

**5.7**

**Humphrey  
Visual Field  
Analyzer**

## *Section 1. A Quick Overview of the Humphrey® Field Analyzer*

### *Operations Summary*

*Setting Up the Instrument*

*Preparing the Patient for Testing*

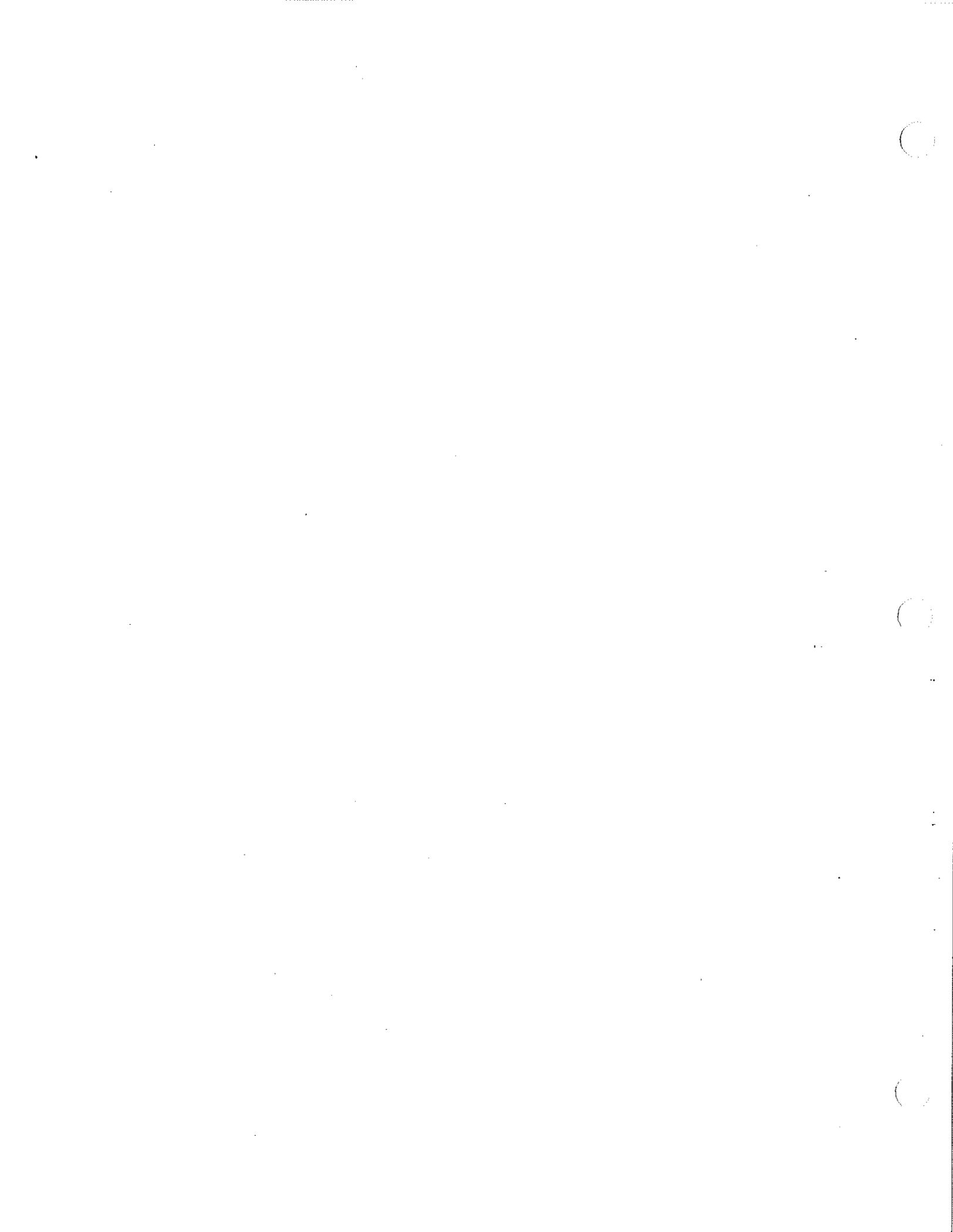
*Testing*

*Printing the Test Results*

*Storing Test Results on Disk*

*Software Options*

*If You Need More Information*



## *Section 1. A Quick Overview of the Humphrey® Field Analyzer*

The Humphrey® Field Analyzer, a truly automatic, state-of-the-art perimeter, provides fast, accurate, and easy-to-interpret results. It combines the accuracy of Goldmann standard stimuli with sophisticated computer technology that has captured the combined knowledge of researchers in the field. All Humphrey Field Analyzer models allow you to select from a large array of test patterns and strategies and to follow up with additional custom points in problem areas. Conducting a thorough visual field examination is as easy as selecting a test name from a list. And your Field Analyzer delivers the results in a variety of easy-to-interpret formats.

Table 1-1 briefly summarizes the various Field Analyzer models and their testing capabilities. Please be aware that although all of the instrument's capabilities are described in this manual, not all features may be available on your instrument. All Humphrey Field Analyzer models allow you to create user-defined menus for fast access to preferred tests and testing conditions, and to define and store custom test patterns. All Field Analyzers include automatic trial lens calculation, problem patient alerts, operator assistance tutorials, personalized text on each printout, and an automatic time and date stamp. Models 605, 607, 610 and 620 monitor fixation with a telescope, while a video eye monitor is available on all other models.

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### **Operations Summary**

Learning to use the Field Analyzer is easy. Once you have set up the Field Analyzer for testing and made sure the patient is prepared for the test, you only have to make a few quick selections from the Analyzer's screens. The instrument records the patient's responses and provides a printout of the test results when the test is complete.

The operations summary below can be used as a quick reminder of the steps to follow. If you need more information, check the relevant sections later in the manual where the Analyzer's features and functions are described in more detail.

**Table 1-1. Humphrey Field Analyzer Models and Features**

Feature	Model				
	605 & 606	607	610 & 611	620 & 630	640
<b>Easy Data Interpretation</b>					
Symbol and numeric formats for screening and automatic diagnostic tests	x	x	x	x	x
Graytone, numeric, defect depth, and profile formats for threshold tests		x	x	x	x
3-in-1 printout for threshold tests		x	x	x	x
<b>Additional Data Analysis Features</b>					
Optional STATPAC 2 analysis of test results		x	x	x	x
Goldmann stimulus sizes	III	III	I to V	I to V	I to V
Kinetic testing	optional	optional	optional	optional	standard
Two follow up threshold test strategies				x	x
Optional FASTPAC threshold strategy		x	x	x	x
Compare, average, and merge functions highlight field changes				x	x
Convenient data storage and recall				x	x
<b>Storage Media</b>					
Dual disk drives				x	
40, 80 megabyte hard disk with single floppy drive					x
60, 150 megabyte streamer tape backup					x

### **Setting Up the Instrument**

- If this is the first field test of the day, remove the dust cover. Flip the on/off switch to turn on the instrument and wait for the main menu to appear (approximately 1 ½ minutes).
- Use the light pen to touch the pad next to ENTER NEW PATIENT DATA. Enter new patient data, or select RECALL PATIENT DATA FROM DISK FILES
- Touch RX USED and enter the patient's distance prescription. If you have software Revise AA and beyond, touch CALCULATE TRIAL LENS USING DISTANCE RX AND BIRTHDATE, and the Field Analyzer will calculate the appropriate spherical and cylindrical trial lens correction.
- Lower the trial lens arm and insert the trial lens(es) in the holder. Put the sphere lens closest to the patient. Trial lenses are to be used for testing the central 30 degrees of the visual field only.
- Return to the main menu and touch either SCREENING or THRESHOLD and select the test pattern and eye to be tested (see table 1-2).

**Table 1-2. Field Analyzer Test Patterns and Data Analysis**

<b>Screening Tests</b>	<b>Extent of Visual Field Tested</b>	<b>Application</b>
Armaly Central	30 degrees	Glaucoma
Armaly Full Field	50 degrees	Glaucoma
Nasal Step	50 degrees	Glaucoma
Central 40	30 degrees	General
Central 76	30 degrees	General, glaucoma, neurological
Central 80	30 degrees	General, glaucoma, neurological
Central 166	30 degrees	General, glaucoma, neurological
Peripheral 68	30 to 60 degrees	General, neurological with central exam, retinal, glaucoma
Full-Field 81	55 degrees	General, retinal, glaucoma, neurological
Full-Field 120	55 degrees	General, retinal, glaucoma, neurological
Full-Field 246	55 degrees	General, retinal, glaucoma, neurological
Automatic Diagnostic	55 degrees	General
<b>Threshold Tests</b>		
Central 10-2	10 degrees	Macular retina, neurological, advanced glaucoma
Central 24-1	24 degrees	Glaucoma, general
Central 24-2	24 degrees	Glaucoma, neurological, general
Central 30-1	30 degrees	Glaucoma, neurological, retinal, general
Central 30-2	30 degrees	Glaucoma, neurological, retinal, general
Peripheral 30/60-1	30 to 60 degrees	Retinal, glaucoma
Peripheral 30/60-2	30 to 60 degrees	Retinal, glaucoma
Temporal Crescent	75 degrees	Retinal, neurological, advanced glaucoma
Nasal Step	50 degrees	Glaucoma
Neurological 20	20 degrees	Hemianopsia
Neurological 50	50 degrees	Hemianopsia
Macula	4 degrees	Macular retina, advanced glaucoma
<b>Statistical Data Analysis</b>		
<b>Tests</b>	<b>Tests</b>	<b>Application</b>
STATPAC 2	Central 24-1, 24-2, 30-1, 30-2, and 10-2	Statistically analyzes central threshold exams for significant departures from norms. For central 24-2 and 30-2 tests only, the summary and glaucoma change probability greatly enhance ease of interpretation of serial fields.
<b>Other Data Analysis</b>		
<b>Tests</b>	<b>Tests</b>	<b>Application</b>
Average	All threshold tests	Averages multiple threshold exams to reduce random variability
Compare	All threshold tests	Compares two tests to measure arithmetic change
Merge	Central 30-1, 30-2, 24-1, and 24-2, Peripheral 30/60-1, 30/60-2, and 68	Combines test results to achieve greater grid resolution and to view full field on a single page

- Review the test parameters. Touch **CHANGE PARAMETERS** to make any necessary revisions.

Depending upon your particular Field Analyzer model, a variety of testing patterns and strategies are available to you. These patterns and strategies are described in detail in sections 4 and 5 (Screening Tests and Threshold Tests). Table 1-2 indicates which kinds of tests may be best suited to monitor particular disease entities.

The screening test patterns are designed to locate visual field defects in the quickest and most efficient way. After a defect has been identified by one of the screening examinations, follow-up may be done using one of the threshold tests. Threshold test results stored on disk may be averaged, compared, and merged using disk functions (see Section 9).

### *Preparing the Patient for Testing*

- Make sure the patient is seated comfortably. Adjust the power table if necessary.
- Place the eye patch over the eye not being tested.
- Dim the room lights. (Bright room lights may cause shadows in the bowl.)
- Touch **OPERATOR ASSISTANCE** and explain the test procedure to the patient.
- Position the patient in the Field Analyzer by making sure his or her head is against the headrest. Align the patient. If your Field Analyzer model has a telescope to monitor alignment, center the patient's eye with the help of the mires and the vertical and horizontal alignment wheels. If your Field Analyzer has a video eye monitor, touch **EYE MONITOR ON**, and use the vertical and horizontal alignment wheels to center the patient's eye in the crosshairs displayed on the screen.
- Move the trial lenses close to the patient's eye, making sure that the patient's lashes do not touch the lens when the eye blinks.

### *Testing*

- Touch **DEMO** to demonstrate the test procedure. The Field Analyzer will beep each time the patient presses the response button. The demonstration test will last one minute and will automatically continue on to the actual test.
- If you are satisfied that the patient understands the test before the demonstration test has been completed, touch **START**.
- During the test, it is important to check the patient's alignment periodically through the telescope or video eye monitor. If a fixation alarm sounds, remind the patient to watch the yellow light. It may be helpful to replot the blind spot. For further details refer to Section 2, Instrument Set Up.
- At the end of the test, the Field Analyzer will emit three short beeps.

## ***Printing the Test Results***

Various printing formats are available depending on the type of test used. To alter the format, touch **CHANGE DISPLAY** and review the other display formats. Screening tests may be printed only in one format. Touch **PRINT**.

## ***Storing Test Results on Disk***

Once a test has been completed, you may save the data if you have an instrument with storage capability. If your Field Analyzer has two floppy disk drives, both must contain floppies. If you have a hard disk model, the floppy drive must contain a disk as well. New floppy disks must be initialized prior to use. For further details on organizing the data, see Section 9, Disk Functions. Touch **SAVE ON DISK**.

## ***Software Options***

Various optional software packages are available for your Field Analyzer. These are STATPAC 2, kinetic testing, Esterman test and FASTPAC. STATPAC 2 provides statistical analysis of test results by comparing patient results to an age-adjusted normal population base. STATPAC 2 also differentiates between random test-to-test variations and significant visual field changes in glaucoma patients and determines if a patient's test results are within normal limits, outside normal limits, or borderline (see Section 10, STATPAC 2). FASTPAC provides practitioners with an option to reduce thresholding test time by approximately 40%. In addition, a new screening option called **AGE-REFERENCE SCREENING** will decrease screening test times by approximately one minute per eye (see Section 11). This capability is standard in Rev 6.0 and above and is offered with FASTPAC. The kinetic testing capability emulates standard Goldmann perimetry and is intended to be used by an experienced operator (see Section 11, Kinetic Testing). The Esterman testing scale is listed by the AMA as an option for disability testing and is useful for evaluating visual disability (see Section 7, Esterman Testing).

In addition, you may link your Field Analyzer to an optional peripheral printer to provide faster, letter quality printing (see Section 12).

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## **If You Need More Information**

When your Field Analyzer is installed, a Humphrey representative will instruct you and your staff in the operation of the instrument. After this training, your *Owners' Manual* will be a good source of answers to questions that may arise. The manual may also be used as a tool to train new staff members. Additional operator training or patient orientation videos or brochures may be purchased from Humphrey. We look forward to a continually satisfying relationship with

you and welcome your comments about your Humphrey Field Analyzer or any aspect of our company. Please feel free to contact us at (800) 341-6968.

## *Section 2. Setting Up the Instrument for Testing*

**Entering Patient Data**

*Entering New Patient Data*

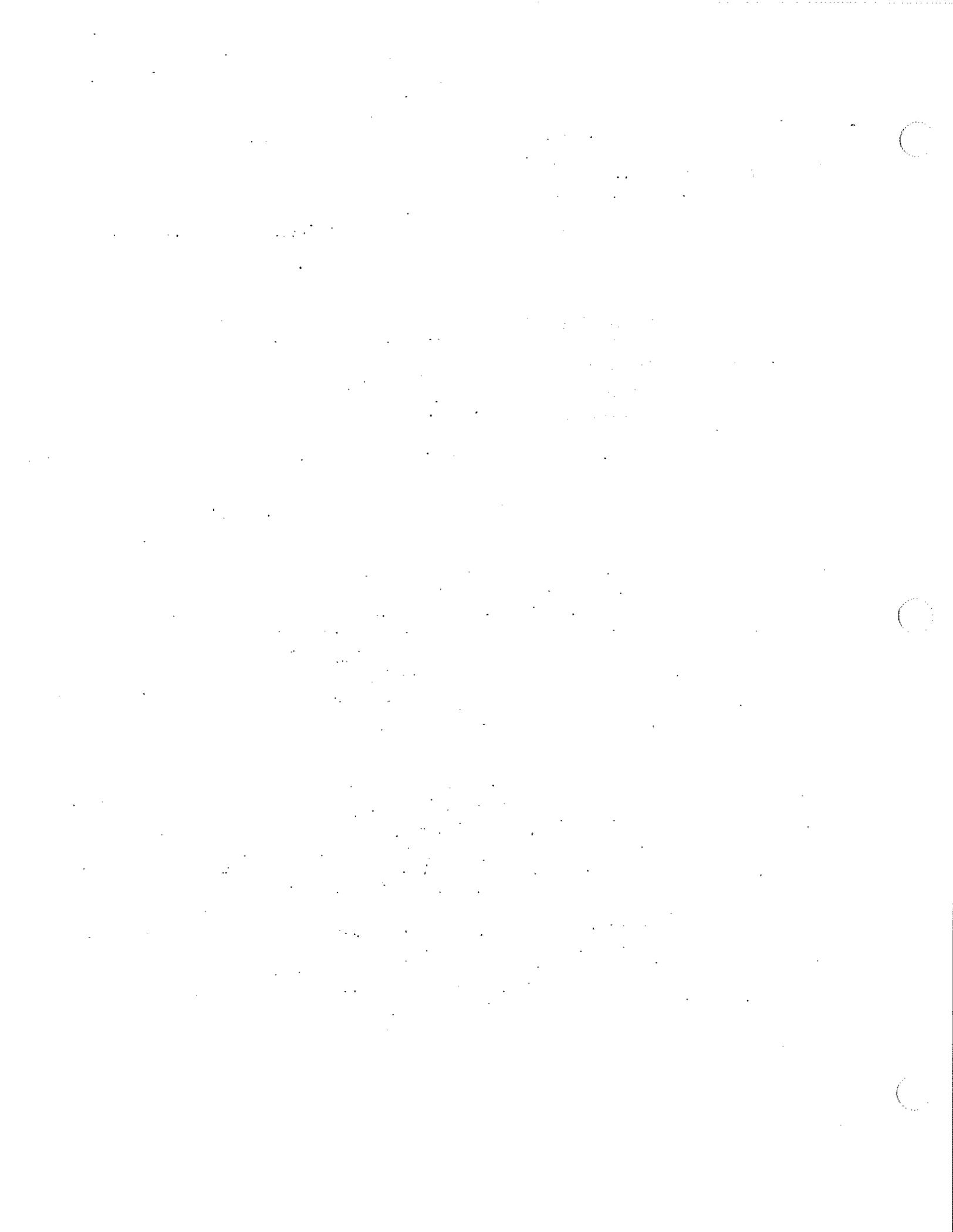
**Trial Lens Selection**

**Selecting a Test**

**Checking or Changing the Test Parameters**

*The Change Parameters Menu*

**User-Defined Menus**



## Section 2. Setting Up the Instrument for Testing

Before you begin to use the Field Analyzer, you should be familiar with its components and accessories. These are shown in figure 2-1.

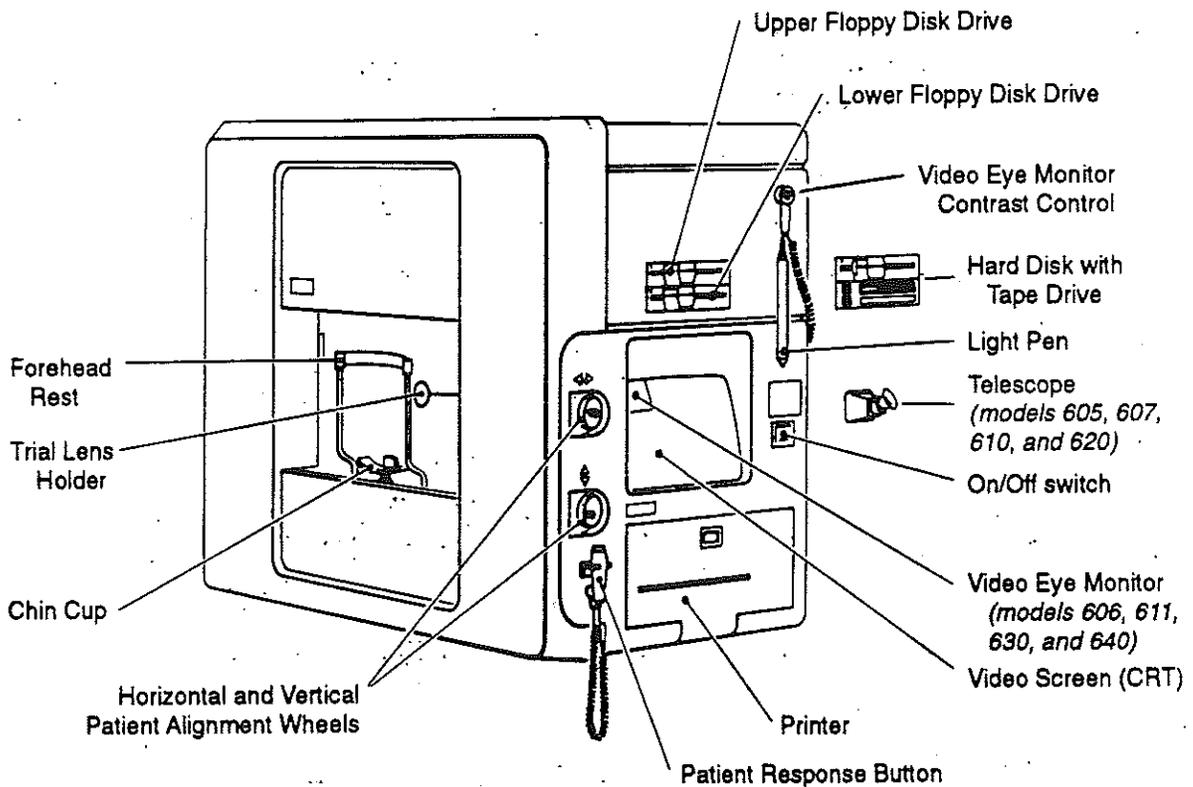
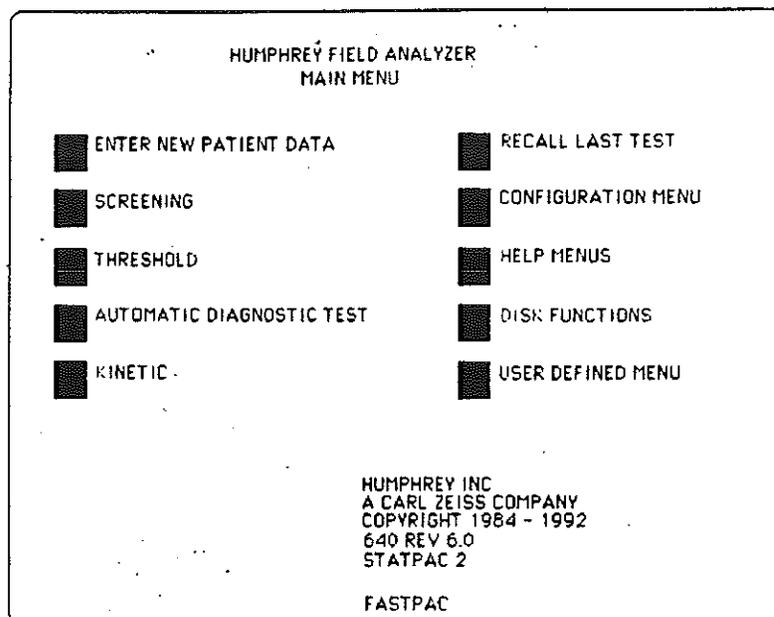


Figure 2-1. The Humphrey Field Analyzer



**Figure 2-2. Main Menu**

Five basic procedures are involved in setting up your Field Analyzer for testing.

1. Turning the Field Analyzer on and allowing it to perform a self check.
2. Entering patient data
3. Determining when to use trial lenses and which ones to use
4. Selecting the appropriate test
5. Checking the test parameters

The Field Analyzer on/off switch is located below the screen on the lower right corner of the instrument. Once the Field Analyzer has been turned on, it will self test for approximately 90 seconds, checking background illumination, stimulus intensity, and stimulus location. Following the self test, either the Humphrey Field Analyzer main menu (figure 2-2) or a user defined menu (figure 2-3) will appear (instructions for creating a user-defined menu are given later in this section).

If the room lights are too bright, the message BOWL ILLUMINATION IS TOO BRIGHT will appear on the screen. Turn off the room lights and touch RETURN.

Your Field Analyzer has a screen-saver feature that dims the screen whenever the instrument is not used for ten minutes. To reactivate the screen, press the patient response button or touch the screen with the light pen.

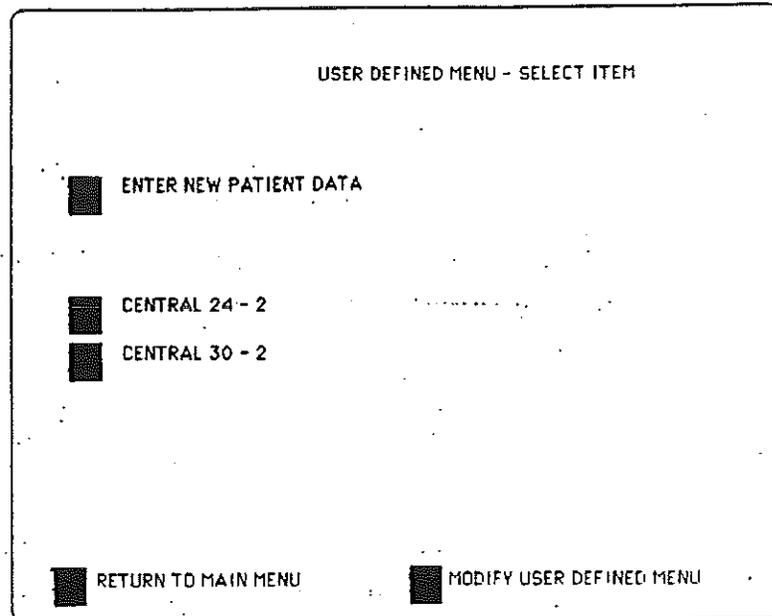


Figure 2-3. Sample User-Defined Menu

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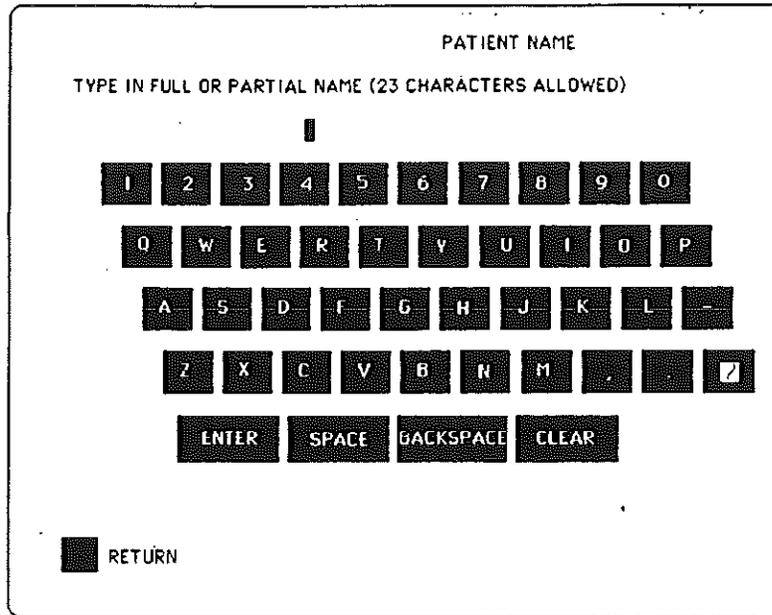
## Entering Patient Data

Each time you perform a field test, it is necessary to enter the patient's name, birthdate, and other test information. This ensures that the printout of test results will include the patient's name, the correction used, and other test conditions. It also makes it possible to recall stored test results at a later time for comparison or STATPAC 2 analysis.

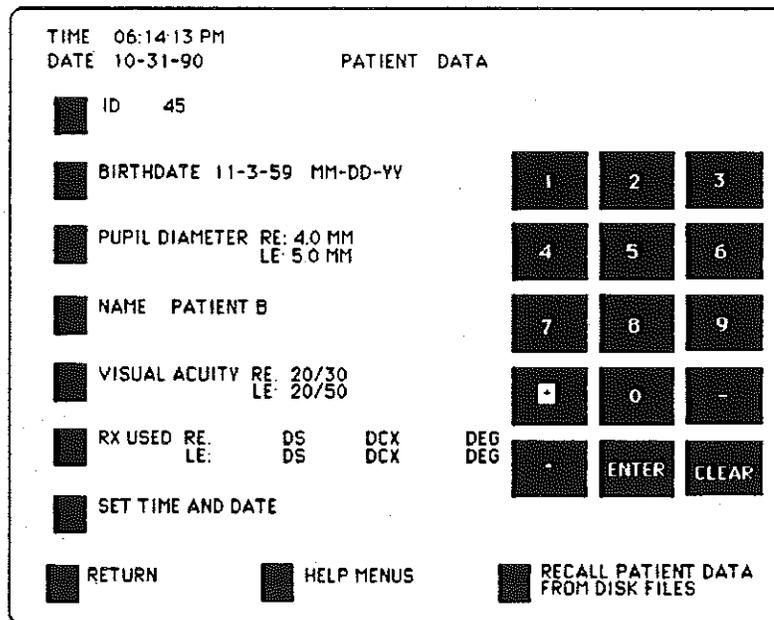
There are two ways to enter patient data. The first can be used when you already have data for the patient stored on disk, and the second is used for entering data for a new patient. If you are starting a new test for a patient for whom you already have records, touch ENTER NEW PATIENT DATA in the main (or user-defined) menu and select RECALL PATIENT DATA FROM DISK FILES. Select HARD or FLOPPY, UPPER or LOWER.

If you selected HARD, a keyboard will appear (figure 2-4). Type in the patient's name, then select the patient's file in the disk directory. The Field Analyzer will automatically enter the patient information for you.

If you selected FLOPPY, touch either UPPER or LOWER to indicate the desired disk directory. Once you have done this and touched ENTER, the Field Analyzer shows you the current list of patients whose files are located on disk. Select the patient you want and touch SELECTION COMPLETE. The Field Analyzer will enter the patient information for you.



**Figure 2-4. Patient Data Keyboard**



**Figure 2-5. Patient Data Screen**

### Entering New Patient Data

To enter data for a new patient touch ENTER NEW PATIENT DATA in the main (or user-defined) menu and enter the specified information on the patient data screen as described below (see figure 2-5).

## Remember:

- When you touch ENTER NEW PATIENT DATA any previously entered patient data will be cleared from the Field Analyzer's memory. Make sure you have saved or printed out any patient data you want to keep before you touch ENTER NEW PATIENT DATA.
- Be sure to enter the patient's name and birthdate exactly the same way each time so that you will always be able to find earlier test results for comparison or STATPAC 2 analysis.

### ■ ID

ID can be used to enter an optional patient identification number up to nine digits long.

### ■ BIRTHDATE

The patient's birthdate is necessary for STATPAC 2 and automatic trial lens calculations. The birthdate should be entered in a numeric month, day, year format (6-22-38). If you want to use the European day, month, year format, touch NAME and enter .T, then touch RETURN. The birthdate format will automatically be changed. The time will also be changed to a twenty-four hour format. To revert back to the month, day, year format, touch NAME again and re-enter .T, and touch RETURN.

