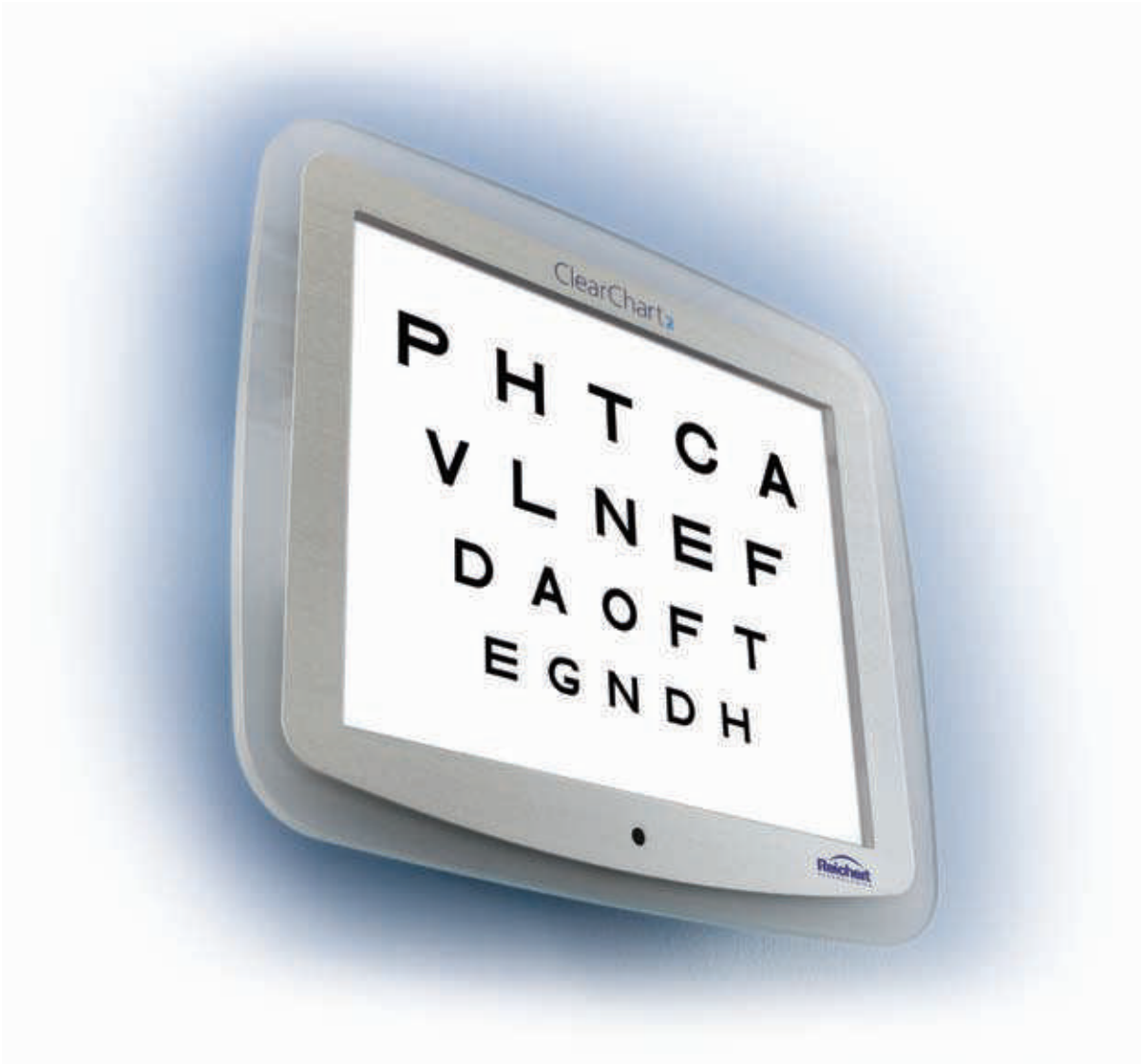
ClearChart®2

Digital Acuity System

User's Guide



AMETEK®
ULTRA PRECISION TECHNOLOGIES

Reichert®
TECHNOLOGIES

Contents

Caution: Federal law restricts this device to sale by or on the order of a licensed physician. Rx Only.

Warnings & Cautions

Reichert Technologies (Reichert) is not responsible for the safety and reliability of this instrument when:

- Assembly, disassembly, repair, or modification is made by unauthorized dealers or persons.
- Instrument is not used in accordance with this User's Guide.

WARNING: AN INSTRUCTION THAT DRAWS ATTENTION TO RISK OF INJURY OR DEATH.

WARNING: UNITED STATES FEDERAL LAW AND EUROPEAN REGULATIONS REQUIRE THAT THIS DEVICE BE PURCHASED ONLY BY A PHYSICIAN OR A PERSON ACTING ON BEHALF OF A PHYSICIAN.

WARNING: THIS INSTRUMENT SHOULD BE USED IN STRICT ACCORDANCE WITH THE INSTRUCTIONS OUTLINED IN THIS USER'S GUIDE. THE SAFETY OF THE OPERATOR AND THE PERFORMANCE OF THE INSTRUMENT CANNOT BE GUARANTEED IF USED IN A MANNER NOT SPECIFIED BY REICHERT TECHNOLOGIES.

WARNING: DO NOT REPAIR OR SERVICE THE CLEARCHART 2 WITHOUT AUTHORIZATION FROM THE MANUFACTURER. ANY REPAIR OR SERVICE TO THE CLEARCHART 2 MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS WHO ARE TRAINED BY REICHERT SO THAT CORRECT OPERATION OF THE CLEARCHART 2 IS MAINTAINED.

WARNING: MODIFICATIONS TO THIS INSTRUMENT ARE NOT ALLOWED. ANY MODIFICATION TO THIS UNIT MUST BE AUTHORIZED BY REICHERT SO THAT CORRECT OPERATION IS MAINTAINED.

WARNING: IF THIS INSTRUMENT IS MODIFIED, APPROPRIATE INSPECTION AND TESTING MUST BE CONDUCTED TO ENSURE CONTINUED SAFE USE OF THIS INSTRUMENT.

WARNING: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE OR DAMAGE TO THE UNIT MAY OCCUR.

WARNING: THIS INSTRUMENT IS NOT SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE ANESTHETIC MIXTURES, SUCH AS OXYGEN OR NITROUS OXIDE.

WARNING: THIS INSTRUMENT MUST BE PLUGGED INTO AN OUTLET WITH AN EARTH GROUND. DO NOT REMOVE OR DEFEAT THE EARTH GROUND CONNECTION ON POWER INPUT CONNECTOR OR THE UNIT'S POWER CORD OF THIS INSTRUMENT OR DAMAGE TO IT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: TO AVOID RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH OR DAMAGE TO THIS INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: THE EQUIPMENT OR SYSTEM SHOULD NOT BE USED ADJACENT TO OR STACKED WITH OTHER EQUIPMENT AND THAT IF ADJACENT OR STACKED USE IS NECESSARY, THE EQUIPMENT OR SYSTEM SHOULD BE OBSERVED TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH IT WILL BE USED.

Warnings & Cautions (Continued)

CAUTION: AN INSTRUCTION THAT DRAWS ATTENTION TO THE RISK OF DAMAGE TO THE PRODUCT.

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT AS DAMAGE TO THE UNIT MAY OCCUR. SEE MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTION.

CAUTION: USE OF AMMONIA BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) MAY CAUSE DAMAGE TO THE DISPLAY. SEE MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTION.

CAUTION: PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT CAN EFFECT MEDICAL ELECTRICAL EQUIPMENT.

