

ClearChart™

Digital Acuity System

User's Guide

Reichert

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Warnings and Cautions

DEFINITIONS
WARNING: AN INSTRUCTION THAT DRAWS ATTENTION TO RISK OF INJURY OR DEATH.
CAUTION: AN INSTRUCTION THAT DRAWS ATTENTION TO THE RISK OF DAMAGE TO THE PRODUCT.

WARNING: THE CLEARCHART 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, INC.

WARNING: IN ORDER TO ENSURE THAT CORRECT OPERATION OF THE CLEARCHART IS MAINTAINED, AND TO GUARANTEE THE SAFETY AND RELIABILITY OF THE INSTRUMENT, ANY REPAIR OR SERVICE MUST BE PERFORMED BY REICHERT, INC. OR AN AUTHORIZED SERVICE AGENT OF REICHERT, INC.

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

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

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

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

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

CAUTION: LCD PANEL IS MADE OF GLASS AND MAY BREAK OR CRACK IF THE CLEARCHART IS DROPPED OR BUMPED ON A HARD SURFACE. HANDLE WITH CARE.

CAUTION: MEDICAL ELECTRICAL 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: PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT CAN AFFECT MEDICAL ELECTRICAL EQUIPMENT.
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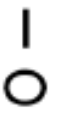
Symbol Information
The following symbols appear on the instrument:


ATTENTION: Consult Accompanying Documents


Protective Earth


Alternating Current


Power: Connection to the Mains

Power: Disconnection to the Mains

Introduction

Congratulations on your purchase of the ClearChart.

The ClearChart 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.

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.

Unpacking and Contents

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

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 out of the box.

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

- ClearChart
- Remote Control
- Two AAA batteries
- Power Cord
- Wall Mount Bracket
- Two Screws
- Two Dry Wall Fasteners
- User's Guide

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.

Installation, Features, and Functions

Mounting ClearChart to the Wall

Note: Make sure the position you choose to mount your ClearChart is within the reach of the supplied power cord.

Direct-Throw

Your ClearChart 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 24 feet (7.32 meters). During configuration, you will be asked for your room's test distance. 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 21 feet (6.40 meters).

Mirror Arrangement

A mirror is a useful space-saving device to increase the patient viewing distance when the room does not permit a direct-throw arrangement. During configuration, you will be asked for the patient to mirror distance and the mirror to monitor distance. Typically, your ClearChart will be positioned higher than the patient eye level so that the examiner will not interfere with the patient's view of the monitor. Optimally, the monitor will be inclined slightly downward so the monitor screen is pointed towards the mirror.

Warning: However the equipment is placed, if it is above either the patient or the examiner, it is important to safely secure the equipment. Unsecured equipment could possibly become dislodged and fall, causing injury to either the patient or examiner.

1. Pick a spot on the wall that 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 using a pen or pencil.
3. Using the supplied Dry Wall Fasteners, place the tip of each fastener on the marked hole, and screw the fastener into the wall until the surface is flush with the wall.
   Warning: Do not over drive the inserts into the wall.
4. Place the Wall Mount Bracket over the wall, and screw supplied screws into the Dry Wall Fasteners.
3. Hang the ClearChart by lining up the holes on the back of unit with the metal tabs of the Wall Mount Bracket and hanging the unit on these tabs.

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 data plate.

NOTE: If necessary to power off the ClearChart without using the power switch, remove power cord from wall outlet.

Remote Control Power

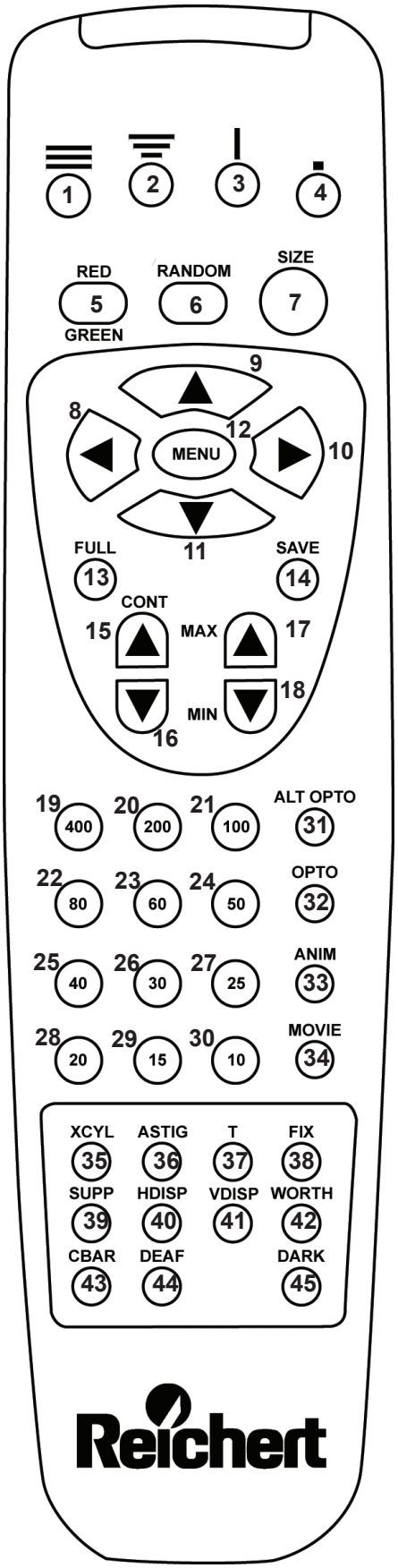
1. Remove the back of the remote control by sliding it in the direction of the arrow.
2. Put in two AAA batteries in the position shown on the remote control.

