ICS Chartr® 200

ICS Chartr 200 VNG/ENG

User Manual

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otometrics
a division of natus

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Technical support
Please contact your supplier.

Table of Contents

1 Introduction to the VNG System

This section provides an introduction to the ICS Chartr 200 VNG/ENG system and the fundamentals of using the ICS Chartr 200 VNG/ENG software.

1.1 Introduction

The ICS VNG (vestibularnystagmography), ENG (electronystagmography), and M-VNG (monocular-vestibularnystagmography) eye movement testing systems provide sophisticated, yet easy-to-use diagnostic tools in a Windows operating environment. This VNG version includes the ability to conduct Videonystagmography testing using special equipment.

***Note** • Throughout this manual, VNG means either VNG or ENG unless expressly specified in the text.*

While using the system is easy, familiarity with the Windows operating environment and the ICS VNG software is important. Otometrics highly recommends that users of the system read this document prior to attempting tests.

***Note** • To comply with HIPAA regulations, the Windows system offers password protection.*

1.2 Intended Use

The ICS Chartr 200 VNG/ENG is a nystagmograph that is intended to measure, record, and display involuntary movement (nystagmus) of the eyeball.

Intended user profile

Users of Type 1068 and Type 1086: To be used only by qualified healthcare personnel with prior knowledge of the medical and scientific facts underlying the procedure.

1.3 Installing/Reinstalling ICS Chartr 200 VNG/ENG Software

1.3.1 Installing ICS Chartr 200 VNG/ENG Software

Use the following procedure if you need to reinstall the ICS Chartr 200 VNG/ENG software.

To install ICS VNG software:

1. Access the **Windows Desktop**.
2. Insert the **ICS Chartr 200 VNG/ENG CD-ROM** in the CD-ROM drive of the PC.

   The installation program will automatically start up. Go to step 5.

   If the installation program does not start in approximately 30 seconds, go to Steps 3 and 4.

3. Click the **Start** button at the bottom left corner of the screen, and select **Run** to display the **Run** dialog box.

Fig. 1 Run Dialog Box for ICS VNG/ENG Installation

4. Type **D:\Setup** (where D = the CD-ROM drive) in the space provided, as shown in Fig. 1 ► 10, and click **OK**.

5. Follow the on-screen instructions.

Welcome

Introduces the Install program. Read the instructions and click **Next** to continue.

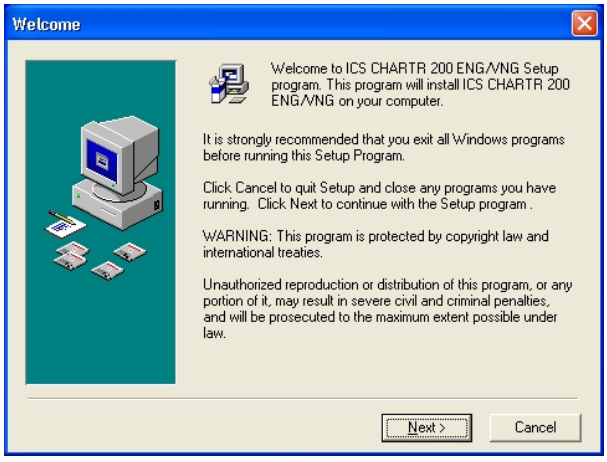


Fig. 2 Welcome Dialog Box (Installation Wizard)

Select Installation Options

Select **ICS CHARTR 200 (USB)** or the MCU-90 (XP) tower. Make sure the correct option is selected. Next select the application(s) you want to install (VNG or ENG). Click **Next** to continue.

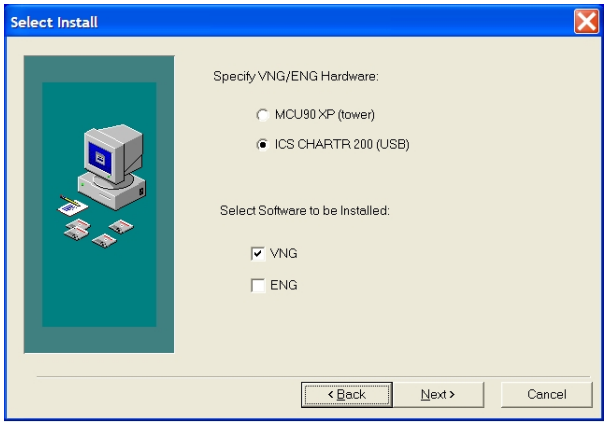


Fig. 3 Select Install Dialog Box (Installation Wizard)

Read Me First

Read the about the enhancements and features available in this version of the software. Click **Next** to continue.

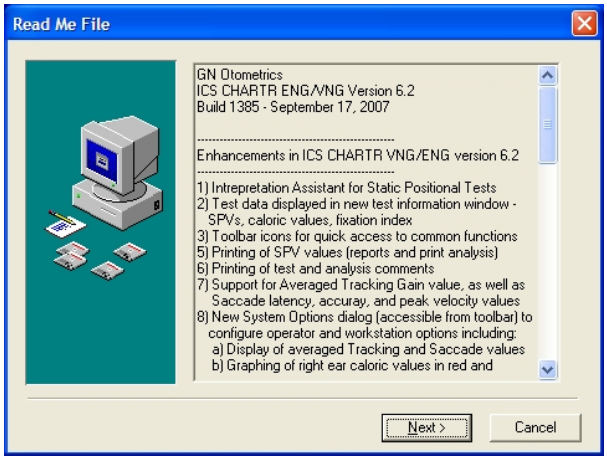


Fig. 4 Read Me First Dialog Box (Installation Wizard)

Choose Destination Location

Places the application in the default destination folder (example: C:\...\CHARTR ENG for Windows) unless you select a different destination folder. Click **Next** to continue.

> ***Note*** • *To make it easier for technical support to assist you if needed, it is best to install the software in the default location.*

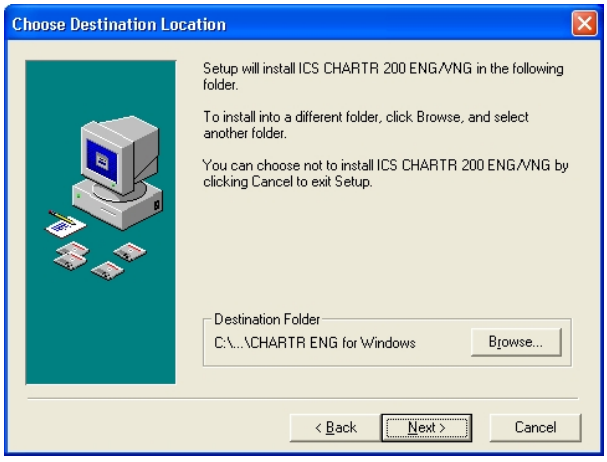


Fig. 5 Choose Destination Location Dialog Box (Installation Wizard)

Select Setup Type

Click on a setup type (Networked Workstation or Standalone Workstation) to highlight it, then click **Next** to continue. Standalone Demo is the default setting.

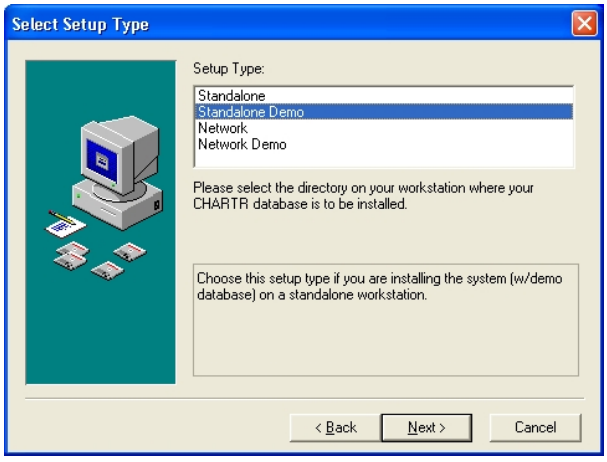


Fig. 6 Select Setup Type Dialog Box (Installation Wizard)

Note • *If you select a Demo setup type, the Demo database becomes the active database, and demo data will be available for training purposes. Any new patient or collected data will be stored in this database. The demo patient data can be deleted at a later time, if desired.*

Choose the default language

Select the language the system will use. When installing on an English system, the default is English. When installing on a German system, the default is German. Click **Next** to continue.

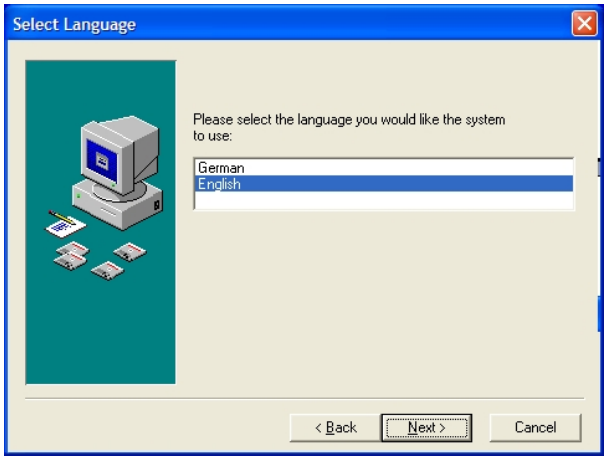


Fig. 7 Select Language Dialog box (Installation Wizard)

Choose Destination Database Location

Place the database in the default folder (C:\CHARTR\DATA) unless you decide to use a different folder. Click **Next** to continue.

> ***Note*** • *To make it easier for technical support to assist you if needed, it is best to install the software in the default location.*

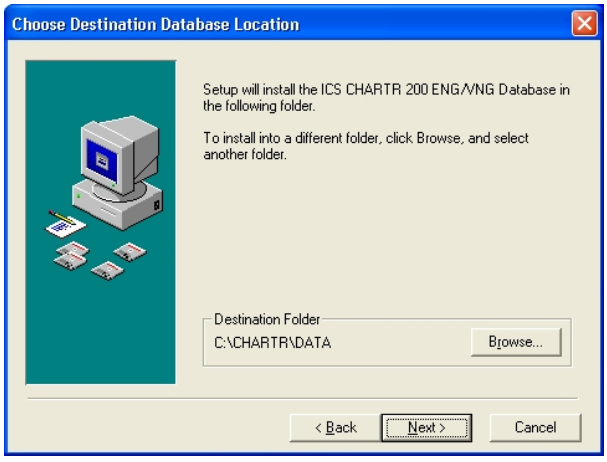


Fig. 8 Choose Destination Location Dialog Box (Installation Wizard)

Choose Video Location

Place the video components in the default program folder unless you decide to use a different folder. Click **Next** to continue.

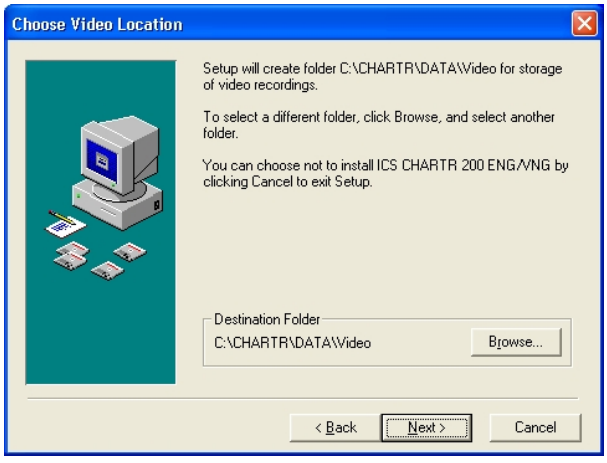


Fig. 9 Choose Video Location Dialog Box (Installation Wizard)

Select Program Folder

Place the program icons in the default program folder (Otometrics) unless you decide to use a different directory. Click **Next** to begin the installation process.

> ***Note*** • *To make it easier for technical support to assist you if needed, it is best to install the software in the default location.*

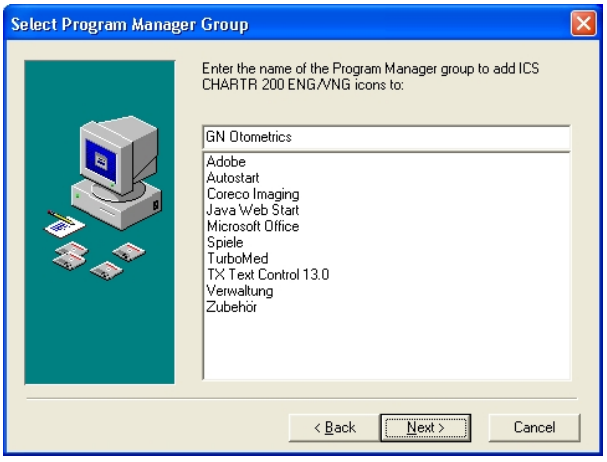


Fig. 10 Select Program Manager Group Dialog Box (Installation Wizard)

Start Installation

Click **Next** to begin installing ICS Chartr VNG/ENG.

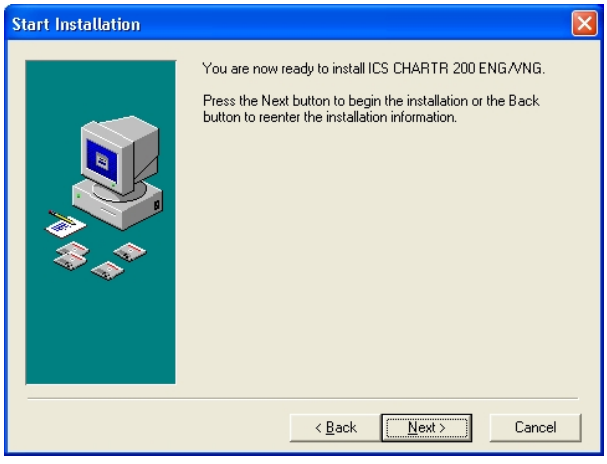


Fig. 11 Start Installation Dialog Box (Installation Wizard)

Software Application Installation

The Initializing Wise Installation Wizard notice will display. The Current file being loaded on the hard drive along with the time remaining will display.

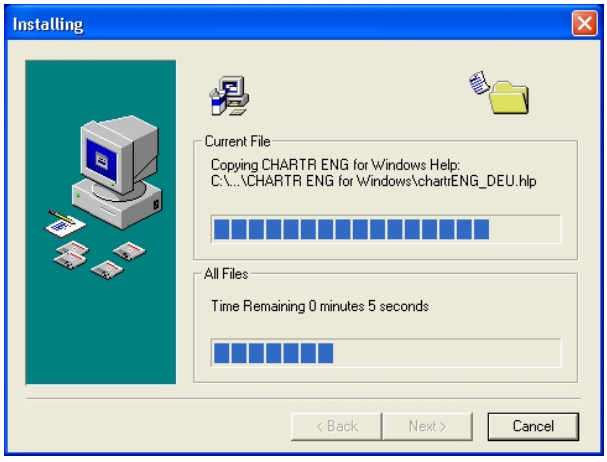


Fig. 12 Software Installation (Installation Wizard)

Hardware Driver Installation

Depending on the application you selected, the Installation Wizard will prompt you to start loading the appropriate drivers. Click **Next** to begin the installation.

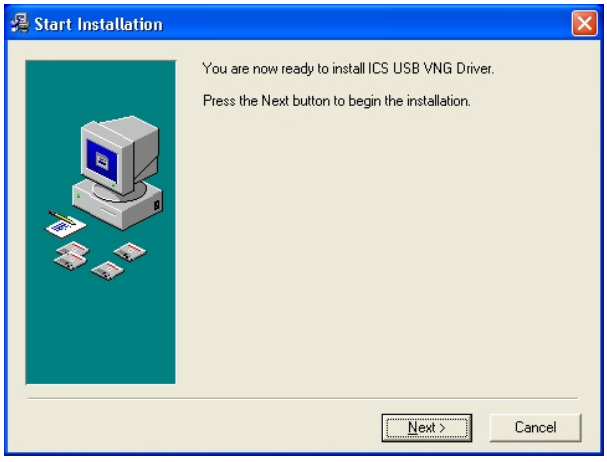


Fig. 13 Start Hardware Installation Dialog Box (Installation Wizard)

Installation Complete

After all of the applications and hardware drivers are installed, click **Finish** to complete this phase of the installation process.

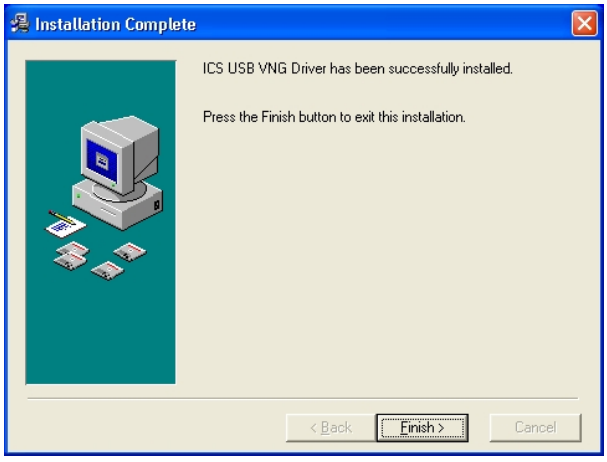


Fig. 14 Installation Complete Dialog Box (Installation Wizard)

Start Database Conversion

The system is now ready to start converting the database. The system will locate any previous databases on your system, and will first backup the database, and then convert the database for use with this version of the software. Click **Next** to continue.

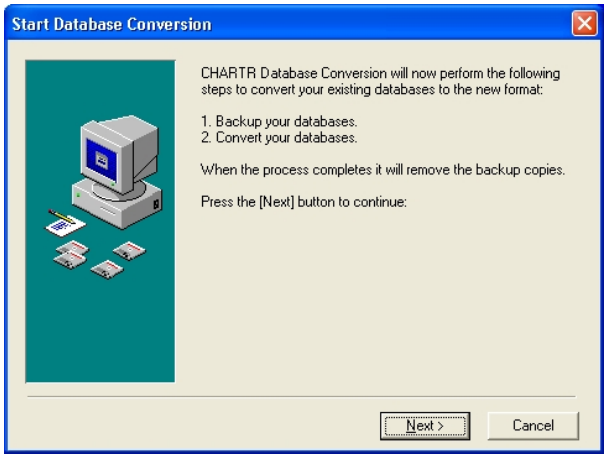


Fig. 15 Start Database Conversion Dialog Box (Installation Wizard)

Database Conversion in Progress

Once the system locates the existing database, click **Convert** to continue.

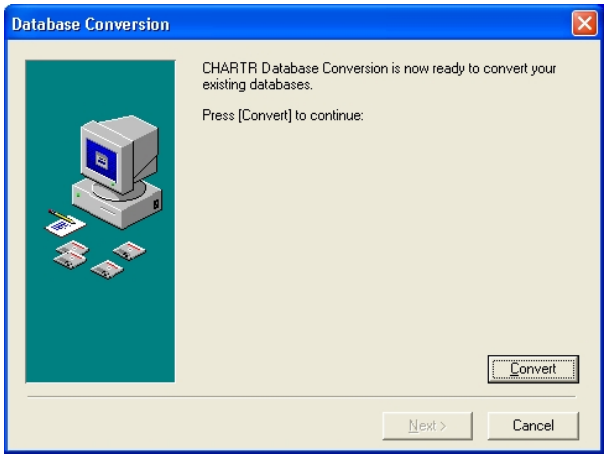


Fig. 16 Database Conversion Dialog Box (Installation Wizard)

Database Conversion Complete

The progress of each database conversion will display. When the conversion process is complete, click **Next** to continue.

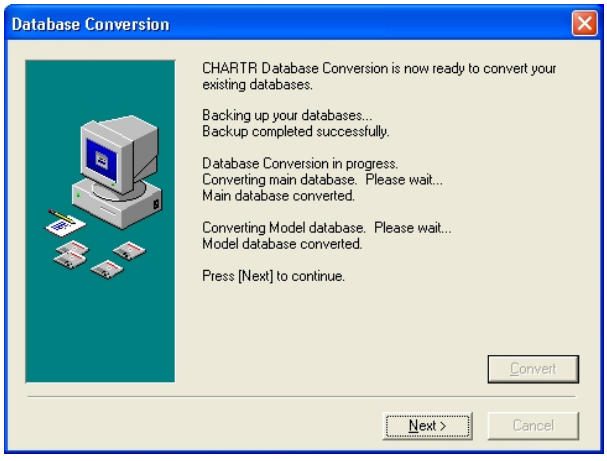


Fig. 17 Database Conversion Complete Dialog Box (Installation Wizard)

Installation Complete

After the software and drivers are installed and the existing databases are converted, click **Finish** to conclude the installation process.

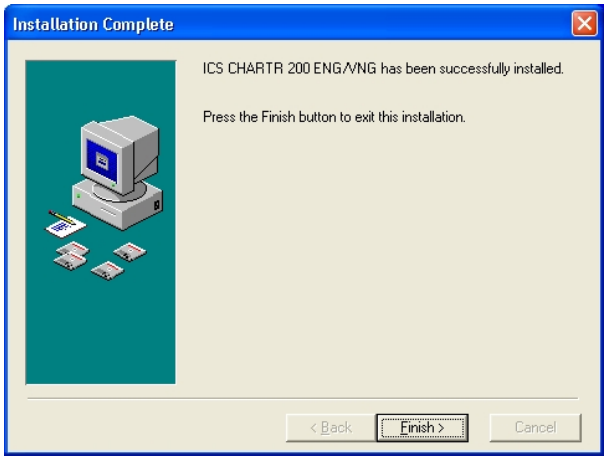


Fig. 18 Installation Complete Dialog Box (Installation Wizard)

6. Click **OK** to restart Windows when prompted.

> ***Note*** • *Make sure the Chartr system hardware is connected and turned on.*

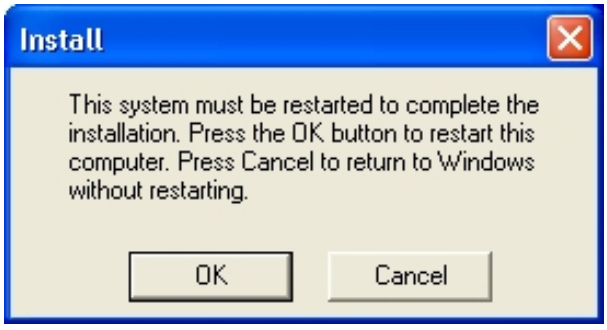


Fig. 19 Restart Windows Prompt

7. Use the Found New Hardware Wizard to install drivers for any new hardware identified when Windows restarted. If the identified hardware came with an installation CD, insert it. Select an installation option and click **Next** to continue.

Fig. 20 Found New Hardware Wizard Dialog Box

8. Click **Finish** when the hardware installation is complete.

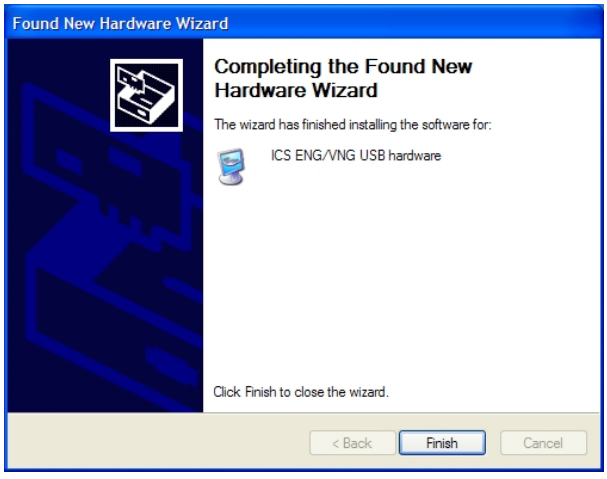


Fig. 21 Hardware Installation Complete

9. Click on the **ICS CHARTR VNG** **or** the **ICS CHARTR ENG** icon to begin a work session.

Fig. 22 ICS Chartr VNG and ENG Desktop Icons

This prompt displays the first time the program starts.

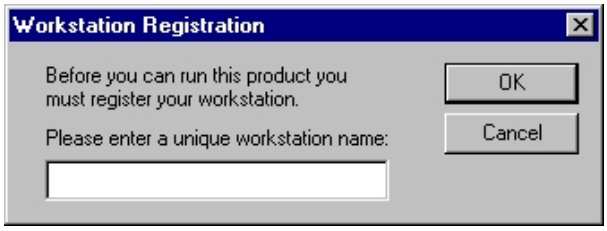


Fig. 23 Workstation Registration Dialog Box

10. Type a descriptive name that identifies the workstation in the **Workstation** text box and click **OK**. If the system is running on a network, the name you supply must be unique. The software is now installed and ready for use.

1.3.2 Uninstalling ICS Chartr 200 VNG/ENG Software

Use the following procedure if you need to uninstall the existing ICS VNG/ENG software from your hard drive. This procedure uses the Windows Uninstall Wizard that is located in the Windows Control Panel.

> ***Note*** • *This procedure only removes the ICS VNG/ENG software program files.* ***It will not remove the patient database file*** *(chartrENG.mdb), video files or the demo database file (C:\Chartr\Data\Demo) if it is installed. When you reinstall ICS VNG/ENG, your patient database will still be available. You must delete the patient database and videos manually if you want to remove them from your system.*

To uninstall the ICS VNG/ENG software:

1. Click the **Start** button on the Windows Task bar to display a list of options.
2. Select **Settings**, **Control Panel** to display the **Control Panel** dialog box.
3. Select the **Install/Uninstall** tab to display that dialog.
4. Double-click on the **Add/Remove Programs** icon to display the **Add/Remove Program Properties** dialog box.
5. Scroll through the list of software that can be automatically removed by Windows and select **ICS Chartr 200 VNG/ENG**.
6. Click the **Add/Remove** button and the system will prompt with: “Are you sure you want to completely remove ICS ENG/VNG for Windows and all of its components?”

7. Click **Yes** to let windows remove the existing version of **ICS VNG/ENG** from your hard drive. The system may prompt you to confirm the deletion of files that could be shared by other programs. Click **Yes** if the file is not shared by other applications. If you are not sure, click **No**.
8. Repeat the above steps to remove each of the following programs (if they are present):

- Keyspan Remove
- Sapera LT (Chartr XP tower only)
- ICS Chartr 200 VNG Driver (Chartr 200 hardware only)

9. Click **OK** to close the **Add/Remove Properties** dialog box.

> ***Note*** • *This procedure will only remove the software program files. It will not remove the patient database or videos.*

1.3.3 Reinstalling ICS Chartr 200 VNG/ENG Software

If it becomes necessary to reinstall the ICS VNG/ENG software, you will need to uninstall the version of the software that is currently on your hard drive. Uninstalling ICS VNG for Windows will remove all of the software programs from the hard drive. **It will not remove the existing patient database!**

When you reinstall the software, your patient database will not be replaced. If you want to replace the patient database, you must remove that database manually before reinstalling ICS Chartr 200 VNG/ENG for Windows.

1.3.4 Demo Database

The demo ICS CHARTR database is installed on your system in the Demo folder. This folder is located under the folder that contains the ICS CHARTR database (i.e., C:\CHARTR\DATA\DEMO).

> ***Note*** • *The demo CHARTR database is used for training purposes. If you need to view the demo patient data, follow the steps below. See* *Exporting, Importing, and Archiving Records ► 162* *for information on how to import patient data for analysis.*

To view the demo database (if not installed initially):

1. Select **Database**, **Open Archive/Export Database** from the **Menu bar**.
2. Navigate through the list of folders and files and find the **Demo** folder. The default location is C:\CHARTR\DATA\DEMO.
3. Select the file called **chartrdemo.mdb**.
4. Click **OK** to open the demo database and view the demonstration records.
5. Select **Database**, **Open Archive/Export Database** to close the demo database and open the normal patient database.
6. This will allow the demo database to be viewed but not reanalyzed. To reanalyze the data, the patients must be imported.

1.4 Workstation and Network Considerations

Installation of ICS Chartr 200 VNG/ENG on networked workstations requires these considerations:

- Assign a unique name to each workstation.
- Use fiber optic network connections to install data acquisition workstations on a network. This will preserve the patient's electrical isolation.

Fiber optic connections are not required when installing review-only workstations (no data acquisition hardware) on a network. The insulation precautions are not necessary because there will be no physical contact between the patient and the workstation.

2 Getting Started in VNG

This section is designed to orient you to the ICS Chartr 200 VNG/ENG program. The section includes detailed descriptions of the Main Window and the Menu Bar commands, along with information on using function keys and dialog boxes.

2.1 Patient Selection

When ICS Chartr 200 VNG/ENG opens, the Patient Selection dialog box is displayed on top of the Main Window. The Patient Selection dialog box is also displayed when an operator opens an existing patient record.

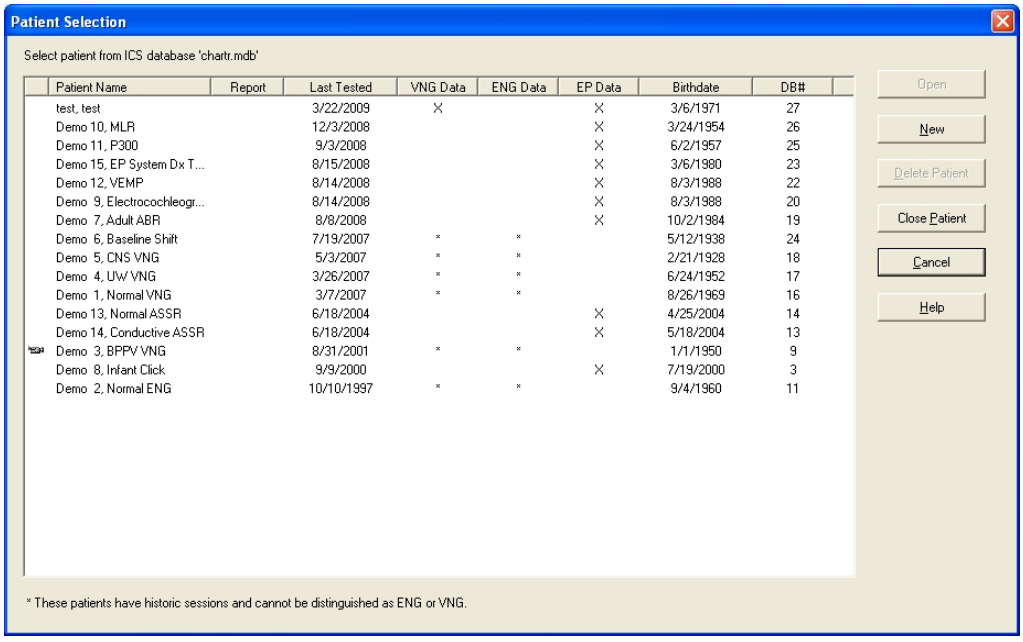


Fig. 24 Patient Selection Dialog Box

The Patient Selection dialog box lists the patient name with the last test date for all patients already in the VNG/ENG database.

In the Patient Selection dialog box:

- Access an existing patient record, including test results by double clicking on the patient name or highlighting the patient name and clicking **Open**.
- Click **Delete** to remove patient records from the database.
- Click **New** to initiate the entry of a new patient in the database and prepare the patient record file prior to testing.
- Click **Close Patient** to close the selected patient record.

> ***Note*** • *See the procedure in* *Establishing a New Patient Record ► 48* *for specific instructions.*

When you are finished working in ICS Chartr 200 VNG/ENG, it is very important that you properly close the application. When you close the application, the system automatically saves the patient data.

To end a work session, select **File**, **Exit** on the Menu bar or click the Close button on the Title bar.

2.2 VNG Main Window

The Chartr 200 VNG/ENG Main Window is the primary workspace. It is displayed when the program is opened. Testing and test analysis activities are performed directly from the Main Window. Other activities, such as entering and modifying patient data, are done in dialog boxes that sit on top of the Main Window.

The Main Window contains patient test and analysis information when a patient record is open. When the Main Window is empty of patient information, it is called the Empty Main Window. The Empty Main Window is accessed by selecting Cancel or Close Patient at the Patient Selection dialog box or File, Close Patient from the Main Window.

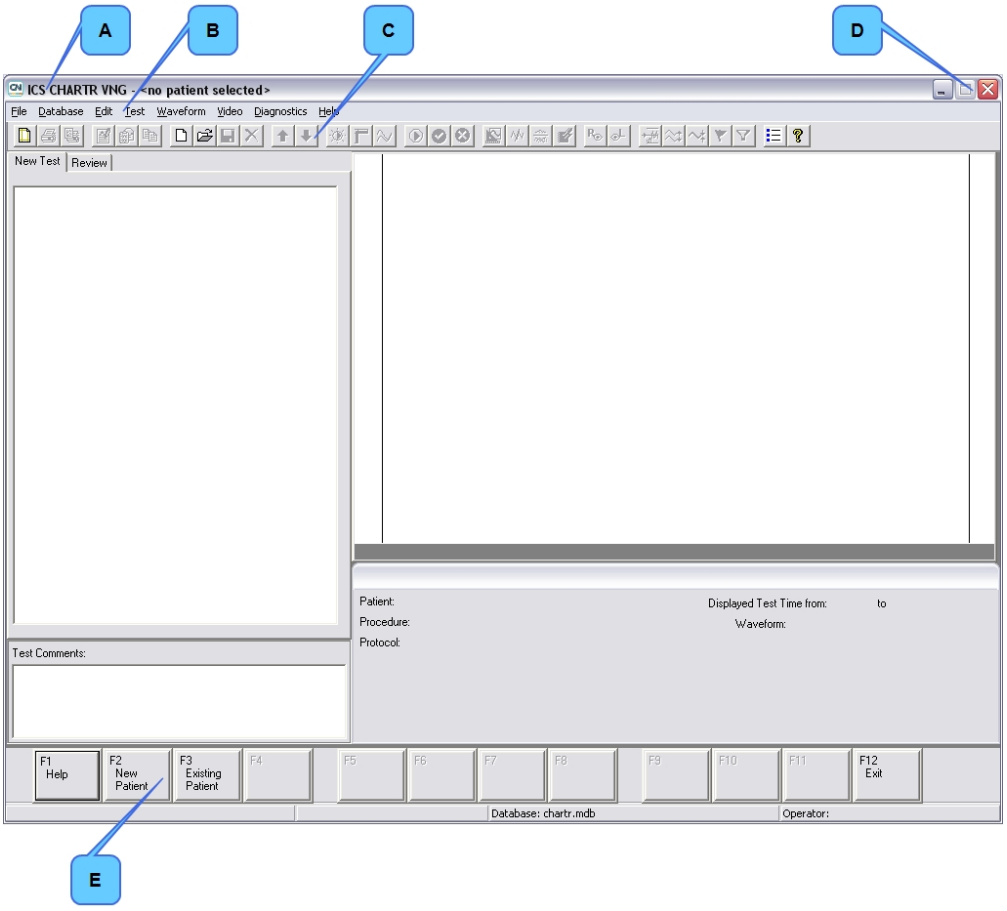


Fig. 25 VNG/ENG Empty Main Window

A. Title bar
B. Menu bar
C. Toolbar
D. Maximize/Minimize/Close buttons
E. Function keys

The Main Window provides useful information, and can be thought of as having several key areas that either provide on-screen information, display test results, or allow the operator to access additional features and information.

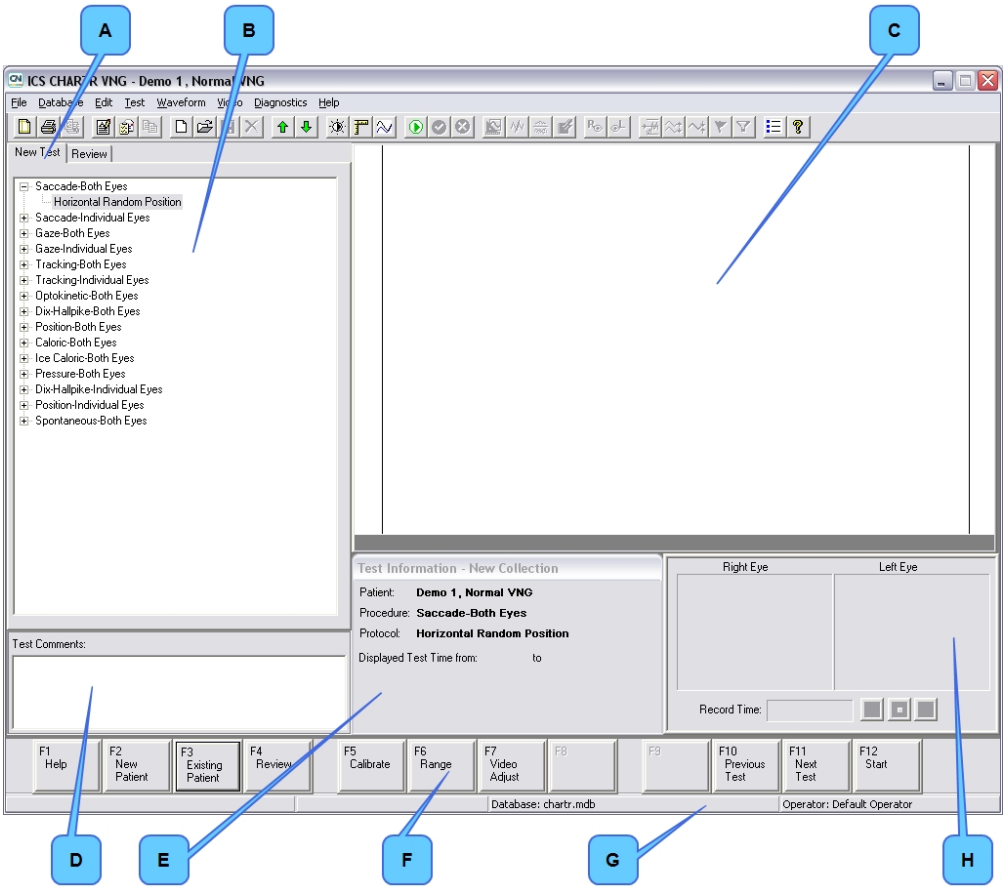


Fig. 26 Main Window with Patient Data Displayed

A. New Test/Review tabs
B. New / Review Test List
C. Test/Review workspace
D. Text comments
E. Information area
F. Function keys
G. Status bar
H. Eye image area

The major components of the Main Window are:

Title bar	Lists program, patient, and operator information.
Menu bar	Lists available menus by category.
Toolbar	Contains shortcut buttons.
New Test/Review tabs	Toggle between testing and review modes.
New/Review Test List	Displays test procedures available (New Test tab) or performed (Review tab).
Test/Review workspace	Displays test data for the selected protocol. The name of the procedure displays directly above this workspace.

Information area	Announces current status or testing information.
Text comments	Provides space for entering up to two lines of text associated with the selected protocol.
Eye viewing area	Displays left and/or right eye images during testing.
Function keys	Activates VNG/ENG patient, testing, and analysis activities. The available function keys vary by activity.
Status bar	Displays on-screen prompts.

Note • *The procedures for conducting tests and analyzing test results begin in* *Test Preparation and Data Collection ► 75 of this manual.*

2.2.1 New Test Tab

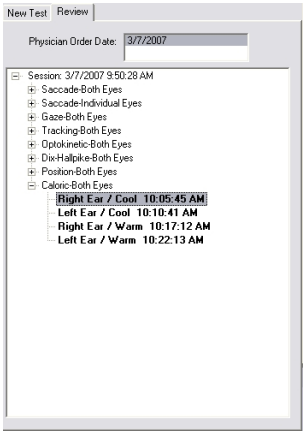
Click the **New Test** tab to display a list of test procedures and protocols from the operator's test battery in the New/Review Test List of the Main Window.

Fig. 27 **New Test** tab

A. **New Test** Tab

2.2.2 Review Tab

Click the Review Tab to display a list of completed procedures and protocols in the New /Review Test List of the Main Window.



When using the Review tab list:

- Select a Physician Order date in the Physician Order drop-down list box to display the list of test sessions conducted under that order.
- Click on the + symbol in front of a session date to expand the directory tree and display a list of procedures that were included in that session.
- Click on the + symbol in front of a procedure to display a list of test protocols. Bold text indicates the protocol is designated as primary. See Reviewing/Analyzing Test Results ▶ 97 for more information.
- Select a test protocol to display the results in the Test/Review Workspace.

Fig. 28 Review Tab

2.2.3 Toolbar Buttons

Use the Toolbar buttons as alternates to the Menu Bar commands (see Menu Bar Commands ▶ 31).

Fig. 29 Toolbar Buttons

	Allows user to set a default font for demographic, facility, and report information. This may be required for central European character sets.
	Displays Printer Setup dialog box
	Displays Print Report options
	Prints current waveform, analysis or calibration

	Displays Patient Information screen
	Displays word processor Report
	Marks the patient file as having a completed report
	Displays New Patient Information screen
	Displays Existing Patient Selection screen
	Saves current waveform
	Cancels current test or calibration
	Goes to previous item (test, channel, beat, etc)
	Goes to next item (test, channel, beat, etc)
	Displays the Video Adjustments dialog box
	Displays Range window
	Displays Calibration window
	Starts a test or calibration
	Accepts the current calibration or baseline
	Stops or closes the current test, calibration or analysis
	Analyzes the test
	Locate peak SPV
	Displays the Caloric PODS and Butterfly analysis window

	Runs the Interpreter Assistant
	Displays both eyes or the eye (right or left) currently being evaluated. Select the eye(s) to be tested.
	Centers the waveform on the page
	Spreads the waveforms apart
	Overlaps the waveforms
	Displays the Copy Waveform options
	Marks an event (E) on the waveform
	Applies a low pass filter to the waveform
	Displays the System Options window
	Displays the Operator's Manual

2.3 Menu Bar Commands

This section describes the commands and functions of each of the drop-down menus on the Menu Bar. The number and type of menus and menu items vary depending on the current VNG/ENG status. For example, the **File** menu items available during testing may be different than the **File** menu items available during analysis or calibration.

There are multiple ways to access some commands and functions. In addition to the Menu Bar menus, many of the functions may be accessed or activated using the function keys, the toolbar, or alternate keyboard actions. For example, to display the **File** menu click **File** on the Menu Bar or type Alt+F on the keyboard

> ***Note*** • *If you do not see the underscored letters or the keyboard option is not working, you may need to activate this function. See* *Keyboard Shortcuts ► 227* *for instructions on how to activate the keyboard options for accessing the menus.*

2.3.1 File Menu

To display the **File** menu click **File** on the Menu Bar or type Alt+F on the keyboard. Then click on the desired menu item to access the related dialog box or to initiate an action. For keyboard access, press the underlined letter of the desired item.

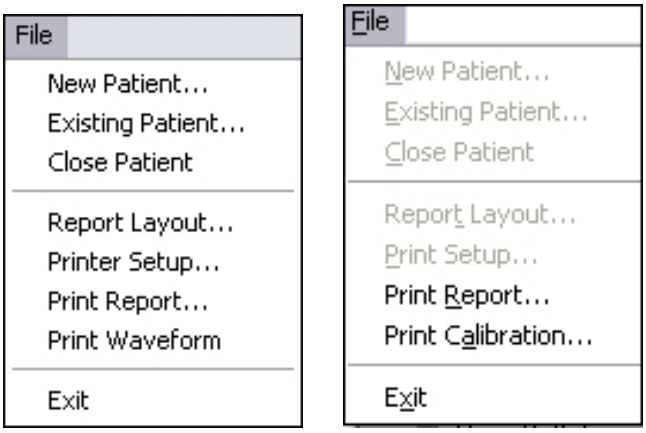


Fig. 30 **File** Menu from Main Window; **File** Menu when Reviewing a Calibration

New Patient	Display the Patient Information dialog box, Patient Information tab.
Existing Patient	Display Patient Selection dialog box.
Close Patient	Close the open patient record.
Report Layout	Display Report Setup dialog box. Modify operator specific printed report layout.
Print Setup	Display Print Setup dialog box. Send setup information directly to the printer.
Print Report	Display Print Report dialog box in order to begin the report printing process.
Print Waveform	Send displayed waveform for an active patient record directly to the printer (available only when a test is being reviewed).
Print Analysis	Send analysis information directly to the printer (available only in Analysis mode).
Print Calibration	Send calibration results directly to the printer (available only in the Review Calibration mode). Select F8 Review Calibration, then click File.
Close Analysis	Close the current analysis and return to Review (available only in Review/Analysis).
Exit	Close and exit ICS Chartr 200 VNG/ENG.

2.3.2 Database Menu

The Database Menu allows you to perform functions related to the patient database. Using this menu, you can archive a database, export a patient file, and open archived files.

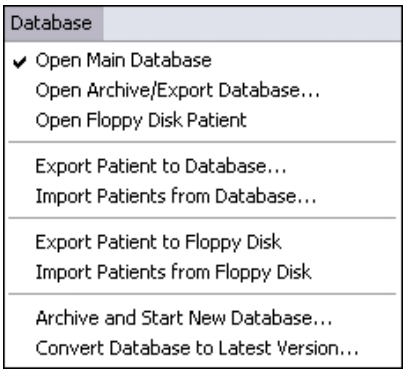


Fig. 31 Database Menu

Open Main Database	Open the active database and view patient records.
Open Archive/Export Database	Open an archived database file, or view previously exported patient records.
Open Floppy Disk Patient	Open a database file stored on a floppy disk and view the archived patient records.
Export Patient to Database	Copy the current patient record to a database on your hard drive.
Import Patients from Database	Copy one or more patient records from a database file on your hard drive or CD-ROM to your main database.
Export Patient to Floppy Disk	Copy the current patient file to a floppy disk.
Import Patients from Floppy Disk	Copy one or more patient records stored on a floppy disk to your main database.
Archive and Start New Database	Create an archive file of the current database and prepare the system to start a new database.
Convert Database to Latest Version	Upgrade a database on your hard drive to the most recent database version available.

2.3.3 Edit Menu

The **Edit** Menu is used to establish and/or configure hardware and software settings and report formats.

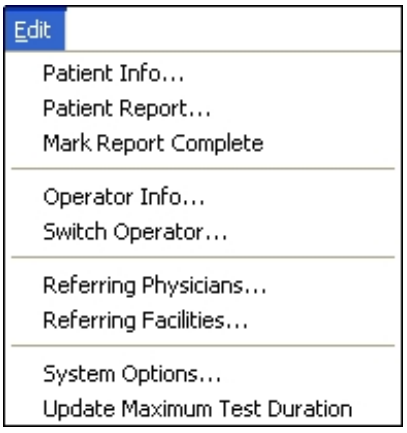


Fig. 32 **Edit** Menu

Patient Info	Display the Patient Information dialog box for the selected patient.
Patient Report	Display an editable copy of the test result report for the selected patient.
Mark Report Complete	Mark the patient file as having a completed report.
Operator Info	Display the Edit Operators dialog box to add or modify operator information.
Switch Operator	Display Operator Select dialog box. Select an operator from the List of Available operators (available only when a patient record is open).
Referring Physicians	Display the Referring Physician Selection dialog box and edit or add new physicians.
Referring Facilities	Display the Referring Facility Selection dialog box and edit or add new facilities.
System Options	Display the System options dialog box. Select and edit operator, workstation, and GDT Interface options.
Update Maximum Test Duration	Enter a maximum test duration for the selected test.

2.3.4 Test Menu

The Test Menu items are available only in the Test and Review modes. The menu items vary depending on the activity currently underway.

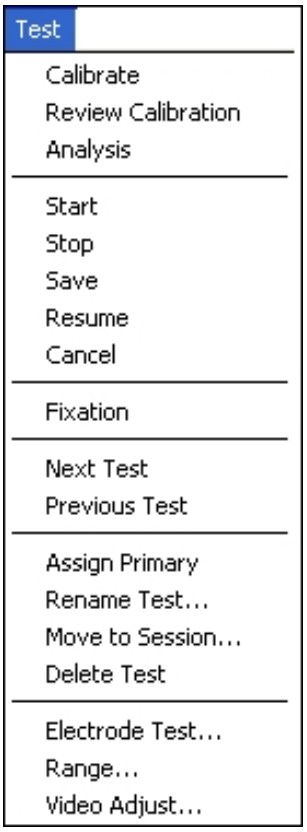


Fig. 33 Test Menu

Calibrate	Display the Calibration dialog box and begin a calibration.
Review Calibration	Display the saved calibration.
Analysis	Display analysis of currently selected test (available only in Review mode).
Start	Begin a test session for the selected test (available only in Test mode).
Stop	Stop the current collection.
Save	Save collected test data.
Cancel	Stop collection and discard collected data.
Fixation	For VNG, turns on the fixation light in the goggles and marks when fixation starts. For ENG, only marks when fixation starts.
Next Test	Access the next protocol on the New Test list (available only in Test mode).
Previous Test	Return to the preceding test on the New Test list or return to the preceding test in Review list.

Assign Primary	Change the currently selected protocol status to primary (bold). The primary protocol is included in the report test results (available only in Review mode).
Rename Test	Display the Protocol Rename dialog box used to change the name of a test (available only in Review mode).
Move to Session	Combine test from one session into another session.
Delete Test	Delete the currently selected test. This option permanently deletes all of the collected data and analysis for the selected test from the database.
Electrode Test	Display the Electrode Test dialog box (available only in ENG Test and Calibration modes).
Range	Display the Light Bar Range Sensor dialog box which indicates the patient's distance from the light bar (available only in Test and Calibration modes).
Video Adjust	Display the Video Adjustments dialog box (available only in VNG Test and Calibration modes).

2.3.5 Waveform Menu

The Waveform Menu is only available in the Review mode. The Menu allows the operator to use the keyboard or mouse to manipulate the tracings or waveforms. Keyboard alternates are shown when available.

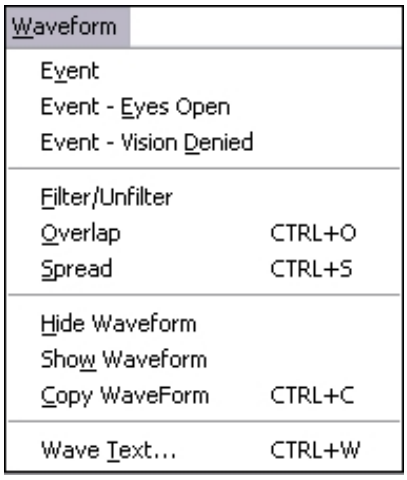


Fig. 34 Waveform Menu

Event	Add an event marker E to the waveform (available in Collection only).
Event – Eyes Open	Add an event marker EO to the waveform (available in Collection only).
Event – Vision Denied	Add an event marker VD to the waveform (available in Collection only).
Filter/Unfilter	Apply or remove a filter for all waveforms in that test (available in Review only).
Overlap	Superimpose all waveforms in the Test/Review workspace (Ctrl + O).
Spread	Evenly spread all waveforms in the Test/Review workspace (Ctrl + S).
Hide Waveform	Hide the active waveform (currently selected signal handle as indicated by the colored box attached to the waveform at the far right side of the workspace) from the Test/Review workspace.
Show Waveform	Display the active waveform in the Test/Review workspace.
Copy Waveform	Display the Custom Page Dialog (Ctrl + C) to create a custom waveform report. Repeat as needed during a review session to add waveforms to the custom report.
Wave Text	Display the Edit Wave Text dialog box (Ctrl + W) to enter comments specific to the waveform. The comments will display with the associated waveform.

2.3.6 Video Menu

The Video menu is used to assist in operating the video functions.

Fig. 35 Video Menu

Video Adjust	Display the Video Adjustments dialog box (available only in VNG Test and Calibration modes).
Record	Start a video recording during collection.
Stop Recording	Stop a video recording during collection.
Restart Recording	Restart a video recording during collection.
Play	Play the video recording for the current test (available only in Review mode).
Export	Display the Export Video dialog box (available only in Review mode). Enter the patient/file and click OK to save only the video to disk.
Delete	Display a prompt to confirm that this video clip should be deleted (available only in Review mode).
Show All Clips	Display all video clips for this test sessions (available only in Review mode).
Hide All Clips	Do not display the video clips for this test sessions (available only in Review mode).
Close All Clips	Close all open video clips (available only in Review mode).

2.3.7 Diagnostics Menu

The Diagnostics Menu is only available when a patient is not selected. The Diagnostics Menu is used to assist in troubleshooting the system hardware and assessing system performance.

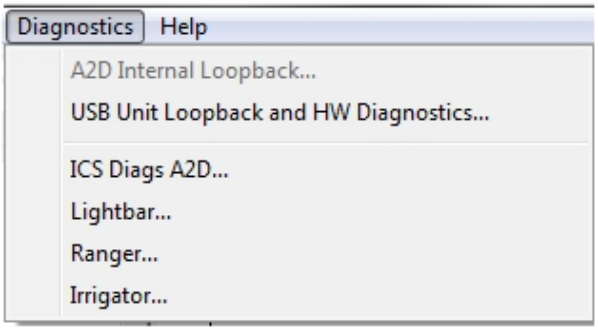


Fig. 36 Diagnostics Menu

A2D Internal Loopback	Does not apply to ICS Chartr 200 VNG/ENG.
USB Loopback and HW Diagnostics	Display the USB Hardware Diagnostic Results and Loopback Settings dialog box (for Chartr 200 VNG/ENG).
ICS Diags A2D	Display the Video Diagnostics dialog box (VNG systems).
Light Bar	Display the Light Bar dialog box.
Ranger	Display the Ranger dialog box.
Irrigator	Display the Irrigator dialog box.

2.3.8 Analysis Menu

The Analysis Menu is only available in the Review/Analysis mode after accessing F12 Analysis. The available Analysis Menu items vary depending on the type of test being analyzed. The description of the action of each item and its function key equivalent is shown below.

