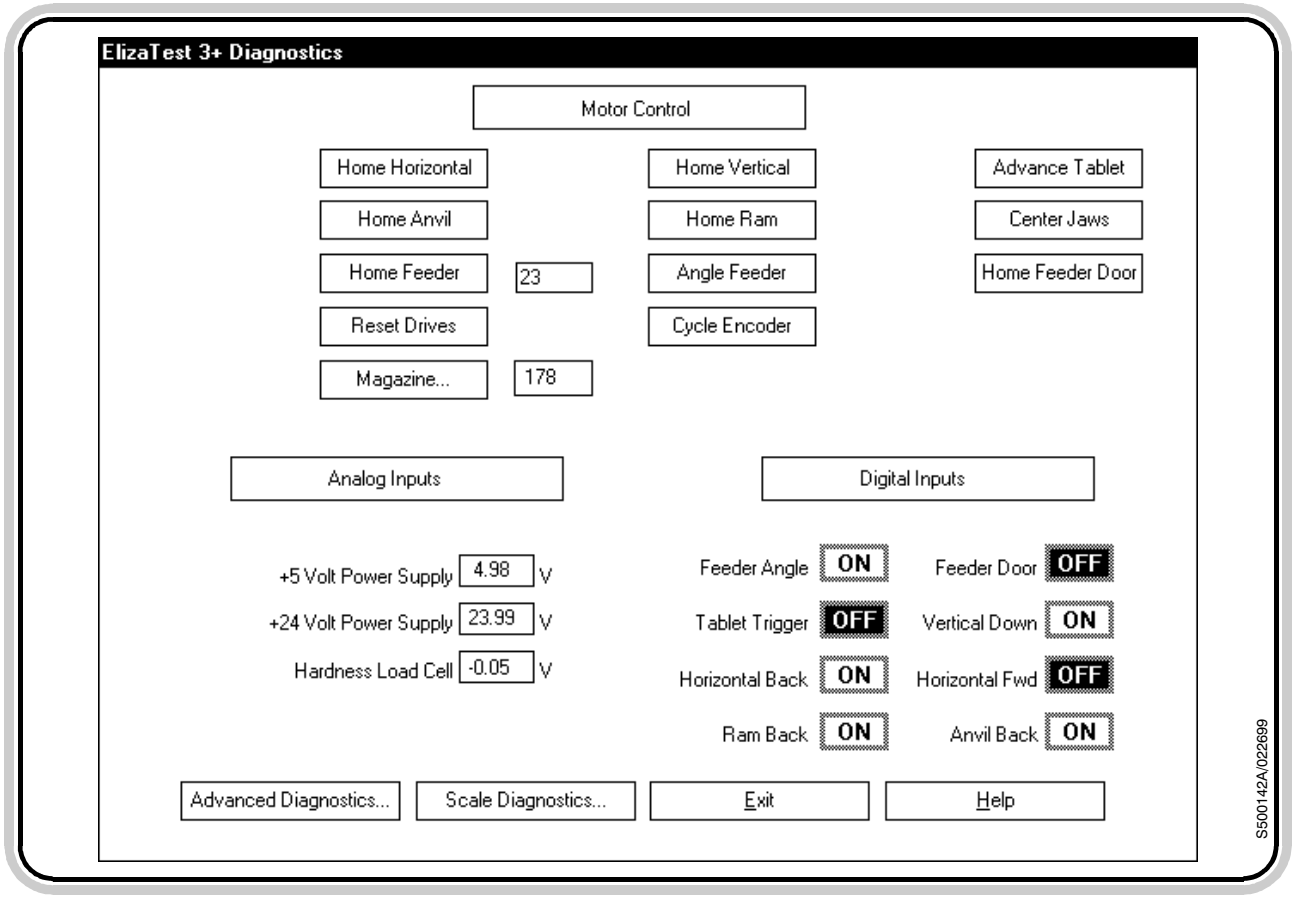

Figure 15.1- Diagnostics screen

15.1.1 Home Horizontal

Selecting this button will cause the horizontal slide of the tablet indexer to move to its home position. The horizontal slide is properly homed when the right edge of the pockets of the indexer are aligned with the right edge of the tablet thickness testing platen and the circular balance pan.

15.1.2 Home Anvil

Selecting this button will cause the hardness anvil to move to its home position. The hardness anvil is properly homed when the vertical face of the anvil is flush with the sides of the hardness testing station.

15.1.3 Home Feeder

Selecting this button will cause the tablet feeder to pivot to its home position. If the tablet feeder is already at the home position, no action will occur. The feeder is properly homed when it is approximately 10 degrees above the horizontal.

15.1.4 Reset Drives

Select this button to reset both stepper motor controller cards.

15.1.5 Magazine Diagnostics and Current Position

If the optional magazine is installed on the Tablet Testing Module, selecting this button will display the Magazine Diagnostics screen, which is covered in the section "Magazine Diagnostics". The Magazine Diagnostics screen contains its own group of controls to test functions involving the magazine. The number in the box to the right of the Magazine button displays the current rotational position of the magazine, and can range from 0 to 255.

15.1.6 Home Vertical

Selecting the Home Vertical button will cause the vertical slide of the tablet indexer to move to its home position. The vertical slide is

properly homed when the top surface of the indexer is flush with the top plate of the Tablet Testing Module.

15.1.7 Home Ram

Selecting the Home Ram button will cause the hardness ram to move to its home position. The hardness ram is properly homed when the vertical face of the anvil is flush with the sides of the hardness testing station.

15.1.8 Angle Feeder and Angle Setting

Selecting the Angle Feeder button will cause the tablet feeder to pivot to the angle that is set in the number field to the left of the Angle Feeder button. The angle value is measured in degrees, and can be set to any value between 10 and 40. Changing this value will not affect the value in the current tablet test setup definition.

15.1.9 Cycle Encoder

Selecting the Cycle Encoder button will cause the thickness encoder to move through one complete cycle, down then back up.

15.1.10 Advance Tablet

Selecting the Advance Tablet button will cause the tablet indexer to perform a single index move, as if it were indexing a tablet during a test. The current Tablet Advance Distance value that is set in the Tablet Test Setup screen will be used for the final 'push' of the indexer.

15.1.11 Center Jaws

Selecting the Center Jaws button will move both the hardness ram and anvil to the center of the hardness testing station. This function allows checking the clearnace between the hardness platforrm and the ram and anvil, and also to verify that their faces are parallel. The Anvil Offset and Ram Offset values are also indirectly checked by this function. When the offset values are correct, there will be a gap of approximately 0.010 inch between the hardness jaws.

15.1.12 Home Feeder Door

Selecting the Home Feeder Door button will cause the tablet feeder to dump any tablets remaining in the feeder and move the door in the feeder to its home position. The tablet feeder door is properly homed when it is facing upright.

15.2 Analog Inputs

These items show the voltages present on the 5 volt and 24 volt power supplies, as well as the voltage generated by the load cell that is used for hardness tests. The power supply voltages will normally be within 5% of their nominal values. The load cell value will read approximately 0.2 volt per kilopond (kilogram) of force being applied.

15.3 Digital Inputs

This area contains on/off indicators that reflect the current state of the various limit switches that are used in the Tablet Testing Module. Limit switches that are on are displayed in a green box, and limit switches that are off are shown with a red box. The limit switch indicators will change state as the different test functions are executed.

15.4 Scale Diagnostics

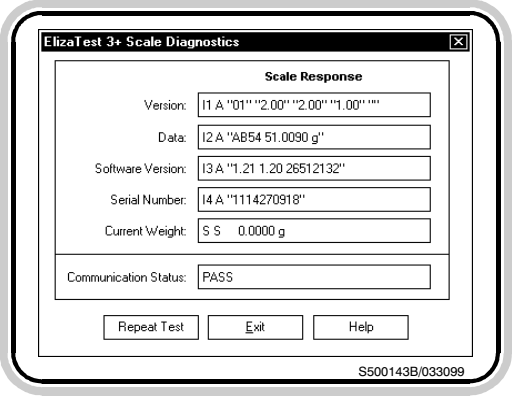

Figure 15.2- Scale Diagnostics dialog box

The Scale Diagnostics dialog box (figure 15.2) is shown by selecting the **Scale Diagnostics** button in the Diagnostics screen. When this dialog box is displayed, a series of commands will be sent to the balance, and the balance's response to these commands will be shown. After all commands have been answered, the Communication Status field will display "PASS", indicating that all commands have been responded to without error. Should a command not be correctly answered, an "ERROR" indication will be shown in the fields for which a problem was encountered. Any error will cause the Communication Status field to read "FAIL". The **Repeat**

Test button in the dialog box can be selected to perform to the test again. Choose the **Exit** button to return to the Diagnostics screen.