### ■ PUPIL DIAMETER

Pupil diameter, measured in millimeters, is optional and should be used if you wish to keep this information in your files.

### ■ NAME

It is necessary to enter the patient's name in order to store and recall tests or perform data analysis in the future. When you touch the NAME pad, a typewriter keyboard will appear on the screen.

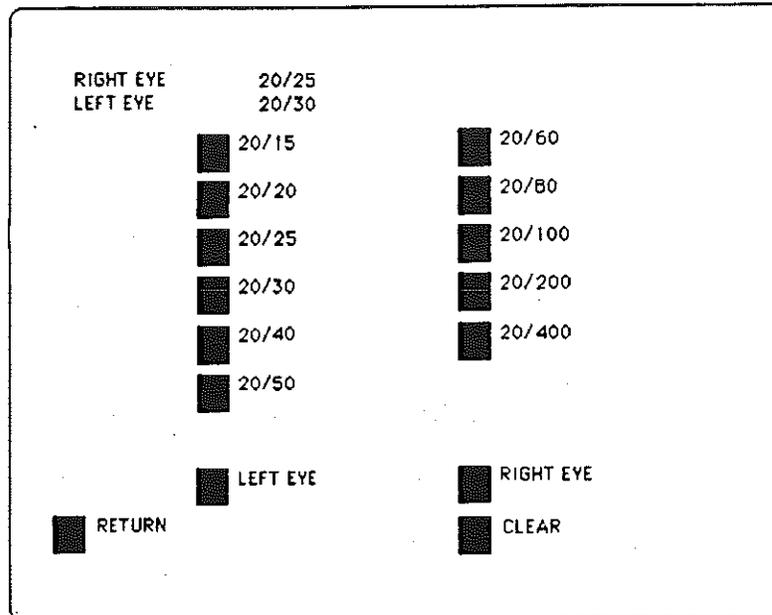
Use the light pen to type in the patient's name. It will be easier to locate patient names if you always enter them in the same format. For example, Smith, Julie. There is room for 23 characters. If the name is longer, only the first 23 characters will be recorded. Touch BACKSPACE to erase letters. Touch ENTER after you have typed the complete, correct name. The Field Analyzer will automatically return to the patient data menu.

If the patient's name has been incorrectly stored on disk, touch RETURN to reach the main menu, select DISK FUNCTIONS, and correct any errors using the CHANGE PATIENT DATA pad in that menu (see Section 9, Disk Functions).

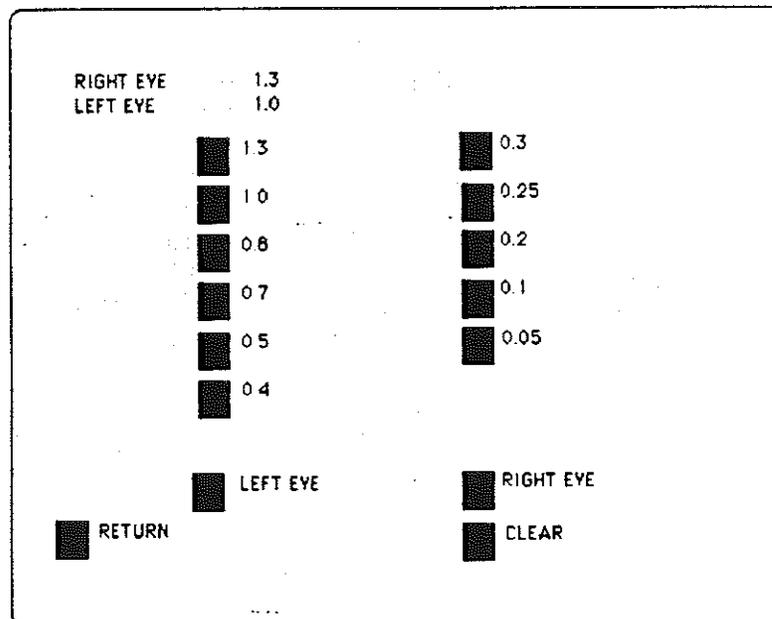
### ■ VISUAL ACUITY

Visual acuity is an optional entry and should be used if you want the patient's best corrected visual acuity to appear on the printout. When you touch VISUAL ACUITY a menu of visual acuities from 20/15 through 20/400 will appear (figure 2-6), and the pad beside RIGHT EYE will flash.

Select the proper visual acuity for the right eye. The pad beside LEFT EYE will then flash. Select the correct visual acuity for the left eye, and touch RETURN to return to the patient data menu. If you want to record the visual acuity for only one eye, you may manually select either



**Figure 2-6. Visual Acuity Menu**



**Figure 2-7. Decimal Visual Acuity Menu**

RIGHT EYE OR LEFT EYE and enter the corresponding visual acuity. To change the visual acuity options to the decimal system, touch NAME in the patient data menu, type .V and press ENTER. All visual acuity options will now appear in decimal form (see figure 2-7). To return to the Imperial, or American, acuity system, enter .V again.

**■ RX USED**

Trial lenses are required for central field tests and the central por-

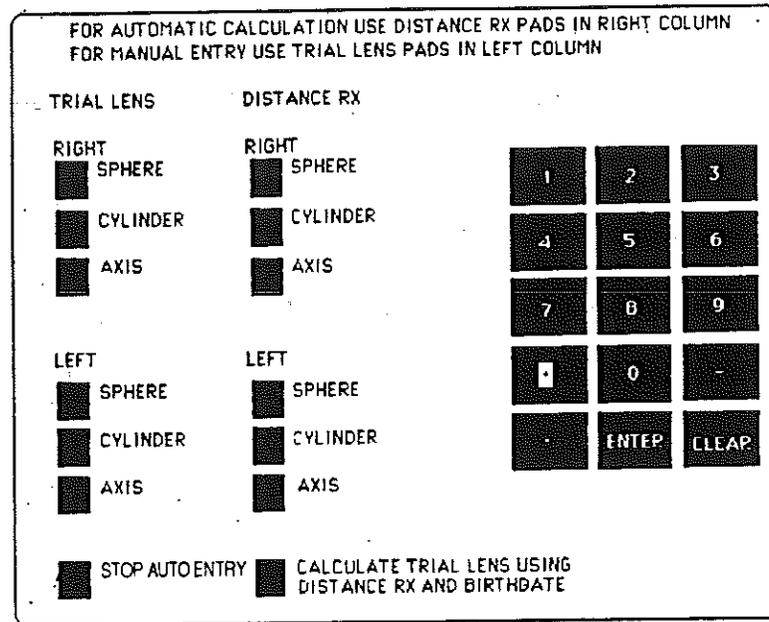


Figure 2-8. Automatic Trial Lens Calculation Screen

tions of full field tests. If you have revision AA software or beyond, the Field Analyzer will automatically calculate the patient's trial lens prescription when you enter the distance prescription (figure 2-8).

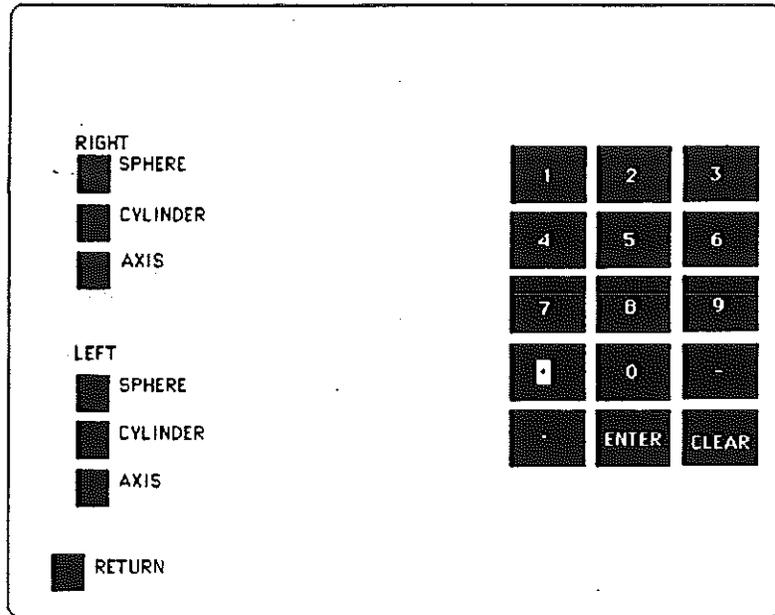
To enter the right and left distance prescriptions, touch **RX USED**. Then select **SPHERE**, **CYLINDER** or **AXIS** under **DISTANCE RX**. A blinking pad indicates that the Field Analyzer is ready to receive information. Use the ten-key pad on the right side of the screen to enter the appropriate values. Remember to press **ENTER** after typing each value. Then touch **CALCULATE TRIAL LENS USING DISTANCE RX AND BIRTHDATE**, and the trial lens corrections will appear under the **TRIAL LENS** column. **STOP AUTO ENTRY** interrupts the sequence and allows you to enter selective distance RX. This feature is available on Rev. 8.0 and above.

If you don't want the Field Analyzer to calculate the trial lenses for you, or if you want to alter the resulting correction, enter the desired values using the pads in the left hand column of this screen. **STOP AUTO ENTRY** and then **Return** will take you back to the patient data screen.

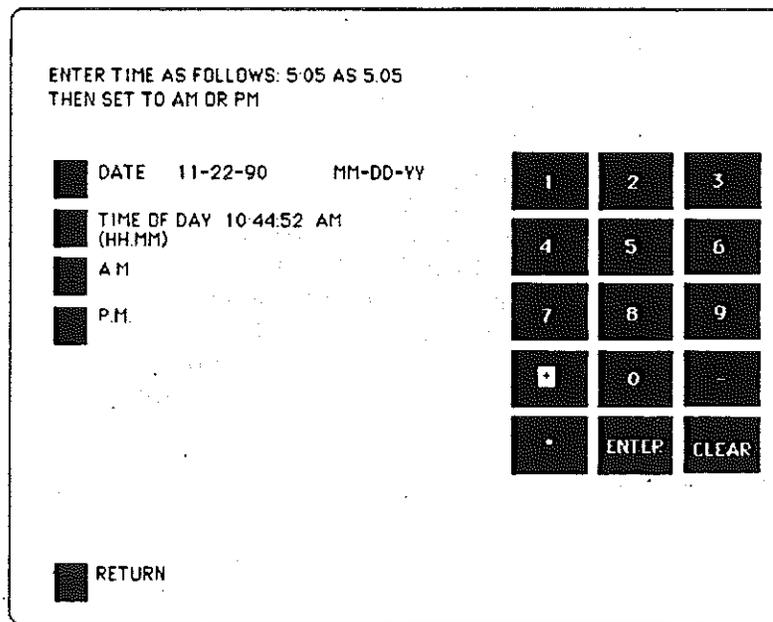
If you have pre-AA software, your screen will display the menu shown in figure 2-9. Refer to the trial lens selection guidelines on pages 2-12 for calculation instructions and then enter the corrections on the ten-key pad.

■ **SET TIME AND DATE**

The Field Analyzer's time and date are set at the factory. If an instrument is moved to a different time zone, or if it is not used for an extended period of time, the internal clock may need to be reset. To set a new time or date, touch **SET TIME AND DATE** and the screen shown in figure 2-10 will appear.



**Figure 2-9. Patient Rx Screen for pre-AA Software**



**Figure 2-10. Set Time and Date Screen**

For time changes, touch TIME OF DAY. Use the keyboard to type in the hour in numerals followed by a period and the minutes. Although the Field Analyzer will display seconds, you will not be able to enter a value for these. Touch ENTER. To change the time from AM to PM touch the appropriate pad.

For date changes, touch DATE. Type in the month, the day, and the last two digits of the year (10-26-43). Touch ENTER and RETURN to go back to the patient data menu. To set the time and date to a twenty-four-hour option (e.g 14:15 instead of 2:15 PM), touch NAME in the patient data menu and enter T. This option will also change the birthdate and date sequence to DD-MM-YY (date-month- year). To alter the sequence to YY-MM-DD (year-month-date) enter J as the patient name. To change either of these sequences back, enter the appropriate letter under NAME again.

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## Trial Lens Selection

Trial lenses are required for central field tests and the central portions of full field tests. To insert a trial lens, move the trial lens holder down into the bowl (see figure 2-11). Place any necessary cylinder lenses in the slot farthest away from the patient. Align the axis with the degree marks on the holder. Place the sphere lens in the slot closest to the patient.

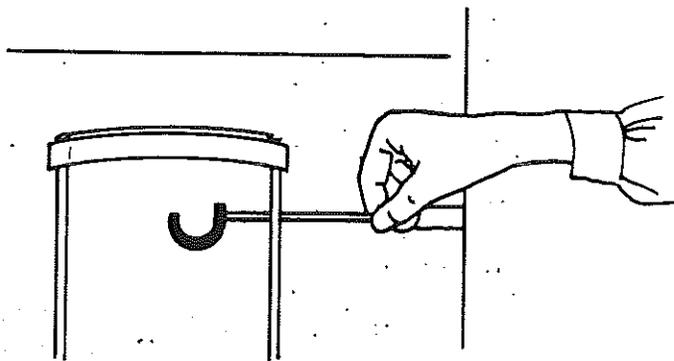
Use only the wire-rimmed type of trial lenses. The wide-rimmed variety will interfere with the patient's peripheral vision. It is necessary to determine the proper distance refraction for each patient and eye to be tested. If you are not using the automatic trial lens calculation, please refer to the following guidelines for selecting trial lenses.

### Guidelines for Trial Lens Selection

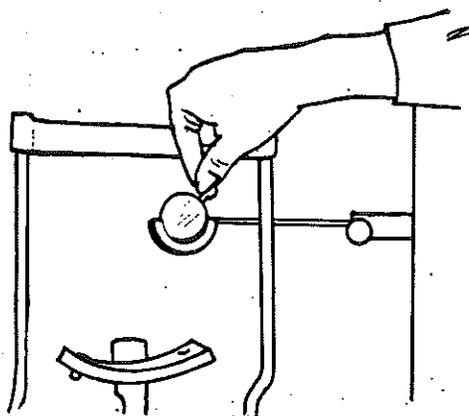
1. Ignore cylinders of .25 DC or less
2. For cylinder errors up to 1.25 D use the spherical equivalent. Use the full cylinder correction for cylinder error of 1.50 D or more.
3. Refer to table 2-1 to determine the spherical power to be used.

Here are some examples of trial lens corrections using table 2-1.

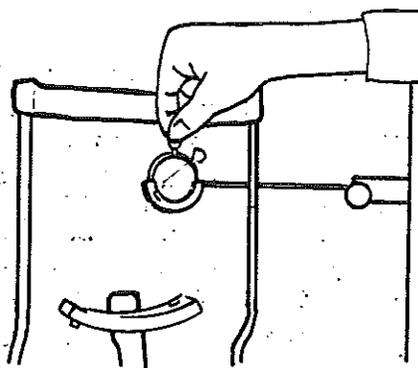
- A. For an emmetropic (plano) 70-year-old patient, refer to the Distance Rx Equals Zero (Plano) column. The spherical correction for this patient is located in the line labeled 55 & Over (+ 3.00 D).
- B. For a 61-year-old patient with a distance refraction of +1.50 + 0.50 x 60, calculate the spherical equivalent of the distance refraction (+1.75). Refer to the Distance Rx Greater than Zero (0) column. Follow the 55 & Over line, where you are instructed to add +3.00 to the distance Rx of + 1.75. The correction for this patient is + 4.75 D.
- C. For a 35-year-old patient with a distance refraction of +1.00 + 1.50 x 90, use a +1.50 cylinder lens and rotate the axis to 90 in the trial lens holder. Follow the Distance Rx Greater than Zero column to the 30-39 row, where you are instructed to add +1.00 to the distance Rx. The total correction is +2.00 +1.50 x 90.



1. Move the trial lens holder into the bowl.



2. Place the cylinder lens in the slot farthest away from the patient and align axis.



3. Place sphere lens in the slot closest to the patient.

**Figure 2-11.** *Inserting Trial Lenses in the Holder*

**Table 2-1. Table of Spherical Correction for Field Testing**

		Patient's Distance Sphere After Any Calculation for Spherical Equivalent								
		Distance Rx Greater than Zero	Distance Rx Equals Zero (Plano)	-0.50	-1.00	-1.50	-2.00	-2.50	-3.00	-3.50
Age		Spherical Trial Lens to be Used								
Under 30	Distance Rx	*	*	*	*	*	*	*	*	Distance Rx +3.00
30-39	Distance Rx + 1.00	+1.00	*	*	*	*	*	*	*	Distance Rx +3.00
40-44	Distance Rx + 1.50	+1.50	*	*	*	*	*	*	*	Distance Rx +3.00
45-49	Distance Rx + 2.00	+2.00	+1.50	+1.00	*	*	*	*	*	Distance Rx +3.00
50-54	Distance Rx + 2.50	+2.50	+2.00	+1.50	+1.00	*	*	*	*	Distance Rx +3.00
55 & Over	Distance Rx + 3.00	+3.00	+2.50	+2.00	+1.50	+1.00	*	*	*	Distance Rx +3.00

\* means no spherical trial lens is needed

- D. For a 60-year-old patient with a distance refraction of  $-3.00 +0.25 \times 90$ , the .25 cylinder is ignored. For the distance Rx, follow the -3.00 column to the age 55 & Over row. The \* signifies that this patient does not need a spherical correction. No trial lenses are needed.
- E. For a 63-year-old patient with a distance refraction of  $-3.00 +2.00 \times 75$ , use the +2.00 cylinder lens and rotate the axis to 75 in the trial lens holder. Follow the -3.00 sphere column to the 55 & Over line. The \* indicates that the patient does not require a spherical correction. Use only the cylinder correction of  $+2.00 \times 75$ .
- F. A 25-year-old with a distance refraction of  $-4.00$ , would require the following: since this patient is under 30, follow the chart to the far right column (-3.50) where it states that you need to add +3.00 to the distance Rx. Take the distance Rx of  $-4.00$  and add +3.00 to obtain your trial lens value of  $-1.00$ .

If your patient is aphakic or needs a high refractive power such as +8.00 D, contact lenses provide the best visual field testing conditions, especially if the patient usually wears them. If the patient is unable to wear contact lenses, refer to table 2-1. For example: a spherical correction of  $-16.00$  would require a  $-13.00$  trial lens regardless of the age of the patient.

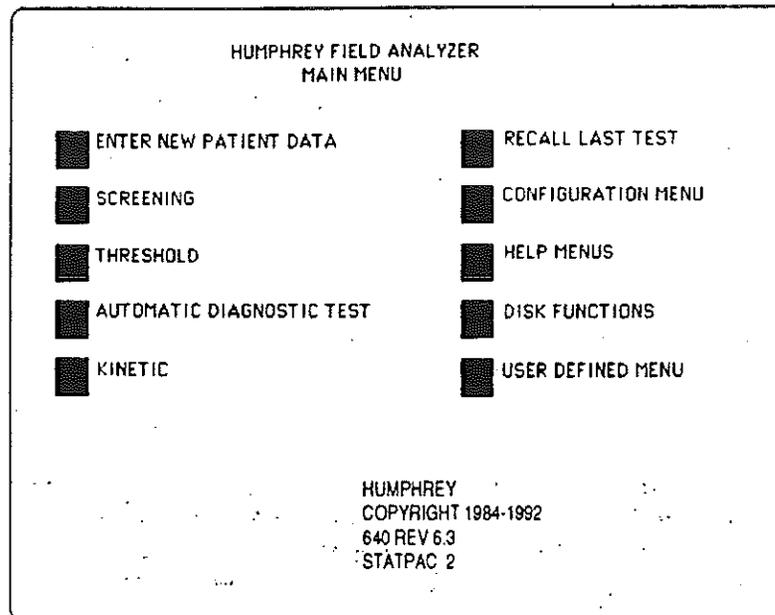


Figure 2-12. Main Menu

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## Selecting a Test

Field Analyzer models 610, 611, 620, 630 and 640 perform three types of tests: screening, threshold, and automatic diagnostic. The Model 607 performs limited screening and threshold tests. Models 605 and 606 perform screening and automatic diagnostic tests. To select a test, choose either SCREENING, THRESHOLD, or AUTOMATIC DIAGNOSTIC TEST from the main menu (figure 2-12) and then choose the test pattern you want from the selections illustrated (see figures 2-13 and 2-14). For a complete description of each test, see Section 4, Screening Tests, Strategies, and Printouts; Section 5, Threshold Tests, Strategies, and Printouts, or Section 6, The Automatic Diagnostic Test.

After you have selected the type of test you want, you may begin testing immediately by selecting RIGHT EYE or LEFT EYE, or you may change some of the test parameters first.

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## Checking or Changing the Test Parameters

When you have selected SCREENING, THRESHOLD, or AUTOMATIC DIAGNOSTIC and have chosen the test pattern you want to use, the test pattern for the eye you want to test first appears on the start test screen (figure 2-15). The patient's name is written in the lower right corner of the screen. If the name was entered incorrectly, touch PATIENT DATA and make the corrections using the method you followed when you first entered the patient data.



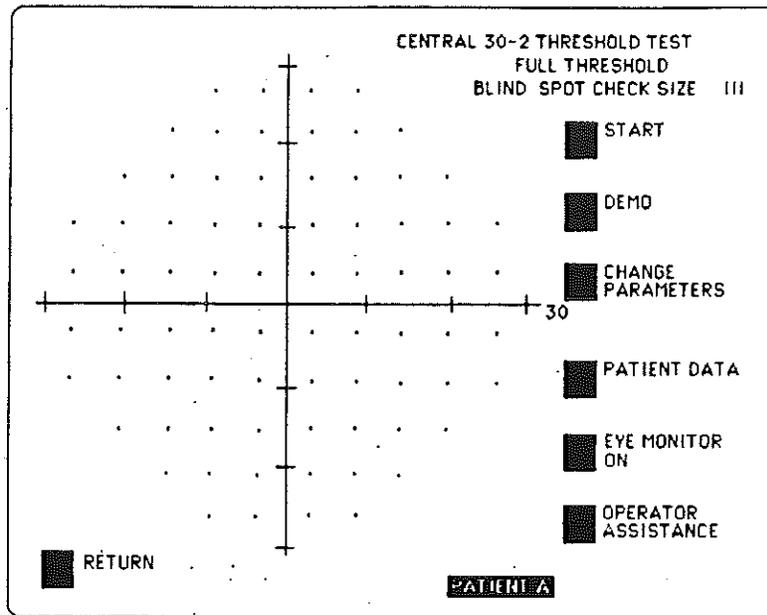


Figure 2-15. Sample Start Test Screen

lighted message NONSTANDARDPARAMETERS will be shown just below the test strategy. You may use the standard Field Analyzer parameters or change any of them before you begin the test. Parameters which may be changed are: the test strategy, fixation target, blind spot check size, stimulus size, stimulus intensity, stimulus color, test speed, foveal threshold test, central reference level, and the fluctuation test.

**NOTE:** Once a parameter has been changed, the new parameter will remain in the instrument's memory until it is turned off, or until you reset the parameters.

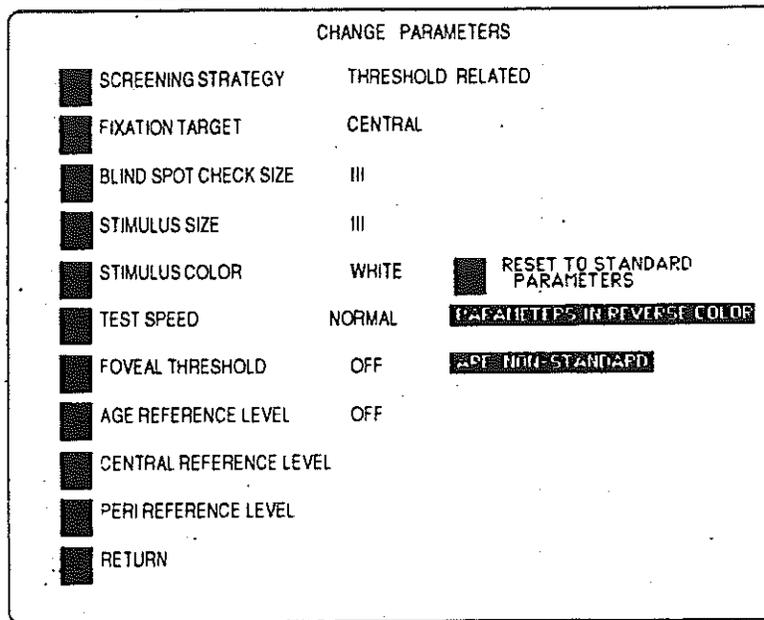
### The Change Parameters Menu

When you touch CHANGEPARAMETERS, a selection of parameters appropriate for the test you have selected will appear. Figures 2-16 and 2-17 illustrate sample test parameters menus for screening and threshold tests.

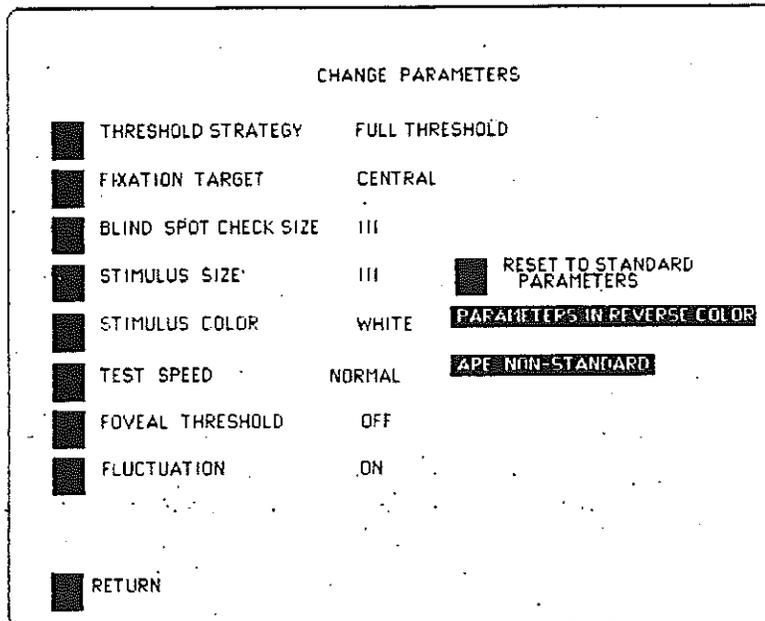
Whenever an item on a test parameters menu is highlighted it means that the highlighted parameter is not the Field Analyzer's standard, or default, parameter. Touching RESET TO STANDARD PARAMETERS restores all the standard settings at once. The change parameter menus for screening, automatic diagnostic, and threshold tests are quite similar and are discussed item by item below.

#### ■ SCREENING STRATEGY

If you are performing a screening test or the automatic diagnostic test, the menu shown in figure 2-16 will appear once you select either of these test categories. Touch SCREENINGSTRATEGY to bring up the

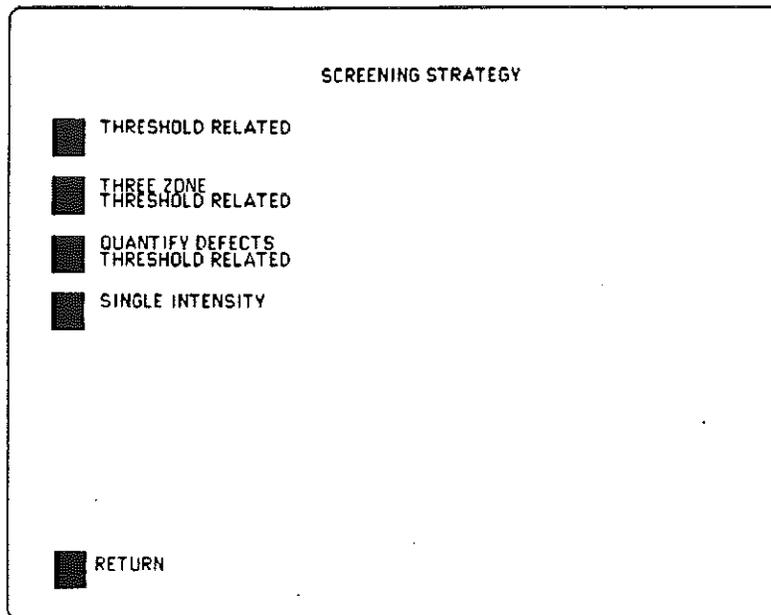


**Figure 2-16.** Change Screening Parameters Menu (Rev. 6.0) and above, or with FASTPAC)

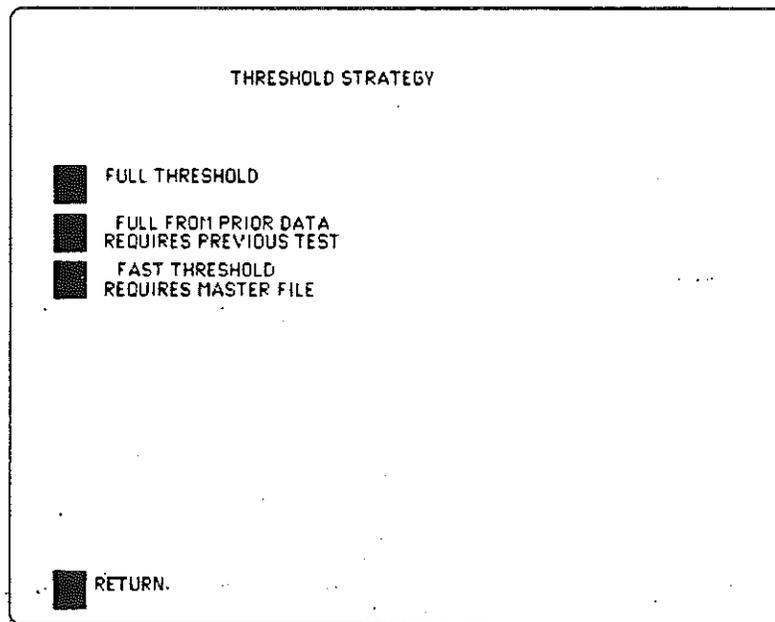


**Figure 2-17.** Change Threshold Parameters Menu

screening strategy menu (figure 2-18). The standard strategy for screening tests is threshold-related; for the automatic diagnostic test it is quantify defects. Make your test selection and touch RETURN. (For



**Figure 2-18. Screening Strategy Menu**

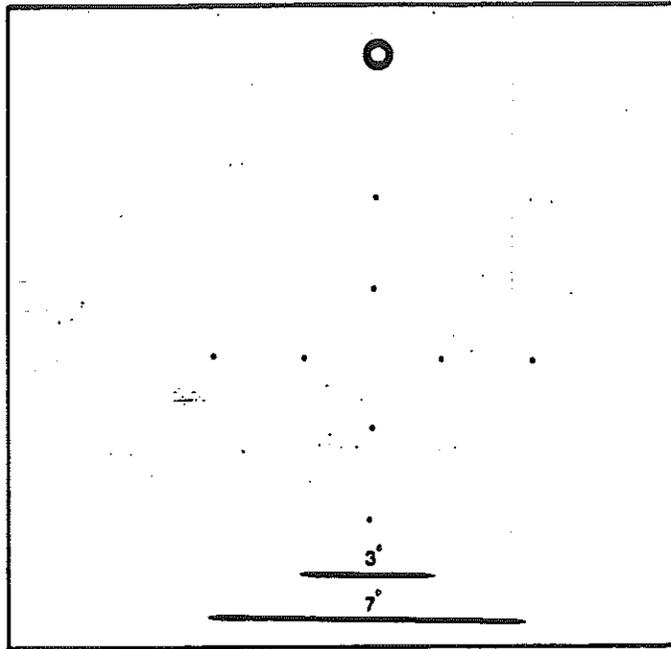


**Figure 2-19. Threshold Strategy Menu**

a complete description of the screening strategies, see Section 4. For a description of the automatic diagnostic test, see Section 6.)