CAUTION: THE INTERNAL CIRCUITRY OF THE INSTRUMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (ESDS) THAT MAY BE SENSITIVE TO STATIC CHARGES PRODUCED BY THE HUMAN BODY. DO NOT REMOVE THE COVERS WITHOUT TAKING PROPER PRECAUTIONS.

CAUTION: MEDICAL ELECTRONIC EQUIPMENT NEEDS SPECIAL PRECAUTIONS REGARDING EMC AND NEEDS TO BE INSTALLED AND PUT INTO SERVICE ACCORDING TO THE EMC INFORMATION PROVIDED IN THE ACCOMPANYING DOCUMENTS.

CAUTION: THIS INSTRUMENT IS NOT TO BE USED NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

CAUTION: THIS INSTRUMENT IS NOT INTENDED TO BE CONNECTED TO EQUIPMENT OUTSIDE THE CONTROL OF REICHERT INC. OR MUST BE TESTED TO AN APPLICABLE IEC OR ISO STANDARDS.

Symbol Information

The following symbols appear on the instrument:

Caution symbol indicating important operating and maintenance instructions that are included in this User's Guide

Alternating Current Power

Protective Earth Connection

ON / OFF

Date of Manufacture

[REF] Catalog Number

Waste of Electrical and Electronic Equipment

Compliance to Medical Device Directive 93/42/EEC

Authorized to mark given by Intertek ETL Semko for conformance with electrical standards

S/N Serial Number

Fragile Contents in Shipping Container - handle with care

Keep Dry - Package shll be kept away from rain.

This Way Up - Indicates correct upright position of package

Authorized Representative in European Community

Consult Instructions for Use

Introduction

Congratulations on your purchase of the ClearChart®2.

The ClearChart 2 is a remote controlled digital acuity system that has been designed to provide a comprehensive, versatile, and convenient system for measuring visual acuity.

This User's Guide is designed as a training and reference manual for operation, maintenance, and troubleshooting. We recommend that you read it carefully prior to use and follow the instructions in the guide to ensure optimum performance of your new instrument. Properly trained eyecare professionals such as ophthalmologists, optometrists, opticians and eye care technicians should operate this instrument.

Please retain this manual for future reference and to share with other users. Additional copies can be obtained from your authorized Reichert dealer or from the Reichert Customer Service Department. Contact information is provided at the end of this guide.

Indications for Use

The indications for use include visual acuity for determining patient objective refraction.

Contraindications

None

Unpacking and Contents

Great care has been taken to deliver your ClearChart 2 to you. The packaging was specifically designed to transport this instrument. Please retain the packaging for future use in case transportation is required. To remove the ClearChart 2 from it packaging:

1. Remove the accessories from the top pieces of foam in the box.
2. Remove the two top pieces of foam from the box.
3. Lift the ClearChart 2 out of the box.

The items listed below should be included in the ClearChart 2 packaging container:

- ClearChart 2 (P/N 13760)
- Remote Control (P/N 13762)
- Two AAA batteries (P/N 13950000-902)
- Power Cord *
- Wall Mount Bracket (P/N 13750-008)
- Two Screws (P/N X76317)
- Two Drywall Fasteners (P/N X76318)
- User's Guide (P/N 13760-101)

If any of these items are missing, please contact the Reichert Customer Service Department. Contact information can be found on the back cover of this manual.

*** An alternate medical grade power cord for your region may need to be obtained as required by your local laws and ordinances for use with a medical grade device.**

Installation, Features, & Functions

Wall Mounting Instructions

WARNING: IT IS IMPORTANT TO SAFELY SECURE THE EQUIPMENT. UNSECURED EQUIPMENT COULD POSSIBLY BECOME DISLODGED AND FALL, CAUSING INJURY TO EITHER THE PATIENT OR EXAMINER.

WARNING: CARE MUST BE TAKEN TO ARRANGE THE CABLES FOR THE ACCESSORIES SUCH THAT THEY DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT..

WARNING: POSITION THE CLEARCHART 2 ON THE WALL SO THAT IT IS NOT DIFFICULT TO OPERATE THE DISCONNECTION DEVICE (PLUG).

Note: Make sure the position you choose to mount your ClearChart 2 is within the reach of a power outlet.

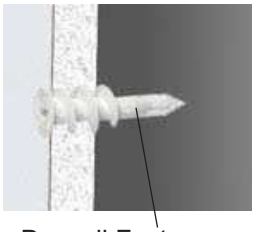
Direct-Throw: Your ClearChart 2 must be positioned at patient eye level directly in front of the patient. The minimum test distance is 6 feet (1.83 meters) with a maximum test distance of 31 feet (9.5 meters). Refer to the Direct Throw illustration in this section.

Mirror Arrangement: A first surface mirror is a useful space-saving device to increase the patient testing distance when the room does not permit a direct-throw arrangement. Typically, your ClearChart 2 will be positioned higher than patient eye level so that the examiner will not interfere with the patient's view of the ClearChart 2. Arrange the ClearChart 2 and mirror so that the ClearChart 2 can be seen by the patient through the mirror.

1. Find an appropriate spot on the wall that will support the ClearChart, which will hang from the Mounting Bracket attached to the wall inserts included with the accessories. Ensure that the refraction distance meets the requirements for either Direct-throw or Mirror Arrangement.

2. Level the supplied Wall Mount Bracket with the metal tabs facing up and out on your wall and mark the holes on the wall.

3. Using the supplied Drywall Fasteners, place the tip of each fastener on the marked hole and using a hammer tap the insert into the wall as far as the threads on the insert. Using a phillips-head screwdriver, screw the fastener into the wall until the surface is flush with the wall. Refer to the Drywall Fastener picture for a sample of correct installation.

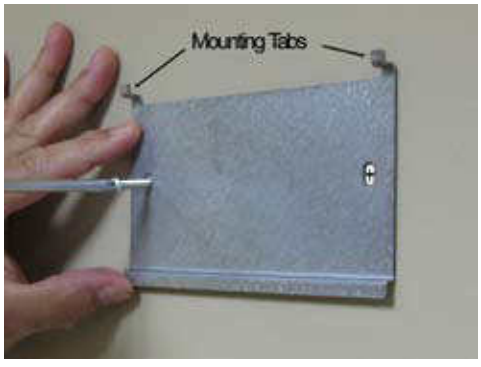


Drywall Fastener

CAUTION: DO NOT OVER DRIVE THE INSERTS INTO THE WALL.

4. Place the Wall Mount Bracket on the wall, and screw the supplied screws into the Drywall Fasteners.

5. Hang the ClearChart 2 by lining-up the holes on the back of unit with the metal tabs of the Wall Mount Bracket and hang the unit on these tabs.



Mounting the Wall Bracket

Installation, Features, & Functions (cont)

Application of Input Power

1. Using the provided power cord, insert the female end into the power input receptacle located at the bottom of the instrument.
2. Plug the male end of the power cord into a wall outlet of the appropriate voltage. Input voltage must not exceed the range specified on the ClearChart 2 data plate.
3. Set the ON / OFF switch to ON (I).

Disconnection of Input Power

1. At any time, the power switch can be set to OFF. The unit does not have a power down sequence. To terminate operation of the ClearChart 2, press the ON / OFF switch to the OFF position (O).
2. If the ClearChart 2 is intended to be OFF for an extended period of time, the ClearChart 2 can be disconnected from power by detaching the power cord from the its receptacle.