16 Advanced Diagnostics

The Advanced Diagnostics screen provides additional controls for testing and monitoring the individual components and sensors used in the ElizaTest 3+ Tablet Testing System. Some of the controls in the Diagnostics screen are duplicated in the Advanced Diagnostics screen for convenience. The Advanced Diagnostics screen (figure 16.1) is accessed by selecting the **Advanced Diagnostics** button in the Diagnostics screen. A security access level of Administrator is required to use the Advanced Diagnostics screen. The Advanced Diagnostics button in the Diagnostics screen will not be visible if the current operator does not have Administrator access privileges.

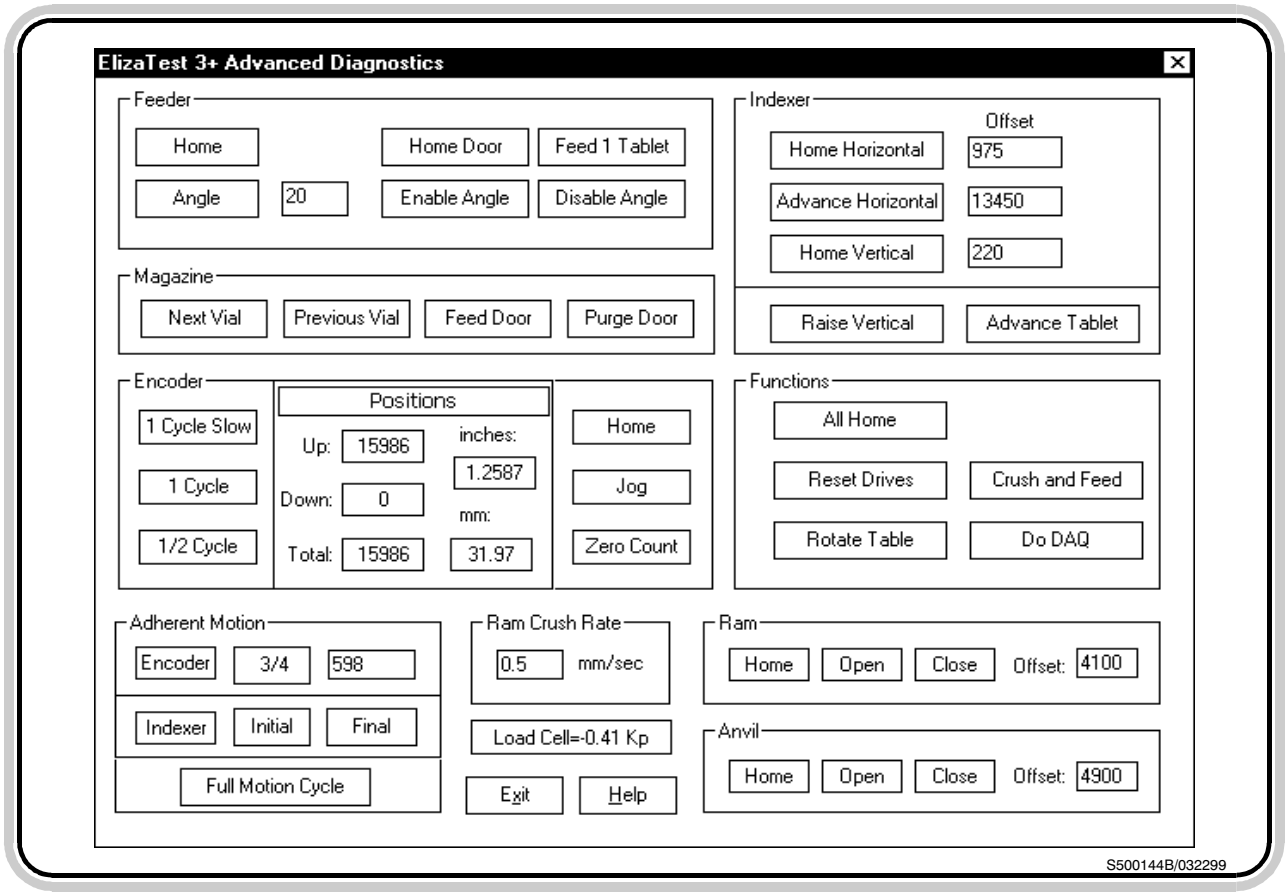

Figure 16.1- Advanced Diagnostics screen

16.1 Feeder Controls

This area of the Advanced Diagnostics screen contains buttons that can be used to test individual motors and movement sequences that involve the tablet feeder. Each item's function is briefly described below.

16.1.1 Home

Selecting the Home button will cause the tablet feeder to pivot to its home position. If the tablet feeder is already at the home position, no action will occur. The feeder is properly homed when it is approximately 10 degrees above the horizontal.

16.1.2 Angle and Angle Setting

Selecting the Angle button will cause the tablet feeder to pivot to the angle that is set in the number field to the right of the Angle button. The angle value is measured in degrees, and can be set to any value between 10 and 40. Changing this value will not affect the value in the current tablet test setup definition.

16.1.3 Home Door

Selecting the Home Door button will cause the tablet feeder to dump any tablets remaining in the feeder and move the door in the feeder to its home position. The tablet feeder door is properly homed when it is facing upright.

16.1.4 Feed 1 Tablet

Selecting the Feed 1 Tablet button will cause the tablet feeder feed a single tablet into the Tablet Testing Module. The tablet feeder will start feeding at whatever angle it is currently positioned. It will not pivot to its preset Feeder Angle position.

16.1.5 Enable Angle

Selecting the Enable Angle button sets the Table/Angle multiplexing relays to the Angle state (feeder angle relay on, hardness table relay off). If an operation is later selected that will

cause the hardness platform table to rotate, the multiplexing relays will automatically be set to the Table state (feeder angle relay off, hardness table relay on).

16.1.6 Disable Angle

Selecting the Disable Angle button sets the Table/Angle multiplexing relays to the Table state (feeder angle relay off, hardness table relay on). If an operation is later selected that will cause the tablet feeder to pivot, the multiplexing relays will automatically be set to the Angle state (feeder angle relay on, hardness table relay off).

16.2 Magazine Controls

This area of the Advanced Diagnostics screen contains buttons that can be used to test movement sequences and actions that involve the optional magazine. Each item's function is briefly described below. The items in this area are disabled and cannot be selected if the optional magazine is not installed.

16.2.1 Next Vial

Selecting the Next Vial button will cause the magazine to rotate clockwise to the next vial position.

16.2.2 Previous Vial

Selecting the Previous Vial button will cause the magazine to rotate counter-clockwise to the previous vial position.

16.2.3 Feed Door

Selecting this button will cause the Feed Door of the magazine to open for as long as the button is selected.

16.2.4 Purge Door

Selecting this button will cause the Purge Door of the magazine to open for as long as the button is selected.

16.3 Indexer Controls

This area of the Advanced Diagnostics screen contains buttons that can be used to test individual motors and movement sequences that involve the tablet indexer. This area also contains settings that control the final positioning of the indexer for homing. Note that the offset values have been properly set prior to shipment of the equipment. These values normally do not require readjustment unless a limit switch or mechanical component has been replaced. Each item's function is briefly described below.

16.3.1 Home Horizontal/ Offset Value

Selecting the Home Horizontal button will cause the horizontal slide of the tablet indexer to move to its home position. The horizontal slide is properly homed when the right edge of the pockets of the indexer are aligned with the right edge of the tablet thickness testing platen and the circular balance pan. The home position can be adjusted by changing the value in the Offset field. Decrease the value to move the home position towards the right.