■ **THRESHOLD STRATEGY**

If you are performing a threshold test, select THRESHOLDSTRATEGY from the menu shown in figure 2-17. This brings up the menu of threshold strategies (figure 2-19). The default strategy is full threshold. Make



**Figure 2-20.** *Fixation Target Locations*

your selection and touch RETURN. (For a complete description of the threshold strategies, see Section 5.)

■ **FIXATION TARGET**

If a patient cannot see the fixation target, (for example, a patient with a central scotoma), two alternate pericentral fixation targets, called the small diamond and the large diamond fixation targets, are available (see figure 2-20). To change the fixation target, touch FIXATION TARGET in the change parameters menu and the screen shown in figure 2-21 will appear. Touch the pad next to the desired fixation target. Touch RETURN. When you are using one of the diamond targets, instruct the patient to fixate in the center of the four yellow lights. Use the smallest fixation target that allows the patient to maintain steady fixation.

■ **BLIND SPOT CHECK SIZE**

The Field Analyzer automatically uses a Goldmann size III stimulus for the blind spot check. When necessary, the blind spot check size may be changed before or during a test. If you are testing a patient whose previous tests have shown that you need to change the blind spot check size, you may do so before the test begins by selecting BLIND SPOT CHECK SIZE in the change parameters menu and choosing the size you want to use from the menu that appears (figure 2-22).

At the beginning of a test the Field Analyzer locates the patient's blind spot. If the blind spot is not found after several tries, you will see the message ERROR IN LOCATING BLIND SPOT. GIVE MORE INSTRUCTIONS OR A DIFFERENT SPOT SIZE. You can then select RE-TRY TO FIND BLIND SPOT or choose a smaller blind spot by touching CHANGE BLIND SPOT MONITOR in the screen that appears.

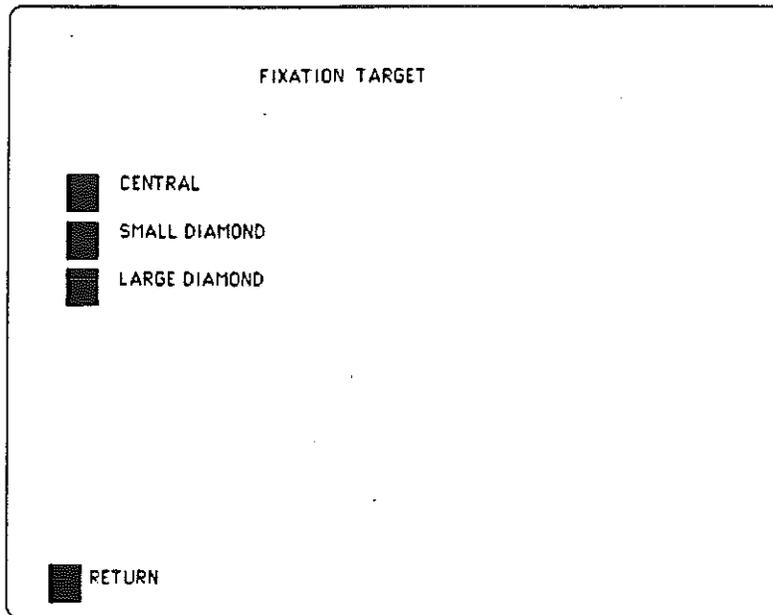


Figure 2-21. Fixation Target Menu

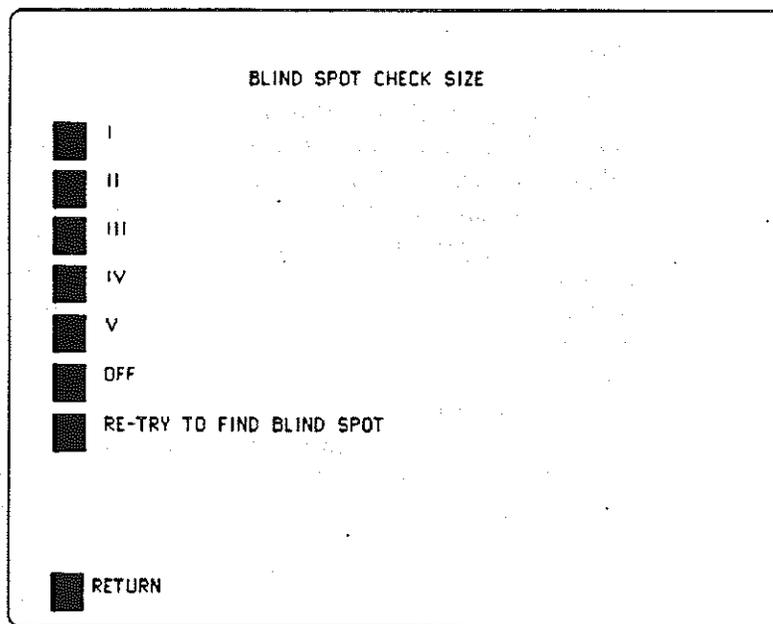


Figure 2-22. Blind Spot Check Size Menu

During a test, approximately 5% of the stimuli are presented in the blind spot to check fixation. If the patient responds to one of these stimuli, the Field Analyzer records a fixation loss. If the patient responds to any two of the last five fixation checks, the instrument will beep to alert the operator that the patient is not fixating well. If the Field Analyzer is indicating fixation losses but when you check fixa-

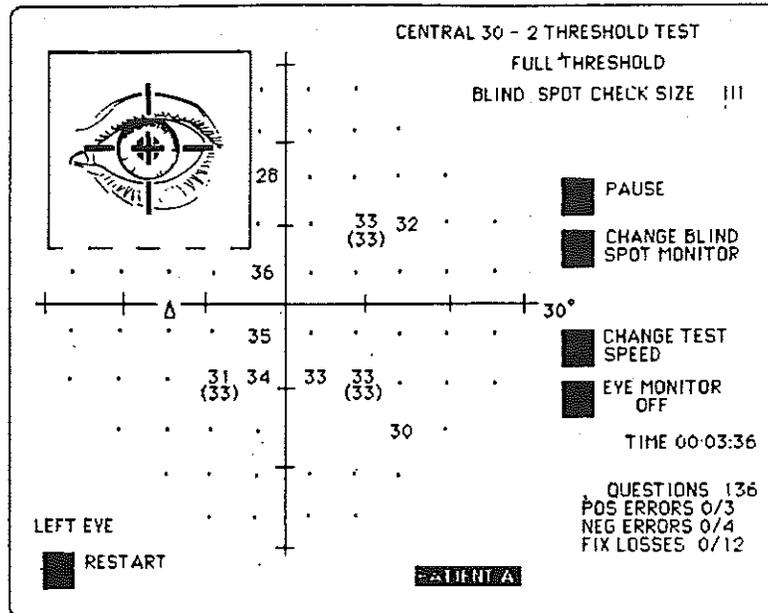


Figure 2-23. Test in Progress Screen

tion with the telescope or video eye monitor and it seems the patient is fixating properly, you may want to reduce the blind spot check size to a Goldmann II or, if needed, a Goldmann Size I. It may also be necessary to re-try to find the blindspot. As a last resort, you may choose to turn the automatic fixation monitor off and observe through the telescope or with the video eye monitor. These options are available on the test in progress screen (figure 2-23).

#### ■ STIMULUS SIZE

On most Field Analyzers with thresholding capability, the stimulus size can be changed for all standard tests. The Model 607 has only one default stimulus size of III. If you touch **STIMULUS SIZE**, the screen in figure 2-24 appears. The Field Analyzer uses standard Goldmann stimulus sizes, ranging from I, the smallest, to V, the largest. The instrument's standard size III setting is recommended for most tests. Size IV and V stimuli will increase the range of the threshold measurements for gravely disturbed fields. Keep in mind that if you have **STATPAC 2**, you will only be able to do a statistical analysis on test results obtained with the size III stimulus. A limited analysis is possible for tests using the size V stimulus if you have a **STATPAC 2** software revision level later than Revision Y. To change the stimulus size, touch the pad next to the size you wish to use. Touch **RETURN** to enter your choice and return to the test menu.

#### ■ STIMULUS INTENSITY

The stimulus intensity menu shown in figure 2-25 appears only if you are performing a screening test and have selected the single intensity strategy. The Field Analyzer automatically controls stimulus intensity for all other strategies.

Each intensity option is listed in decibel notation. Touch the pad next to the stimulus intensity you want to use. Touch

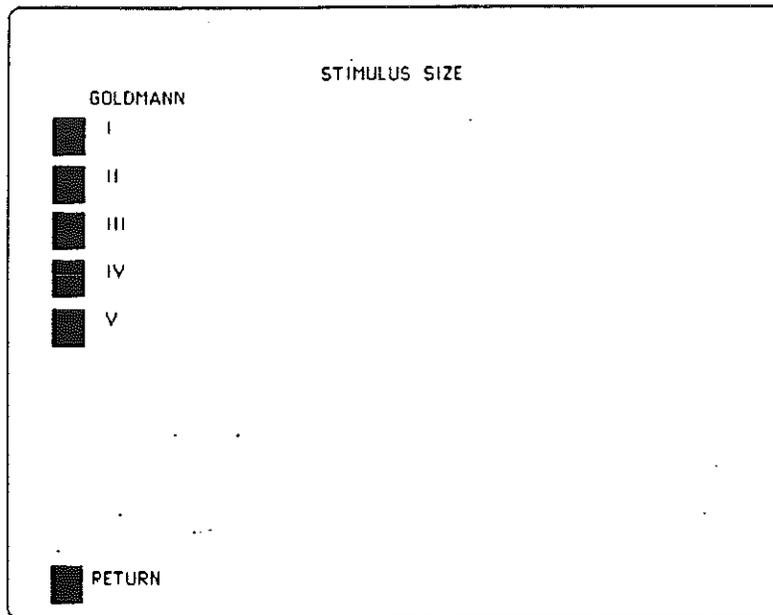


Figure 2-24. Stimulus Size Menu

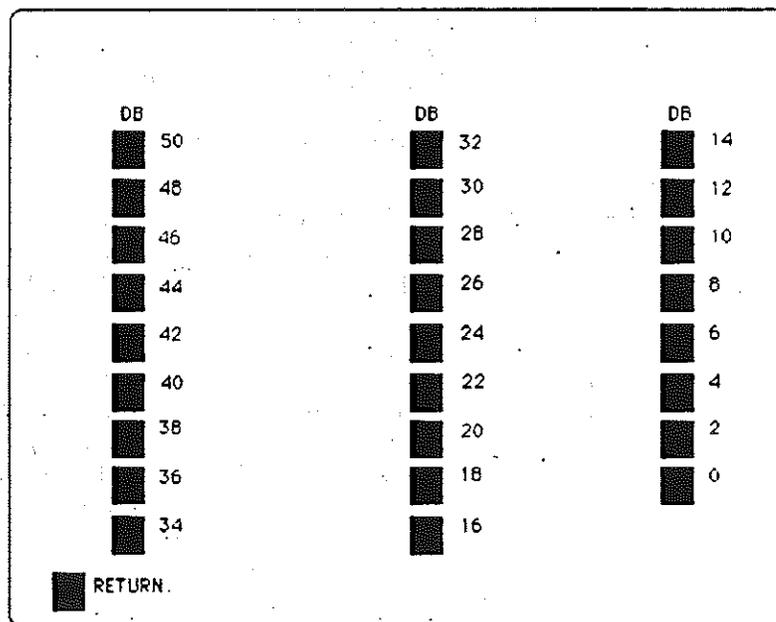
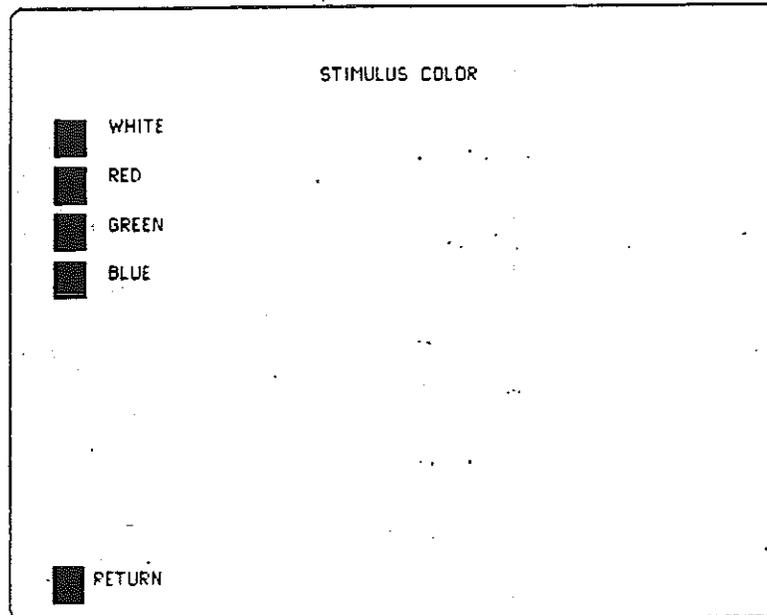


Figure 2-25. Stimulus Intensity Menu

RETURN. For a conversion of decibel to apostilbs and Goldmann sizes and intensities, refer to Appendix A.

■ STIMULUS COLOR

While white stimuli can be presented over a range of 51 dB, the color tests are limited to a range of 30-33 dB. Color testing is not available on Model 607. When you touch STIMULUS COLOR, the screen in figure 2-



**Figure 2-26. Stimulus Color Menu**

26 appears. The available colors are white, red, green, and blue. To change the stimulus color, touch the pad next to the color you wish to use. Touch RETURN. For further information about color testing, please refer to Section 8, Custom and Color Tests.

■ **TEST SPEED**

The Field Analyzer uses a variable time interval between stimuli in order to minimize rhythmicity while assuring adequate time to answer. There are two test speeds, normal and slow. The normal test speed is adequate for almost everyone except arthritic or infirm patients. The slow test speed adds an average of about 500 milliseconds to the normal test speed interval. When you touch TEST SPEED in the change parameters menu, you will be given the choice of NORMAL or SLOW. Make your selection and touch RETURN. The speed can also be altered during the test if necessary. To change the speed during a test, touch the pad labeled CHANGE TEST SPEED and select the desired pace.

■ **FOVEAL THRESHOLD TEST**

The standard setting for the foveal threshold test is OFF. To change the foveal threshold test from on to off or vice versa, touch FOVEAL THRESHOLD on the change parameters menu. You may begin any test with a foveal threshold test. If the foveal threshold test is selected, the small diamond fixation target will automatically illuminate in the bowl and a message reminding the operator to instruct the patient to fixate in the center of the four lights will be shown on the screen. The foveal threshold is measured twice. At the conclusion of the test, the instrument beeps, the central fixation target illuminates, and a message reminding the operator to tell the patient to fixate on the yellow light in the center of the bowl appears on the screen.

CENTRAL REFERENCE LEVEL

ENTER REFERENCE LEVEL  
FOR CENTRAL PDINTS

VALUES FROM 0 TO 50 ARE ALLOWED

1	2	3
4	5	6
7	8	9
+	0	-
.	ENTER	CLEAR

RETURN

**Figure 2-27.** *Set Central Reference Level Screen*

■ **AGE REFERENCE LEVEL**

The AGE REFERENCE LEVEL is automatically on if you activate it from the Configuration menu. This option will save approximately 1 minute per eye on screening tests, as compared to the Threshold Related strategy. The option requires you to enter a birthdate for each patient before testing begins. An expected hill of vision based on age normals is utilized rather than a hill of vision derived from thresholded primary points from your patient. This option can be used with the Quantify defect or Three Zone strategies. Refer to Chapter 11, FASTPAC for further instructions.

■ **CENTRAL REFERENCE LEVEL**

At the beginning of each screening test, the Field Analyzer calculates a central reference level, that is, the expected height of the hill of vision, for that individual patient. This calculation determines the intensity level at which the test is run. You may allow the Field Analyzer to make its calculations by conducting a test initialization, or you may set the reference level manually. The central reference level is used in all screening tests except the peripheral 68 and the nasal step tests, which use the peripheral reference level. Full field tests use both central and peripheral reference levels. When you are testing with standard parameters, both the central and peripheral reference levels are determined automatically, and OFF appears in the change parameters menu next to CENTRAL REFERENCE LEVEL or PERI REF LEVEL.

If you want to set either of these levels manually, touch the CENTRAL REFERENCE LEVEL pad in the change parameters menu and use the numeric keypad that appears to type in the decibel value you have chosen (see figure 2-27). Touch ENTER to enter your choice and return to the change parameters menu. On a full field test, when you set the central reference level, the peripheral reference level is automatically set

to the same value. If you would like the two reference levels to be different for a particular test, it is necessary to set both of them manually as described above.

#### ■ FLUCTUATION TEST

The goal of the fluctuation test is to find out how variable the patient's responses are. This information can also be used to help determine whether a small defect is significant or if a defect is growing. As a general rule, fluctuation less than 1.5 dB is considered low. Fluctuation of 1.5 dB to 3.0 dB is medium, and fluctuation greater than 3.0 dB is considered high. Patients who have pathological fields or who do not fixate well often have high fluctuation values. The fluctuation test makes duplicate threshold measurements on ten predetermined points. Duplicate test results are printed on the numeric print-out in parenthesis directly below the first test result. Points with zero dB sensitivity are excluded from the calculation.

The fluctuation test will add about one minute to the test time. The standard setting for the fluctuation test is ON. To turn the fluctuation test off, touch FLUCTUATION on the change parameters menu at the beginning of a threshold test. When fluctuation is off, the predetermined points will not be tested twice.

#### ■ RESET TO STANDARD PARAMETERS

If you change a test parameter to a nonstandard value, it will remain at that setting until you change it, or until you turn the Field Analyzer off. All nonstandard test parameters will be highlighted on the screen to remind you that your test will not be conducted using standard parameters. To set all test parameters to standard values, touch RESET TO STANDARD PARAMETERS in the change parameters menu.

---

## User-Defined Menus

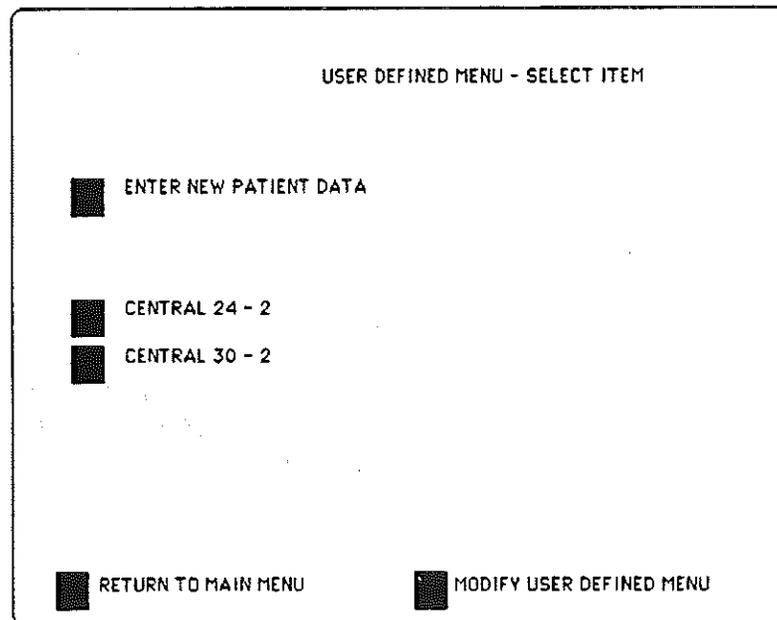
Once you are familiar with the Field Analyzer's operations and have determined how it best fits into your practice, you can streamline the way you use your Field Analyzer by designing user-defined menus to meet your specific needs. This can eliminate several steps on the path to the tests and strategies you use most often. Most practitioners set up user-defined menus that offer the tests and strategies they use most frequently. If you want to select a test or testing parameter that is not on the user-defined menu, you simply use the Field Analyzer's standard menus.

You may include up to eight test patterns on your user-defined menu. Once you have created your menu, it will be the first one you see when you turn on your Field Analyzer. To create your user-defined menu:

1. Select USER-DEFINEDMENU from the main menu and then choose MODIFY USER-DEFINEDMENU.
2. Touch ADD A NEW ITEM and choose either SCREENING or THRESHOLD from the screen that appears.

3. If you have selected SCREENING, the menu of screening patterns will appear. Select up to eight patterns to include on your user-defined menu. For each pattern selected the change parameters menu will appear. Select your testing conditions.
4. To include threshold patterns (for appropriate Field Analyzer Models) as well as screening tests on your user-defined menu, touch MODIFY USER-DEFINED MENU, then select ADD A NEW ITEM from the screen that appears. You will be asked if you want to add a SCREENING or THRESHOLD test. Select THRESHOLD, choose the patterns you want (for a total of eight screening and threshold patterns), set the desired strategy and other testing parameters, and touch RETURN to return to your customized user-defined menu.
5. Touch RETURN and your customized user-defined menu will appear (figure 2-28).

If you later want to add or delete a pattern in your custom main menu, touch MODIFY USER-DEFINED MENU and choose either ADD A NEW ITEM OR DELETE AN ITEM. Then just touch the pad next to the name of the item you want to add or remove and the change will appear on your custom menu.



**Figure 2-28.** *Sample User-Defined Menu*

## *Section 3. Preparing the Patient for Testing*

**Seat the Patient**

**Give the Response Button to the Patient**

**Explain the Test Procedure**

**Occlude the Non-Tested Eye**

**Position the Patient in the Field Analyzer**

**Align the Patient: Telescope Models**

**Align the Patient: Video Eye Monitor Models**

**Position the Trial Lenses**

**If You Need a Reminder**



## *Section 3. Preparing the Patient for Testing*

Once the Field Analyzer is set up for testing, a few simple steps should be taken with the patient in order to ensure a successful test.

1. Seat the patient comfortably
2. Give the response button to the patient
3. Make sure the patient understands the test procedure
4. Cover the non-tested eye
5. Position the patient at the Field Analyzer
6. Align the patient's eye position
7. Move the trial lenses close to the patient's eye

---

### **Seat the Patient**

Because tests can take several minutes, it is important to seat the patient in a comfortable chair. He or she should face the chin cup and headrest. Adjust the power table up or down so that the chin cup is level with the patient's chin as shown in figure 3-1.

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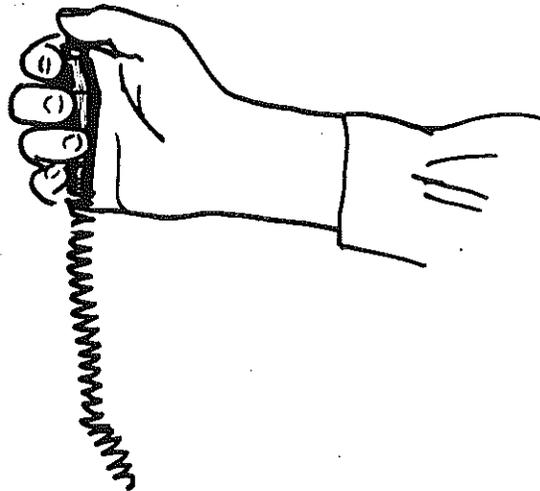
### **Give the Response Button to the Patient**

The patient may hold the response button in either hand as long as the button is pushed with the thumb, as shown in figure 3-2. Make sure the patient can feel the click and hear the faint beep the Field Analyzer makes each time the button is pressed correctly. If the patient holds the button down, the test will pause until the button is released.

**CAUTION: Light stimuli of the type used in the Field Analyzer have, in rare instances, been known to elicit a seizure in epileptic patients.**



**Figure 3-1.** Seating the Patient and Adjusting the Power Table



**Figure 3-2.** Holding the Response Button

---

## Explain the Test Procedure

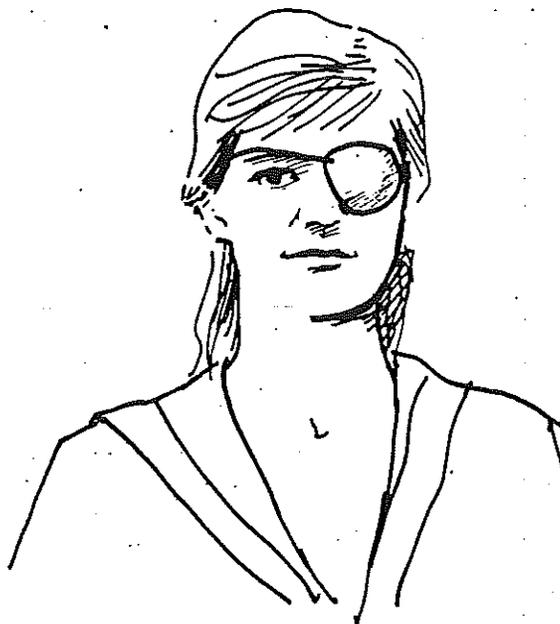
Choose the appropriate test and eye. Select OPERATOR ASSISTANCE. The following dialogue will appear on the screen. Read it to the patient.

*Always look straight ahead at the steady yellow light. Other lights will flash one at a time off to the side. Some will be bright, some dim. Press the button whenever you see one of these flashes. You are not expected to see all of them. If you want to rest, hold the button down. The best time to blink is just as you press the button.*

---

## Occlude the Non-Tested Eye

Place the eye patch so that it completely occludes the non-tested eye as illustrated in figure 3-3. The patient should not wear glasses during the test. Make sure the string of the eye patch is above the eyebrow.



**Figure 3-3.** *Occluding the Non-Tested Eye*

---

## Position the Patient in the Field Analyzer

Help the patient position his or her head squarely in the chin cup and against the forehead rest as shown in figure 3-4. Make sure the patient is comfortable.

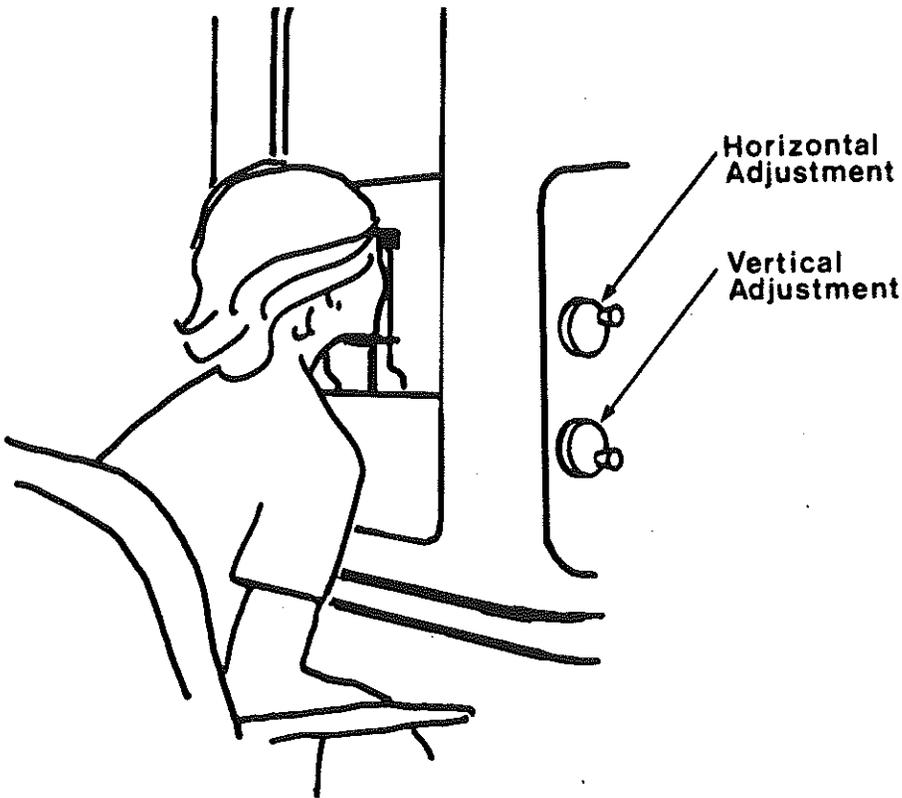


Figure 3-4. Positioning the Patient

## Align the Patient: Telescope Models

To align the patient for testing, look through the telescope and use the upper horizontal and the lower vertical alignment wheels to center the patient's eye in the mires (see figures 3-5 and 3-6). Periodically check the eye position during the test. Readjust the patient if the pupil moves more than halfway out of the target circle as shown in figure 3-6. The mires are approximately 2, 4, and 6 mm in diameter. You may use this as a guide for measuring pupil size.

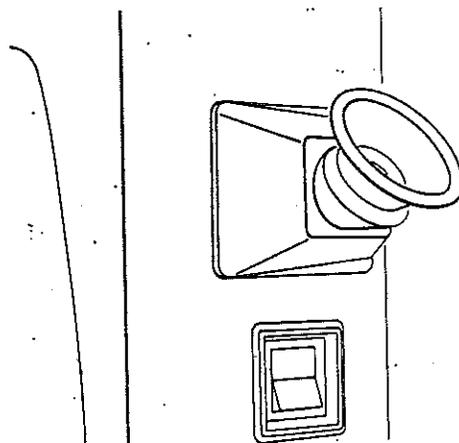
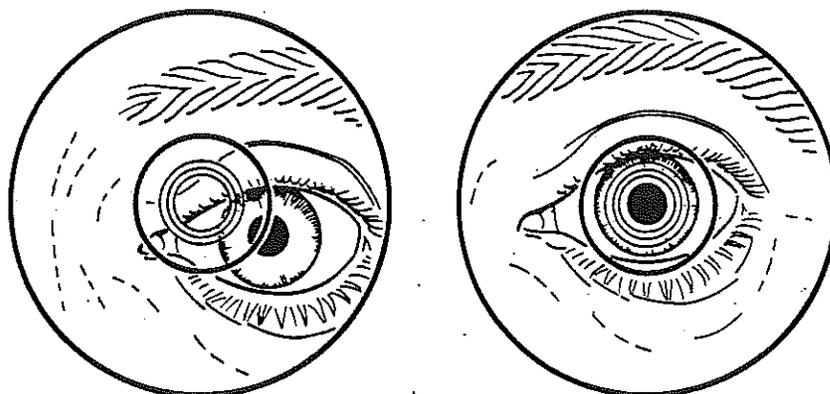


Figure 3-5. *The Telescope Eyepiece*



*Realignment required*

*Correct alignment*

Figure 3-6. *Patient Alignment: the Telescope Mires*

## Align the Patient: Video Eye Monitor Models

To align the patient on a Field Analyzer with a video eye monitor, touch the EYE MONITOR pad on the start test menu until it is ON (see figure 3-7). An image of the patient's eye will appear in the upper left corner of the screen. If you need to adjust the contrast, turn the lever where the light pen rests when it is not in use. To center the eye in the crosshairs, turn the vertical and horizontal patient alignment wheels located to the left of the screen (figure 3-8).