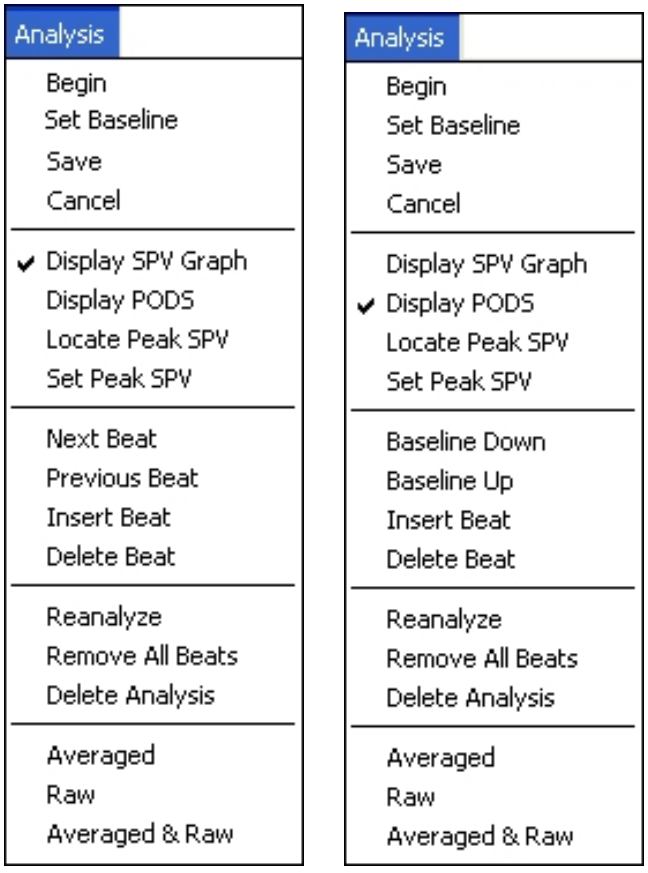


Fig. 37 Analysis Menu and Caloric Analysis Menu

Begin	Begin analyzing data.
Set Baseline	Set the Baseline shift (available only in caloric PODS SPV analysis).
Save	Save the analysis results in the database.
Cancel	Close analysis without saving and return to the review screen.
Display SPV Graph	Display the SPV measurement dialog (available only in caloric PODS SPV analysis).
Display PODS	Display the SPV PODS dialog (available only in caloric PODS SPV analysis).
Locate Peak SPV	Automatically locate SPV peak (available only in SPV analysis).
Set Peak SPV	Select to set the peak SPV value based on an average from a 10 second window around the user selected SPV value.

Next Saccade	Select next saccade (available only in saccade analysis).
Previous Saccade	Select the previous saccade (available only in saccade analysis).
Insert Beat	Insert a nystagmus beat (available in SPV analysis).
Delete Saccade	Delete the saccade (available only in saccade analysis)
Baseline Down	Move the baseline down (available only in caloric analysis)
Baseline Up	Move the baseline up (available only in caloric analysis)
Next Beat	Select next beat in SPV analysis (available only in SPV analysis).
Previous Beat	Select previous beat in SPV analysis (available only in SPV analysis).
Reanalyze	Redo the analysis of the current test after adjusting.
Remove all Beats	Delete all of the beats in the SPV analysis.
Delete Analysis	Delete the analysis of the current test permanently. The analysis will be deleted from the database.
Next Cycle	Select next cycle in tracking tests (available only in tracking analysis).
Previous Cycle	Select previous cycle in tracking tests (available only in tracking analysis).
Averaged	If selected, display only the average data points (available only during saccade and tracking analysis).
Raw	If selected, display the individual data points (available only during saccade and tracking analysis).
Averaged & Raw	If selected, display the individual and average data points (available only during saccade and tracking analysis).

2.3.9 Signal Menu

The Signal menu is only available in the Review/Analysis mode after accessing F12 Analysis during saccade and tracking analysis. Use the Adjust menu to modify the displayed waveform. The description of the action of each item and its function key equivalent is shown below.

Fig. 38 Signal Menu

Enlarge	Increase the size of the waveform.
Shrink	Decrease the size of the waveform.
Up	Move the waveform up on the grid.
Down	Move the waveform down on the grid.

2.3.10 Interpreter Menu

The Interpreter Menu is available only for caloric and position tests. For caloric tests, this menu is available in the SPV/Pods dialog. For position tests, this menu is available in the SPV/Initial and SPV Measurement dialogs. The Interpreter Menu activates the Interpretation Assistant feature, which validates and analyzes caloric test results. See Interpretation Assistant ► 112 for information on using the Interpretation Assistant.

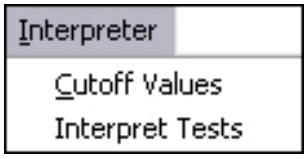


Fig. 39 Interpreter Menu

Cutoff Values	Display the Cutoff Values dialog to select values for parameters used by the Interpretation Assistant.
Interpret Tests	Interpret the test results.

2.3.11 Help Menu

The Help menu can be accessed by clicking on Help on the Menu Bar or by selecting F1 Help using the mouse or the keyboard.

Fig. 40 Help Menu

Contents	Opens this User Manual.
About	Display the About ICS Chartr VNG dialog box (e.g., software version).

2.4 Function Keys

Function keys are used extensively in ICS VNG/ENG for quick keyboard access and control during testing and analysis. The actions of many of the function keys change depending on the mode or situation that is in use and the activities being performed.

To use a function key either press the keyboard equivalent key or place the cursor over the on-screen Function Key button and single click the primary mouse button.

3 Establishing and Maintaining Records

This section provides information and procedures that are used to establish and maintain patient records.

3.1 Patient Information

3.1.1 Patient Selection Dialog Box

The Patient Selection dialog box is used to select an existing patient record or to open a new patient record. The dialog box is displayed when the program opens. It can also be accessed from the Main Window through the **File** Menu, Existing Patient or the Function Key F3, Existing Patient. Patients may be selected directly from the Patient Name list area. A small camera icon appears next to the name of VNG patients who have tests with recorded video.

See Establishing a New Patient Record ► 48 for additional information.

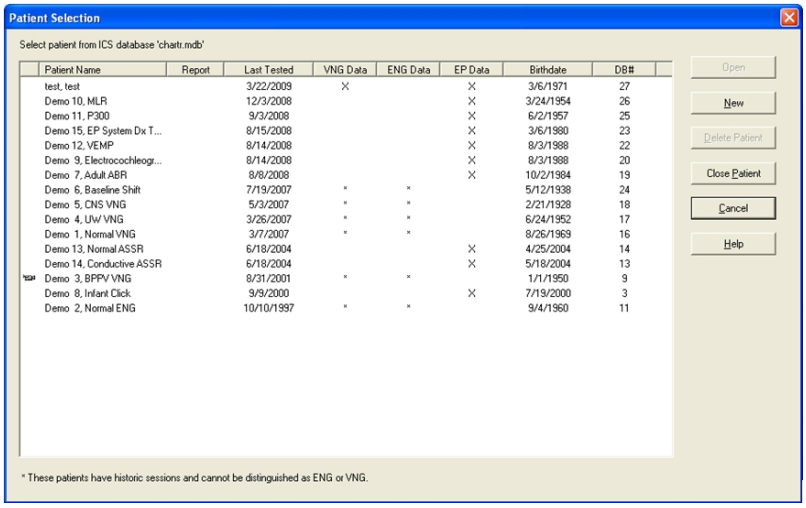


Fig. 41 Patient Selection Dialog Box

> ***Note*** • *Click on the Patient Name heading box to sort the Patient Name list alphabetically. Click on the Date Last Tested heading box to sort the list chronologically. Click the heading boxes again to sort the lists in ascending or descending order.*

Information Area

Patient Name	Contains a list of all patients in the database. Select the desired patient from the list of existing patients.
Last Tested	Patient records are maintained and sorted by the date last tested.
Data	Indicates the type of data (ENG/VNG, EP Only).
Birthdate	Lists the date of birth (month/day/year) for each patient.
DB#	Indicates the number assigned to this patient record in the database.

Buttons	
Open	Open the record for the selected patient.
New	Access the Patient Information dialog box to start a new patient record. See Establishing a New Patient Record ▶ 48 for additional information.
Delete Patient	Delete the records for the selected patient from the VNG/ENG database.
Close Patient	Close the record for the selected patient.
Cancel	Exit this dialog box.
Help	Opens this User Manual.

3.1.2 Patient Information Dialog Box

The Patient Information dialog box is a repository for all patient and patient related information, including referring physician, referring facility, and clinical information.

> ***Note*** • *This dialog box may also be accessed by selecting Edit, Patient Info.*

The Patient Information dialog box has three tabs located directly under the Title Bar:

- Patient Information
- Physician's Order
- Clinical Information

Three buttons (OK, Cancel, and Help) located at the bottom of the dialog box display regardless of the tab accessed.

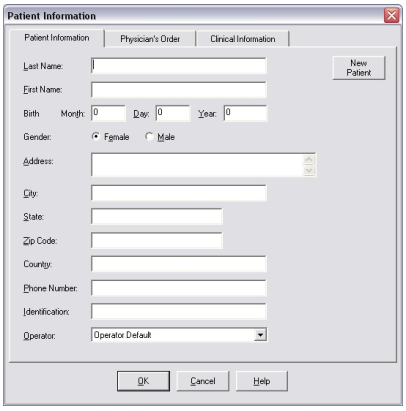


Fig. 42 Patient Information Dialog Box

Patient Information Tab

The information entered in the Patient Information dialog box is used to track the patient, to help in analyzing the test results, and to generate reports. The Patient Information dialog box contains the following:

Last Name	Required. Type the last name of the patient.
First Name	Required. Type the first name of the patient.

Birth	
Month	Required. Type the 1- or 2-digit month of birth for the patient.
Day	Required. Type the 1- or 2-digit day of birth for the patient.
Year	Required. Type the 4-digit year of birth for this patient.
Gender	Required. Select the gender: male or female.
Address	Type the street address of the patient.
City	Type the city name.
State	Type the state or 2-digit state code.
Zip Code	Type the zip code, up to 15 digits.
Country	Type the country name.
Phone Number	Type the patient's telephone number.
Identification	Type identifying information such as a social security number.
Operator	Select the name of the operator performing the test from the list of available operators.

Buttons	
New Patient	Clear the text box and prepare the system for new patient information.
OK	Accept the information in all three tabs of this dialog box and save it to the database.
Cancel	Close the dialog box without saving newly entered information.
Help	Opens this User Manual.

Physician's Order Tab

Select the Physician's Order tab to display the following:

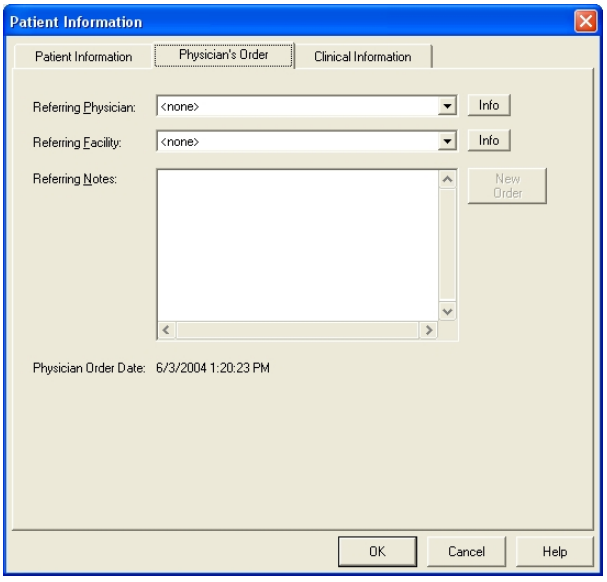


Fig. 43 Physician's Order Dialog Box

Referring Physician	Select the desired physician from the list of available physicians.
Referring Facility	Select the desired facility from the list of available facilities.
Referring Notes	Type any notes provided by the referring physician or facility for the named patient.
Buttons	
Info (Referring Physician)	Access the Referring Physician dialog box.
Info (Referring Facility)	Access the Referring Facility dialog box.
New Order	Begin a Physician Order. A prompt warns that a new Physician's Order is being started and the current order will be closed. The current date is used as the Physician's Order date.
OK	Accept the information in all three tabs of this dialog box and save it to the database.
Cancel	Close the dialog box without saving information in all three tabs of this dialog box.
Help	Opens this User Manual.

Clinical Information Tab

The Clinical Information tab contains three buttons that display a series of dialog boxes that will prompt you to answer questions and supply clinical information related to the patient. See Clinical Information ► 195 for a list of the clinical information questions.

> ***Note*** • *This dialog box can be accessed by clicking the New Patient button or by selecting Edit, Patient Info.*

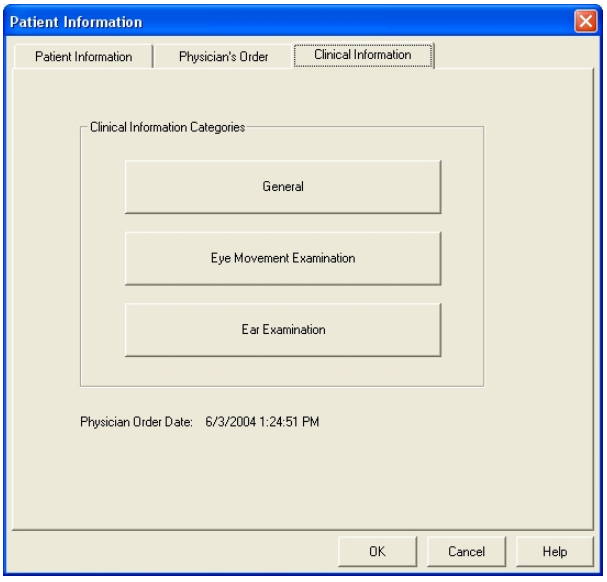


Fig. 44 Clinical Information Dialog Box

To use the Clinical Information tab:

1. Click the **General** button and answer all questions. Click **Finish** to complete this section.
2. Click the **Eye Movement Examination** button and answer all questions. Click **Finish** to complete this section.
3. Click the **Eye Examination** button and answer all questions. Click **Finish** to complete this section.
4. Click **OK** to close and save the information on all 3 tabs of the Patient Information dialog box.

> ***Note*** • *A button is raised if the clinical questions are answered and the operator clicks Finish. This happens when creating a new patient record and when editing an existing patient record.*

The three Clinical Information categories are:

General	Prompts for general condition information.
Eye Movement Examination	Prompts for information related to this patient's eye movements.
Ear Examination	Prompts for information related to this patient's ear examination findings.

The date of the active Physician Order in effect is located below the button area on this dialog box.

Buttons	
OK	Accept the information in all three tabs of this dialog and save it to the database.
Cancel	Close the three dialog boxes without saving the information.
Help	Opens this User Manual.

3.1.3 Establishing a New Patient Record

A patient record needs to be established for every new patient. A patient record may contain multiple Physician Orders and multiple sessions. The VNG/ENG system assigns a Physician Order date when the patient record is established. Test records and results are organized by the Physician Order date and test session date. A test session is an uninterrupted series of tests or protocols run on a patient.

To establish a new patient record:

1. Access the **Patient Selection** dialog box.
   A. At the **Patient Selection** dialog box click **New**, or
   B. From the Main window select **File**, **New Patient** from the Menu Bar, if available, or
   C. Select **F2 New Patient**, if available.
2. Place the cursor in the **Last Name** text box and type the last name of the patient.

> ***Note*** • *Keyboard alternate, press Tab to move the cursor from one text box to the next and from one button to the next. Press Shift + Tab to move the cursor to the previous text box.*

3. Place the cursor in the **First Name** text box and type the first name of the patient. **Last** and **First** Names, **Birthdate**, and **Gender** are required. The other items are optional.
4. Continue moving from one text box to the next until all of the patient information requested or available is entered.
5. Click the **Operator** drop-down list arrow to display a list of available operators. Select the operator who will be conducting the test.

   Note 1: See Establishing a New Operator ▶ 58, for additional information.

   Note 2: Default Operator can be used if no operator-specific options are to be established.

6. Click the **Physician's Order** tab to display the **Physician's Order** dialog box.
7. Click the **Referring Physician** drop-down arrow to display a list of available physicians and select the desired physician.Establishing a New Operator ▶ 58

> ***Note*** • *If the physician is not listed, click the Referring Physician Info button to access the Physician Information dialog box. See Establishing a New Physician ▶ 52 for additional information.*

8. Click the **Referring Facility** drop-down arrow to display a list of available facilities and select the desired facility.

> ***Note*** • *If the facility is not listed, press the Referring Facility Info button to access the Referring Facility*

Information dialog box. See Establishing a New Physician ► 52, for additional information.

9. Click the **Clinical Information** tab to display the **Clinical Information** dialog box.
10. Click the **General** button and answer each question. Click **Next** to move to the next dialog box. Click **Finish** when you have answered all the questions.
11. Repeat Step 10 for the **Eye Movement Examination** and **Ear Examination** buttons.
12. Click **OK** at the bottom of the dialog box to accept and save all of the information entered in all three **Patient Information** dialog boxes.

3.1.4 Editing Patient Information

The Editing Patient Information procedure provides instructions for editing patient data in the Patient Information dialog boxes.

To edit existing patient information:

1. Select **Edit**, **Patient Info** to display the **Patient Information** dialog box with the data for the currently selected patient. Select the **Patient Information** tab.
2. Review the patient personal data and make any required changes in the text boxes.
3. Click the **Physician's Order** tab to display the **Physician's Order** dialog box.
4. Review the physician order information and make any required changes.
5. Click the **Referring Physician Info** button to display the **Referring Physician Information** dialog box.
6. Review the physician information and make any required changes in the text boxes. Click **OK** to return to the **Physician's Order** dialog box.
7. Click the **Referring Facility Info** button to display the **Referring Facility Information** dialog box.
8. Review the facility information and make any required changes in the text boxes. Click **OK** to return to the **Physician's Order** dialog box.
9. Click the **Clinical Information** tab to display the **Clinical Information** dialog box.
10. Click on each of the clinical information buttons and review the answers. Make changes as needed.
11. Click **Finish** to close the clinical information session and return to the **Clinical Information** dialog box.
12. Click **OK** when you are finished modifying all of the patient information in the three **Patient Information** dialog boxes.

3.1.5 Selecting an Existing Patient

This section provides instructions for selecting and opening an existing patient record file.

To open an existing patient file from the Main Window:

1. Select **File**, **Existing Patient** from the Menu Bar or press **F3 Existing Patient**, if available, to display the **Patient Selection** dialog box.
2. Select a patient name from the list of available patients in the **Patient Selection** dialog box.
3. Click **OK** to access the selected patient's records and display the **Patient Information** dialog box.
4. Review the patient information in all three **Patient Information** dialog boxes and make any needed modifications. See Editing Patient Information ► 49 for additional information.

5. Click **OK** to begin a new test session for the patient. If test records from previous test sessions are available, the list of test records will display in the **Review Test** area of the **Main Window**.

3.1.6 Deleting a Patient Record

Use this procedure to delete a patient record from the VNG/ENG database.

> ***Note*** • *Any video recordings for the patient will be deleted without further confirmation. Deleting a patient in Chartr EP does not delete any video recordings for that patient. Chartr EP never deletes any VNG/ENG test data.*

To delete a patient record from the database:

1. Access the **Patient Selection** dialog box.
2. Select the patient whose record you want to delete and make sure the patient name is highlighted.
3. Click the **Delete** button to display a dialog box that prompts: Are you sure you want to delete patient [Last Name, First Name].
4. Click **OK** to delete the patient record, or click **Cancel** to stop the deletion.

3.2 Physician Information

Referring Physician information is stored in the VNG/ENG database. The name, address, and contact information is entered and maintained in the Referring Physician dialog box.

The physician order date and the test session date are the basis for retrieving multiple records for the same patient.

This section contains a description of the Physician Information dialog box and the procedures for:

- Establishing a New Physician
- Selecting an Existing Physician
- Editing Physician Information

3.2.1 Referring Physician Information Dialog Box

The Referring Physician Information dialog box is accessed from the Patient Information, Physician's Order tab dialog box by clicking the Referring Physician Info button or by selecting Setup, Referring Physicians from the Empty Main window.

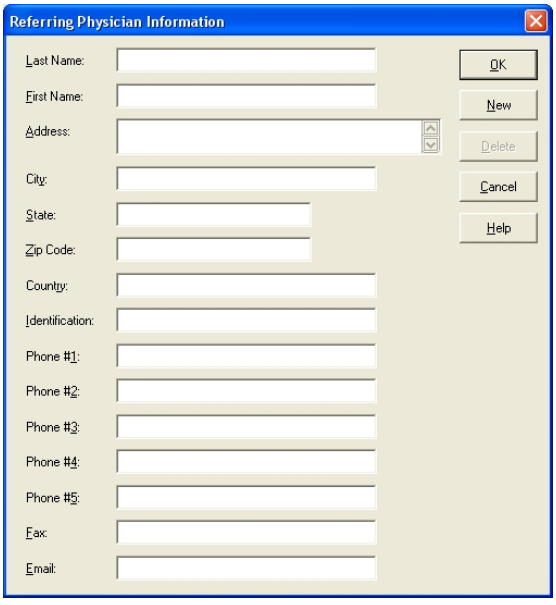


Fig. 45 Referring Physician Information Dialog Box

Last Name	Type the last name and degree, if desired, of the referring physician.
First Name	Type the first name of the referring physician.
Address	Type the street address of the physician.
City	Type the city name.
State	Type the state or 2-digit state code.
Zip Code	Type the zip code, up to 15 digits.
Country	Type the country name.
Identification	Type any identifying information.
Phone	Type the primary phone number.
Phone #5	Type another phone number, if available.
Phone #5	Type another phone number, if available.
Phone #5	Type another phone number, if available.
Phone #5	Type another phone number, if available.
Phone #5	Type another phone number, if available.
Fax	Type the fax number, if available.
Email	Type the email address, if available.

Buttons	
OK	Accept the information in this dialog box and save it to the database.
New	Clear the text boxes and prepare the system for new physician information.
Delete	Delete the physician from the database. A referring physician cannot be deleted if associated with an existing patient record.
Cancel	Close the dialog box without saving the information.
Help	Opens this User Manual.

3.2.2 Establishing a New Physician

Use the following procedure to enter physician information in the Referring Physician Information dialog box.

To establish a new physician:

1. Access the **Patient Information** dialog box.
2. Click on the **Physician's Order** tab at the top of the dialog box.
3. Click the **Info** button next to the **Referring Physician** drop-down list arrow to display the **Referring Physician Information** dialog box.
4. Click the **New** button to clear the text boxes and prepare the system for a new physician.
5. Place the cursor in the **Last Name** text box and type the referring physician's last name and degree.

> ***Note*** • *Keyboard alternate: press Tab to move the cursor from one text box to the next and from one button to the next; press Shift + Tab to return to the previous text box.*

6. Place the cursor in the **First Name** text box and type the first name of the referring physician.
7. Continue moving from one text box to the next until you have entered all of the physician information requested.
8. Click **OK** to save the referring physician information in the database.

3.2.3 Selecting an Existing Physician

Use this procedure to select a physician from the existing list of physicians.

To select an existing physician:

1. Access the **Patient Information** dialog box.
2. Click on the **Physician's Order** tab at the top of the **Patient Information** dialog box.
3. Click the **Referring Physician** drop-down list arrow to display a list of physicians.
4. Select the patient's referring physician from the list of available physicians. Make sure the physician's name displays in the **ReferringPhysician** text box.

> ***Note*** • *If the physician is not in the list of available referring physicians, see* *Establishing a New Physician ▶ 52* *for additional information.*

5. Click the **OK** button at the bottom of the **Patient Information** dialog box to accept the selected physician.

3.2.4 Editing Physician Information

Use this procedure to edit previously entered physician information.

To edit existing physician information:

1. Access the **Patient Information** dialog box.
2. Click on the **Physician's Order** tab at the top of the **Patient Information** dialog box.
3. Click the **Info** button next to the **Referring Physician** drop-down list arrow to display the **Referring Physician Information** dialog box.
4. Place the cursor in the text box where information needs to be modified and make the changes.

> ***Note*** • *Keyboard alternate: press Tab to move the cursor from one text box to the next and from one button to the next; press Shift + Tab to return to the previous text box.*

5. Continue moving from one text box to the next until you have updated all of the existing physician information.
6. Click **OK** to save the modified referring physician information in the database.

3.3 Referring Facility Information

The name, address, and contact information for the referring facility is entered and maintained in the Referring Facility Information dialog box.

This section provides a description of the Referring Facility dialog box and the procedures related to the referring facility, including:

- Establishing a New Referring Facility
- Selecting an Existing Referring Facility
- Editing Existing Referring Facility Information

3.3.1 Referring Facility Information Dialog Box

The Referring Facility Information dialog box is usually accessed from the Patient Information Physician's Order tab by clicking the Referring Facility Info button. It may also be accessed by selecting Setup, Referring Facilities from the Empty Main window.

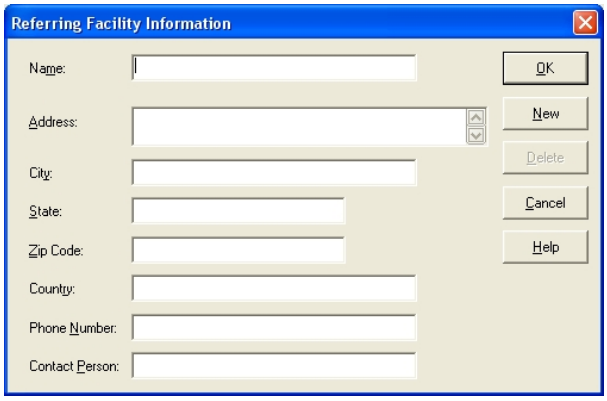


Fig. 46 Referring Facility Information Dialog Box

Name	Type the name of the referring facility.
Address	Type the street address of the facility. Multiple lines may be entered in the text box.
City	Type the city name.
State	Type the state or 2-digit state code.
Zip Code	Type the zip code, up to 15 digits.
Country	Type the country name.
Phone Number	Type the facility's telephone number.
Contact Person	Type the name of the contact person for the facility.
Buttons	
OK	Accept the information in this dialog box and save it to the database.
New	Clear the text box and prepare the system for new facility information.
Delete	Delete the facility from the database. A referring facility cannot be deleted if it is associated with an existing patient record.
Cancel	Close the dialog box without saving the information.
Help	Opens this User Manual.

3.3.2 Establishing a New Referring Facility

Use the following procedure to enter referring facility information in the Referring Facility dialog box.

To establish a new referring facility:

1. Access the **Patient Information** dialog box.

2. Click on the **Physician's Order** tab at the top of the **Patient Information** dialog box.
3. Click the **Info** button next to the **Referring Facility** drop-down list arrow to display the **Referring Facility Information** dialog box.
4. Click the **New** button to clear the text boxes and prepare the system for a new facility.
5. Place the cursor in the **Name** text box and type the referring facility's name.

> ***Note*** • *Keyboard alternate: press Tab to move the cursor from one text box to the next and from one button to the next; press Shift + Tab to return to the previous text box.*

6. Continue moving from one text box to the next until you have entered all of the facility information requested.
7. Click **OK** to save the referring facility information in the database.

3.3.3 Selecting an Existing Referring Facility

Use this procedure to identify the referring facility and attach the facility information to a specific patient record.

To select an existing referring facility:

1. Access the **Patient Information** dialog box.
2. Click on the **Physician's Order** tab at the top of the **Patient Information** dialog box.
3. Click the **Referring Facility** drop-down list arrow to display a list of facilities.
4. Select the name of the facility that referred the patient from the list of available facilities. Make sure the facility name displays in the **Referring Facility** text box.

> ***Note*** • *If the facility is not in the list of available referring facilities, see* *Establishing a New Referring Facility ▶ 54**.*

5. Click the **OK** button at the bottom of the **Patient Information** dialog box to accept the selected facility.

3.3.4 Editing Referring Facility Information

Use this procedure to edit previously entered referring facility information.

To edit referring facility information:

1. Access the **Patient Information** dialog box.
2. Click on the **Physician's Order** tab at the top of the **Patient Information** dialog box.
3. Click the **Info** button next to the **Referring Facility** drop-down list arrow to display the **Referring Facility Information** dialog box.
4. Place the cursor in the text box where information needs to be updated or edited and make the changes.

> ***Note*** • *Keyboard alternate: press Tab to move the cursor from one text box to the next and from one button to*

the next; press Shift + Tab to return to the previous text box.

5. Continue moving from one text box to the next until you have updated all of the existing facility information.
6. Click **OK** to save the modified referring facility information in the database.

3.4 Operator Information

The process for establishing an operator includes more than entering name, address, and associated information in a dialog box. Each operator may set up a unique test battery, test options, and report formats.

***Note** • The Default Operator settings will apply if an operator chooses not to customize the test battery, test options, and report formats.*

This section includes a description of the Edit Operators dialog box and the procedures for establishing a new operator in the system.

See System Options, Operator Settings Tab ▶ 60 for information on how to select and set operator options including the test battery. See Report Setup ▶ 152 for information on how to format the report.

3.4.1 Edit Operators Dialog Box

The Edit Operators dialog box is accessed by selecting Edit, Operator Info.

Complete the Edit Operators dialog box information to save operator-specific information in the VNG/ENG database.

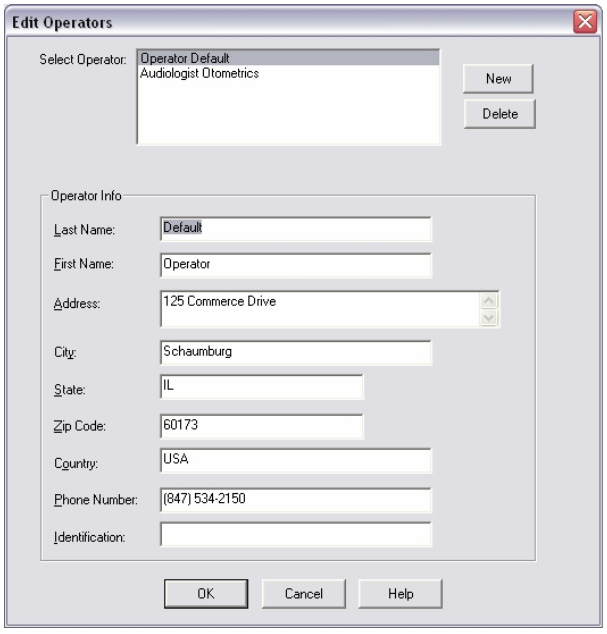


Fig. 47 Edit Operators Dialog Box

Select Operator	Select an operator from the list. The database information associated with the selected operator will display.
Last Name	Type the last name and degree of the operator.
First Name	Type the first name of the operator.
Address	Type the street address of the operator. Multiple lines may be entered.
City	Type the city name.
State	Type the state or 2-digit state code.
Zip Code	Type the zip code, up to 15 digits.
Country	Type the country name.
Phone Number	Type the operator's telephone number.
Identification	Type any identifying information.
Buttons	
New	Clear the text boxes and prepare the system for new operator information.
Delete	Delete the operator from the database. An operator cannot be deleted if an existing patient record is associated with the operator.

Buttons	
OK	Accept the information in this dialog and save it to the database.
Cancel	Close the dialog box without saving the information.
Help	Opens this User Manual.

3.4.2 Establishing a New Operator

Use the following procedure to enter operator information in the Edit Operator dialog box. See System Options, Operator Settings Tab ▶ 60 to setup operator determined options for conducting tests and a test battery.

To establish a new operator:

1. Select **Edit**, **Operator Info** to display the Edit Operators dialog box.
2. Click the **New** button to clear the text boxes and prepare the system for a new operator.
3. Place the cursor in the **Last Name** text box and type the last name of the operator.

> ***Note*** • *Keyboard alternate: press Tab to move the cursor from one text box to the next and from one button to the next; press Shift + Tab to return to the previous text box.*

4. Place the cursor in the **First Name** text box and type the first name of the operator.
5. Continue moving from one text box to the next until you have entered all of the operator information requested.
6. Click **OK** to save the operator information in the database.
7. Go to Setup and System Options ▶ 60 to setup the test battery and other operator options.

3.4.3 Selecting an Existing Operator

There are several ways to select an operator depending on where you are in the VNG/ENG program. Typically, the operator is selected when a new patient record or new Physician Order or test session are started. However, multiple operators can also view, analyze, and prepare reports for the same set of test data.

The following procedures describe the process for selecting an operator prior to conducting tests and during a test session.

To select an operator prior to testing:

1. Access the **Patient Information** dialog box.
2. Click on the drop-down list arrow next to the **Operator** text box to display a list of available operators.
3. Select the desired operator and make sure the name appears in the text box.
4. Click **OK** to select the operator and begin a test session.

To select an operator during a test session:

1. Select **Edit**, **SwitchOperator** on the Menu Bar to display the **Operator Select** dialog box.

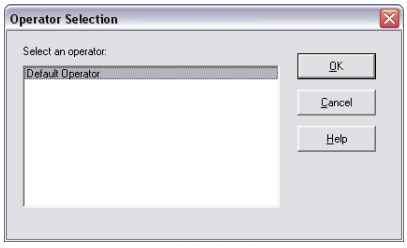


Fig. 48 Operator Select Dialog Box

2. Select an operator from the list of available operators. The name of the selected operator should display in the text box.
3. Click **OK** to close the dialog box. The name of the selected operator will display in the brackets next to the patient name on the Title bar.

3.4.4 Editing Existing Operator Information

Use this procedure to modify previously entered operator information, including the Test Battery and Operator Options.

To edit existing operator information:

1. Select **Edit**, **Operator Info** to display the **Edit Operators** dialog box.
2. Select the desired operator and make sure the operator's name displays in the text box.
3. Place the cursor in the text box where information needs to be modified and make the changes.

> ***Note*** • *Keyboard alternate: press Tab to move the cursor from one text box to the next and from one button to the next; press Shift + Tab to return to the previous text box.*

4. Continue moving from one text box to the next until you have updated all of the existing operator information.
5. Click **OK** to save the modified operator information in the database.
6. Go to System Options, Operator Settings Tab ► 60 for information on how to modify operator options.

4 Setup and System Options

4.1 Overview

Many of the setup and system options are available through the **Edit** Menu on the Menu Bar. The **Edit** Menu is available from both the Empty Main window and from the New Test/Review mode; however, the active menu options vary. The Print setup options are available through the **File** Menu. This section covers the options available in the Empty Main window and all of the New Test/Review mode options except Report.

Note • *See Report Setup ► 152 for a discussion of Report Setup options.*

Fig. 49 **Edit** Menu

4.2 System Options, Operator Settings Tab

The operator settings and test battery options are found in the three tables on the System Options dialog box:

- Operator Settings / Test Battery
- Workstation Settings (see Workstation Settings Tab ► 65)
- Peak Frequency / GDT Interface (see System Options, Peak Frequency/ GDT Interface Tab ► 69)

4.2.1 Operator Settings / Test Battery Tab

Each operator is able to use the default settings and protocol or to select operator settings and a test battery that will be unique to the operator.

A Test Battery is a list of test protocols arranged in the sequence the operator wants to conduct the tests. A Test Battery is unique to each operator. Once established, a Test Battery remains the same for all patients tested by an operator until the battery is changed by the operator.

The Operator Settings / Test Battery tab is used to establish the operator specific testing sequence. Select and move tests between the Available test protocols and the Selected test protocols list boxes.

Access this dialog box by selecting Edit, System Options or clicking the System Options icon on the Toolbar.

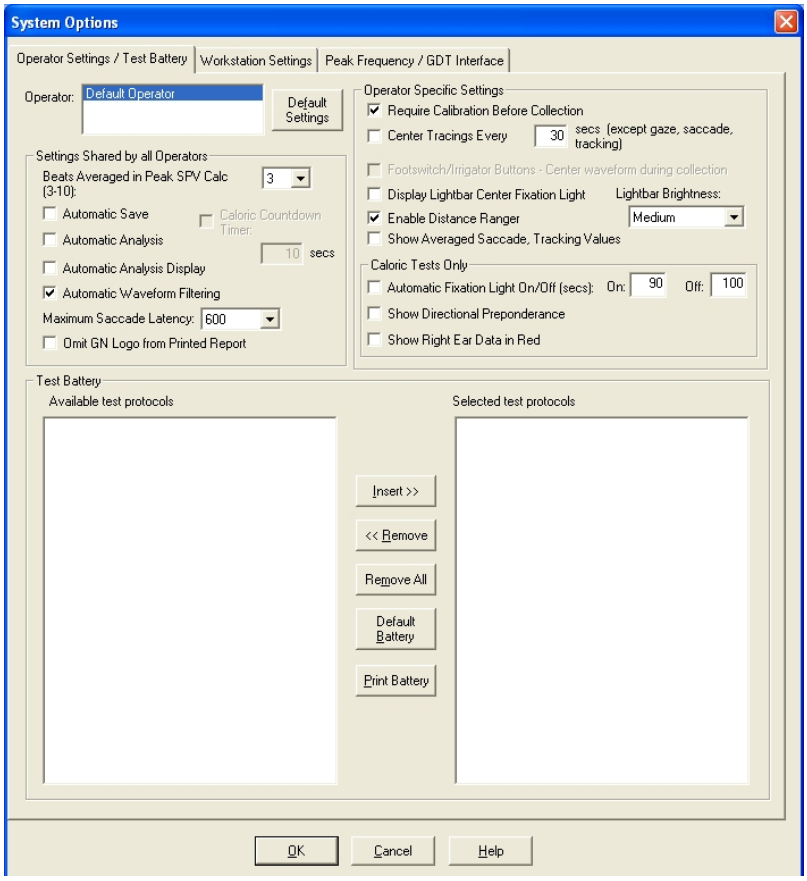


Fig. 50 System Options, Operator Settings / Test Battery Tab

Operator	Select an existing operator.
Settings Shared by All Operators	
Beats Averaged in Peak SPV Calc (3-10)	Select the number of SPV beats to be averaged in SPV to calculate slow phase peak velocity. Choose from the list of available choices: 3 through 10 beats.
Automatic Save	Select to have the data automatically saved when the test is stopped.
Automatic Analysis	Select to have the data automatically analyzed when the test is stopped. The data can always be reanalyzed.

Settings Shared by All Operators	
Automatic Analysis Display	Select to have the data automatically display the analysis screen once the data is analyzed. This option requires that Auto Analyze also be selected.
Automatic Waveform Filtering	Select to use automatic filtering during review. If selected, a low pass digital filter is applied to the tracings during review. This eliminates high frequency noise and provides a cleaner appearance to the data.
Maximum Saccade Latency	Select the Maximum Latency setting for a saccade to be accepted from the list of available choices: 600 through 900 milliseconds (applies to saccade latency measurements).
Caloric Countdown Timer	Select to have a countdown timer appear between caloric tests. Note that you can not access analysis or other software features while the timer is active.
Omit GN Logo from Printed Report	Select this option to omit the Otometrics logo on the printed patient report.
Operator Specific Settings	
Require Calibration Before Collection	Select this option to require manual calibration before testing a patient.
Center Tracings Every x Seconds	Select this option to have the system autocenter the ENG or VNG waveform tracings every "x" seconds during a test. Specify the interval, in seconds, between each autocentering event. Setting this value too low may cause jittery tracings. ***Note*** • *Waveforms or Gaze, Saccade, and Tracking tests will NOT be automatically centered if this setting is selected.*
Footswitch/Irrigator Button – Center Waveform during Collection (VNG only)	Select to choose to have the 2nd press of the footswitch or irrigator button center the tracing. If this option is not selected, the 2nd press of the footswitch or irrigator button will start the video recording.
Display Lightbar Center Fixation Light	Select to use the fixation light during testing. If selected, turns on a center light on the light bar whenever it is not being used for other forms of optical stimulation.
Enable Distance Ranger	Select to use the light bar ranging function during testing.
Lightbar Brightness	Select the desired light bar brightness from the list of available choices: Low, Medium, High.
Show Averaged Saccade and Tracking Values	Select to turn on/off the display of the following "average" rightward and leftward values for a test: • Saccade: Accuracy, Latency, and Peak Velocity • Tracking: Gain
Caloric Test Only Settings	
Automatic Fixation Light On/Off (secs) (VNG only)	Select to have the fixation light come on in the goggles. Select the second in the tracing that the fixation light will come on and go off.
Show Caloric Directional Preponderance	Select to display directional preponderance measurements in the caloric pods review screen.

Caloric Test Only Settings	
Show Right Ear in Red	Select to display right ear irrigations in red and left ear in blue on caloric graphs.

> ***Note*** • *By default, Chartr VNG displays all graph data for warm caloric irrigation tests in red and cool irrigations in blue*

Test Battery	
Available test protocols	Contains a list of all available VNG test procedures and protocols for a specific hardware configuration.
Selected test protocols	Contains a list of all VNG test protocols selected by the operator.
Buttons	
Default Settings	Applies the standard default (as defined in the Default Operator's record) test options. System defaults are applied if the Default Operator record itself is being modified.
Insert >>	Moves the selected test protocol from the Available test protocols list and inserts it beneath the highlighted procedure or protocol in the Selected test protocols list box. If an entire procedure is highlighted, the procedure and all its protocols are inserted in the Selected test protocols list box.
<< **Remove**	Removes the highlighted test protocol (or entire procedure) from the Selected test protocols list box.
Remove All	Removes all of the test procedures and protocols from the Selected test protocols list box.
Default Battery	Applies the standard recommended (default, as defined in the Default Operator's record) test battery to the Selected test protocols list box. System defaults are applied if the Default Operator record itself is being modified.
Print	Prints a copy of the selected test protocols for the current operator.
OK	Accepts and saves the test battery that is displayed in the Selected test protocols list box.
Cancel	Closes the dialog box without saving and returns to the Operator Information tab.

4.2.2 Establishing Operator Test Battery

All Chartr VNG/ENG systems have a list of available protocols. These protocols differ for 2channel and 4-channel ENG, VNG, and monocular VNG systems. For example, Individual Eye tests is not available on 2 channel ENG and monocular VNG systems.

Each system has a factory default test battery, which is a list of commonly used protocols.

> ***Note*** • *When you first install the system and if your facility has a different protocol than what is set up in the default test battery, it is recommended that you first setup the default operator test battery. Then add all other operators, and they will inherit the default test battery. If desired, each operator's test battery can be further customized.*

If desired, each facility can establish a unique facility default test battery that consists of a sequenced list the protocols commonly used at that facility. The facility default test battery will be active when the system is started. In addition, an operator can establish an operator-specific test battery.

The process for establishing operator settings and options in the VNG/ENG system includes:

- Entering the name, address, and contact information for the operator (Operator Information ► 56)
- Selecting the operator determined options for conducting tests.
- Setting up the test battery sequence

Use the following procedure to establish operator options and set up a test battery

To establish operator options and a test battery:

1. Select **Edit, System Options** to display the **System Options** dialog box.
2. Select the **Operator Options/Test Battery** tab.
3. Select an operator from the list. If the name is not on the list see Operator Information ► 56.
4. Select the desired **Settings Shared by Operator** options.

> ***Note*** • *Click the Default Settings buttons to return the operator settings to the original system settings.*

5. Select the desired **Operator Specific Settings**.
6. Select the desired **Caloric Test Only** options.
7. Use the mouse to select a test procedure or protocol in the **Available test protocol** list box and click the **Insert** button to move the procedure or protocol to the **Selected test protocol** list box. Highlight the procedure or protocol in the **Selected test protocol** list box beneath which you want the new item inserted.

> ***Note*** • *Click the Remove button to remove a selected protocol from the Selected test protocols list box.*
>
> *Click the Remove All button to remove all of the test protocols from the Selected test protocols list box.*
>
> *Click the Default button to use only the facility default's (test battery or options) maintained under the special operator, named Default operator. If editing the Default Operator account, the Default button will bring up the system defaults.*

8. Continue selecting and moving test protocols until satisfied with your selections.
9. Click **OK** to save the entries in the **Operator Settings / Test Battery**tab.

4.3 Workstation Settings Tab

The ICS Chartr 200 VNG/ENG workstation name is used to help identify the source of the test information. Workstation names are established at system installation. The workstation name and other workstation settings can be changed using the Workstation Settings tab (Edit, System Options/Workstation Settings tab).

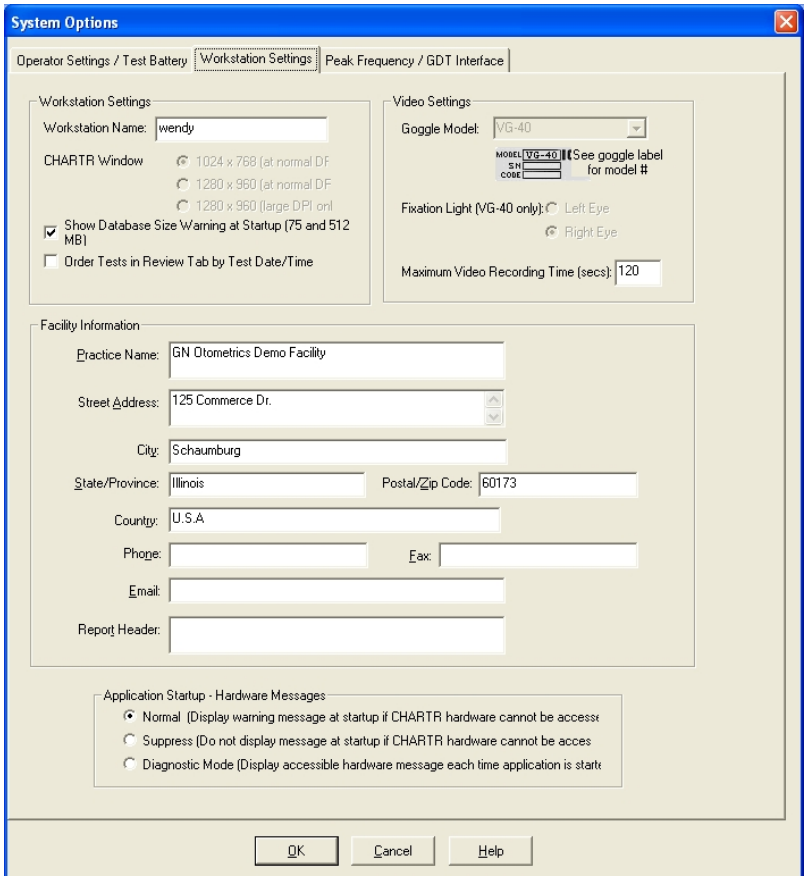


Fig. 51 System Options, Workstation Settings Tab

4.3.1 Workstation Settings

Workstation specific settings include:

Workstation Name	Name assigned to this workstation. The assigned name must correspond to your network naming conventions if this workstation is connected to a network.
Chartr Window	Select the display window size for this application on this workstation (grayed options are not available on this workstation: 1024 x 768 (at normal DPI), 1280 x 960 (at normal DPI), or 1280 x 960 (large DPI only)

Show Database Size Warning at Startup (75 and 512 MB)	Select to have the system display an alert when the database reaches 75 and 512 MB.
Order Tests in Review Tab by Test Date/Time	Select to display the order of the tests in the review tab sorted by the time/date they were collected from first collected to last collected.

To rename a workstation:

1. Select **Menu, System Options** from the Menu Bar to display the **System Options** dialog box.
2. Select the **Workstation Settings** tab.
3. Change the name in the **Workstation Name** edit box.
4. Click **OK** to save the new name to the database and close the dialog box.

4.3.2 Video Settings

The video settings, including the model of the video goggle used on this workstation, should be designated as part of the setup process. Several models of video goggles are available for use the ICS Chartr 200 VNG/ENG system.

> ***Note*** • *The model number of ICS Chartr 200 VNG system video goggles is listed on the label of the video goggle itself. See the example shown in the Video Settings portion of the Workstation Settings tab*

Goggle Model	Click on the drop-down arrow to display a list of goggle models. Select the model found on the label on the video goggles that will be used with your system.
Fixation Light (VG-40 only)	Select Left Eye or Right Eye.
Maximum Video Recording Time (in secs)	Type the maximum amount of time, from 10 to 300 seconds, for each video recording session on this workstation.

4.3.3 Facility Information

The Facility Information option is used to enter and maintain information about the test-site facility at which the ICS Chartr 200 VNG/ENG workstation is located. It is also the address information appearing on the report. Select Edit, System Options, Workstation Settings Tab to display the Facility Information dialog box.

Complete the information in the Facility Information dialog box as follows:

Practice Name	Enter the name of the practice or clinic, as it will display in reports.
Address	Enter the address of the practice.
City	Enter the name of the city in which the practice is located.
State	Enter the name or abbreviation of the state in which the practice is located.
Postal/Zip Code	Enter the up to 15-character zip code identifier for the practice.
Country	Enter the name of the country in which the practice is located.
Phone Number	Enter the primary phone number of the practice.
Fax	Enter the fax number for the practice.
Email	Enter the e-mail address of the practice.

Report Header	Enter the information that will appear at the top of the report. The first two lines of this field appear on the report.
OK	Save the settings and exit the dialog box.
Cancel	Exit the dialog box without saving the settings.
Help	Opens this User Manual.

4.3.4 Application Startup - Hardware Warning Selection

The Application Startup - Hardware Warning Selection option is used to select a startup mode warning message option. Select the hardware message option that will be activated each time the ICS Chartr 200 VNG/ENG software is started.

Normal – Display startup warning if CHARTR hardware cannot be accessed	(Recommended) Select this option to display the Hardware Startup Warning dialog box (see System Options, Operator Settings / Test Battery Tab ► 61) any time the CHARTR hardware is not accessible when the ICS Chartr 200 VNG/ENG software is started. This is the default setting.
Suppress – Do not display startup warning	Select this option to skip the Hardware Startup Warning each time the ICS Chartr 200 VNG/ENG software is started. This setting is not recommended for normal use. This option maybe selected on “Demo-Read Only” systems that do not require all of the hardware needed to run a VNG/ENG test.
Diagnostic Mode – Display list of accessible hardware each time application is started (for Otometrics Support use)	Select this option to display the Hardware Startup Warning dialog box each time the ICS Chartr 200 VNG/ENG software is started. A list of all of the hardware present or absent on your system that is needed to run a VNG/ENG test. You may be asked to select this mode by a Otometrics technician attempting to conduct a remote troubleshooting session.

Hardware Startup Warning Dialog Box

The Hardware Startup Warning Dialog Box displays if the option is selected in the System Options / Workstation Settings Tab and the system cannot find all of the Chartr hardware when the system is started.

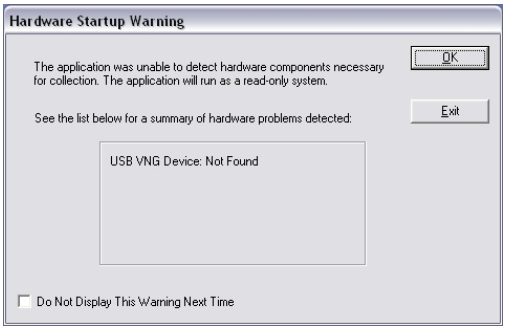


Fig. 52 Hardware Startup Warning Dialog Box

Summary of Hardware Problems	View a list of missing hardware and/or problem hardware. All of the required hardware must be installed and working properly in order to collect VNG/ENG data.
Do Not Display This Warning Next Time	Do not check this option to enable the system to display this dialog box only if a hardware problem is detected when the ICS Chartr 200 VNG/ENG software is started. Check this option if you do not want to see a list of missing hardware the next time ICS Chartr 200 VNG/ENG is started.
OK	Save selected option and close the dialog box.

4.4 System Options, Peak Frequency/ GDT Interface Tab

The System Options, Peak Frequency/GDT Interface Tab is used to select the program language, peak frequency calculation options, and German GDT interface settings. To change these settings, select the Edit, System Options, Peak Frequency/ GDT Interface Tab.

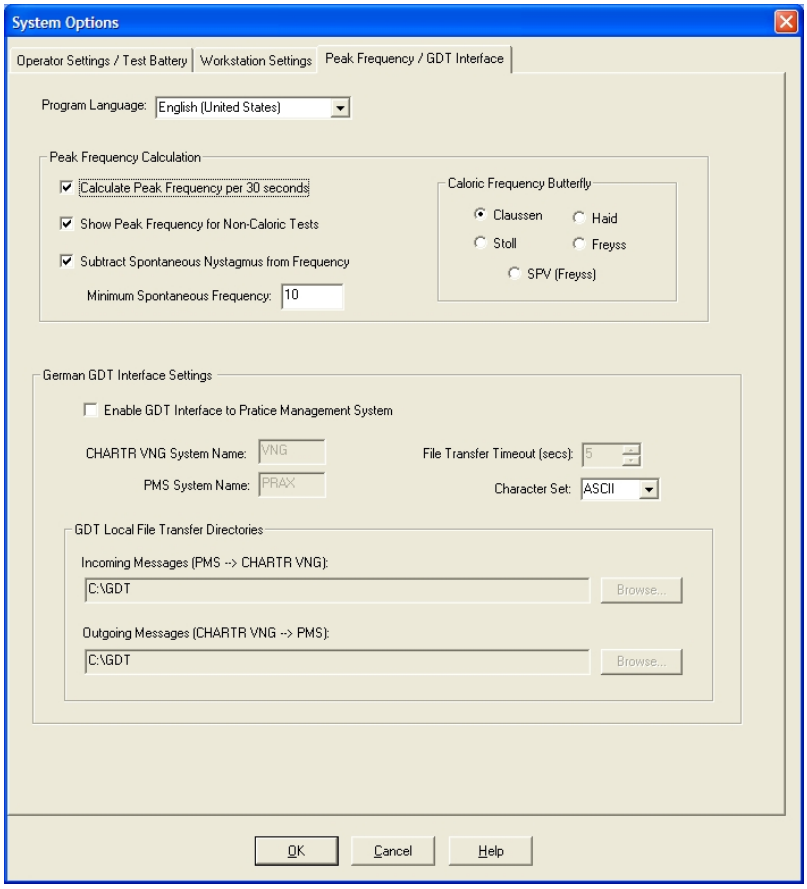


Fig. 53 System Options / Peak Frequency / GDT Interface Tab

Program Language — Click the drop-down arrow to display a list of languages. Click on a language to select it. (English or German)

Peak Frequency Calculation

Calculate Peak Frequency per 30 seconds. — Select to calculate the peak (in addition to the SPVs) when an SPV test analysis. The first 140 seconds of the test is analyzed and the 30 second window with the highest frequency of nystagmus is identified. In Analysis mode, click the Begin button to start the 140 second window.

> ***Note*** • *If this option was not selected before a test was analyzed and saved, the peak frequency will not be displayed. To include the peak frequency in an analysis, select this option, and then click the Reanalyze button to regenerate the SPV and Frequency analyses.*

Show Peak Frequency for Non-caloric Tests (Available only if the Calculate Peak Frequency per 30 seconds options is selected). Select to display the calculated peak frequency value for SPV tests other than calorics (i.e., gaze, spontaneous, position, optokinetic, dix-hallpike).

Subtract Spontaneous Nystagmus from Frequency (Available only if the Calculate Peak Frequency per 30 seconds options is selected). Select to enable subtraction of a frequency-based spontaneous nystagmus from the caloric test values.