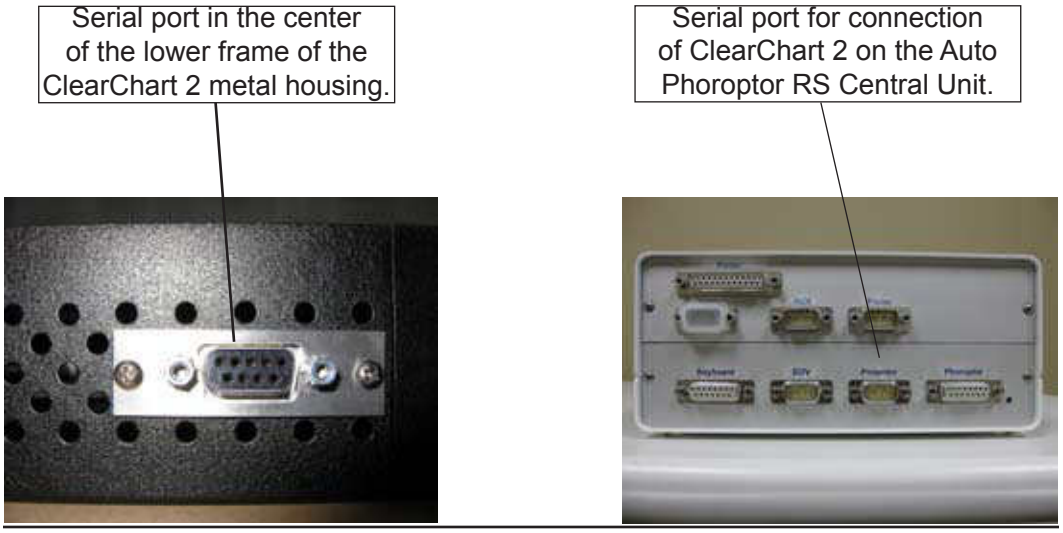
Connection with the Auto Phoroptor RS™ Auto Refraction System

The ClearChart 2 can be configured for bi-directional communication with the Auto Phoroptor RS automated refraction system. This can be achieved with a hard-wired serial connection or with wireless communication accessories.

Wired Connection

Wired communication between the ClearChart 2 and the Auto Phoroptor RS requires connection of a NULL modem serial cable with 9 pin male connector on one end and 9 pin female connector at the other end. The cable should be connected to the serial port on the ClearChart 2 and the serial port labeled “Projector” on the Auto Phoroptor RS Central Unit.

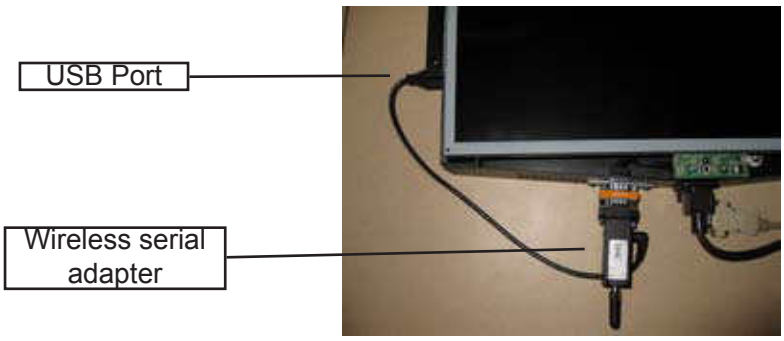
Note: The Reichert part number for the interface cable between the AutoPhoroptor RS and the ClearChart 2 is: 16200-440.



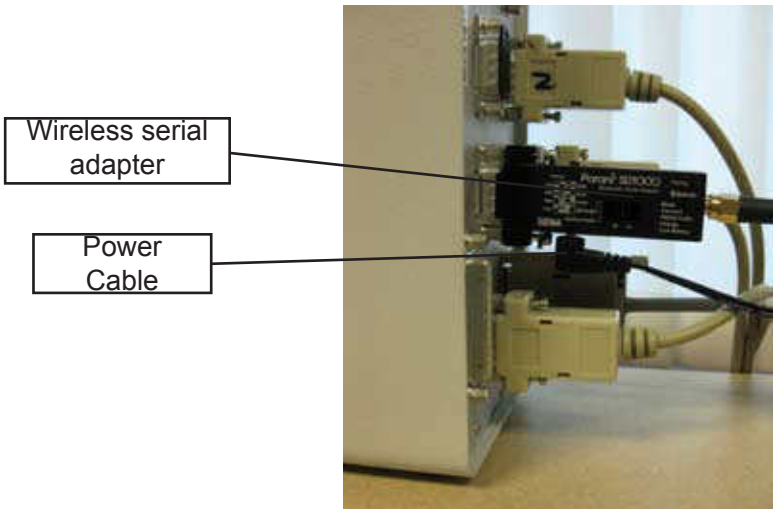
Connection with the Auto Phoroptor RS™ ... (Con't)

Wireless Connection

Wireless connectivity between the ClearChart 2 and the Auto Phoroptor RS can be achieved with a set of Bluetooth® serial adapters. One serial adapter needs to be connected to the serial port on the bottom of the ClearChart 2 and can be powered through the USB connection on the side of the device or with a separate AC adapter.



The second serial adapter should be connected to the Projector serial port on the Auto Phoroptor RS Central Unit and powered with an adapter plugged into an outlet.



Follow the instructions provided by the manufacturer of the wireless serial adapters to set the devices for the serial port configuration.

Installation, Features, & Functions (cont)

Remote Control Power

1. Remove the back of the remote control by sliding it in the direction of the arrow.

2. Put in two AAA batteries in the position shown on the remote control.

Remote Control

The remote control will operate all the screens on your ClearChart 2.

1. Lines of Same Sized Optotypes
2. Lines of Descending Sized Optotypes
3. Single Vertical Line/Descending/ Normal Optotypes
4. Single Letter
5. RED/GREEN Test
6. Randomize Optotype
7. View Size of Optotype Currently Displayed
8. Left Arrow
9. Up Arrow (Volume Up)
10. Right Arrow
11. Down Arrow (Volume Down)
12. Menu Button
13. Educational Slides
14. Save Button
15. Contrast Up (MAX)
16. Contrast Down (MIN)
17. Light (3 Illumination Levels)
18. Contrast Mode
19. 400 Optotype Size
20. 200 Optotype Size
21. 100 Optotype Size
22. 80 Optotype Size
23. 60 Optotype Size
24. 50 Optotype Size
25. 40 Optotype Size
26. 30 Optotype Size
27. 25 Optotype Size
28. 20 Optotype Size
29. 15 Optotype Size
30. 10 Optotype Size
31. Default/Change Optotype
32. Alternate Optotype
33. Animate
34. Movie
35. Cross Cylinder Test
36. Astigmatic Dial
37. Astigmatic T
38. Fixation Targets
39. Color Suppression
40. Horizontal Disparity
41. Vertical Disparity
42. Worth Four Dot Test
43. Crowding Bars
44. Not Active - For Future Use
45. Dark (Screen Saver)

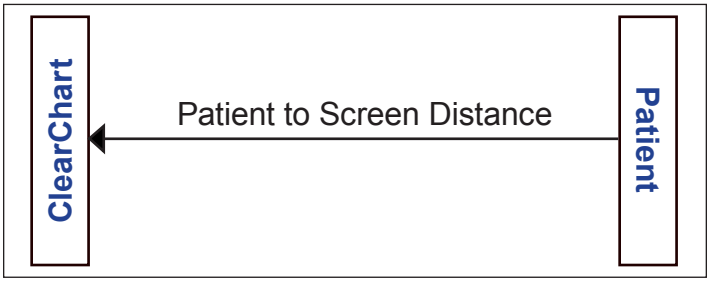
Installation, Features, & Functions (cont)