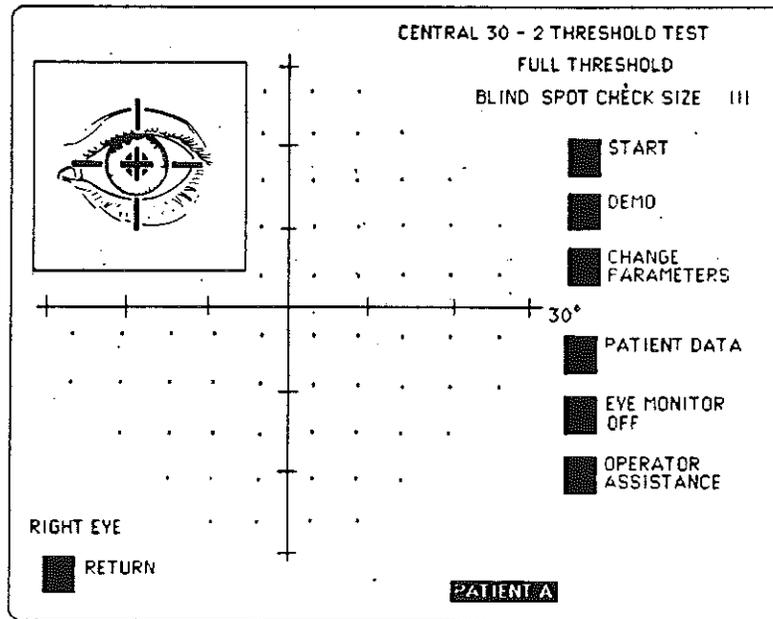


Figure 3-7. Start Test Menu: Video Eye Monitor Models

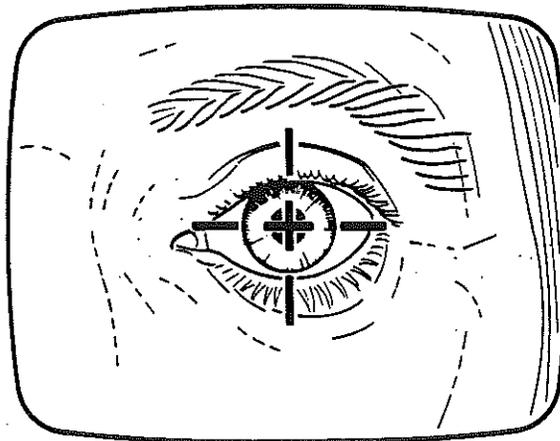
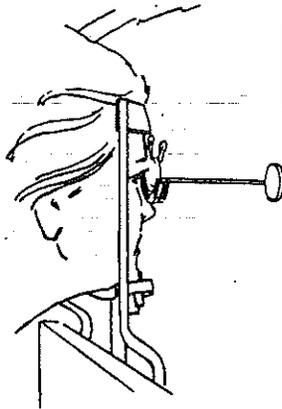


Figure 3-8. Patient Alignment: the Crosshairs



**Figure 3-9. Proper Trial Lens Position**

---

## Position the Trial Lenses

Use the knob at the side of the trial lens holder to move the trial lenses close to the patient's eye. The lenses should be as close to the eye as possible, but the patient's lashes should not touch the lens when the patient blinks (see figure 3-9).

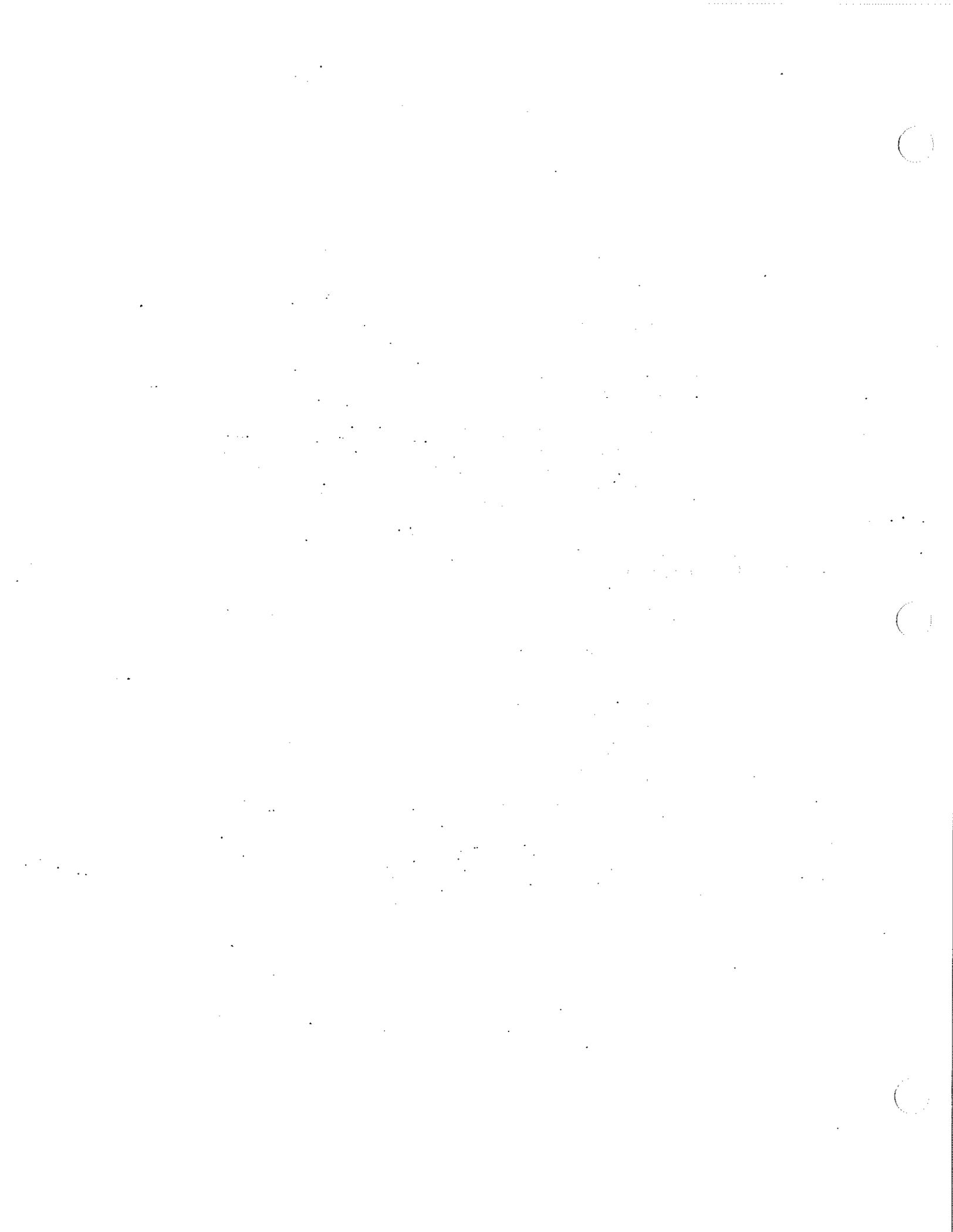
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## If You Need a Reminder

If you need additional help, touch **HELP MENUS** in the main menu or **OPERATOR ASSISTANCE** in the start test menu. The operator checklist shown below should also be helpful.

### Operator Checklist

- Trial lenses in holder
- Patient data entered
- Choose test and check test parameters
- Eye patch
- Instruct and align patient
- Dim room lights
- Start test



## Section 9. Disk Functions

Handling and Storing Floppy Disks

Initializing Floppy Disks

Initializing the Hard Disk

Saving Test Results

Organizing Disk Files

*Dual Disk Drive Models*

*Hard Disk Models: 640*

*The Streamer Tape: Model 640*

*Choosing Directory Order: Dual Disk Models*

Selecting Files from the Disk Directory

Recalling Patients for Follow-Up Testing

Printing the Disk Directory

Copying Files or Disks

*Copy Functions for Dual Disk Drive Models*

*Copying Entire Floppy Disks*

*Copying Single Files*

*Copy Functions for Hard Disk Drive Models*

*Copying an Entire Floppy Disk*

*Copying Single Files*

Comparing the Hard Disk to the Backup Tape: Model 640

Deleting Files

Changing or Correcting Patient Data

Printing Recalled Results

Adding the Doctor's Name to The Printout

Adding the Serial Number to Test Results

Recovering Hard Disk Files: Model 640

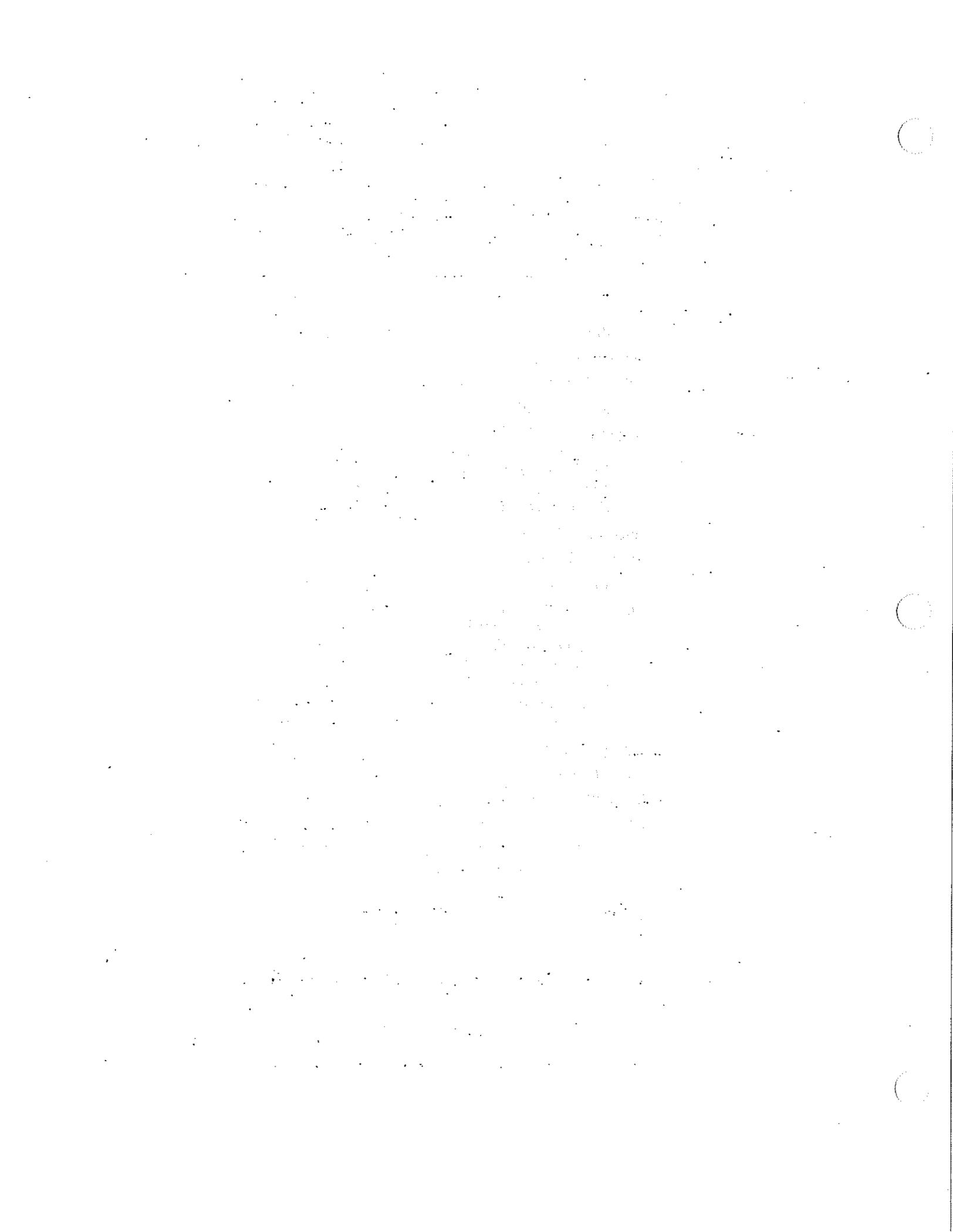
Data Analysis

*Compare*

*Average*

*Merge*

Transmitting Files



## Section 9. Disk Functions

Field Analyzers with model numbers 620 and above can store and retrieve patient test results on either floppy disks or a hard disk drive. Your Field Analyzer's floppy and hard disk drives serve five key functions:

1. To store test results, keeping them available to be recalled and analyzed later
2. To supply the stored patient data required for the faster threshold test strategies
3. To analyze test results with the average, compare, and merge programs
4. To analyze test results over time with STATPAC 2
5. To serve as a communication link between instruments

Field Analyzers with two disk drives, labeled upper and lower, accept 5¼" double sided, double density floppy disks. Each disk stores 130 to 180 files. Disks can be purchased from any retail computer store or from Humphrey. Be sure the floppies you buy have 40 to 48 tracks per inch and 360 kilobytes of memory.

The Model 640 has a 40 or 80 megabyte hard disk, one floppy disk drive, and a 60 or 150 megabyte streamer tape backup. The hard disk stores approximately 33,000 and 75,000 files respectively.

Throughout this section of the manual, descriptions of disk functions will begin with the floppy disk. Then the uses of the hard disk and the streamer tape will be described. Portions of this section which refer specifically to hard disk operations are indicated with ❖ in the margin.

---

### Handling and Storing Floppy Disks

The terms disk, diskette, and floppy are often used interchangeably. All three mean the 5¼" floppy disk. Because floppy disks store information magnetically, they can be ruined by static electricity or by strong magnets. Typical sources of magnetic fields include telephones, fluorescent desk lights, magnetic secretarial memo holders, and other electrical appliances. Be sure to keep your floppy disks at least two feet away from these sources of magnetic fields. Remove

disks from disk drives before turning the instrument on or off. Transient power surges can also jeopardize information on the diskettes.

Floppy disks are fragile and should be handled carefully. Never scratch, fold, or crush the disk. Do not touch the recording surface of the disk or the center of the disk. Do not write on the disk label with a ballpoint pen or pencil after the label has been attached to the disk. It is best to write on the label first and then attach it to the disk, but if you must write on the label later, use only a soft, felt-tip pen.

Floppies should *not* be stored in patient files. They may be stored in the original boxes from the manufacturer, or in any filing system designed for floppy disk storage.

To insert a disk in a drive, take the disk out of its paper folder and hold it so the label is facing up. Insert the disk in the drive slot and rotate the latch closed until it locks into place.

---

## Initializing Floppy Disks

Before you can save test results on a floppy disk, you must perform a quick procedure called initializing the disk. Initializing prepares the disk to record information in the format used by the Field Analyzer's internal computer. All data previously stored on a disk will be erased during initialization. To initialize a disk, begin by touching the light pen to the pad next to DISK FUNCTIONS in the main menu (figure 9-1). When the disk functions menu appears (figure 9-2), touch INITIALIZE FLOPPY DISK, and the screen in figure 9-3 will be displayed.

Touch INITIALIZE FLOPPY DISK in the disk initialization menu. Hard disk models with only one floppy disk drive will begin initialization immediately. Models with two floppy disk drives will ask you to select UPPER OR LOWER to indicate which drive contains the disk you want to initialize. While a disk is being initialized, the disk in the other drive will not be disturbed. The initialization process takes two to four minutes. The red light on the disk drive will be on throughout the process. When initialization is complete, the disk is ready to use.

REMEMBER: If you initialize a disk which contains data, all the data on it will be lost.

---

## Initializing the Hard Disk

- ❖ The hard disk on the Field Analyzer is built in. It isn't visible to the user, and does not have to be handled. Your 80 megabyte hard disk will hold approximately 75,000 files, and initializing it is a time-consuming process that is done in manufacturing before you receive your Field Analyzer. **Initializing the hard disk erases all previously stored data.** The only time you might have to reinitialize your hard disk is in the event of a hard disk crash. In such a case, call the Humphrey Customer Service Department for instructions on reinitializ-

ing the hard disk (also, see Section 13, Troubleshooting). Once you have reinitialized your hard disk, you can copy backup files onto the hard disk to replace the files lost in the crash. Backup files are kept on floppy disks and on the 60 or 150 megabyte streamer tape backup.

## Saving Test Results

Depending on which model of Field Analyzer you have, test results can be stored on floppy disks, the hard disk, or the streamer tape backup.

Field Analyzer models with dual floppy disk drives are designed so that the alphabetical patient disk goes in the upper drive, and the chronological patient disk you are using for backup goes in the lower drive. When you save a test result, it will be stored on the disks in both the upper and lower drives. On hard disk models, test results are stored on the single floppy disk at the same time they are stored on hard disk.

At the end of a test, a menu similar to the one in figure 9-4 will appear. If you have a Field Analyzer with dual disk drives, insert the most recent chronological disk in the lower drive. Make sure that the correct alphabetical disk is in the upper drive. Touch SAVE ON DISK in the end test menu. The test results will be stored on the disks in both drives. When the red disk drive light goes out, the test results are stored. If one or both drives are empty, the screen will read FAULT ERROR ON UPPER (OR LOWER) DRIVE. Insert the correct disk in the empty drive and touch TRY AGAIN.

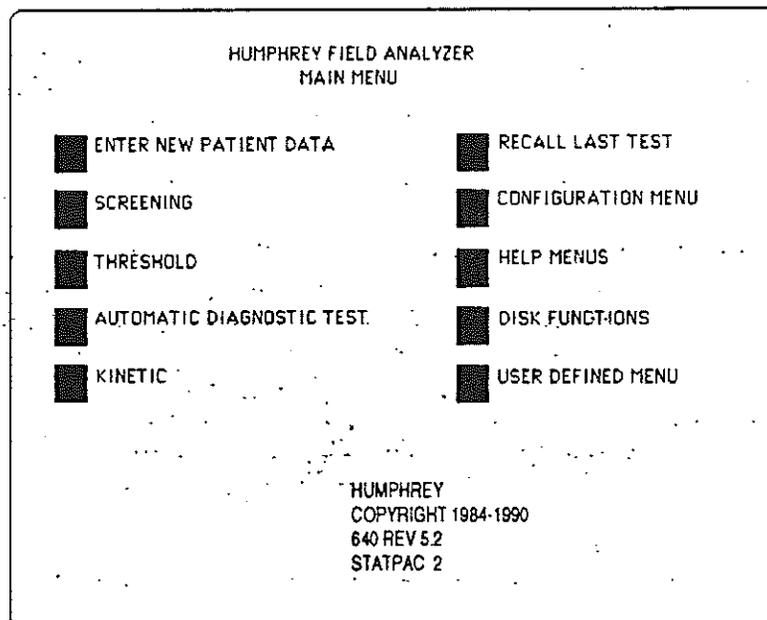
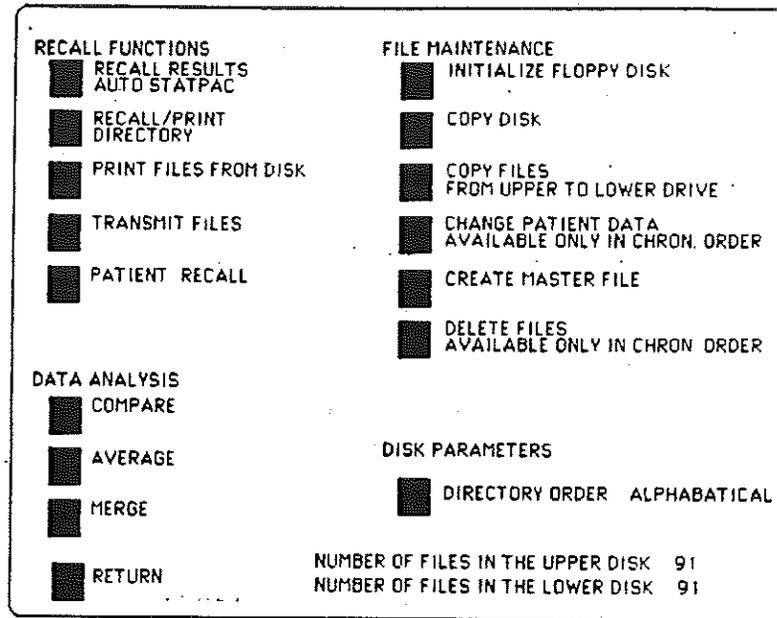
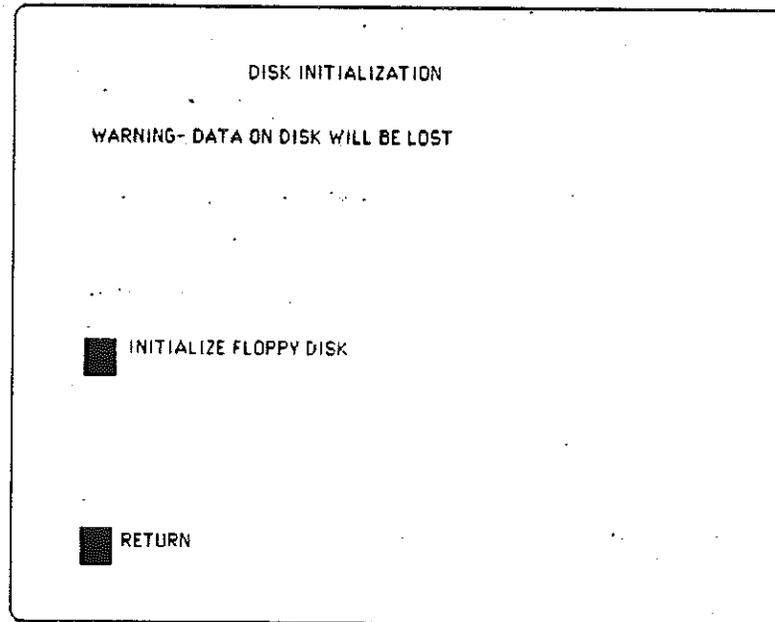


Figure 9-1. Main Menu



**Figure 9-2. Disk Functions Menu: Dual Disk Drive Models**



**Figure 9-3. Disk Initialization Menu**

- ❖ Hard disk models store test results both on the hard disk and the single floppy disk when you touch SAVE ON DISK. The screen shows the message SAVING ON HARD DISK while the results are being stored. If you have forgotten to insert a disk in the drive, or if you have decided not to save this particular test result on floppy disk, a FAULT ERROR ON FLOPPY DRIVE message will appear on the screen. Insert a disk in the drive and touch TRY AGAIN, and the test results will be saved on both disks.

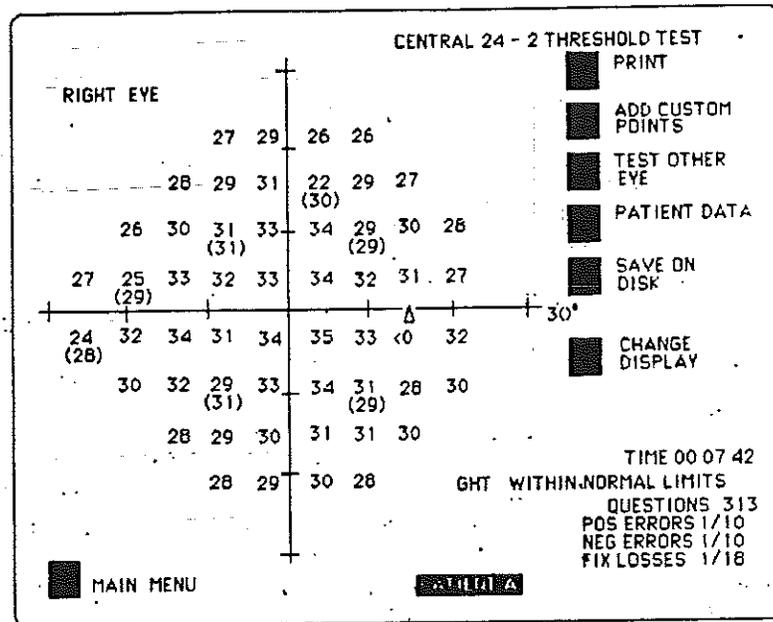


Figure 9-4. End Test Menu

## Organizing Disk Files

It is necessary to organize patient records on disk by a method that suits your office practices, just as you organize and file patient records that are on paper. The Field Analyzer is programmed to organize its own disk directories for you, but a few simple methods for labeling and keeping track of disks can simplify patient record keeping.

### Dual Disk Drive Models

If you are using a Field Analyzer with dual floppy disk drives, the upper drive will contain your alphabetical patient files. For patients whom you will be testing repeatedly, it is helpful to assign and label a separate disk for each patient, or for a set of five to ten patients, grouped by the first letter of the last name. Keep in mind that each floppy disk will hold about 150 files. Before saving test results for a patient who has his or her own assigned disk, be sure to insert that patient's disk in the upper drive.

The lower drive should be used for the disk that you use for backup files. This disk may contain either alphabetical or chronological files. In general, this disk is used as a chronological disk. To set up a chronological disk, initialize it, label it with the date of the first test to be stored on it, and insert it in the lower disk drive. Each day, just after the Field Analyzer is turned on, that disk should go in the drive. Throughout the day, whenever you save test results, they will be stored on this disk as well as on the disk in the upper drive.

When the screen gives you an ERROR DISK IS FULL OR FAULT ERROR IN LOWER DRIVE message, remove the floppy from the lower drive and use a felt-tipped pen or marker to label it with the date of the last test it contains. Date a new initialized disk and insert it in the backup drive. It is helpful to keep a printout of the names and files on each disk folded in the disk jacket. Instructions for printing the disk directory are found later in this section.

### *Hard Disk Models: 640*

- ❖ With the Model 640, the hard disk will save all your patient files alphabetically. The single floppy disk will serve as a chronological backup. You may, of course, create individual patient disks by copying single files from the hard disk to the floppy disk designated for that patient.

Because the hard disk can contain such an enormous number of files, using it alone can be unwieldy. Treat the backup floppy as a chronological record, labeling it with the dates of the first and last tests it contains. The beginning and ending dates on the backup floppy disk label serve to organize patient records chronologically. The hard disk stores files alphabetically.

### *The Streamer Tape: Model 640*

- ❖ The streamer tape serves as additional backup on the Model 640. All the files on the hard disk should be copied to the streamer tape at regular intervals. A good way to remember to do this systematically is to make it a rule to copy the hard disk to the streamer tape whenever a floppy disk is filled. Since this requires at least forty minutes, you will probably find it most efficient to do this at the end of the work day.

**CAUTION:** If you have acquired a Field Analyzer with a 80 megabyte hard disk and a 150 megabyte streamer tape, 60 megabyte Field Analyzer streamer tapes are compatible with this system. However, your 150 megabyte streamer tape cannot be backed onto a 60 megabyte streamer tape drive.

The 60 megabyte streamer tapes are only upward compatible. This is of particular importance for clinics with multiple Field Analyzers.

**NOTE:** Before backing up the hard disk on tape, spend twenty to thirty seconds scrolling through the hard disk directory. If you find any unusual characters in the directory, call Customer Service at (800) 341-6968 before performing a backup.

To back up the hard disk records on tape, begin by selecting TAPE FUNCTIONS in the Model 640 disk functions menu (figure 9-5). The screen shown in figure 9-6 will appear. Touch BACK UP ENTIRE HARD DISK TO TAPE.

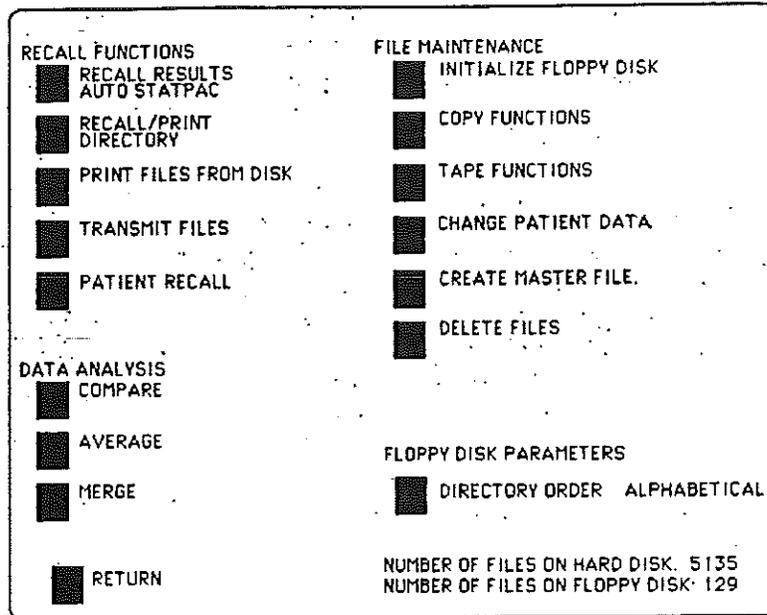


Figure 9-5. Disk Functions Menu: Model 640

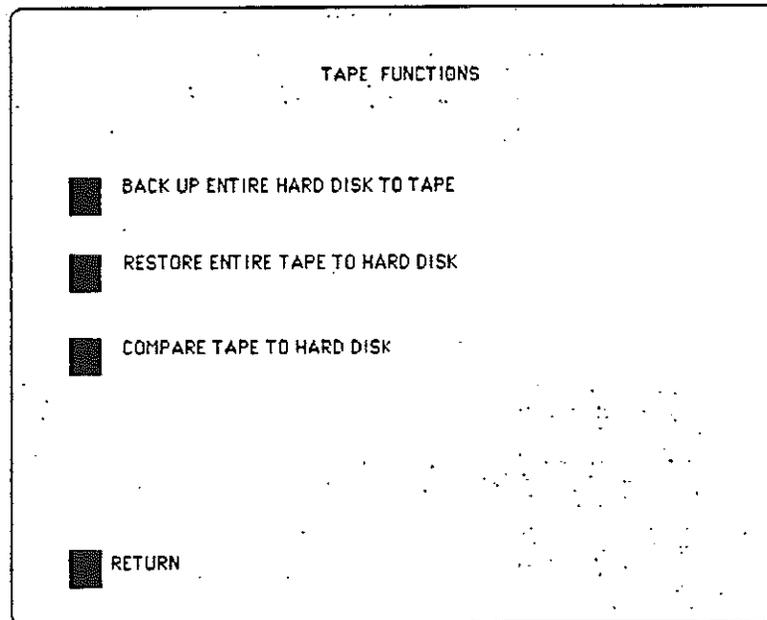


Figure 9-6. Tape Functions Menu: Model 640

The Field Analyzer will copy all of the files on the hard disk to the streamer tape. The message COPY HAS STARTED will be displayed on the screen while the copying, which takes about forty-five minutes for 5000 files, is being completed.