> ***Note*** • *The system expects the operator to first perform a spontaneous nystagmus test, followed by the four caloric tests. The spontaneous test must be analyzed before the caloric tests in order to calculate a frequency-based spontaneous nystagmus value. Then, when the caloric tests are analyzed, the system will locate the current spontaneous nystagmus test (the primary test will be identified if more than one spontaneous test is found). The peak frequency from the identified spontaneous test will be subtracted from each caloric test, taking into account the correct + / – sign for left and right beating.*

Minimum Spontaneous Frequency Select to define the minimum spontaneous frequency value that will be considered applicable. If the spontaneous nystagmus results in a peak frequency that is equal to or above the indicated minimum, the value will be subtracted from the calorics. If the spontaneous nystagmus results in a peak frequency that is below the indicated minimum, the value will NOT be subtracted from the calorics.

Caloric Frequency Butterfly Select the type of caloric butterfly diagram will display on the PODS caloric review screen. Four peak frequency-based diagrams (Claussen, Stoll, Haid, and Freyss) and one SPV-based diagram (Freyss) are available. Peak frequency-based diagrams are only available if the peak frequency calculation option is selected.

German GDT Interface Settings
(only for use in Germany)

Enable German Interface to Practice Management System. Select to enable the file-based interface to a German Practice Management System (PMS). The interface is based on the documented GDT standard. When selected, an external PMS can be used to launch Chartr VNG and open (or create) a specific patient. When the VNG test is complete, a report is returned to the PMS system, and Chartr VNG is exited.

Chartr VNG System Name Type the short (4 character) name used in the GDT interface files to identify the Chartr VNG system.

PMS System Name Type the short (4 character) name used in the GDT interface files to identify the PMS system.

File Transfer Timeout (secs)	Indicate the timeout length in seconds to be applied when processing messages via the GDT interface.
Character Set	Select the character set to be applied when processing messages via the GDT interface.
GDT Local File Transfer Directories	
Incoming Messages (PMS > CHARTR VNG)	Specify the folder location for incoming GDT messages. Chartr VNG will pick up messages from this folder. The specified folder must exits. Use the browser button to select the folder.
Outgoing Messages (CHARTR VNG > PMS)	Specify the folder location for outgoing GDT messages. Chartr VNG will place outgoing messages in this folder to be picked up by the PMS system. The specified folder must exits. Use the browser button to select the folder.
OK	Save selected options and close the dialog box.
Cancel	Exit the dialog box without saving options.
Help	Opens this User Manual.

4.5 Select an Operator

The Operator Select option is used to select the default operator or an operator from the list of operators. Select Edit, Switch Operator to display the Operator Select dialog box.

> ***Note*** • *To modify operator information, select Edit, System Options, Operator Settings Tab.*

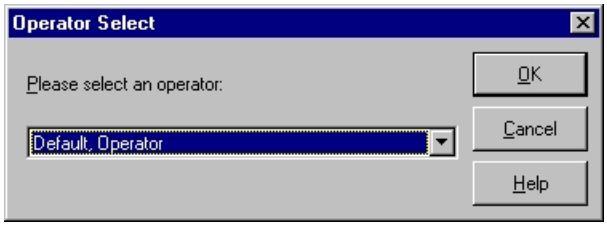


Fig. 54 Operator Select Dialog Box

Please select an operator	Click on the drop-down list of operators to display the list of operators already in the system. If no operators are listed, choose the Default, Operator option.
OK	Save the selected operator and display the Operator Information dialog box for the selected operator. See Operator Information ▶ 56 for information on completing the Operator Information dialog box.
Cancel	Exit the dialog box without selecting an operator.
Help	Opens this User Manual.

4.6 Referring Physician

The Referring Physician Setup option is used to update physician information. Select Edit, Referring Physicians to display the Referring Physician Selection dialog box.

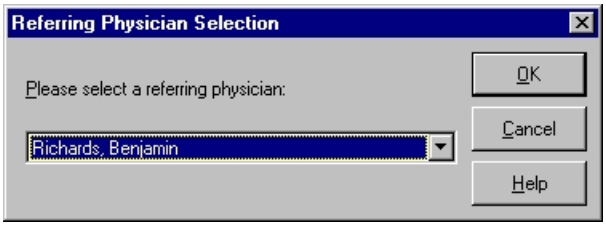


Fig. 55 Referring Physician Selection Dialog Box

Please select a referring physician	Click on the drop-down list of physicians to display the physicians listed in the system. If the None option is selected, a new physician can be created. If an existing physician is selected, this physician's information can be edited.
OK	Save the selected physician and display the Referring Physician Information dialog box for the selected physician. See Establishing a New Physician ▶ 52 for information on completing the Referring Physician Information dialog box.
Cancel	Exit the dialog box without selecting a physician.
Help	Opens this User Manual.

4.7 Referring Facility

The Referring Facility Setup option is used to update referring facility information. You may select the default facility from the list of available facilities. Select Edit, Referring Facilities to display the Referring Facility Selection dialog box.

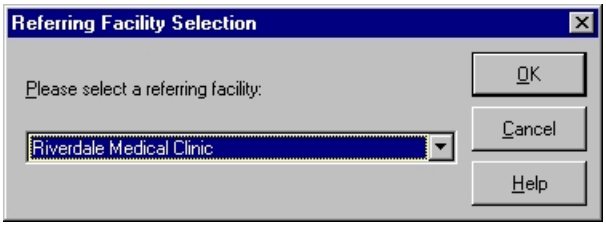


Fig. 56 Referring Facility Selection Dialog Box

Please select a referring facility	Click on the drop-down list of facilities to display the facilities listed in the system. If the None option is selected, a new facility can be created. If an existing facility is selected, this facility's information can be edited.
OK	Save the selected facility and display the Referring Facility Information dialog box for the selected facility. See Selecting an Existing Referring Facility ▶ 55 for information on completing the Referring Facility Information dialog box.

Cancel	Exit the dialog box without selecting a facility.
Help	Opens this User Manual.

4.8 Printer

The Print Setup option is used to set the default printer for the workstation. Selecting **File**, **Print Setup** displays the Print Setup dialog box.

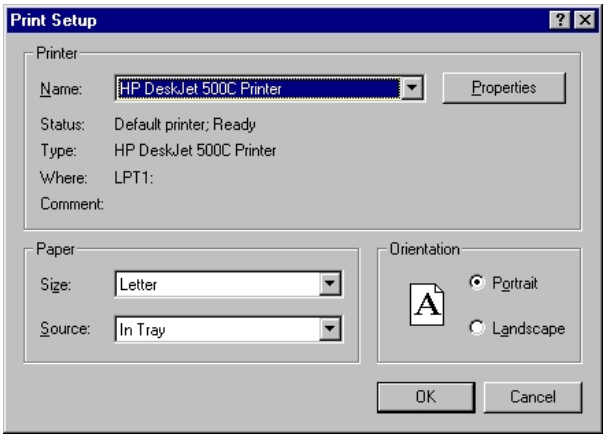


Fig. 57 Print Setup Dialog Box

This dialog box allows the operator to set the default values for the printer.

Name	Select the printer from the drop-down list of installed printers.
Properties	Click to display a dialog box that provides information on the properties of the selected printer, if available.
Status	Indicates the readiness status of the selected printer.
Type	Indicates the name of the default printer.
Where	Indicates the default printer port.
Comment	Provides additional printer information, if available.
Size	Select the default paper size for reports printed at this printer from the drop-down list of available paper sizes.
Source	Select the default paper source for this printer from the drop-down list of available paper sources.
Orientation	Select the default paper orientation setting—portrait or landscape. VNG always prints on Letter or A4 size paper in portrait orientation.
OK	Click OK to save the printer settings and exit the Print Setup dialog box.
Cancel	Exit the dialog box without saving settings.

Note • *If your printer supports both raster and vector graphics, select the raster graphics option. The report will not print correctly if the printer is set to vector graphics.*

5 Test Preparation and Data Collection

This section provides information on pre-test activities and data collection during a test session.

5.1 Overview

This section provides information on the process of preparing a patient for testing and collecting data. The procedures in this section assume that all of the patient-related information has been entered as described in Establishing and Maintaining Records ► 43.

5.2 New Test Tab

The New Test tab contains a list of the test procedures in the operator's test battery in the order the operator selected them.

Note • *Specific tests consist of a procedure (e.g., Saccade, Caloric, etc.) and a protocol (e.g., Right Ear/Cool).*

Note • *For additional information see Operator Information ► 56, and System Options, Operator Settings Tab ► 60.*

The + sign in front of a listing indicates that the listing can be expanded to show the individual test protocols. A – sign indicates the list is completely expanded.

- Click directly on a + sign to show the name of each protocol within the procedure.
- Click on a – sign to collapse the individual protocols back to the procedure level.

Fig. 58 New Test Tab

Use the scroll bars to view the entire name of a procedure or protocol if it is partially hidden, or place the mouse cursor directly over a protocol name to reveal the entire name.

To select a specific protocol and activate the test mode:

Using the mouse	Click directly on the protocol name.
Using the keypad	Use the mouse to place the cursor in the New Test Menu area then use the ↑ ↓ keys to move through procedures and protocols.

Within a test session, a protocol may be repeated by selecting it more than once or skipped by not selecting it.

5.3 Physician's Orders and Test Sessions

Physician's Orders and Test Sessions are used to organize patient test information in the system. A physician's order binds the patient data, report, and identifying information together in the database. The physician order date is assigned when the Physician's Order tab in the Patient Information dialog box is completed and a new patient record is established in the database. See Patient Information Dialog Box ► 44, for additional information.

Test Sessions are conducted under the existing Physician's Order until a new Physician's Order is established.

See Reviewing/Analyzing Test Results ► 97 for additional information on using Physician's Orders and Test Sessions during a test analysis session.

5.3.1 Setting up a New Physician's Order

When needed, a new Physician's Order may be established and tests may be run and maintained under the new order. A new Physician's Order is automatically started when a new patient record is created. When retesting a patient, a new Physician's Order needs to be started by the operator.

To establish a Physician Order:

1. Access the **Patient Selection** dialog box.
2. Select an existing patient and click **OK** to display the **Patient Information** dialog box for that patient.
3. Click the **Physician's Order** tab to display **Physician's Order** dialog box.
4. Click the **New Order** button to establish a new Physician's Order for the selected patient. A system prompt informs the operator that a new physician's order is being started and the current order will be closed. The system automatically assigns the current date to the new order.
5. Enter all information required in the Referral Reason text box.
6. Select a Referring Physician and a Referring Facility for this Physician's Order.
7. Click the Clinical Information tab and complete the General, Eye Movement Examination, and the Ear Examination questionnaires.
8. Click **OK** to exit the **Patient Information** dialog box and return to the **Main Window** with the selected patient's record open.

5.3.2 Test Sessions

Test records and results are organized by the Physician's Order date and the test session date. A test session is an uninterrupted series of tests or protocols run on a patient. Multiple test sessions may be run under one physician's order. In addition, a test may be conducted multiple times within a test session. See Test Preparation and Data Collection ▶ 75 for additional information on working with session dates.

5.4 Checking Range

The range sensor provides a continuous display of patient-to-light bar distance. The sensor indicates whether a patient is located at the 4 foot (121.9 cm) distance required for testing.

> ***Note*** • *The ranging function is only activated during tests that use a light bar stimulus. The ranging function is not available for all system light bars.*

When the range sensor is activated, a dialog box displays and prompts with one of the following status designations:

- Over Range
- Under Range
- x'xx" xx cm (distance in feet and inches and centimeters)

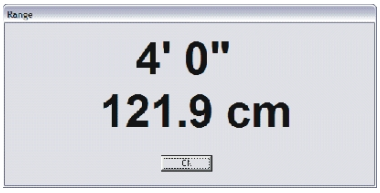


Fig. 59 Range Dialog Box

The range sensor is constantly sampling patient-to-bar distance while a test is being conducted. The range distance displays during the test in the Information Area of the Main Window. This distance is updated every 3 seconds. If the patient moves out of the acceptable range of 3 feet 8 inches to 4 feet 4 inches (111.8 cm to 132.1 cm), the displayed value will change to Over Range or Under Range to prompt the operator to make an adjustment.

If a test was run with the patient "out of range" for more than 10% of the test, a message displays at the conclusion of the test, announcing the out-of-range status.

> ***Note*** • *An incorrect patient-to-bar distance can distort the data as the patient is calibrated to a 4 foot (121.9 cm) distance from the light bar.*

Use the following procedure to check the range. Repeat this procedure as often as needed during a test session.

To check the range:

1. Click on the **New Test** tab to access the **Test** mode.
2. Click on the **+** sign in front of a test procedure to display a complete list of individual protocols.
3. Select the desired test.
4. Position the patient in front of the light bar for testing.
5. Click **F6 Range** to display the **Range** dialog box and activate the **Range Sensor** on the light bar.
6. Click **OK** to close the range dialog box.

5.5 Electrodes

5.5.1 Single Use Electrodes

Detachable articles (such as electrodes or VNG face cushions) should be disposed of according to local regulations. The electrodes supplied for Chartr ENG are intended for single use. This is in order to prevent cross infection between patients.

5.5.2 Applying Electrodes

The Otometrics ICS ENG system is capable of simultaneously recording 2 or 4 channels of eye movement information depending upon the model being used. The channel designations are described below and relate to the placement of the electrodes shown in 5.5.2 ▶ 79.

Channel	Electrode cable connections
Horizontal both (HB)	red – blue
Vertical right (VR)	orange – white
Vertical left (VL)	green – brown
Horizontal right (HR)	red – black
Horizontal left (HL)	blue – black

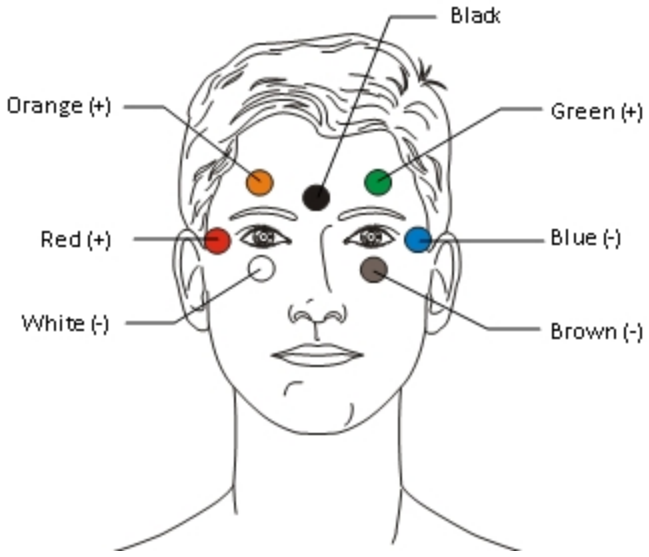


Fig. 60 Normal Electrode Placement (4 channels)

5.5.3 Electrode Test

ICS ENG systems measure the offset potential between a pair of electrodes. In the Electrode Test dialog box, a question mark displays next to all suspect electrodes, that is, they are part of a pair that tests out of the range of acceptable offset potentials.

The table at the bottom of the dialog box provides a continually updating status report of the offset values, in millivolts, of the four pairs of electrodes. Values exceeding ±19 millivolts are unacceptable.

To determine the exact site of the electrodes, look at the combinations with a question mark. For example, if the HB and the HR readings are high, check the right electrode.

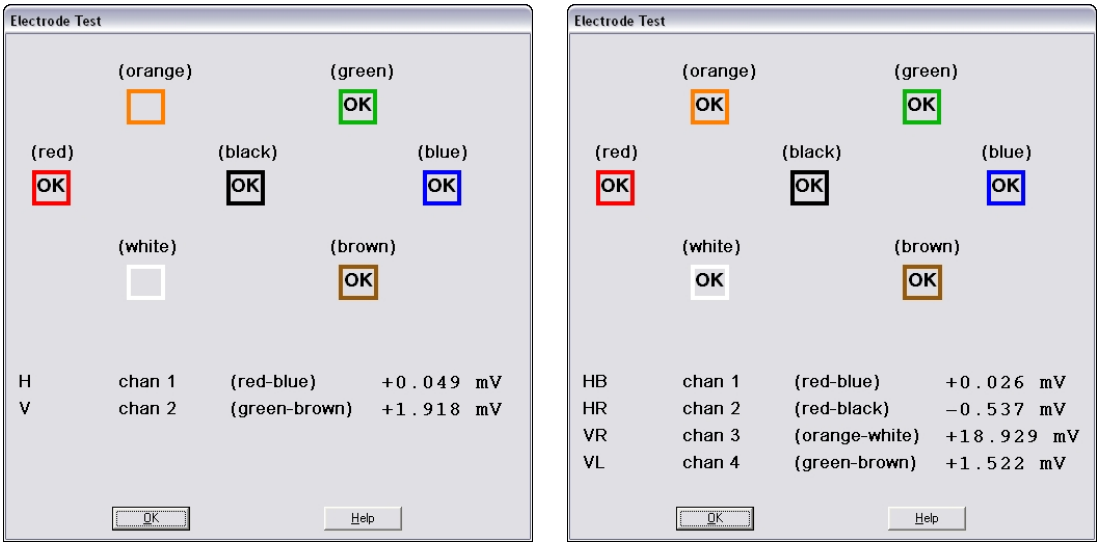


Fig. 61 Electrode Test Dialog Box (2-channel and 4-channel systems)

The millivolt readings are useful for monitoring drift. Rapid drift, more than 2.0 millivolts in 5 seconds, makes data collection difficult. The patient's eyes should be fixated when making electrode test readings.

The operator can set up to use 2-channel (up to 5 electrodes) or 4-channel (up to 7 electrodes) recordings. Unused channels are read as bad (a question mark) or as rapidly changing millivolt values. If only one vertical channel is used, it is important to connect to the green and brown (left eye) inputs on the electrode cable, as this is the vertical channel read by the software.

For the majority of recordings, horizontal both and vertical left eye channels are used.

5.5.4 Checking Electrodes

To test the electrodes:

1. Click the **New Test** tab to access the **Test** mode.
2. Select a test protocol.
3. Click **F7 Electrode Test** to display the **Electrode Test** dialog box.
4. Check the status of the electrode connections. Reapply any electrodes if indicated by a question mark.

5. Click **OK** to exit the **Electrode Test** dialog box when satisfied with the results.

5.6 VNG Mode

The ICS Chartr 200 VNG system uses video goggles, instead of electrodes, to obtain eye movement information. An additional feature of VNG is that during a test, optional video recordings may be taken for future reference. The patient's eyes can also be monitored in real time from the Video Eye Display or on the two monochrome monitors attached to the system.

5.6.1 Setting Up VNG

The VNG setup requirements for systems using ICS Chartr 200 are as follows.

> ***Note*** • *See Video Goggles ► 81 and Video Image Controls ► 85 for additional information.*

- Two optional 9 inch (23 cm) black and white monitors connect to the "Video output, left" and the "Video output, right" ports on the Chartr 200.
- An optional microphone connects to the "Audio, Input" port on the Chartr 200.
- VG-40 Video Goggles connect via a video cable to the "Video Goggles" port on the Chartr 200 hardware. The goggles have manual controls that are used to make all the adjustments needed to properly align the patient's eyes prior to a test session. The operator accesses the VNG Video Adjustments dialog box in the software to change the video brightness and contrast settings for each patient.

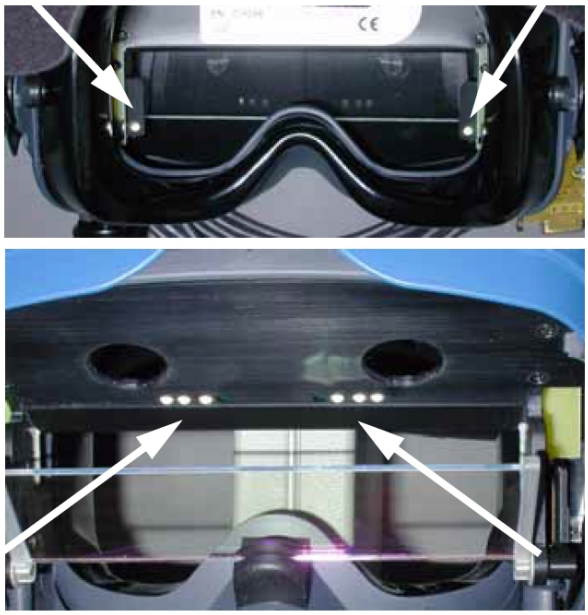
5.6.2 Video Goggles

The VNG video goggles are positioned on the patient as shown in 5.6.2.2 ► 82. The video goggles contain video camera lenses and mirrors. The video image displays on the monitor. Adjustments are done through the control knobs located on the video goggles and through the software. The operator views the adjustment process by looking at each eye on the video image that displays in the Video Adjustments dialog box (Fig. 63 ► 85) and optionally on the monochrome monitors.

5.6.2.1 How the Video Goggles function

The video goggles contain two infrared cameras. These are located to the left and right, above each eye.

Two infrared LEDs below the eyes, one on each side, and 6 LEDs above the eyes ensure proper lighting of each eye. See the positions below.



The infrared light makes video recording possible in complete darkness, even when the visor of the video goggles is closed.

Through a process of deflection by the infrared mirror, the video cameras record the eyes and transmit the video images to the video analyzer system for further processing.

5.6.2.2 Proper Positioning of the VG-40 Goggles on the Patient

Please follow these instructions to achieve quality data collection and reduce the risk of damage to the goggles.

> ***Caution*** • *The infrared mirror may be damaged if the video goggles are dropped. If the mirror in the goggles is cracked or broken, do not use the goggles. Please contact Otometrics for technical support.*

Consider having a supply of the following:

- Make-up remover – The crosshairs seek out the darkest area of the eye. Dark make-up, such as eyeliner and mascara, may provide a secondary dark area that will compete with the pupils and cause the crosshairs to jump between areas. This will result in noisy data. Have patients remove their makeup.
- White eyeliner pencil – See above. Have patients cover any permanent makeup, like tattooed eyeliner, with white eyeliner pencil.
- Eyelash curler – Thick, long eyelashes can obscure pupil movements, leading to noisy data and/or flat line responses. Curl eyelashes up.

To position the goggles:

1. Loosen the back and top head straps on the goggles.
2. Make sure the mirror is clean. If needed, clean with the VG-40 optical cleaning cloth.
3. Click on **Video Adjust** or press **F7** to monitor the placement onscreen.

4. Hold the goggles with one hand, taking the back head strap in the other hand. Take care not to touch the mirror. Place the goggles on the bridge of the patient's nose, ensuring the patient can still breathe.
5. Pull the back head strap over the back of the patient's head below the inion (bump on lower part of the back of the skull).
6. Move the goggles on the patient's head to center and level the pupils. Use the video adjust window to verify that the pupils are inside the boxes, as close to center as possible. Both pupils should be in the same horizontal plane.
7. Tighten the back strap until the goggles are snugly attached to the head. The goggles should not be painful, but you may see a red mark from the face cushion after removal. A snug goggles placement is necessary to ensure that the goggles do not slip during positional testing.
8. Straighten the top head strap and tighten it. Adjusting the top head strap can also assist in positioning the pupils in the box. The top head strap will raise and lower the goggles on the patient's face.
9. Fine-tuning can be performed by using the 3 knobs: **H** (horizontal), **F** (focus), **V** (vertical) on the goggles.

> ***Caution*** • *Tightening the knobs to the maximum position may cause damage to the adjustment pieces holding the mirror. If the pupils are out of the video adjust box, physically move the goggles on the patient's head and then fine tune with the knobs if needed.*

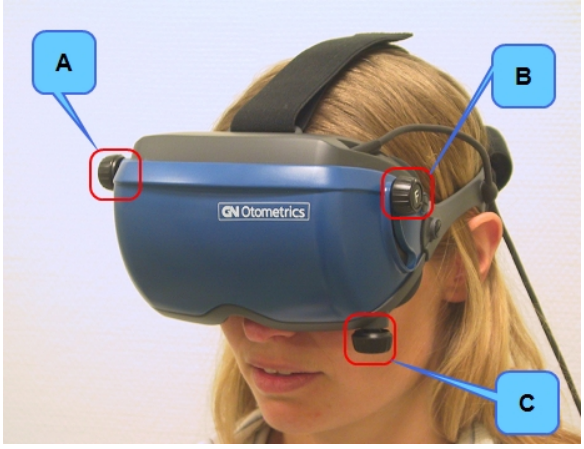


Fig. 62 VNG Video Goggles

A. Horizontal
B. Focus
C. Vertical

Horizontal knob
Adjusts the distance between the patient's eyes. The horizontal distance may need to be adjusted if the patient has wide-set or close-set eyes.

Focus knob
Adjusts the distance between the cameras and the patient's pupils. The focus may need to be adjusted if the patient has deep-set or protruding eyes.

Vertical knob

Adjusts the camera up and down. The vertical distance is the most common adjustment to fine-tune the placement of the pupil in the box.

10. Click on **Auto Adjust** in the video adjust screen. Manually adjust threshold, brightness, and contrast, if needed, to improve the quality of the tracking. The pupil should be the only area covered in blue.

> ***Note*** • *If there is a lot of light in the room, do the auto and manual adjust with the goggle cover closed.*

11. Ask the patient to move his/her eyes side to side, up and down. Make sure the crosshairs follow the pupils with as little jitter as possible.

5.6.3 Video Image Controls

For ICS Chartr 200 VNG to work properly, the mirrors and video camera lenses in the goggles must be properly aligned with the patient's eyes, and the images must be focused. In the Video Adjustments dialog box, the patient's eyes are properly aligned in VNG when both eye images are in the square region of interest and focused as the patient looks straight ahead at the center of the light bar positioned at 4 feet (1.2 m).

All video adjustments are viewed from the Right Eye and Left Eye viewing areas on the Video Adjustments dialog box within the application. This dialog box, which is active when **F7 Video Adjust** is selected, provides the operator with the ability to independently adjust and fine-tune the displayed image and settings for each eye.

VNG provides two types of video adjustment controls:

- Manual controls located on the video goggles allow the operator to make sure both eye images display, center both pupils in the region of interest, and focus the eye images.
- Software controls located on the Video Adjustments dialog box allow the operator to fine tune the video image for each eye.

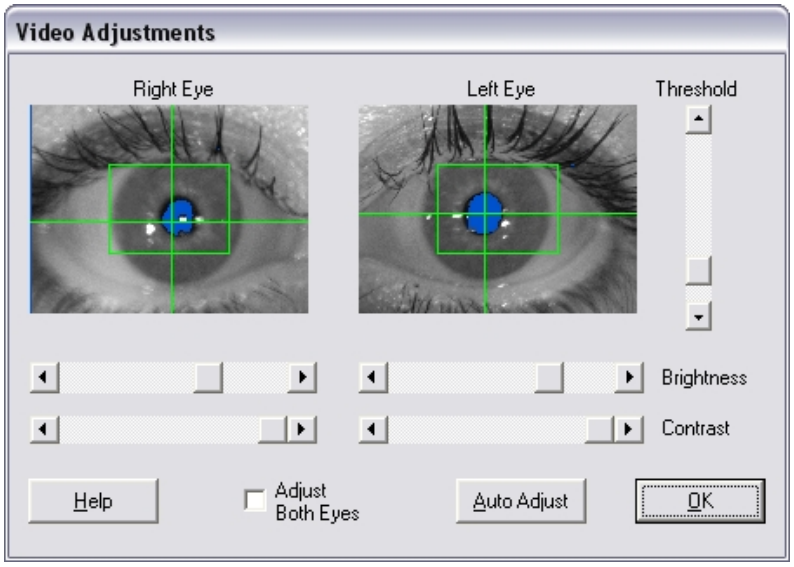


Fig. 63 Video Adjustments Dialog Box

To display the Video Adjustments dialog box, access the New Test mode and press **F7 Video Adjust**.

Right Eye	Video image of the right eye.
Left Eye	Video image of the left eye.
Threshold	Slide the control to fine tune the threshold setting for both eyes. Slowly move the threshold slider until the on-screen color of only the pupil area of each eye is blue.
Brightness (right and left eyes)	Slide each control to fine tune the on-screen image brightness for the right and left eyes.

Contrast (right and left eyes)	Slide the controls to fine tune the on-screen image contrast for the right and left eyes.
Adjust Both Eyes	Check this option to change the brightness or contrast of the eye images in tandem. Do not select this option if you want to adjust each eye separately.
Auto Adjust	Click to automatically adjust the system to track the pupils by moving the threshold, brightness, and contrast controls.
OK	Accept the video adjustment settings and exit the dialog box.
Help	Opens this User Manual.

5.6.4 Video Adjustments for Monocular Testing

Adjusting the video image in monocular VNG systems using the Video Adjustments dialog box is similar to VNG systems with these exceptions:

- The Adjust Both Eyes checkbox is not available.
- Only the test eye video displays. The display area for the untested eye is gray.
- The slider controls for the untested eye are disabled.

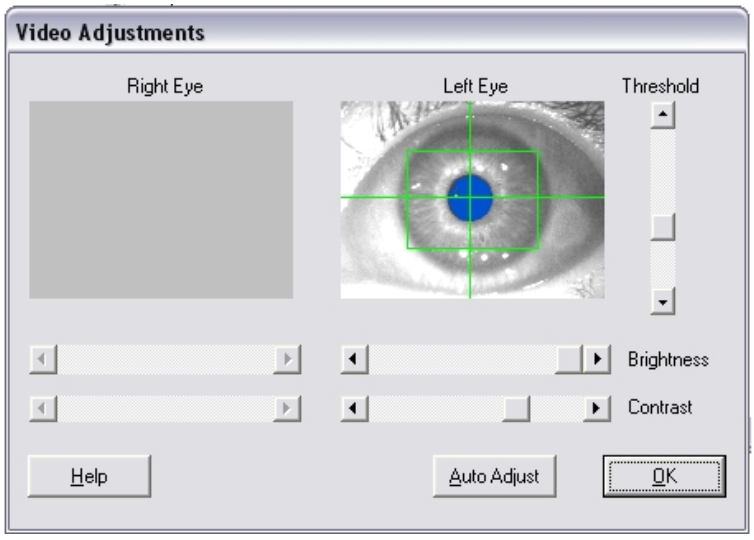


Fig. 64 Video Adjustments Dialog, Monocular VNG Systems

5.6.5 Goggles Cleaning and Disinfection

Proper care and maintenance of the video goggles involves disinfecting the goggle parts that make contact with the patient's skin and cleaning the goggle components. Cleaning and disinfecting should be done before placing the goggles on the patient.

> ***Note*** • *Follow all of the cleaning procedures in this section to avoid damaging the goggles.*

- **Face cushion**
  Clean before placing the goggles on the next patient.

  To clean:

  1. Use a pre-moistened non-alcohol based pad (e.g., AudioWipes) or apply the solution to a soft cloth.
  2. Wipe the face cushion, and all areas of the goggles that come in contact with the patient, gently with the pad or cloth until clean. This is done to remove dirt and disinfect the goggles.
  3. Dispose of the pad or cloth properly after each use.

  > ***Note*** • *The face cushion of the VG-40 goggles can be replaced in the field. This should be done every 6 months or anytime the face cushion shows significant wear.*

- **Dichroic mirror surfaces**
  Improper cleaning may scratch the mirror surfaces.

  To clean:

  1. Wipe the surface gently with the cloth provided with the goggles using a rotary motion until the surface is clean.
  2. Repeat step 1 for the other side of the mirror.

- **Video camera lenses**
  The camera lenses rarely require cleaning since they are protected within the goggle housing. Never dry-wipe an optical surface as the coating can be easily scratched if improperly cleaned.

  To clean:

  1. Place a drop of lens cleaning solution on a cotton swab. Avoid using excessive amounts of the solution; it can get between the lens components.
  2. Wipe the surface gently with the cotton swab using a rotary motion until the surface is clean.

  > ***Note*** • *Lens cleaning solution is available at camera/photography stores.*

- **Goggles housing**
  The housing is made of molded PVC material. Never spray or immerse the goggles components with the cleaning solutions. This could contaminate the electronics and/or optics.

  To clean:

  1. Moisten a cloth with a mild detergent and water solution until damp.
  2. Wipe the soiled surfaces gently with the damp cloth until clean.
  3. Wipe the goggles with a clean damp cloth moistened with plain water.
  4. Dry the goggles using a dry cloth.

5.6.6 Replacing the Head Strap

The head strap has a Velcro closure. Open this to pull the strap out of the eyelets on top of the goggle and at the earpieces. Reverse the process to insert the new head strap.

5.7 Calibrating a Patient

The sine wave calibration used by ICS Chartr 200 VNG is an almost completely automated process. In real-time, while a patient follows a light stimulus, the system automatically adjusts the gain and offset of the signal being calibrated in order to match that of the stimulus.

The calibration signal is a light target moving in a sinusoidal pattern. Calibration occurs automatically immediately after pressing **F12 Start**. In this stage of the calibration, the program adjusts the gain and offset of the eye signal to match the target. Press **F7 Center** to center the waveform during a calibration.

When there is a good match between the amplitudes of the eye and target traces for a full cycle, press or click **F12 Accept** to accept the calibration. When **F12 Accept** is pressed, an 'A' event marker is automatically placed into the data stream and is seen on the screen. Continue running the calibration for two to three more cycles in order to verify the accepted calibration. Press **F12 Stop** to save the current channel's calibration and proceed to the next channel (or complete the calibration if all channels are calibrated).

Before performing a calibration, consider the following:

- The option to calibrate is only available at the start of a new test and not during data collection.
- Two stimulus speeds are available, fast (0.30 Hz) and slow (0.20 Hz). Fast is the default setting. The operator may change the speed during calibration, however, the calibration stimulus speed will only change at a peak or trough of the stimulus.
- There are two parts to the calibration process; a calibration stage during which the system adjusts the gain based on the signal from the eyes, followed by a verification stage during which the system displays the gain for a particular calibration. Verification is the responsibility of the operator.
- Each time the stimulus crosses zero-degrees on a downward swing, the system adjusts the gain and offset. The system monitors the stimulus peak-to-peak and the patient's peak-to-peak amplitudes. These amplitudes are used to automatically adjust the gain of the patient's eye movement to match the stimulus. The baseline offset is based on the center of the patient's peak-to-peak amplitude.
- When the operator presses F12 Accept, an Event Marker is immediately placed in the recording and calibration is suspended, although data collection continues.
- Once a calibration is accepted, a software comparison between the target and eye positions is made. If the accepted amplitude of the patient's peak-to-peak eye signal is more than 10% different from the target's peak-to-peak amplitude, the calibration technical comment dialog box (5.8 ► 90) will display and prompt for a recalibration or adjustment of the current calibration.

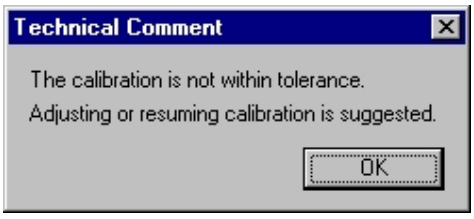


Fig. 65 Calibration Technical Comment

- **F12 Stop**, stops data collection. If the calibration is saved, the last 10 seconds are saved to document calibration validity. The Event Marker marks the acceptance point. If **F12 Stop** occurs more than 10 seconds after **F12 Accept**, the event marker and the actual accepted cycle will not be displayed in calibration or calibration review.

Note • Monocular VNG Calibration: *Calibration in monocular VNG systems is the same as in VNG systems except that only one eye can be calibrated at a time. Calibrating for one eye overwrites the calibration for the other eye. Thus, you must recalibrate every time you change the test eye. The system will prompt to you calibrate if you attempt to run a test using an eye that has not been calibrated.*

Use the following procedure to calibrate a patient prior to a test session.

To calibrate a patient:

1. Select the **New Test** tab to access the test mode.
2. Select a specific test from the list of tests.
3. Make sure the light bar is positioned properly (horizontally or vertically).
4. Position the patient to face the bar at a distance of 4 feet (1.2 m) from the bar.
5. Press **F5 Calibrate** to access the calibration mode.

Note • *If using monocular systems, click* ***F9 Switch Eye*** *to select the eye to be tested the eye that is grayed out is the currently selected.*

6. Instruct the patient to follow the dot of light on the bar without moving his/her head.
7. Press **F12 Start** to begin the calibration. The system will move the light bar target. Based on the associated eye movements, the system will adjust position and gain.
8. During the calibration, press **F5 Faster/Slower** to adjust the speed, if needed. Press **F7 Center** (only on ENG systems) to center the waveform during calibration.
9. Press **F12 Accept** to place an event marker at the point of acceptance and lock in gain. Calibration gain is based on the full cycle immediately preceding the event marker.
10. Continue running the calibration for a few more cycles to verify an acceptable calibration.
11. Press **F12 Stop** to end the verification. The system reviews the calibration and if the accepted eye signal is out of the acceptable tolerance range, a technical comment displays suggesting a recalibration or adjustment of the accepted calibration.
12. Press **F4 Resume** if the calibration is unacceptable and to continue the calibration process. Repeat steps 9 - 11.
13. Press **F5 Enlarge** and **F6 Shrink** to adjust the calibration. Enlarge will increase the size of the waveform and Shrink will reduce it. Press **F7 Up** and **F8 Down** to move the wave up or down. Press **F10 Overlap** and **F11 Spread** to overlap and spread the waves.

Note • *The calibration gain and offset displays in the Information Area of the Main Window (ENG only).*

Note • *Use the default calibration if a patient cannot be calibrated. Press* ***F3 Default*** *to set the sensitivity at 150 microvolts per 10 degrees for the horizontal both channel. Horizontal individual left and right channels are set at 75 microvolts per 10 degrees, and vertical left and right channels are set at 100 microvolts per 10 degrees.*

14. Press **F12 Save** when you are satisfied with the calibration to save the results of the calibration and prepare for calibration of the next channel.

> ***Note*** • *When all channels are calibrated, press F12 Save to return to the test mode.*

15. Press **F9 Done** to return to the test mode immediately.
16. Press **F10 Next Channel** or **F11 Previous Channel** to calibrate the next or previous channel.

5.8 Conducting a Test/Collecting Data

Before you begin data collection, consider the following:

- You may stop and start data collection at any time during the data collection process.
- Suggested minimum times in order to have enough data to analyze are 1 minute 30 seconds for Saccade tests and 2 minutes for Tracking tests. Run other tests for 20 seconds or longer, if needed.

> ***Note*** • *The tests have a maximum time limit and, when this limit is reached, collection stops. Saccade and Tracking tests can be recorded for up to 200 seconds; all other tests for up to 400 seconds.*

- VNG/ENG Both Eyes and Monocular VNG protocols collect two channels—Horizontal (H) and Vertical (V). VNG/ENG (4 channel) Individual Eye protocols collect four signals—Horizontal Right (HR), Horizontal Left (HL), Vertical Right (VR), and Vertical Left (VL).
- Start recordings for caloric tests at the onset of stimulation. This allows observation of spontaneous nystagmus during stimulation. The system adjusts the temperature of the irrigator. If an ICS caloric stimulator is properly connected to the ICS Chartr 200 PC, starting the test from the caloric handset or footswitch will initiate both units simultaneously. (This function is also possible for non-caloric tests as long as the power to the caloric stimulator is on.)

  ENG Note: After a test is started, press the handset or footswitch to remotely center a tracing.

  VNG Note: After a test is started, press the handset, footswitch, or remote control to remotely start or restart the video recording. You may also use the remote control to center a tracing.

- Selecting a caloric test from the New Test tab automatically selects the correct temperature (warm or cool) on the caloric stimulator.
- An Interpretation Assistant for reviewing ICS static positional and caloric VNG/ENG tests is available in VNG and ENG. All related tests to be interpreted (LW/RW/LC/RC calorics, or static positionals) must be performed during the same test session. See Interpretation Assistant ► 112 for information on using this feature. See Test Menu ► 35 for information on moving a test from one session to another.

- If a system has the range sensor installed, it is activated during tests that use the light bar. The sensor indicates whether the patient is located at the 4-foot (1.2 m) distance during testing. If a test was run with the patient "out-of-range" for more than 10% of the test, a technical comment similar to the following displays at the end of the test. The ranging function is activated or deactivated through the System Options, Operator Settings/Test Battery tab dialog box.

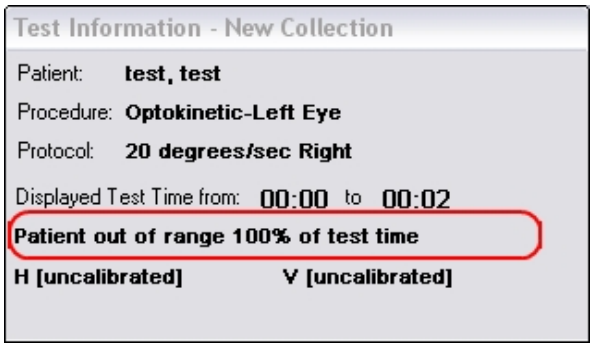


Fig. 66 Ranger Technical Comment

- Although the light bar is normally turned off between tests, a fixation light option is available through the System Options, Operator Settings/Test Battery tab dialog box. If the fixation light option is selected, one light in the middle of the light bar is left on between tests.
- During testing, the Pause and Resume options are available. Resume is also available if data collection was stopped. Waveforms can be adjusted (Spread/Overlap, Hide/Show, move handles) during data collection.
- Multiple tests may be run during a patient test session. The first test run is called the primary; the others are secondaries. The primary test is listed in bold text in the Review Tab. To make a secondary test a primary test (the current primary becomes a secondary), select Test, Assign Primary option on the Menu bar. Only primary test results print when the Print Report option is used. In addition, the primary test for calorics make up the four tests in the PODS display.
- To reject recordings, press **F9 Cancel**. Do not press **F12 Save**; a recording may not be deleted once it is saved.
- After a test is saved, **F12 Save**, VNG advances to the next protocol.

5.8.1 Selecting the Test Eye

When performing a monocular VNG system, select the test eye using the R (right) or L (left) eye button on the toolbar or the **F9 Switch Eye** function key.

5.8.1.1 Toolbar Eye Selection Buttons

When using the toolbar button, the depressed toolbar button represents the eye currently selected for testing.

Fig. 67 Eye Selection Toolbar Buttons, Right Eye Selected

The test eye cannot be changed (clicking on the toolbar will have no effect and the depressed button will not change):

- During calibration

- When data is being collected
- After calibration/collection but before the collected data is saved

5.8.1.2 F9 Switch Eye Function Key

When the F9 function key is labeled “Switch Eye”, press the F9 key on the keyboard or click the F9 function key on the screen to change the test eye. The corresponding button on the toolbar will be depressed to indicate the selected eye.

5.8.2 Conduct a Test and Collect Data

Use this procedure to conduct a test and collect data:

1. Select the **New Test** tab.
2. Click on the **+** sign in front of a test procedure to display a list of test protocols. Click on a specific protocol to select it.
3. Click **F12 Start** to access the test mode for the selected test.
4. During data collection, the operator can:
   A. Press **F5 Center**, if necessary, to center the tracing.
   B. Press **F2 Event** to place an event arrow labeled “E” on the tracing.
   C. Press **F3 Eyes Open** to place an “eyes open” (EO) label on the tracing.
   D. Press **F4 Vision Denied** to mark an “eyes open in the dark” (VD) label on the tracing.
   E. Press **F11 Fixation Light** (currently available only during caloric tests) to turn on the Fixation Light and place a “fixation index” (FI) label on the tracing (available during caloric tests when using the VG-40 goggles).

      Note 1: You may also use the Fixation button on the remote control (ICS Chartr 200 systems) to place a fixation index (FI) label on the tracing.

      Note 2: This fixation light function is only enabled during caloric tests when using the VG-40 goggles and an ICS Chartr 200 system.

   F. Press **F7 Hide Wave** or **F8 Show Wave** to hide or show the selected wave during the test.
   G. Press **F10 Overlap Waves** or **F11 Spread Waves** to overlap or spread the waves. Click on a waveform handle and hold the left mouse button down to drag a waveform up or down directly on the tracing.
   H. Press **F9 Cancel** to stop data collection or when stopped, exit the test mode without saving the test data.
   I. Press **F12 Stop** to stop data collection and display the tracing.
5. Press **F12 Save** to save the test data and advance to the next protocol.
6. Repeat Steps 3 through 5 of this procedure for each protocol test in the Test Battery.

5.9 Recording a Video Image

ICS VNG records eye movement video for each test and saves the recording with the patient record. A small camera icon  next to a patient name in the Patient Selection dialog or protocol in the Review tab indicates the existence of a video recording.

Video recording may be started at any time during data collection. The video controls are in the Video Recording Control dialog box.

To record an eye movement video:

1. Click the **New Test** tab and select a protocol.
2. Click **F12 Start** to begin data collection and display the **Video Recording Control** dialog box.

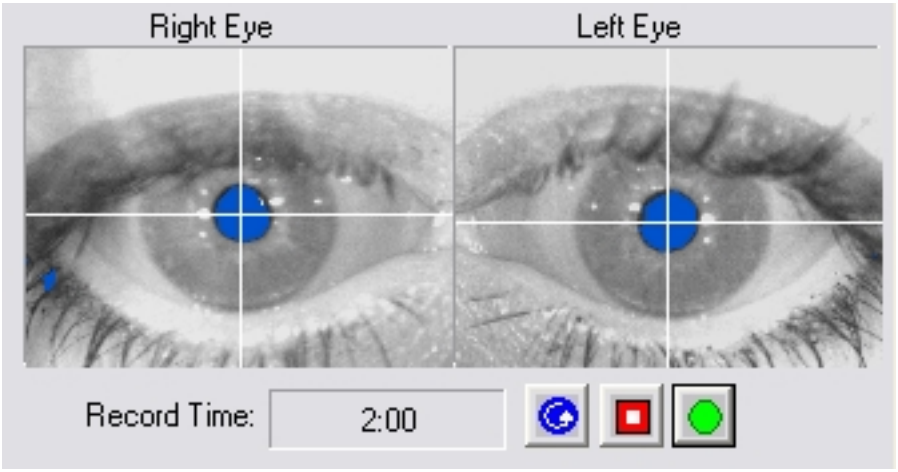


Fig. 68 Video Recording Control Dialog Box, Both Eyes

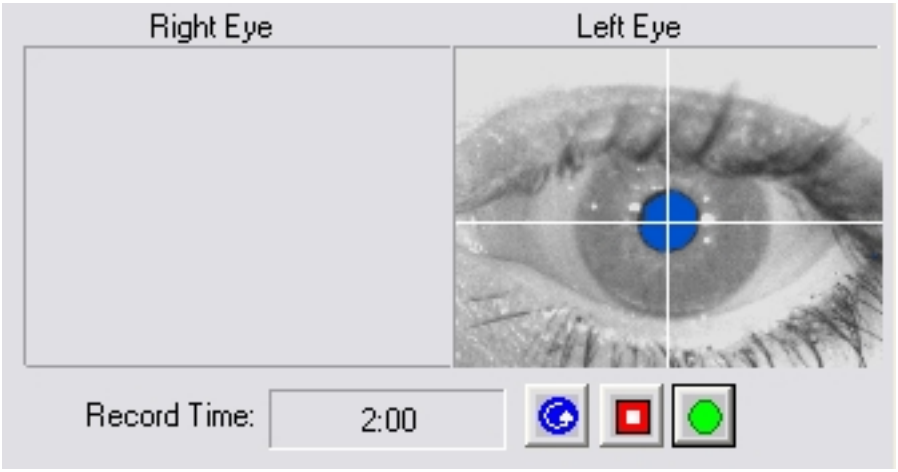


Fig. 69 Video Recording Control Dialog Box, One Eye

3. Click the **Record**  button to start the video recording option. The system puts an event marker (V) on the tracing at the point video recording begins. Note the available recording time at the bottom of the Video Recording Control dialog box.

> ***Note*** • *You may also use the optional footswitch to start or restart a video recording.*

4. Monitor video collection activity and the right and left eye movement.
   A. Monitor the remaining recording time.
   B. Click the **Restart** button to discard any recorded video and to begin video recording.
   C. Click the **Stop** button to stop recording video.
   D. Click **Cancel Test** to stop the recording and discard any recorded video and tracings.

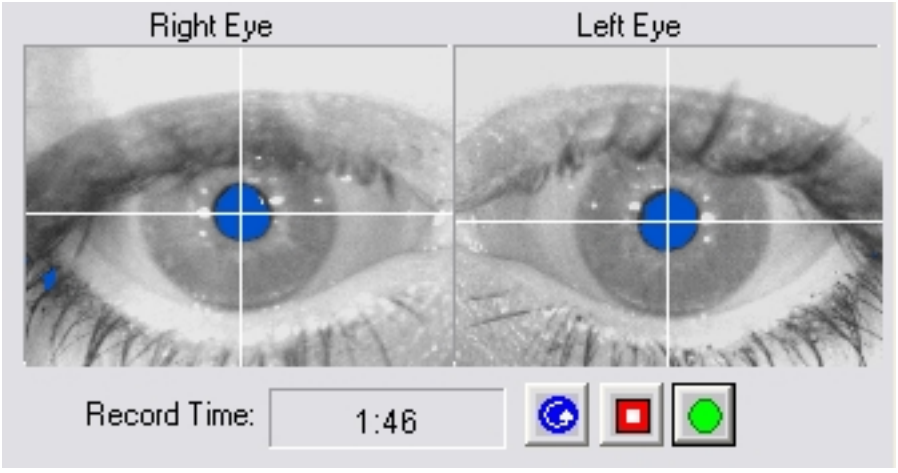


Fig. 70 Video Recording Control Dialog Box (Recording)

5. Click **Stop Video**.
6. Click **F12 Save** to save the collected data and video recording.

To open the video playback dialog and play a video:

1. Access the **Review** tab and select or double-click the desired test.
2. Select **Video**, **Play** to start the video.

5.10 Using the Footswitch

Systems with a footswitch provide the operator with an alternate way to initiate some specific actions without using a mouse and keyboard.

> ***Note*** • *If the footswitch is connected to the caloric stimulator, the caloric stimulator must be turned on prior to using the footswitch.*

5.10.1 Footswitch Operations

Use the footswitch to initiate these specific actions:

- Press the footswitch to start a test. If the test involves caloric stimulation, pressing the footswitch will start both the test and the caloric stimulator. Note that the button on the handset of the caloric stimulator has the same function as the footswitch.
- During collection, press the footswitch again to center the waveform (VNG/ENG) or start the video (VNG).

> ***Note*** • *The VNG option of centering waveforms or starting the video is set up in the System Options.*

5.10.2 Record Video Using the Footswitch

The footswitch (or irrigator hand switch) serves two different functions in VNG. It may be used to start a test, or to start or restart video recording.

Once a test is in progress, VNG associates the footswitch with the Record Video / Restart Video button in the Video Recording Control Dialog. Pressing the footswitch or the irrigator hand switch during a VNG test will cause video recording to start or restart.

The footswitch cannot be used to stop or cancel video recording. Recording will stop automatically after the maximum recording time has elapsed, or you may press Stop Video or Cancel in the Video Recording Control dialog.

To conduct a test and record video:

1. Select the **New Test** tab in the Main Window.
2. Click on the **+** sign in front of a procedure to display a list of test protocols and click on a protocol to select it.
3. Click **F12 Start** or press the footswitch to begin the selected protocol.
4. Press the foot switch to initiate video recording.

> ***Note*** • *If you wish to replace recorded video with a different segment later in the test, press the foot switch to restart video recording.*

5. Press **F12 Save** to save the test data and any recorded video.

5.11 Using the Remote Control

A wireless remote control can be used to initiate some specific video actions without using a mouse and keyboard.

Fig. 71 Remote Control with Cradle

Use the remote control to initiate these actions:

- Start, pause, restart, and stop a video recording.
- Turn the fixation light on and off (caloric tests only).
- Start and stop data collection.
- Save test results.
- Calibrate or center a waveform.
- Accept and save test results.
- Access the New Test and Review tabs on the Main Window.
- Move from one test to another in the New Test and Review tabs.
- Check the electrode impedance and video and auto adjust options.
- Place Event (E), Eyes Open (EO), and Vision Denied (VD) markers on the waveform.

To record video using the remote control:

1. Start a collection in VNG.
2. Press the top Start button on the remote to begin video recording.

> ***Note*** • *While a video is recording, press the Start button again to restart the video recording.*

3. Press the top Stop button on the remote to stop a video recording while in progress.

When not using the remote control, place it in the cradle. See Setting up the ICS Chartr 200 Hardware ► 220 for more information.

6 Reviewing/Analyzing Test Results

This section provides information on how to review and analyze test results.

6.1 Overview

Sophisticated review and analysis of tracings is part of the ICS Chartr 200 VNG/ENG system. This section provides information on the review and analysis of tests conducted during a session.

All of the tests conducted and saved during a patient test session are available for review and analysis in the Review/Analysis mode. In addition to test results, all calibrations are saved and are available for review.

Test results may be reviewed immediately after the test is conducted and saved or recalled at a later time for review and analysis.

During review and analysis, the operator is able to compute the slow phase velocity of nystagmus, analyze saccades, and analyze tracking test results.

> ***Note*** • *All analyses are operator specific allowing for multiple opinions and interpretations of the same test results. Refer to* *Establishing and Maintaining Records ► 43* *for instructions on how to change the active operator to obtain a different view of the test results.*

6.2 Review Tab

The Review tab contains a list of all the tests for this patient in the database, listed by Physician's Order date and Session date. The organization is similar to the directory in the New Test tab.

***Note** • Specific tests consist of a procedure (e.g., Saccade, Caloric, etc.) and a protocol (e.g. Right Ear/Cool).*

***Note** • For additional information see New Test Tab ► 75, and Operator Settings / Test Battery Tab ► 60.*

The + sign in front of a listing indicates that the listing can be expanded to show the individual test protocols. A - sign indicates the list is completely expanded.

Click directly on a + sign to show the name of each protocol within the procedure or session. Click on the - sign to hide the individual protocols back to the procedure or session level.

If multiple tests of the same protocol were conducted during a test session, each test and the time the test was conducted displays under the session.

Bold text indicates that a test is designated as primary. Only the primary test results will be included in the patient report.

Fig. 72 Review Tab

6.3 Working with Multiple Test Results

If multiple tests are run during a test session, one set of test protocol results must be designated as primary. The primary test results are included in the patient report. For caloric protocols, the primary test also determines which test is used to analyze caloric test results.