Configuring the ClearChart 2

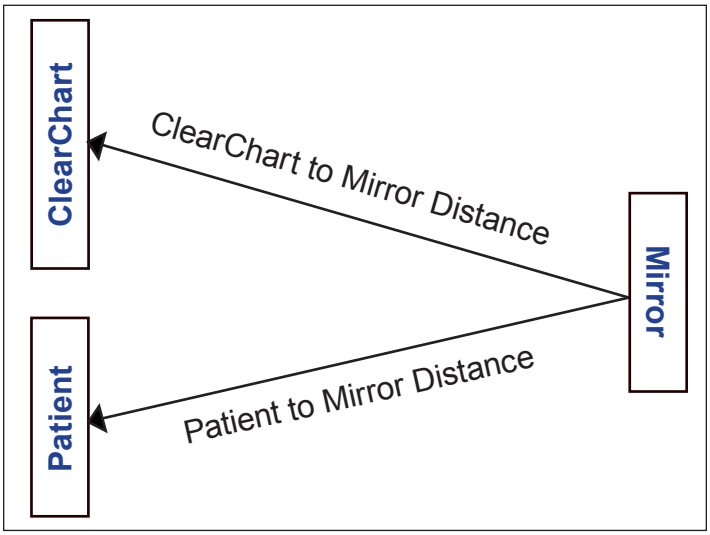
Press the ON/OFF switch located on the side of the instrument. The ClearChart 2 will boot-up. When the ClearChart 2 welcome screen appears, press the MENU button on the remote to enter the configuration mode. Use the UP and DOWN arrows to navigate through different options.

ROOM
Using the LEFT/RIGHT arrows on your remote, select DIRECT THROW or MIRRORED based on the configuration of your office. When you are finished, press the DOWN arrow.

Using the LEFT/RIGHT arrows on your remote, select METRIC or ENGLISH units based on which units you use to measure your refraction distance. When you are finished, press the DOWN arrow.



Direct Throw



Mirror Set Up

Installation, Features, & Functions (cont)

ACUITY NOTATION

Using the LEFT/RIGHT arrows on your remote, select SNELLEN, METRIC, or DECIMAL for your acuity notation. When you are finished, press the DOWN arrow.

- Snellen - displayed as distance in feet / size in mm
- Metric - displayed as distance in meters / size in mm
- Decimal - displayed as the decimal equivalent for the distance in feet / size in mm

The 20/10 optotypes may not be available at test distances under 12 feet (3.66 meters) and the 20/400 optotypes may not be available at test distance over 22 feet (6.71 meters).

DISTANCE

Use the MAX and MIN buttons to adjust the testing distance from the patient's eye to the screen. The units are either inches or centimeters depending on whether you chose ENGLISH or METRIC earlier in the setup procedure. When you are finished, press the DOWN arrow.

Note: If MIRRORED was selected in the ROOM setup category entered above, then two distances will be required. First enter the distance from the patient to the mirror, then enter the distance from the mirror to the screen. Press the DOWN arrow after each distance is entered.

OPTOTYPES

Using the LEFT/RIGHT arrows on your remote, select the default optotype you would like the ClearChart 2 to display when first started.
Available optotypes are:

- 17 Letter
- 8 Letter
- Sloan
- Tumbling E
- Landholt C
- O Landholt C
- HOTV
- Numbers
- Symbols
- Allen Symbols

Note: You will be able to access any optotype while using the ClearChart 2. When you are finished, press the DOWN arrow.

ALTERNATE OPTOTYPES

Using the LEFT/RIGHT arrows on your remote, select the alternate optotype you would like the ClearChart 2 to display when you press ALT OPT on your remote. When you are finished, press the DOWN arrow.

LINE PRESENTATION

Using the LEFT/RIGHT arrows on your remote, select the default line presentation you would like the ClearChart 2 to display.
Presentation types:

- Triple Decreasing
- Quadruple/Same
- Quadruple/Decreasing
- Single Letter
- Column
- Column Uneven
- Single Line
- Double Same
- Double Decreasing
- Triple Same

Note: You will be able to access any line presentation while using the ClearChart 2. When you are finished, press the DOWN arrow.

Installation, Features, & Functions (cont)

PROGRESSION

Using the LEFT/RIGHT arrows on your remote, select standard or logmar for the default size progression you would like the ClearChart 2 to display.

Note: You will be able to change size progression while using the ClearChart 2. When you are finished, press the DOWN arrow.

DISPLAY OPTOTYPE SIZE

Using the LEFT/RIGHT arrows on your remote, select whether or not you would like the optotype size displayed on the screen at all times.
Options are: Display or No Display.

When you are finished, press the DOWN arrow.

MAXIMUM PER LINE

Using the LEFT/RIGHT arrows on your remote, select the maximum number of characters you would like displayed on any line.

Options are: 1, 2, ,3, 4, 5, or 6

When you are finished, press DOWN arrow.

RED/GREEN ADJUST

Using the LEFT/RIGHT arrows on the remote, select recalibrate or factory default. If you choose to recalibrate your red/green settings, press the DOWN button to enter adjustment mode. To adjust red (R) use the MIN and MAX buttons to acquire proper tone. Press the RIGHT arrow key four (4) times to get to green adjust. Use MIN and MAX to adjust green to desired tone. Next press the DOWN arrow to enable adjustment of the red tone for the suppression letters. MIN and MAX buttons will again change the color tone. Press the RIGHT arrow button four (4) times to adjust the green tone for the suppression letters. Use MIN and MAX buttons to adjust the color. Press the DOWN arrow to re-enter the initial red/green setup screen. Using the RIGHT/LEFT arrows, move back to the no change option, then press the DOWN arrow to leave the red/green menu selection.

SCREEN SAVER

Use the MIN and MAX buttons to set the length of time of non-activity you would like to elapse before the screen saver starts. When you are finished, press the DOWN arrow. ClearChart 2 will initialize and then display your default optotype with your default line configuration and is ready for use.

Optotypes

All of the optotypes contained within the ClearChart 2 conform to the American National Standard Institute guidelines for general purpose clinical visual acuity charts. The optotypes are constructed on a 5 x 5 matrix such that their stroke width is one-fifth of their overall size. Letter optotypes are of Letter Gothic typeface.

The spacing between optotypes of the same size is equal to the width of that size optotype. The spacing between rows of descending size is equal to the width of the larger optotype.

The letters found in the seventeen letter set have been traditionally used in many visual acuity testing situations. This letter set consists of these letters: **A B C D E F G H K L N O P T U V Z.**

The eight letter set consists of these letters: **C D E K N P U Z**. The individual letters of this set have been shown to be equivalent to the Landolt 'C'. Because of this, each letter is essentially equally legible to patients. Unlike the seventeen letter set, no letter is easier or harder to identify than another. Since these letters can be presented in many combinations by the ClearChart 2, the few letters in the letter set do not pose a problem of memorization.

The Sloan Letter Set consists of these letters: **C D H K N O R S V Z.**

The tumbling 'E's and the Landolt 'C's are both presented in four positions: up, down, left, and right.

The Children's Shape Symbols are four shapes. As these symbols begin to blur, they are each perceived as circles.

A second set of shapes for Children consists of the following five shapes. These symbols may be more easily recognized and verbalized by some children than the Children's Shape Symbols.

The Allen Symbols are only available up to size 100.