When all the files on the hard disk have been copied to the streamer tape, the message COPY SUCCESSFUL will appear. Then the screen will dis-

play the disk functions menu. Remove the tape and store it in a safe place.

It is a good idea to compare the backup tape to the hard disk fairly regularly to make sure that all of your records are backed up. This is done by selecting `COMPARE TAPE TO HARD DISK` in the tape functions menu. The entire process is described later in this section under *Comparing the Hard Disk to the Backup Tape* (page 9-18).

To prevent tape degradation, the streamer tape should be inserted in the instrument only when you are copying the hard disk to the tape. For data management insurance, and to help keep your files organized chronologically, it is a good idea to rotate between two tapes. Each time you put a tape into the Field Analyzer to copy the hard disk to it, write the date on the label. That way you will know that particular tape contains all the files stored on the hard disk up to that date. Even though you have backed up your files onto the tape, you should always keep your floppy disks as a secondary backup. This will ensure that all of your data is safe in case of a problem with the tape or hard disk.

### *Choosing Directory Order: Dual Disk Models*

Dual disk drive Field Analyzer models allow you to view your disk directories in either alphabetical or chronological order. The default order is alphabetical. The hard drive directory is always alphabetical.

To view your disk directory in chronological rather than alphabetical order, touch `DIRECTORY ORDER` in the disk functions menu. Then select either `CHRONOLOGICAL` or `ALPHABETICAL` on the screen that appears (see figure 9-7).

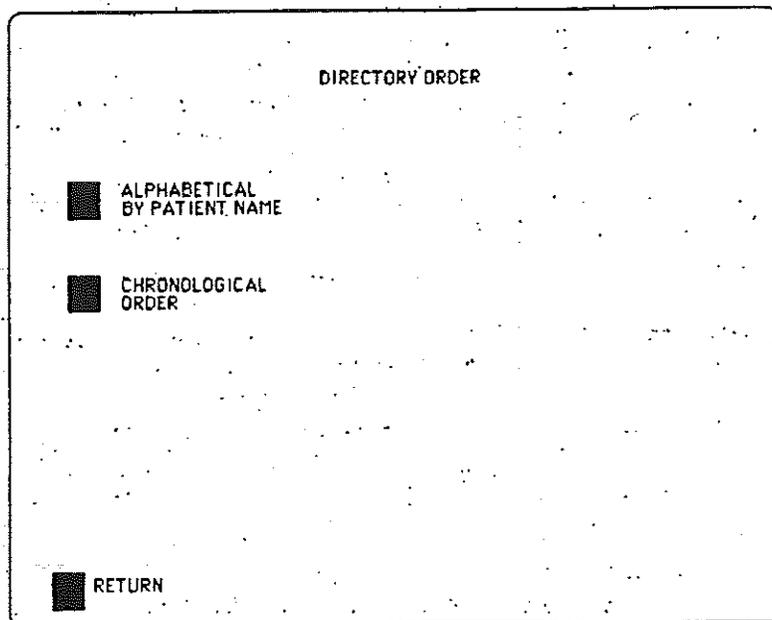
---

## Selecting Files From the Disk Directory

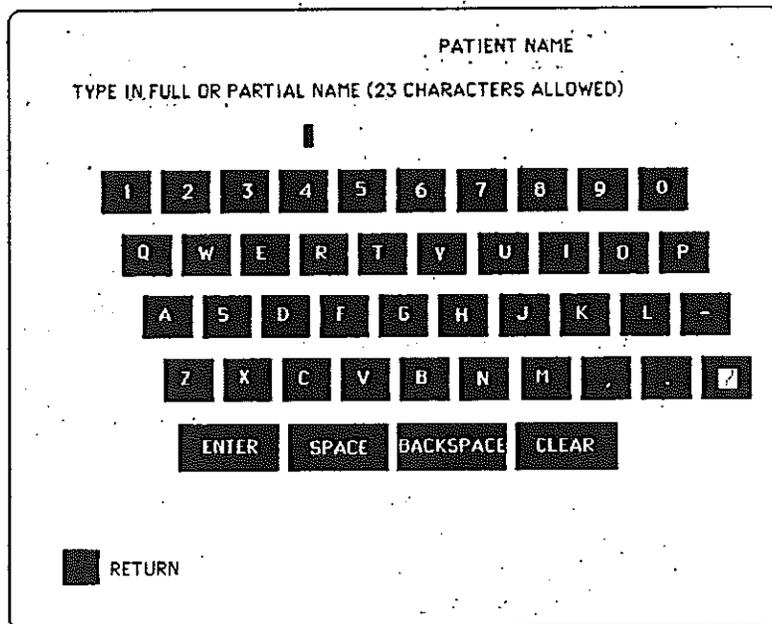
A great many Field Analyzer disk functions are performed by first selecting a file or files from the disk directory. In most cases you will follow the same procedure to find the files you want to use, although the menus will vary slightly according to the disk function to be performed.

With dual disk drive Field Analyzer models it is recommended that you get in the habit of always using the upper drive for the disk containing the files you want to work with. So, when you make a selection from the disk functions menu that first goes to the directory, choose `UPPER` to tell the Field Analyzer which disk drive you want to use. Then use `SCROLL UP` and `SCROLL DOWN` to move through the alphabetical directory until you find the file you are looking for.

Touching the light pen to the pad next to the file highlights the file name on the screen and tells the Field Analyzer that this is the file you want to use for the disk function you are performing. If the selection is incorrect, touch the pad next to the file a second time and the highlighting will disappear.



**Figure 9-7. Directory Order Menu: Dual Disk Drive Models**



**Figure 9-8. Hard Disk Search Screen**

- ❖ To find a file on the hard disk you must first select HARD DISK from the screen that appears after you have made your selection from the disk functions menu. If you choose FLOPPY, follow the procedures described above for finding files on floppy disks. If you choose HARD, a keyboard screen, called the search screen, will appear (figure 9-8).

Use the light pen to type the patient's name. You may enter all or part of the patient's name. An alphabetical portion of the hard disk directory that matches what you have typed will be called up. Use SCROLL UP or SCROLL DOWN to find the file you want. Touching the light pen to the pad next to the file highlights the file name on the screen and tells the Field Analyzer that this is the file you want to use for the disk function you are performing. If the selection is incorrect, touch the pad next to the file a second time and the highlighting will disappear.

## Recalling Patients for Follow-Up Testing

The Field Analyzer allows you to search automatically for the files of patients who have not had a field test for a specified amount of time. To search your files for these patients, select PATIENT RECALL from the disk functions menu and indicate which disk drive to search. The screen shown in figure 9-9 will appear. Although the Field Analyzer is programmed to search for patients who have not had a field test within the past six to twenty-four months, this time frame may be changed. Simply touch the pad next to the time element you wish to change and use the keyboard on the screen to enter the new value.

When you are ready to print a list of patients for recall, touch PRINT. The Field Analyzer will give you a list of patients who have not been seen within the indicated time frame. If you want to print only those

THIS FUNCTION WILL SEARCH THE DISK AND PRINT THE MOST RECENT DIRECTORY ENTRY OF ALL PATIENTS NOT SEEN SINCE 6 MONTHS IT WILL NOT PRINT ENTRIES THAT EXCEED 24 MONTHS

<input type="checkbox"/> MOST RECENT DIRECTORY ENTRY FOR PATIENTS NOT SEEN SINCE	6 MONTHS	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> DO NOT INCLUDE ENTRIES OLDER THAN	24 MONTHS	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> PRINT		<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9
<input type="checkbox"/> PRINT ONLY NEW ITEMS		<input type="checkbox"/> +	<input type="checkbox"/> 0	<input type="checkbox"/> -
<input type="checkbox"/> CLEAR NEW FLAG		<input type="checkbox"/> -	<input type="checkbox"/> ENTER	<input type="checkbox"/> CLEAR
<input type="checkbox"/> RETURN				

Figure 9-9. Recall Patients for Follow-Up Screen

patients who have become eligible for the list since the last recall, touch **PRINT ONLY NEW ITEMS**.

If you want to print the names of all patients who meet the selection criteria regardless of whether their names appeared on a previous search list, touch **CLEAR NEW FLAG** before touching **PRINT**.

---

## Printing the Disk Directory

The directory of the tests stored on a floppy disk may be reviewed and printed. You may find it is convenient to keep a current printout of each disk's directory folded in the disk jacket.

To see a floppy disk directory on the screen, select **RECALL/PRINT DIRECTORY** from the disk functions menu. If you have a Field Analyzer with dual disk drives, put the disk you want to work with in the upper drive and select **UPPER**. If you have a hard disk model and want to print the directory of a floppy disk, make sure the correct disk is in the floppy disk drive and select **FLOPPY**. A list of the first ten files stored on the disk will appear on the screen (figure 9-10). To view more files, touch **SCROLL UP** or **SCROLL DOWN**.

To print the directory, touch **PRINT** and the Field Analyzer will print the entire directory. A section of a sample directory printout is shown in figure 9-11.

- ❖ Because the 80 megabyte hard disk can hold up to 75,000 files and it would take much too long to print the directory, the Field Analyzer is programmed to print sections of the hard disk directory. To print a

RECALL/PRINT					
PATIENT, E	12-05-58	DS	FAST-CENTRAL 30-1 T	07:11	10-29-89
PATIENT, E	12-05-58	DS	MAS-CENTRAL 30-1 T	07:05	10-29-89
PATIENT, E	12-05-58	DS	CENTRAL 30-1 THRES	07:04	10-29-89
PATIENT, F	08-24-55	DD	MACULA THRESHOLD TES	09:48	10-25-89
PATIENT, G	07-04-60	DD	ARC THRESHOLD TEST	04:11	10-24-89
PATIENT, G	07-04-60	DD	PROFILE THRESHOLD	04:05	10-24-89
PATIENT, G	07-04-60	DD	CUSTOM THRESHOLD TES	03:29	10-24-89
PATIENT, H	08-08-53	DD	CENTRAL 40 POINT SCR	06:07	10-19-89
PATIENT, I	05-04-60	DD	MAS-CENTRAL 30-2T	12:21	10-19-89
PATIENT, J	12-05-58	DS	CENTRAL 30-1 THRES	11:41	10-19-89

■ RETURN   ■ SCROLL UP FOR EARLIER FILES   ■ SCROLL DOWN FOR MORE RECENT FILES   ■ PRINT DIRECTORY

Figure 9-10. Floppy Disk Directory Screen

```

DATE 03-30-01                               TIME 01:39:19 PM
CARTER, SARAH                               06-14-30 OD MRC-P60-2,C30-2 THRE 02:56 10-24-86
CARTER, SARAH                               06-14-30 OD PERIPHERAL 30/60 - 2 01:28 10-10-83
CARTER, SARAH                               06-14-30 OD CENTRAL 30 - 2 THRES 02:56 10-02-83
CARTER, SARAH                               06-14-30 OD CENTRAL 30 - 1 THRES 02:40 09-25-83
CUMMINS, LORI                               10-09-51 OS KINETIC                               11:35 11-28-89
CUMMINS, LORI                               10-09-51 OD KINETIC                               06:24 10-22-89
FARMER, FRANK                               09-09-63 OD CENTRAL 30 - 2 THRES 11:42 12-20-00
FARMER, FRANK                               09-09-63 OD CENTRAL 30 - 2 THRES 11:41 12-20-00
JONES, BILL                                06-20-46 OD FULL FIELD 120 POINT 03:21 08-28-90
SMITH, J                                    10-26-63 OD CENTRAL 24 - 2 THRES 02:25 01-24-01
SMITH, J                                    10-26-63 OD CENTRAL 30 - 2 THRES 02:24 01-24-01
SMITH, J                                    10-26-63 OD CENTRAL 24 - 2 THRES 02:21 01-24-01
SMITH, J                                    10-26-63 OD CENTRAL 30 - 2 THRES 02:20 01-24-01
SMITH, J                                    10-26-63 OD CENTRAL 30 - 2 THRES 01:27 12-20-00
STATPAC, T                                 03-19-28 OD CENTRAL 30 - 2 THRES 03:02 10-08-86
STATPAC, T                                 03-19-28 OD CENTRAL 30 - 2 THRES 12:51 05-19-86
STATPAC, T                                 03-19-28 OD CENTRAL 30 - 2 THRES 09:50 02-18-86
STATPAC, T                                 03-19-28 OD CENTRAL 30 - 2 THRES 01:26 10-07-85
STATPAC, T                                 03-19-28 OD CENTRAL 30 - 2 THRES 11:19 12-17-84
TEMPLE, JOE C.                             02-24-60 OD CMP-CENTRAL 30 - 2 T 11:40 05-08-86
TEMPLE, JOE C.                             02-24-60 OD CENTRAL 30 - 2 THRES 11:40 03-23-84
TEMPLE, JOE C.                             02-24-60 OD CENTRAL 30 - 2 THRES 11:44 03-22-84
TRUTT, PAUL A.                             06-14-30 OD AVG-CENTRAL 30 - 2 T 02:53 10-24-86
TRUTT, PAUL A.                             06-14-30 OD CENTRAL 30 - 2 THRES 02:53 10-31-83
TRUTT, PAUL M.                             06-14-30 OD MRC-C30-2,C30-1 THRE 02:40 10-24-86
WALL, JOHN                                 06-22-47 OD KINETIC                               04:43 10-04-89

```

Figure 9-11. Sample Disk Directory Printout

SELECT UP TO 2 FILE(S) RECALL/PRINT  
TO CHANGE SELECTION, TOUCH FILE IN REVERSE COLOR A SECOND TIME

PATIENT NAME	BIRTHDATE	EYE	TEST NAME	TIME	DATE
■ PATIENT, E.	12-05-58	OS	FAST-CENTRAL 30-1 T	07.11	10-29-89
■ PATIENT, E.	12-05-58	OS	MAS-CENTRAL 30-1 T	07.05	10-29-89
■ PATIENT, E.	12-05-58	OS	CENTRAL 30-1 THRES	07.04	10-29-89
■ PATIENT, F.	08-24-55	OD	MACULA THRESHOLD TES	09.48	10-25-89
■ PATIENT, G.	07-04-60	OD	ARC THRESHOLD TEST	04.11	10-24-89
■ PATIENT, G.	07-04-60	OD	PROFILE THRESHOLD	04.05	10-24-89
■ PATIENT, G.	07-04-60	OD	CUSTOM THRESHOLD TES	03.29	10-24-89
■ PATIENT, H.	08-08-53	OD	CENTRAL 40 POINT SCR	06.07	10-19-89
■ PATIENT, I.	05-04-60	OD	MAS-CENTRAL 30-2T	12.21	10-19-89
■ PATIENT, J.	12-05-58	OS	CENTRAL 30-1 THRES	11.41	10-19-89

RETURN     
 CHANGE SEARCH NAME  
 SCROLL UP FOR EARLIER FILES     
 SCROLL DOWN FOR MORE RECENT FILES     
 SELECTION COMPLETE

Figure 9-12. Hard Disk RECALL/PRINT DIRECTORY Screen

section of the hard disk directory, select RECALL/PRINT DIRECTORY from the disk functions menu. When the search screen appears, type in the name of the patient whose record should be the first one printed.

When the Field Analyzer displays that portion of the directory, touch the pad next to the first file you want to print and then touch CHANGE SEARCHNAME (figure 9-12). This will bring the keyboard back and you can enter the name of the patient whose record should be the last one printed. Again, when that section of the directory appears, touch the pad next to the last record you want to print. Then touch SELECTION COMPLETE and the Field Analyzer will print a directory of all patient records stored alphabetically between the two files you have chosen.

---

## Copying Files or Disks

There are a number of reasons for wanting to copy individual files or entire disks, but the most important is to prevent the loss of patient records. Even with the best handling and storage techniques, floppy disks can be inadvertently ruined or lost. Power surges and other malfunctions can cause hard disks to crash. Therefore, you should always store duplicate or backup copies of all data on floppy disks. Even if you have a Model 640 with a streamer tape backup, you should keep copies of patient records on floppy disks as well.

The Field Analyzer will copy entire floppy disks at once, or you can choose to make copies file by file. Copying single files allows you to create a patient disk from old backup disks and to keep important benchmark test results on the current chronological disk. You can also copy patient files for use in other Field Analyzers or to use for referral patients.

### *Copy Functions for Dual Disk Drive Models*

Field Analyzers with dual disk drives can copy an entire floppy disk to another floppy disk, or copy files from one disk to another.

#### *Copying Entire Floppy Disks*

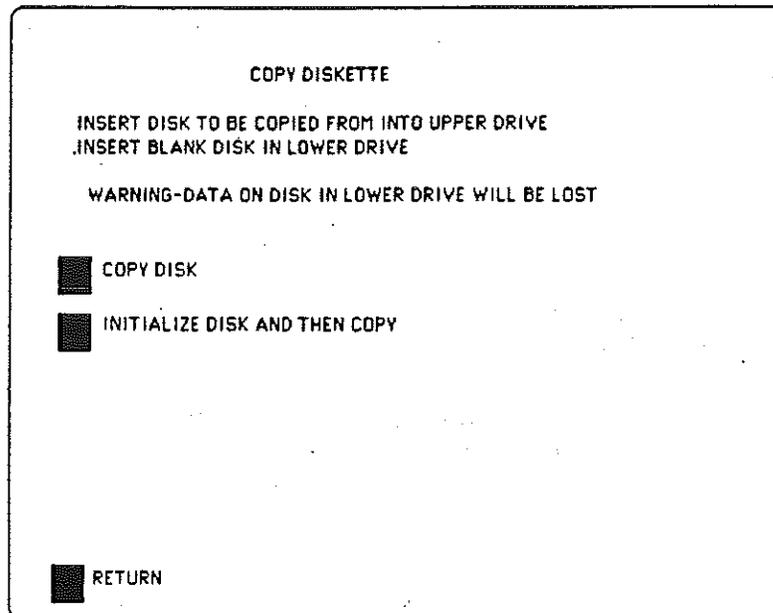
To copy an entire disk on a dual disk drive Field Analyzer, begin by selecting DISK FUNCTIONS from the main menu, then select COPY DISK from the disk functions menu. The copy diskette menu will appear (see figure 9-13).

Insert the source disk, that is, the disk that contains the material you want to copy from into the upper disk drive. Insert the target disk, the disk you want to copy to, into the lower disk drive. You may copy onto a newly initialized disk or to a disk that already contains data, but in the second case, the old data will be erased.

Touch COPY DISK. The copy will be completed in two to ten minutes, depending on how many files are stored on disk. A disk with forty files takes about two minutes to copy.

#### *Copying Single Files*

To copy individual files on a Field Analyzer with dual disk drives, insert the disk containing the files you want to copy into the upper



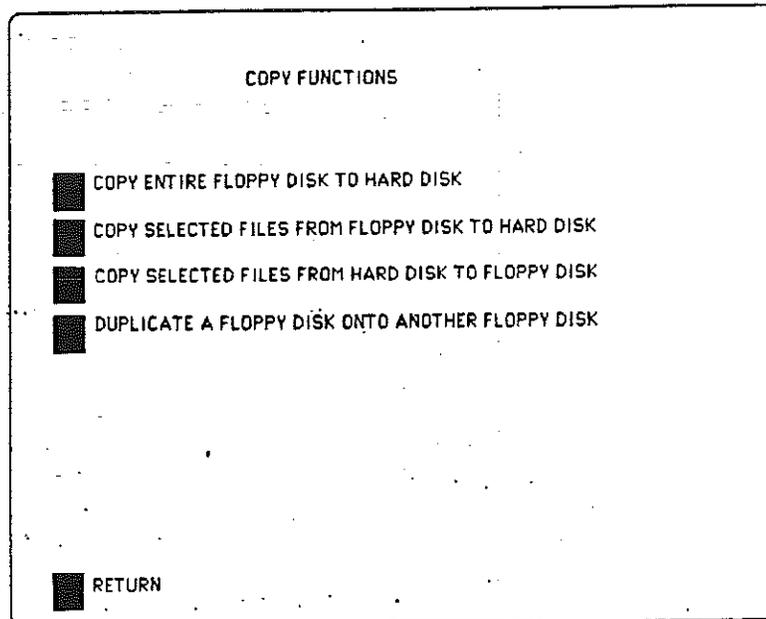
**Figure 9-13.** *Copy Diskette Menu: Dual Disk Drive Models*

drive, and insert the target disk into the lower drive. Touch DISK FUNCTIONS in the main menu, and then select COPY FILES FROM UPPER TO LOWER DRIVE in the disk functions menu (figure 9-2).

A list of the first ten files stored on the disk in the upper drive will appear on the screen. To view more files, touch SCROLL UP or SCROLL DOWN. When you find the file you want to copy, touch the pad next to it, and it will be highlighted on the screen and designated as a file to copy. To erase an incorrect selection, touch the file keypad a second time. Up to 250 files may be selected. When you have selected all the files you want to copy, touch SELECTION COMPLETE. The files will be copied onto the disk in the lower drive, and the disk functions menu will reappear on the screen.

### ***Copy Functions for Hard Disk Drive Models***

- ❖ On hard disk models, you may copy:
    - The contents of an entire floppy disk to another floppy disk or to the hard disk
    - Single files or blocks of files from one floppy disk to another
    - Single files or blocks of files from a floppy disk to the hard disk
    - Single files or blocks of files from the hard disk to a floppy disk
- Begin by selecting COPY FUNCTIONS in the disk functions menu. This calls up the hard disk copy functions screen (figure 9-14).



**Figure 9-14.** *Copy Functions Screen: Hard Disk Models*

### ***Copying an Entire Floppy Disk***



To copy one floppy disk onto another, select **DUPLICATE A FLOPPY DISK ONTO ANOTHER FLOPPY DISK** from the copy functions screen. The Field Analyzer will give you the message **INSERT SOURCE FLOPPY DISK AND HIT THIS PAD WHEN YOU ARE READY**. The instrument then reads the floppy disk into memory and shows the message **READING FILES FROM SOURCE DISK (ABOUT 3 MINUTES)**. The time depends on how full the disk is.

When the Field Analyzer is ready, the screen will tell you to insert an initialized floppy disk and touch the pad when you are ready. Take the source disk out of the drive and insert an initialized disk. Touch the pad. While the files are being copied onto the new disk, the screen message says **WRITING PATIENT RESULTS TO DESTINATION DISK (ABOUT 3 MINUTES)**. As the process nears the end, the screen tells you it is finishing up, and when the copy is complete the disk functions menu appears.

To copy an entire floppy disk to the hard disk, select **COPY ENTIRE FLOPPY DISK TO HARD DISK** from the menu shown in figure 9-14. It will take two or three minutes to copy the floppy disk. When the **COPY SUCCESSFUL** message appears and the red light in the floppy disk drive goes out, the entire floppy disk has been copied to the hard disk. During this copying process, the Field Analyzer checks for duplicate files so that it will not copy them and integrates the new files into the hard disk directory.

### ***Copying Single Files***



To copy a single file from the hard disk to a floppy disk, select **COPY SELECTED FILES FROM HARD DISK TO FLOPPY DISK** from the copy functions screen. This will call up the keyboard on the hard disk search screen (refer back to figure 9-8). Use the light pen to type the patient's name and

touch ENTER. Use SCROLL UP or SCROLL DOWN to locate the desired file when the relevant portion of the disk directory appears.

When you find a file you want to copy, touch the pad next to it, and it will be highlighted on the screen and designated by the Field Analyzer as a file to be copied. To erase an incorrect selection, touch the file keypad a second time. Up to 250 files may be selected. When you have selected all the files you want to copy, touch SELECTION COMPLETE. The files will be copied onto the floppy disk, and the COPY SUCCESSFUL message will appear on the screen.

To copy files from floppy disk to hard disk, select COPY FILES FROM FLOPPY DISK TO HARD DISK on the hard disk copy screen. A list of the first ten files in the floppy disk directory will appear on the screen. Scroll up or down until you find the file or files you wish to copy. Touching the pad next to the file name highlights it and designates it as a file to be copied. You may select up to 250 files. When you have selected all the files you want to copy, touch SELECTION COMPLETE. The files will be copied onto the hard disk, and the COPY SUCCESSFUL message will appear. The Field Analyzer will sort the hard disk directory alphabetically to include the new additions.

---

## Comparing the Hard Disk to the Backup Tape: Model 640

- ❖ If you have a Model 640 with a backup streamer tape, it is important to check occasionally that the tape backup system is working properly. This is done by comparing the contents of the backup tape to the contents of the hard disk *immediately* after transferring data to the tape. Making the comparison at regular intervals ensures that your backup tape is complete and accurate so that no data will be lost in the event of a hard disk failure. Remember that for data management insurance, and to help keep your files organized chronologically, it is a good idea to use two tapes alternately.

To compare the tape to the hard disk, select TAPE FUNCTIONS from the disk operations menu. When the tape functions menu appears (refer back to figure 9-6), select COMPARE TAPE TO HARD DISK. The Field Analyzer will then ask you if you really want to compare the tape and the hard disk. This is because the comparison can take up to forty minutes, depending on how much data you have stored on the hard disk, and the comparison process cannot be interrupted. You will probably find it most efficient to set your Field Analyzer to check the backup tape overnight.

If you select YES, you will see a screen that counts down the minutes required to complete the comparison and adds up any errors that are found.

If, at the end of the comparison, you see that any errors have been logged, you should return to the tape functions menu, copy the hard disk onto the tape again, and repeat the comparison process. If errors are consistently found, call Customer Service.

## Deleting Files

❖ The procedure for erasing a file from a floppy disk is the same for both dual drive and hard drive models. Files stored on floppy disks must be deleted one at a time. To delete a file, select **DELETE FILES** in the disk functions menu. With dual drive models, put the disk containing the file or files you want to delete in the upper drive and then choose **UPPER**. With a hard disk model, select **FLOPPY**. Please note that no matter how you usually keep your disk directory, the directory that appears will be in chronological order, not alphabetical, for this procedure. Use **SCROLL UP** or **SCROLL DOWN** to find the file you want to delete, and touch the pad next to it. It will be highlighted on the screen. To erase an incorrect file selection, touch the pad a second time and the highlighting will disappear (see figure 9-15).

When the correct file has been designated, touch **SELECTION COMPLETE**. The file will appear on the screen with the options **CHANGE DISPLAY**, **DELETE FILE/DATALOST**, and **RETURN**. If you would like to see the test results in another format before deciding whether to delete it, touch **CHANGEDISPLAY**. If you still want to delete the file, select **DELETE FILE/DATALOST**. To cancel the delete command, touch **RETURN**.

❖ With the hard disk model, you may delete files from the hard disk individually or in a block. It is possible, for example, to delete all the files for a particular patient in a single operation. To delete a group of files, select **DELETE FILES** in the disk functions menu, and then choose **HARD** from the next screen. The delete functions menu will appear (figure 9-16).

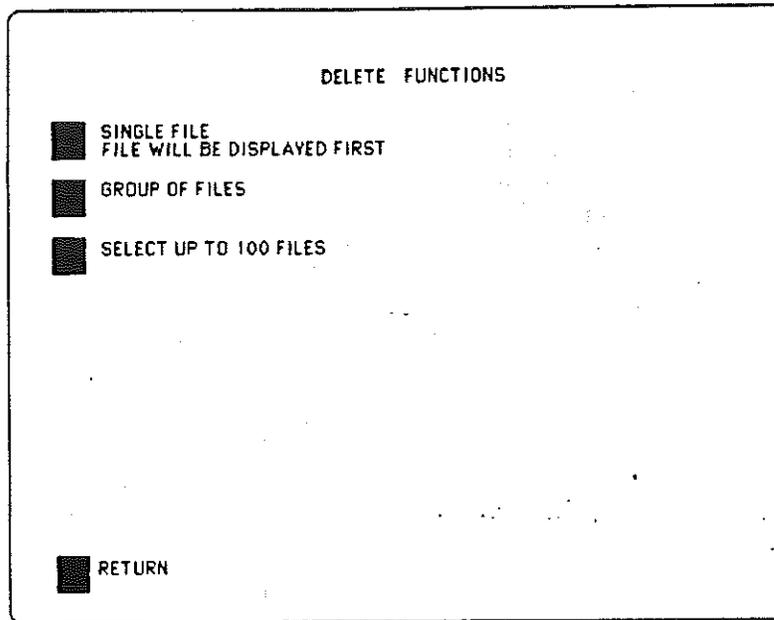
SELECT UP TO 1 FILE(S) FILE WILL BE DISPLAYED FIRST  
TO CHANGE SELECTION, TOUCH FILE IN REVERSE COLOR A SECOND TIME

PATIENT NAME	BIRTHDATE	EYE	TEST NAME	TIME	DATE
■ PATIENT, E.	12-05-58	OS	FAST-CENTRAL 30-1 T	07:11	10-29-89
■ PATIENT, E.	12-05-58	OS	MAS-CENTRAL 30-1 T	07:05	10-29-89
■ PATIENT, E	12-05-58	OS	CENTRAL 30-1 THRES	07:04	10-29-89
■ PATIENT, F	06-24-55	OD	MACULA THRESHOLD TES	09:48	10-25-89
■ PATIENT, G	07-04-60	OD	ARC THRESHOLD TEST	04:11	10-24-89
■ PATIENT, G	07-04-60	OD	PROFILE THRESHOLD	04:05	10-24-89
■ PATIENT, G	07-04-60	OD	CUSTOM THRESHOLD TES	03:29	10-24-89
■ PATIENT, H.	08-08-53	OD	CENTRAL 40 POINT SCR	06:07	10-19-89
■ PATIENT, I.	05-04-60	OD	MAS-CENTRAL 30-2T	12:21	10-19-89
■ PATIENT, J.	12-05-58	OS	CENTRAL 30-1 THRES	11:41	10-19-89

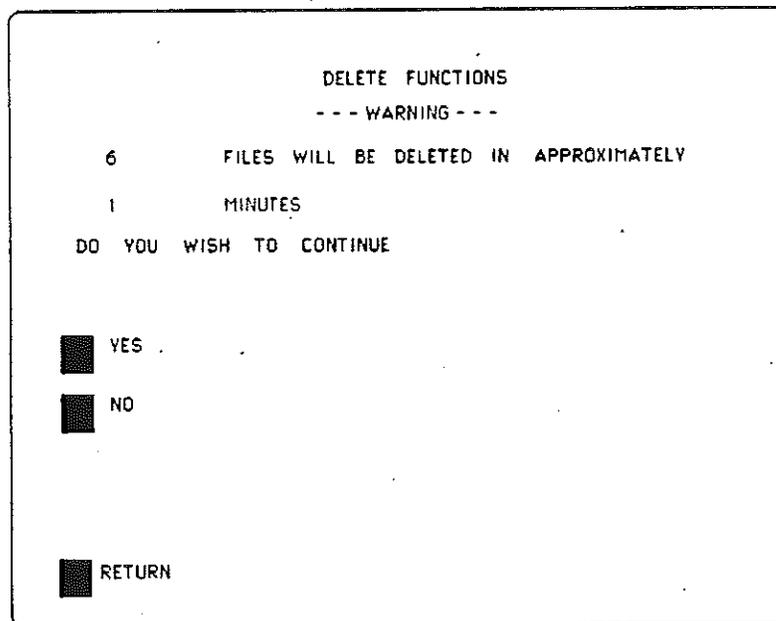
■ CHANGE SEARCH NAME

■ RETURN    ■ SCROLL UP FOR EARLIER FILES    ■ SCROLL DOWN FOR MORE RECENT FILES    ■ SELECTION COMPLETE

Figure 9-15. Delete File Screen



**Figure 9-16.** *Delete Functions Menu*



**Figure 9-17.** *Delete Functions Warning Screen*

The GROUP OF FILES pad calls up a keyboard. Type in the first name (alphabetically) you want to include in the block of files to be deleted. When that portion of the directory appears, touch the pad next to the desired file name. The Field Analyzer will highlight it on the screen. Scroll down until you find the last file of the block you want to delete and touch the pad next to that file name. You may include any

number of files in the deletion process as long as they fall in the directory between the two files you have selected in the directory.