16.3.2 Advance Horizontal/ Offset Value

Selecting the Advance Horizontal button will cause the tablet indexer to perform one complete cycle, returning to its home position at the end of the cycle. The value in the Offset field controls the overall length of the horizontal portion of the cycle. Increase this value to increase the stroke length. This value is properly set when the left edge of the pockets of the indexer are aligned with the left edge of the tablet thickness testing platen and the circular balance pan when the indexer is at it maximum stroke.

16.3.3 Home Vertical/Offset Value

Selecting the Home Vertical button will cause the vertical slide of the tablet indexer to move to its home position. The vertical slide is properly homed when the top surface of the tab-

let indexer is flush with the top plate of the Tablet Testing Module. The home position can be adjusted by changing the value in the Offset field. Decreasing this value will raise the height of the tablet indexer.

16.3.4 Raise Vertical

Select the Raise Vertical button to move the vertical indexer to the top of its stroke, where it will remain until it homed. Raising the indexer in this manner can be of assistance in cleaning the wiping blade and table.

16.3.5 Advance Tablet

Selecting the Advance Tablet button will cause the tablet indexer to perform a single index move, as if it were indexing a tablet during a test. The current Tablet Advance Distance value that is set in the Tablet Test Setup screen will be used for the final 'push' of the indexer.

16.4 Encoder Controls

This area of the Advanced Diagnostics screen contains buttons that can be used to test the movement sequences that involve the thickness encoder. Each item's function is briefly described below.

16.4.1 1 Cycle Slow

Selecting the 1 Cycle Slow button will cause the thickness encoder to move through one complete cycle at one-sixth of its normal operating speed.

16.4.2 1 Cycle

Selecting the 1 Cycle button will cause the thickness encoder to move through one complete cycle at its normal operating speed.

16.4.3 1/2 Cycle

Selecting the 1/2 Cycle button will cause the thickness encoder to move through one-half a complete cycle at its normal operating speed.

16.4.4 Home

Selecting the Home button will cause the thickness encoder to move to its top-dead-center home position.

16.4.5 Jog

Selecting the Jog button will cause the thickness encoder to move a small distance. Note that when the thickness encoder is close to the top or bottom of its stroke, the movements may be too small to see.

16.4.6 Zero Count

Selecting the Zero Count button will zero both the up and down counters. This operation should only be performed when the measuring foot of the encoder is resting flat on the bottom of the thickness measuring station. Zeroing the counters at any other time will result in erroneous thickness values.

16.4.7 Position Displays

There are two counters associated with the thickness encoder that measure the distance the encoder has traveled. One counter will respond when the encoder is moving up, and the other will respond when the encoder is moving down. When the down counter is subtracted from the up counter, this total count represents the position that the bottom of the thickness encoder foot is above the floor of the thickness testing chamber. The three counter displays are updated as the encoder is moving. The total count value of the thickness encoder is converted into inches and millimeters, and is also displayed in this area. These values are also updated as the encoder is moving.

16.5 Adherent Motion

This area contains controls to set the clearance and test the actions involved in the Adherent Tablet modified indexer motion.

16.5.1 Encoder 3/4 and Offset Value

The Encoder Offset value determines how high off the bottom of the testing chamber the thickness measurer will be at the end of the first stage of the adherent tablet indexing motion. The encoder must be positioned above the top of the tablet indexer at this point, otherwise the indexer will strike the thickness measurer as it moves forward. Increasing the value will increase the distance above the bottom of the testing chamber.

The 3/4 button may be selected to move the thickness measurer through the first stage of the adherent tablet indexing motion in order to test the offset value.

16.5.2 Indexer Initial

Select this button to cause the tablet indexer to perform the first stage of adherent tablet indexing motion. This will cause the indexer to move forward to the end of its stroke.

16.5.3 Indexer Final

Select this button to cause the tablet indexer to perform the final stage of adherent tablet indexing motion. This will cause the indexer to move back to the start of its stroke.

16.5.4 Indexer Full Motion Cycle

Select this button to cause a complete adherent tablet motion modified tablet indexing motion.

16.6 Ram and Anvil Controls

These areas of the Advanced Diagnostics screen contains buttons that can be used to test individual motors and movement sequences that involve the hardness ram and anvil jaws. This area also contains settings that control the final positioning of the jaws for homing. Note that the offset values have been properly set prior to shipment of the equipment. These values normally do not require readjustment unless a

limit switch or mechanical component has been replaced. Both the Ram and Anvil areas contain identical controls. Each item's function is briefly described below.

16.6.1 Home

Selecting the Home button will cause the ram or anvil hardness jaw to move to its fully-retracted home position. A jaw is properly homed when its vertical face is flush with the side wall of the hardness testing station.

16.6.2 Open

Selecting the Open button will cause the ram or anvil to retract a small distance, away from the center of the hardness testing station.

16.6.3 Close

Selecting the Close button will cause the ram or anvil to advance a small distance, toward the center of the hardness testing station.

16.6.4 Offset

This value is used to adjust the final home position of the hardness jaws. Decreasing this value will position the jaws more toward the center of the hardness testing station. Increasing the value will retract the jaws further into the machine.

16.7 Ram Crush Rate and Load Cell Display

This item can be used to set the speed that the ram will move during the final portion of the hardness test, as the tablet is actually broken. The value is expressed in millimeters per second, and can range from 0.1 to 5.0. The factory setting is 0.5 mm/sec. Changing this setting will affect the apparent hardness of tablets.

The Load Cell value shows the current force being applied to the hardness load cell. It is expressed in kiloponds only, and cannot be changed.

16.8 Functions

16.8.1 All Home

Selecting this button will cause the indexer, thickness encoder, feeder, ram, and anvil to move to their home positions.

16.8.2 Reset Drives

Selecting this button will send a reset signal to the stepper motor drives.

16.8.3 Rotate Table

When selected, this button will cause the hardness platform to rotate one complete revolution.

16.8.4 Crush and Feed

Selecting this button will cause a hardness test and tablet feeding operation to occur simultaneously.

16.8.5 Do DAQ

Select this button to cause a load cell data acquisition cycle to be performed.

17 Magazine Diagnostics

The Magazine Diagnostics screen (figure 17.1) provides a set of controls for testing the functions of the optional magazine. By using the controls in this screen, the magazine can be rotated to any position, vials can be emptied, and the magazine doors may be opened. Each control in the Magazine Diagnostics screen is described below. Select the **Exit** button in the Magazine Diagnostics screen to leave the screen.

17.1 Magazine Schematic

The right side of the screen contains a top view schematic of the magazine, shown in its current position. This schematic is updated as the magazine rotates. The schematic magazine will show the number of vials as has been set in the current magazine configuration being used