Size Progressions

When multiple lines of descending size are in use, the line size display is that of the smallest line. The standard progression has the following visual acuity sizes expressed as Snellen fractions:

Snellen	Snellen(metric)	Snellen (decimal)
20/10	6/3.0	2.00
20/15	6/4.5	1.33
20/20	6/6.0	1.00
20/25	6/7.5	0.800
20/30	6/9.0	0.667
20/40	6/12.0	0.500
20/50	6/15.0	0.400
20/60	6/18.0	0.333
20/70	6/21.0	0.286
20/80	6/24.0	0.250
20/100	6/30.0	0.200
20/200	6/60.0	0.100
20/400	6/120	0.050

Another line size progression available in ClearChart 2 is the LogMAR progression. This progression has proved useful in prescribing low vision magnification aids and permits a more precise method of scoring visual acuity.

Snellen	Snellen(metric)	LogMAR
20/10	6/3.0	-0.3
20/12.5	6/3.8	-0.2
20/16	6/4.8	-0.1
20/20	6/6.0	0.0
20/25	6/7.5	0.1
20/32	6/9.5	0.2
20/40	6/12	0.3
20/50	6/15	0.4
20/63	6/19	0.5
20/80	6/24	0.6
20/100	6/30	0.7
20/125	6/38	0.8
20/160	6/48	0.9
20/200	6/60	1.0
20/250	6/76	1.1
20/320	6/96	1.2
20/400	6/120	1.3

When the LogMAR progression is being used, the line size display shows the Snellen value in the lower right-hand corner with the LogMAR line size next to it.

Installation, Features, & Functions (cont)

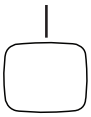
Remote Control Functions

1. This button will present lines of the same size of optotypes. Multiple presses of this button will change the number of lines presented on the screen from 1 to 4.

Note: At larger optotype sizes, there will be a limit of how many lines can be displayed.

2. This button will present lines of optotypes descending in size. Multiple presses of this button will change the number of lines presented on the screen from 1 to 4.

Note: At larger optotype sizes, there will be a limit of how many lines can be displayed.



3. This button will present a single line of optotypes. The second time you press this button, a single line of optotypes of descending size will be displayed. A third press of this button will return you to normal lines of optotypes.

Note: At larger optotype sizes, there will be a limit of how many lines can be displayed.

4. This button will present a single optotype. A second press of this button will return you to normal lines of optotypes.

RED/GREEN

5. This button will initialize RED/GREEN mode. In this mode, you will be able to change optotypes, sizes, lines, and line presentation by pressing other buttons on the remote. To exit the RED/GREEN mode, simply press this button again.

Note: At larger optotype sizes, there will be a limit of how many lines can be displayed.

RANDOM

6. Press the RANDOM button to randomize the current optotypes at its current size. Pressing the RANDOM button repeatedly will continue to present random characters of the current optotype at its current size.

Note: Use the RIGHT arrow button to randomize single optotypes.

SIZE

7. This button will momentarily display the current size of the smallest optotypes displayed on the screen on the bottom right hand corner of the screen.

Note: This button only works if you have the DISPLAY OPTOTYPE SIZE option on the menu turned off.

Installation, Features, & Functions (cont)

Remote Control Functions *(continued)*

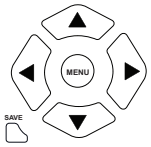
8. This is the LEFT arrow button. Pressing the LEFT arrow button will randomize the optotypes on the screen. The LEFT arrow button is also used to select options during the initial setup of the ClearChart 2, as well as making selections in the menu screen.

9. This is the UP arrow button. Pressing the UP arrow button will increase the size of the optotypes on the screen. The UP arrow button is also used to select options during the initial setup of the ClearChart 2, as well as making selections in the menu screen.

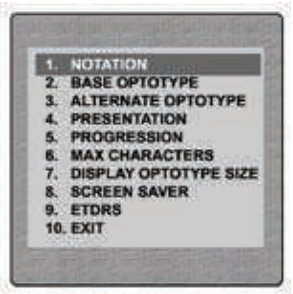
10. This is the RIGHT arrow button. Pressing the RIGHT arrow button will randomize the optotypes on the screen. The RIGHT arrow button is also used to select options during the initial setup of the ClearChart 2, as well as making selections in the menu screen.

Note: It is recommended that the RIGHT arrow button be used to randomize single optotypes.

11. This is the DOWN arrow button. Pressing the DOWN arrow button will decrease the size of the optotypes on the screen. The DOWN arrow button is also used to select options during the initial setup of the ClearChart 2, as well as making selections in the menu screen.



12. The MENU button presents the main menu to select default preferences for the ClearChart 2.



Once in the menu screen, use the UP and DOWN arrow buttons to select a menu item, and the RIGHT and LEFT arrow buttons to toggle through options.

When you are ready to save your selection, press the SAVE button on the remote.

Remote Control Functions *(continued)*

Menu Item	Options
1. NOTATION	Snellen, Metric, Decimal
2. BASE OPTOTYPE	17 Letter Set, 8 Letter Set, Sloan, Tumbling E, Landolt C, O Landolt C, HOTV, Numbers, Children's Shape Symbols (Set 1), Children's Shape Symbols (Set 2), Allen Symbols
3. ALTERNATE OPTOTYPE	17 Letter Set, 8 Letter Set, Sloan, Tumbling E, Landolt C, O Landolt C, HOTV, Numbers, Children's Shape Symbols (Set 1), Children's Shape Symbols (Set 2), Allen Symbols
4. PRESENTATION	Single Line, Double/Same, Double/Decreasing,Triple/Same, Triple/Decreasing, Quadruple/Same, Quadruple/Decreasing, Single Letter, Column, Column/Uneven
5. PROGRESSION	Standard, Logmar
6. MAX CHARACTERS	1, 2, 3, 4, 5, 6
7. DISPLAY OPTOTYPE SIZE	No Display, Display
8. SCREEN SAVER	000 TO 999 minutes, Off
9. ETDRS	Sloan/Logmar
10. EXIT	Exit back to main display

13. The EDU button activates the patient education slides. The RIGHT and LEFT arrows change the slides in this mode. Pressing the button a second time exits the EDU mode.

14. The SAVE button is used in the Menu Mode to save your selections.

15. Press the Contrast MAX button to increase the contrast of the opto character or the sine gratings in the contrast sensitivity mode.

Note: RED/GREEN tests do not function when-ness than full contrast is selected.

Remote Control Functions *(continued)*

MIN

16. Press the Contrast MIN button to decreases the contrast of the opto character or the sine gratings in the contrast sensitivity mode.

Note: RED/GREEN tests do not function when less than full contrast is selected.

LIGHT

17. Pressing the LIGHT button changes the illumination of the screen. There are three light levels available for testing: full illumination (220 cd/m^2), photopic (contrast sensitivity standard, 85 cd/m^2), mesopic (contrast sensitivity low light test 3 cd/m^2).

Note: Unit should be illuminated 10 minutes prior to photopic and mesopic testing.

CONT

18. Pressing the CONT button activates the frequency grating, contrast sensitivity mode. When in the CONT mode, the UP/DOWN arrows adjust the frequency, the RIGHT/LEFT arrows rotate the image angle, and the MIN/MAX buttons adjust the level of contrast. In this mode the number in the upper right corner displays the frequency, and in the lower left the contrast level by percentage. Pressing the CONT a second time exits this mode.

19 - 30. Each button is labeled with a line size and when pressed, will display the current optotype at that size. Pressing the same button again will randomize the optotype at that current size.

OPTO

31. Pressing the OPTO button will toggle through the different optotypes.

Note: Toggling through optotypes at large line sizes might prevent the viewing of the Allen Symbols.