Before the Field Analyzer begins to delete the files, you will see the screen shown in figure 9-17.

If you want to delete a single file from the hard disk choose DELETE FILES from the disk functions menu and indicate HARD as the location of the file. Select SINGLE FILE from the delete functions menu. Type in the patient's name on the search screen keyboard and scroll up or down to find the file you want to delete. Touch the pad next to the file name and it will be highlighted. When you have indicated the correct file to delete, touch SELECTION COMPLETE. If you have chosen a threshold test result, the Field Analyzer will give you a choice of CHANGE DISPLAY, DELETE FILES/DATA LOST, or RETURN. If you would like to see the test results in another format before deciding whether to delete the file, touch CHANGE DISPLAY. If you still want to delete the file, select DELETE FILE/DATA LOST. To cancel the delete command, touch RETURN.

## Changing or Correcting Patient Data

At times, a test is saved on disk with the patient's name, birthdate, or other patient data incorrect. This makes it difficult to find files for data analysis, fast thresholding, and ordinary office record keeping.

- ❖ Incorrect patient data entries on an existing file must be corrected one at a time. Touch CHANGE PATIENT DATA in the disk functions menu. Dual disk drive models ask you to select UPPER or LOWER to indicate the

TIME: 06:14 13 PM  
DATE 10-31-87 PATIENT DATA

■ ID	45								
■ BIRTHDATE	11-3-59	MM-DD-YY			1	2	3		
■ PUPIL DIAMETER	RE: 4.0 MM				4	5	6		
	LE: 5.0 MM								
■ NAME	PATIENT A.				7	8	9		
■ VISUAL ACUITY	RE: 20/30				■	0	-		
	LE: 20/50								
■ RX USED	RE: DS DCX DEG				-	ENTER	CLEAR		
	LE: DS DCX DEG								
■ TEST DATE	4-6-87								
■ RETURN									
■ HELP MENUS									

Figure 9-18. Change Patient Data Screen





DATE	EVALUATION	MD	PSD	SF	CPSD	FP	FN	FL	VA	PUP
14 OCT 86	DEFECT	-23.51	11.09	1.85	10.89	0/5	2/8	0/23		
19 NOV 86	DEFECT	-24.21	10.94	1.79	10.75	0/10	0/4	2/24		
31 OCT 88	DEFECT	-23.79	10.34	1.94	10.10	0/20	1/6	0/23		
13 APR 89	DEFECT	-23.97	10.40	5.97	7.90	0/14	0/9	0/26		

RETURN

Figure 9-21. Multi-Field Display

CHANGE DISPLAY

<input type="checkbox"/> NUMERIC DB	<input type="checkbox"/> SINGLE FIELD ANALYSIS
<input type="checkbox"/> DEFECT DEPTH	<input type="checkbox"/> MULTI-FIELD ANALYSIS
<input type="checkbox"/> GREYTONES	
<input type="checkbox"/> PROFILE	

RETURN

Figure 9-22. Change Display Screen

losses, false positive and false negative scores, and the glaucoma hemifield test evaluation. All of these STATPAC2 variables are described in more detail in Section 10. Visual acuity and pupil size are also included in the list of variables.

To view the multi-field display, touch **CHANGE DISPLAY** at the end of a test or after recalling stored results using the **RECALL RESULTS** function discussed above. Select **MULTI FIELD DISPLAY** from the change display screen (figure 9-22) and the Field Analyzer will ask you whether your files are stored on **HARD** or **FLOPPY** disk. All matching serial fields on the disk you have designated will be located and the selected fields will be highlighted on your screen. You may add or remove files from the selection in the usual manner.

When you are satisfied with the list of fields, touch **SELECTION COMPLETE** and the multi-field display will appear on your screen. You may print the screen by selecting **SUMMARY PRINTOUT** from the print menu.

---

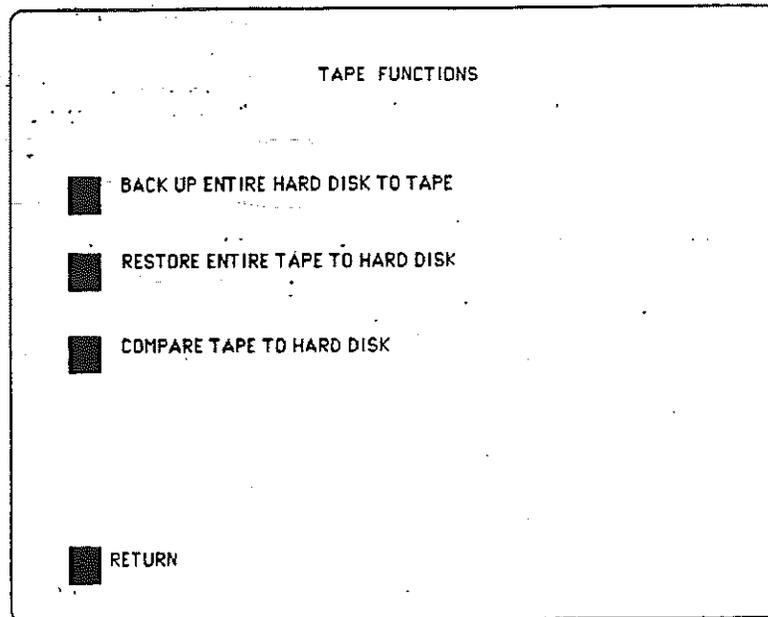
## Adding the Doctor's Name to the Printout

It is possible to add the doctor's or institution's name and address to your printout. To do so, select **CONFIGURATION MENU** from the main menu and then choose **PERSONALIZED ID** (see figure 9-23). The screen that appears contains pads numbered one through five, indicating that five lines are available to enter the information. Each line has room for twenty-three characters. Touch the pad for the first line, use the keyboard that appears to type in the first line, and touch **ENTER**. Follow the same procedure for the other lines. The name and address you have added will now appear on all printouts from this Field Analyzer.

CONFIGURATION MENU

<input type="checkbox"/> PRINTER	INTERNAL	<input type="checkbox"/> AUTOMATIC PAPER FEED
<input type="checkbox"/> BAUD RATE	9600	
<input type="checkbox"/> PARITY	NONE	
<input type="checkbox"/> PERSONALIZED ID		
<input type="checkbox"/> HFA SERIAL NUMBER	640-00XXXX	MOTOR REV. NUMBER = E 001
<input type="checkbox"/> INITIALIZE HARD DISK		
<input type="checkbox"/> REBUILD HARD DISK DIRECTORY AND RECOVER FILES		
<input type="checkbox"/> RETURN		

**Figure 9-23.** Configuration Menu



**Figure 9-24. Tape Functions Menu: Model 640**

ment that you attempt this only in very unusual circumstances and when all else fails. The rebuilding effort cannot be interrupted once it is underway, and under no circumstances should you turn the power off while it is in process because that would cause further loss of records. Since a very full hard disk can contain up to 33,000 files, rebuilding can take several hours.

To attempt to rebuild the directory, select CONFIGURATION MENU from the main menu. If you select the REBUILD HARD DISK DIRECTORY AND RECOVER FILES pad, the Field Analyzer will ask you if you really want to rebuild the files. If you touch the YES pad, the Field Analyzer will begin to evaluate the integrity of the hard disk and attempt to read some files, rebuilding where appropriate. At the end of this process, you will see either the screen shown in figure 9-25 or the screen shown in figure 9-26.

If your Field Analyzer presents the screen shown in figure 9-25, it has succeeded in recovering some or all of the files on your hard disk.

If your Field Analyzer presents the screen shown in figure 9-26, it means that in the first evaluation, the instrument was unable to read more than 200 to 300 continuous sectors. It may be productive to try again. Touch YES and the Field Analyzer will again attempt to rebuild the hard disk. If repeated tries are not successful, or if you get a FAULT ERROR while attempting the rebuilding process, you will have to call Customer Service.

---

## Adding the Serial Number to Test Results

You can add the serial number to test results for easy reference. The serial number of your Field Analyzer is on the back of the instrument near the plug. It consists of the model number followed by a dash and the four-digit individual instrument number, for example 620-3510. Select **CONFIGURATION MENU** from the main menu and then choose **HFA SERIAL NUMBER** (see figure 9-23). Use the keyboard that appears to enter the entire seven-digit number. This needs to be done only once. All test results that are generated after you have entered the serial number will include the number of the instrument on which the test was taken, even if you print the results out on another Field Analyzer.

---

## Recovering Hard Disk Files: Model 640

With any data storage system there is a possibility of losing data. For that reason, we advocate the careful backup procedures described earlier in this section. In the event of a hard disk failure, the Field Analyzer contains a function that may, in rare cases, be used to recover as many files as possible. This function is not a substitute for maintaining backup records. Your best protection against a hard disk failure is to maintain a current streamer tape and complete, up-to-date floppy disk backup records.

If a hard disk failure occurs while you are recalling, copying, or saving a file, you will receive a **HARD DISK READ ERROR** or **HARD DISK WRITE ERROR** message. A **HARD DISK NOT READY** or **FAULT ERROR** message may also mean a hard disk failure. In the event of a hard disk failure during recalling, copying, or saving, the Field Analyzer automatically saves the most recent file on the backup floppy disk, if there is one in the drive.

**Turning the Field Analyzer off will cause you to lose your current test.**

If you get one of the hard disk failure messages, you should call Customer Service at (800) 341-6968. The cause of the problem may have been a power surge or failure during disk operations, in which case the hard disk may have suffered no permanent damage. On the other hand, there may be a hardware problem that could lead to further loss of files if you do not have your Field Analyzer serviced.

While you are waiting for a field service representative, or if hardware failure does not seem to be the problem, you may try to rebuild files. If you experience a hard disk failure and there is no apparent hardware failure, you can attempt to copy the backup tape by selecting **RESTORE ENTIRE TAPE TO HARD DISK** from the tape functions menu (figure 9-24). Remember, if this procedure is successful, only those files which are stored on the tape will be copied onto the hard disk. You may have to copy additional files from floppy disks to restore your records fully. The importance of maintaining complete and up-to-date backup records cannot be overstated.

Begin by trying the rebuilding function only in the rare event of a streamer tape failure, or if you do not have a backup tape. We recom-

**Table 9-1. Data Analysis Programs and Printouts**

Test Pattern	Strategy	Printout Formats
<b>Compare</b>		
All threshold patterns	Full threshold or full threshold from prior data	Numeric
<b>Average</b>		
All threshold patterns	Full threshold or full threshold from prior data	Numeric
<b>Merge: in any combination</b>		
Central 30-1 Central 30-2 Peripheral 30/60-1 Peripheral 30/60-2	Full threshold or full threshold from prior data	Numeric, defect depth, graytone, profile, and 3-in-1
Peripheral 68 with any of the above	Threshold-related or three-zone	Screening printout
<b>Merge: only with each other</b>		
Central 24-1 and Central 24-2	Full threshold or full threshold from prior data	Numeric, defect depth, graytone, and 3-in-1

*Note: For STATPAC 2 data analysis options and printouts, see Section 10.*

disk storage. STATPAC 2 is an optional statistical analysis package that can be used on Field Analyzer models 610 and up (see Section 10, STATPAC 2 for a full description of this Field Analyzer option). When you are using any of the data analysis functions, be careful to select tests for the same patient to avoid erroneous analysis.

## Compare

The compare program analyzes the results of two tests to show the difference in threshold values measured by the same test pattern and strategy at two different times. The results of the comparison are presented in the numeric format (see table 9-1 and figure 9-27).

The change in decibels for each test point appears on the printout. Negative numbers indicate that the sensitivity at that point has decreased over time. Positive numbers indicate that the sensitivity has increased.

- ◆ To compare two files, select COMPARE from the disk functions menu. Dual disk drive models will present the beginning of the directory of the disk you have inserted into the upper drive. Hard disk models will first ask whether the files are on hard or floppy disk and show the search screen keyboard if the files to be compared are stored on the hard disk. Select the two files you want to compare, making sure they are for the same patient, and touch SELECTION COMPLETE. The order

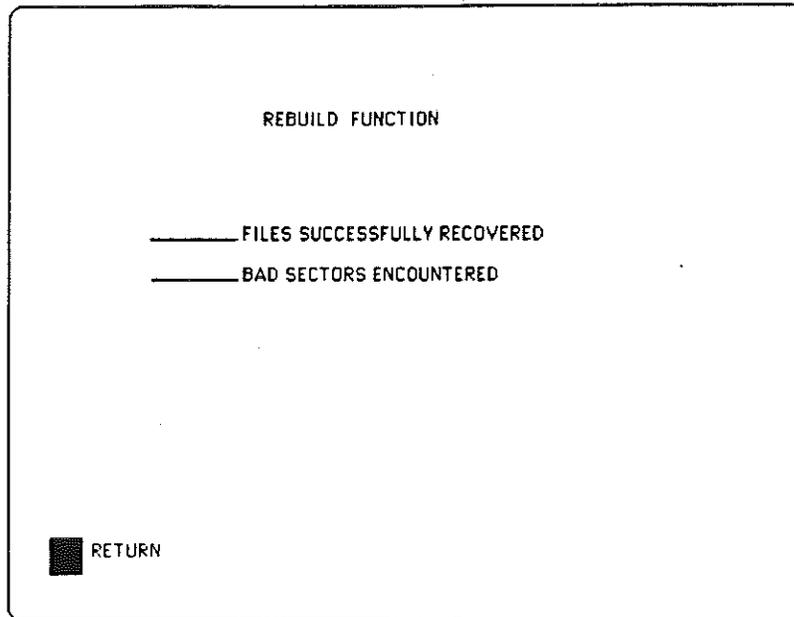


Figure 9-25. Rebuilding Success Screen

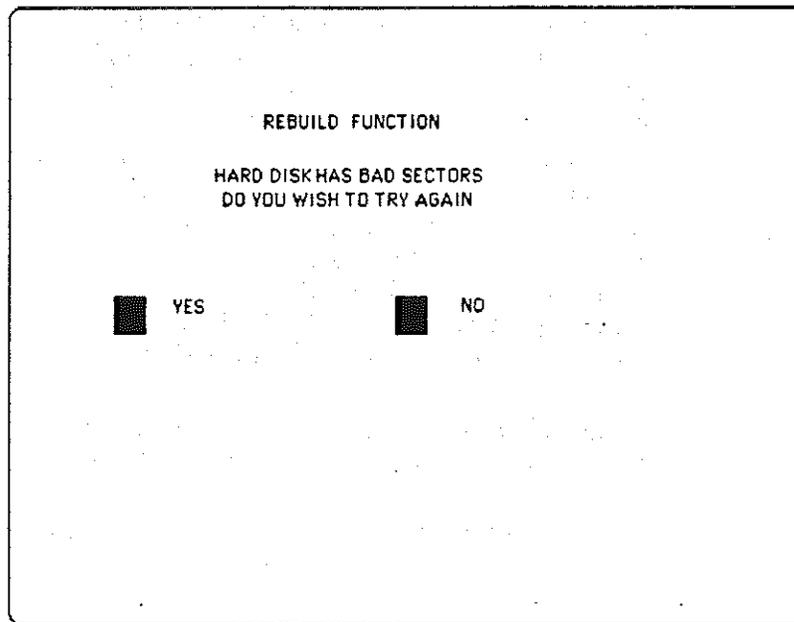


Figure 9-26. Rebuilding Failure Screen

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## Data Analysis

Test results which are stored on disk may be analyzed using the data analysis options in the disk functions menu. The compare, average, and merge programs are available on all Field Analyzer models with

in which you select the two files does not influence the data analysis. The Field Analyzer notices the dates and compares the tests chronologically. Touch **SAVE ON DISK** to save the results. Use **PRINT** to print the results.

## *Average*

The average program calculates the arithmetic average of the threshold values measured in two to five threshold examinations. Averaging the results of several examinations performed over a relatively short period of time reduces the effect of fluctuation on the threshold values.

- ❖ To average files, select **AVERAGE** from the disk functions menu. Dual disk drive models will present the beginning of the directory of the disk you have inserted in the upper drive. Hard drive models will first ask if the files are on the hard or floppy disk and then present the search screen keyboard if the files to be averaged are stored on the hard disk. Select between two and five files, making sure they are for the same patient and eye, and touch **SELECTION COMPLETE**.

The Field Analyzer will make its calculations and present the averaged results screen (figure 9-28). To save these results, touch **SAVE ON DISK**. The file will be stored under the patient's name in the directory, preceded by the notation **AVG**. To print out a copy of the averaged results, touch **PRINT**. The results will be presented in the numeric format. **RETURN** takes you back to the disk functions menu.

## *Merge*

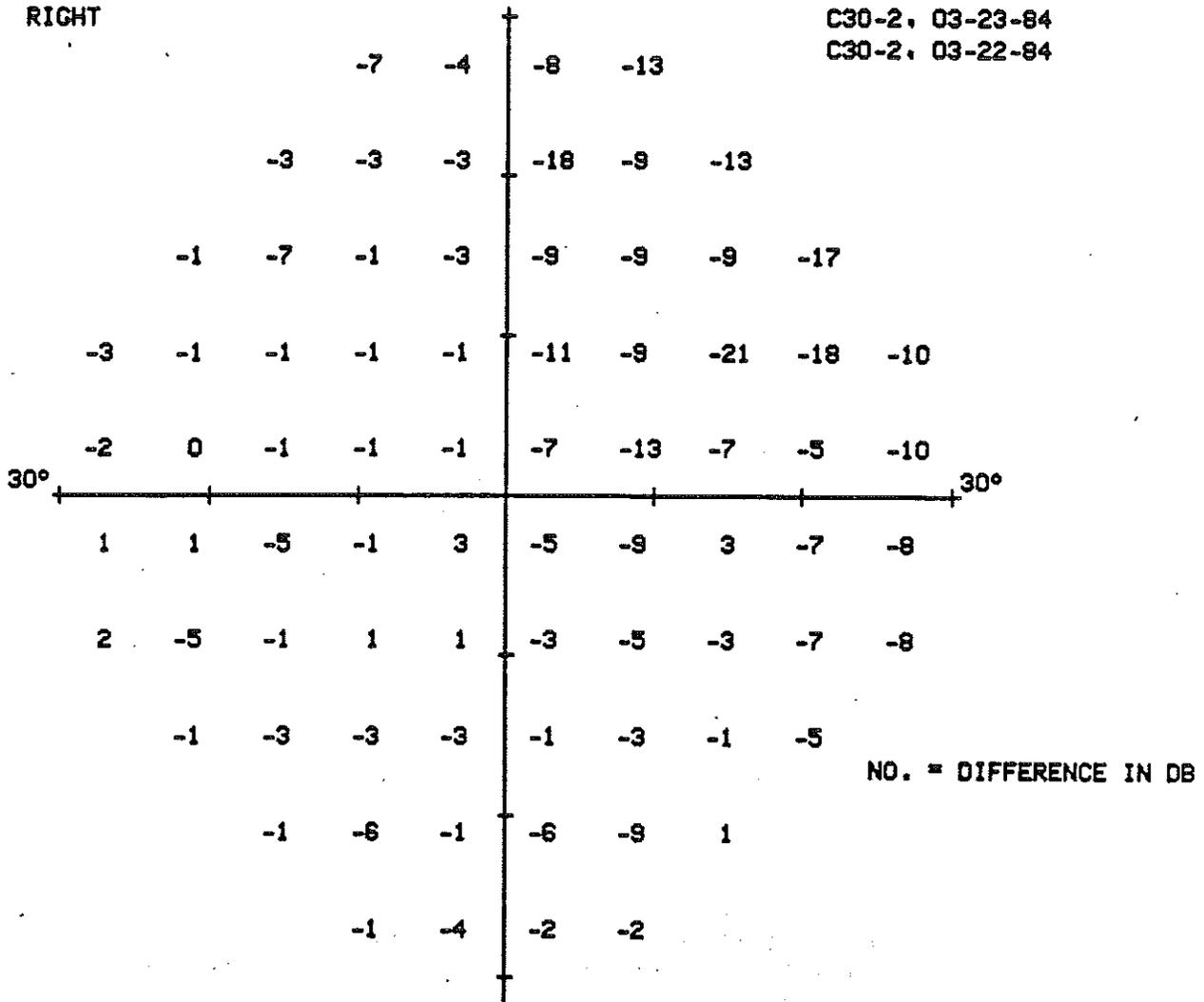
The merge program can be used to combine results from two to four different threshold tests using different test patterns into one file. Merging allows you to view test data over the full field on one print-out, or in a tighter grid formation, and thus with higher resolution, than can be provided with a single test. It is best to merge only test results that have been acquired within a thirty-day period. The test patterns that may be merged in any combination are the central 30-1, central 30-2, peripheral 30/60-1, and the peripheral 30/60-2. The central 24-1 and central 24-2 tests can be merged with each other but not with the other threshold patterns. The peripheral 68 screening test can also be merged with the central 30-1 and 30-2 threshold tests.

- ❖ To merge files, select **MERGE** from the disk functions menu. Dual disk drive models will present the beginning of the directory of the disk you have inserted into the upper drive. Hard drive models will first ask if the files are on hard or floppy disk and then present the search screen keyboard if the files to be merged are stored on the hard disk. Select between two and four files, checking to make sure that they are for the same patient and eye. Touch **SELECTION COMPLETE** and the merged files will appear on the screen. **CHANGE DISPLAY** allows you to view the merged files in the numeric, defect depth, and graytone formats (figures 9-29, 9-30, and 9-31). **PRINT** allows you to print your choices.

CMP-CENTRAL 30 - 2 THRESHOLD TEST

STIMULUS III, WHITE, BCKGND 31.5 ASB NAME TEMPLE, JOE C.  
 BLIND SPOT CHECK SIZE III ID BIRTHDATE 02-24-60  
 FIXATION TARGET CENTRAL  
 STRATEGY FULL THRESHOLD

REFERENCE DATES



GRAYTONE SYMBOLS

SYM										
ASB	.8 .1	2.5 1	8 3.2	25 10	79 32	251 100	794 316	2512 1000	7943 3162	2 10000
DB	50 41	40 36	35 31	30 26	25 21	20 16	15 11	10 6	5 1	10

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 100 EAST MAIN STREET  
 SAN FRANCISCO, CA  
 PHONE 555-2020



Figure 9-27. Sample Compare Printout

MRC-P60-2.C30-2 THRESHOLD TEST

STIMULUS III, WHITE, BCKGND 31.5 ASB NAME TRUTT, PAUL M.

BLIND SPOT CHECK SIZE III

ID 265

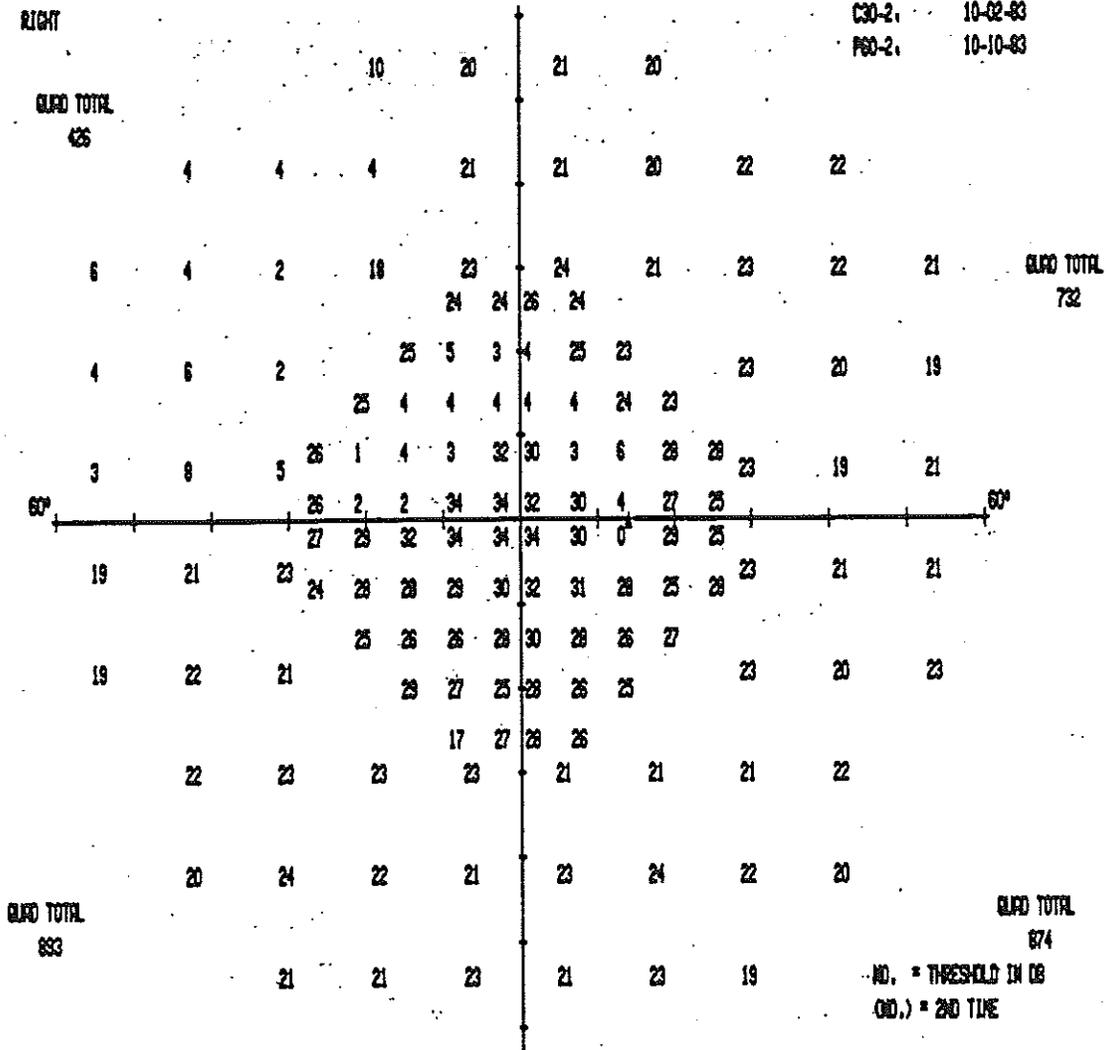
BIRTHDATE 06-14-30

FIXATION TARGET CENTRAL

STRATEGY FULL THRESHOLD

REFERENCE DATES

C30-2, 10-02-83  
 P60-2, 10-10-83



GRAYTONE SYMBOLS

SYM										
ASB	0.1	2.5	3.2	10	12.5	16	25	31.6	40	1000
DB	50	40	35	30	25	20	15	10	5	10

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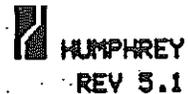
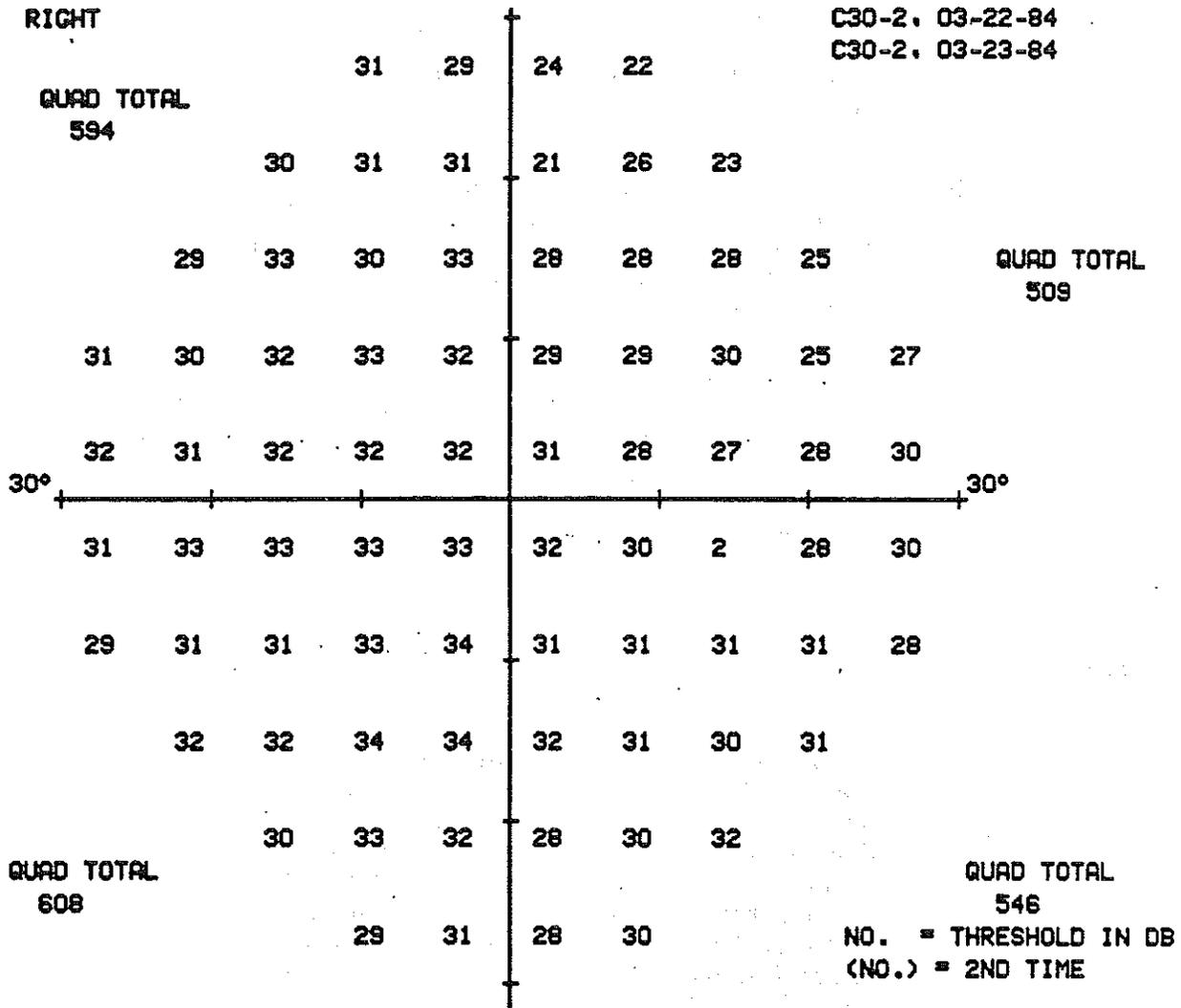