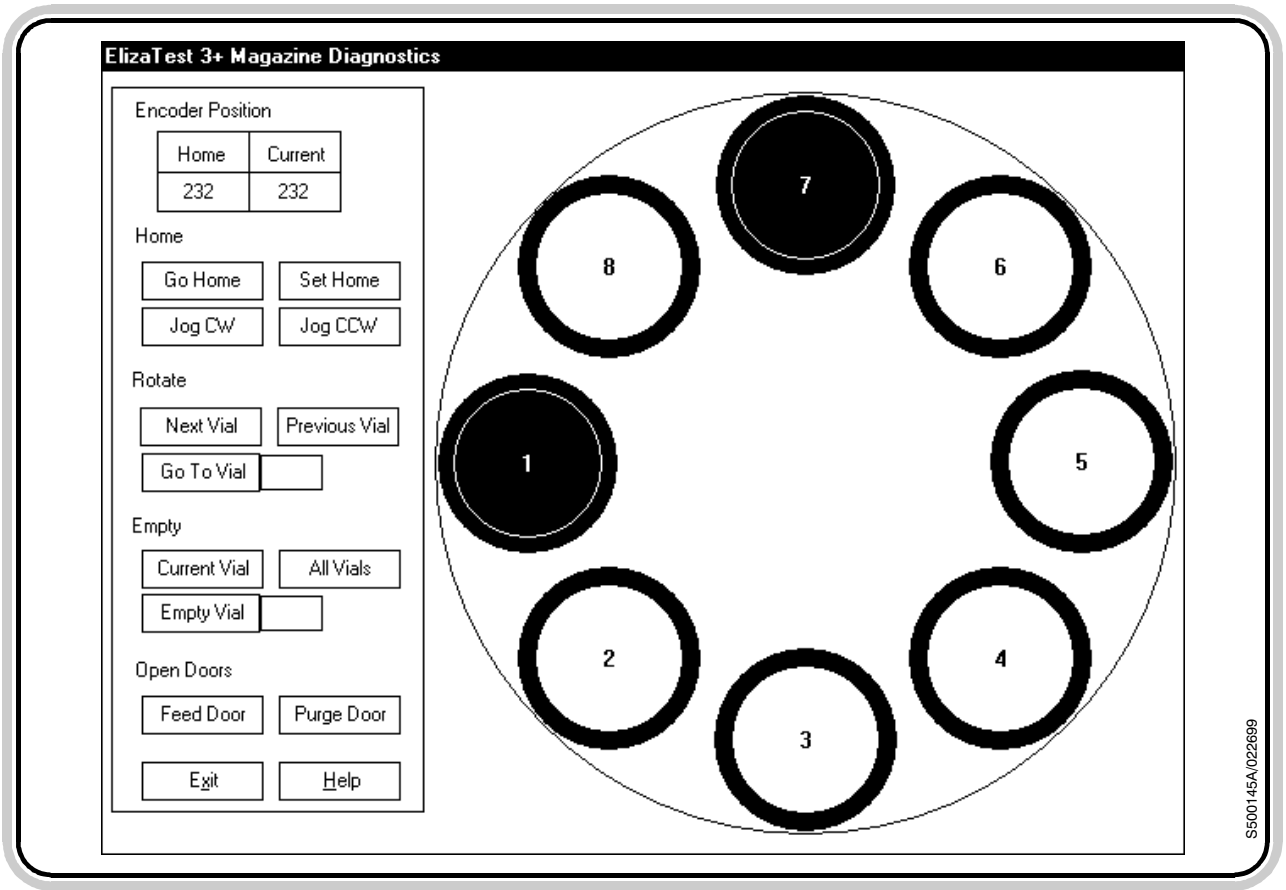

Figure 17.1- Magazine Diagnostics screen

in the Magazine screen. The number of vials may be either 8 or 12. Each vial is numbered in the schematic. The green circle at the 9 o'clock position indicates the location of the feed door, where tablets will be dropped into the tablet feeder inside the Tablet Testing Module, and the red circle at the 12 o'clock position indicates the location of the purge door, where a vial may emptied into the chute located at the rear of the machine.

17.2 Encoder Position

This area displays the current rotational position of the magazine, and the position that has been identified as the 'home' position. These values can range from 0 to 255. The Current Position value will be updated as the magazine rotates. One encoder count equals approximately 1.4 degrees.

17.3 Home Controls

These buttons provide a means for moving to and setting the home position of the magazine. The **Jog CW** (clockwise) and **Jog CCW** (counter-clockwise) will rotate the magazine one encoder count each time the buttons are selected. Selecting the **Go Home** button will cause the magazine to rotate to the position that has been identified as the 'home' position. Selecting the **Set Home** button will register the current position of the magazine as the home position. This will not necessarily be the zero count position. The Set Home button cannot be selected while the magazine is moving. For consistency, it is recommended that home position always be set so that vial 1 is centered over the feed door. If another position is registered as the home position, the numbered vials in the schematic view will not match the numbers stamped into the magazine itself, and the wrong vials will be tested.

17.4 Rotate Controls

Selecting the **Next Vial** and **Previous Vial** buttons will rotate the magazine until the next or previous adjacent vial is centered over the feed door. Selecting Next Vial will rotate the magazine clockwise, and selecting Previous Vial will rotate the magazine counter-clockwise. Since the magazine is circular, the highest-numbered vial is adjacent to vial 1. The **Go To Vial** button allows for moving to a specific vial. Enter the number of the vial to move to into the field, then select the button. Please note that only valid vial numbers can be entered.

17.5 Empty Controls

This group of controls allows for emptying any or all of the vials by means of the purge door and chute located at the rear of the Tablet Testing Module. Selecting the **Current Vial** button will empty the vial the that is positioned over the purge door. The purge door will open for a few seconds to empty the contents of the vial, then close. If a vial is not centered over the purge door, this button cannot be selected. Selecting the **All Vials** button will open the purge door, and while the door remains open, the magazine will rotate one revolution, briefly pausing as each vial passes over the open door to allow the vial time to empty. After all vials have passed over the door, the purge door will close. The **Empty Vial** button allows for emptying a specific vial. Enter the number of the vial to empty into the field, then select the button. Please note that only valid vial numbers can be entered. When the Empty Vial button is selected, the desired vial will move over the purge door, which will then open for a few seconds.

17.6 Open Doors

These buttons can be selected to manually open either the feed door or purge door. The door will open for as long as the button is selected. Please note that the doors cannot be opened if the magazine is currently rotating.

18 Integrating the ElizaTest 3+ Tablet Testing System with the TabSys Tableting Press Interface

This section describes the highlights of using the ElizaTest 3+ Tablet Testing system as an in-line production tester in conjunction with an Elizabeth-Hata tableting press. When the two are integrated, tablet tests are initiated by commands from the tablet press. The tablet press specifies what product, batch, and tablet test setup to use, as well as the frequency of testing. After tablet tests are run by the ElizaTest 3+, the press is notified of the results of the tests, so that it may use this information to make any needed adjustments in the tablet-making process. Other details of integration and inline production testing can be found in the *TabSys Tablet Press Interface User Manual*.

18.1 Database Locations and Contents

Both the ElizaTest 3+ Vision Tablet Testing System and the TabSys Tableting Press Interface maintain their own independent databases. However, when the ElizaTest 3+ is integrated with the tableting press, they must share their databases with each other, forming a single distributed database. This is required in order for the TabSys interface to be able to access Tablet Test Setup definitions from the ElizaTest 3+, and for the TabSys interface to be able to print tablet test results and other reports from the ElizaTest 3+. Each will also need to access the same common set of products and batches.

When the ElizaTest 3+ is integrated with the TabSys interface, the press will act as the 'master' database. The products and batches that have been defined will be resident within the TabSys database, as will the results of all tablet tests performed.

Once an ElizaTest 3+ tablet tester has been integrated with a tablet press, special considerations must be given to the tablet tester's database if the ElizaTest 3+ is ever removed from inline production testing service.

When the tablet tester is acting as an inline-production tester, the default database configuration is such that all products and batches used are resident in the tablet press database, and not the tablet tester database. If the ElizaTest 3+ is taken out of inline service, any data generated by the tester while it is out of service cannot be used by the tablet press if the two are reintegrated in the future. Complete details of the database configurations are found in the *TabSys Tableting Press Interface User Manual*.

18.2 System Startup Considerations

Generally speaking, the order that the ElizaTest 3+ computer and TabSys computer are started does not affect system operations. It is important, though, that both computers are powered up and the Windows NT operating systems be allowed to initialize before the actual ElizaTest 3+ and TabSys programs themselves are started. Refer to the *TabSys Tableting Press Interface User Manual* for specific information concerning the tablet press.

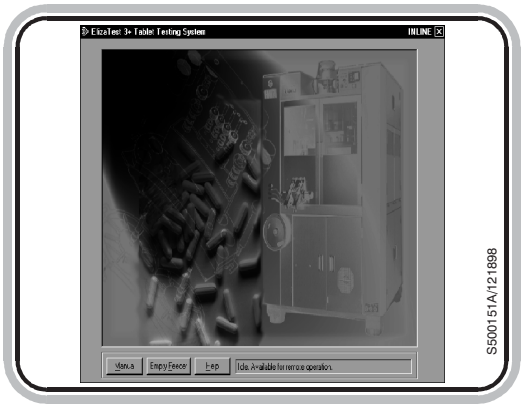

Figure 18.1- In-Line Production idle screen

The next step is to start the ElizaTest 3+ software. The ElizaTest 3+ will then perform its initialization, mechanically home the system, and connect to the required database tables resident on the TabSys computer. When the initialization is complete, the ElizaTest 3+ will then display the In-Line Production idle screen (figure 18.1).