The system automatically assigns the primary status, however, the operator may change the primary assignment of a test result at any time.

To change the status of a test protocol to primary:

1. Open an existing patient record and access the **Main Window**.
2. Select the **Review** tab to display a list of procedures/protocols.
3. Expand the procedure list to display the desired protocol and click on the protocol to select it.
4. Select **Test**, **Assign Primary** from the Menu Bar. The assigned protocol displays in bold type.

> ***Note*** • *This menu item is only applicable when a secondary (non-bolded) protocol is selected.*

6.4 Working with Waveforms

During a review/analysis session, a waveform tracing for each tested channel displays in the Main Window Workspace.

6.4.1 Waveform Handles

Each waveform has a handle located at the far right side of the waveform that can be manipulated by the operator.

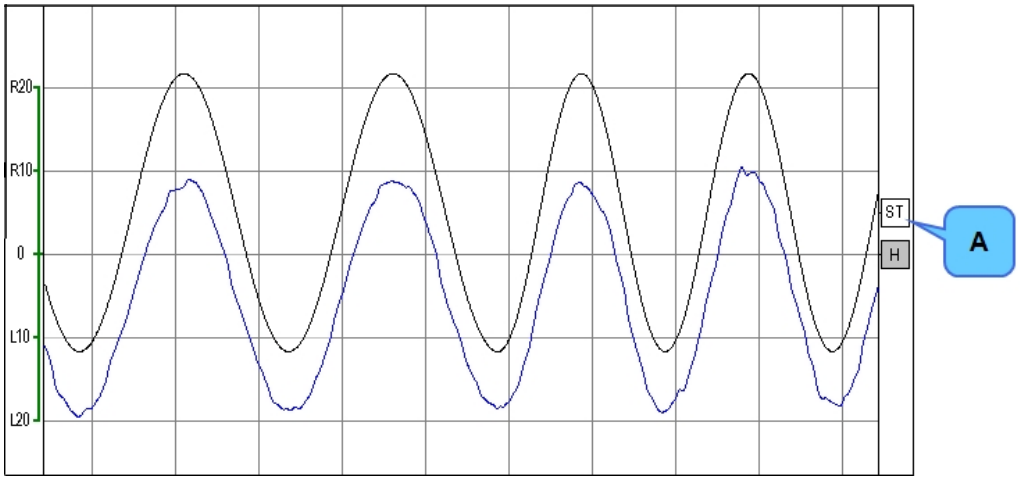


Fig. 73 Waveform Handles

A. Selected waveform handle

The handles are square boxes with letter designations indicating the channel. The selected waveform handle is a colored box.

To move waveforms:

- Use the mouse to select a waveform handle and drag the waveform to the desired location. In Review mode, the ↑ ↓ arrow keys may be used to move the active waveform up or down.

- Use the Function Keys, as indicated to overlap, spread, show, or hide waveforms or from the Menu Bar select Waveform, Overlap, Spread, Hide Waveform, or Show Waveform.
- Press Ctrl + O or Ctrl + S to overlap and spread the displayed waveforms.

6.4.2 Waveform Text

During a review/analysis session, the operator may write notes specific to a waveform in the Edit WaveText dialog box.

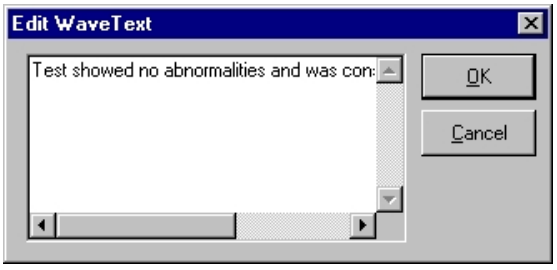


Fig. 74 Edit WaveText Dialog Box

Waveform notes can be viewed and edited by operators, and are included in patient reports.

To create or edit waveform notes in the review mode:

1. Double-click on the selected waveform handle or select **Waveform**, **Wave Text** to display the edit **Edit WaveText** dialog box.
2. Type directly in the **Text** box.
3. Click **OK** to save the waveform text and exit the dialog box.

> ***Note*** • *An operator may type up to 2 lines of text in the Text Area (just below the Test/Review Workspace) on the Main Window. See* *VNG Main Window ► 26.*

6.4.3 Printing Waveforms

During a Review/Analysis work session, the operator may print a waveform, as needed. Select File, Print Waveform to send the current waveform information directly to the printer.

6.5 Reviewing Test Results

The results for all tests can be reviewed before and after the test results are analyzed. Select the Review Tab in the Main Window to access the Review mode.

In the Review mode:

- The operator may view the entire tracing, select and manipulate waveforms, access the calibration results, and begin an analysis session.
- If the patient record is changed or closed, or if another test is selected for review, ICS VNG automatically saves the current position of the waveforms in time. It also saves the position and the configuration of the waveforms, hidden or shown, and the position of the waveform handle.
- A filtering option, **F7 Filter/Unfilter**, is available. During data collection, displays show unfiltered data. If the **Automatic Filter** option is selected in the **System Options**, **Operator Settings / Test Battery** tab dialog box, the system

displays filtered data as the Review mode default. Using F7, the operator can toggle between filtered and unfiltered views. This function is only for review of the unanalyzed tracings as the analysis incorporates automatic filtering that is not under the control of the operator.

Note • *Procedures for analyzing the major test types: slow phase velocity, saccades, and tracking are found later in this section.*

Physician Order Date

The Physician's Order date is the date assigned by the system the first time a patient is tested. Multiple tests sessions may be recorded under one Physician Order date. The Physician's Order date will remain in effect for a patient record until the Operator sets up a new Physician Order. Technically, a new Physician Order should be started for a patient record each time that patient is referred for testing.

Monocular VNG Review Test Tab

When the Review Test tab is active, the review workspace/waveform display will be labeled with the eye that was used to collect the data for the selected test. Each protocol in the review test tab is labeled with the eye that was selected when the test was run.

To review test results:

1. Click the **Review** tab to access the **Review Test**.
2. Select a **Physician Order** date then select a **Session** under that **Physician Order** .
3. Click the **+** sign in front of a procedure to display the test protocols under that procedure.
4. Select a protocol to display the test results.
5. Once displayed, the operator may:
   A. Use the waveform handles to move waveforms or create/edit waveform text.
   B. Use the scroll bars or left and right arrow keys to move through the displayed waveform.
   C. Use the available function keys to access and review the calibration, access the next or previous test results, begin an analysis session, etc.

6.6 Reviewing Calibrations

When a test is saved, the current calibration is saved with that test. From the Review mode, while reviewing a test, the saved calibration may also be reviewed. The calibration is signal specific. The calibration for the “active” signal is reviewed.

To review a calibration:

1. Access the Review tab and select a specific protocol to display the test results for that protocol.
2. Press **F8 Review Calib.** to show the calibration that was active at the beginning of the selected test.

Each calibration record contains the last 10 seconds of the calibration. The age of the calibration displays in the Information Area. The age is calculated from the end of the calibration process to the time the displayed test was saved. An Event marker (A) displays at the point that the operator pressed **F12 Accept** during the calibration session.

Note • *See Calibrating a Patient ► 88 for additional information on conducting a calibration session.*

6.6.1 Calibration Review, Uncalibrated

Uncalibrated eye movements, or where default calibration has been applied, are indicated by a flat eye movement signal and a saccade stimulus as shown in Fig. 75 ► 103.

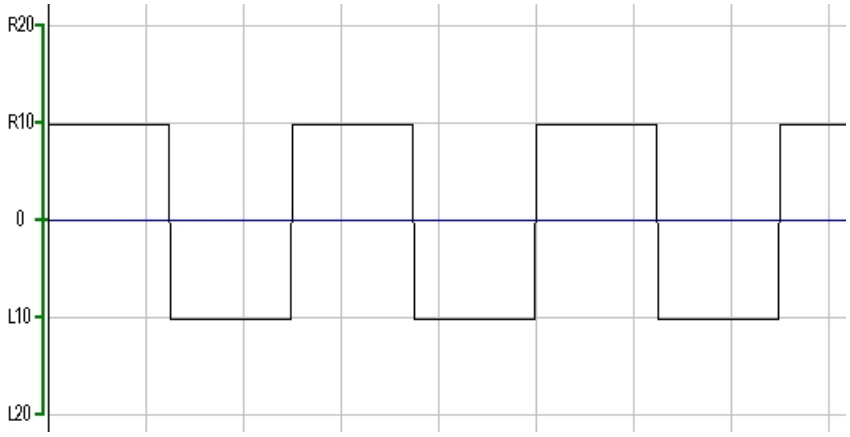


Fig. 75 Uncalibrated Display

In the Test Review mode, the calibration status of the active signal is shown in the Information Area. If uncalibrated, it reads e.g., Active Signal: H [uncalibrated].

In the Calibration Review mode, the calibration status is displayed in the Workspace title. If uncalibrated, the title reads e.g., Calibration Review - H [default].

6.6.2 Calibration Review, Calibrated

During a test review session, the calibration for the active signal may be reviewed and modified. Use **F5 Enlarge** and **F6 Shrink** to increase or decrease the gain of the signal in relation to the target. Use **F7 Up** and **F8 Down** to move the waveform in relation to the target. Saving these changes will only affect the associated test.

> ***Note*** • *Modifying a calibration (using the enlarge and shrink options) can be done when the operator is not able to recollect the calibration and wants to analyze saccades or tracking. If a calibration is modified, it will only be for that test. It is best to recollect calibration and test data if a faulty calibration has occurred.*

Select **F3 Original Calib.** to view the calibration signal prior to adjustment. A calibrated signal display is similar to that shown in Fig. 76 ► 104.

An Event marker (A) is placed at the point on the tracing at which the operator pressed **F12 Accept** during a calibration session.

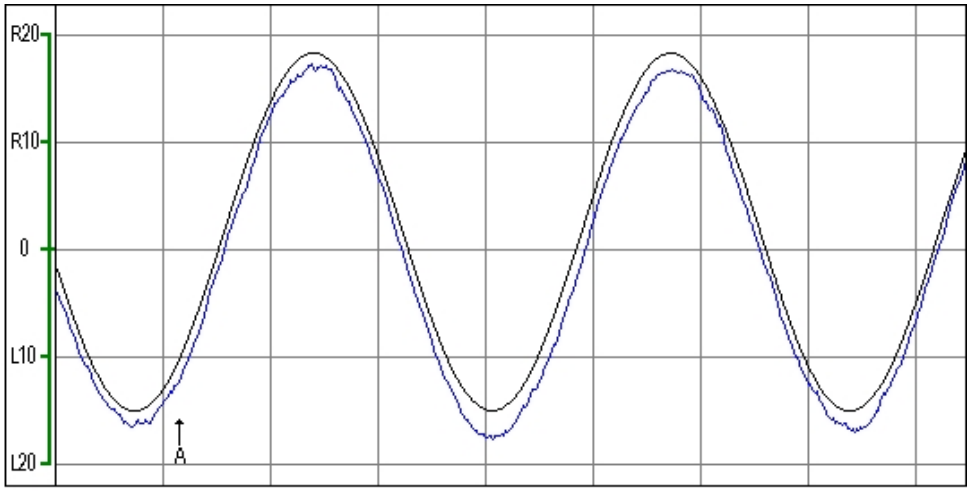


Fig. 76 Calibrated Display

In the Test Review mode, the calibration status of the active signal is shown in the Information Area, e.g., Active Signal: H.

In the Calibration Review mode, the Workspace title says, e.g., Calibration Review - H and the Information Area shows the actual calibration values.

Calibration age is the length of time elapsed between the calibration and the time at which the displayed test was saved.

6.6.3 Printing a Calibration

A Print Calibration option is available only while reviewing a calibration. This option generates a single, printed page that contains the selected calibrated waveform along with the Gain, Offset, and Calibration Age information.

To use the Print Calibration option, select **File, Print Calibration** from the Menu Bar.

***Note** • This information also displays in the Information Area at the lower-left side of the Main Window when patient data is displayed.*

6.7 Analyzing Slow Phase Velocity Measurements

The purpose of this analysis procedure is to provide a quantified record of the strength of nystagmus. A 140-second section of the tracing is identified and, for each second, the slow phase velocity of the individual beats of nystagmus are measured. Once measured, each velocity is displayed graphically within a 140-second time frame to show the time course of the response.

Slow phase velocity (SPV) displays adapt to the size of the waveform as follows:

- The scaling measurement used in the Slow Phase Velocity window varies from 0 to 20, 0 to 40, 0 to 80, or 0 to 160 depending on the size of the largest SPV beat.
- If the system detects an SPV beat that is greater than 80 deg/sec the waveform display "zooms". In the zoom view, the grid that usually represents 1 second, now represents 500 ms. This change is indicated in the display window.

There are several ways to select a specific beat on the waveform display and place it directly under the vertical cursor:

- Scroll through the tracing or press the ← → arrow keys to move the tracing left or right until the beat to be measured is under the vertical cursor.
- Use **F10 Previous Beat** and **F11 Next Beat** to move through the tracing.
- Click on a specific beat in the Slow Phase Velocity (lower) chart to move to that section of the tracing. The vertical cursor in the lower chart moves to that beat. The slope line and vertical cursor in the upper chart are then aligned with the actual SPV being represented and the SPV value between the charts represents this value.
- Click on a section of the waveform in the upper chart to move to that section of the tracing. The actual SPV of the beat under the cursor is not represented and needs to be manually verified by the operator.

***Note** • Each time the position of the slope cursor is changed, click **F8 Insert** to allow the system to accept the new slope cursor position.*

6.7.1 Locating Versus Selecting Peak SPV

When selecting **F5 Locate Peak**, the system goes through a series of calculations to locate the peak value. It searches all the identified slow phase velocities in the 140-second time window. At each second, (moving from left to right for 140 seconds) it calculates the velocity for that second and for velocities 5 seconds to the left and 4 seconds to the right. It then sorts these velocities from highest to lowest for that 10-second window and determines the average of the 3 fastest velocities.

***Note** • The default value for the sample size is three. The operator may change the samples in SPV setting in the Operator Information, Options tab dialog box.*

Next, the system identifies the most positive of the 140 averages (rightward moving slow phases, i.e., Right Cool and Left Warm) or the most negative (leftward moving slow phases, i.e., Right Warm and Left Cool). The second that has the fastest average value becomes peak and is represented by the square on the Slow Phase Velocity chart. Since the peak is an average value, there may not be a data point in the square.

The operator may choose to override the system-determined peak. To select a new peak, click on a SPV to move it under the vertical cursor and click **F6 Set Peak**. The system computes the average of the highest SPVs in the 10-second window around the selected slow phase velocity value. This average becomes the new peak.

> ***Note*** • *Remember that the number of slow phase velocities used to determine peak is set in the System Options, Operator Settings/Test Battery tab dialog box.*

For non-caloric tests (e.g., positionals), the SPV algorithm determines whether there are more positive or negative slow phase velocities. Following the same procedure, the system calculates the fastest positive or negative slow phase velocity average and places a box at that second.

6.7.2 Measuring Slow Phase Velocity

This analysis procedure is used to review any test results that contain nystagmus for the selected patient.

To analyze nystagmus beats:

1. Click on the **Review** tab to display the tests that were performed for the selected patient.
2. Click on the **+** sign in front of the desired **Physician Order** / **Test Session** .
3. Click on the **+** sign in front of a test procedure to display a list of protocols.
4. Click on a specific protocol to select it and display the test results.
5. Click on the handle of the waveform to be analyzed to select the waveform.
6. Press **F12 Analysis** to access the analysis for the selected test.
7. Use the scroll bar to move the tracing and cursor to select a starting point for the analysis.

> ***Note*** • *For calorics, it is best to start the measurement at the point of initiation of stimulation. This will provide a common reference for all four tests.*

8. Move the green cursor line to determine where to begin analysis, and then press **F12 Begin** to activate the analysis process for the selected test.

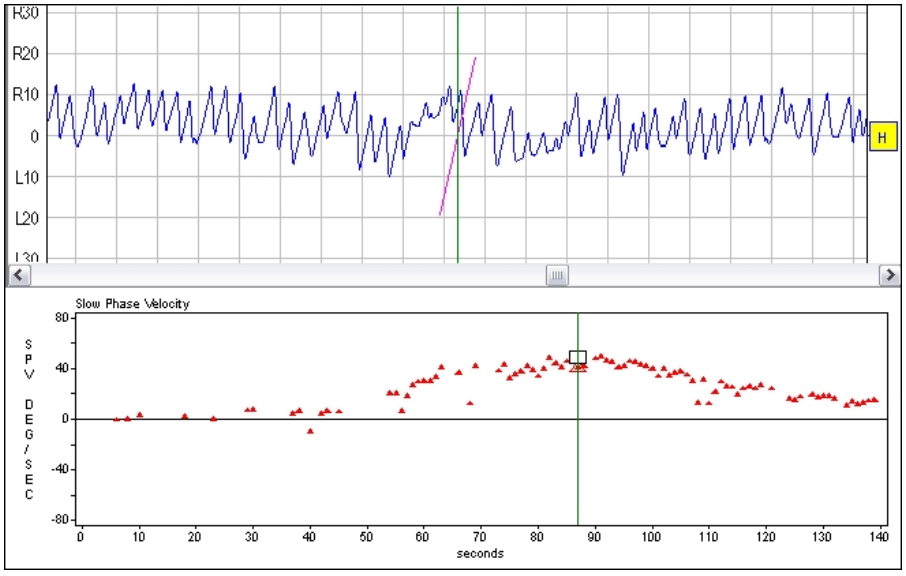


Fig. 77 SPV Analysis

The system automatically measures as many beats as it is able to identify and plots the beats on the lower Slow Phase Velocity chart, one beat per one second section is represented. Once completed, the system returns to the point marked as the beginning. The Number of Beats identified displays in the Information Area of the Main Window.

The system analysis of individual beats can be overridden or measurements of additional beats, not identified by the system, can be added manually.

> ***Note*** • *The vertical cursor in the middle of the top chart and the moveable vertical cursor on the bottom chart always indicate the same point in time.*

9. To measure the slope of a beat and enter a new measurement:

A. Scroll through the tracing or press the ← → arrow keys to move the tracing left or right until the beat to be measured is under the vertical cursor; or use **F10 Previous Beat** and **F11 Next Beat** to move through the tracing; or point and click on a specific beat in the Slow Phase Velocity lower chart to move the selected beat under the vertical cursor or point and click on a section of tracing in the upper chart to move to that section.

> ***Note*** • *Holding down the left or right arrow keys moves the tracing in that direction at an accelerating rate.*

B. Press the ↑ ↓ arrow keys to raise and lower the velocity measuring line, if needed.

C. Press **Ctrl +** ← and/or **Ctrl +** → to change the angle of the velocity measuring line until it is parallel with the slow phase of the beat.

D. Press **F8 Insert** to accept the new SPV value of the beat.

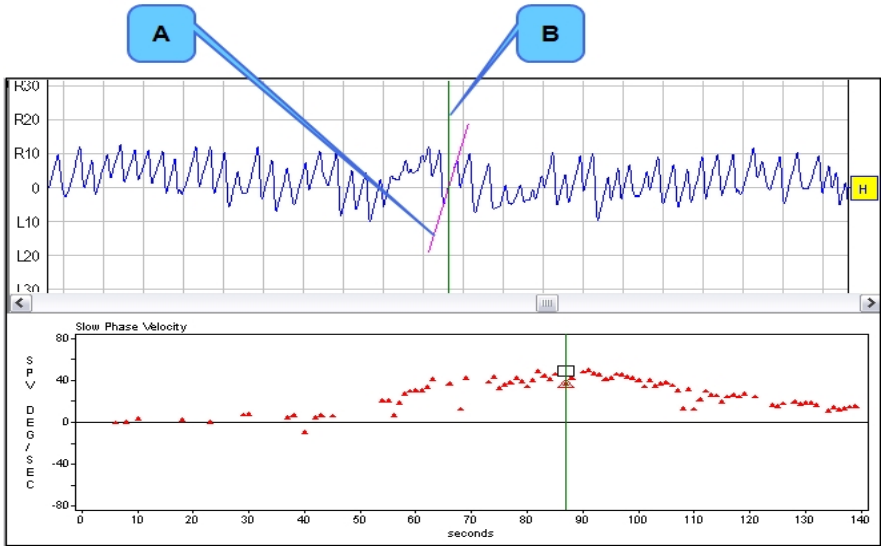


Fig. 78 Measuring the SPV of an Individual Beat

A. Velocity measuring (slope) line
B. Vertical cursor

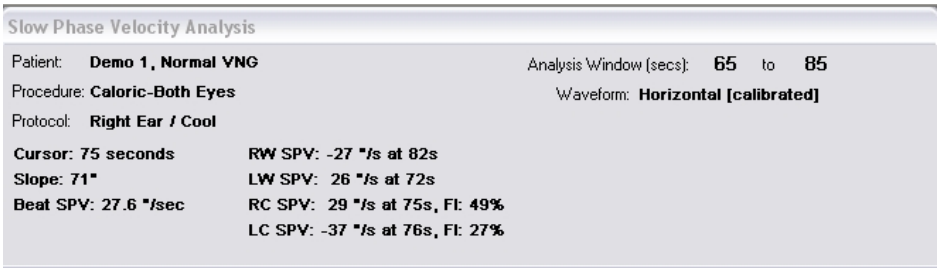


Fig. 79 Caloric peak values in Information Area

10. During review several options are available:

A. Press **F2 Reanalyze** to clear the analysis and begin a new analysis for the selected test.

B. Press **F3 Interpret Tests** (only available in PODS – Butterfly views).

C. Press **F4 SPV Graph** to view the caloric summary screen display (only available for caloric tests horizontal channel).

D. Press **F5 Locate Peak** to have the computer calculate and move to the area of the greatest average SPV.

E. Click on a different SPV measurement and press **F6 Set Peak** to set the peak to the current beat under the vertical cursor.

F. Press **F8 Insert** or **F7 Delete** to add or remove beats from the analysis. Press **F8 Insert** to insert a beat measurement on the bottom chart or to insert the new SPV value after altering the slope of a beat. The Number of beats number in the Information Area increases each time a beat is inserted (if adding a new beat) and decreases when **F7 Delete** is used to delete a beat.

G. Press **F10 Previous Beat** or **F11 Next Beat** to move between beats.

H. Press **F9 Close** to end the review.

I. Press **F12 Save** to save the analysis results and exit the Analysis mode for the selected test.

> ***Note*** • *Pressing **F12 Save** will save the analysis to the database and overwrite any previously performed analysis of the test for that operator. Press **F9 Cancel** to exit the Analysis mode without saving the analysis.*

11. Repeat this procedure for each test in which measurements of nystagmus slow phases are desired.

6.7.3 Analyzing Peak Frequency

In order to choose to analyze peak frequency, make sure the Calculate peak frequency per 30 seconds option is selected in the System Options, Operator Settings/Test Battery tab dialog box.

When analyzing for peak frequency, the system looks at the 30 second window that contains the most beats (1-30, 2-31, 3-32 second windows SPV measurements). For example:

Peak Frequency = -11 at 15s	Where:	– (left beating) + (right beating)
		11 = number of beats in the 30 second window
		15 = time in seconds of the center of the window
Caloric – Frequency/30 sec	Where:	f(30s) = number of beats in the 30 second window
		– (left beating) + (right beating)
		t(s) = time in seconds in the center of the window

In the System Options dialog box, the Calculate peak frequency per 30 seconds option must be selected for the software to provide this measurement. To provide the peak frequency option for other tests (i.e., Spontaneous), the Show peak frequency for non-caloric tests option must be selected.

6.7.4 Analyzing Caloric Test Results

For caloric tests, the peak responses are identified and saved for use in the system's calculation of caloric (unilateral) weakness and gain asymmetry/directional preponderance.

When all four calorics have been measured, the routine will calculate and display caloric weakness and gain asymmetry. Directional preponderance can be selected in the System Options, Operator Settings/Test Battery tab dialog box.

The formulas used to calculate unilateral weakness, gain asymmetry, and directional preponderance are:

For unilateral weakness and gain asymmetry, PEAK caloric = PEAK - Baseline Shift
(Note that baseline shift is not adjusted in Directional Preponderance)

and

RC = right ear cool	RW = right ear warm
LC = left ear cool	L W = left ear warm

$$\text{Unilateral Weakness (UW)} = \frac{(RC\text{-}RW)\text{-}(LW\text{-}LC)}{(RC\text{-}RW\text{+}LW\text{-}LC)} \times 100$$

$$\text{Gain Asymmetry} = \frac{(RC\text{+}LW)\text{+}(RW\text{+}LC)}{(RC\text{-}RW\text{+}LW\text{-}LC)} \times (\text{-}100)$$

$$\text{Directional Preponderance} = \frac{(RC\text{+}LW)\text{+}(RW\text{+}LC)}{(RC\text{-}RW\text{+}LW\text{-}LC)} \times (\text{-}100)$$

Note • *The system designates values of positive or negative based on the direction of the slow phase, not the beat. The exact value as designated is used in the formulas.*

The analysis routine cannot measure beats that have zero velocity or where distinct slow phases and fast phases could not be identified. Therefore, some sections appear without measured beats. If the algorithm finds no beats in an entire tracing, it places a beat of zero degrees per second at a time of one second to indicate zero velocity for that test.

Sometimes in tracings, a few artifacts will be measured. If these are not overridden or deleted, the analysis may be incorrect.

Caloric test results can be shown in “PODS - Butterfly” views. Press **F4 PODS - Butterfly** to display the caloric results.

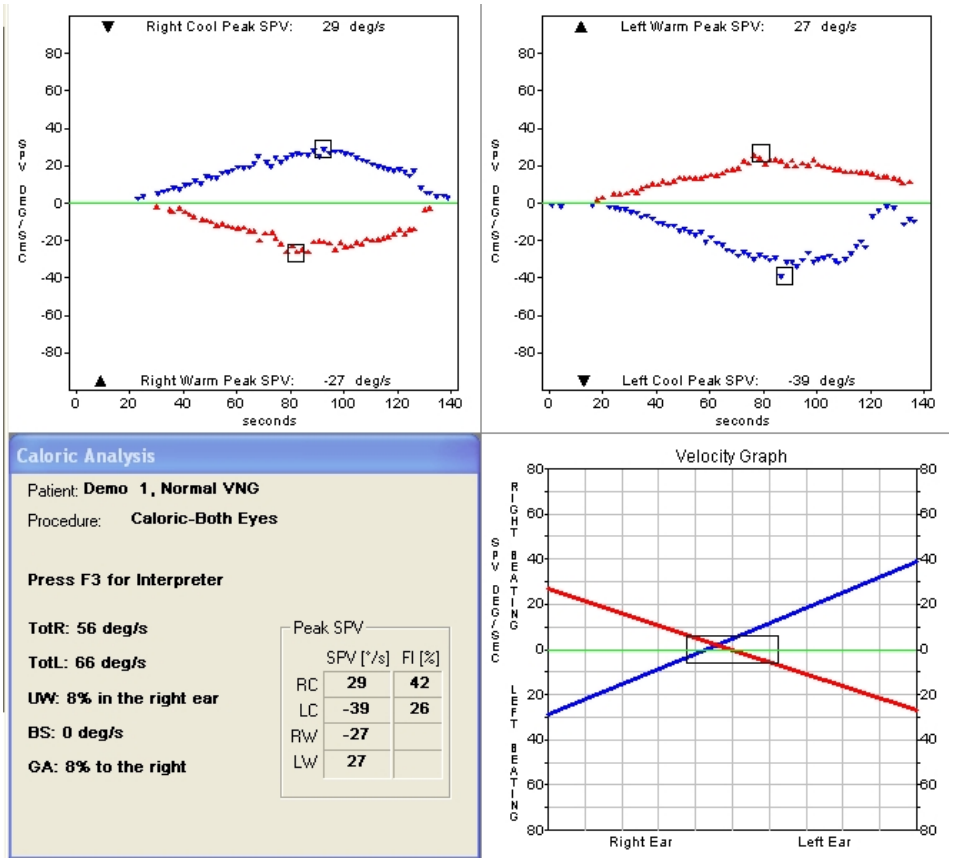


Fig. 80 Caloric Analysis, Pods Butterfly Views

> ***Note*** • *In Pods, Caloric Weakness and Gain Asymmetry information display in the VNG Main Window Information Area located in the lower-left portion of the window. Directional Preponderance is an operator option, and the information only displays if that option is selected in the* ***Operator Settings / Test Battery***.

The Butterfly chart is a nomograph of caloric results—two intersecting lines, one representing cool stimulations and one representing warm stimulations. The vertical axis of the chart represents slow phase velocity, the horizontal axis is percent caloric weakness. The box in the center of the chart represents normal values. By default these values are plus or minus 25% for caloric weakness, plus or minus 6 degrees per second for implied asymmetry.

The lines in the graph are connections between the values of the peak responses from right ear caloric stimulations plotted on the left edge and the left ear responses plotted on the right edge of the chart. A normal response presents an intersection point within the “normal” box. Caloric weaknesses of more than 25% have intersections to the left or right of the normal box, implying a right or left ear caloric weakness respectively. Abnormal average implied asymmetry (unnormalized gain asymmetry or spontaneous nystagmus) presents intersections above or below the normal box. A right asymmetry falls above the box and a left asymmetry has its intersection below the box.

The table of numeric results on the right displays the values used for the graph and the resultant Caloric Weakness. Asymmetry in this table is calculated by averaging the Right Cool, Left Cool, Right Warm, and Left Warm values.

6.7.5 Fixation Index

VG40 Goggles and later come equipped with a built-in Fixation Light that can be triggered from the software in systems with USB unit hardware. All protocols support the Fixation Light feature.

6.7.5.1 Setting the Fixation Light to Turn on in the Left or Right Eye

The Fixation Light can be turned on in either the left or the right eye. In the monocular version of the software, the Fixation Light will always turn on in the eye being tested. In the full version of the software, the eye can be set by the tester. To set the Fixation Light eye, access System Options, Workstation Settings, Fixation Light. The eye cannot be changed in the middle of a test.

6.7.5.2 Invoking the Fixation Light

To turn on the Fixation Light during the collection, invoke F11 (Fixation Light). Invoking F11 again will turn off the light or use fixation button on the remote control.

When the Fixation Light is turned on, an “FI” marker will be placed on the tracing. When the Fixation Light is turned off during a collection, the tracing will be marked with a “Fo” marker.

6.7.5.3 Calculating the Fixation Index

The Fixation Index is calculated at the point at which the Fixation Light is turned on. If the Fixation Light was turned on more than once during the course of a single test, the point at which the Fixation Light was turned on last shall be used to calculate the Fixation Index. The formula for calculating the Fixation Index is FI = SPV_{fix} / SPV_{nofix}, where SPV_{fix} is the average of the largest SPV beats in the 5 seconds after the Fixation Light was turned on, and SPV_{nofix}, is the average of the largest SPV beats in the 5 seconds immediately before the Fixation Light was turned on. The second at which the fixation event was triggered is not used in the calculation.

The Fixation Index will be calculated once the peak SPV is set or located. The Fixation Index will be displayed in the same window as the peak SPV values. If the fixation event is within 5 seconds of the analysis start or end time, the Fixation Index will not be calculated. Five seconds of data must be available on either side of the fixation event for Fixation Index to be calculated.

The fixation index can be calculated for ENG as well. However, it is important that the patient fixates as soon as the Fixation (F11 or remote control) button is selected. Since the Fixation Index is calculated the 5 seconds immediately before the software marks the F1, the fixation index will only be accurate if the patient began fixation at the point where the clinician selected Fixation (told the software that fixation began).

6.8 Interpretation Assistant

The Interpretation Assistant, a proprietary tool provided with Chartr 200, assists users in interpreting the results of caloric and static position VNG/ENG tests. The Interpretation Assistant first validates the test results. If the results are valid, the Assistant continues with the analysis during which the test results are compared to the pre-determined cutoff values. The output from the analysis can be viewed immediately and can be included in the patient report.

***Note** • IMPORTANT!*
The Interpretation Assistant does not suggest diagnosis. Diagnosis can be made only when a licensed physician incorporates the interpretation from the VNG/ENG test with the results from other tests such as audiometric evaluations, MRI, CT scan, blood tests, etc.

The Interpretation suggestions provided by the Chartr VNG/ENG feature are based on many studies that have been accumulated during the past 50 years. The following books and review articles summarize the results of these studies:

1. Baloh, RW, Honrubia, V. Clinical Neurophysiology of the Vestibular System. F A Davis, Philadelphia, 1990.
2. Barber, HO, Stockwell, CW. Manual of Electronystagmography. C V Mosby, St. Louis, 1980.
3. Barin, K. and Stockwell, C.W. "Directional Preponderance Revisited," Insights in Practice, February 2002, pp. 1-6.
4. Halmagyi, G.M., Cremer, P.D., Anderson, J., Murofushi, T, and Curthoys, I.S., (2000). Isolated Directional Preponderance of Caloric Nystagmus. I. Clinical Significance. Am J Otol 21: pp. 559-567.
5. Jacobson, GP, Shepard, NT, Balance Function Assessment and Management. Plural Publishing, San Diego, 2008.
6. Stockwell, CW. ENG Workbook. Mosby Year Book, St. Louis, 1983.

For caloric tests, when all 4 caloric tests have been analyzed, this tool can interpret the results and provide information such as test validity and whether any irrigations should be repeated.

For position tests, a separate interpretation is provided for horizontal and vertical nystagmus. Even a single analyzed position test can be interpreted.

If the results are valid, the operator will be allowed to paste the interpretation to the patient report. The interpretation may be edited if needed.

6.8.1 Interpreting Caloric Tests

6.8.1.1 Conducting an Interpretation for Caloric Tests

To use the Interpretation Assistant for caloric tests:

1. Collect all four caloric tests (Right Ear – Warm, Right Ear – Cool, Left Ear – Warm, Left Ear – Cool).
2. Select the **Review** tab, then review and analyze each caloric test.
3. Click **F5 Move Baseline Up** or **F6 Move Baseline Down** or use the arrow keys to adjust the baseline, if needed. Click **F7 Set Baseline Shift** to accept and save the new baseline.
4. Click **F4 PODS - Butterfly** to display the Pods/Butterfly views of the caloric results.
5. Select **F3 Interpret** or **Interpreter, Interpret Tests** to view the results of the Interpretation Assistant validation and analysis in the Caloric Test Interpretation dialog box.

Note • *If all 4 caloric analyses are not available, the system will generate this message:*

Fig. 81 Caloric Test Interpretation Assistant Message

6. If all 4 irrigations are analyzed and the results are within the user-defined cutoff values, the following dialog box displays. Go to step 7. If the results are not within the cutoff values, go to step 8.

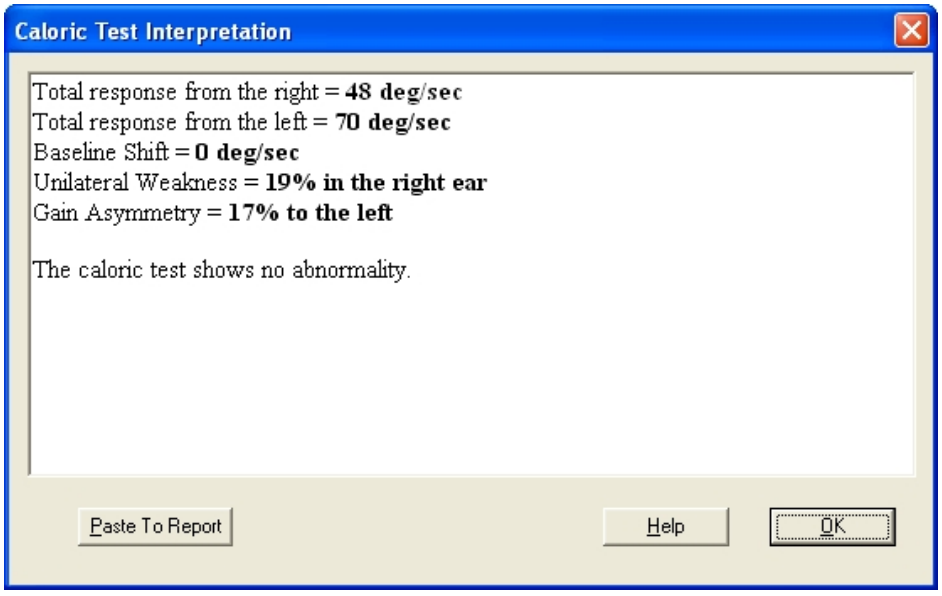


Fig. 82 Caloric Test Interpretation, No Abnormalities

7. Finish the caloric interpretation.
   A. Click **OK** to close the dialog box.
   B. Select **Paste To Report** to place the Interpretation results into the patient report where the text can be edited, if needed, and saved to the database.

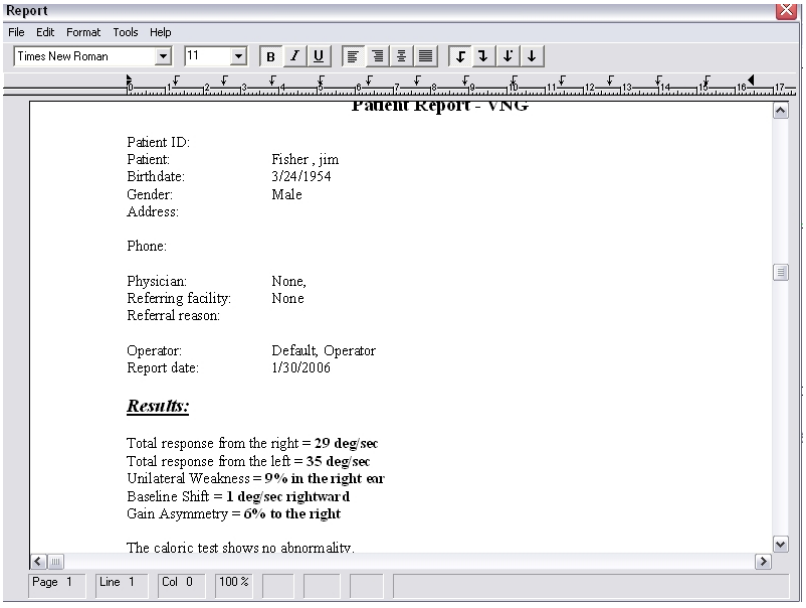


Fig. 83 Interpretation Assistant Caloric Analysis in Patient Report

8. If caloric results cannot be explained by any known physiology or pathophysiology of the vestibular system, the following technical error message displays with suggestions to clean the PODS, adjust the baseline shift, and repeat poor irrigations.

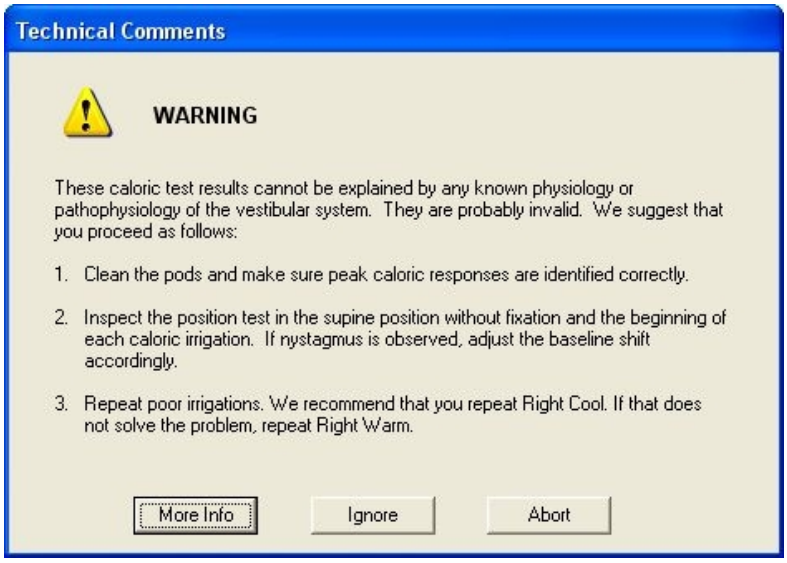


Fig. 84 Caloric Test Interpretation Technical Error, Invalid Test Results

A. Select **More Info** to open the Operator's Manual.

B. Select **Ignore** to continue with the interpretation and display a Warning dialog similar to the following.

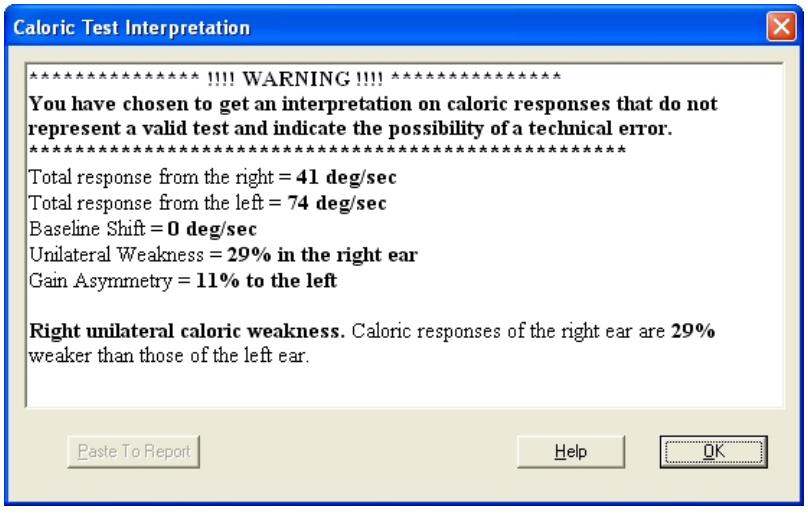


Fig. 85 Caloric Test Interpretation Dialog – Technical Error

If you agree there is a technical error, follow the Interpreter's suggestions and repeat the procedure.

C. Select **Abort** to close the Technical Error dialog and end the Interpreter session.

6.8.1.2 Interpreting Caloric Tests Results

Upon the completion of a caloric test interpretation, the results first display in the Caloric Tests Interpretation dialog box.

> ***Note*** • *The test results cannot be edited in this dialog box. However, once the results are pasted into the patient word processing report, the text can be modified as needed.*

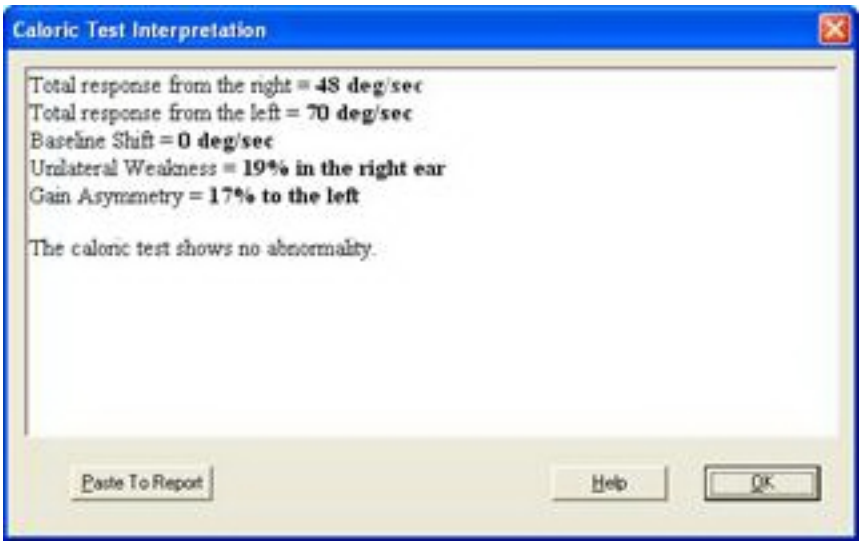


Fig. 86 Caloric Test Interpretation Dialog Box

Paste To Report	Copy and paste the interpretation results into the word processor report. This button is disabled if a technical error occurred during the interpretation.
Help	Opens this User Manual.
OK	Close the dialog box without saving the results.

6.8.1.3 Correcting a Caloric Test Technical Error

Caloric test results are probably invalid when they cannot be explained by any known physiology or pathophysiology of the vestibular system. We suggest that you proceed as follows.

First, check your data. Caloric responses differ in strength and direction, but they always have the same shape. They start about 20 sec after the onset of the irrigation (if the tympanic membrane is intact), rise to a peak about 60 to 90 sec after the onset of the irrigation, and thereafter decline to baseline. If your caloric responses don't look like this, we suggest that you clean up your data. If any response doesn't contain enough data points to work with, then you will have to repeat the irrigation. When you are satisfied with your data, repeat the analysis.

If your data looks good and the result still comes up invalid, inspect the position test in the supine position without fixation and the beginning of each caloric irrigation. If nystagmus is observed, adjust the baseline shift accordingly. If the data is still invalid, you probably have one or more bad responses due to poor irrigation or low patient alertness. We suggest that you repeat those irrigations and then repeat the analysis. If you are unable to repeat any more irrigations at this time, we suggest that you ask the patient to return at a later date and repeat the entire caloric test.

One type of technical error, shown below, occurs when one caloric response is significantly weaker than the other three responses.

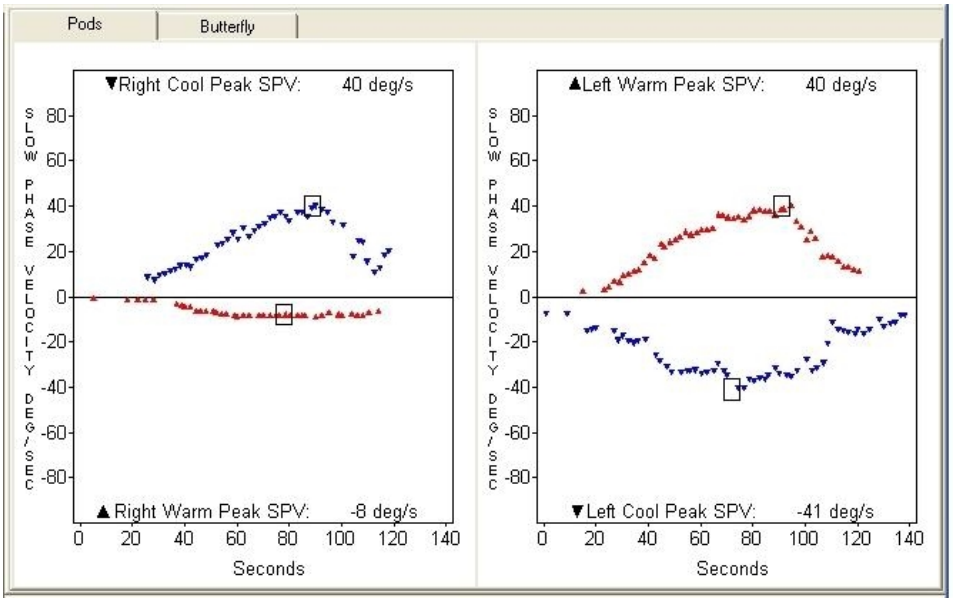


Fig. 87 Caloric Test Technical Error, One Weak Response

Another type of technical error occurs when one caloric response is significantly stronger than the other three responses.

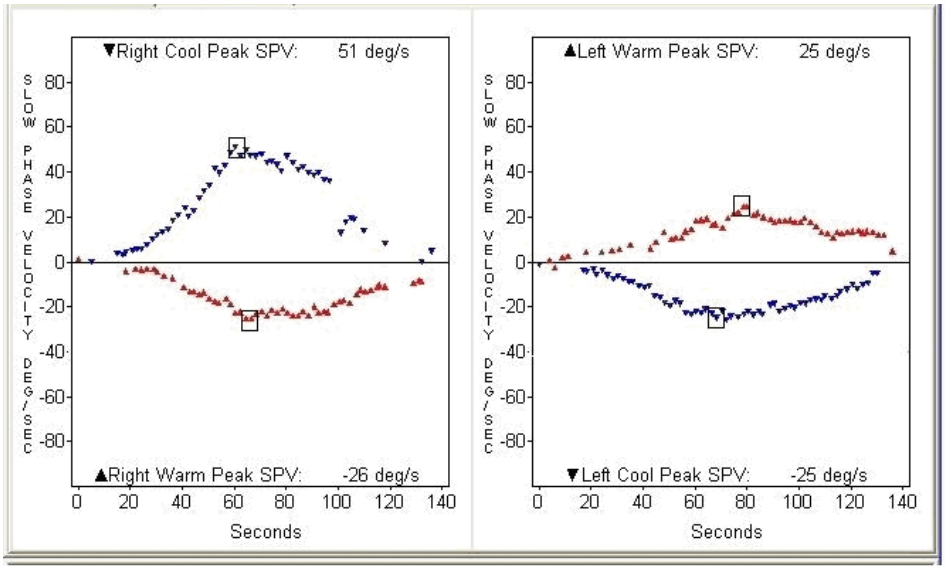


Fig. 88 Caloric Test Technical Error, One Strong Response

6.8.1.4 Temperature Effect

Another type of technical error occurs when caloric responses for one irrigation temperature are significantly different compared to the responses for the other temperature. This temperature effect is shown below.

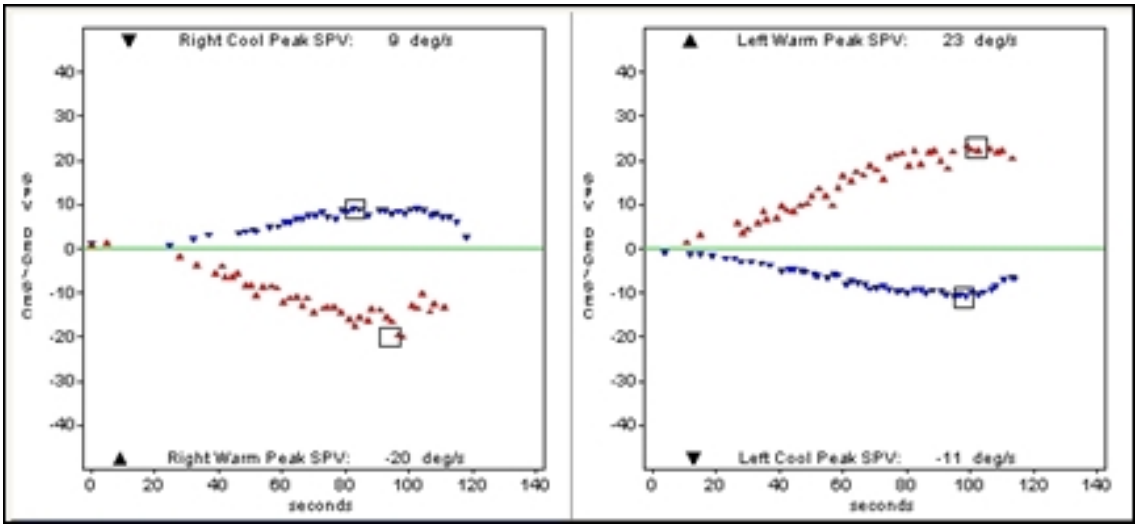


Fig. 89 Caloric Test Technical Error, Temperature Effect

An isolated temperature effect does not adversely affect calculations of the response parameters such as UW and DP. However, other types of technical errors may become more difficult to identify in the presence of temperature effect. If significant temperature effect is observed frequently, the irrigator should be checked and, if necessary, the irrigation temperature calibrated. Also, the examiner should review the test procedures to ensure that they are not different for the different irrigations. For example, the exact same procedure should be followed if eye movements are recalibrated between temperature changes.

6.8.1.5 Baseline Shift

Some patients have pre-existing nystagmus with eyes closed in the caloric test position. The best time to observe this nystagmus is just after the onset of the caloric irrigation because the irrigation alerts the patient. When the tympanic membrane is intact, the caloric response itself does not begin until about 20 seconds after the onset of the irrigation.

If the patient has pre-existing nystagmus, the baseline of the caloric responses is no longer zero; it is the slow phase velocity of the pre-existing nystagmus. In this example, the patient has left beating spontaneous nystagmus with rightward slow phase velocities of 10 deg/sec. The baseline of the caloric responses is shifted upward by that amount.

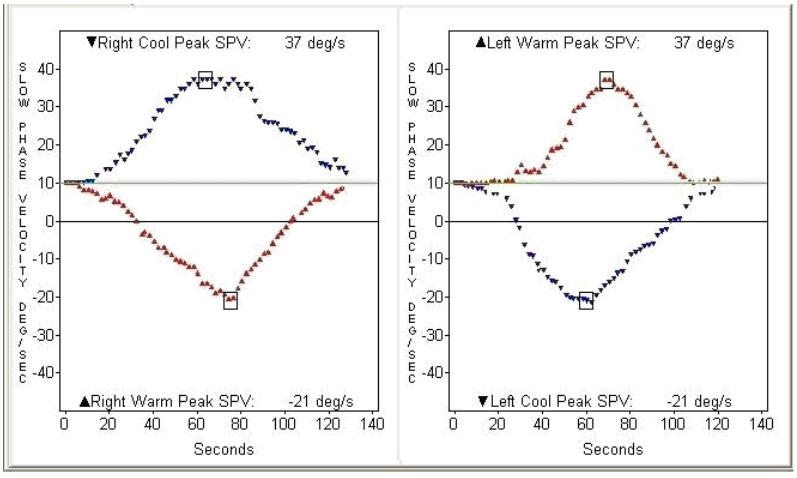


Fig. 90 Baseline Shift Example

For each caloric test, you must determine if the patient has pre-existing nystagmus with eyes closed in the caloric test position. If so, you must move the baseline by an amount equal to the slow phase velocity of the pre-existing nystagmus. If you fail to do this, your calculation of gain asymmetry will be inaccurate.

6.8.1.6 Gain Asymmetry

Sometimes the peak intensities of caloric responses in one direction are significantly stronger than the peak intensities of responses in the other direction. This is called directional preponderance (DP). It has two components. The first component is baseline shift, which is due to pre-existing nystagmus with eyes closed in the caloric test position. Caloric responses are in fact equally strong in both directions, but the baseline is shifted by an amount equal to the slow phase velocity of the pre-existing nystagmus, so the peak intensities of responses in the direction of the shift are higher than the peak intensities of those in the other direction. The second component is gain asymmetry, in which the responses really are stronger in one direction than in the other direction. Baseline shift is common and gain asymmetry is rare.