ALT OPTO

32. Pressing the ALT OPTO button will display the alternate optotype selected during the initial setup or in the Menu screen.

ANIM

33. Pressing the ANIM button will animate the current optotype. Press the ANIM button a second time to stop the animation.

Installation, Features, & Functions (cont)

Remote Control Functions *(continued)*

MOVIE

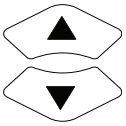
34. Pressing the MOVIE button will run an animated movie for pediatric focusing. Use the UP/DOWN arrows to adjust the volume. Press the MOVIE button a second time to exit the movie.

XCYL

35. Pressing the XCYL button will present a Cross Cylinder test. Pressing the XCYL button a second time will exit the Cross Cylinder Test mode.

ASTIG

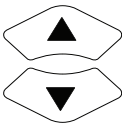
36. Pressing the ASTIG button will present an Astigmatic dial. Pressing the ASTIG button a second time will exit the Astigmatic Dial.



Use the UP and DOWN arrow buttons to rotate the dial and adjust the angle.

T

37. Pressing the T button will present an Astigmatic T. Pressing the T button a second time will leave the Astigmatic T mode.



Use the UP and DOWN arrow buttons to rotate the T and adjust the angle.

FIX

38. Pressing the FIX button will present a fixation target.

Installation, Features, & Functions (cont)

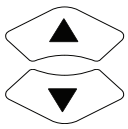
Remote Control Functions *(continued)*

FIX

Pressing the FIX button a second time will present a second fixation target. Pressing the FIX button a third time exits the Fixation mode.

SUPP

39. Pressing the SUPP button will initiate Color Suppression mode.



Use the UP and DOWN arrow buttons to change the size of the optotype. You can also use the individual optotype size buttons to change the size of the optotype.

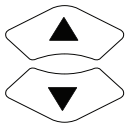
Pressing the SUPP button a second time will present the second screen of the Color Suppression mode. Press the SUPP button a third time to exit the Color Suppression mode.

HDISP

40. Pressing the HDISP button will present a horizontal disparity test.

HDISP

Press the HDISP button a second time for a second type of horizontal disparity test. Use the UP and DOWN arrow buttons to move the fixation line.



HDISP

Press the HDISP button a third time for a third type of horizontal disparity test. Pressing the HDISP button a fourth time will exit Horizontal Disparity testing mode.

Installation, Features, & Functions (cont)

Remote Control Functions *(continued)*

VDISP

41. Pressing the VDISP button will present a vertical disparity test.

VDISP

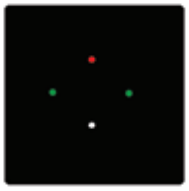
Press the VDISP button a second time for a second type of vertical disparity test. Use the UP and DOWN arrow buttons to move the fixation line.

VDISP

Press the VDISP button a third time for a third type of vertical disparity test. Pressing the VDISP button a fourth time will exit the Vertical Disparity testing mode.

WORTH

42. Pressing the WORTH button will present a Worth Four Dot test.



CBAR

43. Pressing the CBAR button will present a single character with crowding bars. Press the CBAR button a second time to present closer bars. A third press of the CBAR button will remove the bars.

OPTO

You can change the optotype within the CBAR mode by pressing the OPTO button.

Use the UP/DOWN arrows to change the optotype size. Individual optotype size buttons also change the optotype size. The RIGHT/LEFT arrows will change the character displayed.

DARK

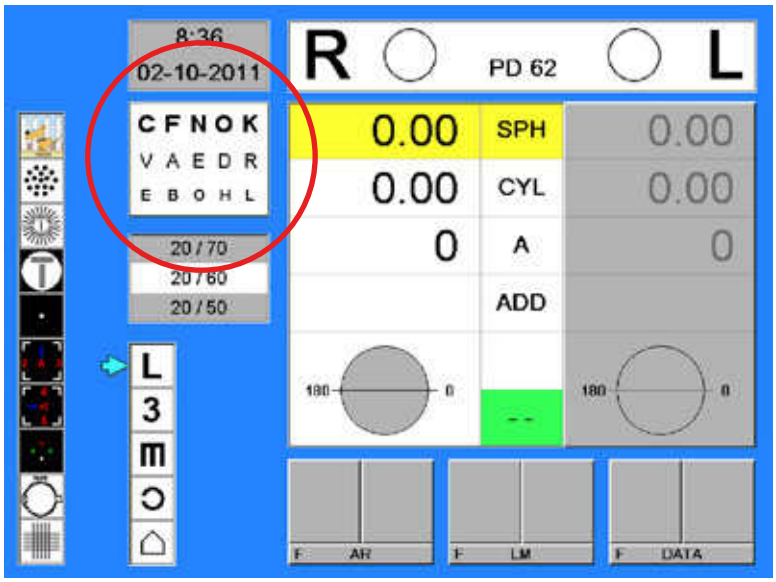
45. Pressing the DARK button will darken the screen and present columns of the ClearChart logo. Press any button to leave dark mode.

ClearChart 2 and AutoPhoroptor RS™ Communication

Setup

Communication between the ClearChart 2 and Auto Phoroptor RS is bi-directional, allowing for the use of either the ClearChart 2 remote or the scroll wheel on the Auto Phoroptor RS Controller to change the charts presented to the patient.

The chart displayed to the patient on the ClearChart 2 will be visible in a window on the LCD screen of the Auto Phoroptor RS Controller as shown below.



Preferred default settings for optotype, alternate optotype, notation (Snellen or Decimal), and size progression (Standard or Logmar) can be selected in the ClearChart 2 menu using the remote (refer to Configuring the ClearChart 2 section in this manual). The Auto Phoroptor will recognize and respond to those settings.

Communication between the ClearChart 2 and the Auto Phoroptor RS is immediate once both instruments have been powered on after either a hard wired or wireless connection has been established.

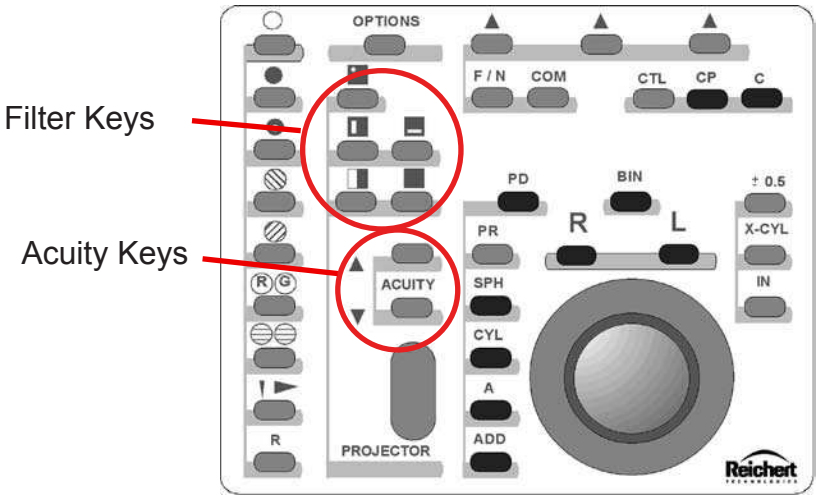
***Note**: If the Auto Phoroptor RS has established communication with the ClearChart 2 and the ClearChart 2 is turned off and then rebooted, a signal must be sent to the Auto Phoroptor RS to initialize communication between the two instruments. This can be accomplished by pressing the "C" button twice on the Controller of the Auto Phoroptor RS to clear the refraction data and reset the instrument to its default settings. Make sure that any refraction data you need are saved before resetting the instrument.*

Optotype Selection

The Auto Phoroptor RS™ interface includes optotype selections for letters, numbers, tumbling “Es”, Landolt “Cs”, and Children’s Charts. The optotypes can be changed using the scroll wheel on the Auto Phoroptor RS controller or the ClearChart 2 remote.