At this point, the TabSys Tableting Press Interface program may then be started. As the TabSys interface is initializing, it determines whether or not the In-Line Production Tester is enabled, and if it is, it will then attempt to estab-

lish the appropriate connections to the database tables on the ElizaTest 3+ in preparation for tablet testing. If these connections cannot be made, such as will be the case if the ElizaTest 3+ is not present or is not turned on, the operator will be notified of the problem and inline production tablet testing will not be performed.

18.3 In-Line Production Testing

18.3.1 Remote Procedure Call (RPC) Basics

Remote Procedure Calls (RPCs) are a method of carrying out interprocess communications (communications between two or more separately executing programs). The programs may reside on the same computer, or may reside on two physically separate computers. This is the case when the ElizaTest 3+ Tablet Testing System is integrated with the tablet press. The TabSys Interface uses RPCs (carried via the Ethernet link between the two machines) to instruct the ElizaTest 3+ to begin testing. Likewise, the ElizaTest 3+ uses RPCs to inform the TabSys Interface about its state and to supply the TabSys Interface with the final test results. Remote Procedure Calls provide the means to invoke functions of other programs exactly as if the function was initiated by the program itself.

18.3.2 The Tablet Testing Sequence

When an inline production tablet test is required, the TabSys interface will request permission from the ElizaTest 3+ to begin testing. If the ElizaTest 3+ is in a state that allows it to accept and test tablets, permission will be granted to the TabSys interface. The TabSys interface will then log on to the ElizaTest 3+ and synchronize the tester's time with its own. At this point, the ElizaTest 3+ is then 'locked' to the press.

If permission could not be granted to begin testing tablets, such as may happen when the ElizaTest 3+ is busy (operating in manual mode, or locked by another tablet press), the ElizaTest

3+ will deny TabSys permission to begin testing, and TabSys will not be allowed to sample or test tablets until the ElizaTest 3+ notifies it that it is no longer busy. The ElizaTest 3+ tablet tester keeps track of which presses request permission to test tablets, and will then notify each of them when it is no longer busy. The press may then try again after it receives notification that the tester is free, if desired.

Once permission has been granted to the TabSys interface, the sampling gate in the tablet chute will open, and remove as many tablets as is requested by the Test Settings definition being used for this side of the press. The tablets are then delivered to the ElizaTest 3+'s tablet feeder. TabSys then commands the ElizaTest 3+ to begin its test.

After the test is complete (assuming that there were no problems with either the tablets or the ElizaTest 3+), the results of the test will be sent back to the TabSys interface. TabSys then processes the test results, and will adjust the press to change the tablet weight, thickness, or hardness if needed. If adjustments to the press are necessary, TabSys will keep its lock on the ElizaTest 3+, and will resample and retest the same side of the press to make sure the adjustments were correct. If no adjustments to the press are needed, TabSys will release its lock on the ElizaTest 3+, which will then return to its idle state.

18.3.3 Tablet Tester Hardware Errors

There are three major categories of tablet tester hardware problems. Each is handled differently, depending on the problem and when it occurs. One common feature is that any type of tablet tester hardware error will generate a tablet press alarm, stopping the press.

The first category of problems are those that occur prior to a tablet test actually getting underway. These problems are usually the result of

either the tablet feeder or thickness gauge not being in the proper position. If this is the case, a dialog box will appear on the ElizaTest 3+ video monitor describing the problem, and will give the operator a chance to correct it. If the problem was successfully corrected, the test will continue. If the operator decides not to correct the problem, the current test will be aborted, TabSys will be forcibly unlocked from the tablet tester, and the ElizaTest 3+ will not be able to accept any tablets for testing until the trouble is rectified. No record of the aborted tablet test will be kept in the database.

Other types of problems that cannot be corrected by simple operator intervention will cause the test to abort immediately. Again, TabSys will be forcibly unlocked from the tablet tester, and the ElizaTest 3+ tablet tester will not be able to accept any tablets for testing until the trouble is corrected. No record of the aborted tablet test will be stored in the database.

The next category is problems that occur during a tablet test, before the test is finished. Any problems encountered during an actual tablet test will cause the test to be aborted. As with any other hardware error, TabSys will be unlocked from the tablet tester, and the ElizaTest 3+ cannot accept any more tablets for testing until the trouble is corrected. Again, no record of the aborted test will be kept.

The last group of problems are those that occur during the tablet tester clean-up phase, after a test has completed but before TabSys releases its lock on the tester. In this case, the test results will be recorded.

18.3.4 Tablet Test Process Errors

Tablet test process errors are those that are generated due to problems with the tablets being tested. Tablet test process errors also gen-

erate a machine-stop alarm. Process errors are unique in the fact that they can be enabled or disabled by checking the appropriate options in the Test Settings definitions in the TabSys interface; specifically, T2 violations for weight, thickness, and hardness, and excessive weight percent standard deviation can be selected to stop the machine. Refer to the *TabSys Tableting Press Interface User Manual* for complete information on Test Settings definitions. When a tablet test process error occurs, a tablet press machine-stop alarm will be generated and the results of the tablet test will be discarded. Tablet test T2 errors will cause the machine-stop alarm to occur immediately. However, because the weight percent standard deviation cannot be computed until the entire test has been run, this error can only be generated at the end of the test sequence.

18.3.5 System (RPC) Errors

System errors occur when there is some type of trouble with the Remote Procedure Call mechanism. The RPC system performs extensive error checking on each communication that is generated. Any error in the RPC will generate a tablet press machine-stop alarm.

When system errors occur, first check to make certain that both the ElizaTest 3+ tablet tester and the TabSys Tableting Press Interface are both up and running, and that the Ethernet cabling is intact. Dropping the Ethernet connection during a tablet test is probably the most common cause of system errors.

If there appears to be no obvious physical reason why system errors are occurring, examine the event logs of both the tablet tester and tablet press. The logs will contain entries that indicate what operations had failed. Contact Elizabeth-Hata International, and forward the contents of the logs.

18.3.6 Aborting a Tablet Test from the Tablet Press

Once the TabSys tableting press interface has been locked to the ElizaTest 3+ Tablet Testing System, testing may be aborted by the press operator at any time. To abort the tablet test, select the **Abort Tablet Test** button in the Operator Panel, Main Controls screen of the TabSys interface, the **Abort Tablet Test** button on the physical operator panel, or the **Stop** button in the Tablet Test Run screen on the ElizaTest 3+ itself. When a test is aborted, the ElizaTest 3+ will be unlocked from the press. To resume testing, it will be necessary to begin the tablet testing sequence (as described above) again.

If a test is aborted before it finishes, any tablet test results obtained for the test will be discarded, and no record of the test will be kept in the database. Results from tests that ran to completion prior to the abort will be kept in the database, and any adjustments to the press that are required will be made.

18.3.7 How Tablet Press Machine-Stop Alarms are Handled

Any tablet press machine-stop alarm that occurs while the ElizaTest 3+ tablet tester is locked to the press will cause an abort request to be sent to the tester. Whether or not the tablet test results are recorded in the database will depend on the time that the machine-stop alarm occurred. Machine-stop alarms that occur during a testing cycle (or re-testing cycle if a machine adjustment was made) will end the cycle.

18.4 Other Differences While Operating as an Inline Production Tester

18.4.1 Magazine Operation

Magazines cannot be used while the ElizaTest 3+ tablet tester is operating in the inline production testing mode. If the ElizaTest 3+ detects that a magazine is present during its start-up initialization, a message box will appear

alerting the operator that an invalid hardware configuration has been detected, and the software will not be allowed to start until the magazine is removed.

18.4.2 Maintenance Administration

When the ElizaTest 3+ is being used as an inline production tablet tester, a few differences are apparent in the operation of the Maintenance Administration dialog box. While operating in this mode, the Archive, Disk Space Monitor, and Compaction items are disabled. The database archive and compaction scheduling are set through similar items in the TabSys tableting press interface. The ElizaTest 3+ will still maintain its own event log.