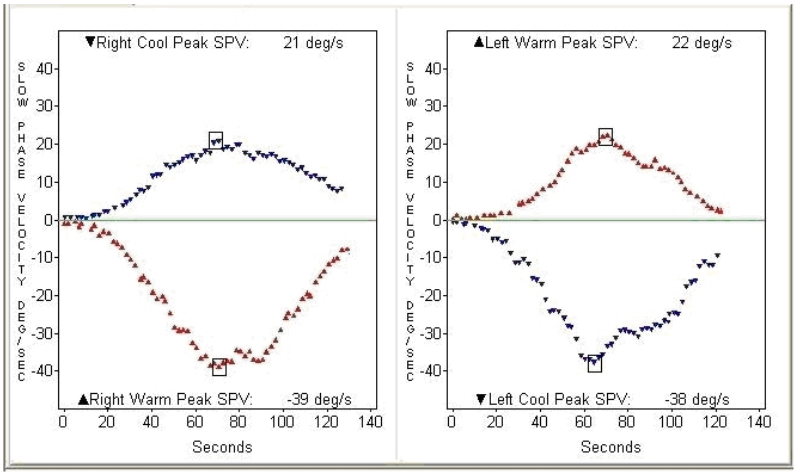


Fig. 91 Gain Asymmetry Example

6.8.1.7 Caloric Test Cutoff Values

The Interpretation Assistant compares caloric test results to a pre-determined set of cutoff values. Before running the Interpreter, cutoff values can be reviewed and adjusted if needed. Select Interpreter, Cutoff Values from the menu bar to display the Cutoff Values dialog box.

> ***Note*** • *The default (system supplied) Cutoff Values were researched and selected by a team of experts. Great care should be taken before adjusting these values.*

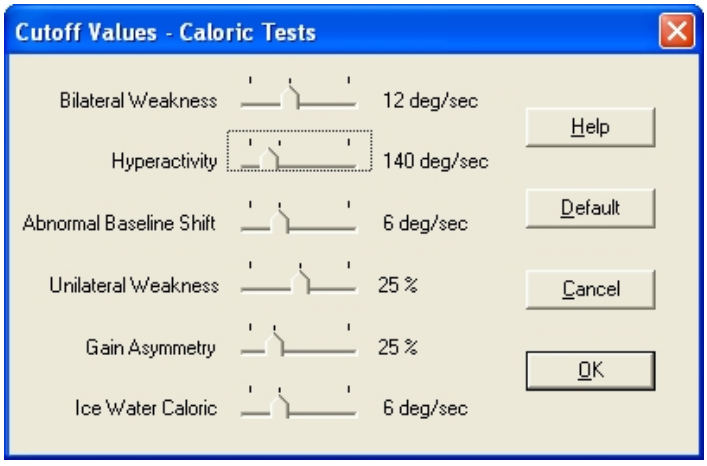


Fig. 92 Cutoff Values Dialog Box

Bilateral Weakness	Bilateral weakness is present when total responses from the right and the left ear are both less than the cutoff value. (Default = 12 deg/sec)
Hyperactivity	Caloric responses are hyperactive when total responses from either the right ear or the left ear exceed the cutoff value. (Default = 140 deg/sec)
Abnormal Baseline Shift	The baseline shift is abnormal when it exceeds the cutoff value. (Default = 6 deg/sec)
Unilateral Weakness	Unilateral weakness is present when the normalized difference between the right and left ear responses exceeds the cutoff value. (Default = 25%)
Gain Asymmetry	Gain asymmetry is present when the normalized difference between right beating and left beating responses exceeds the cutoff value. (Default = 25%)
Ice Water Caloric	Ice water caloric testing should be performed on any ear with an intact tympanic membrane that does not respond to standard bithermal caloric stimuli. The purpose of this test is to confirm the results of the bithermal caloric test. Ice water caloric testing is recommended when the warm response plus the cool response of one ear is less than the cutoff value. (Default = 6 deg/sec)
Help	Opens this User Manual.
Default	Sets the cutoff value sliders to default locations marked by center ticks.
Cancel	Cancels current changes and restores previous values.

OK	Applies current changes and dismisses the dialog. The OK button is disabled when working with read-only databases.

6.8.2 Interpreting Static Position Tests

The Static Position Test Interpretation Assistant is a Chartr VNG/ENG feature that provides suggestions to the user about the validity and the clinical significance of the VNG/ENG test results. In the Review mode, select Interpreter, Interpret Tests or press F3 Interpret Tests to open the Interpretation Assistant. At least one position test with a designation of With Vision or Without Vision must be analyzed to get a partial interpretation.

The Interpretation Assistant for Static Position testing currently provides interpretation only for head positions that have been tested and analyzed. A complete static position test requires testing in at least four head positions (sitting, supine, head right, and head left) both with and without vision. For an incomplete static position test, the Interpretation Assistant provides only a partial interpretation.

The Interpretation Assistant for Static Position testing assumes that the peak SPV for each head position represents the intensity of typical nystagmus beats for that head position. The operator must make sure that the slow-phase velocity tracings are cleaned and the peak response represents the intensity of typical nystagmus beats.

The Interpretation Assistant currently does not detect nystagmus that changes direction in a single head position. This is a rare but significant finding. The operator must recognize this type of nystagmus and interpret it accordingly.

The Interpretation Assistant currently does not differentiate between transient nystagmus that may be provoked due to head movements or BPPV and steady-state nystagmus typical of static position testing. The operator must make sure that the peak response does not include the transient part of the nystagmus. The operator must also take appropriate actions for testing and interpreting the transient response.

6.8.2.1 Conducting a Static Position Interpretation

To activate the Interpretation Assistant for static position tests:

1. Collect one or more static position tests.

> ***Note*** *• To use the Interpretation Assistant for static position tests, the tests for w/vision and w/o vision have to be done as separate tests. You can not collect one tracing with both conditions present.*

2. Select the **Review** tab, and review and analyze each static position test.
3. Select **F3 Interpret Tests** to view the results of the Interpretation Assistant validation and analysis in the Static Positional Test Interpretation dialog box.

Note • *If at least one position test with a designation of With Vision or Without Vision is not available, the system will generate this message.*

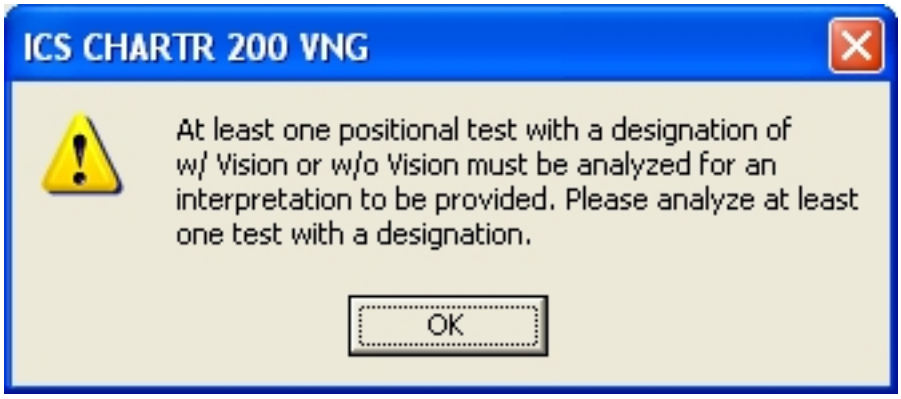


Fig. 93 Positional Test Message

A. The results of Interpreter for a position test with a technical error are shown below.

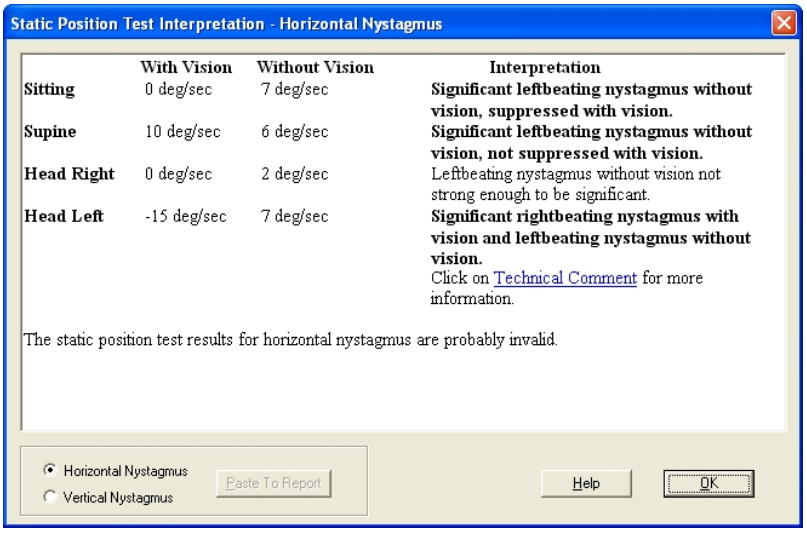


Fig. 94 Static Position Test Interpretation – Horizontal Nystagmus

B. Click the Technical comment hyperlink to generate a warning message.

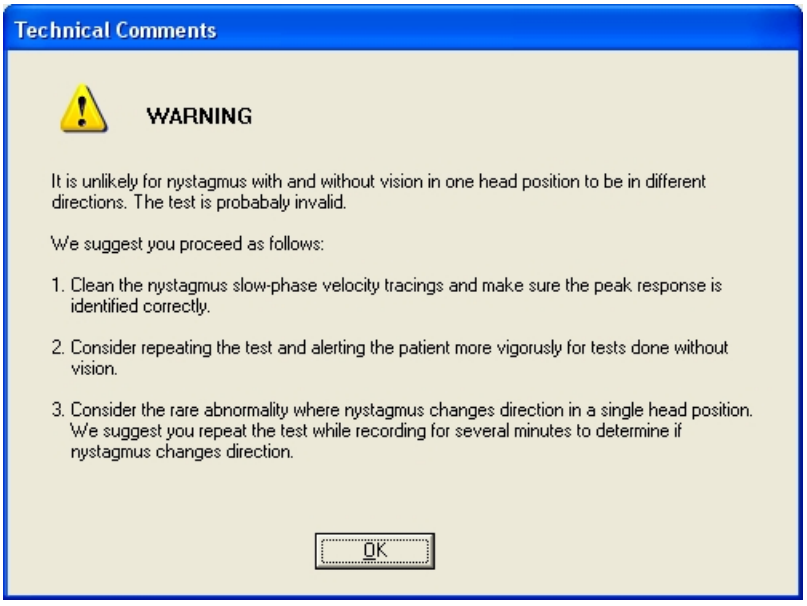


Fig. 95 Interpretation Assistant Technical Comment

4. Finish the interpretation.
   A. Select the **Vertical Nystagmus** radio button to generate an interpretation for the vertical channel. Select the **Horizontal Nystagmus** button to generate an interpretation for the horizontal channel.

> ***Note*** • *If no test data for a channel has yet been analyzed, the Interpretation Assistant will generate the following message: "The tracings for this channel have not been analyzed. An interpretation cannot be provided."*

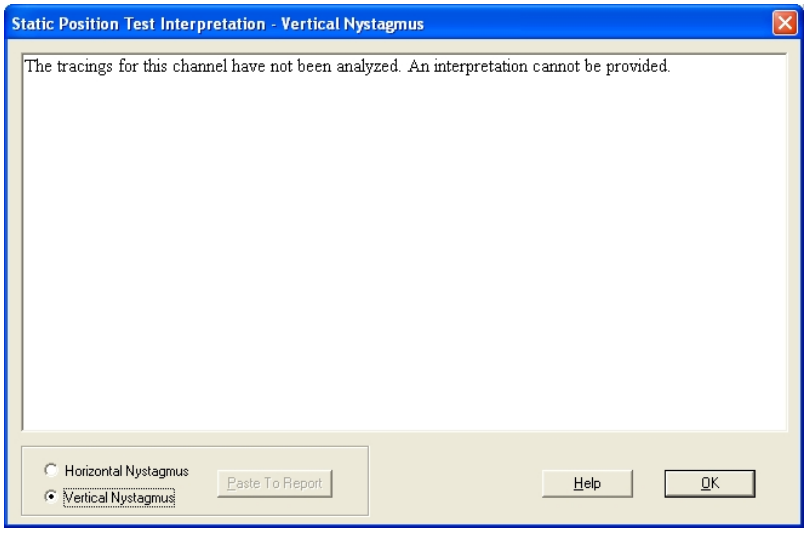


Fig. 96 Interpretation Assistant – Tracings for requested channel not analyzed

B. Resolve any identified technical issues.

5. Finish the positional interpretation.

   A. If no technical errors were identified, click **Paste To Report** to place the Interpretation results into the patient report where the text can be edited, if needed, and saved to the database.

   B. Click **OK** to close the dialog box.

6.8.2.2 Static Position Test Interpretation Dialog Box

Upon the completion of a caloric test interpretation, the results first display in the Static Position Test Interpretation dialog box.

> ***Note*** • *The test results cannot be edited in this dialog box. However, once the results are pasted into the patient word processing report, the text can be modified as needed.*

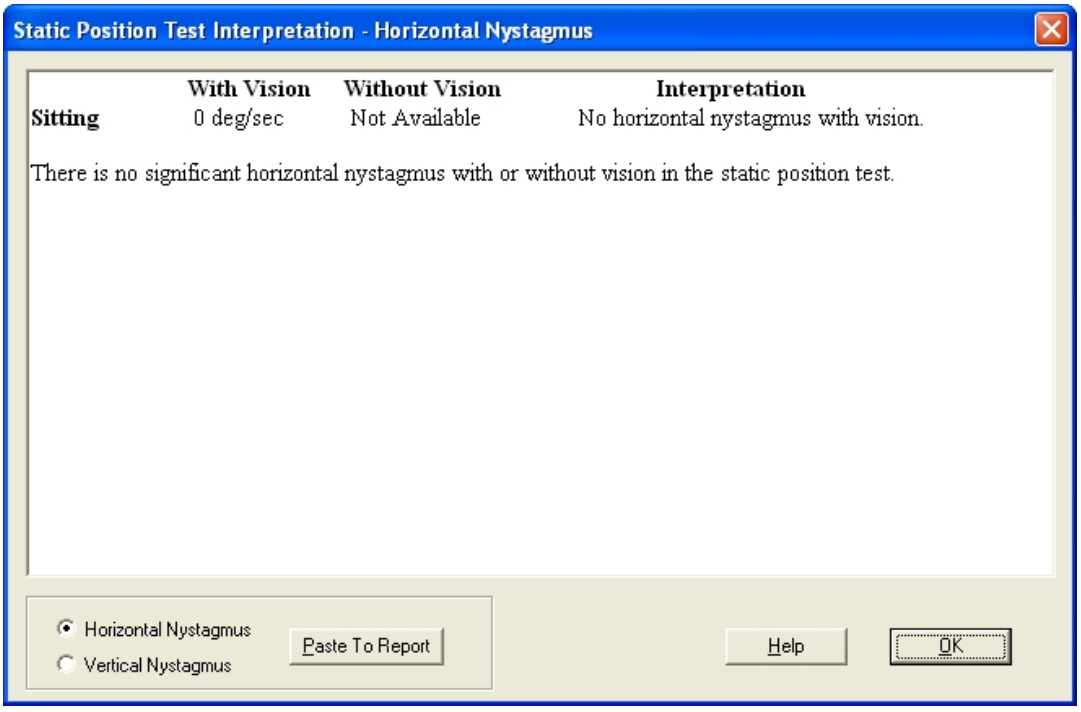


Fig. 97 Static Position Test Interpretation Dialog Box

Horizontal Nystagmus	Displays the interpretation for the horizontal channel.
Vertical Nystagmus	Displays the interpretation for the vertical channel.
Paste To Report	Copies and pastes the interpretation to the word processor report. This button is disabled if a technical error occurs.
Help	Opens this User Manual.
OK	Close the dialog.

6.8.2.3 Static Position Cutoff Values

The Interpreter compares static position test results to a pre-determined set of cutoff values. Before running an Interpretation, cutoff values can be reviewed and adjusted if needed. Select Interpreter, Cutoff Values to display the Cutoff Values – Static Position Tests dialog box.

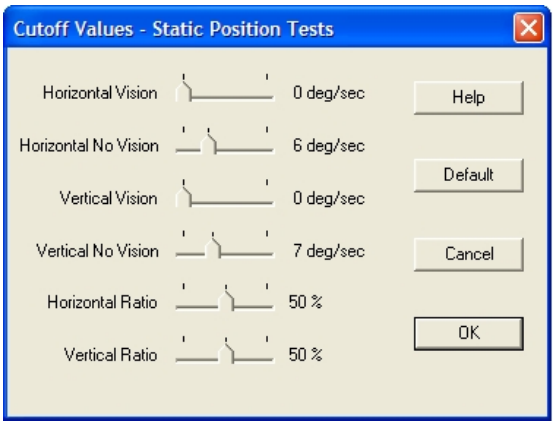


Fig. 98 Cutoff Values – Static Position Tests Dialog Box

> ***Note*** • *The default (system supplied) Cutoff Values were researched and selected by a team of experts. Great care should be taken before adjusting these values.*

Horizontal Vision	Normal limit for horizontal nystagmus with vision. (Default = 0 deg/sec)
Horizontal No Vision	Normal limit for horizontal nystagmus without vision. (Default = 6 deg/sec)
Vertical Vision	Normal limit for vertical nystagmus with vision. (Default = 0 deg/sec)
Vertical No Vision	Normal limit for vertical nystagmus without vision. (Default = 7 deg/sec)
Horizontal Ratio	Normal limit for with/without vision ratio for horizontal nystagmus. (Default = 50%)
Vertical Rati	Normal limit for with/without vision ratio for vertical nystagmus. (Default = 50%)
Neck Effect	Limit to determine the neck rotation effect on horizontal nystagmus (currently not available). (Default = 6 deg/sec)
Help	Opens this User Manual.
Default	Sets the cutoff value sliders to default locations marked by center ticks.
Cancel	Cancels current changes and restores previous values.
OK	Applies current changes and dismisses the dialog. The OK button is disabled when working with read-only databases.

6.8.3 Unable to Paste Interpretation into the Patient Report

There are several situations that could make it difficult for you to paste the Interpretation Results into a patient report.

6.8.3.1 Paste to Report Button Disabled (Grayed)

- **Are you using the main database?**
  Copying the interpretation to the word processor means that the report will be modified and saved in the database. In order to save anything to the database, it should be considered “writable” by the VNG software. Archived databases, exported patient databases, and floppy disk databases are not considered “writable” by the VNG software. Although, one may choose to get an interpretation on a test from an archived, exported patient or floppy disk database, this interpretation cannot be pasted into the word processor report. Only the main database is considered “writable” and a test interpretation shall be pasted into the word processor report only when working with the main database. Therefore, if you are not using the main database, the ‘Paste To Report’ button will be disabled in interpretation dialog.
- **Are the Tests Invalid?**
  When the test results cannot be explained by any known physiology or pathophysiology of the vestibular system, the test is considered invalid. If the Interpretation Assistant determined that your test results are invalid (based on current settings of cutoff values), the ‘Paste To Report’ button is disabled and the interpretation cannot be copied to the word processor report.

6.8.3.2 Interpretation Text Token <IA_RESULTS> Not in the Report Template

- **Is the <IA_RESULTS> token in the word processor template?**
  The word processor report is generated by replacing place holder tokens in the ENG/VNG word processor template file with information such as patient name, facility, etc. These tokens can be moved around in the template files to customize the word processor report. During a software upgrade, the template files are not overwritten or replaced because a facility may have chosen to customize their word processor reports.

  When you click the Paste to Report button, the Interpretation Assistant locates the <IA_RESULTS> token and replaces it with the interpretation text. If the Interpretation text is not added to the word processor report, it is likely that that the <IA_RESULTS> token is not in the report template file.

To add the <IA_RESULTS> token to the report template files:

> ***Note*** • *See Customizing the Word Processing Report ► 215 for more information on how to work with the template files.*

1. Open the ENG/VNG template files template.rtf and vngtemplate.rtf. These files are located in the same folder as the application executable. The default application executable folder is C:\Program Files\ICS Medical .
2. Open the sample template file InterpretationAssistantTemplate.rtf also located in the same folder as the application executable.
3. Search for the token <IA_RESULTS> in InterpretationAssistantTemplate.rtf and copy it using the Copy command.
4. Paste the token using the Paste command into the ENG/VNG template files where you would like the interpretation text to appear. If you are not sure where to paste the token, use the file InterpretationAssistantTemplate.rtf as a reference for location of the token <IA_RESULTS>.
5. Save all files that were changed and close all files.
6. Try using the Interpretation Assistant again to see if the problem is fixed. If the problem persists, contact Otometrics Customer Support.

6.9 Analyzing Saccades

The total possible length of a recording for the various saccade tests is 200 seconds (3 min., 20 sec.).

Saccadic eye movements are analyzed in terms of amplitude, peak velocity, accuracy, and latency. The results are then compared to normal values.

The saccade analysis terms are defined as follows:

Amplitude	Movement of the eyes in degrees between the initial position and the first stop of more than 75 milliseconds (ms).
Peak Velocity	Maximum velocity reached in a saccadic movement as measured over an 18.75 ms period.
Accuracy	Amplitude of the patient saccade divided by the amplitude of target movement expressed in percent.
Latency	Time between stimulus movement and the first eye movement of more than 108 degrees/second

The stimulus is a light on the light bar moving pseudo-randomly. The range of target amplitude is 5 degrees to 30 degrees, and measurement can be made on from 1 to 160 identified saccades. Results are summarized in graphic form.

The algorithm rejects as artifacts eye movements that occur too early (250 ms before through 75 ms after target movement), too late (default is more than 600 ms after target movement), or in the wrong direction.

> ***Note*** • *The operator can specify when a saccade is too late in the System Options, Operator Settings/Test Battery tab dialog box, as described in* *System Options, Operator Settings Tab ► 60*.

Each saccade analyzed generates one data point in each of the analysis charts—Peak Velocity, Accuracy, and Latency.

The data point for the specific saccade that occurred at the time shown by the green vertical line on the tracing display appears with a small square around it in each of the charts. The numeric value of the saccade in the dimension being presented is displayed in the upper-right corner of each chart.

To analyze a saccade protocol:

1. Click on the **Review** tab to display the test performed for the selected patient.
2. Click the **+** sign in front of the desired **Physician's Order**/ **Test Session** .
3. Click the **+** sign in front of a test procedure to display a list of individual protocols.

4. Click on a specific saccade protocol to select it and click on the handle of the waveform to be analyzed. Then press **F12 Analysis** to access the analysis for the selected test and waveform.

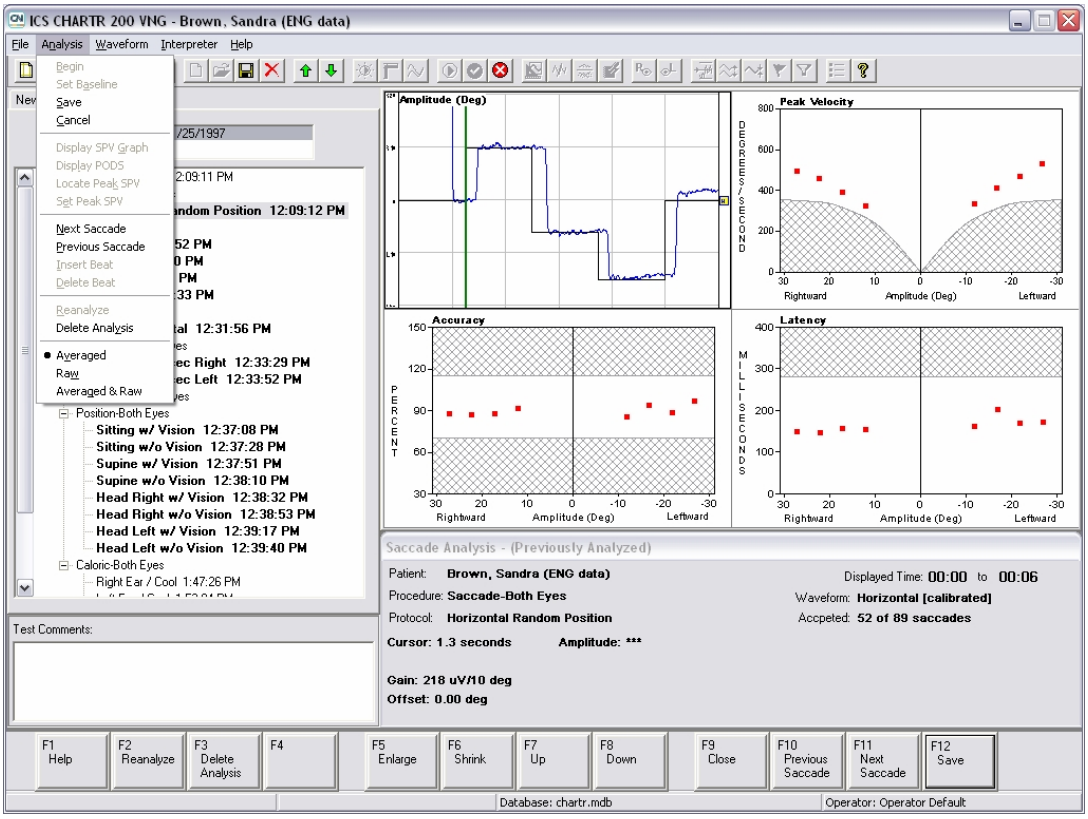


Fig. 99 Saccade Analysis Displaying Raw and Averaged Values

5. During the analysis, a number of options are available:
   A. Press **F2 Reanalyze** to reanalyze the test after making adjustments to the data.
   B. Press **F3 Delete Saccade** to remove the outlined saccade.
   C. Press **F4 Left/ Right Eye Gain** to display the calibration gain for each eye in the Information Area (this applies to individual eye tests only).
   D. Press **F5 Enlarge** and **F6 Shrink** to adjust the gain of the tracing in relation to the target. In effect, this adjusts calibration and changes peak velocity and accuracy values.
   E. Press **F7 Up** and **F8 Down** to move the tracing up or down.
   F. Press **F9 Cancel** to end the analysis session for the selected test without saving the results.
   G. Press **F10 Previous Saccade** and **F11 Next Saccade**F11 Next Saccade to move from one saccade to another.

H. If an individual saccade test protocol is selected, click on the **Latency**, **Accuracy**, and **Peak Velocity** Tabs on the lower chart to display these analyses separately for the right and left eyes (this applies to individual eye tests only).

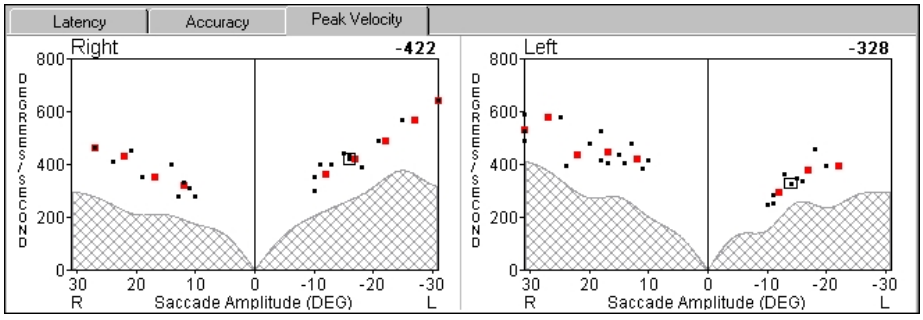


Fig. 100 Saccade Latency, Accuracy, and Peak Velocity - Individual Eye Test

I. Select **Analysis**, **Raw**; **Averaged**; or **Raw and Averaged** from the Menu bar to display different views of the data.

J. Click directly on a data point to move the tracing to correspond with the analysis result.

6. Press **F12 Save** to save the analysis and exit the Analysis mode for the selected test.

> ***Note*** • *Press **F12 Save** to save the analysis to the database and overwrite any previously performed analysis of the test for that operator.*

6.10 Analyzing Sinusoidal Tracking

The purpose of this procedure is to evaluate eye movements in response to a sinusoidally moving stimulus in terms of velocity gain and to compare them to normal values.

The stimulus for the test is a light target moving in a sinusoidal pattern including 3 cycles at each of the following frequencies: 0.2, 0.3, 0.4, 0.5, 0.6, 0.7 Hz. The amplitude of the movement is 16.7 degrees. Once completed, the sequence of sine waves repeats until the test is terminated. The maximum test length is 200 seconds (3 minutes, 20 seconds).

During analysis, the stimulus and the eye movements elicited are compared. The phase of the fundamental frequency of the eye movement is computed from a Discrete Fourier Transform and compared to the phase of the stimulus. If phase shift is greater than 3 degrees leading or more than 20 degrees lagging, the cycle is rejected as an artifact. This is based on empirical observations of the effects of patient non-compliance with instructions. For gain, the velocity of the stimulus over its fastest 250 milliseconds is compared to the eye movements over the same period. Saccades, defined as movements of more than 15 degrees/second faster than the stimulus are eliminated from the calculations.

Average values for gains from accepted cycles are plotted and compared to values from age and sex matched normals.

To analyze a sinusoidal tracking protocol:

1. Click on the **Review** tab to display the test battery for the selected patient.
2. Click the **+** sign in front of the desired **Physician's Order**/ **Test Session** .
3. Click the **+** sign in front of a test procedure to display a list of individual test protocols.

4. Click on a specific test to select it and click on a waveform handle to select it. Then press **F12 Analysis** to access the Analysis mode for the selected test and waveform.

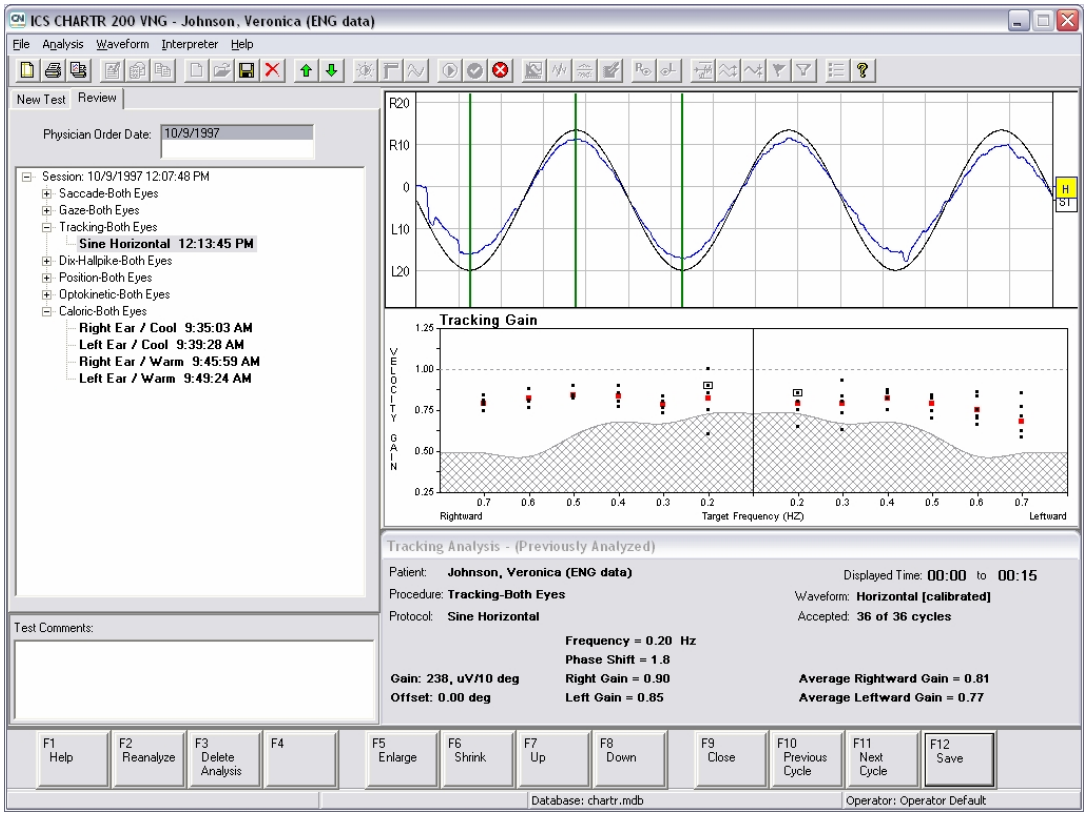


Fig. 101 Sinusoidal Tracking Analysis

5. During the analysis, a number of options are available:
   A. Press **F2 Reanalyze** to reanalyze the test after making adjustments to the data.
   B. Press **F3 Delete Cycle** to remove the outlined cycle.
   C. Press **F5 Enlarge** and **F6 Shrink** to adjust the gain of the tracing in relation to the target.
   D. Press **F7 Up** and **F8 Down** to move the wave up or down on the tracing.
   E. Press **F9 Cancel** to end the analysis session for the selected test without saving the results.
6. Press **F10 Previous Cycle** and **F11 Next Cycle** to move from one cycle to another.
7. Select **Analysis**, **Raw; Averaged**; or **Raw and Averaged** from the Menu bar to display different views of the data.
8. Click directly on a data point to move the tracing to correspond with the analysis result.
9. Press **F12 Save** to save the analysis and exit the review mode for the selected test.

> ***Note*** • *Press**F12 Save** to save the analysis to the database and overwrite any previously done analysis of the test. Press **F9 Cancel** to exit the Analysis mode without saving the analysis.*

6.11 Renaming Protocols

The VNG/ENG software provides a Rename option. A test may be renamed and analyzed appropriately if it is misnamed. Any of the test protocols that do not require the use of a light bar stimulus, can be renamed.

The rename a protocol option is available in the Review mode.

To rename a test:

1. Select the test from the directory to highlight it.
2. Press **F5 Rename** or select **Test**, **Rename Test** from the Menu bar to display the **Protocol Rename** dialog box.

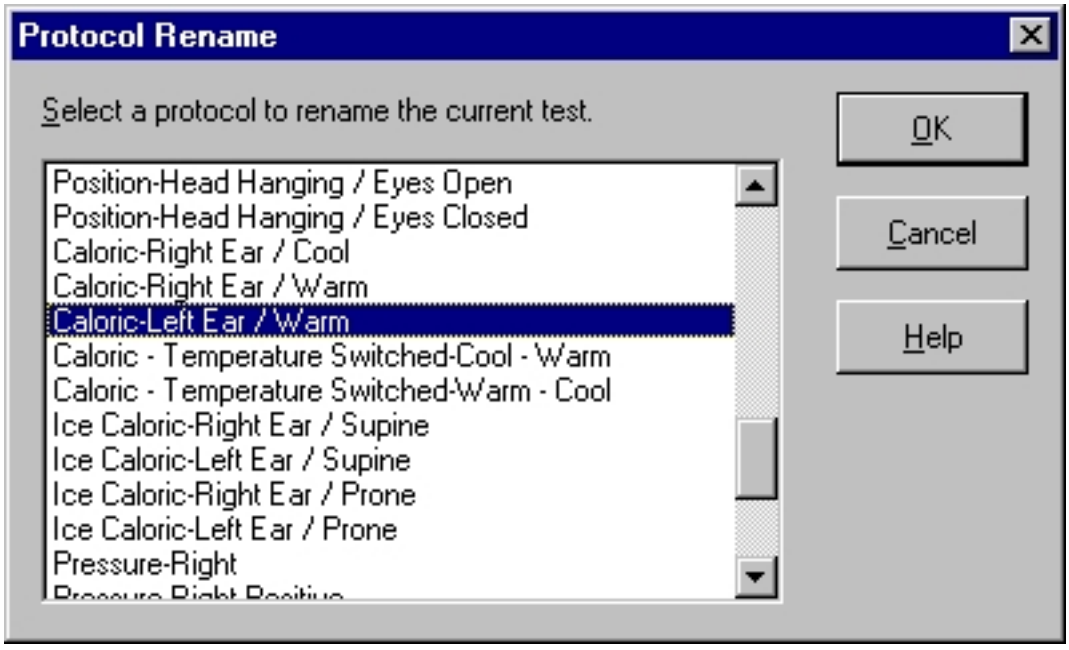


Fig. 102 Protocol Rename Dialog Box

3. Select a protocol name from the list of available names to highlight it.

4. Click **OK** to rename the selected protocol in the directory. The system will prompt for confirmation of the rename.

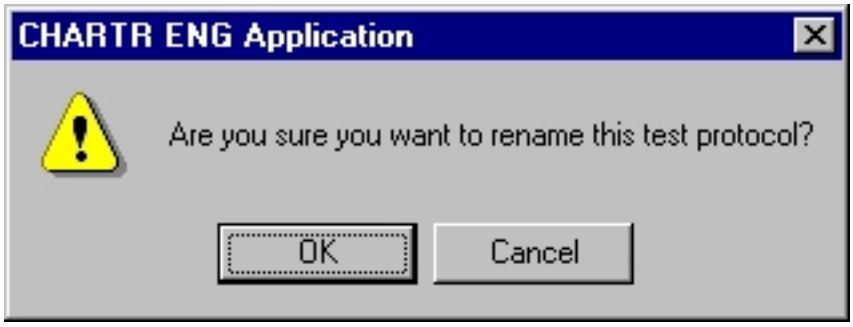


Fig. 103 Rename Protocol Prompt

5. Click **OK** to rename the protocol.

7 Working with Reports

This section provides information on how to work with the reporting features and options available in ICS Chartr 200 VNG/ENG. A built-in word processor allows the operator to customize reports and includes a spell check option.

7.1 Overview

The report writing features of ICS Chartr 200 VNG/ENG are extensive. Reports can be set up to include patient information and test results.

There are two elements to each report:

- The patient information portion of the report is system generated. The operator may edit or modify the patient information by using the ICS VNG/ENG word processor.
- The test results portion of the report is system generated according to the format established by the operator.

Another type of report that may be generated is a temporary custom waveform report page. This report contains up to eight waveform segments for a selected patient and is created using the Copy Waveform option (available in the Review mode). The operator selects specific waveforms and copies/pastes them into a custom report page. The custom report can be printed and the hard copy saved. However, the system does not save an electronic copy of this report.

In addition to the above reports, an operator is able to print individual waveforms, analyses, or calibrations during or after a test session using the Print Waveform, Print Analysis, or Print Calibration command.

This section provides information on how to access and use the word processor; procedures for generating, editing, and formatting reports; procedures for generating a custom waveform report; and procedures for printing waveforms, analyses, and calibrations.

7.2 Accessing the Word Processor

The word processing program included in ICS VNG prepares an initial report by drawing data from the patient record in the database. The operator may use the word processor to modify the patient information and add test result summary information to the report.

To access the word processor:

- Press **F6 Report** if in the Review mode, or
- Select **Edit**, **Patient Report** from the Menu Bar if in either the New Test or Review modes.

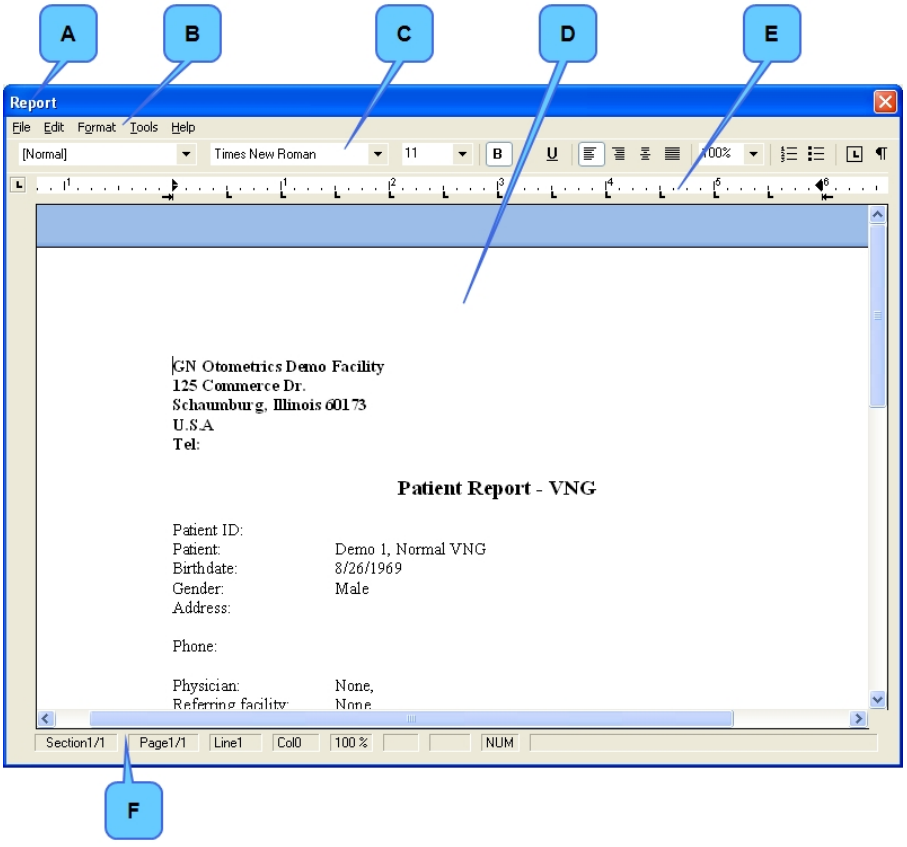


Fig. 104 Report in Word Processor

A. Title bar
B. Menu bar
C. Toolbar
D. Report area
E. Ruler/Tabs
F. Status bar

7.2.1 Word Processor Functions

The word processor includes the following:

- Basic text editing options such as cut, paste, and copy.
- Text formatting by font and paragraph.
- Tabs (programmable).
- Spell checking.
- Creating and applying macros.

7.2.2 Word Processor Menus

The Word Processor menu bar contains these menus:

- File
- Edit
- Format
- Tools
- Help

File Menu

The word processor **File** Menu allows the operator to create a new document, save a report file, save a report as a rich text format (.rtf) file, and exit the report mode. Files may be saved in the default folder or in a folder selected by the operator.

> ***Note*** • *Rich text format files can be opened in most Windows word processors and Internet browser applications. These files retain their font and format attributes regardless of the application used to view the file.*

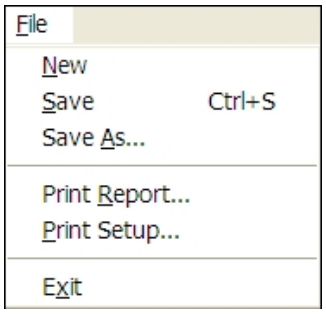


Fig. 105 Word Processor **File** Menu

New	Use the report template file to create a new report.
Save	Save the report in the database.
Save As	Save the report as an RTF file. Use this command to apply special formatting to the report through a word processor program of your choice. Note that the special formatting will not be saved in the database.
Print Report	Display Print Report dialog box in order to begin the report printing process.
Print Setup	Display the Print Setup dialog box.
Exit	Exit the word processor; prompts to save changes.

Edit Menu

The word processor **Edit** Menu allows the operator to perform the following editing functions: Undo, Cut, Copy, Paste, Clear, Find, and Replace.

Fig. 106 Word Processor **Edit** Menu

Undo	Clear the most recent action.
Cut	Copy the selected text to the clipboard (for temporary storage) and delete from the report.
Copy	Place the selected text on the clipboard for temporary storage. This does not delete the selected text from the report.
Paste	Place the clipboard information in the document.
Clear	Delete the selected text.
Find	Display the Find dialog box.
Replace	Display the Replace dialog box.

Format Menu

The word processor Format Menu allows the operator to assign font or paragraph attributes to selected text.

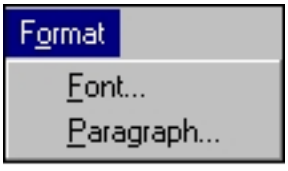


Fig. 107 Word Processor Format Menu

Font	Display the Fonts dialog box.
Paragraph	Display the Paragraph Format dialog box.

Tools Menu

The word processor Tools Menu allows the operator to conduct a spell check; select the dictionary that the spell checker will use; and define and use macros.

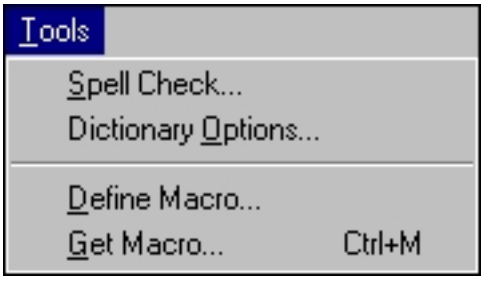


Fig. 108 Word Processor Tools Menu

Spell Check	Initiate a spell check.
Dictionary Options	Display the Dictionary Options dialog box. Select the dictionary you want to use (American English, British English, French, German, Spanish).
Define Macro	Display the Define Macro dialog box.
Get Macro	Display the Get Macro dialog box.

Help Menu

Access help information on how to use the word processor and keyboard shortcuts.

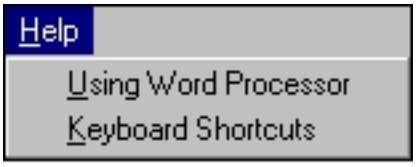


Fig. 109 Word Processor Help Menu

Using Word Processor	Display help information on how to use the word processor.
Keyboard Shortcuts	Display help information on keyboard shortcuts within the word processor environment.

7.2.3 Word Processor Toolbar

The word processor toolbar allows the operator to use the toolbar components to perform most of the editing and formatting functions available through the menu bar.

Fig. 110 Word Processor Toolbar

Use the toolbar elements to:

Assign a font to selected text.

Assign a font size to selected text.

Assign bold (B), italic (I), or underline (U) style to selected text.

Assign paragraph justification to selected text.

Assign bullet or numbered list style to a paragraph.

7.2.4 Word Processor Ruler Bar

The word processor ruler bar allows the operator to set tabs and adjust the page margins.

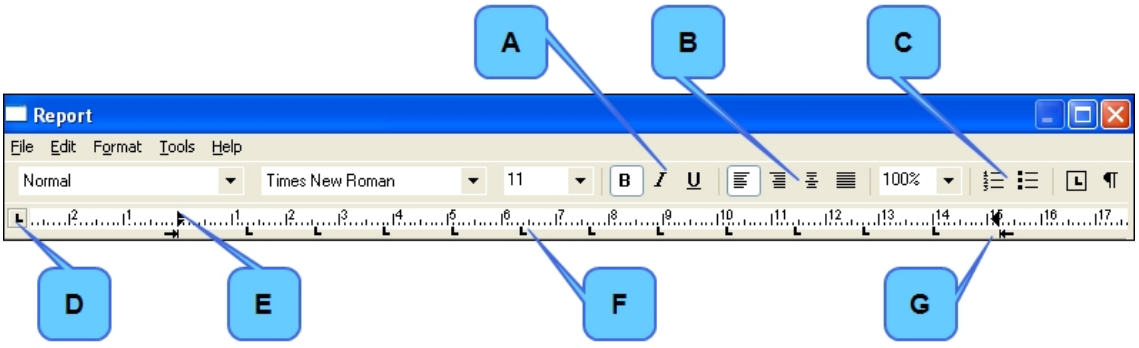


Fig. 111 Word Processor Ruler Bar

A. Select font syle
B. Select paragraph sytle
C. Select numbered list or bullet
D. Select tab type (left, right, decimal, center)
E. Left margin for paragraph first line
F. Tab set
G. Right margin

First click anywhere in the text of the report to display the left/right margin triangles. The two small triangles on the left-side of the ruler bar indicate the paragraph's left margin. CLick and drag the triangles to adjust the left margin. Click and drag the top triangle to indent only the first line of a paragraph. The larger single triangle on the right side of the ruler bar indicates the paragrph's right margin. Click and drag this triangle to adjust the right margin.

7.3 Using Find and Replace

The Find option allows the operator to search a report to locate a specific word, number, or phrase. The Replace option allows the operator to find a specific word, number, or phrase and replace it with another (operator-defined) word, number, or phrase. Both options are accessed from the word processor **Edit** Menu.

7.3.1 Find Option

To use the Find option:

1. Select **Edit**, **Find** (from the word processor **Edit** Menu) to access the **Find** dialog box.

Fig. 112 Find Dialog Box

2. Type the search word(s) and/or number(s) in the **Find what** text box.
3. Select **Match case** if the search is to be case sensitive. A ✓ indicates the option is selected.
4. Select **Up** or **Down** to set the direction of the search in the document. A dot indicates the selected option.
5. Click **Find Next** to move the cursor to the next occurrence of the **Find what** text string.
6. Click **X** or **Cancel** to close the **Find** dialog box.

7.3.2 Replace Option

To use the Replace option:

1. Select **Edit**, **Replace** (from the word processor **Edit** Menu) to access the **Replace** dialog box.

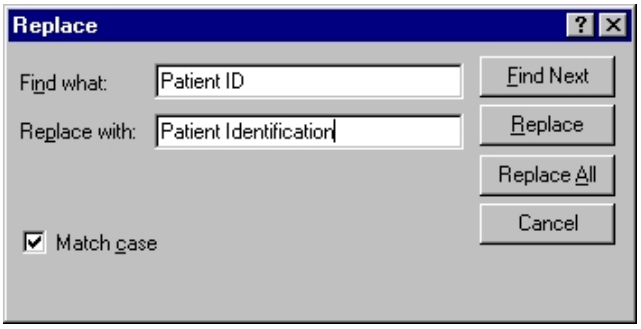


Fig. 113 Replace Dialog Box

2. Type the word(s) and/or number(s) to be replaced in the **Find what** text box.
3. Type the word(s) or number(s) that will replace the found text string in the **Replace with** text box.
4. Click **Find Next** to find the next occurrence of the text string in the **Find what** text box.
5. Click **Replace** to substitute the **Replace with** text string for the found text. Click **Replace All** to replace each occurrence of the **Find what** text string with the **Replace with** text string.
6. Click **X** or **Cancel** to close this dialog box.

7.4 Working with Text

The ICS VNG word processor is designed to allow the operator to easily manipulate the text elements by changing font and paragraph characteristics.

7.4.1 Modifying Fonts

By modifying font types, styles, and sizes, the reports produced within the ICS VNG system can be customized to meet your requirements. Fonts are changed and modified using the Fonts dialog box at anytime within a document. Select Format, Font to display the following dialog box.

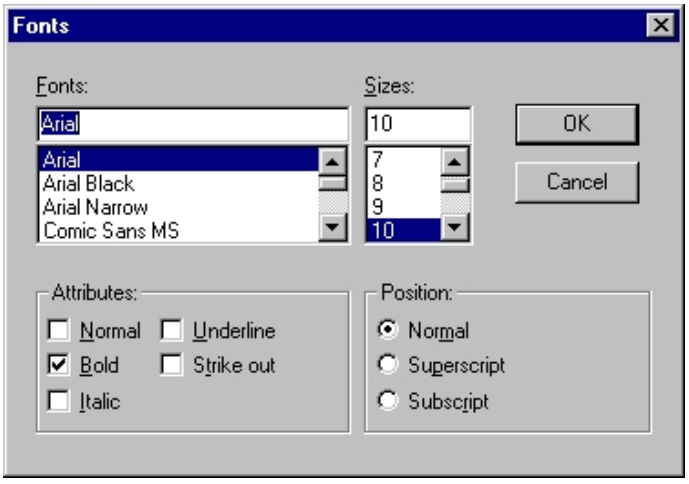


Fig. 114 Fonts Dialog Box

Fonts	Change the font type of the selected text. Choose from the list of available fonts loaded in the system.
Sizes	Change the font size of the selected text. Select or type a size.
Attributes	Select all of the font attributes that will apply to the selected text. A ✓ indicates an option is selected.
Position	Select one of the following positions for the font placement on the line: Normal, Superscript (above the line), or Subscript (below the line).
OK	Save the font settings and return to the report.
Cancel	Exit the Font dialog box without saving the changes.

7.4.2 Formatting Paragraphs

The characteristics that are applied to a paragraph in the report can be changed using the Paragraph Format dialog box. Select Format, Paragraph to display the following dialog box.

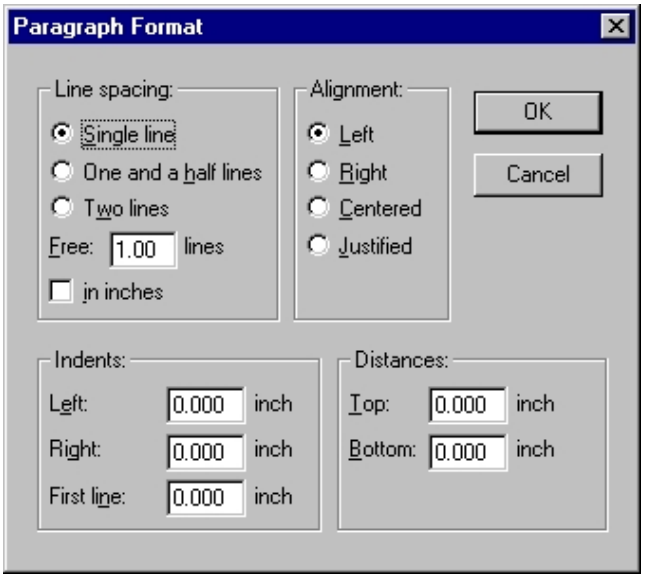


Fig. 115 Paragraph Format Dialog Box

Line spacing	Select from the available options to set the distance between lines on the report: Single line, One and a half line, Two lines.
Free	Enter the number of lines that will not be used, 1.0 is the default.
In inches	Enter the distance in inches for the left and right margins.
Alignment	Select one of the following paragraph alignment options: Left, Right, Centered, or Justified.
Indents	Enter the distance in inches, that all of the lines in the paragraph will be indented from the left side of the page and the right side of the page. Enter the distance the first line will be indented compared to the rest of the lines of the paragraph.
Distances	Enter the distance in inches that will be used as top and bottom margins on each page of the report.
OK	Save the paragraph formatting options and return to the report.
Cancel	Exit the Paragraph Format dialog box without saving the changes.

7.5 Using Word Processor Spell Check

Spell Check is a word processing option that checks the report for spelling errors.

7.5.1 Spell Check Dictionaries

The spell checker uses the active or default dictionary. Several dictionaries are available, including:

- American English
- British English
- French
- German
- Spanish

To change the active dictionary:

1. Select **Tools**, **Dictionary Options** to display the **Dictionary Options** dialog box.
2. Click the drop-down arrow to display a list of available dictionaries.
3. Select the desired dictionary to highlight it.
4. (optional) Click **Set Default** to change the selected dictionary to the default dictionary.
5. Click **OK** to activate the selected dictionary and close the dialog box.

7.5.2 Spell Check a Document

To access the spell check option, select Tools, Spell Check... to display the following dialog box.