The Auto Phoroptor RS™ will accommodate either Snellen or Decimal optotype notation and different letter sets including the 17 letter set, 8 letter set, Sloan, and HOTV by changing the default optotype settings in the ClearChart 2 menu using the remote (refer to Configuring the ClearChart 2 section in this manual). The selected default letter optotype will be presented on the Auto Phoroptor RS. In addition, the Children’s charts can be changed by selecting the preferred set of charts when selecting the Alternate optotype default setting. The Auto Phoroptor RS will display whatever Children’s charts are selected.

Optotype size can be changed using the up and down Acuity keys on the Auto Phoroptor RS Controller, and the size buttons or up and down arrows on the ClearChart 2 remote. Red/Green filters can also be applied using the Controller or the remote.

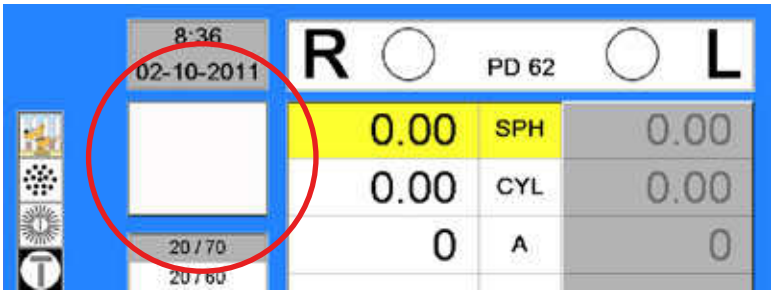


Optotypes can be randomized on the Auto Phoroptor RS interface by repeatedly pressing the filter keys that control presentation of the optotypes (single, horizontal line, vertical line and multiple lines). Refer to the Autp Phoroptor RS User’s Guide for details of the controls.

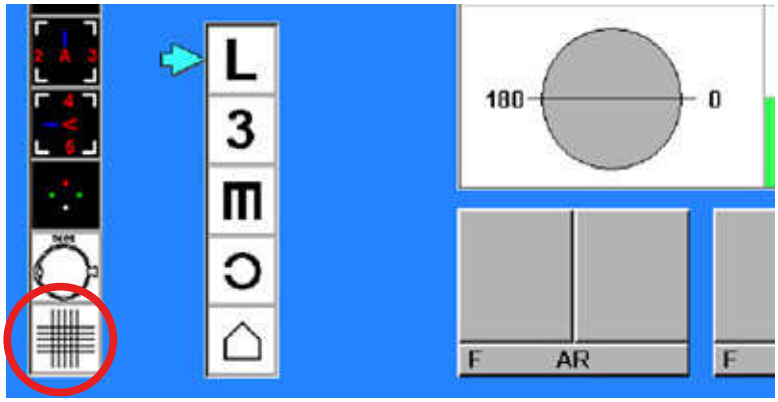
Installation, Features, & Functions (cont)

Special Test Charts

Most of the special test charts can be accessed on the Auto Phoroptor RS Controller interface. Exceptions are Contrast Sensitivity, Suppression Testing, Crowding Bars, and the Blank Screen. If these charts are displayed using the ClearChart 2 remote, the window that displays the charts on the Auto Phoroptor RS controller LCD will be blank.



The vertical and horizontal line chart on the Auto Phoroptor RS is used to bring in the fixed cross cylinder lenses for near point testing and is not available on the ClearChart 2. When that chart is selected, the ClearChart 2 will revert to the Dark Screen with the ClearChart 2 logos.



Other Functions

Some functions of the ClearChart 2 are available through the remote only: adjustment of the direction of the astigmatic “T” and the lines on the Astigmatic Dial, movement of the lines in the Horizontal and Vertical Disparity test charts, and scrolling through the Educational slides.

Cleaning & Maintenance

Cleaning ClearChart 2
Use a lint-free, soft cloth lightly damped with 90% Isopropyl Alcohol to clean the ClearChart 2 screen and the unit. Cleaning of theClearChart 2 should be performed when the screen is has contaminants on it or when visually, there is dust accumulation on the instrument.

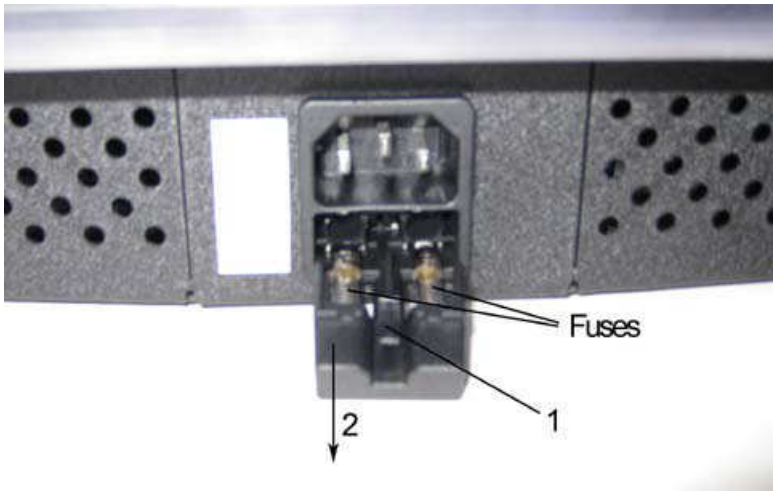
⚠ **CAUTION: Do not use ammonia-based window cleaners. Do not use paper towels.**

Fuse Replacement

WARNING: DISCONNECT POWER BEFORE ATTEMPTING TO REMOVE THE FUSES OR SERIOUS INJURY OR DEATH MAY OCCUR.

Replace the fuses in the Power Input Module with the fuses indicated in the Specifications section of this manual.

1. Remove input power to the instrument and press down on the tab in the middle of the Power Input Module to release the Fuse Holder. Refer to item 1.
2. Pull the fuse holder out of the input module. Refer to item 2.



Fuse Removal

3. Install new fuses that are indicated in the Specification section of this manual into the Fuse Holder.
4. Push the Fuse Holder into the Power Input Module until it snaps into place.

Specifications

Catalog Number 13760

Physical Dimensions

Size:
Height: 16.91 in. (42.95 cm)
Width: 19.88 in. (50.49 cm)
Depth: 2.52 in. (6.4 cm)

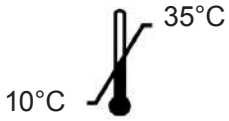
Weight, unpacked: 11.25 lbs. (5.1 Kg)

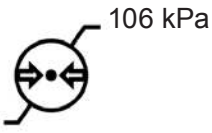
Electrical

Voltage: 100 - 240 volts AC 50/60 Hz
Current: 1.5 A
Watts: 93 - 109 VA
Fuses: Slo-Blo (T3 15AL), 3.15A 250V 5 X 20mm SLO-BLO, RoH

Operational Conditions

Environmental:
The environmental conditions are as follows:
Operating:
Temperature 10° C (50° F) to 35° C (95° F)
Relative Humidity: 30% to 75% (non-condensing)
Atmospheric Pressure: 80 (23.6 in. Hg) to 106 kPa (31.3 in. Hg)
Transportation & Storage:
Temperature -20° C (-4° F) to +50° C (122° F).
Relative Humidity: 10% to 80% (non-condensing)
Atmospheric Pressure: 70 (20.7 in. Hg) to 106 kPa (31.3 in. Hg)





Exposure to extreme temperature conditions indicated above must not exceed 15 weeks.