18.4.3 Inline Production Idle Screen and Manual Operation

While the ElizaTest 3+ is being used as an inline production tester, the Inline Production Idle screen will be shown while no tablets are actually being tested. Select the **Manual** button in the Inline Production Idle screen to enter a manual mode of operation, where it is possible to run single-test mode tablet tests, create and edit setups, configure users, or nearly any other operation that can be performed. As always, it will be necessary to log on to the system before using it. The ElizaTest 3+ will not be able to perform inline production testing until manual mode is exited.

19 Appendices

19.1 Appendix A- Event Log Entries

This appendix describes the various messages that are reported in the Event Log maintained by the system. The Event Log lists both error messages and procedural events. Most of the error messages that are logged have also appeared on the monitor at the time they occurred. This appendix does not cover error messages generated by the vision sub-system.

19.1.1 Analog board initialization errors (numerous variations)

An error was encountered during the start-up of the ElizaTest 3+ program. Information shown in the error message should be supplied to Elizabeth-Hata to assist in determining the cause and corrective actions to take.

19.1.2 Analog board read errors (numerous variations)

An error was encountered as information was being read from the analog circuit card. Information shown in the error message should be supplied to Elizabeth-Hata to assist in determining the cause and corrective actions to take.

19.1.3 Analog board write errors (numerous variations)

An error was encountered as information was being transferred to the analog circuit card. Information shown in the error message should be supplied to Elizabeth-Hata to assist in determining the cause and corrective actions to take.

19.1.4 Bad voltage on 5V supply (high/low)

A voltage fluctuation occurred with the 5 volt power supply. A 5% variation is allowed. If this message frequently occurs, contact Elizabeth-Hata, and be prepared to state what the equipment was doing when the error occurred (machine was idle, in the process of testing, etc.).

19.1.5 Bad voltage on 24V supply (high/low)

A voltage fluctuation occurred with the 24 volt power supply. A 5% variation is allowed. If this message frequently occurs, contact Elizabeth-

Hata, and be prepared to state what the equipment was doing when the error occurred (machine was idle, in the process of testing, etc.).

19.1.6 Hardness calibration validation error

The hardness load cell must be initially calibrated before a test can be run.

19.1.7 COM port open error

The computer could not open a communications channel using the serial COM port. The com ports are used for the pointing device and the balance. If this error occurs frequently, contact Elizabeth-Hata.

19.1.8 Scale communications error

The computer could not communicate with the balance. If this error occurs frequently, contact Elizabeth-Hata.

19.1.9 Scale unsteady

The balance reading did not stabilize within the allotted time during a tablet test. Make certain that the tablet tester covers are closed, and the equipment is on a level, vibration-free surface. Do not jar the equipment while it is performing a tablet test.

19.1.10 Scale not zero at end of test

The balance did not read zero at the end of a tablet test. This may be due to a tablet particle that is caught between the balance pan and the side of the weight testing station, or to a large accumulation of dust in the unit. The weight results of the last test may not be valid. This information is presented as a warning only.

19.1.11 Encoder limit violation (while waiting for operation)

The limit switch for detecting the thickness encoder home position could not be sensed. This error indicates that the limit switch may have failed. If this error frequently occurs, contact Elizabeth-Hata.

19.1.12 Encoder movement with unhomed indexer

The thickness encoder attempted to move when the tablet indexer was not in its home position. This error indicates that the indexer failed to complete its last movement. If this error frequently occurs, contact Elizabeth-Hata.

19.1.13 Encoder not in home position (operation aborted)

The thickness encoder was not properly homed when a test was started. The operator was given a chance to correct the problem.

19.1.14 Encoder position validation error

The thickness encoder was not properly homed when a test was started. The operator was given a chance to correct the problem.

19.1.15 Feeder fault (failed movement command)

The tablet feeder did not complete a movement in the allotted time.

19.1.16 Feeder not at home position (move aborted)

The tablet feeder was not in its home position prior to starting a test.

19.1.17 Feeder empty

The tablet feeder ran out of sample tablets during a test.

19.1.18 Feeder refilled from vial XXX

The tablet feeder was refilled from the indicated magazine vial during a test that spanned more than one vial (a continued chain).

19.1.19 Feeder autorefill failed (not enough vials to finish test)

There were not enough tablets in the magazine vial(s) to complete the requested number of samples for a tablet test.

19.1.20 Tablet trigger fault (stuck)

The Tablet Trigger sensor detected a tablet when none was expected. This is normally due to a build-up of dust. Clean the tablet trigger sensor regularly with a foam swab.

19.1.21 Indexer movement with jaws closed

The tablet indexer attempted to move when the ram and/or anvil was not in its home position. This error indicates that the ram and/or anvil failed to complete its last movement. If this error frequently occurs, contact Elizabeth-Hata.

19.1.22 Indexer movement with encoder down

The tablet indexer attempted to move when the thickness encoder was not in its home position. This error indicates that the encoder failed to complete its last movement. If this error frequently occurs, contact Elizabeth-Hata.

19.1.23 Wait for operation timed out

A requested movement failed to complete in its allotted time. This may be due to mechanical damage or the failure of a limit switch. If this error frequently occurs, contact Elizabeth-Hata.

19.1.24 Motion card initialization error

One of the two stepper motor motion control circuit cards could not be properly initialized. If this error frequently occurs, contact Elizabeth-Hata.

19.1.25 Motion card i/o error

The computer could not communicate with one of the two stepper motor motion control circuit cards. If this error frequently occurs, contact Elizabeth-Hata.

19.1.26 Vision is not available

The vision sub-system could not be initialized. If this error frequently occurs, contact Elizabeth-Hata.

19.1.27 Database error - open database

The ElizaTest 3+ database could not be properly opened before use. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.28 Database error - open table

A table in the ElizaTest 3+ database could not be properly opened before use. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.29 Database error - delete record

A database record could not be deleted properly. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.30 Database error - insert record

A database record could not be inserted properly. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.31 Database error - update record

A database record could not be updated properly. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.32 Database error - next record

No next database record was found when one was expected to be present. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.33 Database error - unable to obtain ODBC field info

ODBC information for database operations could not be found. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.34 Database error - delete query failure

A group of related database records could not be deleted properly. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.35 Successful database compaction

The database was compacted without incident.

19.1.36 Failed Database compaction

The database could not be successfully compacted. No data has been lost. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.37 Archiving database XXX

An archive of the listed primary database was started.

19.1.38 Initiating backup phase of archive operation

A copy of the data in the primary database is being sent to the archive file.

19.1.39 Initiating delete phase of archive operation

The data that was copied to the archive file is being deleted from the primary database.

19.1.40 Archive operation complete

The archive is finished.

19.1.41 Closing archive database

The archive database file is closed.

19.1.42 Low disk capacity

The computer's hard disk is running out of required space. The operator has been given a chance to correct or ignore the problem.

19.1.43 Access error (while determining disk capacity)

One or more disk drives could not be examined for the amount of free space it has left. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.44 Event log cleared

The Event Log was manually cleared immediately prior to this entry.

19.1.45 Unable to clear the event log

The event log could not be manually cleared. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error oc-

curs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.46 Deleted events prior to XXX

The automatic deletion of the events listed was performed.

19.1.47 Unable to delete events prior to XXX

The automatic deletion of the events listed could not be performed. If the database is part of a network connection, make certain the network is running and all connections are physically secure. If the error occurs frequently, contact Elizabeth-Hata, and be prepared to state the sequence of events prior to receiving this error.

19.1.48 Calibrated camera

The camera was successfully calibrated.

19.1.49 Calibrated scale

The balance was successfully calibrated.

19.1.50 Calibrated thickness encoder

The thickness encoder was successfully calibrated.

19.1.51 Calibrated hardness load cell

The hardness load cell was successfully calibrated.

19.1.52 Added batch (p,b) [XXX]

The listed batch was added to the database. p = internal product ID, b = internal batch ID, XXX = batch name.

19.1.53 Deleted batch (p,b) [XXX]

The listed batch was deleted from the database. p = internal product ID, b = internal batch ID, XXX = batch name.

19.1.54 Renamed batch (p,b) [XXX=>YYY]

The listed batch was renamed. p = internal product ID, b = internal batch ID, XXX = original batch name, YYY = new batch name.

19.1.55 Deleted magazine (m) [XXX]

The listed magazine was deleted from the database. m = internal magazine ID, XXX = magazine name.