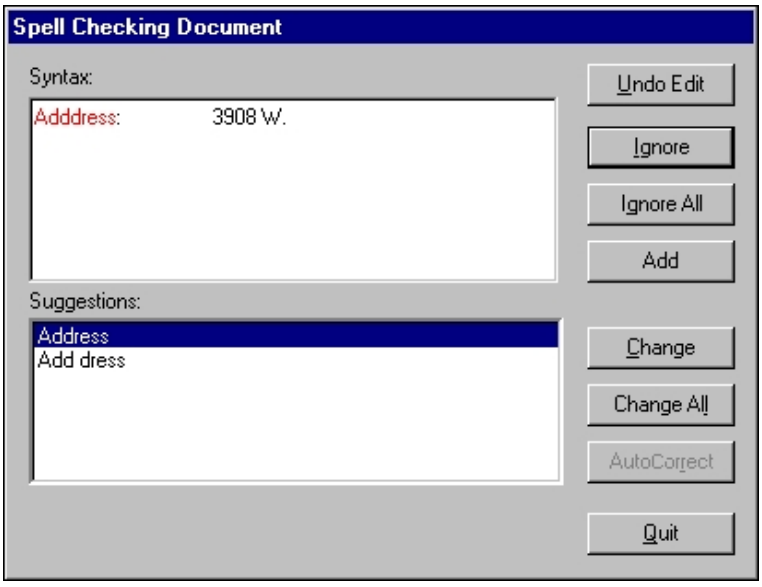


Fig. 116 Spell Checking Document Dialog Box

Syntax	Displays the possible misspelled word(s) from the report in red text.
Suggestions	Displays suggested correct spellings for the word(s) in red in the Syntax area.
Undo Edit	Changes the previously corrected word in the report back to the original form.
Ignore	Skips the currently highlighted word(s) in the report (listed in red in the Syntax area) and moves to the next not found word.
Ignore All	Skips the currently highlighted word(s) in the report (listed in red in the Syntax area) every time it finds it in the report.
Add	Adds the currently highlighted word in the report (listed in red in the Syntax area) to the custom dictionary.
Change	Replaces the currently highlighted word in the report (listed in red in the Syntax area) with the highlighted word in the Suggestions area.
Change All	Replaces the currently highlighted word every time it appears in the report (listed in red in the Syntax area) with the highlighted word in the Suggestions area.
AutoCorrect	(Disabled) Replaces all system found spelling errors with system selected words based on the currently selected Dictionary.
Quit	Close and exit the Spell Check option.

To spell check a report:

1. Select **Tools**, **Spell Check** from the Menu Bar to display the **Spell Checking Document** dialog box.

2. Look at the word(s) in red text in the **Syntax** area and decide whether changes are needed in the report.

> ***Note*** • *Click* ***Ignore*** *or* ***Ignore All*** *to skip the word in the* ***Syntax*** *area and not change it in the report.*
> *Click* ***Add*** *to add the word in red in the* ***Syntax*** *area to the current custom Dictionary. Once a word is added, the Spell Checker will not consider it misspelled.*

3. Look at the word(s) listed in the **Suggestions** area and click on a word to highlight it.
4. Click **Change** to change the existing word(s) in the report to the Suggested word or click **Change All** to change all occurrences of the misspelled word in the report to the suggested word.
5. Repeat steps 1 through 4 for each word that displays in red in the Syntax area. When the spell checker has completed the entire report, the buttons turn gray and the Quit button changes to Done.
6. Click **Done** or **Quit** to close the spell checker and return to the report and display this message. Click **OK**.

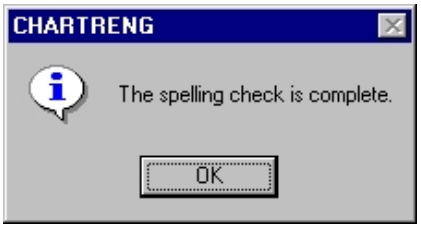


Fig. 117 Spelling Check Complete Message

7.6 Using Macros

Word processor macros are operator-defined shortcuts that can be used to insert strings of text within a patient report and from one report to another.

Any macros defined for the default operator are copied to the report setup for each new operator. Operators should check the macros available and make changes on an as needed basis.

7.6.1 Defining Macros

Macros are established in the Define Macro dialog box.

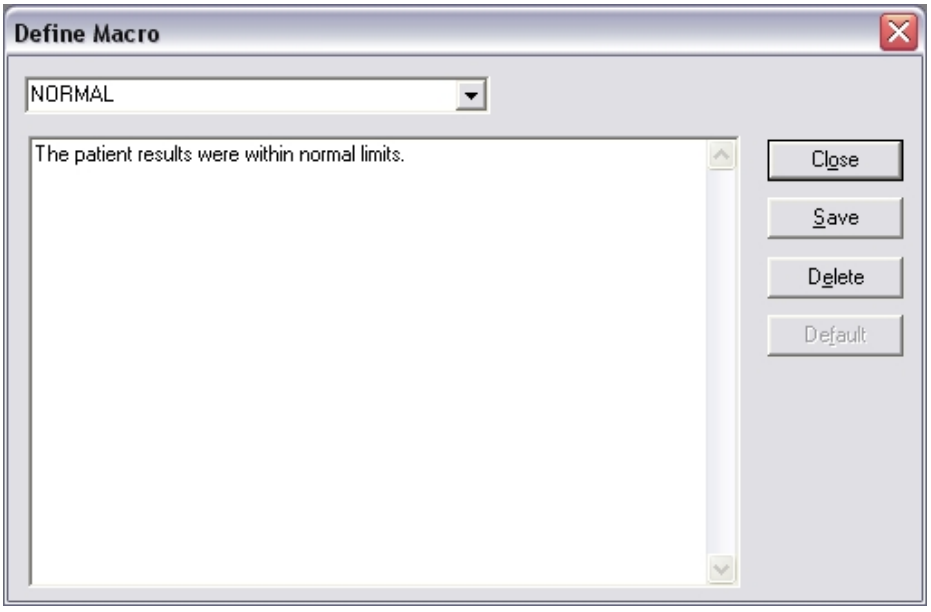


Fig. 118 Define Macro Dialog Box

Drop-down list	Type the up to 12-character name of a new macro or select an existing macro from the list.
Text box	Type the text for the macro or edit existing macro text.
Done	Exit the dialog box and save any changes.
Save	Save the currently displayed macro.
Delete	Delete the currently displayed macro.
Default	Replace the current operator macros with the macros defined for the Default Operator.

To define a word processor macro:

1. Select **Tools**, **Define Macro** to display the **Define Macro** dialog box.
2. Type an up to 12-character alphanumeric name for the macro.

3. Type the text in the text box. Press **Enter** to start a new line.

> ***Note*** • *Add new macros by typing over any word already entered in the box and saving it.*

4. Press **Save** to save the macro name and text.
5. Press **Done** to exit the dialog box.

7.6.2 Inserting Macros

Once a macro is defined, the operator may insert the macro text anywhere within the word processor portion of a patient report. Macros are inserted from the Get Macro dialog box.

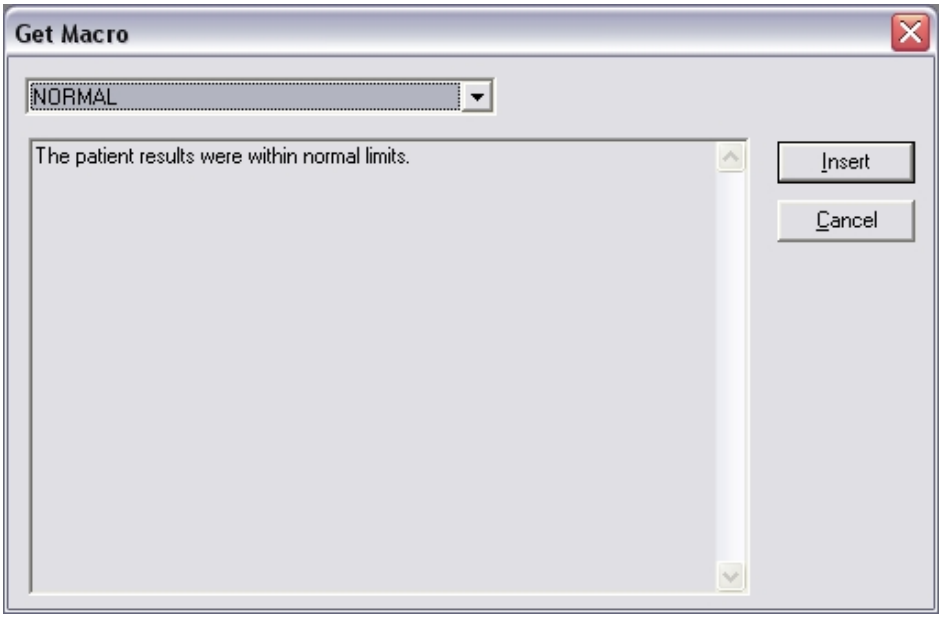


Fig. 119 Get Macro Dialog Box

Drop-down list	Display a list of existing macro names.
Text box	Display the text attached to the selected macro name.
Insert	Place the macro text at the cursor position in the patient report.
Cancel	Exit the dialog box without inserting the macro in the patient report.

To insert a macro in a patient report:

1. Place the cursor at the place you want to insert text in the patient report.
2. Select **Tools**, **Get Macro** or press **Ctrl + M** to display the **Get Macro** dialog box.
3. Select the macro from the list of available macros in the drop-down list box. Check the macro text and make sure the correct macro is selected.
4. Click **Insert** to place the macro text in the patient report.

Note • *The macro text will be assigned the font and paragraph attributes that are active at the point of insertion. For example, if the cursor is on a line that is Times, bold, 12 pt., and centered the macro text will display as Times, bold, 12 pt., centered. Once the macro is in the report, the operator may change the font and paragraph attributes.*

7.7 Report Setup

The report setup feature allows the operator to plan and designate the order in which the test results (waveforms) will appear in the printed report. Each operator should establish and maintain a template which will be used for all reports produced by that operator. If the operator does not define a set of report templates, a default template set is used. The default set is defined in the Default Operator.

All or only some of the test results may be included in the report. A waveform for each included test displays on the report in the order determined by the active template.

> ***Note*** • *The patient information section of the report is formatted in the word processor. For information on how to customize the report format for a specific facility, see* *Customizing the Word Processing Report ► 215 of this manual.*

7.7.1 Report Setup Dialog Box

Select File, Report Layout from the Main Window to display the Report Setup dialog box.

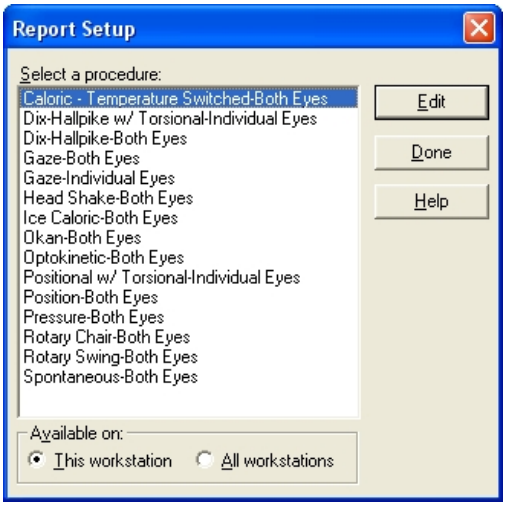


Fig. 120 Report Setup Dialog Box

Select a procedure	Displays a list of procedures.
Edit	Open the Report Page Setup - [procedure name] dialog box.
Done	Save the changes and exit the dialog box.
Help	Opens this User Manual.
Available on This workstation	Lists procedures available for the hardware in this workstation.
Available on All workstations	Lists the procedures available on all networked systems.

7.7.2 Report Page Setup Dialog Box

The Report Page Setup dialog box is used to establish a template which determines the placement of each protocol's results on a report page. The operator places the protocols and signals into the various text boxes.

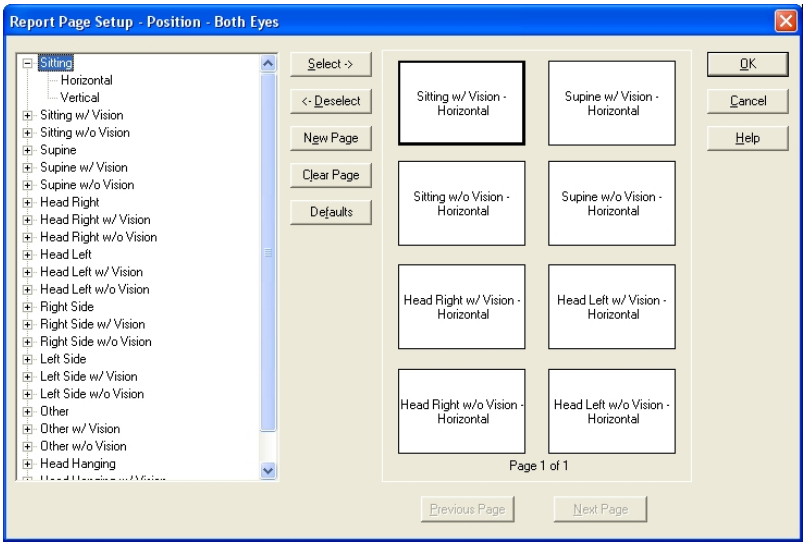


Fig. 121 Report Page Setup - [procedure name] Dialog Box

> ***Note*** • *Saccades, tracking, and caloric tests use report pages are fixed by Otometrics. The operator cannot define report setup for these procedures.*

Procedure Directory	Lists each procedure.
Select>>	Move the selected test protocol and signal to the highlighted text box.
<<**Deselect**	Remove the test protocol and signal from the highlighted text box.
New Page	Adds a new page to the report for this protocol.
Clear Page	Removes all protocols and signals from the report page. If Clear Page is pressed on the last page of a multiple page report, the last page is deleted.
Defaults	Loads the default page layout for this procedure.
Next Page	Access the next page of the report for this procedure.
Previous Page	Access the previous page of the report for this procedure.
OK	Save the format and exit the dialog box.
Cancel	Exit the dialog box without saving the changes.
Help	Opens this User Manual.

7.7.3 Setting Up a Report Template

Follow these steps to set up a template that will define the page format for each procedure included in a report.

To set up an operator-specific report template:

1. Select File, Report Layout from the Menu Bar to display the Report Setup dialog box (See Report Setup Dialog Box ► 152).
2. Select a procedure from the list of available procedures and click Edit to display the Report Page Setup - [procedure name] dialog box (See Report Page Setup - [procedure name] Dialog Box ► 153).
3. Click on the + sign in front of a protocol to expand the list.
4. Click on a text box on the right hand side of the window to select it.
5. Click on a specific test and signal to highlight it, then click the Select button to place the name of the selected protocol and signal in the Selected text box. Alternate: Double-click on a signal to place it in the Selected Test box. This represents the location on the report page where the selected protocol and signal results will display.
6. Click on the New Page button to add a new page to the report.
7. Continue selecting tests and placing tests until satisfied with the report setup.
8. Click OK to save the format and return to the Report Setup dialog.
9. Click Done to exit the Report Setup mode or repeat Steps 2 through 8 until you have selected and set up the page format for each protocol to be included in the report.

7.8 Printing a Report

Reports can be set up to include the word processor report page; the clinical information report; the test results; or selected combinations of these.

Individual test results choices for test result pages include: caloric Butterfly and/or Pods views and a combination saccade and tracking page.

> ***Note*** • *Both the Saccade-Horizontal Random Position and the Tracking-Sine Horizontal protocols must have been run to print the combination Saccade/Tracking page.*

Other viewing options can be selected, including the option to use Raw, Averaged, or Raw and Averaged data from Saccade and Tracking Analyses; or to include results from previous test sessions for the patient.

Page numbers can be included on or excluded for each page. And all of the report pages can be previewed on-line prior to printing.

Reports can be printed on either Letter or A4 size paper. Printer paper size is established during printer setup, typically from the Printer Properties dialog box. Reports always print in the Portrait mode on Letter or A4 paper, even if another option is set during printer set up.

> ***Note*** • *Printing a report is context sensitive to the active physician order/session. Grayed procedures indicate that the test was completed but no report format has been set up for these tests. For information on how to format each test result page in the report, see Report Setup ► 152.*

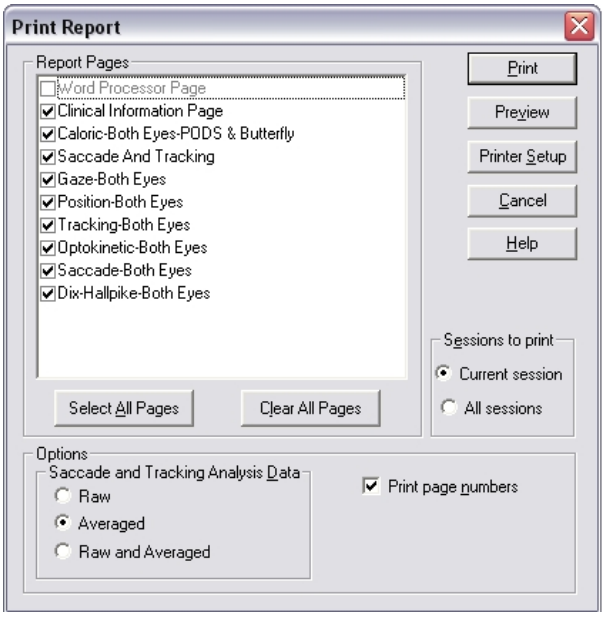


Fig. 122 Print Report Dialog Box

Report Pages

Word Processor Page Select to include the text portion of the patient report.

Clinical Information Page Select to include the clinical information questions in the report.

Test Procedures Pages (listed by procedure name) Select each of the test procedures to be included in the report.

Sessions to print

Current Session Select to display only the test procedures from the current test session.

All Sessions Select to display a list of the test procedures from all of the test sessions of the current Physician's Order for this patient in the database.

Options - Saccade and Tracking Analysis Data

Raw Select to print Saccade and Tracking Analysis data in the report in raw view only.

Averaged Select to print Saccade and Tracking Analysis data in the report in averaged view.

Raw and Averaged Select to print both raw and averaged views of the Saccade and Tracking Analysis data in the report.

Print Page numbers Select to include page numbers on each page of the report.

Buttons

Select All Pages Place a check mark in front of all of the listed Report pages.

Buttons	
Clear All Pages	Remove the check mark in front of all of the listed Report pages.
Print	Send the report directly to the printer.
Preview	Display the Print Preview mode. Display each page of the report as it will be printed.
Printer Setup	Display the Windows Print Setup dialog box.
Cancel	Exit the dialog box without printing the report.
Help	Opens this User Manual.

To print a patient report:

1. Select **File**, **Print Report** from the **Menu Bar** to display the **Print Report** dialog box.
2. Click **Word Processor Page** to select it and include patient information in the report. A ✓ indicates an option is selected.
3. Click **Clinical Information Page** to select it and include the general information in the report. A ✓ indicates an option is selected.
4. Click on a test procedure to select it and include the test results in the report. A ✓ indicates an option is selected.

> ***Note*** • *If multiple protocols are run within a procedure, e.g., Saccade: Horizontal Random and Saccade: Horizontal 10°, then all of the protocols from that procedure will be printed.*

> ***Note*** • *If a section of tracing is to be printed, the section chosen will be the section in the middle of the window when the protocol was last reviewed.*

5. Click on **Current Session** to include only results from the active session or click **All Sessions** to include results from all of the sessions under the active physician order for the patient. A dot indicates an option is selected.
6. Click on **Raw**, **Averaged**, or **Raw and Averaged** to display that view of the data for all saccade and tracking analysis data included in the report.
7. Select the **Print Page numbers** option if page numbers need to be included on each page of the report. The page numbers will be centered at the bottom of the report in the format: x of x. A ✓ indicates an option is selected.

8. Click **Preview** to display the **Print Preview** mode.

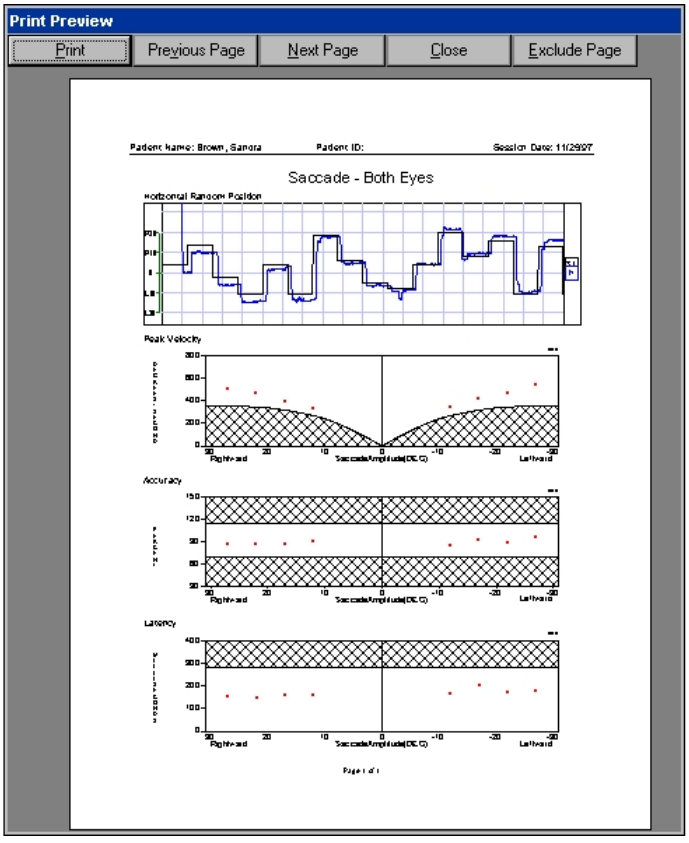


Fig. 123 Print Preview Mode, Test Result Page

While in Print Preview mode, the operator may:

A. Click **Print** to send the report to the printer.

B. Click **Previous Page** and **Next Page** to preview each page of the report.

C. Click **Exclude Page**/ **Include Page** to exclude or include individual pages from the report. Excluded pages are not part of the printed report page count, and "Excluded" displays instead of the page number on the preview page. Excluded pages are only valid when printing from the Print Preview mode.

D. Click **Close** to exit the **Print Preview** Mode and return to the **Print Report** dialog box.

9. Click **Printer Setup** to display the **Printer** dialog box.
10. Select the printer at which the report will be printed and the paper size (Letter or A4). All VNG reports print in the Portrait mode.
11. Click **Print** to print the report.

7.9 Creating Custom Reports

In the Review Mode, individual waveforms may be copied and pasted into a temporary custom waveform report. Although the resulting report may be printed, the system does not save an electronic version. The waveform report is deleted when the patient record is closed, another patient is selected, or the current Physician's Order of the session is changed.

7.9.1 Custom Page Dialog

To display the Custom Page Dialog, select a patient, access the Review mode, and click **F9 Copy Waveform**.

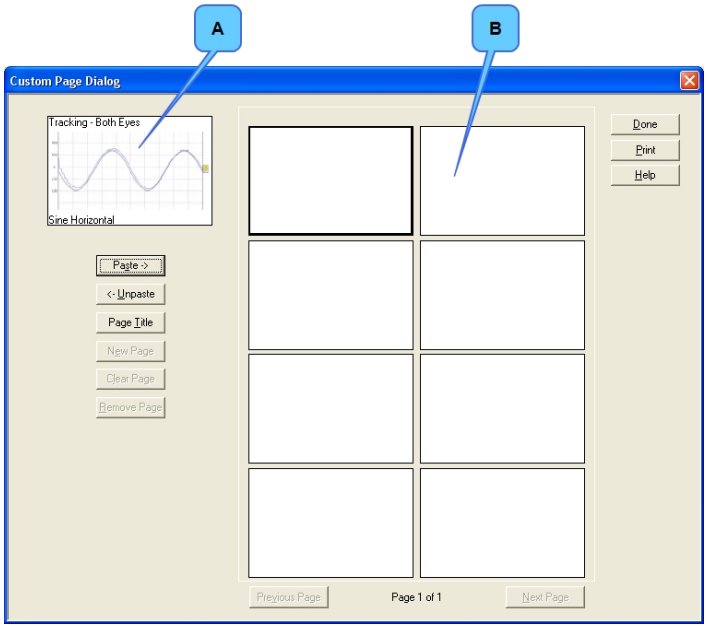


Fig. 124 Custom Page Dialog Box

A. Clipboard Area

B. Display Area

Clipboard Area Displays the waveform that is available to be copied to the selected Display Area.

Report Title Displays the title that will appear on the printed report. The default title is the name of the first copied waveform. Click the Page Title button to display the Custom Page Title dialog box and type the new report name.

Display Area Displays individual waveforms as they will be printed on the custom report. Click on a Display Area to select it or use the arrow keys to move through and select a Display Area. Then click the Paste button to copy the waveform from the Clipboard Area to the selected Display Area.

Buttons	
Paste	Copy the waveform that is in the Clipboard Area to the selected Display area.
UnPaste	Copy a waveform from a selected Display Area back to the Clipboard Area and remove the waveform from the selected Display Area.
Page Title	Display the Custom Page Title dialog box. Type the new custom report title in the text box and click OK to place the title on the report.
New Page	Add another page to the custom report.
Clear Page	Remove all of the waveforms from the Display Areas on the current page.
Remove Page	Remove the current page from the custom report.
Previous Page	Show the preceding page of the custom report.
Next Page	Show the subsequent page of the custom report.
Done	Close the Custom Page Dialog and return to the Review Mode. This does not delete the custom report. The report is deleted only when the selected patient record is closed; a new patient is selected; a new physician order is selected; another session is selected; or when the ICS Chartr 200 VNG/ENG application is closed.
Print	Send the custom report directly to the printer and print a paper copy.
Help	Opens this User Manual.

7.9.2 Creating a Custom Waveform Report

The following procedure provides instructions for using the Custom Page Dialog to create a custom waveform report for a selected patient. This type of report can only be created while in the Review Mode. The report is temporary in that the system will not save an electronic copy when the selected patient record is closed.

To create a custom waveform report:

1. Open a patient record and select the **Review** tab.
2. Locate a waveform segment that you want to print.
3. Click **F9 Copy Waveform** to display the **Custom Page Dialog** box with the current waveform displayed in the **Clipboard Area**.
4. Click on a **Display Area** or use the arrow keys to select it. A black border appears around the selected box.
5. Click **Paste** to copy the waveform from the **Clipboard Area** to the selected **Display Area**.

> ***Note*** • *You may continue to select, paste, and unpaste waveforms into the custom report as long as the selected patient record is open.*

6. Click **Done** to close the **Custom Page Dialog** box and return to the Review mode.
7. Repeat steps 2 through 6 until all of the waveforms that will be included in the custom report are copied to the **Custom Page Dialog**.
8. To change the order of waveforms in a custom report:
   A. Select a waveform and click **UnPaste** to move the selected waveform to the **Clipboard Area**. Select the desired

Display Area and click **Paste** to copy the waveform to the selected **Display Area**.

B. Click **New Page** to add another page to the report. Click **Delete Page** to remove the current page from the custom report.

C. Click **Page Title** to display the **Custom Page Title** dialog box. Type the new title and click **OK** to place the title at the top of the first page of the report.

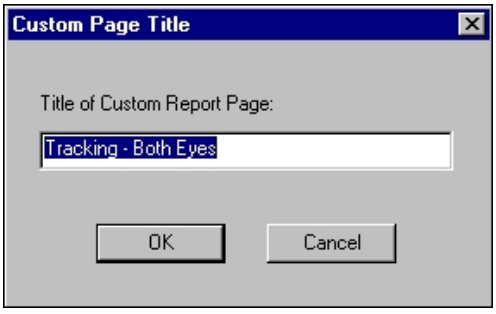


Fig. 125 Custom Page Title Dialog Box

> ***Note*** • *The Patient Name, Patient ID number, and Physician Order Date will always print on the top line of the report. The Title will print in a large font above the waveforms. Information about each waveform, including the waveform name and time, will print above and below the individual waveforms.*

D. Click **Previous Page** or **Next Page** to preview each page of the report.

E. Click **Clear Page** to remove all of the waveforms from the **Display Areas** on the current page.

9. Click **Print** to send the custom report to the printer.
10. Click **Done** to close the **Custom Page Dialog** and return to the Review Mode.

> ***Note*** • *The temporary custom waveform report will remain available until you change the Physician's Order in a session, close the selected patient, select another patient, or close ICS Chartr 200 VNG/ENG.*

7.10 Printing a Waveform

Displayed waveforms can be sent directly to the printer and printed immediately. This printout begins from the current position to the end of the waveform. The waveform data will print on as many pages as needed. The ending time for each waveform segment is also printed.

To print a waveform:

1. Select **File**, **Print Waveform** from the **Menu Bar** .
2. A prompt displays listing the name of the waveform and the printer to which it is being sent.

> ***Note*** • *The print order is spooled and will print as soon as the system resources are available, so that if a patient*

test is in process it will not be interrupted.

3. The waveform will print to the indicated printer. Click **Cancel** to stop the printing process.

7.11 Printing an Analysis

In the Analysis mode, an analyzed test result can be sent directly to a printer.

To print an analysis:

1. Click the **Review** tab to access the Review/Analysis mode.
2. Select **File**, **Print Analysis** from the Menu Bar to display a prompt indicating the printer to which the analysis is being sent. The waveform will print to the indicated printer.
3. Click **Cancel** to stop the printing process, if desired.

7.12 Printing a Calibration

Calibration waveforms can be sent directly to the printer and printed immediately.

***Note** • This procedure can only be done from the Calibration mode after the calibration is finished or while a calibration is being reviewed.*

To print a calibration:

1. Select **File**, **Print Calibration** from the **Menu Bar** .
2. A prompt displays listing the name of the calibration and the printer to which it is being sent.

***Note** • The print order is spooled and will print as soon as the system resources are available, so that if a patient test is in process it will not be interrupted.*

3. The waveform will print to the indicated printer. Click **Cancel** if you want to stop the printing process.

8 Exporting, Importing, and Archiving Records

This section provides information and procedures for exporting, importing, and archiving patient and database records in ICS Chartr VNG/ENG.

8.1 Overview

ICS Chartr 200 VNG/ENG saves all patient records to a database. The database typically resides on the hard drive of the workstation. It may also reside on a file server in a networked environment.

When the number of patient records reaches 75 MB, the patient records should be archived and moved to an offline storage media, such as CD-ROM backup or another hard drive. The archived patient records can be restored from offline storage at a later time.

Some facilities may want to archive records on a regular, scheduled basis. Regardless of the reason for the archive, the process used to archive the records is the same.

This section provides information on how to transfer individual patient records to other workstations and how to archive, store, and retrieve database records. The section is organized as follows:

- Exporting Patient Records
- Reviewing Exported Patient Records
- Importing Patient Records
- Archiving an Entire ICS Database
- Working with Archived Databases

8.2 Exporting Patient Records

Individual patient records can be transferred from one system to another via floppy disks, memory sticks, and CD-ROMs for review and analysis.

> ***Note*** • *Older systems used floppy disks or tape drives. Newer systems typically use hard drives, CD-ROMs or memory sticks to transfer data. The examples in this section will use a hard drive file.*

To export a patient record to a hard drive or memory stick:

1. Access the **Patient Selection** dialog box and select the patient whose records will be transferred.
2. Click **OK** to access the **Patient Information** dialog box and click **OK** to open the patient record.

3. Select **Database**, **Export Patient to Database**. The Save Export As dialog will prompt you to select the database file to export to. Select an existing database file or a new (empty) file.

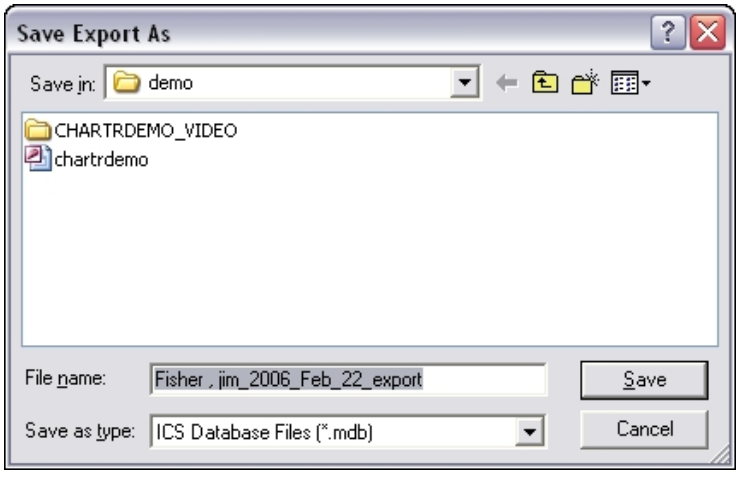


Fig. 126 Save Export As Dialog Box

Note • *If you select an existing ICS database file, the following dialog box will display.*

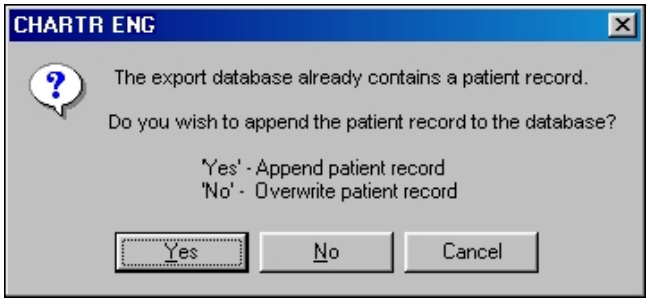


Fig. 127 Contains a Patient Record Message

Note • *Click **Yes** to append the patient record to the existing database or click **No** to overwrite the existing patient record(s) and replace it with the current patient record.*

4. Click **Save** to save the patient record to the selected database.

8.3 Reviewing Export Database Patient Records

Patient records that have been exported to a database file can be reviewed and analyzed on any other workstation.

To review a patient record in an export database:

1. Select **Database**, **Open Archived Database or Exported Patient**. The Open File dialog will allow you to select an archived database or an export database
2. Select the desire database and click **OK** to display the **Patient Selection** dialog box containing a list of the patient records on the floppy disk.
3. Select the desired patient record to view.
4. Select **File**, **Close Patient** to close the active patient record when finished.

8.4 Importing Patient Records

Data in an archived database or exported patient database can be returned to the original database for storage or viewing.

To import a patient record from a database file:

1. Select **Database**, **Import Patients from Database**. The Open File dialog will allow you to select the archived database or export database containing the patient records you wish to import.

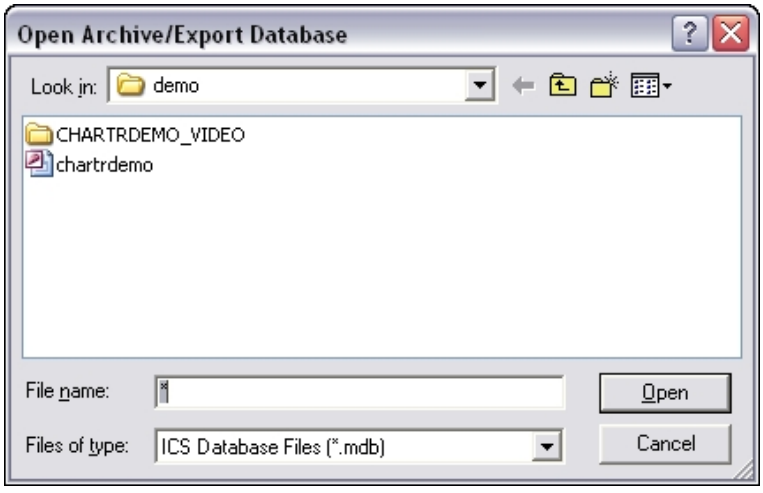


Fig. 128 Open Archive/Export Database Dialog Box

2. Click **OK** to display the **Import Patient Selection** dialog box containing a list of the patient records in the archive/-export database.
3. Select the desired patient record(s) to be imported. Click **OK** to import the patient record(s).

To import patient records into Chartr 200 systems:

1. Select **Database**, **Import Patients from Database.**
2. Select the database (*.mdb) and click **Open**. A prompt: “operator specific information will not be imported…” displays. Click **OK**.
3. Highlight all patients (select the top case on the list, hold the Shift key, and left click on the bottom case) and click **Import**.
4. Click **OK**. Importing may take a few minutes if there are video files.

8.5 Archiving an Entire Database

The ICS VNG system includes an archiving option that allows the operator to archive all of the patient records in the main database. The archived records can be re-imported easily.

> ***Note*** • *Operator, referring physician, and other non-patient records are archived with the patient records and are also maintained to the new empty main database.*

Typical reasons for archiving records include:

- **System Requirements**. When the storage capacity of the database is filled, system resources are impacted. This affects the ability of the system to successfully conduct, review, and analyze tests.
- **Periodic Storage**. Some facilities may want to schedule archives of patient records on a regular basis, for example, archiving monthly, quarterly, or annually.
- There is an archive warning that will appear when the database reaches 75 and 512 MB. This option is located in the System Options, Workstation Settings tab dialog box.

To archive patient records:

1. Open the Database Menu.

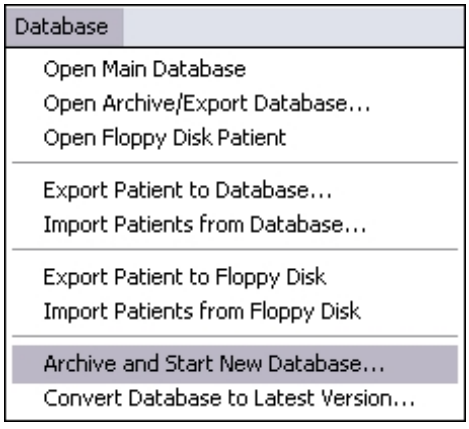


Fig. 129 Database Menu

2. Select **Database**, **Archive and Start New Database** to display the **Select Archive Destination** dialog box.

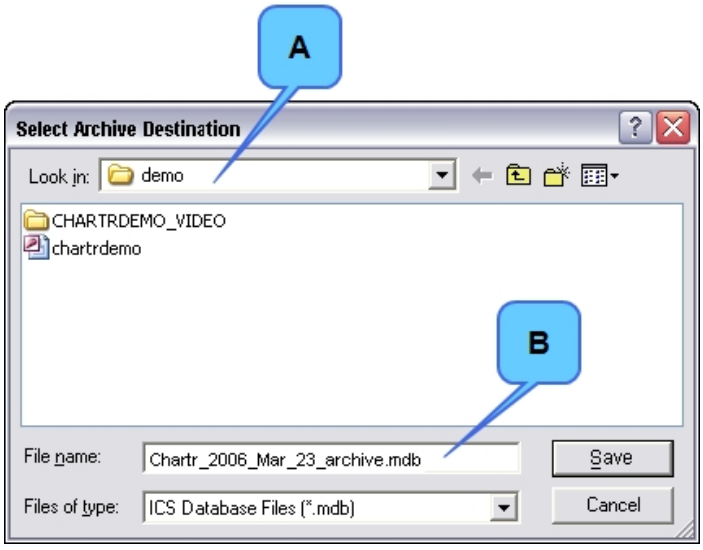


Fig. 130 Select Archive Destination Dialog Box

A. Destination name here
B. File name here

3. Select a destination folder for the archive.

4. Choose the default archive name or type a new name in the **Archive Destination Save As** dialog. If the

Note 1: *The system automatically assigns a name, based on the year, month, day, to the archive. (Example: chartr_2006_Mar_23_arachive.mdb is an archive created March 23, 2006). The archive file extension is always .mdb.*

For consistency and accuracy, we recommend that you use the archive default destination folder and default naming conventions. However, you may assign a name and store an archive in a folder of your choosing.

Note 2: *If you select an existing ICS database file, the following dialog box will display.*

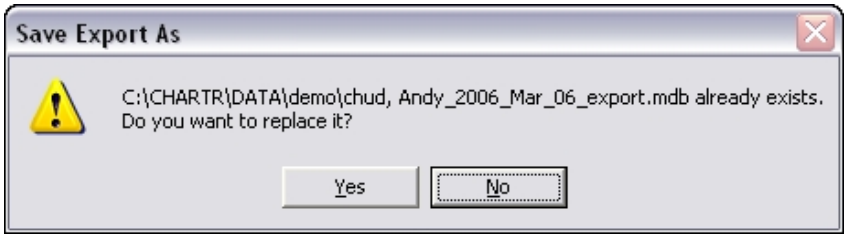


Fig. 131 Save Export As message

Click Yes to replace the old database file with the current database file. Click No to return to the Select Archive Destination dialog box without saving the current database file.

5. Click **Save** to store the archive file in the destination folder. A message will display announcing that the database archive was successful and the archived database and video files may now be moved to another storage medium, such as CD/DVD-ROM.

The archived database and videos may now be moved to an offline storage option, such as CD/DVD-ROM. Once copied to a new destination, the archived database on the hard drive should be deleted in order to free up disk space.

- Use Windows Explorer to copy the archived database and videos to another location, or use your CD/DVD-ROM burning software to burn the database and videos to CD/DVD-ROM.
- Use the instructions supplied by the manufacturer to copy the archived database to another storage option.

8.6 Working with Archived Patient Records

Archived records can be accessed directly from the ICS VNG system and reviewed at any time.

To view an archived database:

1. Select **Database**, **Open Archive/Export Database**to display the **Select Archive Source** dialog box.

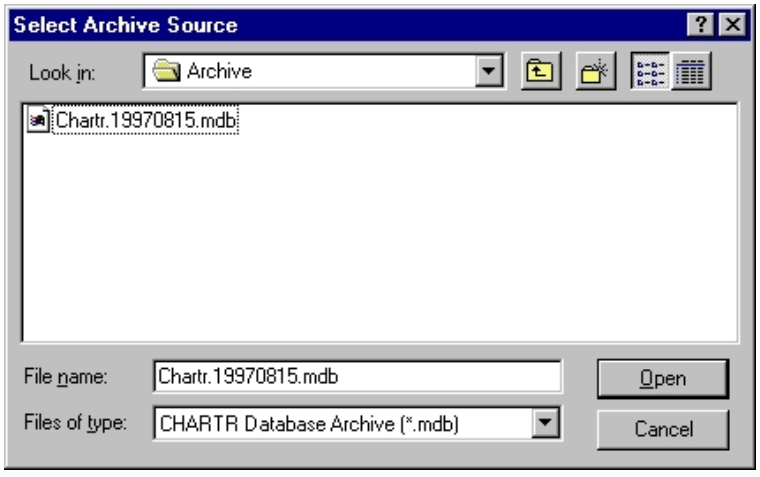


Fig. 132 Select Archive Source Dialog Box

2. Select the archived file to be opened. Make sure it displays in the **File name** text box.
3. Click **Open** to display the **Patient Selection** dialog box.
4. Select a patient from the list of available patients and click **OK** to view the selected patient's record.
5. Select **File**, **Close Patient** to close the patient record.
6. Select **Database**, **Open Main Database** to exit the archived database and return to the main database.

> ***Note*** • *Refer to the procedure Exporting Patient Records ► 162 for instructions on how to move an archived database offline again.*

9 Troubleshooting

This section provides information on how to work with the builtin system software and hardware diagnostic options to troubleshoot the system.

9.1 Overview

The diagnostic options available in ICS Chartr 200 VNG/ENG are used to ensure the proper function of the system components. An operator uses these options to help troubleshoot the system.

This section covers the online diagnostics for ICS Chartr 200 VNG/ENG hardware and ICS CHARTR systems and systems that include video.

The diagnostic information obtained from the tests is used in conjunction with the troubleshooting and error message information found in this section to help in resolving system problems.

This section also contains information on attempting to fix a corrupted database. Use the database repair procedure only if the system prompts with an error message (see Error Messages ► 223) while attempting to access or save information to the database.

Contact Otometrics Customer Support for additional technical assistance.

> ***Note*** • *The items enabled in the diagnostics menu relate to the specific system hardware being used.*

9.2 Diagnostic Tests

The diagnostic tests verify the status of system components. These tests are performed on the hardware components of the system and are used to help isolate defective system components.

9.2.1 Self Test

The self-check diagnostic test is used to make sure the system is working properly and able to collect data.

To conduct a self-test:

1. Launch the ENG software.
2. Plug the loopback test fixture into the back of the Chartr 200 box denoted by this symbol  .
3. Plug the ENG patient cable into the loopback test fixture.

4. In the ENG software, click **Diagnostics**, **USB Unit Loopback and HW Diagnostics**.

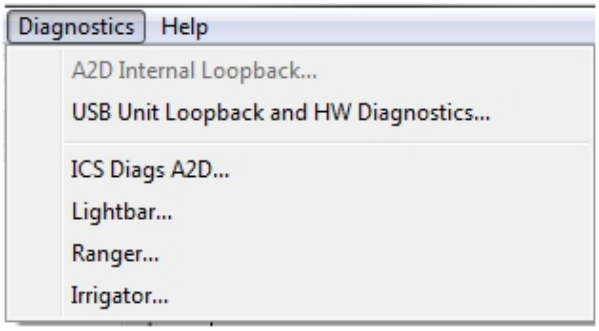


Fig. 133 Diagnostics Menu

5. Select **External** and click **OK**.

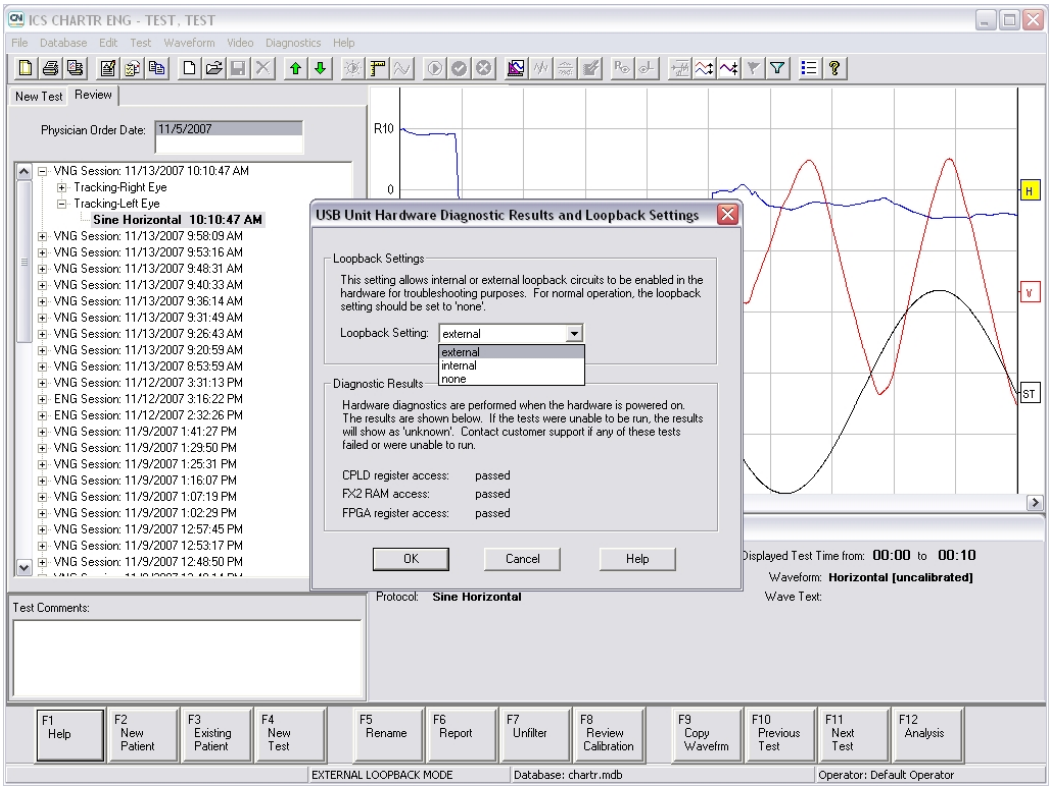


Fig. 134 USB Unit Hardware Diagnostic Results and Loopback Settings Dialog Box

6. Open an existing patient file, select a protocol, and press **F5 Calibrate** to access the Calibration Mode.
7. Press **F12 Start** to run a calibration. **Do NOT click Accept**.
8. Check the on-screen tracings. The target and the signal waveforms should overlap. This may take 5 to 10 seconds before they overlap. You may spread the waveforms to make sure both signals are displayed.
9. Verify that the Pass light on the text fixture is illuminated.

10. Press **F9 Cancel** to stop the current calibration. Then press **F3 Default** to move onto the next channel.

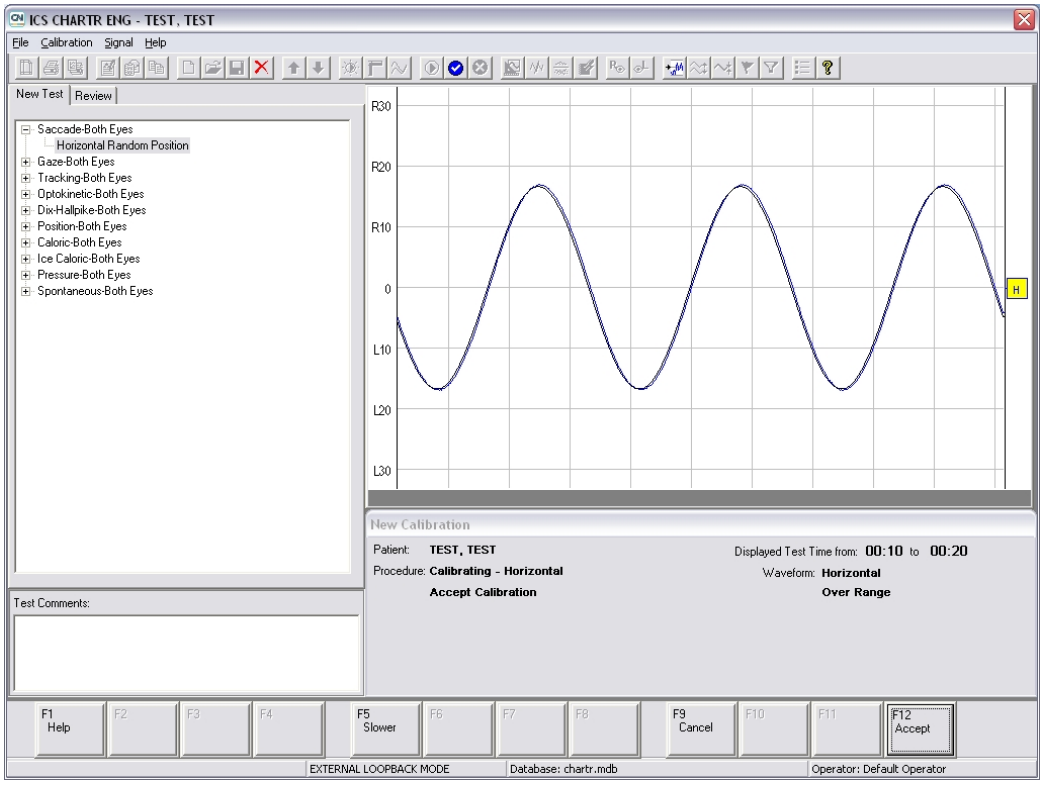


Fig. 135 Test Dialog Box

1. Repeat this process for all channels.
2. **IMPORTANT**: In order to begin patient data collection, click **Diagnostics**, **USB Unit Loopback and HW Diagnostics**. Change the Loopback setting to **None**.
3. Contact Otometrics for technical support if the target and signal waveforms do not mirror each other.

> ***Note*** • *If you continue to have problems and the system passes the diagnostic evaluation, the problem may reside with the electric leads, the electrodes, or the patient electrode junction.*

9.2.2 ENG Board Check

The board check diagnostics option is used to verify the operating status of the amplifier board in the Chartr 200.

> ***Note*** • *This diagnostic test should be used only in conjunction with or under the direction of Otometrics personnel.*

Select **Diagnostics**, **USB** to display a dialog box similar to the one shown in Fig. 136 ▶ 171.

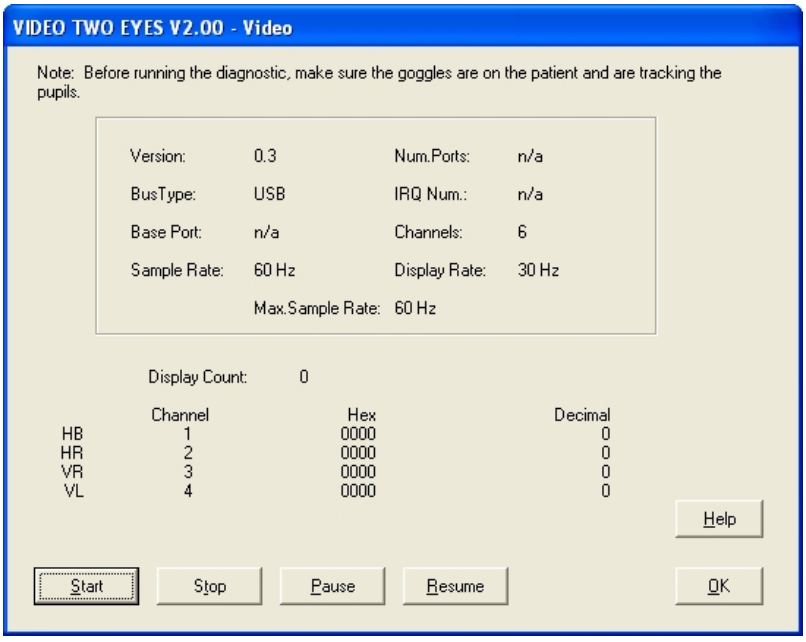


Fig. 136 USB Unit Dialog Box

On the USB unit dialog box, the status is shown in the upper portion of the window. During collection, the hex and decimal values from all two or four channels display in the lower portion of the window. The numbers are updated at the display rate.

The USB unit dialog box provides the following information.

Version	Lists the current version.
Num Ports	Lists the number of active ports.
Bus Type	Lists the bus type used by the board.
IRQ Number	Lists the IRQ number assigned to the board.
Base Port	Provides the Base Port I/O address.
Channels	Lists the number of active, available channels.
Sample Rate	Displays the sample rate in Hz.
Display Rate	Displays the display rate in Hz.
Max Sample Rate	Displays the maximum sample rate in Hz.
Display Count	Displays the number of times the display is updated. The number increments during a diagnostic test.
Channel	Lists the channel number.
Hex	Provides the hexadecimal reading for each channel.
Decimal	Provides the decimal reading for each channel.