Disposal

This product does not generate any environmentally hazardous residues. At the end of its product service life, follow your local laws and ordinances regarding the proper disposal of this equipment.

Software Revision

The software revision can be obtained by contacting Reichert, Inc.
The serial number identifies the manufacture date and will provide access to the software version.

Specifications (Continued)

Classifications

The ClearChart 2 is classified as Class I equipment. Class I equipment provides additional protection against electrical shock beyond basic insulation.

Type B equipment provides an adequate degree of protection against electrical shock, particularly regarding allowable leakage currents and reliability of the protective earth connection. (No applied parts per the noted standards.)

The ClearChart 2 is classified as IPX0 Equipment. IPX0 equipment is equipment enclosed without protection against ingress of water.

According to the mode of operation, the ClearChart 2 is a continuous operation instrument.

Guidance & Manufacturer's Declarations

Table 201 – Guidance and Manufacturer's Declaration

Electromagnetic Emissions

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The ClearChart 2 is intended for use in the electromagnetic environment specified below. The customer or user of the ClearChart 2 should ensure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment** - Guidance -
RF Emissions CISPR 11	Group 1 Class B	The ClearChart 2 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.
Harmonics IEC 61000-3-2	Class A	The ClearChart 2 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies building for domestic power.
Flicker IEC 61000-3-3	Complies	

Guidance & Manufacturer's Declarations (cont)

Table 202 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The ClearChart 2 is suitable for use in all establishments and is intended for use in the electromagnetic environment specified below. The customer or user of the ClearChart 2 should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
ESD IEC 61000-4-2	±6kV Contact ±8kV Air	±6kV Contact ±8kV Air	Floors should be wood, concrete or ceramic tile. If floors are synthetic, the r/h should be at least 30%.
EFT IEC 61000-4-4	±2kV Mains ±1kV I/Os	±2kV Mains ±1kV I/Os	Mains power quality should be that of a typical residential, commercial or hospital environment.
Surge IEC 61000-4-5	±1kV Differential ±2kV Common	±1kV Differential ±2kV Common	Mains power quality should be that of a typical residential, commercial or hospital environment.
Voltage Dips/Dropout IEC 61000-4-11	>95% Dip for 0.5 Cycle 60% Dip for 5 Cycles 30% Dip for 25 Cycles >95% Dip for 5 Seconds	>95% Dip for 0.5 Cycle 60% Dip for 5 Cycles 30% Dip for 25 Cycles >95% Dip for 5 Seconds	Mains power quality should be that of a typical residential, commercial or hospital environment. If the user of the ClearChart 2 requires continued operation during power mains interruptions, it is recommended that the ClearChart 2 be powered from an uninterruptible power supply or battery.
Power Frequency 50/60Hz Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be that of a typical residential, commercial or hospital environment.

Guidance & Manufacturer's Declarations (cont)

Table 204 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

Equipment and Systems that are NOT Life-supporting

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The ClearChart 2 is intended for use in the electromagnetic environment specified below. The customer or user of the ClearChart 2 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	3 Vrms 150 kHz to 80 MHz	(V1) = 3 Vrms	Portable and mobile RF communications equipment should be no closer to any part of the ClearChart 2, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance: d=(3.5/V1)(Sqrt P) d=(3.5/E1)(Sqrt P) 80 to 800 MHz d=(7/E1)(Sqrt P) 800 MHz to 2.5 GHz Where P is the max output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol. 
Radiated RF IEC 61000-4-3	80 MHz to 2.5 GHz @ 3V/m	(E1) = 3 V/m	

Note 1: At 80 MHz and 800 MHz, 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.

* Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. The measured field strength in the location in which the ME Equipment or ME System should be observed to verify normal operation. If abnormal performance is observed, additional measures many be necessary, such as re-orienting or relocating the ME Equipment or ME System.

* Over the frequency range 150 kHz to 80 MHz, field strengths should be less then [V1] V/m.

Guidance & Manufacturer's Declarations (cont)

Table 206 – Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the Product for ME Equipment and ME Systems that are NOT Life-supporting.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

Recommended Separation Distances for between Portable and Mobile RF Communications Equipment and the Product

The Product is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the Product can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the Product as recommended below, according to the maximum output power of the communications equipment.

Max Output Power of Transmitter (W)	Separation (m) 150kHz to 80 MHz d=(3.5/V1)(Sqrt P)	Separation (m) 80 to 800 MHz d=(3.5/E1)(Sqrt P)	Separation (m) 800MHz to 2.5GHz d=(7/E1)(Sqrt P)
0.01	0.1166	0.1166	0.2333
0.1	0.3689	0.3689	0.7378
1	1.1666	1.1666	2.3333
10	3.6893	3.6893	7.3786
100	11.6666	11.6666	23.3333

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: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Warranty

This product is warranted by Reichert Technologies (herein after referred to as Reichert) against defective material and workmanship under normal use for a period of two years from the date of invoice to the original purchaser. (An authorized dealer shall not be considered an original purchaser.) Under this warranty, Reichert's sole obligation is to repair or replace the defective part or product at Reichert's discretion.

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or which has had the serial number removed, altered or effaced. Nor shall this warranty be extended to a product installed or operated in a manner not in accordance with the applicable Reichert instruction manual, nor to a product which has been sold, serviced, installed or repaired other than by a Reichert factory, Technical Service Center, or authorized Reichert Dealer.

Lamps, bulbs, charts, cards and other expendable items are not covered by this warranty.

All claims under this warranty must be in writing and directed to the Reichert factory, Technical Service Center, or authorized instrument dealer making the original sale and must be accompanied by a copy of the purchaser's invoice.

This warranty is in lieu of all other warranties implied or expressed. All implied warranties of merchantability or fitness for a particular use are hereby disclaimed. No representative or other person is authorized to make any other obligations for Reichert. Reichert shall not be liable for any special, incidental, or consequent damages for any negligence, breach of warranty, strict liability or any other damages resulting from or relating to design, manufacture, sale, use or handling of the product.

Patent Warranty

If notified promptly in writing of any action brought against the purchaser based on a claim that the instrument infringes a U.S. Patent, Reichert will defend such action at its expense and will pay costs and damages awarded in any such action, provided that Reichert shall have sole control of the defense of any such action with information and assistance (at Reichert's expense) for such defense, and of all negotiation for the settlement and compromise thereof.

Product Changes

Reichert reserves the right to make changes in design or to make additions to or improvements in its products without obligation to add such to products previously manufactured.

Claims for Shortages

We use extreme care in selection, checking, rechecking and packing to eliminate the possibility of error. If any shipping errors are discovered:

1. Carefully go through the packing materials to be sure nothing was inadvertently overlooked when the unit was unpacked.
2. Call the dealer you purchased the product from and report the shortage. The materials are packed at the factory and none should be missing if the box has never been opened.
3. Claims must be filed within 30 days of purchase.

Warranty (continued)

Claims for Damages in Transit

Our shipping responsibility ceases with the safe delivery in good condition to the transportation company. Claims for loss or damage in transit should be made promptly and directly to the transportation company.

If, upon delivery, the outside of the packing case shows evidence of rough handling or damage, the transportation company's agent should be requested to make a "Received in Bad Order" notation on the delivery receipt. If within 48 hours of delivery, concealed damage is noted upon unpacking the shipment and no exterior evidence of rough handling is apparent, the transportation company should be requested to make out a "Bad Order" report. This procedure is necessary in order for the dealer to maintain the right of recovery from the carrier.