Figure 9-29. Sample Numeric Merge Printout

AVG-CENTRAL 30 - 2 THRESHOLD TEST

STIMULUS III, WHITE, BCKGND 31.5 ASB NAME TEMPLE, JOE C.  
 BLIND SPOT CHECK SIZE III ID BIRTHDATE 02-24-60  
 FIXATION TARGET CENTRAL  
 STRATEGY FULL THRESHOLD

REFERENCE DATES



GRAYTONE SYMBOLS

SYM										
ASB	.8	2.5	8	25	79	251	794	2512	7943	2
	.1	1	3.2	10	32	100	316	1000	3162	10000
DB	41	36	31	26	21	16	11	6	1	50
	50	40	35	30	25	20	15	10	5	50

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HUMPHREY  
 REV 5.1

Figure 9-28. Sample Averaged Results Format

MRG-P60-2.C30-2 THRESHOLD TEST

STIMULUS III, WHITE, BCKGND 31.5 ASB NAME TRUTT, PAUL M.  
 BLIND SPOT CHECK SIZE III ID 265 BIRTHDATE 06-14-30  
 FIXATION TARGET CENTRAL  
 STRATEGY FULL THRESHOLD

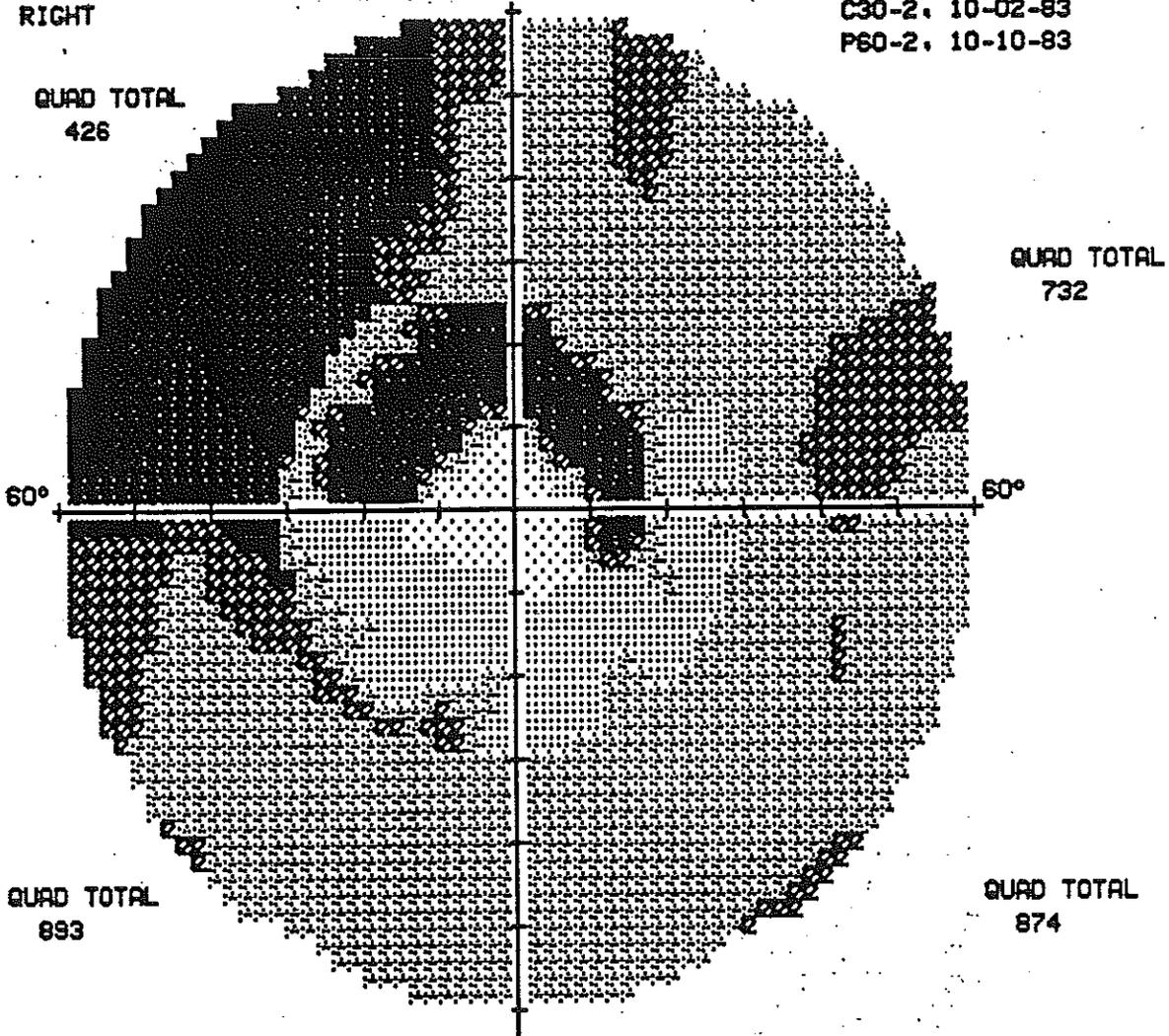
REFERENCE DATES

C30-2, 10-02-83  
 P60-2, 10-10-83

RIGHT

QUAD TOTAL  
 426

QUAD TOTAL  
 732



QUAD TOTAL  
 893

QUAD TOTAL  
 874

GRAYTONE SYMBOLS

SYM										
ASB	8 .1	25 1	8 3.2	25 10	79 32	251 100	794 316	2512 1000	7943 3162	2 10000
DB	41 50	36 40	31 35	26 30	21 25	16 20	11 15	6 10	1 5	10

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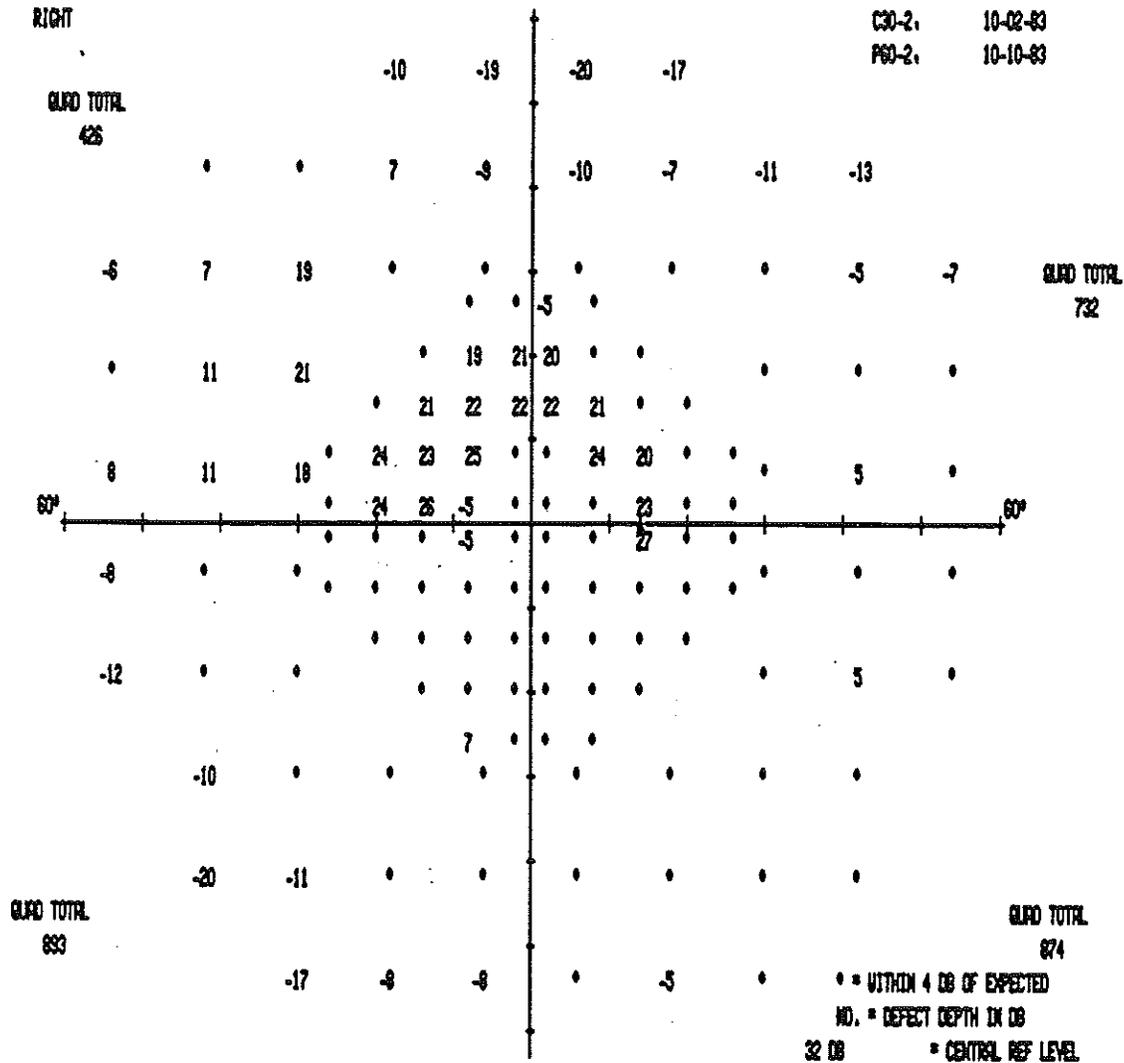
HUMPHREY  
 REV 5.1

Figure 9-31. Sample Graytone Merge Printout

MKG-P60-2.C30-2 THRESHOLD TEST

STIMULUS III, WHITE, BCKGND 31.5 ASB NAME TRUTT, PAUL M.  
 BLIND SPOT CHECK SIZE III ID 265 BIRTHDATE 06-14-30  
 FIXATION TARGET CENTRAL  
 STRATEGY FULL THRESHOLD

REFERENCE DATES



GRAYTONE SYMBOLS

SYM										
ASB	.6 .1	2.5 1	8 3.2	25 10	79 32	251 100	794 316	2512 1000	7943 3162	2 10000
DB	50 41	40 36	35 31	30 26	25 21	20 16	15 11	10 6	5 1	0

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HUMPHREY  
 REV 5.1

Figure 9-30. Sample Defect Depth Merge Printout

## *Section 13. Troubleshooting*

Operating Difficulties

Floppy Disk Error Messages

Hard Disk Problems and Error Messages

Internal Thermal Printer Problems (Thermal)

Internal Impact Printer Problems (Impact)

Peripheral Printer Problems

Additional Error Codes and Screen Messages

NOTE: Error messages will be displayed if you attempt to merge field results from different eyes or results from tests using the fast threshold strategy. The error messages are displayed on the top portion of the screen when the directory is shown.

---

## Transmitting Files

Field Analyzer test results can be transferred from one Field Analyzer to another Field Analyzer, or from a Field Analyzer to a personal or mainframe computer.

The floppy disk is the common medium of exchange among all Field Analyzer models. To move patient records from one Field Analyzer to another, simply copy the files you want to move onto a floppy disk in the first Field Analyzer. Then insert the disk into the drive of the second instrument, and use the files as you would if they had been generated on that instrument.

If you are transferring patient file information from your Field Analyzer to a personal or mainframe computer system, touch TRANSMIT FILES in the disk functions menu and indicate the drive that contains the files you want to transmit. Select up to 100 files from the directory, scrolling up and down as necessary, and touch SELECTION COMPLETE. The Field Analyzer will transmit the complete files via a cable attached to its RS232 serial port. Additional software is necessary to read the data from the Field Analyzer. For more information, please call Customer Service.

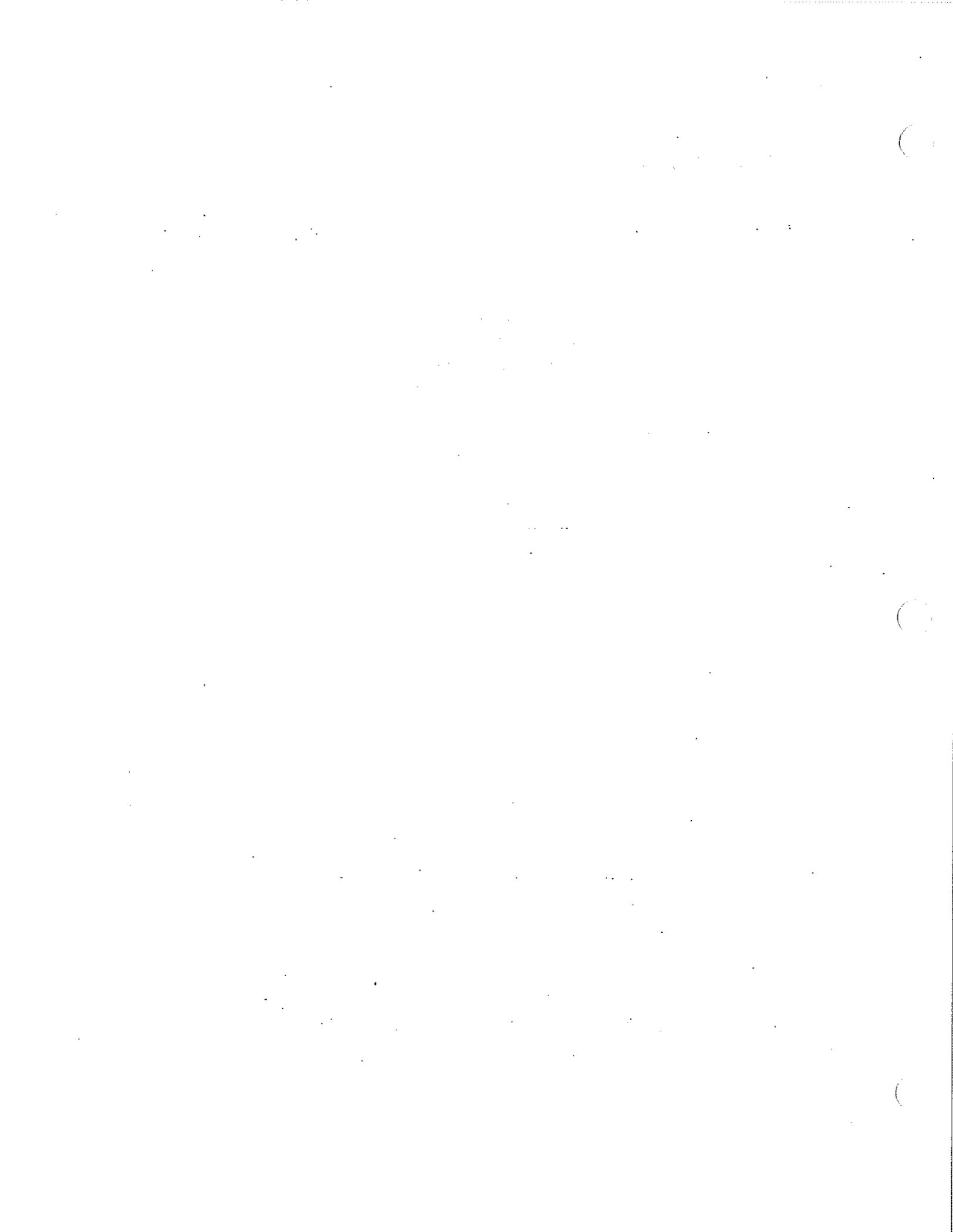
## Section 13. Troubleshooting

For Customer Service, please call (800) 341-6968.

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### Operating Difficulties

<b>Problem</b>	<b>Possible Solution</b>
The instrument won't turn on or is unresponsive	Double check plug and outlet. Try replacing the fuse (see Section 14). Open small door in the rear to see if the projection bulb comes on brightly or is dim. Call Customer Service if it is at full brightness.
RAM test successful, but stops and starts over during count-down	Turn the Field Analyzer off and on. If this problem persists, call Customer Service.
Screen will not respond to the light pen	Check to see if the light pen is securely plugged into the Field Analyzer. Clean the screen with Staticwipe. Blow on the tip of the light pen to remove any dust.
The Field Analyzer will not present stimuli during testing	Check the projector bulb. See Section 14.
Unable to find blind spot	Change the blind spot check size from a size III to II (see Section 2). If the problem is still unresolved, try to find the blind spot again. In those extremely rare cases that the blind spot monitor must be turned off, someone must remain with the instrument to monitor the patient's fixation.



BUSY ERROR upper or lower drive	Remove disk, remove write protect labels if applicable and replace the disk in the drive. Try again. If the problem persists, call Customer Service.
ERROR IN READING FILE	Remove disk, remove write protect labels if applicable and replace the disk in the drive. Try again.
NO FILES IN DIRECTORY	Make sure the disk has data stored on it by checking it in another drive. Check to be sure there is no write protect label on the disk, replace it in the drive, and try again.
ERROR DISK IS FULL	Disk is full. Replace it with a new, initialized disk.

---

## Hard Disk Problems and Error Messages

Problem or Message	Possible Solution
Errors found in comparing backup tape to hard disk	Repeat comparison process (see Section 9). Remember, a comparison should be done immediately after a tape backup. If errors persist, call Customer Service.
Unusual characters appear in directory	Call Customer Service before attempting to back the hard disk up to the streamer tape.
HARD DISK READ ERROR	May mean hard disk failure. Call Customer Service.
HARD DISK WRITE ERROR	May mean hard disk failure. Call Customer Service.
FAULT ERROR ON HARD DISK	May mean hard disk failure. Call Customer Service.
ERROR — HARD DISK NOT READY	Hard disk initialization has failed. Turn the Field Analyzer on and off and try again. If the problem persists, call Customer Service. Note that initializing the hard disk erases all files previously stored on it. This procedure should be attempted only in the event of a hard disk crash. See Section 9.

Unusually high number of fixation losses	Make sure patient understands testing procedure. Check patient alignment. Change blind spot size from III to II. Try to find blind spot again.
Video eye monitor is too dim or not on	Adjust the brightness by turning the screw located in the knob where the light pen normally rests. Touch the pad labeled EYE MONITOR ON to turn on the eye monitor.
Field Analyzer time and date are incorrect	From the main menu, go to the patient data screen, touch SET TIME AND DATE and enter the correct information. See Section 2 for more details.
Can't print single field analysis from STATPAC2	Review parameters. See Section 10 for details.

---

## Floppy Disk Error Messages

Message	Possible Solution
UNABLE TO SAVE ON DISK	Check to see if disk is initialized. If not, see Section 9 for initialization instructions. Make sure the disk drive latch is turned from the horizontal to the vertical position. Check that the disk label is facing upwards and that the disk is 5.25 inch, 40-48 track, double sided, double density, 360 KB.
ERROR IN DISK INITIALIZATION	Turn power off, then on again. Try again with another disk. If the problem persists, call Customer Service.
FAULT ERROR upper or lower drive	Make sure disk drive is latched, and diskette is inserted properly with label side facing up. This may also mean that the disk is full. If so, replace it with a new, initialized disk.
DISK ERROR upper or lower drive	Make sure disk is initialized. If not, review the initialization procedure in Section 9. All disks should be 5.25 inch, 360 KB, double sided, double density, 40-48 track.
WRITE ERROR upper or lower drive	Remove disk, remove write protect labels if applicable and replace the disk in the drive. Try another disk.

and birthdate must be identical on every test you want to include.

No graytone scale is printed

If you have just changed the paper, this will not appear until the next printout. Some models do not print the graytone scale since screening tests are the only available options.

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### Internal Printer Problems *(Impact Printer, Units manufactured before November, 1992)*

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<b>Problem</b>	<b>Possible Solution</b>
Paper is not advancing, lines print on top of each other or paper pulls to one side	Push lever on lower right hand side of printer toward you and down. Also check to see if the paper was loaded correctly. One of the width adjustments may cause it to jam. Set these as wide as possible. See Section 14 for more details.
Although paper advances, nothing prints	Check to see if ribbon is positioned correctly or needs to be replaced. See Section 14 for further details.
Printhead jams, will not move left or right	Review ribbon cartridge position. Refer to Section 14 for further details.
Blind spot does not print on graytone printout	If the blind spot is located between two tested points, shading may not reveal the point. Always refer to the numeric printout for more details.
Graytone printout has large white areas	Check false positives score because this may be an unreliable patient. Review test procedures with the patient and start over.
OU printout does not print	The OU printout must be made immediately after testing both eyes and can only be made from the 24-1, 24-2, 30-1, and 30-2 central threshold tests. The patient's name and birthdate must be identical on every test you want to include.
No graytone scale is printed	If you have just changed the paper, this will not appear until the next printout. Some models do not print the graytone scale since screening tests are the only available options.

## Internal Printer Problems (*Thermal Printer*)

<b>Problem</b>	<b>Possible Solution</b>
Error indicator lights are on	Check to see if printer is out of paper
Error indicator lights flash	<p>Check to see if internal printer door is closed properly. CRT screen will also display message to check internal door.</p> <p>An overvoltage error may have occurred. Printer will wait for voltage to drop to appropriate operating levels.</p> <p>An undervoltage error may have occurred. Printer will wait for voltage to return to adequate level before resuming operation.</p> <p>Printhead temperature increases above a preset level resulting in printer running at slower speed. Printer will wait for operating temperature to drop to appropriate levels before resuming operation.</p> <p>If a SELF TEST is warranted or requested by your service technician, simply press the LINE/LOCAL button to place it in the LOCAL mode. Then press and hold the PAPER ADVANCE button and LINE/LOCAL button simultaneously to initiate the SELF TEST. The SELF TEST can be terminated by pressing the PAPER ADVANCE button again.</p>
Blind spot does not print on graytone printout	If the blind spot is located between two tested points, shading may not reveal the point. Always refer to the numeric printout for more details.
Graytone printout has large white areas	Check false positives score because this may be an unreliable patient. Review test procedures with the patient and start over.
OU printout does not print	The OU printout must be made immediately after testing both eyes and can only be made from the 24-1, 24-2, 30-1, and 30-2 central threshold tests. The patient's name

## Additional Error Codes and Screen Messages

Message	Possible Solution
ERROR IN LOCATING BLINDSPOT	Try to find blind spot again. Change blind spot size from III to II. See Section 2 for more information.
TOO MANY POINTS SELECTED — LIMIT IS 200 POINTS TOTAL OR 65 PER QUADRANT	Modify the test pattern. See Section 8 for more details.
NEED TO INCREASE SPACING OR DE- CREASE ARC LENGTH — LIMIT IS 61 POINTS	Modify the test pattern. See Section 8 for more details.
SHUTTER CALIBRATION ERROR	Turn the instrument off and on. Call Customer Service if message persists.
SPOT QUALITY ERROR	Call Customer Service.
ERROR IN WRITING TO EEPROM	Call Customer Service.
ERROR IN EEPROM CHECKSUM	Call Customer Service.
FIXED EEPROM	This message appears when the Field Analyzer successfully uses data in the eeprom to correct itself.
FAULTY DISKETTE. COPY FILES ONTO AN- OTHER DISKETTE	Try again with another initialized diskette.
ERROR IN READING FILE	Reinsert the diskette and try again.
BOWL ILLUMINATION IS TOO DIM/ BOWL ILLUMINATION IS TOO BRIGHT	Dim room lights. If problem per- sists, call Customer Service
BRIGHTEST INTENSITY IS __ DB	Change projector bulb (see Section 14). If problem persists, call cus- tomer Service
LIGHT INTENSITY ERROR 1: LIGHT LESS THAN 20 DB	Change the projector bulb
LIGHT INTENSITY ERROR 3: LIGHT NOT BRIGHT ENOUGH	Change the projector bulb
LIGHT INTENSITY ERROR 2, 4 OR 5	Call Customer Service
EDGE DETECTOR ERROR ON MOTOR	Turn the power off and on. If the problem persists, call Customer Ser- vice.

Please make a note of any other messages and call Customer Service.

Custom test cannot be recalled

PRINTER STOPPED message

OR

PRINTER STOPPED DUE TO A MOTOR

STALL, TRY AGAIN

OR

OUT OF PAPER

Custom test results must be printed right after testing.

Make sure paper supply is sufficient. Check paper path and try again.

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## Peripheral Printer Problems

<b>Problem</b>	<b>Possible Solution</b>
Printer doesn't respond	Make sure that the printer is plugged in and turned on. Make sure printer is connected to the Field Analyzer according to the instructions in Section 12.
Printout slow	The first printout of the day takes longer than subsequent printouts because the Field Analyzer must download its character set to the printer. The printer retains this character set in its memory until it is turned off.
Unintelligible printout	<p>You may need to reset the printer. This can happen if you turned the Field Analyzer off while the printer was still on. Hold down the printer's ALT button and touch the ONLINE/RESET button. The READY message will appear on the printer display. See Section 12 for more information.</p> <p>OR</p> <p>You may need to initialize the printer. This can happen if you turned the printer off and then on again while the Field Analyzer was still on. See Section 12 for instructions on initializing the printer.</p>

## *Section 14. Maintenance*

Cleaning the Instrument

Cleaning the Disk Drives

Cleaning the Tape Drive

The Internal Printer (Field Analyzers manufactured  
after November, 1992)

*Replacing the Printer Paper*

The Internal Printer (Field Analyzers manufactured  
before November, 1992)

*Replacing the Printer Paper*

*Replacing the Printer Ribbon Cartridge*

Replacing the Projector Bulb

Replacing the Background Illumination Bulbs

Replacing the Fuse

Voltage Selection Procedure

Checking the Stimulus Focus



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## Section 14. Maintenance

The parts of your Humphrey Field Analyzer are illustrated and labeled in figures 14-1 and 14-2.

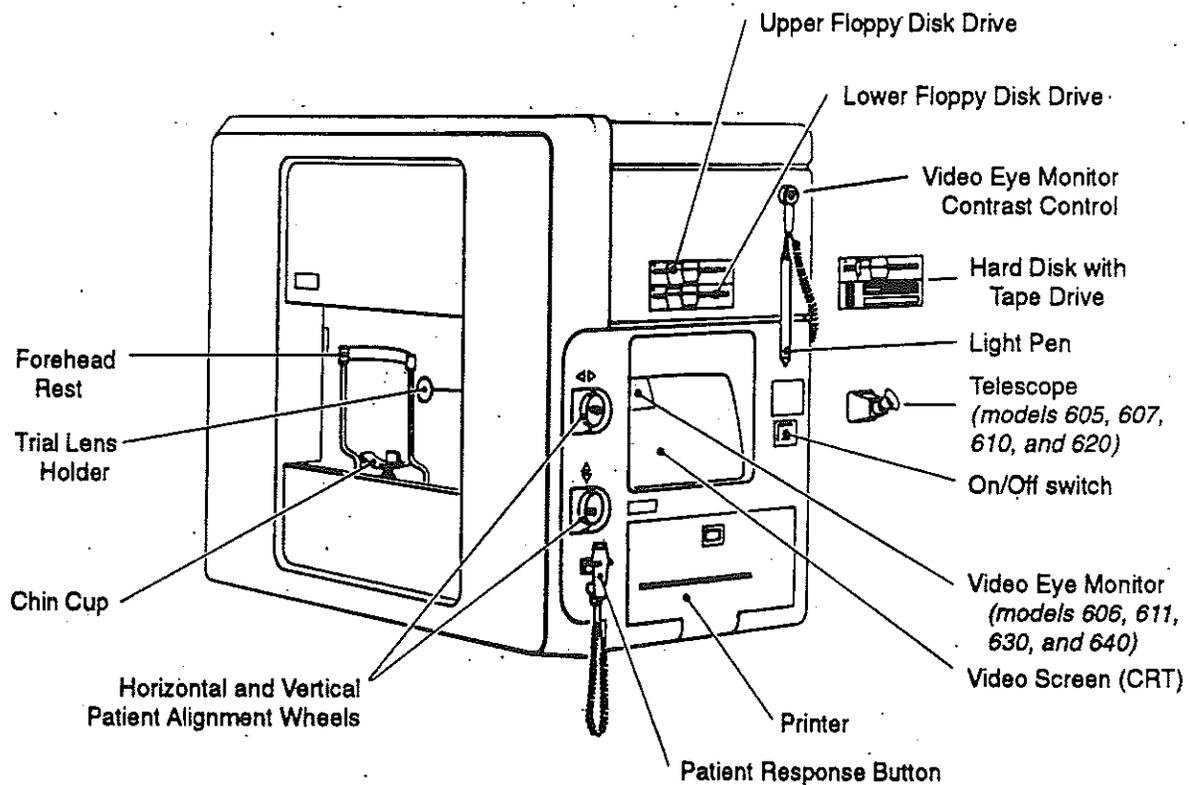


Figure 14-1. Field Analyzer: Front View



To clean the light pen tip, use alcohol and a Q-tip. The patient response button may be cleaned with water, alcohol or 409 cleaner. Be very careful not to let water enter the button.

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## Cleaning the Disk Drives

How often you clean the disk drives on the Field Analyzer depends on the frequency of testing. It is recommended that the drives be cleaned about three times a year.

To clean the drives, follow the instructions in the head cleaning kit. Since the Field Analyzer uses dual-head disk drives, remove the label covering the access hole on the front of the special jacket of the cleaning disk. You will need to run the disk drive with the cleaning disk installed.