19.1.56 Renamed magazine (m) [XXX=>YYY]	The listed magazine was renamed. m = internal magazine ID, XXX = original magazine name, YYY = new magazine name.
19.1.57 Saved magazine (m) [XXX]	The listed magazine was saved to the database. m = internal magazine ID, XXX = magazine name.
19.1.58 Deleted product (p) [XXX]	The listed product was deleted from the database. p = internal product ID, XXX = product name.
19.1.59 Renamed product (p) [XXX=>YYY]	The listed product was renamed. p = internal product ID, XXX = original product name, YYY = new product name.
19.1.60 Saved product (p) [XXX]	The listed product was saved to the database. p = internal product ID, XXX = product name.
19.1.61 Deleted setup (s) [XXX]	The listed setup was deleted from the database. s = internal setup ID, XXX = setup name.
19.1.62 Renamed setup (s) [XXX=>YYY]	The listed setup was renamed. s = internal setup ID, XXX = original setup name, YYY = new setup name.
19.1.63 Saved setup (s) [XXX]	The listed setup was saved to the database. s = internal setup ID, XXX = product name.
19.1.64 Deleted operator XXX	The listed operator was deleted from the authorized user list.
19.1.65 Renamed operator [XXX=>YYY]	The listed operator was renamed. XXX = original operator name, YYY = new operator name.
19.1.66 Saved operator XXX	The listed operator was saved to the database.
19.1.67 Test aborted (p,b,s) [m,v]	A tablet test was aborted due to an error. p = internal product ID, b = internal batch ID, s = internal setup ID, m = internal magazine ID, v = vial number.

19.1.68 Test canceled (p,b,s) [m,v]	A tablet test was canceled by the operator. p = internal product ID, b = internal batch ID, s = internal setup ID, m = internal magazine ID, v = vial number.
19.1.69 Test finished (p,b,s) [m,v]	A tablet test was completed. p = internal product ID, b = internal batch ID, s = internal setup ID, m = internal magazine ID, v = vial number.
19.1.70 Test started (p,b,s) [m,v]	A tablet test was started. p = internal product ID, b = internal batch ID, s = internal setup ID, m = internal magazine ID, v = vial number.
19.1.71 Test results saved (p,b,s)	The results of a tablet test were saved to the database. p = internal product ID, b = internal batch ID, s = internal setup ID.
19.1.72 Test results discarded (p,b,s)	The results of a tablet test were discarded. p = internal product ID, b = internal batch ID, s = internal setup ID.
19.1.73 Test results moved to permanent tables	The results of a tablet test were moved from the temporary results database tables into the permanent tables.
19.1.74 Operator XXX logged on	The listed operator logged onto the system.
19.1.75 Operator XXX logged off	The listed operator logged off the system.
19.1.76 Failed log on	An unsuccessful log-on occurred.
19.1.77 Starting Elizatest 3+	The ElizaTest 3+ program was started.
19.1.78 Shutting down Elizatest 3+	The ElizaTest 3+ program was exited.
19.1.79 Aborting Elizatest 3+	The ElizaTest 3+ program was aborted due to an error.
19.1.80 Recovery situation detected	An aborted test cycle was discovered during program start-up.

19.1.81 User elected to resume the test cycle

The operator resumed an aborted test cycle.

19.1.82 User elected to save/discard the test results

The operator saved or discarded the results of an aborted test cycle.

19.1.83 Incomplete test recovery data detected. Tables cleared

There was not enough information available to recover the results of an aborted test cycle. The temporary database tables were cleared.

19.1.84 Initiating inline production testing.

The tablet tester database is configured for in-line testing

19.1.85 Tester available for remote operation.

The tester is in an idle state, awaiting commands from the tablet press.

19.1.86 Tester locked remotely. [XXX]

The tablet press has exclusively connected to the tester in preparation for an inline tablet test. XXX is the name of the computer associated with the tablet press.

19.1.87 Remote abort request.

The tablet press has requested that the current test be aborted.

19.1.88 Disconnected press. (XXX) [YYY]

The tablet tester has disconnected itself from the tablet press. This occurs when an operation must be terminated prematurely due to unusual conditions. This also occurs when tablet tests are aborted. XXX is the disconnect code, and YYY is the name of the computer associated with the tablet press.

19.1.89 Tester unlocked. [XXX]

The tablet press has released its exclusive connection to the tablet tester. XXX is the name of the computer associated with the tablet press.

19.1.90 Manual mode requested.

An operator has attempted to enter the manual mode of operation from the inline production mode.

19.1.91 Entering manual mode.

An operator has entered the manual operating mode.

19.1.92 Test results sent to press. [XXX]

The results of the last tablet test have been sent to the tablet press. XXX is the name of the computer associated with the tablet press.

19.1.93 Notified press test is complete. [XXX]

The tablet press has been informed that the test (including the clean-up phase) is completed. XXX is the name of the computer associated with the tablet press.

19.1.94 Locked for remote DB maintenance. [XXX]

The tablet press has exclusively connected to the tablet tester in order to perform a database maintenance operation, such as compaction or archival. XXX is the name of the computer associated with the tablet press.

19.1.95 [P] T2 violation. Tablet is too .... (Side n)

A tablet exceeded the upper or lower limits of a particular property, and the tablet press was notified of the event. The message will state what property was exceeded and what side (if applicable) of the press was being tested at the time.

19.1.96 [P] Too few tablets tested (x out of y). (Side n)

Not enough tablet were successfully tested to consider the test complete, and the tablet press was notified of the event. The message will state how many were tested, how many were required, and what side of the press (if applicable) was being tested.

19.2 Appendix B- Vision System Errors

This appendix describes the various errors that are generated by the vision sub-system during learning and aligning tablets, and offers possible solutions to these problems. During the learning process, any vision errors are displayed in a message box. While a tablet test is in progress, errors that are encountered are displayed in the Test Status area of the Tablet Test Run screen. The Test Status indicator also alerts the operator if three tablets have consecutively failed a plausibility check at one of the testing stations.

19.2.1 Could not orient tablet

The Tablet Testing Module could not orient the tablet. This is the most common type of error encountered, and its causes are many. If bisect detection is being used, a tablet that is upside-down can not be oriented. If the bisect was right-side up, it is possible that there is not enough contrast or light for the system to find the bisect properly. A poor alignment image can also cause difficulties in bisect detection alignment. Relearn the tablet's alignment image. Too much light can be a factor. Reduce the Light Intensity value if the tablets appear washed-out. Large areas of purple (magenta) indicate that the light is too bright.

The tablets must be positioned entirely on the hardness platform. Tablets that have a tendency to roll may end up being positioned partially off the rotating platform. If this is the case, reduce the Tablet Advance Setting. Too small of a setting may not push the tablets far enough onto the hardness platform. A dirty hardness platform can cause orientation problems. The platform must be clean in order for the vision system to properly distinguish the tablet from the background. This is especially important when dark-colored tablets are tested.

The camera must be in proper focus, and the aperture F-stop setting must be correct. The camera has been properly adjusted prior to shipment. If the images appear fuzzy and lack detail, adjust the focusing ring while viewing the supplied camera calibration disk. The edges of the disk and the printing on the disk should appear sharp. The F-stop setting should range between 2 and 2.8. Testing tablets using a different F-stop than the reference alignment image was learned with may cause problems, since the images will be of different overall brightness.

19.2.2 Could not find tablet

This error occurs when there is no tablet to find, or the image is of such poor quality that the tablet cannot be identified. Check to see that the light source is functioning. Tablets that have a tendency to roll may end up rolling out of the field of vision, or out of the hardness testing station entirely. If this is the case, reduce the Tablet Advance Setting. It is also possible that the tablet bounced out of the receiving station after being fed, causing an empty station to be advanced. Plausibility checks performed on thickness or weight will catch this problem before the alignment is performed for the hardness test.

19.2.3 Too many spokes found;
Fewer than 2 spokes found;
Tablet too round;
No tablet edges found

These errors are most often caused by improper lighting. They are generated when the vision system cannot correctly determine the edges of a tablet. The computer-drawn bounding box and lines that are superimposed on the image can aid by showing where the system 'thinks' it has found the tablet edges. Tablets made using tooling with very deep cup depths are most susceptible to this. Often times a small change in light intensity will correct this error, or at least minimize its frequency. If changing the lighting does not help, it may be necessary to adjust the F-stop and/or focus and relearn the

image with the new settings. The Setup Comment field should note the new settings, because they will also need to be manually adjusted before testing these tablets.