Buttons	
Start	Begin a diagnostic session.
Stop	Stop the active diagnostic session.
Pause	Pause the active diagnostic session while holding the Display Count.
Resume	Resume the diagnostic session and continue to increment the Display Count.
Help	Opens this User Manual.
OK	Exit the dialog box.

9.2.3 USB Diagnostics and Internal Loopback

The USB and USB Internal Loopback and USB Diagnostics options are used to verify the operating status of the USB hardware.

> ***Note*** • *This diagnostic test should be used only in conjunction with or under the direction of Otometrics personnel.*

Select **Diagnostics**, **USB** or **Diagnostics**, **USB Loopback and HW Diagnostics** to display the USB Hardware Diagnostic Results and Loopback Settings dialog box.

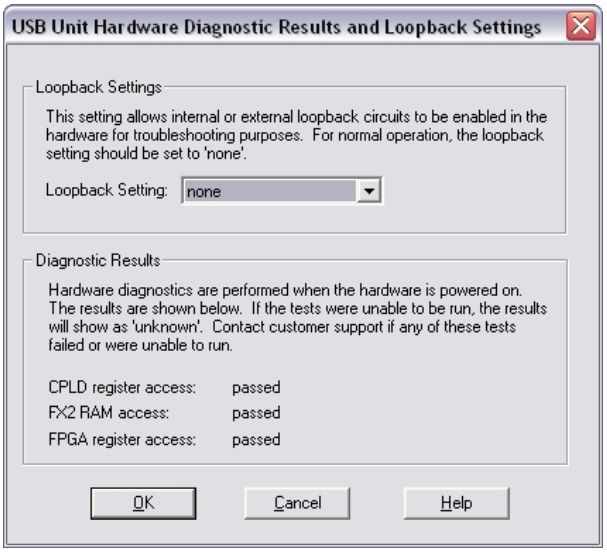


Fig. 137 USB Hardware Diagnostic Results and Loopback Settings Dialog Box

The USB Hardware Diagnostic Results and Loopback Settings dialog box provides the following information.

Loopback Settings Enable loopback circuits for hardware troubleshooting. The options are none (for normal operations) and external and internal for diagnostic troubleshooting.

Diagnostic Results Indicates diagnostic test results for the CPLD register access, FX2 RAM access, and FPGA register access. The results will be listed as:

- **passed** if the hardware is performing properly.
- **failed** if the hardware is not performing properly.
- **unknown** if the system was unable to run the tests.

Note • *Contact Otometrics Customer Support for assistance if any of these tests failed or were unable to run.*

9.3 Light Bar

The Light Bar diagnostic option is used to verify the hardware operation of the light bar.

Note • *This diagnostic test should be used only in conjunction with or under the direction of Otometrics personnel.*

The light bar contains a series of LED lights. The lights are arranged in a specific pattern and are activated based on the requirements of the test being conducted. The manual diagnostic test checks to determine whether all of the LEDs are working properly for each type of test.

To display the Lightbar dialog box, close any open patient records to display the Empty Main Window. Select Diagnostics, Lightbar to display a dialog box similar to the one shown in Fig. 138 ▶ 174.

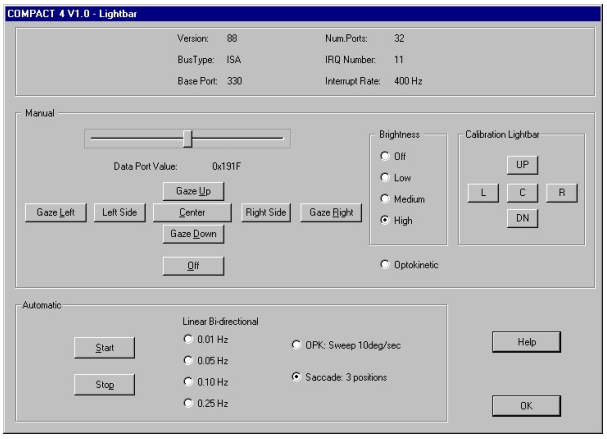


Fig. 138 Lightbar Dialog Box

Status information is shown in the upper portion of the window. Manual and automatic operations are shown in the lower portion of the window.

The Lightbar dialog box provides the following information:

Version	Lists the current version of the light bar.
NumPorts	Lists the number of active ports.
BusType	Lists the bus type used by the light bar.
IRQNum	Lists the IRQ number assigned to the light bar.
BasePort	Provides the Base Port I/O address.
Interrupt Rate	Provides the interrupt rate for the light bar.

Manual Operations	
Data Port Value	For Otometrics technical support use only.
Gaze Left	Moves the light bar light to the Gaze Left (-30°) position.
Left Side	Moves the light bar light to the left (approximately 16.7°) position.
Center	Moves the light bar light to the center.
Right Side	Moves the light bar light to the right (approximately 16.7°) position.
Gaze Right	Moves the light bar light to the Gaze Right (+30°) position.
Gaze Up	Moves the light bar light to the Gaze Up (+30°) position (light bar rotated vertically).
Gaze Down	Moves the light bar light to the Gaze Down (-30°) position (light bar rotated vertically).
Brightness	Select one of the brightness settings:
	Off Turn light off.
	Low Use lowest setting.
	Medium Use medium setting.
	High Use highest setting.
Calibration Lights	For Otometrics technical support use only.
Automatic Operations	For Otometrics technical support use only.
OK	Exit the dialog box.

Lightbar Diagnostics User Information

The arrow keys and mouse may be used to manually move the slider, and the light bar light will follow. The buttons can be used to select gaze lights, left/right sides of the light bar, and turn the light bar off.

9.4 Ranger

The Ranger diagnostic function is used to test the light bar ranging function. During a patient test session, the Ranger status is conveyed to the operator as Under Range, an actual distance, or Over Range. In addition, a clicking sound can be heard when the ranger is operating.

> ***Note*** • *This diagnostic test should be used only in conjunction with or under the direction of Otometrics personnel.*

The diagnostic test function, described in this section, involves a dynamic test of the ranger accuracy. When the test is started, the range values change and the software collates how many samples were in and out of the “goal” range. The goal range is 44 to 52 inches (111.76 to 132.08 cm).

At the end of a test, the results of the “in” and “out” samples display as a percent. These values are used to guide the technical comment that displays at the end of a patient test—“Out of Range” more than “xx%” of the goal range during the test.

From the Empty Main Window, select **Diagnostics**, **Ranger** to display a dialog box similar to the one shown in Fig. 139 ► 176.

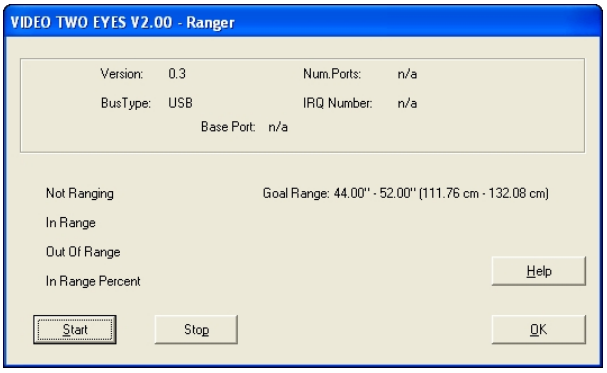


Fig. 139 Ranger Dialog Box

The Status is shown in the upper portion of the window.

Click Start to begin the Ranger diagnostic test. While ranging a value displays. Click Stop to end the test and display the test result which is a display of the number of samples (sampling is done every 3 seconds) measured that were in and out of range. In addition, the in-range percent value displays.

The Ranger dialog box provides the following information:

Version	Lists the version number for the ranger.
NumPorts	Lists the number of ports for the ranger component.
BusType	Lists the active bus type for the ranger.
IRQNum	Lists the IRQ number assigned to the ranger.
BasePort	Lists the base port I/O address for the ranger.
Not Ranging	Indicates the ranger is stopped.
In Range	Indicates the ranger is working. Also indicates the distance to the target.
Out Of Range	Indicates the distance to the target is not within the accepted range.
In Range Percent	Indicates the percentage of the active time that the target was within the accepted range.
GoalRange	Indicates the patient to light bar distance that is used as the standard or goal.
Start	Begin the ranger diagnostic session.
Stop	Stop the ranger diagnostic session.
OK	Exit the Ranger dialog box.

9.5 Irrigator

The irrigator diagnostic test evaluates the control of a Otometrics NCA200 (air) or NCI-480 (water) caloric stimulator. The test examines the communication between the software and the selection of warm and cool temperatures on the stimulator.

***Note** • This diagnostic test should be used only in conjunction with or under the direction of Otometrics personnel.*

The PC and the irrigator communicate operating status and temperature information through an interconnecting cable (see Installing/Reinstalling ICS Chartr 200 VNG/ENG Software ► 9 for additional information). When the operator selects a caloric test from the software, the system automatically sets the correct bath or temperature on the stimulator. In turn, the first depression of the head of the irrigator or the footswitch starts the recording and the irrigation. Subsequent depressions of the button on the irrigator head or footswitch remotely center the tracings. For non-caloric tests, the footswitch can be used to remotely start and center tracings if the power to the irrigator is on.

From the Empty Main Window, select Diagnostics, Irrigator to display an Irrigator dialog box similar to the one shown in Fig. 140 ► 177.

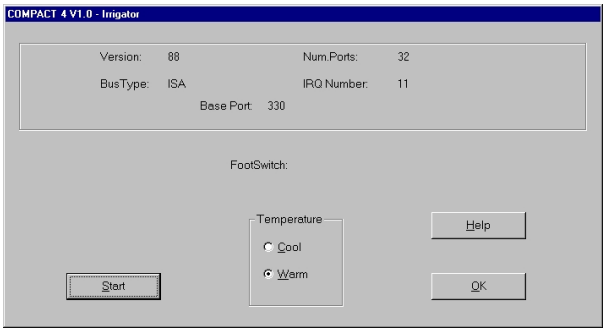


Fig. 140 Irrigator Dialog Box

The status information displays in the upper portion of the window. The test results display in the lower portion of the window.

The Irrigator dialog box provides the following information:

Version	Lists the version number for this component.
Num Ports	Lists the number of ports for this component.
Bus Type	Lists the active bus type for this component.
IRQ Number	Lists the IRQ number assigned to the irrigator.
Base Port	Lists the base port I/O address for the irrigator.
Footswitch	Lists the current footswitch status. Reads “pressed” if the footswitch or the button on the head of the irrigator is pressed.
Temperature	Select Cool or Warm to change the temperature stimulus on the irrigator.
Start	Begin the countdown on the timer of both stimulators.
OK	Exit the dialog box.

9.6 Video

9.6.1 Video Diagnostics

The Video Diagnostic option is used to verify the operation of the video equipment when operating VNG under the direction of a Otometrics support technician.

The Video diagnostic mode is used to test the video equipment and determine whether all of the channels are operating.

To display the Video Diagnostics dialog box, close any open patient records to display the Empty Main Window. Select **Diagnostics**, **ICS Diags A2D** to display a dialog box similar to the one shown in Fig. 141 ▶ 178.

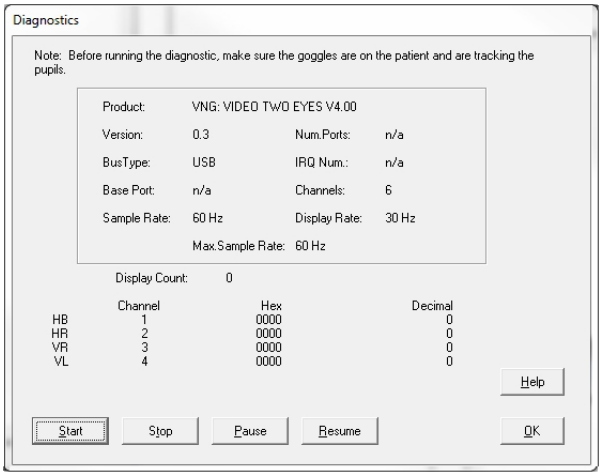


Fig. 141 Video Diagnostics Dialog Box

The status information displays in the upper portion of the window. The test results display in the lower portion of the window. During operation, the hex and decimal values from all six channels display in the lower portion of the window. The numbers are updated at the display rate.

The Video dialog box provides the following information:

Version	Lists the version number for the Frame Grabber board.
Num Ports	Lists the number of ports for the Frame Grabber board.
Bus Type	Lists the active bus type for the Frame Grabber board.
IRQ Number	Lists the IRQ number assigned to the Frame Grabber board.
Base Port	Lists the base port I/O address for the Frame Grabber board.
Channels	Lists the number of active, available channels.
Sample Rate	Displays the sample rate in Hz.
Display Rate	Displays the display rate in Hz.
Max Sample Rate	Displays the maximum sample rate in Hz.

Display Count	Displays the number of times the display is updated. The number increments during a diagnostic test.
Channel	Lists each of the six active channels by type and number (H = horizontal, V = vertical, and T = torsional). Torsional channels are not active in this version of VNG, and will report as a flat line.
Hex	Provides the hexadecimal reading for each channel.
Decimal	Provides the decimal reading for each channel.
Start	Begin a diagnostic session.
Stop	Stop the active diagnostic session.
Pause	Pause the active diagnostic session while holding the Display Count.
Resume	Resume the diagnostic session and continue to increment the Display Count.
Help	Opens this User Manual.
OK	Exit the dialog box.

9.6.2 Video Equipment Connection Problems

If there is no video signal on the video monitor, the possible cause could be a missing or unreliable cable connection between ICS Chartr 200 VNG/ENG and the goggles.

- Check the cable connections.
- Check the power connection: Turn on the fixation LED and look into the goggles from the outside. A faint green glow should be seen in the small holes right below the round black windows.

If the system senses a problem with the cable connections between the goggles, the video distribution amplifier, the ICS Chartr 200 VNG/ENG, or any related video equipment, the following error message will display.

Fig. 142 Video Connection Error Message

If this message displays:

- Make sure the Chartr 200 is powered on and communicating with the computer (green light). If the ICS Chartr 200 is powered up, but has not yet connected to the computer, the light will be blue.
- Make sure the cable connections between the goggles, and video port on the back of the ICS Chartr 200 are firmly in place and connected according to App. 4.1 ▶ 220 and App. 4.2 ▶ 221.
- Close and exit the VNG application.

Then, from the Windows Desktop, restart the VNG application. This will allow the program to sense the presence of the video equipment and setup the necessary system components needed to operate the VNG application.

9.6.3 Video Image Problems

Problem	Possible cause	Solution
The video image on monitor is hazy, dark or noisy	Cameras may be out of focus.	Adjust the focus with the focus adjustment knob until the image is sharp. Ensure that the headstrap is neither too tight nor too loose, since this could result in the correct focus position being outside the adjustment range.
	One or more of the infrared LEDs are blocked, reducing the illumination of the eye.	Clean the surface of the central and side LEDs. If the problem persists, the LEDs may be defective. Contact your local Otometrics dealer for service. ***Caution*** • *Do not moisten the IR-filters! Use a dry cloth only.*
The video image is clear and crisp, but the position of the pupil cannot be reliably detected.	The eye is positioned too far outside of the optimal area.	Adjust the eye position by turning the knobs on the outside of the goggle.

9.7 Database Repair Utility

A Database Repair Utility, installed on the system hard drive, attempts to correct ICS Chartr 200 VNG/ENG database problems. Use this utility only when instructed by an error message while attempting to access or save information to the database.

Warning • *Do not run this utility unless necessary. Running the repair program on a database that is not experiencing problems may actually corrupt the database.*

To run the Database Repair Utility:

1. Select **File**, **Exit** to close the **ICS VNG/ENG for Windows** application.

2. Click **Start** and select Otometrics, **CHARTRDatabase Repair** to access the Database Repair Utility and display this prompt.

Fig. 143 CHARTR Database Repair Prompt

3. Click **Yes** to repair the database or click **No** to close the Database Repair Utility without repairing the database. No further operator action is required.
4. Click **Start** and select Otometrics, **ICS VNG/ENG** to restart the application after the database repair is completed.

> ***Note*** • *If you continue to have database problems, contact Otometrics Customer Support for assistance.*

10 Safety

This Operator's Manual contains information and warnings that must be followed to ensure the safe performance of ICS Chartr 200 VNG/ENG. Local government rules and regulations, if applicable, should also be followed at all times.

10.1 Symbols Used

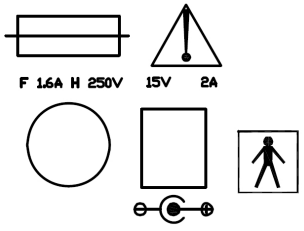
ICS Chartr 200 Symbols

	ICS Chartr 200 VNG/ENG is marked with this symbol to indicate compliance with Type BF of the safety standard EN 60601-1.
	ICS Chartr 200 VNG/ENG is marked with this symbol when it is important that the user refers to associated information given in this manual.
	The switch alternates between On and Stand-by mode. Green – the switch is On (pushed in) and the USB connection unit is ready. Blue – the switch is in Stand-by mode (pushed in) with no USB connection. Clear – the switch is Off (pushed out).
	The instrument is marked with this symbol to indicate that it is electronic equipment covered by the Directive 2002/96/EC on waste electrical and electronic equipment (WEEE).
	ICS Chartr 200 VNG/ENG is marked with this symbol to indicate it is suitable for direct current.
	Symbols on the ICS Chartr 200 VNG/ENG back panel, see section *ICS Chartr 200Back Panel* on ICS Chartr 200 VNG/ENG Back Panel Connections ▶ 221.

ICS Chartr 200 Accessories Symbols

 ISO 15223-1 Symbol 5.4.2	Do not reuse. Indicates a medical device that is intended for one use, or for use on a single patient during a single procedure.

10.2 Warning Notes

	Equipment connected to the displayed connectors must be certified to relevant EN/IEC safety standards, e.g., EN/IEC 60950. Mains connected equipment – except EN/IEC 60601-1 certified equipment – must be powered from the Powertronix Isolation Station (X1ATWFHNOC1).
	Equipment connected to the displayed connectors must be certified to relevant EN/IEC safety standards, e.g., EN/IEC 60950. Mains connected equipment – except EN/IEC 60601-1 certified equipment – must be powered from the Powertronix Isolation Station (X1ATWFHNOC1).
	The ICS Chartr 200 should only be connected to power adapter type FW7362M/15 from Friwo. For continued protection against fire hazard, replace fuse with the same type and rating only.

Note 1: There are no user-serviceable parts inside the ICS Chartr 200 cabinet. For the sake of safety, and in order not to void the warranty, the cabinets should only be opened and serviced by authorized service personnel. In case of defects, please make a detailed description of the defect(s) and contact your supplier. Do not use a defective instrument.

Note 2: Keep ICS Chartr 200 VNG/ENG away from liquids. Do not allow moisture inside the instrument.

Note 3: Do not use the instrument in the presence of flammable anesthetics (gases).

Note 4: Unwanted noise may occur if ICS Chartr 200 VNG/ENG is exposed to a strong radio field. Such noise may interfere with the process of recording correct measurements. Many types of electrical devices, e.g., mobile telephones, may generate radio fields. We recommend that the use of such devices in the vicinity of ICS Chartr 200 VNG/ENG is restricted as much as possible.

Note 5: It is recommended to install the unit in an environment that minimizes the amount of static electricity. For example, anti-static carpeting is recommended.

Note 6: No parts may be eaten, burnt, or in any way used for purposes other than videonystagmography and electronystagmography testing.

Note 7: ICS Chartr VNG/ENG can be disposed of as normal electronic waste, according to local regulations.

Note 8: For safety reasons, accessories connected to the equipment's outlet fittings must be identical to the type supplied with the system.

Note 9: To comply with EN 60601-1-1, the computer, printer, etc. must be connected to the isolation transformer.

Note 10:	Conductive parts with patient connection must not be in contact with other conductive parts at any time. No defibrillators or HF surgical equipment should be applied to the patient when connected to ICS Chartr 200 VNG/ENG at any time.
Note 11:	Connection to network or modem components may compromise the safety or effectiveness of this system. Use fiber-optic network connections to install the computer on a network.
Note 12:	Installation of any third party software (applications, programs, or utilities) other than those specified by Otometrics can compromise the safety or effectiveness of this system.
Note 13:	The device is disconnected from the mains by pulling the plug from the wall outlet.
Note 14:	Avoid accidental contact between connected but unapplied parts (VG-40 video goggle and electrodes including connections) and other conductive parts.
Note 15:	The Isolation station should be plugged into an outlet. Extension cords or power strips (MSPO) should not be used in combination with the isolation station.
Note 16:	Only the ICS Chartr 200 power supply, laptop/computer power supply, and printer power supply should be connected to the isolation station. Do not connect any other device to the isolation station. Connecting other devices to the isolation station can overdrive the isolation station resulting in a blown fuse or damaging the isolation station beyond repair.
Note 17:	Do not connect the ICS Chartr 200 system directly to the wall outlets. By not using the isolation station supplied, you put the patient and operator at risk to be exposed to power surges or electrical shock.
Note 18:	Otometrics ICS Chartr products are not designed to be used in conjunction with any devices not approved by Otometrics. Summation of combined unapproved parts could result in increased electrical leakage. All parts of the ICS Chartr 200 are suitable for use within the patient environment.
Note 19:	Accessory equipment connected to the analog and digital interfaces must be certified to the respective IEC standards (i.e., IEC 950 for data processing equipment and IEC 60601-1 for medical equipment.) Furthermore all configurations shall comply with the system standard IEC 60601-1-1. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore, responsible that the system complies with the requirements of the system standard IEC 60601-1-1. If in doubt, consult the technical service department or your local representative.
Note 20:	The ICS Chartr 200 needs to be installed and put into service according to the EMC information provided in this manual. Portable and mobile RF communications equipment can affect medical electrical equipment. The ICS Chartr 200 may be interfered with by other equipment with CISPR emission requirements.
Note 21:	Do not use a multiple USB hub for connection between the device and the PC.
Note 22:	The use of accessories and cables other than those specified in the Accessories list of this manual may result in increased emissions or decreased immunity of the ICS Chartr 200.

10.3 Manufacturer

Natus Medical Denmark ApS
Hoerskaetten 9, 2630 Taastrup
Denmark
+45 45 75 55 55
www.natus.com

10.3.1 Responsibility of the Manufacturer

The manufacturer is to be considered responsible for effects on safety, reliability, and performance of the equipment only if:

- All assembly operations, extensions, re-adjustments, modifications or repairs are carried out by the equipment manufacturer or personnel authorized by the manufacturer.
- The electrical installation to which the equipment is connected complies with EN/IEC requirements.
- The equipment is used in accordance with the instructions for use.

The manufacturer reserves the right to disclaim all responsibility for the operating safety, reliability and performance of equipment serviced or repaired by other parties.

11 Technical Specifications

11.1 ICS Chartr ENG

CMR Ratio

>100 dB at 50/60 Hz

Channel Frequency Response

12 dB/octave low-pass filter with a cutoff frequency of 35 Hz

Input Impedance

Channel 1:> 5.5 MΩ

Channel 2, 3, 4:> 8.0 MΩ

> ***Note*** • *Channel 1 electrode input is actually shared between two of the channels and has a reference to isolated ground, which lowers its input impedance.*

Input Sensitivity

A measurement of eye movement as small as 10 µV can be observed on the PC display. Typical voltage measurement from a human eye is typically between 100 and 400 µV. A gain of 500 is used to amplify the input signal. Hence, the eye movement seen on the PC screen is usually between 40 mV and 200 mV.

11.2 ICS Chartr 200

Interface

USB 2.0 or 3.0 to PC

Type Identification

ICS Chartr 200 is Type 1068 from Natus Medical Denmark ApS

Power Supply

AC/DC Adapter	Type	FW7362M/15 from Friwo
	Input	100-240 VAC / 50-60 Hz / 700-350 mA
	Output	15V DC / 2A

Isolation Transformer

Powertronix Isolation Station from Natus Medical Denmark ApS.	
AC/DC Adapter	
Input Voltage	115 (120) / 230 (240) VAC – 50/60Hz
Input Current	2.7A / 1.35A
Leakage Current	< 100-A
Output Voltage	115 (120) / 230 (240) VAC
Output Current	2.6A / 1.3A

System Capabilities

Inputs	2 Eyes/4 Channels; Full Binocular Testing (Simultaneous Collection of Signals from Both Eyes)	
Coupling	DC Response	
Resolution	0.1° Typical (Horizontal and Vertical)	
Linearity	1% Full Scale Horizontal; 1.2% Full Scale Vertical	
Sampling Rate	Full 60 Hz for All Tests	
Eye Tracking	± 30° Horizontal; ± 25° Vertical	
Software	Windows Graphical User Interface; High Performance Analysis Software; Database Storage of Test Data; Sophisticated Patient and Test Data Management	
Additional Capabilities	See-through for External Targets; Vision-denied for Testing in Complete Darkness	
Video Camera	Number of cameras	2
	Outgoing signal	Monochrome NTSC
	Operation mode	Frame synchronized
	Image sensor size	1/4" (3.3 x 2.5 mm^2 active area)
	Horizontal resolution	320 pixels
	Vertical resolution	240 pixels
	Frame rate	60 Hz
Laser/LED	Laser/LED product	Laser/LED product
	Maximum measured LED output	470 µW
	Classification standard	IEC 60825-1, edition 1.2: 2001
	Infrared light wavelength	950nm

Caution • *Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure*

Optimal Stimulus		
(Including Light Bar)	Patient-To-Bar Distance	4 feet (1.2 m) Ultrasonic Range Sensing
	Target Position	Gaze Targets ± 30°
	Pursuit and Saccades	± 16° Computer Controlled
	Target Size	Less than 1/2° of Arc
	Brightness	Software Controlled
	Optokinetic	6 Targets
	Rotation	90° (Horizontal or Vertical)
Other stimulators	Designed for connection to caloric stimulators.	

Weight

ICS Chartr 200 unit	2.7 kg (5 lbs 7 oz)
Lightbar	2.4 kg (5 lbs 3 oz)
Binocular goggles	0.4 kg (14.5 oz)

Operating Mode

Warm-up time:	<2 min
Mode of operation:	Continuous

Operating Environment

Temperature:	+15° C to +35° C (59° F to +95° F)
Rel. Humidity:	30 to 90%, non-condensing
Air Pressure:	600 hPa to 1060 hPa

Operations at temperatures below –20° C (-4° F) or above +60° C (140° F) may cause permanent damage.

Storing and Handling

Temperature:	-20° C to +60° C (-4° F to +140° F)
Rel. Humidity:	<90%, non-condensing
Air Pressure:	500 hPa to 1060 hPa

Dimensions

ICS Chartr 200 (HxWxD)	4.9 cm x 34.2 cm x 28.7 cm (2" x 13.6" x 11.3")
Lightbar (with ends closed)	11.8 cm x 90.8 cm x 12.1 cm (4.63" x 35.75" x 4.75")

Patient Interface

Distance pupil to pupil	60 ±8mm
Distance eye to forehead	22 ±3mm
Nose width	30 ±10mm
Horizontal range of viewing angle (visor open)	±55°
Vertical range of viewing angle (visor open)	±30°

Calibration

None Required

Standards

Safety:	EN 60601-1, UL60601-1, CAN/CSA-C22.2 NO 601.1-M90	
	ICS Chartr 200:	EN 60601-1, Class II, Type BF, IPXO
	Power Supply:	EN 60601-1, Class II, IPXO
System:	EN 60601-1-1	
EMC:	EN 60601-1-2	

11.3 Accessories and Cables

Chartr 200 Starter Kit:

Nuprep, 4 oz tubes, pkg/3 (1 tube supplied in starter kit)	7590030-3
Five-snap lead package, 24” length (2 ch ENG)	7590318-24-5
Seven-snap lead package, 24” length (4 ch ENG)	7590318-24-7
Snap disposable electrodes, qty 20. Single use	8-64-21602
VNG optical cleaning cloth	7590527
AudioWipes	8-62-43002

Cables:

Cable, ICS Chartr Lightbar	7-08-10200
ICS Cable, USB type A-B, 3 meters	8-71-79100
Assy, CBL, ICS foot switch	8-35-26400
Power cord, US w/plug (UL approved)	7-08-017
Power cord. CH w/plug	7-08-027
Power cord, EU (straight)	7-08-07500
Power cord, UK (straight)	7-08-07501
Power cord, US (straight)	7-08-07502
Power cord, AUS (straight)	7-08-07503
CD Mains Cord HO5VV, CHI	7-08-07504
Power cable, standard w/ "Schuko" plug	8-71-240
Power cord, DK w/plug	8-71-290
Power cord, UK w/plug	8-71-80200
Power cord, AUS w/plug	8-71-82700
Power cord, CHI w/plug	8-71-86400
Mains Adaptor Cables, EU	7-08-10500
Mains Adaptor Cables, UK	7-08-10501
Mains Adaptor Cables, US	7-08-10502
Mains Adaptor Cables, AUS/CHI	7-08-10503
Mains Adaptor Cables, SWISS	7-08-10505
Mains Adaptor Cables, DK	7-08-10506

11.4 Guidance and manufacturer’s declaration tables

- ICS Chartr 200 VNG/ENG is part of a medical electrical system and is thus subject to special safety precautions. For this reason, the installation and operating instructions provided in this document should be followed closely.
- Portable and mobile high-frequency communication devices, such as mobile phones, may interfere with the functioning of ICS Chartr 200 VNG/ENG.

Guidance and manufacturer's declaration - electromagnetic emissions for all equipment and systems		
ICS Chartr 200 VNG/ENG is intended for use in the electromagnetic environment specified below. The user of ICS Chartr 200 VNG/ENG should ensure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR11	Group 1	ICS Chartr 200 VNG/ENG uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11	Class B	ICS Chartr 200 VNG/ENG is suitable for use in all environments, including domestic environments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity for all equipment and systems			
ICS Chartr 200 VNG/ENG is intended for use in the electromagnetic environment specified below. The user of ICS Chartr 200 VNG/ENG should ensure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	+/- 6 kV contact +/- 8 kV air	+/- 6 kV contact +/- 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	+/- 2 kV for power supply lines +/- 1 kV for input/output lines	+/- 2 kV for power supply lines +/- 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	+/- 1 kV line(s) to line(s) +/- 2 kV line(s) to earth	+/- 1 kV line(s) to line(s) +/- 2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % UT (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 s	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % UT (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ICS Chartr 200 VNG/ENG requires continued operation during very long power mains interruptions, it is recommended that the ICS Chartr 200 VNG/ENGbe powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Swept Magnetic Fields per AAMI	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Guidance and manufacturer's declaration - electromagnetic immunity - for equipment and systems that are NOT life-supporting			
ICS Chartr 200 VNG/ENG is intended for use in the electromagnetic environment specified below. The user of ICS Chartr 200 VNG/ENG should ensure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2,5 GHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of ICS Chartr 200 VNG/ENG, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: $d = 1.17\sqrt{P}$ $d = .5\sqrt{P}$ (80 MHz to 800 MHz) $d = 1\sqrt{P}$ (80 MHz to 2.5 GHz) where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with this symbol: 
Note 1: At 80 MHz and 800 MHz the separation distance for the higher frequency range applies. **Note 2**: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in these frequency ranges.			

Recommended separation distances between portable and mobile RF communications equipment and ICS Chartr 200 VNG/ENG

The ICS Chartr 200 VNG/ENG is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the ICS Chartr 200 VNG/ENG can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the ICS Chartr 200 VNG/ENG as recommended below, according to the maximum output power of the communications equipment.

	Separation distance according to frequency of transmitter m		
Rated maximum output power of transmitter W	**150 kHz to 80 MHz**	**80 MHz to 800 MHz**	**800 MHz to 2.5 GHz**
Rated maximum output power of transmitter W	150 kHz to 80 MHz $d = 1.17\sqrt{P}$ (V1=3)	80 MHz to 800 MHz $d = 1.17\sqrt{P}$ (E1=7)	800 MHz to 2.5 GHz $d = 1\sqrt{P}$ (E1=7)
0.01	0.117	0.050	0.10
0.1	0.369	0.158	.316
1	1.167	0.50	1.00
10	3.689	1.58	3.16
100	11.667	5.00	10.00

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz the separation distance for the higher frequency range applies.

Note 2: The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.

Note 3: An additional factor of 10/3 has been incorporated into the formula used in calculating the recommended separation distance for transmitters in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas.

Note 4: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

App. 1 Clinical Information

This appendix contains the questions asked in the Clinical Information tab of the Patient Information dialog box. See the last page of this appendix for a printable version of these questions

CHARTR 200 VNG/ENG CLINICAL INFORMATION

General:	Yes	No	Don't Know
Has the patient taken tranquilizers, sedatives, or vestibular suppressants within 48 hours?			
Has the patient consumed alcohol within 48 hours?			
Has the patient taken drugs that can cause labyrinthine hypofunction?			
Is the patient currently taking other drugs that can cause eye movement abnormalities?			
Is the Dix-Hallpike maneuver contraindicated?			
Has the patient had right eye surgery?			
Has the patient had left eye surgery?			
Eye Movement Examination:	Yes	No	Don't Know
Does the patient have restricted deviation of the right eye?			
Does the patient have restricted deviation of the left eye?			
Does the patient have nystagmus on center gaze?			
Does the patient have nystagmus on rightward gaze?			
Does the patient have nystagmus on leftward gaze?			
Does the patient have nystagmus on upward gaze?			
Does the patient have nystagmus on downward gaze?			
Does the patient have disconjugate eye movements during saccades?			
Ear Examination:	Yes	No	Don't Know
Does the patient have a tympanic membrane perforation in the right ear?			
Does the patient have excess cerumen in the right external ear canal?			
Does the patient have a narrow right external ear canal?			
Does the patient have a tympanic membrane perforation in the left ear?			
Does the patient have excess cerumen in the left external ear canal?			
Does the patient have a narrow left external ear canal?			

App. 2 VNG Tests

This appendix provides a descriptive list of all of the VNG/ENG test protocols by procedure. The procedures are listed in the same order found in the Test Battery. In addition, this appendix provides a list of the test protocols in the default Test Battery, as supplied by Otometrics.

App. 2.1 Overview

All of the ICS VNG/ENG test protocols available to an operator when setting up a Test Battery are listed and described in this appendix. In addition, this appendix provides a list of the test protocols in the original default operator's Test Battery.

The procedures are listed in the order found in the Test Battery, as follows:

- Saccade - Both Eyes
- Saccade - Individual Eyes
- Gaze - Both Eyes
- Gaze - Individual Eyes
- Tracking - Both Eyes
- Tracking - Individual Eyes
- Optokinetic - Both Eyes
- Okan Test - Both Eyes
- Dix-Hallpike - Both Eyes
- Position - Both Eyes
- Caloric - Both Eyes
- Caloric - Temperature Switched - Both Eyes
- Ice Caloric
- Pressure - Both Eyes
- Head Shake - Both Eyes
- Rotary Chair - Both Eyes
- Rotary Swing - Both Eyes
- Dix-Hallpike - Individual Eyes
- Position - Individual Eyes
- Spontaneous - Both Eyes

***Note** • The available tests are specific to a particular hardware configuration, e.g., two or four channels.*

App. 2.2 Saccade Tests

Fig. 144 Procedure: Saccade - Both Eyes

Protocols	Stimulus	Collected signals
Horizontal Random Position	Light target moving randomly each 1.25 seconds over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Vertical Random Position	Light target moving randomly each 1.25 seconds over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Horizontal 10°	Light target moving 10 degrees right or left of center each 1.25 seconds.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Horizontal 15°	Light target moving 15 degrees right or left of center each 1.25 seconds.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Vertical 10°	Light target moving 10 degrees up or down from center each 1.25 seconds.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Vertical 15°	Light target moving 15 degrees up or down from center each 1.25 seconds.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Horizontal Random Position and Time	Target moved at random intervals to random positions.	Horizontal Eye Position, Vertical Eye Position, Target Position.

Fig. 145 Procedure: Saccade - Individual Eyes

Protocols	Stimulus	Collected Signals
Horizontal Random Position	Light target moving randomly each 1.25 seconds over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.*
Vertical Random Position	Light target moving randomly each 1.25 seconds over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Horizontal 10°	Light target moving 10 degrees right or left of center each 1.25 seconds.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Horizontal 15°	Light target moving 15 degrees right or left of center each 1.25 seconds.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.

Protocols	Stimulus	Collected Signals
Vertical 10°	Light target moving 10 degrees up or down from center each 1.25 seconds.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Vertical 15°	Light target moving 15 degrees up or down from center each 1.25 seconds.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Horizontal Random Position and Time	Target moved at random intervals to random positions.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Horizontal Random Direct Recording**	Light target moving randomly each 1.25 seconds over a 34° arc. Note: uses special montage.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.

* 2 Channel systems only collect Horizontal Right Eye Position, Horizontal Left Eye Position, and Target Position.

** Not available for VNG.

App. 2.3 Gaze Tests

Fig. 146 Procedure: Gaze - Both Eyes

Protocols	Stimulus	Collected Signals
Center	Light target centered.	Horizontal Eye Position, Vertical Eye Position.
Center w/o Vision	Light target centered, without vision.	Horizontal Eye Position, Vertical Eye Position.
Right	Light target 30° right of center.	Horizontal Eye Position, Vertical Eye Position.
Right w/o Vision	Light target 30° right of center, without vision.	Horizontal Eye Position, Vertical Eye Position.
Left	Light target 30° left of center.	Horizontal Eye Position, Vertical Eye Position.
Left w/o Vision	Light target 30° left of center, without vision.	Horizontal Eye Position, Vertical Eye Position.
Up	Light target 30° up from center.	Horizontal Eye Position, Vertical Eye Position.
Up w/o Vision	Light target 30° up from center, without vision.	Horizontal Eye Position, Vertical Eye Position.

Protocols	Stimulus	Collected Signals
Down	Light target 30° down from center.	Horizontal Eye Position, Vertical Eye Position.
Down w/o Vision	Light target 30° down from center, without vision.	Horizontal Eye Position, Vertical Eye Position.
Rebound Right	Gaze 30° right for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position.
Rebound Left	Gaze 30° left for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position.
Rebound Up	Gaze 30° up for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position.
Rebound Down	Gaze 30° down for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position.

Fig. 147 Procedure: Gaze - Individual Eyes

Protocols	Stimulus	Collected Signals
Center	Light target centered.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Center w/o vision	Light target centered, without vision.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Right	Light target 30° right of center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Right w/o vision	Light target 30° right of center, without vision.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Left	Light target 30° left of center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Left w/o vision	Light target 30° left of center, without vision.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Up	Light target 30° up from center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Up w/o vision	Light target 30° up from center, without vision.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Down	Light target 30° down from center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Down w/o vision	Light target 30° down from center, without vision.	Horizontal Eye Position, Vertical Eye Position, Target Position.

Protocols	Stimulus	Collected Signals
Rebound Right	Gaze 30° right for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Rebound Left	Gaze 30° left for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Rebound Up	Gaze 30° up for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Rebound Down	Gaze 30° down for 20 seconds followed by a return to center.	Horizontal Eye Position, Vertical Eye Position, Target Position.

App. 2.4 Tracking Tests

Fig. 148 Procedure: Tracking - Both Eyes

Protocols	Stimulus	Collected Signals
Sine Horizontal	Light target moving sinusoidally at frequencies of 0.2, 0.3, 0.4, 0.5, 0.6, and 0.7 Hz over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Sine Vertical	Light target moving sinusoidally at frequencies of 0.2, 0.3, 0.4, 0.5, 0.6, and 0.7 Hz over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Linear Horizontal	Light target moving 10, 20, 30, 40, 50, and 60° per second over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Linear Vertical	Light target moving 10, 20, 30, 40, 50, and 60° per second over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Sine Horizontal 0.25 Hz	Light target moving sinusoidally at 0.25 Hz over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.
Sine Vertical 0.25 Hz	Light target moving sinusoidally at 0.25 Hz over a 34° arc.	Horizontal Eye Position, Vertical Eye Position, Target Position.

Fig. 149 Procedure: Tracking - Individual Eyes

Protocols	Stimulus	Collected Signals
Sine Horizontal	Light target moving sinusoidally at frequencies of 0.2, 0.3, 0.4, 0.5, 0.6, and 0.7 Hz over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Sine Vertical	Light target moving sinusoidally at frequencies of 0.2, 0.3, 0.4, 0.5, 0.6, and 0.7 Hz over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Linear Horizontal	Light target moving 10, 20, 30, 40, 50, and 60° per second over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Linear Vertical	Light target moving 10, 20, 30, 40, 50, and 60° per second over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Sine Horizontal 0.25 Hz	Light target moving sinusoidally at 0.25 Hz over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Sine Vertical 0.25 Hz	Light target moving sinusoidally at 0.25 Hz over a 34° arc.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.

App. 2.5 Optokinetic Tests

Fig. 150 Procedure: Optokinetic - Both Eyes

Protocols	Stimulus	Collected Signals
20°/sec Right	Multiple light targets moving rightward at 20° per second.	Horizontal Eye Position, Vertical Eye Position.
20°/sec Left	Multiple light targets moving leftward at 20° per second.	Horizontal Eye Position, Vertical Eye Position.
20°/sec Up	Multiple light targets moving upward at 20° per second.	Horizontal Eye Position, Vertical Eye Position.

Protocols	Stimulus	Collected Signals
20°/sec Down	Multiple light targets moving downward at 20° per second.	Horizontal Eye Position, Vertical Eye Position.
30°/sec Right	Multiple light targets moving rightward at 30° per second.	Horizontal Eye Position, Vertical Eye Position.
30°/sec Left	Multiple light targets moving leftward at 30° per second.	Horizontal Eye Position, Vertical Eye Position.
40°/sec Right	Multiple light targets moving rightward at 40° per second.	Horizontal Eye Position, Vertical Eye Position.
40°/sec Left	Multiple light targets moving leftward at 40° per second.	Horizontal Eye Position, Vertical Eye Position.
60°/sec Right	Multiple light targets moving rightward at 60° per second.	Horizontal Eye Position, Vertical Eye Position.
60°/sec Left	Multiple light targets moving leftward at 60° per second.	Horizontal Eye Position, Vertical Eye Position.
Accelerating	External stimulus provided by operator.	Horizontal Eye Position, Vertical Eye Position.

App. 2.6 Okan Tests

Fig. 151 Procedure: Okan - Both Eyes

Protocols	Stimulus	Collected Signals
40°/sec-30sec Right	Multiple light targets moving rightward at 40° per second for 30 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.
40°/sec-30sec Left	Multiple light targets moving leftward at 40° per second for 30 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.
40°/sec-60sec Right	Multiple light targets moving rightward at 40° per second for 60 seconds, turned off.	Horizontal Eye Position, Vertical Eye Position.
40°/sec-60sec Left	Multiple light targets moving leftward at 40° per second for 60 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.
60°/sec-30sec Right	Multiple light targets moving rightward at 60° per second for 30 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.

Protocols	Stimulus	Collected Signals
60°/sec-30sec Left	Multiple light targets moving leftward at 60° per second for 30 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.
60°/sec-60sec Right	Multiple light targets moving rightward at 60° per second for 60 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.
60°/sec-60sec Left	Multiple light targets moving leftward at 60° per second for 60 seconds, then turned off.	Horizontal Eye Position, Vertical Eye Position.

App. 2.7 Dix-Hallpike Tests

Fig. 152 Procedure: Dix-Hallpike - Both Eyes

Protocols	Stimulus	Collected Signals
Head Right	Rapid movement of the patient from sitting with head turned right to supine, head hanging turned right.	Horizontal Eye Position, Vertical Eye Position.
Head Left	Rapid movement of the patient from sitting with head turned left to supine, head hanging turned left.	Horizontal Eye Position, Vertical Eye Position.
Head Right/Up	Rapid movement of the patient from head hanging right to sitting position.	Horizontal Eye Position, Vertical Eye Position.
Head Left/Up	Rapid movement of the patient from head hanging left to sitting position.	Horizontal Eye Position, Vertical Eye Position.
Head Right Repeat	Rapid movement of the patient from sitting with head turned right to supine, head hanging turned right.	Horizontal Eye Position, Vertical Eye Position.
Head Left Repeat	Rapid movement of the patient from sitting with head turned left to supine, head hanging turned left.	Horizontal Eye Position, Vertical Eye Position.
Head Right/Up Repeat	Rapid movement of the patient from head hanging right to sitting position.	Horizontal Eye Position, Vertical Eye Position.
Head Left /Up Repeat	Rapid movement of the patient from head hanging left to sitting position.	Horizontal Eye Position, Vertical Eye Position.

App. 2.8 Position Tests

Fig. 153 Procedure: Position - Both Eyes

Protocols	Stimulus	Collected Signals
Sitting	Patient sitting erect.	Horizontal Eye Position, Vertical Eye Position.
Sitting w/ Vision	Patient sitting erect, with vision.	Horizontal Eye Position, Vertical Eye Position.
Sitting w/o Vision	Patient sitting erect, without vision.	Horizontal Eye Position, Vertical Eye Position.
Supine	Patient supine nose toward the ceiling.	Horizontal Eye Position, Vertical Eye Position.
Supine w/ Vision	Patient supine with nose toward the ceiling, with vision.	Horizontal Eye Position, Vertical Eye Position.
Supine w/o Vision	Patient supine with nose toward the ceiling, without vision.	Horizontal Eye Position, Vertical Eye Position.
Head Right	Patient supine with head turned 90° to right.	Horizontal Eye Position, Vertical Eye Position.
Head Right w/ Vision	Patient supine with head turned 90° to right, with vision.	Horizontal Eye Position, Vertical Eye Position.
Head Right w/o Vision	Patient supine with head turned 90° to right, without vision.	Horizontal Eye Position, Vertical Eye Position.
Head Left	Patient supine with head turned 90° to left.	Horizontal Eye Position, Vertical Eye Position.
Head Left w/ Vision	Patient supine with head turned 90° to left, with vision.	Horizontal Eye Position, Vertical Eye Position.
Head Left w/o Vision	Patient supine with head turned 90° to left, without vision.	Horizontal Eye Position, Vertical Eye Position.
Right Side	Patient on his right side.	Horizontal Eye Position, Vertical Eye Position.
Right Side w/ Vision	Patient on his right side, with vision.	Horizontal Eye Position, Vertical Eye Position.
Right Side w/o Vision	Patient on his right side, without vision.	Horizontal Eye Position, Vertical Eye Position.
Left Side	Patient on his left side.	Horizontal Eye Position, Vertical Eye Position.
Left Side w/ Vision	Patient on his left side, with vision.	Horizontal Eye Position, Vertical Eye Position.
Left Side w/o Vision	Patient on his left side, without vision.	Horizontal Eye Position, Vertical Eye Position.
Other	Patient in another position.	Horizontal Eye Position, Vertical Eye Position.
Other w/ Vision	Patient in another position, with vision.	Horizontal Eye Position, Vertical Eye Position.

Protocols	Stimulus	Collected Signals
Other w/o Vision	Patient in another position, without vision.	Horizontal Eye Position, Vertical Eye Position.
Head Hanging	Patient supine with head hanging.	Horizontal Eye Position, Vertical Eye Position.
Head Hanging w/ Vision	Patient supine with head hanging, with vision.	Horizontal Eye Position, Vertical Eye Position.
Head Hanging w/o Vision	Patient supine with head hanging, without vision.	Horizontal Eye Position, Vertical Eye Position.

App. 2.9 Bithermal Caloric Tests

Fig. 154 Procedure: Caloric - Both Eyes

Protocols	Stimulus	Collected Signals
Right Ear/Cool	A medium below body temperature irrigating the right ear.	Horizontal Eye Position, Vertical Eye Position.
Left Ear/Cool	A medium below body temperature irrigating the left ear.	Horizontal Eye Position, Vertical Eye Position.
Right Ear/Warm	A medium above body temperature irrigating the right ear.	Horizontal Eye Position, Vertical Eye Position.
Left Ear/Warm	A medium above body temperature irrigating the left ear.	Horizontal Eye Position, Vertical Eye Position.

Fig. 155 Procedure: Caloric - Temperature Switched - Both Eyes

Protocols	**Stimulus**	**Collected Signals**
Temp Switched Cool	Irrigation using cool water followed by warm water.	Horizontal Eye Position, Vertical Eye Position.
Temp Switched Warm	Irrigation using warm water followed by cool water.	Horizontal Eye Position, Vertical Eye Position.

App. 2.10 Ice Water Caloric Tests

Fig. 156 Procedure: Ice Caloric - Both Eyes

Protocols	Stimulus	Collected Signals
Right Ear/Supine	A fluid near 0°C irrigating the right ear.	Horizontal Eye Position, Vertical Eye Position.
Left Ear/Supine	A fluid near 0°C irrigating the left ear.	Horizontal Eye Position, Vertical Eye Position.
Right Ear/Prone	A fluid near 0°C irrigating the right ear.	Horizontal Eye Position, Vertical Eye Position.
Left Ear/Prone	A fluid near 0°C irrigating the left ear.	Horizontal Eye Position, Vertical Eye Position.

App. 2.11 Pressure Tests

Fig. 157 Procedure: Pressure - Both Eyes

Protocols	Stimulus	Collected Signals
Right	Rapid change from positive to negative pressure in the right ear.	Horizontal Eye Position, Vertical Eye Position.
Right Positive	A rapid increase in pressure in the right ear	Horizontal Eye Position, Vertical Eye Position.
Right Negative	A rapid decrease in pressure in the right ear.	Horizontal Eye Position, Vertical Eye Position.
Left	Rapid change from positive to negative pressure in the left ear.	Horizontal Eye Position, Vertical Eye Position.
Left Positive	A rapid increase in pressure in the left ear.	Horizontal Eye Position, Vertical Eye Position.
Left Negative	A rapid decrease in pressure in the left ear.	Horizontal Eye Position, Vertical Eye Position.

App. 2.12 Other Tests

Fig. 158 Procedure: Head Shake - Both Eyes

Protocols	Stimulus	Collected Signals
Active	Patient shakes head in horizontal plane.	Horizontal Eye Position, Vertical Eye Position.
Passive	Patient’s head is shaken in horizontal plane by operator.	Horizontal Eye Position, Vertical Eye Position.

Fig. 159 Procedure: Rotary Chair - Both Eyes

Protocols	Stimulus	Collected Signals
Right	Clockwise rotation about the vertical axis.	Horizontal Eye Position, Vertical Eye Position.
Left	Counterclockwise rotation about the vertical axis.	Horizontal Eye Position, Vertical Eye Position.

Fig. 160 Procedure: Rotary Swing - Both Eyes

Protocols	Stimulus	Collected Signals
200°	Passive rotation with 200° peak-to-peak excursion.	Horizontal Eye Position, Vertical Eye Position.

Fig. 161 Procedure: Dix-Hallpike - Individual Eyes

Protocols	Stimulus	Collected Signals
Head Right	Rapid movement of the patient from sitting with head turned right to supine, head hanging turned right.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Head Left	Rapid movement of the patient from sitting with head turned left to supine, head hanging turned left.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Head Right/Up	Rapid movement of the patient from head hanging right to sitting position.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Head Left/Up	Rapid movement of the patient from head hanging left to sitting position.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Head Right Repeat	Rapid movement of the patient from sitting with head turned right to supine, head hanging turned right.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Head Left Repeat	Rapid movement of the patient from sitting with head turned left to supine, head hanging turned left.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.

Protocols	Stimulus	Collected Signals
Head Right/Up Repeat	Rapid movement of the patient from head hanging right to sitting position.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.
Head Left /Up Repeat	Rapid movement of the patient from head hanging left to sitting position.	Horizontal Right Eye Position, Horizontal Left Eye Position, Vertical Right Eye Position, Vertical Left Eye Position, Torsional Right Eye Position, Torsional Left Eye Position.

Fig. 162 Procedure: Position - Individual Eyes

Protocols	Stimulus	Collected Signals
Sitting	Patient sitting erect.	Horizontal Eye Position, Vertical Eye Position.
Sitting w/ Vision	Patient sitting erect, with vision.	Horizontal Eye Position, Vertical Eye Position.
Sitting w/o Vision	Patient sitting erect, without vision.	Horizontal Eye Position, Vertical Eye Position.
Supine	Patient supine nose toward the ceiling.	Horizontal Eye Position, Vertical Eye Position.
Supine w/ Vision	Patient supine with nose toward the ceiling, with vision.	Horizontal Eye Position, Vertical Eye Position.
Supine w/o Vision	Patient supine with nose toward the ceiling, without vision.	Horizontal Eye Position, Vertical Eye Position.
Head Right	Patient supine with head turned 90° to right.	Horizontal Eye Position, Vertical Eye Position.
Head Right w/ Vision	Patient supine with head turned 90° to right, with vision.	Horizontal Eye Position, Vertical Eye Position.
Head Right w/o Vision	Patient supine with head turned 90° to right, without vision.	Horizontal Eye Position, Vertical Eye Position.
Head Left	Patient supine with head turned 90° to left.	Horizontal Eye Position, Vertical Eye Position.
Head Left w/ Vision	Patient supine with head turned 90° to left, with vision.	Horizontal Eye Position, Vertical Eye Position.
Head Left w/o Vision	Patient supine with head turned 90° to left, without vision.	Horizontal Eye Position, Vertical Eye Position.
Right Side	Patient on his right side.	Horizontal Eye Position, Vertical Eye Position.
Right Side w/ Vision	Patient on his right side, with vision.	Horizontal Eye Position, Vertical Eye Position.
Right Side w/o Vision	Patient on his right side, without vision.	Horizontal Eye Position, Vertical Eye Position.

Protocols	Stimulus	Collected Signals
Left Side	Patient on his left side.	Horizontal Eye Position, Vertical Eye Position.
Left Side w/ Vision	Patient on his left side, with vision.	Horizontal Eye Position, Vertical Eye Position.
Left Side w/o Vision	Patient on his left side, without vision.	Horizontal Eye Position, Vertical Eye Position.
Other	Patient in another position.	Horizontal Eye Position, Vertical Eye Position.
Other w/ Vision	Patient in another position, with vision.	Horizontal Eye Position, Vertical Eye Position.
Other w/o Vision	Patient in another position, without vision.	Horizontal Eye Position, Vertical Eye Position.
Head Hanging	Patient supine with head hanging.	Horizontal Eye Position, Vertical Eye Position.
Head Hanging w/ Vision	Patient supine with head hanging, with vision.	Horizontal Eye Position, Vertical Eye Position.
Head Hanging w/o Vision	Patient supine with head hanging, without vision.	Horizontal Eye Position, Vertical Eye Position.