**NOTE:** The white, alcohol-soaked disk should never be used dry, it will damage the drives.

Turn the Field Analyzer on and insert the cleaning disk into the upper drive. Select **DISK FUNCTIONS** from the main menu and then choose **RECALL RESULTS** from the disk functions menu.

**WARNING: To avoid damaging your disk drives, use only the RECALL RESULTS function to run the disk drives for cleaning.**

After the initial running of the cleaning disk, the Field Analyzer will give you an error message and a **TRY AGAIN** prompt will appear. Use the light pen to **TRY AGAIN** three times. Touch **RETURN** and then clean the lower drive using the same procedure.

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## Cleaning the Tape Drive

The easiest method of cleaning the tape head, is to use the Perfect Data QIC II Drive Head Cleaning Kit which consists of a "mock" tape cartridge with a cleaning pad, cleaning solution, and an arm for moving the cleaning pad across the head. The cartridge is simply inserted into the drive in the same fashion as a tape cartridge. Before inserting the cleaning cartridge, apply a few drops of the cleaning solution to the pad. After inserting the cartridge, move the handle up and down to clean the entire head surface. After cleaning, remove the cartridge and proceed with normal tape operation.

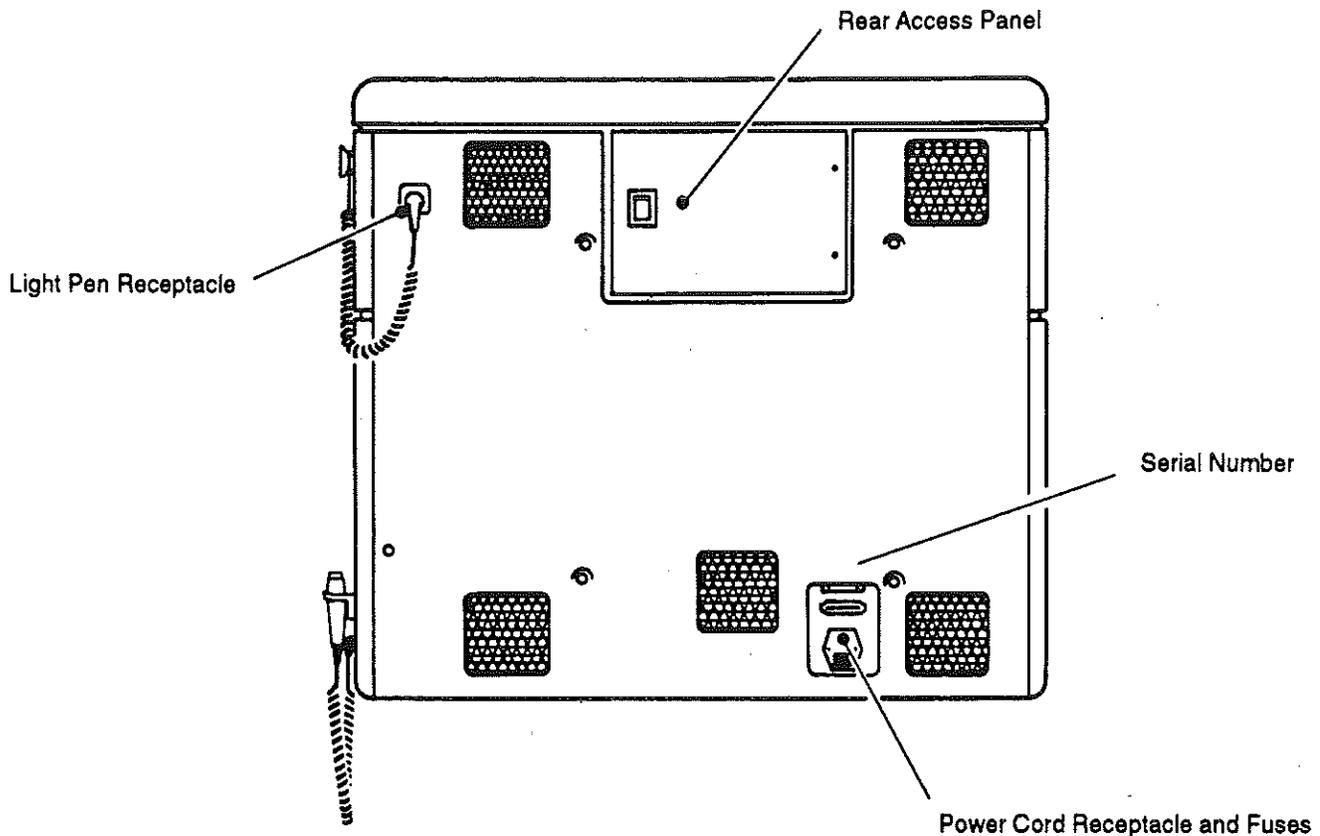


Figure 14-2. *Field Analyzer: Rear View*

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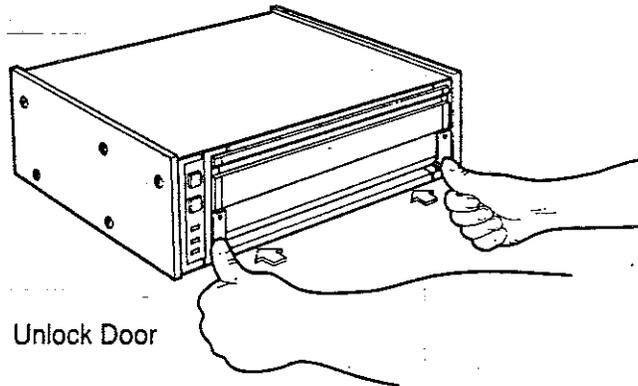
## Cleaning the Instrument

Occasionally, use a mild, nonabrasive cleaner or distilled water on a damp, soft cloth to wipe the exterior surfaces and bowl of your Field Analyzer. Do not polish, but rather lightly brush the instrument if necessary. Never spray a cleaner directly onto the Field Analyzer.

**NOTE:** Before wiping the bowl be sure to remove all jewelry such as watches or rings. These items can scratch and permanently damage the Field Analyzer bowl. Be careful of long fingernails and fingernail polish as well.

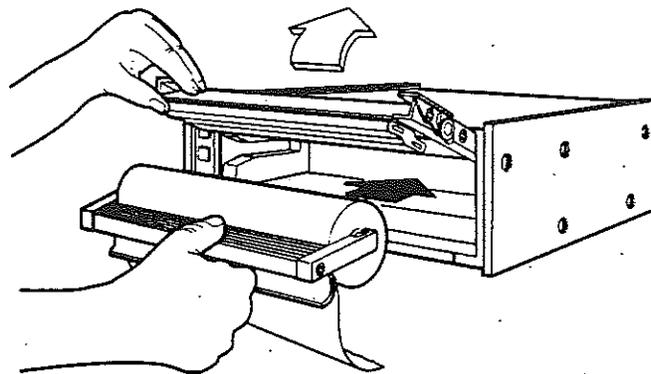
Electrostatic discharge from your CRT, can cause an instrument malfunction. To avoid this, use the disposable Staticwipes from the accessory kit to clean the CRT screen. Use each wipe only once. Normally this should be done once a month. In very dry climates however, wipe the screen once a week. The use of central heat or air conditioning will make the environment drier.

Additional Staticwipes are available through Humphrey's parts department or may be purchased at a computer store.



Unlock Door

*Step B. Unlock the door of the printer by pressing on the open circles printed on the two latches at the lower corners of the door. Pull up on the latches to open the door.*



Insert Roll In Printer

*Step C. Remove the paper roll holder from the printer and remove the paper roll bar from the holder. Slip the empty core off the bar.*

*Step D. Slip the paper roll bar through the core of the new paper roll and install the paper roll on the holder so the paper feeds from the top of the roll toward the front of the holder. Feed 6 inches of paper from the roll so it will extend over the plate after insertion.*

**Figure 14-3.** Replacing the Printer Paper, Steps B, C and D

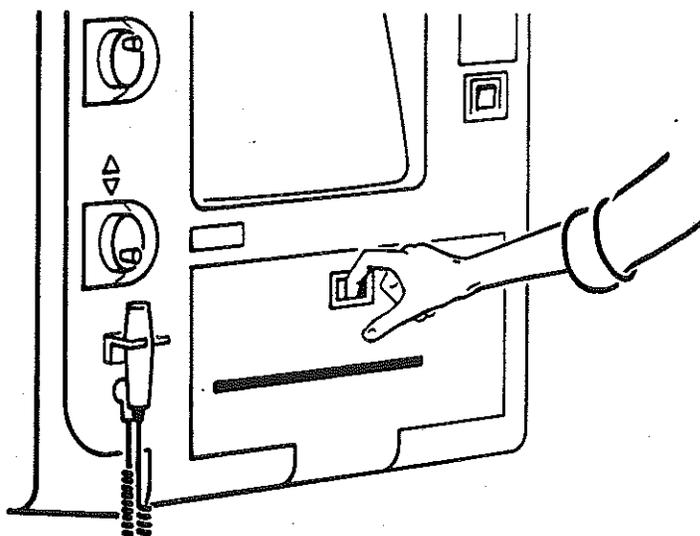
## The Internal Printer (*Field Analyzers manufactured after November, 1992*)

The Humphrey Field Analyzer uses a built-in, high quality, thermal printer which meets Humphrey standards for document longevity and rapid print speed. (*For information on maintaining the HP Laserjet peripheral printer, see your printer manual and Section 12 of this manual.*)

### *Replacing the Printer Paper*

When the colored line appears along the edge of the paper, it is time to replace the roll. Paper can be purchased directly through the Humphrey Parts Department or your computer store. We recommend the Optima Superior manufactured by Appleton. Be sure to ask for paper that is:

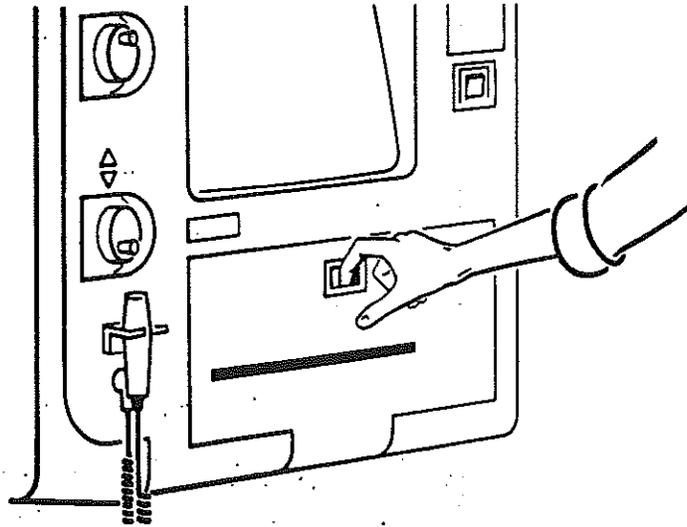
- 21.4 lb (80.6 gm/m<sup>2</sup>) in weight quality
- Inside roll diameter is .44 inches (11.1 mm)
- Paper size is 8.5 inches (216 mm) wide and no more than 110 ft. (33.5 m) in length,
- Maximum outside roll diameter should not exceed 2.6 inches (66 mm).



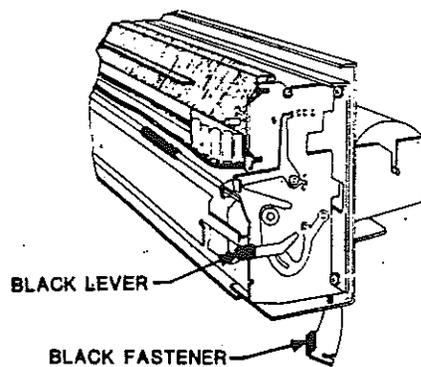
*Step A. Turn the Field Analyzer off. Open the instrument printer panel door by pulling it toward you.*

**Figure 14-3.** *Replacing the Printer Paper, Step A*

your printer and will void your warranty. When the pink line appears along the edge of the paper, it is time to replace the roll. Follow the procedure illustrated in figure 14-3b, steps A through E.

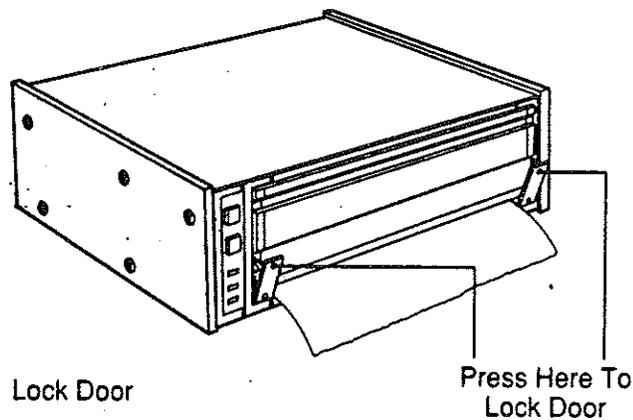


*Step A. Turn the Field Analyzer off. Open the instrument printer panel door by pulling it toward you.*



*Step B. Pull the black fastener in the lower right hand corner of the printer opening to the left. Lift the black lever just above the printer fastener. Swing the right side of the printer all the way out of the instrument.*

**Figure 14-3b.** Replacing the Printer Paper, Steps A and B



*Step E. Insert the paper roll holder in the printer and close the door with the latches unlocked. Press on the solid circles printed on the door latches to lock them.*

*Step F. Feed paper through the instrument panel and tear off extra paper by pulling up. You are now ready to print. The instrument will automatically put the printer in the "on line" mode.*

**Figure 14-3.** *Replacing the Printer Paper, Steps E and F*

**CAUTION:** If the Field Analyzer will not be in use for a period longer than one month, leave internal printer door unlatched (as shown in figure 14-3, steps A and B).

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## **The Internal Printer** (*Field Analyzers manufactured before November, 1992*)

The Humphrey Field Analyzer uses a built-in, high quality impact printer to ensure permanent records. (*For information on maintaining the peripheral printer, see your printer manual and Section 12 of this manual.*)

Swing the printer back into the instrument and secure the fastener in the lower right corner of the printer door opening. Be sure that the paper feeds through the slot on the printer door.

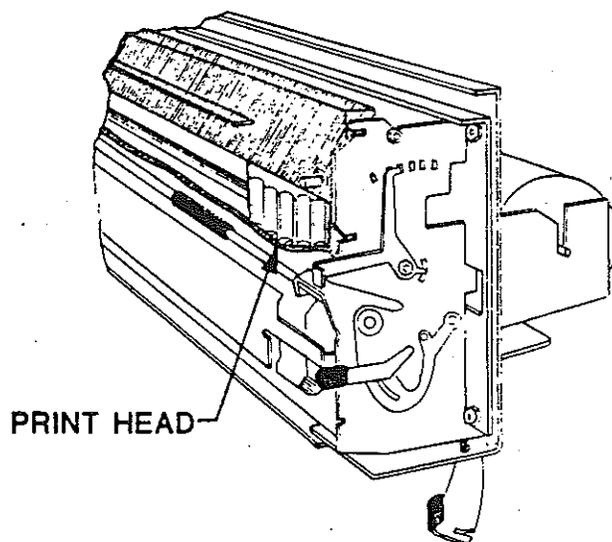
### ***Replacing the Printer Paper***

To protect your printer's delicate mechanisms, use only Humphrey paper. Using substitute paper may cause gradual deterioration of

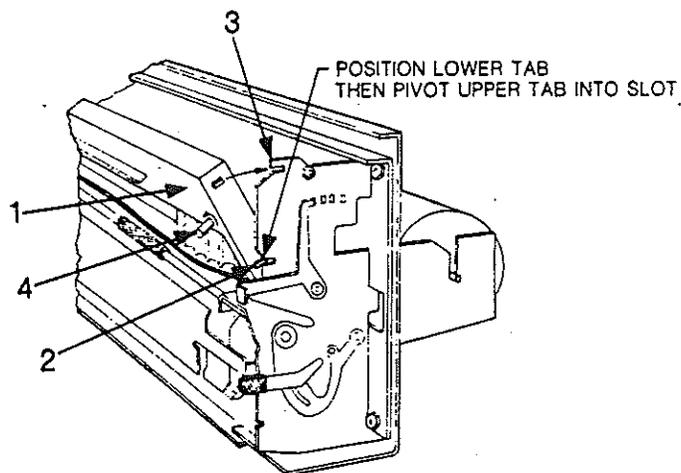
## Replacing the Printer Ribbon Cartridge

When the print becomes light, change the printer ribbon cartridge as described below and as shown in figure 14-4.

Begin by pulling the printer door open. (Refer back to figure 14-3, step A, if you need a reminder about opening the printer door.)

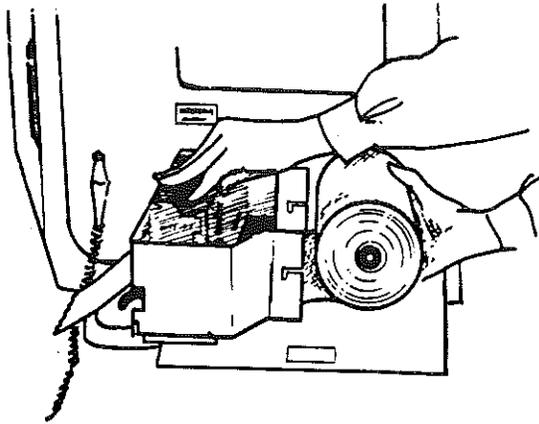


Step A. Push the print head to the center of the printer.

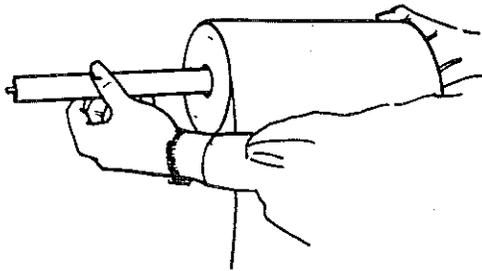


Step B. Pull the top of the ribbon cartridge (1) toward you and lift the right end of the cartridge out of the printer. Remove the entire cartridge.

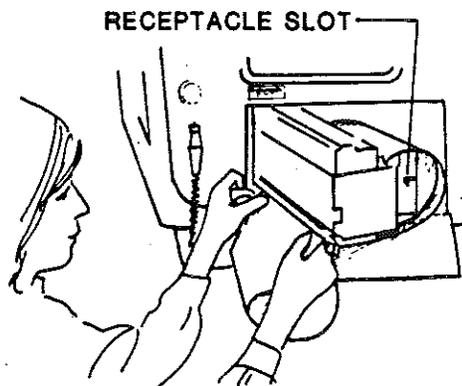
Figure 14-4. Replacing the Printer Ribbon Cartridge, Steps A and B



*Step C. Remove the old paper roll. Remove the plastic spindle from the center of the old roll and insert it in the new roll. It is helpful to fold the paper diagonally in order to fit it through the slot*



*Step D. Place the new paper roll and spindle in the receptacle slots, so that the paper is coming off the top of the roll towards you.*

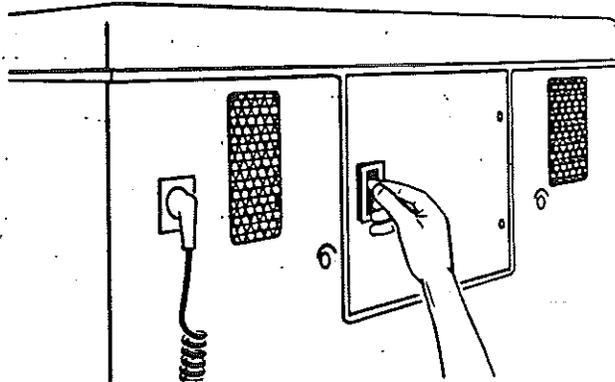


*Step E. Lift the carriage bar on the back roller and feed the paper through the printer using the paper path diagram on the side of the printer as a guide. It will be helpful to fold the paper into a point. Once you have the paper in place, select CONFIGURATION MENU from the main menu. Select AUTOMATIC PAPER FEED. This will advance the paper six inches.*

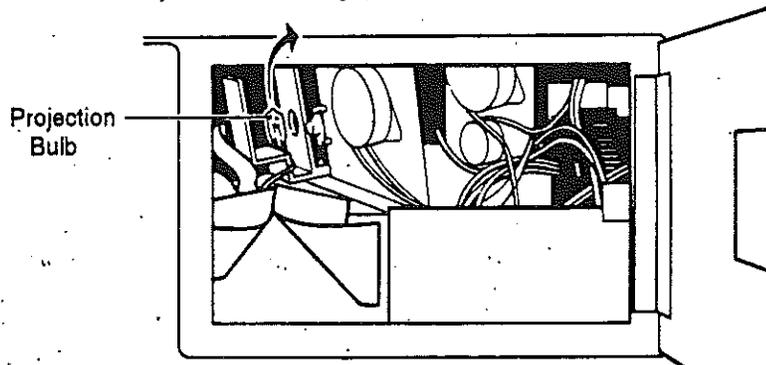
**Figure 14-3b.** Replacing the Printer Paper, Steps C, D and E

## Replacing the Projector Bulb

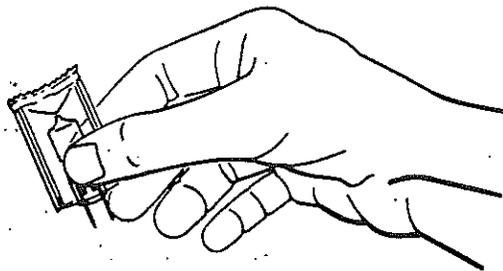
If the Field Analyzer will not present stimuli during a test, or if a message on the screen indicates the light intensity of the projector bulb is too low, the projector bulb should be replaced as described below and as shown in figure 14-5, A through C.



*Step A. Turn the Field Analyzer off. Open the small access panel at the top of the back side of the Field Analyzer.*



*Step B. Make sure that the old bulb is cool enough to handle. Pull it straight up out of the socket:*



*Step C. Grasp the new bulb using the protective envelope. Do not touch the new bulb. Push the new bulb down firmly into the socket as far as it will go. Approximately 1.5 mm of lamp legs will still show once the bulb is totally inserted. Remove the protective envelope. Close the access panel.*

**Figure 14-5. Replacing the Projector Bulb**

*Step C. To install a new cartridge, insert the left end of the ribbon cartridge into the printer. Push down on the right end until the ribbon cartridge rests on lower tab (2) on both sides. Push the top of the cartridge until tab (3) snaps into the corresponding frame slot on both sides. Feed the ribbon under the print head and over the small silver plate (ribbon guide). Take up the slack in the ribbon by rotating knob (4) on the ribbon cartridge in the direction of the arrow.*

*Step D. Swing the printer back into the instrument and secure the fastener in the lower right corner of the printer opening. Feed the paper through the slot in the printer door and close the door.*

## Replacing the Fuse

The fuse for your Humphrey® Field Analyzer is located next to the power plug insert. If an unusual surge of electricity runs through the instrument, a fuse may blow. To replace a fuse:

1. Turn the Field Analyzer off.
2. Unplug the power cord from the back of the Field Analyzer.
3. Look through the opening in the fuse cover and notice the number that is shown (see figure 14-7). This is the voltage setting for your instrument.
4. Insert a flat screwdriver into the slot located at the top of the fuse cover, just above where the power cord plugs in (see figure 14-7), and open the fuse cover.
5. Two fuses will now be visible (see figure 14-8). Look at the fuses. A blown fuse will often look burned or melted, or you may see that the wire inside the fuse is broken. Replace only the fuse that appears blown.
6. If the small cylinder above the fuses is moved, be sure it is replaced so that the number visible through the opening in the fuse cover is the same as the number you noticed in step 3. If a different number is showing through the opening, your instrument will not be set for the proper voltage.

For 100V/120V volt selection, use 4 amp, type T, 250V, slo-blow fuses. For 220V/240V volt selection, use 2 amp, type T, 250V, slo-blow fuses.

7. Replace the fuse cover. Plug the power cord in and turn the instrument on.

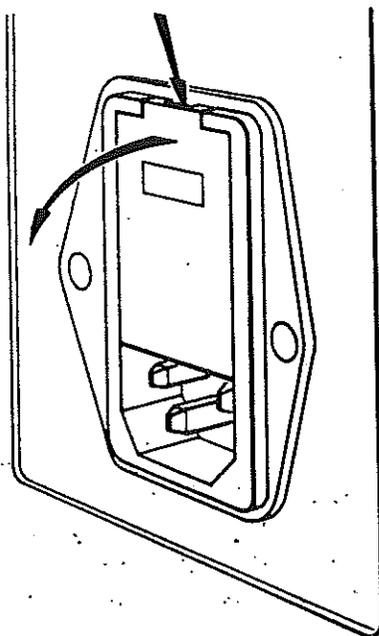
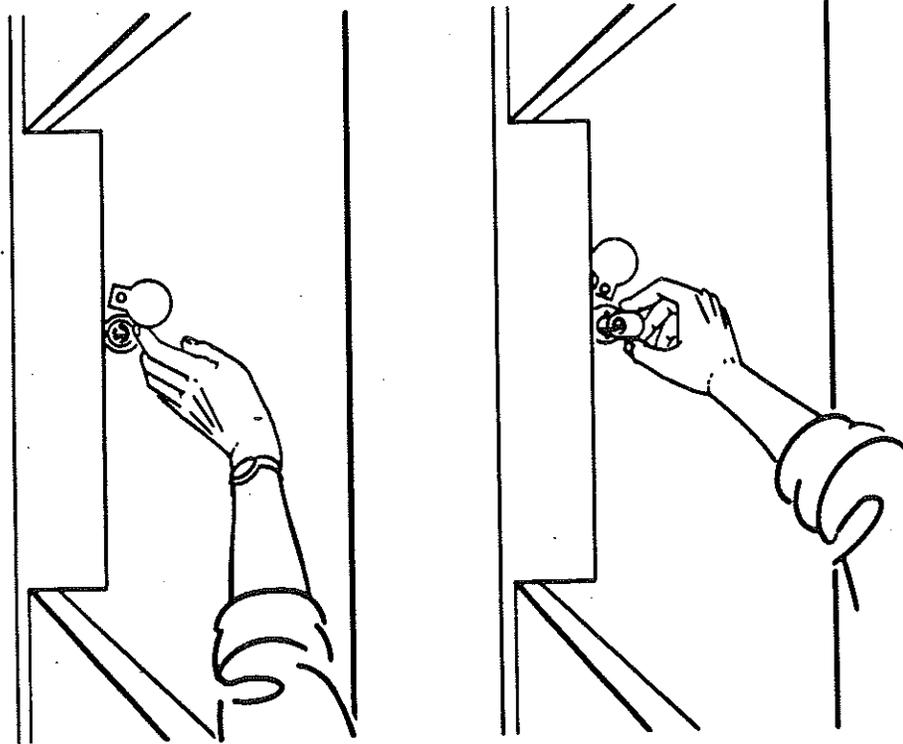


Figure 14-7. Opening the Fuse Cover

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## Replacing the Background Illumination Bulbs

The Field Analyzer uses two background light bulbs located at the front of the bowl at the three and nine o'clock positions. An error message, BACKGROUND ILLUMINATION TOO DIM, will appear if the background illumination is not adequate for testing. Replace one or both of the background illumination bulbs as described below and as shown in figure 14-6.



*Step A. Turn the Field Analyzer off. Rotate the filter along the bowl surface to expose the bulb.*

*Step B. Make sure that the bulb is cool enough to handle. You may use the plastic hose from your accessory kit to facilitate changing the bulbs. Push the end of the hose over the bulb. Push the old bulb in and twist to the left, pulling the bulb out of the socket.*

*Step C. Push the new bulb into the end of the hose. Push the new bulb in and twist to the right, pushing the bulb into the socket. Rotate the filter back over the window in the bowl.*

**Figure 14-6.** Replacing the Background Illumination Bulb

4. Quickly move into the patient seat and look into the bowl as if you were taking a test.

The stimulus will appear in the center of the four illuminated fixation lights. Watch the stimulus as it is presented during the foveal threshold portion of the test.

Look for obvious levels of blur, but not for small inconsistencies in the stimulus. See figure 14-9 below for examples of acceptable and unacceptable stimuli.



*Acceptable*



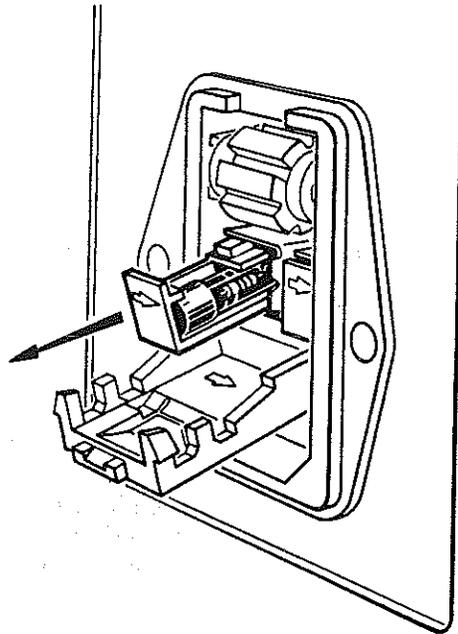
*Not Acceptable*



*Not Acceptable*

**Figure 14-9.** *Acceptable and Unacceptable Stimulus Focus*

If a substantially blurred stimulus is found, contact Humphrey to schedule a service visit.



**Figure 14-8.** *Inspecting and Replacing the Fuses*

If your fuse has a different configuration from the one described above, please contact Humphrey for instructions.

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## Voltage Selection Procedure

To select the voltage, first look through the fuse cover to determine the current setting. Then open the fuse cover just as you would for changing the fuse. Use a pair of tweezers or pliers to remove the voltage selection drum. Do not rotate the drum. Select the correct voltage and reinsert into the slot. Make sure the fuse rating is correct. Close the fuse cover and the selected voltage should appear on the window.

---

## Checking the Stimulus Focus

It is important to evaluate the quality of your Field Analyzer's stimulus focus weekly. To do this select SCREENING or THRESHOLD from the main menu and choose any test pattern. Select CHANGE PARAMETERS from the start test menu that appears. When the change parameters menu comes up on the screen:

1. Select FOVEAL THRESHOLD and touch RETURN to go back to the change parameters menu.
2. Select STIMULUS SIZE and choose a size V stimulus from the menu that appears. Touch RETURN.
3. Touch START.

4. Quickly move into the patient seat and look into the bowl as if you were taking a test.

The stimulus will appear in the center of the four illuminated fixation lights. Watch the stimulus as it is presented during the foveal threshold portion of the test.

Look for obvious levels of blur, but not for small inconsistencies in the stimulus. See figure 14-9 below for examples of acceptable and unacceptable stimuli.



*Acceptable*



*Not Acceptable*



*Not Acceptable*

**Figure 14-9.** *Acceptable and Unacceptable Stimulus Focus*

If a substantially blurred stimulus is found, contact Humphrey to schedule a service visit.