19.2.4 Vision library C++ exception; Unknown vision error. Error code = x

These errors indicate some form of software error. Contact Elizabeth-Hata if these errors occur.

19.2.5 Tablet area mismatch

This error occurs when the perceived area of the tablet is significantly different than the area calculated from the learned image. This causes of this error are many. Improper lighting and debris on the hardness platform are the most common causes. Improperly set camera focus can contribute to the problem. Broken tablets and double-fed tablets (where the two are touching each other) will also cause this to occur. Plausibility checking done at the thickness or weight testing stations will nearly always prevent this. A piece of dust on the camera lens will affect the analysis of the tablet. This is normally indicated by an out-of-focus hexagon 'ghost' that is always in the same location relative to the displayed image. Finally, a tablet pushed over so that it is resting on its side will also cause this error.

19.3 Appendix C-Resolving Calibration Errors

This appendix describes some of the reasons why instrument calibrations may not succeed, and gives some possible solutions. If calibrations cannot be completed after taking the corrective steps discussed here, contact Elizabeth-Hata.

19.3.1 Thickness Calibration

Thickness calibration errors result from incorrectly measuring the thickness of the supplied calibration gauge. The most common cause of these errors is due to dust or debris on the floor of the thickness measuring station or the bottom of the measuring foot. Prior to calibration, these areas, as well as the receiving station of the tablet indexer, should be cleaned with compressed air or a damp foam swab. The calibration gauge should also be wiped with a dry cloth to clean any dust that may be on the gauge. Examine the calibration gauge for nicks or burrs that may have resulted from careless handling. Remove any that are found with fine emery cloth or a stone. Do not use a substitute for the supplied calibration gauge. Be certain that the gauge is sitting on the center of the testing station platen, and is not contacting any other part of the equipment.

Another cause of thickness calibration errors is the foot of the gauge not being parallel to the floor of the thickness measuring station. If the foot is not parallel, the gauge may have a different apparent thickness, depending on where the measuring foot contacts the gauge. To readjust the thickness measuring foot, use the controls in the Advanced Diagnostics screen to move the measuring foot all the way down to contact the floor of the measuring station. Loosen the 2.5 mm allen screw inside the thickness measuring foot, then while holding the foot flat against the bottom of the testing station, retighten the

screw. Double-check that the measuring foot is contacting the floor of the station at all points around the circumference.

19.3.2 Balance Calibration

Problems encountered during balance calibration are most likely due to using an incorrect or damaged calibration mass. Use only the supplied mass. Prior to calibration, the balance pan should be cleaned with compressed air or a damp foam swab. Wipe the mass with a dry cloth to ensure that there is no dust on it. Be certain that the mass is sitting directly on the center of the balance pan, and is not contacting any other part of the equipment. Close the cover of the Tablet Testing Module during calibration because air movement may not allow the balance to become stable. Likewise, avoid jarring or shaking the equipment. Allow a 30 minute warm-up period before trying to calibrate the balance.

19.3.3 Hardness Calibration

Problems encountered during hardness calibration are most likely due to using an incorrect or damaged calibration mass. Use only the supplied mass. Prior to placing the load cell upright, snug up the nut on the rod to prevent the assembly from shaking. When placing the calibration mass on the upright load cell, be sure to center the mass on the ram face. Do not place the mass on the ram until the message box asking to do so is displayed.

19.3.4 Camera Calibration

Camera calibration will fail when the apparent size of camera calibration disk does not match the expected size, appearing larger or smaller than required. The height of the camera is critical to ensuring a successful calibration of the camera. During the Align Camera phase of the calibration, the image of the hardness platform must fill the camera view in the screen, touching the top and bottom of the image frame. If it does not, carefully align the camera until it

does. Make certain that the camera calibration disk is placed on the center of the platform during calibration. Use only the supplied calibration disk. The camera image must also be sharply focused. A fuzzy, indistinct image may not be properly analyzed by the computer. Use the printed side of the calibration disk to check the focus, and adjust the focusing ring on the camera lens until the sharpest image is displayed. Close the cover of the Tablet Testing Module after placing the disk into position. Excess light will affect the system's ability to locate and measure the calibration disk.

19.4 Appendix D- General Cleaning and Maintenance

Routine cleaning is required to keep the instrument functioning properly and accurately. The thickness gauge should be cleaned approximately every 200 tablets. Other cleaning can be done every 1000 tablets. The actual interval depends on how dusty the tablets being tested are. Some products may require the equipment be cleaned more frequently, while others can extend the interval.

19.4.1 Tablet Feeder

Remove the tablet feeding screw by pulling the feeding screw straight out from the black aluminum shell. The inside of the feeding screw may be blown out with compressed air, or may be wiped clean with ammonia glass cleaner or isopropyl alcohol pad. Wipe clean the outside of the feeding screw, as well as the inside of the aluminum shell, paying particular attention to the slot in the rear of the feeding screw and the pin inside the rear of the shell.

After the feeding screw and aluminum shell are clean, replace the feeding screw in the shell by aligning the pin in the rear of the shell with the slot in the rear of the feeding screw, then push the feeding screw firmly into the shell. Brush the tablet trigger clean with a soft nylon brush. Using compressed air, blow clean the entire top of the tablet tester.

CAUTION:

When removing or replacing the feeding cup, apply force straight along the axis of the feeding cup and hold the shell securely to prevent the shell from moving. Sideways force can damage the feeder angle worm gear mechanism.

19.4.2 Indexer and Thickness Gauge

The thickness gauge will need to be recalibrated after cleaning. Brush off any accumulated dust or particles on the tablet indexer and neoprene curtains. Using an alcohol pad or glass cleaner, clean the tablet receiving chamber (the first station in the indexer), the thickness measuring chamber and the bottom of the thickness measuring gauge foot. Gently brush off the balance platen, taking care not to press down excessively hard on the platen.

19.4.3 Camera and Ring Light Assembly

To clean the camera and ring light, loosen and remove the thumb screw securing the camera mounting plate to the top of the tester, then swing the camera assembly up and allow it to rest on its hinge. The camera and ring light are cleaned by blowing out with compressed air. The lens of the camera should not be wiped unless distortion or blurring of the tablet image can be noted in the Tablet Alignment screen. If it is ever necessary to wipe the lens, use only cleaners designed for coated camera optics.

19.4.4 Hardness Platform

Do not blow downward with compressed air, as this can cause dust to become embedded under the table, preventing the platform from rotating easily. The hardness platform can be cleaned by wiping the top of platform with an alcohol pad. Separate the upper portion of the hardness platform by carefully inserting a flat-blade screwdriver in to the slot at the end of table (the angled portion) and gently prying upward to separate the top and bottom sections. Use an alcohol pad or foam swab to clean the entire platform. Rotate the hardness platform several times, cleaning away any dust that becomes dislodged. Replace the upper section of the hardness platform when finished.

19.4.5 Indexer Wiper

A synthetic rubber wiping blade is located on the bottom surface of the leading edge of the horizontal indexer. This wiping blade assists in clearing the hardness platform of crumbs that result when tablets are broken during the hardness test. The tablet tester must be turned off while cleaning the wiper. To clean the wiping blade, lift the camera assembly up out of the way, allowing it to rest on its hinge. Push the horizontal indexer forward, then lift the indexer to expose the wiping blade. Clean the wiping blade with glass cleaner or an alcohol pad. If the wiping blade is severely worn, it will require replacement. Replacement is accomplished by disassembling the side brackets of the indexer mechanism to gain access to the indexer slides. Remove the worn wiper, and insert a new one into the slot, taking care that the wiper blade is flush at the sides of the indexer and is not twisted in the slot.

19.4.6 Magazine

The magazine can be cleaned by blowing with compressed air or by wiping with a slightly damp lint-free cloth.

Index

Numerics

A

B

C

Index (con't)

Index (con't)

M

N

O

P

Index (con't)

R

S

T

Index (con't)