Fig. 163 Procedure: Spontaneous - Both Eyes

Protocols	Stimulus	Collected Signals
Vision denied	None.	Horizontal Eye Position, Vertical Eye Position.
With vision	None.	Horizontal Eye Position, Vertical Eye Position.

App. 2.13 Default Test Battery

App. 2.13.1 Chartr 200 VNG Default Test Battery

This list of tests is the default standard battery of tests for Chartr 200 VNG. The test battery can be installed and modified from the System Options, Operator Settings/Test Battery Tab dialog box (see System Options, Operator Settings Tab ▶ 60).

Saccade - Both Eyes	Horizontal Random Position
Saccade - Individual Eyes	Horizontal Random Position
Gaze - Both Eyes	Right Left Up Down

Gaze - Individual Eye	Right Left Up Down
Tracking - Both Eyes	Sine Horizontal
Tracking - Individual Eyes	Sine Horizontal
Optokinetic - Both Eyes	20°/sec Right 20°/sec Left 40°/sec Right 40°/sec Left
Dix-Hallpike - Both Eyes	Head Right Head Left Head Right Repeat Head Left Repeat
Position - Both Eyes	Sitting Sitting w/ Vision Sitting w/o Vision Supine Supine w/ Vision Supine w/o Vision Head Right Head Right w/ Vision Head Right w/o Vision Head Left Head Left w/ Vision Head Left w/o Vision Head Hanging Head Hanging w/ Vision Head Hanging w/o Vision Right Side Right Side w/ Vision Right Side w/o Vision Left Side Left Side w/ Vision Left Side w/o Vision Other Other w/ Vision Other w/o Vision
Caloric - Both Eyes	Right Ear / Cool Left Ear / Cool Right Ear / Warm Left Ear / Warm

Ice Caloric - Both Eyes	Right Ear / Supine Left Ear / Supine Right Ear / Prone Left Ear / Prone
Pressure - Both Eyes	Right Left
Dix-Hallpike - Individual Eyes	Head Right Head Left Head Right Repeat Head Left Repeat
Position – Individual Eyes	Sitting Sitting w/ Vision Sitting w/o Vision Supine Supine w/ Vision Supine w/o Vision Head Right Head Right w/ Vision Head Right w/o Vision Head Left Head Left w/ Vision Head Left w/o Vision Right Side Right Side w/ Vision Right Side w/o Vision Left Side Left Side w/ Vision Left Side w/o Vision Other Other w/ Vision Other w/o Vision Head Hanging Head Hanging w/ Vision Head Hanging w/o Vision
Spontaneous - Both Eyes	With Vision Vision Denied

App. 2.13.2 Chartr 200 ENG Default Test Battery

This list of tests is the default standard battery of tests for Chartr 200 ENG. The test battery can be installed and modified from the System Options, Operator Settings/Test Battery Tab dialog box (see System Options, Operator Settings Tab ▶ 60).

Saccade - Both Eyes	Horizontal Random Position
Saccade - Individual Eyes	Horizontal Random Position

Gaze - Both Eyes	Right Left Up Down
Gaze - Individual Eye	Right Left Up Down
Tracking - Both Eyes	Sine Horizontal
Tracking - Individual Eyes	Sine Horizontal
Optokinetic - Both Eyes	20°/sec Right 20°/sec Left 40°/sec Right 40°/sec Left
Dix-Hallpike - Both Eyes	Head Right Head Left Head Right Repeat Head Left Repeat
Position - Both Eyes	Sitting Sitting w/ Vision Sitting w/o Vision Supine Supine w/ Vision Supine w/o Vision Head Right Head Right w/ Vision Head Right w/o Vision Head Left Head Left w/ Vision Head Left w/o Vision Head Hanging Head Hanging w/ Vision Head Hanging w/o Vision Right Side Right Side w/ Vision Right Side w/o Vision Left Side Left Side w/ Vision Left Side w/o Vision Other Other w/ Vision Other w/o Vision

Caloric - Both Eyes	Right Ear / Cool Left Ear / Cool Right Ear / Warm Left Ear / Warm
Ice Caloric - Both Eyes	Right Ear / Supine Left Ear / Supine Right Ear / Prone Left Ear / Prone
Pressure - Both Eyes	Right Left
Spontaneous - Both Eyes	With Vision Vision Denied

App. 2.13.3 Chartr 200 M-VNG Default Test Battery

This list of tests is the default standard battery of tests for Chartr 200 M-VNG. The test battery can be installed and modified from the System Options, Operator Settings/Test Battery Tab dialog box (see System Options, Operator Settings Tab ► 60).

Saccade - Both Eyes	Horizontal Random Position
Gaze - Both Eyes	Right Left Up Down
Tracking - Both Eyes	Sine Horizontal
Optokinetic - Both Eyes	20°/sec Right 20°/sec Left 40°/sec Right 40°/sec Left
Dix-Hallpike - Both Eyes	Head Right Head Left Head Right Repeat Head Left Repeat

Position - Both Eyes	Sitting
	Sitting w/ Vision
	Sitting w/o Vision
	Supine
	Supine w/ Vision
	Supine w/o Vision
	Head Right
	Head Right w/ Vision
	Head Right w/o Vision
	Head Left
	Head Left w/ Vision
	Head Left w/o Vision
	Head Hanging
	Head Hanging w/ Vision
	Head Hanging w/o Vision
	Right Side
	Right Side w/ Vision
	Right Side w/o Vision
	Left Side
	Left Side w/ Vision
	Left Side w/o Vision
	Other
	Other w/ Vision
	Other w/o Vision
Caloric - Both Eyes	Right Ear / Cool
	Left Ear / Cool
	Right Ear / Warm
	Left Ear / Warm
Spontaneous - Both Eyes	With Vision
	Vision Denied

App. 3 Customizing the Word Processing Report

This appendix provides information on how to customize the word processor portion of a patient report.

App. 3.1 Overview

This appendix explains how to customize the template that is used to produce the word processor portion of a patient report. Use the procedure in this appendix to create a template that reflects your specific report requirements and includes unique identifying elements, such as a logo, for your facility.

There are two elements of the word processor portion of the patient report that can be customized:

- Page layout and design including margins, font selection, etc.
- Position of the data elements that extract patient specific information from the database, such as the patient name, address, etc.

App. 3.2 Default Page Layout and Design

The text portion of the ICS Chartr 200 VNG/ENG patient report, is formatted based on the page layout and design defined in a report template. In addition, the database information in the report is also defined in the template.

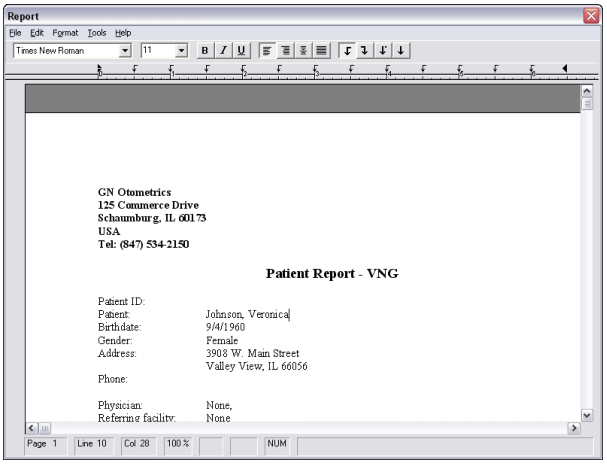


Fig. 164 Default Report Page

Using the VNG/ENG word processor, the operator may change the font selection and the paragraph appearance of each individual report. The operator may also add, modify, and delete information in the report. However, the changes the operator makes only apply to the report the operator is currently working on and will not apply to any other reports created by the operator.

See Working with Reports ► 136 for more information on how to access the report and modify it in the word processor.

App. 3.3 Database Information

The database fields and access tags defined in the report template for the text portion of a patient report are shown in Fig. 165 ▶ 216. A complete list of the database tags and a description of the data each retrieves is at the end of this appendix.

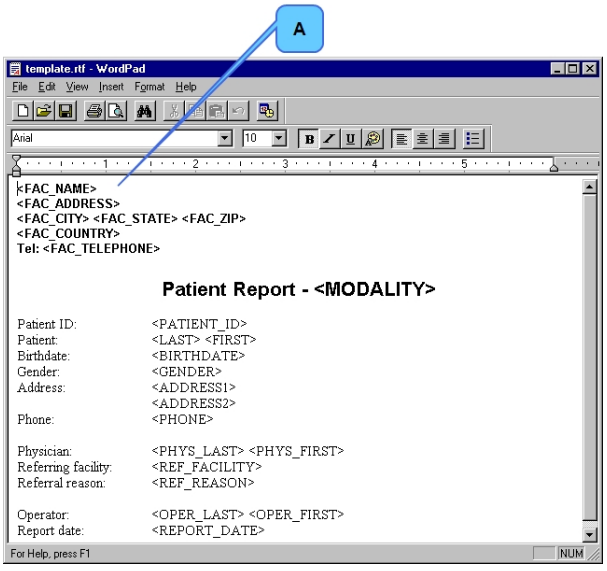


Fig. 165 Default Report Template

A. Database access tag

The words within the brackets (< >) are the database access tag, and the brackets signal that the enclosed information is requested from the database. The brackets do not appear in the word-processed version of the report. For example, <PHYS_LAST> retrieves the last name of the referring physician from the database.

App. 3.4 Customizing the Report Template

Within a patient report, the placement of the information on the page, the font selection and sizes, and the paragraph styles are all predefined in a Report Template.

The information and format of each report may be changed in the VNG/ENG word processor. However, the template must be changed in order to implement a global change that will apply to all of the reports produced at a workstation or at a facility.

Report templates cannot be changed while working in ICS VNG/ENG for Windows. Use a standard word processing program, such as Word, WordPerfect, or WordPad (included with Windows), to make changes to the report template.

To access and modify the report template:

> ***Note*** • *The file name of the report template is vngtemplate_ENU. The file extension is .rtf (rich text format). This format can be opened and displayed in a variety of word processing applications.*

1. Close ICS VNG/ENG and access the **Windows Desktop**.
2. Click the **Windows Explorer** icon or select **Start**, **Programs**, **Windows Explorer** to open **Windows Explorer**.
3. Expand the prog **Program Files** Folder.
4. Expand the **ICS Medical Folder** (under Program Files) to display the **ICS CHARTR ENG for Windows** Folder.
5. Click on **ICS CHARTR ENG for Windows** to display the contents.

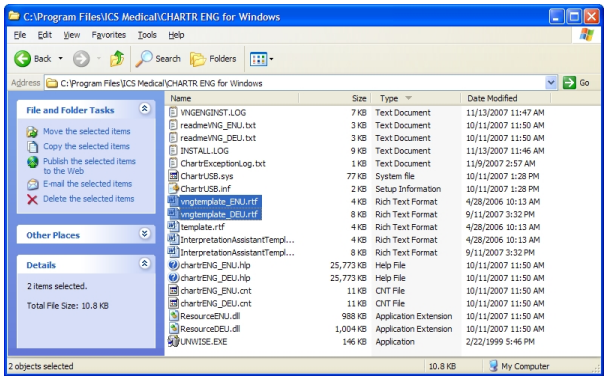


Fig. 166 vngtemplate_ENU.rtf in Windows Explorer

> ***Note*** • *You may also open this file in another word processing application.*

6. Locate and double-click the **vngtemplate_ENU.rtf** (for English) file to open the file in a word processing program.

> ***Warning*** • *DO NOT change any of the brackets (< >) or the information in the brackets. It must remain exactly as written in order to retrieve information from the database. You may however, delete these items, change the font and paragraph characteristics, or change their placement on the page.*

7. Make changes to the font selection and size, as desired. Make changes to the paragraph appearance as desired.
8. Make changes to the placement of data on the page as desired.

> ***Note*** • *Notes:A logo can be added to the template. Insert the logo into the template and move it to the desired location. The logo should be smaller than 500 KB.*

> ***Note*** • *Use the font icon on the Toolbar to change the font used for the report.*

9. Save the changes made to file **vngtemplate_ENU.rtf** (for English) and save the file as Rich Text Format (.rtf). Any other format will not work with the Chartr VNG/ENG software.
10. Close the file and exit the word processing program.

> ***Note*** • *Special Note regarding Interpretation Assistant Caloric Test Word Processor Reports:*
> *In order to generate a caloric test word processor report via the Caloric Test Interpretation Assistant, a new token <IA_RESULTS> must be added to the engtemplate.rtf file on your system. If this token in not listed, please copy this token from the file: C:\Program Files\ICS Medical\Interpretation Assistant.rtf and paste it in the engtemplate.rtf file.*

App. 3.5 Report Template Database Tags

The following is a list of the VNG/ENG database access tags and the information each retrieves into a patient report.

Fig. 167 Patient Report Database Access Tags

Access Tag	Description
<FAC_NAME>	Facility name
<FAC_ADDRESS>	Facility address
<FAC_CITY>	Facility city
<FAC_STATE>	Facility state
<FAC_ZIP>	Facility zip code
<FAC_COUNTRY>	Facility country
<FAC_TELEPHONE>	Facility telephone number
<MODALITY>	Product Modality - ENG, EP, VNG
<PATIENT_ID>	Patient identification (i.e., social security number)
<LAST>	Patient last name
<FIRST>	Patient first name
<BIRTHDATE>	Patient birthdate
<AGE>	Patient age
<GENDER>	Patient gender
<ADDRESS1>	Patient street address
<ADDRESS2>	Patient city, state, zip code
<PHONE>	Patient telephone number
<PHYS_LAST>	Referring physician last name

Access Tag	Description
<PHYS_FIRST>	Referring physician first name
<REF_FACILITY>	Referring facility name
<REF_REASON>	Referral reason
<OPER_LAST>	Operator last name
<OPER_FIRST>	Operator first name
<REPORT_DATE>	Current date
<IA_RESULTS>	Caloric test interpretation derived by the Caloric Test Interpretation Assistant
<Caloric_Weak>	Caloric unilateral weakness
<Dir_Prepond>	Directional preponderance
<Salutation>	Salutation

App. 4 Setting up the ICS Chartr 200 Hardware

Several hardware configurations are possible with the VNG/ENG system.

All system components connect to the rear of the ICS Chartr 200 or the PC via connecting cables (included). See ICS Chartr 200 VNG/ENG ▶ 220, ICS Chartr 200 VNG/ENG Back Panel Connections ▶ 221, and ICS Chartr 200 Remote Control ▶ 222 for illustrations of the setup of the various ICS Chartr 200 VNG/ENG components.

Contact Otometrics Customer Support if you need assistance.

> ***Warning*** • *Connection of parts other than those supplied for this instrument by Otometrics can degrade the performance and safety of the system.*

App. 4.1 ICS Chartr 200 VNG/ENG

The ICS Chartr 200 VNG/ENG hardware cable connections are shown on this diagram.

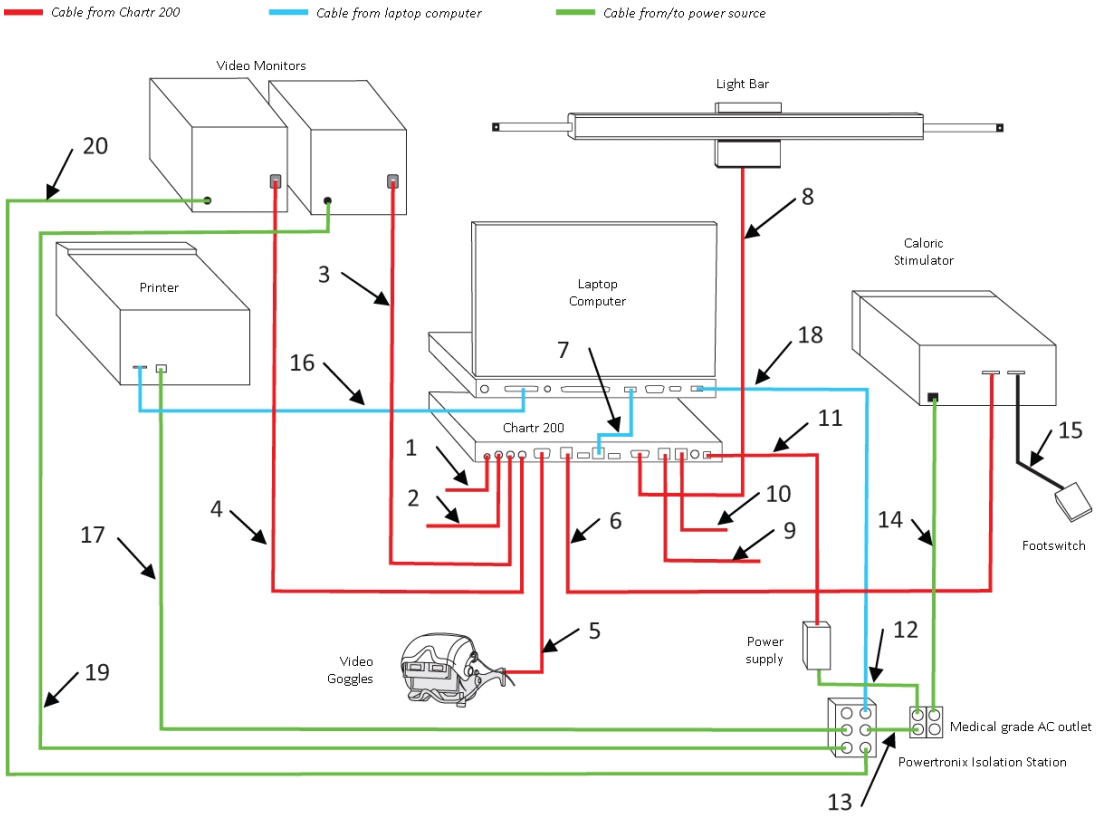


Fig. 168 ICS Chartr 200 VNG/ENG System Connections

1. Cable to microphone (optional)
2. Cable to speaker (optional)
3. Monitor cable to left video monitor (optional)
4. Monitor cable to right video monitor (optional)
5. Video goggle cable to video goggles
6. Otometrics caloric stimulator cable to ICS Chartr 200 or footswitch
7. USB cable to ICS Chartr 200
8. Light bar cable to port on Chartr 200
9. Patient cable
10. Cable to loopback test fixture
11. ICS Chartr 200 power cord to DC power supply (AC/DC converter)
12. DC power supply (Friwo FW7362M/15) cable to hospital grade outlet
13. Powertronix isolation station (X1ATWFHNOC1) cable to hospital grade outlet
14. Caloric stimulator power cable to hospital grade outlet
15. Footswitch cable to remote connector on caloric stimulator
16. Printer cable to printer port on laptop
17. Printer power cable to Powertronix isolation station
18. Laptop power cable to Powertronix isolation station
19. Video monitor power cable to Powertronix isolation station
20. Video monitor power cable to Powertronix isolation station

App. 4.2 ICS Chartr 200 VNG/ENG Back Panel Connections

The components on theICS Chartr 200 VNG/ENG back panel are shown on the following diagram.

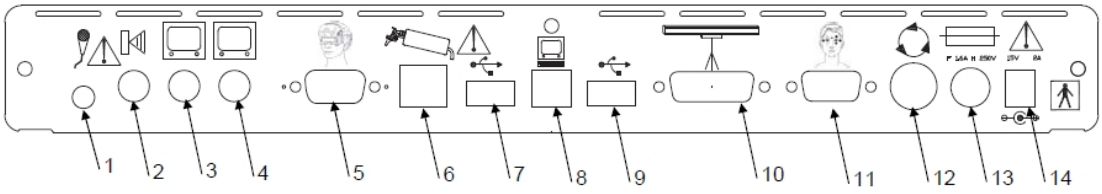


Fig. 169 ICS Chartr 200 VNG/ENG Back Panel

1	Audio input	8	PC (laptop)
2	Audio output	9	USB
3	Video output, left	10	Light bar
4	Video output, right	11	Patient cable
5	Video goggles	12	Loopback test fixture
6	Caloric stimulator	13	Power input fuse
7	USB	14	DC power input

App. 4.3 ICS Chartr 200 Remote Control

The wireless remote control consists of a transmitter and a keypad. The keypad allows the operator to remotely operate many of the VNG/ENG data collection and video recording activities without using the software function keys.

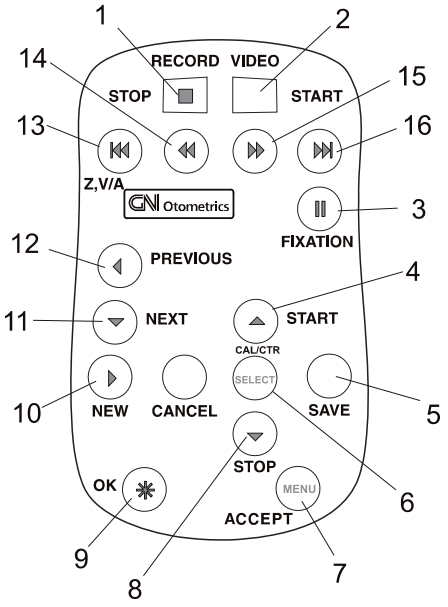


Fig. 170 Remote Control Keypad

	Description / Function
1	Stop video recording
2	Start / restart video recording
3	Turn fixation light on or off
4	Start data collection
5	Save the results
6	Center / calibrate
7	Accept results
8	Stop data collection
9	OK
10	New Test tab / Review tab
11	Next test
12	Previous test
13	Electrode impedance / video adjust / auto adjust
14	Event marker
15	Eyes open marker
16	Vision denied marker

Note • *See Using the Remote Control ▶ 95 for more information on using the remote control.*

App. 5 Error Messages

This section contains some commonly encountered Error Messages. It provides possible causes and suggests actions that the operator could take to address the problem.

The Error Messages are grouped as follows:

- Patient Testing Error Messages (Patient Testing Error Messages ▶ 223)
- Video-Related Error Messages (Video-Related Error Messages ▶ 223)
- Database Error Messages (Database Error Messages ▶ 224)
- Archiving, Exporting, and Importing Error Messages (Archiving, Exporting, and Importing Error Messages ▶ 225)
- Hard Drive Data Storage Error Messages (Hard Drive Data Storage Error Messages ▶ 225)
- Other Error Messages (Other Error Messages ▶ 226)

Fig. 171 Patient Testing Error Messages

Error Message	Possible Cause/Solution
The calibration is not within tolerance. Adjusting or resuming calibration is suggested.	Resume calibration or adjust the calibration prior to saving it.
The patient was out of range for xx% of the test.	Reposition the patient with respect to the light bar. The goal range is 44 to 52 inches (112 to 132 cm).

Fig. 172 Video-Related Error Messages

Error Message	Possible Cause/Solution
No response from the video goggles. Please check to see if the video goggles are connected and powered up. Then, exit and restart ENG to restore normal operation.	The cable connections from the goggles to the Chartr 200 may be loose. Check the connections between the goggles, the Video Distribution Amplifier, and the computer. Exit VNG. From the Windows desktop restart VNG. The system should identify the VNG equipment.
The CORECO Framegrabber drivers were not loaded on this system. Try the following: ** a) Reboot the computer and restart VNG. ** b) Re-install the VNG Software from CD-ROM. If this does not remedy the situation, please contact Otometrics customer support.	Missing or malfunctioning software drivers. Try steps a) and b). If that does not solve the problem, contact Otometrics customer support.
The CORECO Framegrabber board is not being recognized by the drivers. Try the following: ** a) Reboot the computer and restart VNG. ** b) Re-install the VNG software from CDROM. If this does not remedy the situation, please contact Otometrics customer support.	Missing or malfunctioning hardware. Try steps a) and b). If that does not solve the problem, contact Otometrics customer support.

Fig. 173 Database Error Messages

Error Message	Possible Cause/Solution
Database Error: Unable to switch to a new operator.	Contact Otometrics Customer Support for assistance.
Unable to add or update the database. It is recommended that you shut down the application and contact Otometrics Customer Support.	Close any open patient records and exit the VNG/ENG program. Contact Otometrics Customer Support for assistance.
All VNG test and analysis records for this patient have been removed. However, the patient information records will be kept since the database has data collected for other modalities under this patient's name.	The patient information portion of this record (name, address, clinical information, etc.) was not deleted from the database when the test and analysis data was deleted. The patient information is referenced in some other record in the database and cannot be deleted unless all associated information is deleted. For example, Evoked potential data may be associated with the patient's record.
The database version is not compatible.	The system is unable to access the database. Try reinstalling the program. See Introduction to the VNG System ▶ 9 for information. If the problem persists, contact Otometrics Customer Support for assistance.
You can't delete this referring facility. It is associated with a patient in the database.	The facility you are deleting is associated with other patient records, and can not be deleted.
You can't delete this referring physician. It is associated with a patient in the database.	The physician you are deleting is associated with other patient records, and can not be deleted.
The model database can not be copied to the temporary directory.	The hard disk might not have enough free space for the operation. Delete any unnecessary files and try again.
You can't delete this operator. It is associated with a patient in the database.	The operator you are deleting is associated with other patient records and can not be deleted.
Unable to save analysis, test data, etc. - "The application was unable to save information to the database." Please close the application and contact Otometrics Customer Support.	The system is unable to save the current data (test, analysis, calibration, etc.) to the database. Contact Otometrics Customer Support for assistance.
A new ICS database can not be created.	The hard disk might not have enough free space. Delete any unnecessary files and try again.

Note • *If a database error message prompts you to run the Database Repair Utility, see Database Repair Utility ▶ 180 for instructions.*

Fig. 174 Archiving, Exporting, and Importing Error Messages

Error Message	Possible Cause/Solution
An unknown error occurred. The import, export, or archive operation was canceled.	Confirmation to the operator after canceling the export (or import) operation.
An archive database already exists with the same filename. Choose another archive database filename.	You are attempting to create a new archive using a name that is already assigned to another archive. Use the system supplied default archive file name or enter another unique name for the new archive.
There is not enough disk space available to archive the database.	The storage space on the disk drive to which the archive is being saved does not have enough capacity to make a new archive. Exit the program and remove unneeded files from the hard drive. Open VNG/ENG and try the archive again.
The export database can not be copied to the temporary directory.	Check to make sure the file is not read only. Check the available hard drive space.
The floppy disk database can not be copied to the floppy disk.	Verify the floppy disk is inserted into the floppy drive. Verify the floppy disk is not full.
The patient record can not be exported because there is not enough free space on the floppy disk.	Use a blank, formatted floppy disk.
Your ICS database was archived to file 'XXXXX.mdb'. Videos were moved to the folder 'XXXXX.mdb'. We recommend you burn the archived database and videos to CD-ROM/DVD.	You have created an archived database that can be transferred to a CD-ROM/DVD or another hard drive or storage media. Burn the archived database and videos to a CD-ROM/DVD or use the Windows Explorer to move the archived files to a new hard drive or to a location in the network. Consult the instructions supplied with your storage media (i.e., CD-ROM/DVD burner) to transfer the archived file to a new location.

Fig. 175 Hard Drive Data Storage Error Messages

Error Message	Possible Cause/Solution
You have less than 5 MB of free disk space available. There might not be enough space to save your test results. It is recommended that you archive and start a new database, or delete any unneeded files off your hard drive.	The active hard drive has less than 5 MB of storage space available, and needs to be archived. Archive the current database and move it to another location. See Exporting, Importing, and Archiving Records ▶ 162 for additional information.
The hard disk is out of space.	The hard disk does not have enough available memory to complete the requested operation. Exit the program and delete unnecessary files to free up more space. Reopen the program and archive the current database. Move the archive to another hard drive or storage destination.

Error Message	Possible Cause/Solution
There is not enough free space on the hard disk to complete the import/export operation. (5 MB minimum is required).	A minimum of 5 MB of free space is needed to perform an import/export operation. Exit the program and delete any unnecessary files to free up more space.

Fig. 176 Other Error Messages

Error Message	Possible Cause/Solution
The VNG application cannot run with the current monitor display settings. The color quality must be 32-bit. At 96 dpi, the screen resolution must be at least 1024x768 pixels. At 120 dpi, the screen resolution must be at least 1280x960 pixels.	The monitor settings do not meet the minimum monitor display specifications. Right click on the Desktop to show the Window Display properties. Click on the Setup tab; modify the color palette and display size.
Unable to load the word processor. Try to reinstall the software. If unsuccessful, contact Otometrics Customer Support.	The system can not access the built-in word processor. See Introduction to the VNG System ▶ 9 for instructions on reinstalling the program. Contact Otometrics Customer Support for assistance.
The workstation was not registered.	A workstation name was not supplied when the program was originally installed.

App. 6 Keyboard Shortcuts

App. 6.1 Activate Keyboard Shortcut Feature

The procedure in this appendix provides instructions for activating the keyboard shortcut options. This feature allows you to use the keyboard to display menus and menu options. When this option is on, an underscore appears under a letter in each menu option. To use the keyboard, press the Alt key plus the underscored letter.

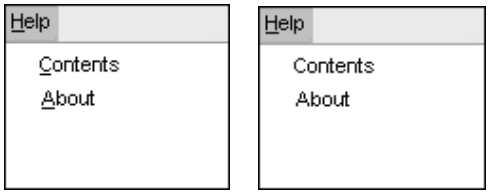


Fig. 177 Help Menu – Keyboard Shortcuts On and Off

If you do not see the underscored letters, use the following procedure to activate this feature.

To activate the keyboard shortcuts feature:

1. Close all open programs.
2. Select **Start**, **Control Panel**.
3. Select the **Switch to Classic View** option

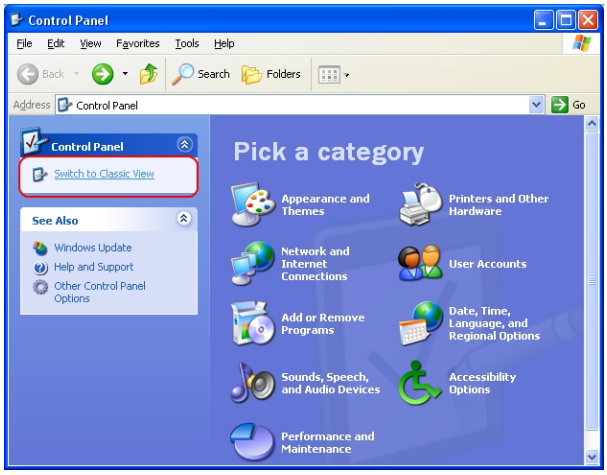


Fig. 178 Control Panel Dialog Box

4. Double-click the **Display** icon.

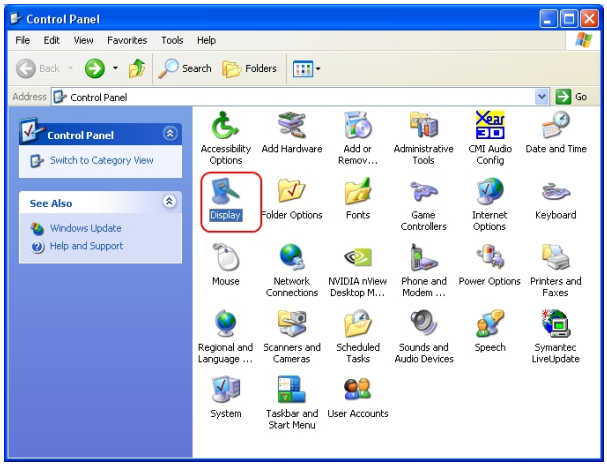


Fig. 179 Select the Display Option

5. Click the **Appearance** tab, then click the **Effects** button.

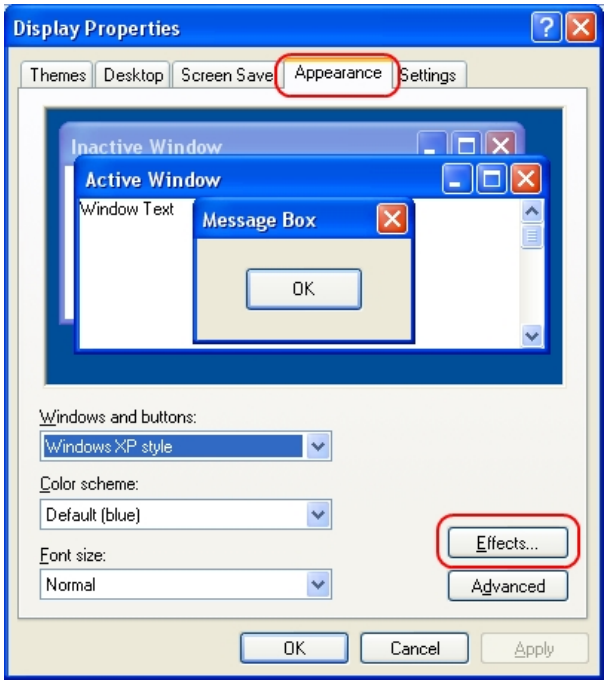


Fig. 180 Display Properties, Appearance Tab

6. Click the **Hide underlined letters for keyboard...** option to clear (i.e., remove) the check mark from this option.

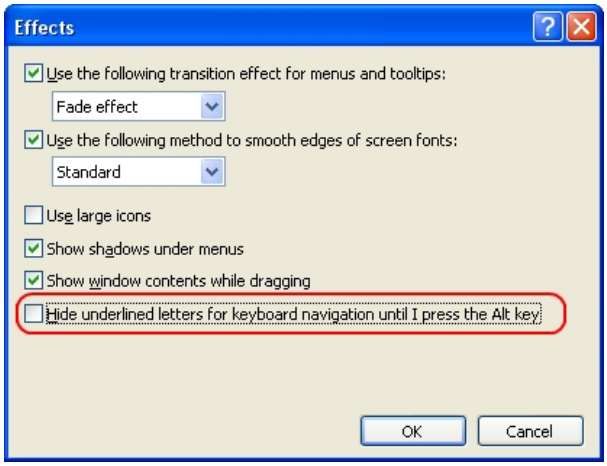


Fig. 181 Effects Dialog Box

7. Click **OK** to save the new Effects setting.

App. 6.2 Use Keyboard Shortcuts

Fig. 182 Keyboard Shortcuts for Menu/Submenu Items

Press the Control (Ctrl) key then the letter	Available from the Data Collection Window
Ctrl + O	Overlap waveforms
Ctrl + S	Spread waveforms
Ctrl + W	Add waveform text
	Available from the Report Window
Ctrl + S	Display the Save dialog box.
Ctrl + Z	Undo the previous action.
Ctrl + X	Cut the selected text and place it on the clipboard.
Ctrl + C	Copy the selected text to the clipboard.
Ctrl + V	Paste the text from the clipboard to the cursor location in the document.
Ctrl + F	Display the Find dialog box.
Ctrl + H	Display the Replace dialog box.
Ctrl + M	Display the Get Macro dialog box.

11.4.1 Keyboard Shortcuts Using the Alternate Key

1. These keyboard shortcuts are available for use with menu and submenu options.
2. Press the Alternate (Alt) key followed by the underscored (menu) letter to display the indicated Menu.
3. Press the underscored letter in a submenu option to activate the option. For example, to use the Format Menu to display the Paragraph Format dialog box:
   A. Press **Alt + o** to display the Format Menu.
   B. Press **P** to display the Paragraph Format dialog box.

App. 7 Function Keys

Chartr VNG/ENG software function keys provide keyboard access and control during testing and while reviewing results. The function keys are located along the bottom of the Main Window.

Fig. 183 Chartr VNG/ENG Software Function Keys

To use a function key, either press the keyboard equivalent key or place the cursor over the on-screen function key button and single click the primary mouse button.

The actions of many of the function keys change depending on the mode or situation that is in use and the activities being performed. The following tables show the function keys organized by mode or situation.

Fig. 184 Function Keys: Collection/Initial

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	New Patient	Create new patient record; display Patient Information dialog box.
F3	Existing Patient	Access an existing patient record; display Patient Selection dialog box.
F4	Review	Access the Review mode.
F5	Calibrate	Perform a calibration.
F6	Range	Access Range dialog box.
F7	Electrode Test/ Video Adjust	Display Electrode Test dialog box (ENG mode only). Display Video Adjustments dialog box (VNG mode only).
F9	Switch Eye	Switches the test eye during monocular testing
F10	Previous Test	Return to previous test.
F11	Next Test	Display next test.
F12	Start	Begin a test.

Fig. 185 Function Keys: Collection/Run

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	Event	Mark Event (E) on the tracing.
F3	Eyes Open	Mark Eyes Open (EO) on test tracing.
F4	Vision Denied	Mark Vision Denied (VD) on test tracing.
F5	Center	Center the waveform.

Function Key	Action	Function
F7	Hide Wave	Make the selected wave invisible.
F8	Show Wave	Make the selected wave visible
F9	Cancel Test	Cancel the test and do not save results.
F10	Overlap Waves	Overlap all waveforms.
F11	Spread Waves	Spread all waveforms.
F11	Fixation Light (VNG)	Toggles the Fixation Light on or off. Available only during Caloric testing on USB systems with VG40 Goggles.
F12	Stop	Stop the test.

Fig. 186 Function Keys: Collection/Pause

Function Key	Action	Function
F1	Help	Opens this User Manual.
F4	Resume	Resume testing or calibration.
F7	Hide Wave	Make the selected wave invisible.
F8	Show Wave	Make the selected wave visible.
F9	Cancel Test	Cancel the test and do not save results.
F10	Overlap Waves	Overlap all waveforms.
F11	Spread Waves	Display all waveforms.
F12	Save	Save test data and move to next protocol.

Fig. 187 Function Keys: Calibration/Initial

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	Default	Use default calibration settings.
F5	Range	Access Range dialog box.
F7	Electrode Test/ Video Adjustments	Access Electrode Test dialog box (ENG mode only). Access Video Adjustments dialog box (VNG mode only)
F8	Close	Exit Calibration mode.
F9	Switch Eye	Switches the test eye during monocular testing
F10	Previous Channel	Return to previous channel.
F11	Next Channel	Display next channel.
F12	Start	Begin calibration.

Fig. 188 Function Keys: Calibration/Start

Function Key	Action	Function
F1	Help	Opens this User Manual.
F5	Slower/Faster	Decrease or increase stimulus speed during calibration.
F7	Center	Center the waveform during calibration. (Only in systems with a pre-amp.)
F9	Cancel	Cancel the calibration without saving results.
F12	Accept	Accept the calibration.

Fig. 189 Function Keys: Calibration/Accept

Function Key	Action	Function
F4	Resume	Resume calibration (i.e., redo active calibration stage).
F12	Stop	Stop the calibration.

Fig. 190 Function Keys: Calibration/Stop

Function Key	Action	Function
F1	Help	Opens this User Manual.
F3	Default	Use default calibration settings.
F4	Resume	Resume or restart calibration.
F5	Enlarge	Increase size of wave.
F6	Shrink	Reduce size of wave.
F7	Up	Move selected tracing up.
F8	Down	Move selected tracing down.
F9	Cancel	Cancels that calibration.
F10	Overlap Waves	Overlap all waveforms.
F11	Spread Waves	Spread all waveforms.
F12	Save	Save calibration and access the next channel to calibrate or if all changes have been calibrated, return to Test mode.

Fig. 191 Function Keys: Review Mode

Function Key	Action	Function
F1	Help	Access Operator's Manual
F2	New Patient	Create new patient record; display Patient Information dialog box.

Function Key	Action	Function
F3	Existing Patient	Access an existing patient record; display Patient Selection dialog box.
F4	New Test	Access New Test mode.
F5	Rename	Rename an existing test; display Protocol Rename dialog box.
F6	Report	Display word processor portion of patient report.
F7	Filter/Unfilter	Add or remove effect of a filter on all tracings.
F8	Review Calib.	Display most recent calibration associated with the test being reviewed.
F9	Switch Eye	Switches the test eye during monocular testing
F10	Previous Test	Access and display the previous test listed for that session.
F11	Next Test	Access and display the next test listed for that session.
F12	Analysis	Begin analysis for the current test.

Fig. 192 Function Keys: Calibration/Review

Function Key	Action	Function
F1	Help	Opens this User Manual.
F3	Original Calibration	Return to original calibration (i.e., the calibration saved prior to manipulation).
F5	Enlarge	Increase the gain of the wave.
F6	Shrink	Reduce the gain of the wave.
F7	Up	Move selected wave up.
F8	Down	Move selected wave down.
F9	Cancel	Cancel any adjustment and do not save results.
F12	Save	Save the changes to the calibration and reaccess the current test.

Fig. 193 Function Keys: Tracking Analysis

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	Reanalyze	Clear previous analysis and begin a new analysis.
F3	Delete Cycle	Delete a tracking cycle.
F5	Enlarge	Increase the gain of the wave.
F6	Shrink	Reduce the gain of the wave.

Function Key	Action	Function
F7	Up	Move selected wave up.
F8	Down	Move selected wave down.
F9	Close	Prompts to save analysis. Clicking No will go back to Review state without saving.
F10	Previous Cycle	Move the tracing to the previous cycle.
F11	Next Cycle	Move the tracing to the next cycle.
F12	Save	Save analysis.

Fig. 194 Function Keys: Saccade/Individual Analysis

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	Reanalyze	Clear previous analysis and begin a new analysis.
F3	Delete Saccade	Delete analysis results of selected saccade.
F4	Right Eye Gain / Left Eye Gain	Toggle between a display in the Information area of the gain and number of saccades accepted for the right or the left eye. This also determines which eye the enlarge / shrink / up / down function keys affect.
F5	Enlarge	Increase the gain of the wave.
F6	Shrink	Reduce the gain of the wave.
F7	Up	Move selected wave up.
F8	Down	Move selected wave down.
F9	Close	Prompts to save analysis. Clicking No will go back to Review state without saving.
F10	Previous Saccade	Move the tracing to the previous saccade.
F11	Next Saccade	Move the tracing to the next saccade.
F12	Save	Save analysis.

Fig. 195 Function Keys: Saccade/Both Analysis

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	Reanalyze	Clear previous analysis and begin a new analysis.
F3	Delete Saccade	Delete analysis results of selected saccade.

Function Key	Action	Function
F5	Enlarge	Increase the gain of the wave.
F6	Shrink	Reduce the gain of the wave.
F7	Up	Move selected wave up.
F8	Down	Move selected wave down.
F9	Close	Prompts to save analysis. Clicking No will go back to Review state without saving.
F10	Previous Saccade	Move tracing to the previous saccade.
F11	Next Saccade	Move tracing to the next saccade.
F12	Save	Save analysis.

Fig. 196 Function Keys: SPV/Initial

Function Key	Action	Function
F1	Help	Opens this User Manual.
F9	Cancel	Cancel the analysis and return to the Review mode.
F12	Begin	Start analysis at the time defined by the cursor.

Fig. 197 Function Keys: SPV/Analysis

Function Key	Action	Function
F1	Help	Opens this User Manual.
F2	Reanalyze	Clear previous analysis and begin a new analysis.
F3	Remove All Beats	Removes all beats for that test.
F3	Interpret Tests	Invoke Interpretation Assistant to interpret results. Currently, this option is available only when PODS/Butterfly is displayed. To initiate Interpreter during Positional tests, use the menu bar or interpret icon
F4	Pods - Butterfly	Display pod (summary) views of caloric analysis.
F5	Locate Peak	Identify the area representing the average of the fastest beats.
F6	Set Peak	Mark peak velocity where the cursor is currently set.
F7	Delete	Delete the selected SPV beat measurement.
F8	Insert	Insert the selected SPV beat measurement.
F9	Close	Prompts to save analysis. Clicking No will go back to Review state without saving.

Function Key	Action	Function
F10	Previous Beat	Move the cursor to preceding measured beat.
F11	Next Beat	Move the cursor to the next measured beat.
F12	Save	Save analysis.

Fig. 198 Function Keys: SPV/Pods Butterfly

Function Key	Action	Function
F1	Help	Opens this User Manual.
F3	Interpret Tests	Interpret caloric results.
F4	SPV Graph	Return to SPV measurement state.
F5	Baseline Up	Moves baseline up (green line on PODS graph).
F6	Baseline Down	Moves baseline down (green line on PODS graph).
F7	Set Baseline	Saves the baseline at current position. F12 - Save must be pressed to save baseline to the database.
F9	Close	Cancel the analysis and return to the Review mode.
F12	Save	Save the PODS information.

App. 8 Video Files

App. 8.1 Video Playback Dialog

The video playback dialog contains several distinct regions.

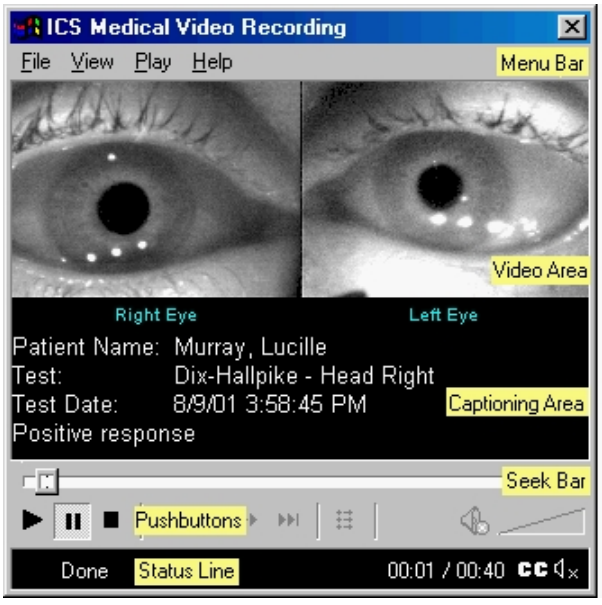


Fig. 199 Medical Video Recording Dialog Box

- The Video Area is beneath the dialog's Menu Bar. This region displays the recorded eye movements.
- The Captioning Area is beneath the Video Area. It displays a label for each eye, and identifies the name of the patient, the name of the test, and the date and time at which the test was conducted. The Captioning Area may also display a comment from the Text Area of the Main Window.
- The Seek Bar lies beneath the Captioning Area. It indicates the progress of video playback relative to the beginning and end of the video clip. The progress indicator may be dragged to change the current position in the video clip.
- Pushbuttons to Play, Pause, and Stop playback are beneath the Seek Bar.
- The Status Line is at the bottom of the dialog. It displays the current state of the player (for example, Playing, Paused, or Stopped), the current position in the video clip, and the total duration of the video clip in seconds. Note that there is no correlation between the current position in the video clip and the time into the test. For example, a display of "00:08 / 00:40" means that playback is currently 8 seconds into a 40 second clip. It does not mean that the video image was recorded 8 seconds into the test.

App. 8.2 Adding a Comment to a Video Recording

The last line of the caption in the Video Playback Dialog is reserved for user comments.

To enter a comment:

1. Select the test in the Review Tab.
2. Click in the Text Area of the Main Window, located on the right side of the screen just above the function key bar.
3. Type in the desired comments.
4. Double-click on the test's entry in the Review Tab, or select Video, Play in the Menu Bar to begin video playback.

App. 8.3 Deleting Video

To permanently delete a video recording:

1. Select the desired test in the Review Tab.
2. Select **Video**, **Delete** in the Menu Bar. A dialog appears, asking you to confirm the deletion of the video file. Select **Yes** to delete the file, or **No** to preserve it. Video deletion has no effect on the test or the tracings.

> ***Note*** • *Once deleted, a video file cannot be recovered.*

App. 8.4 Archiving Recorded Video

When a database is archived, all video associated with it is also archived. There are two ways in which you can preserve video recordings when archiving your database.

- Export individual video recordings of interest
- Archive Patient Records

App. 8.5 Exporting Video

The Video Export feature enables you to save a copy of a video recording to a file of your choosing. Exported video files may then be used for purposes such as conferring with colleagues or experts, or teaching. When a video recording is exported, a new copy of that video (including caption information) is created. This copy is detached from the patient's record in the Chartr database.

Exported video files are stored in the industry-standard Audio Video Interleave (AVI) file format. Video data may be compressed (at some loss of image quality) during the export operation to reduce the size of the exported video file. During Video Export, a progress dialog displays the status of the export operation. This dialog contains a Cancel button that permits the export operation to be aborted.

Exported video is viewable on any platform that has Windows Media Player 6.0 or later installed and High Color (thousands of colors) or True Color (millions of colors) display.

App. 8.5.1 Video File Export Dialog

When the Video, Export menu item is selected, the Video File Export dialog box is displayed. This dialog can be used to export the video file. The patient's name written to the exported video file can be changed via this dialog. This provides for protection of patient confidentiality when exported video is to be used for teaching.

The dialog also allows for selection and configuration of a codec to compress the exported video. Uncompressed video is quite large (1.1 megabytes/second for VNG eye movements), so it may be necessary to sacrifice some image quality in order to reduce the size of the exported video file.

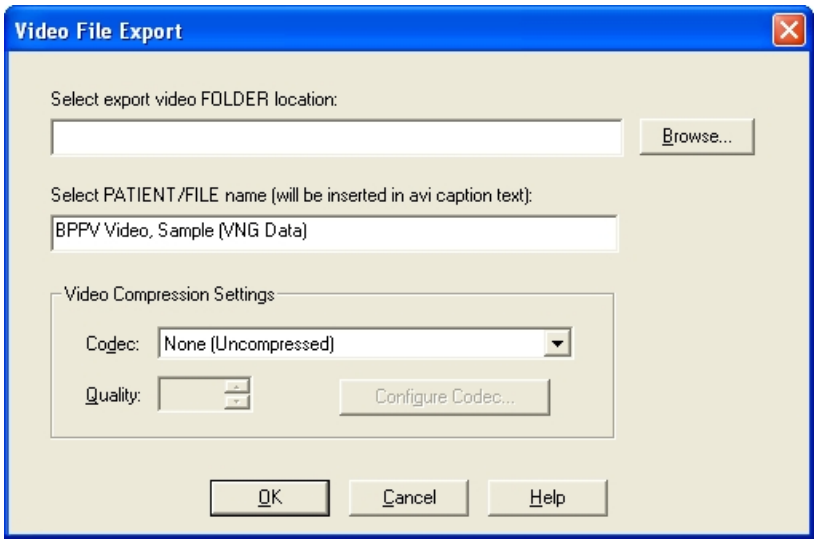


Fig. 200 Video File Export

These options are available from the Video File Export dialog.

Exported Video Location	Specify the folder where the exported video file will be placed. The Browse button may be used to locate the desired folder.
Patient/File Name	Specify the name of exported video file. By default, the patient's name appears here but change the name if patient privacy is desired.
Codec	Select the desired codec from the Codec dropdown list.
Configure codec	Displays the configuration dialog for the selected codec. Not all codecs have configuration dialogs.
Quality	Select the desired compression quality. The Quality Controls are only enabled if the selected codec supports quality configuration. Reducing the quality value can result in smaller exported files, but a lower-quality image may not be as crisp as the original.
OK	Export Video and dismiss dialog
Cancel	Cancel the Video Export operation.
Help	Opens this User Manual.

App. 8.6 Configuring Windows Media Player for Caption Display

Exported video files contain a caption consisting of a label for each eye, the name of the patient, the name of the test, the date and time at which the test was conducted, and an optional comment.

In order to view the caption in an exported video file, closed-captioning display must be enabled.

App. 8.6.1 Windows Media Player, version 9

1. Press the Stop button.
2. In the Menu Bar, select Play - Captions and Subtitles – On if available
3. Press the Play button. The caption will be visible.
4. If necessary, enlarge the caption window by grabbing the top and dragging it towards the image of the eyes.

App. 8.6.2 Windows Media Player, version 10

1. Press the Stop button.
2. In the Menu Bar, click on the down arrow in the upper right corner of the screen
3. Select Play - Captions and Subtitles – On if available
4. Press the Play button. The caption will be visible.
5. If necessary, enlarge the caption window by grabbing the top and dragging it towards the image of the eyes.

App. 8.6.3 Windows Media Player, version 11

1. Press the Stop button.
2. Right Click on title bar to see Play menu
3. Select Play - Lyrics, Captions, and Subtitles - On if Available
4. Press the Play button. The caption will be visible.
5. If necessary, enlarge the caption window by grabbing the top and dragging it towards the image of the eyes.

App. 8.7 Choosing a Codec

Compression involves finding patterns in data (i.e. text or video files) and storing them more efficiently. Text compresses extremely well; it is possible to achieve high rates of compression without discarding any data. If a compressed text file is decompressed, the resulting file is identical to the original uncompressed file. This kind of compression is called reversible or lossless compression.

Patterns in video data are more difficult to find, so a lossless-compressed video file tends not to be much smaller than the original. In order to compress video data to any significant degree, some of the data has to be discarded. This is called lossy compression. If a lossy-compressed file is decompressed, the resulting file is not identical to the original. Whether the differences are significant depend on the type of image, the person viewing the image, and the technique used to compress the image.

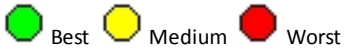
Lossy codecs generally try to discard data that the human eye is not likely to notice. Different codecs use different strategies for discarding data, producing varying results.

There are four main areas in which codecs can be compared:

- Size of the compressed video file (smaller = better)
- Speed of compression process (faster = better)
- Quality of the compressed video image (clearer = better)
- Compatibility with other applications (i.e., Macintosh QuickTime)

The following table compares the standard Windows 98 codecs using these criteria.

Codec	Size	Speed	Quality	Compatibility
None (Uncompressed)				
Microsoft Video 1				
Indeo® video 5.04				
Cinepak Codec by Radius				
Intel Indeo(R) Video R3.2				

Key:  Best Medium Worst

Other codecs may be purchased or downloaded from the Internet. However, keep in mind that not all codecs support the video format used by Chartr VNG. Also, a compressed video file cannot be played back without the codec used to compress it. Use of “third-party” codecs is not recommended unless you are sure that the proper codec is installed on the system where the video will be played back.

App. 8.8 Video Export Compression Controls

The Save Video As Dialog Box allows for selection and configuration of the codec to be used to compress the exported video.

The codec dropdown displays a list of the installed codecs that support Chartr VNG video files. Use this control to select the desired codec.

The Compression Configure... button is enabled if the codec selected in the codec dropdown supports its own proprietary configuration dialog. Selecting this button displays the configuration dialog for the selected codec.

The Compression Quality Controls (edit box and spin control) are enabled if the selected codec supports additional quality configuration. If quality configuration is supported by the selected codec, the codec’s default quality factor (from 0 to 100) will be displayed. Any number from 0 to 100 (inclusive) may be entered in the Quality edit box. The Quality spin control (up-down arrows) may be used to increment or decrement the quality by multiples of 5.