Installation, Features, and Functions

Remote Control

Your remote control will operate all the screens on your ClearChart.

1.) Lines of same sized optotypes
2.) Lines of descending sized optotypes
3.) Single vertical line of optotypes
4.) Single letter
5.) RED/GREEN Test
6.) Randomize optotype
7.) View size of optotype currently displayed
8.) Left arrow
9.) Up arrow
10.) Right arrow
11.) Down arrow
12.) Menu button
13.) Full Contrast
14.) Save button
15.) Contrast Up
16.) Contrast Down
17.) Maximum optotype size
18.) Minimum optotype size
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.) Alternate optotype
32.) Default/Change optotype
33.) Animate
34.) Movie
35.) Cross cylinder test
36.) Astimagatic dial
37.) Astigmatic T
38.) Fixation targets
39.) Color supression
40.) Horizontal disparity
41.) Vertical disparity
42.) Worth Four Dot test
43.) Crowding bars
44.) Hearing Impaired mode
45.) Dark screen



Installation, Features, and Functions

Configuring the ClearChart

Depress the on/off switch located on the side of the instrument. The ClearChart will boot up and you will see a screen asking you to **'Please Wait...'** When the ClearChart welcome screen appears, you will see a message to press the Menu Key to configure the system. Press the menu button on your remote to enter the configuration mode.

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 MENU.

UNITS
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 MENU.

ACUITY NOTATION
Using the Left/Right arrows on your remote, select either SNELLEN, METRIC, or DECIMAL for your acuity notation. When you are finished, press MENU.

DISTANCE
Using the CONT up/down for single units and the MAX/MIN arrows for 5 units at a time on your remote, enter the distance from the patient's eye to the screen. The units will be either inches or centimeters depending on whether you chose ENGLISH or METRIC units earlier in the setup. When you are finished, press MENU.

OPTOTYPE
Using the Left/Right arrows on your remote, select the default optotype you would like the ClearChart to display when first started. *Note: You will be able to access any optotype while using the ClearChart.* When you are finished, press MENU.

ALTERNATE OPTOTYPE
Using the Left/Right arrows on your remote, select the alternate optotype you would like the ClearChart to display when you press ALT OPT on your remote. When you are finished, press MENU.

LINE PRESENTATION
Using the Left/Right arrows on your remote, select the default line presentation you would like the ClearChart to display. *Note: You will be able to access any line presentation while using the ClearChart.* When you are finished, press MENU.

SIZE PROGRESSION
Using the Left/Right arrows on your remote, select the default size progression you would like the ClearChart to display. *Note: You will be able to change size progression while using the ClearChart.* When you are finished, press MENU.

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. When you are finished, press MENU.

MAXIMUM PER LINE
Using the Left/Right arrows on your remote, select the maximum number of characters you would like displayed on any line. When you are finished, press MENU.

SCREEN SAVER
CONT up/down for single units and the MAX/MIN arrows for 5 units at a time on your remote, select the length of time of non-activity you would like to elapse before the screen saver starts. When you are finished, press MENU.

After you have finished with the initial configuration, the ClearChart will initialize and then display your default optotype with your default line configuration and is ready for use.

Installation, Features, and Functions

Optotypes

All of the optotypes contained within the ClearChart 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 are 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 see than another. Since these letters can be presented in many combinations by the ClearChart the few letters in the letter set does 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 (Clover, Square, Circle, Cross) 
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 (Scissors, House, Tree, Boat, Apple). 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)
20/10	6/3.0
20/15	6/4.5
20/20	6/6.0
20/25	6/7.5
20/30	6/9.0
20/40	6/12.0
20/50	6/15.0
20/60	6/18.0
20/70	6/21.0
20/80	6/24.0
20/100	6/30.0
20/200	6/60.0
20/400	6/120

Another line size progression available in ClearChart is the LogMAR progression. This is a progression of $1:10^{0.1}$, or 1:1.2589 which means that each increase in line size is by a factor of 1.2589. This factor has been chosen since 1.2589^3 yields an answer of 2. Therefore, each three line change in the LogMAR progression is a two-fold increase in resolving ability. Since 1.2589^6 is 4, each six line change is a four-fold increase in resolving ability. 1.2589^{10} is 10, so a ten line change (from 20/200 to 20/20 is a ten-fold increase in resolving ability. 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.

Remote Control Functions

1.) 

This button will present lines of the same 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.



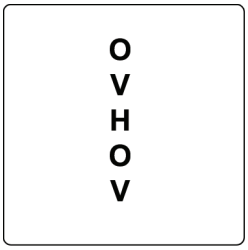
2.) 

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.



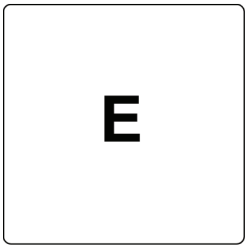
3.) 

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.



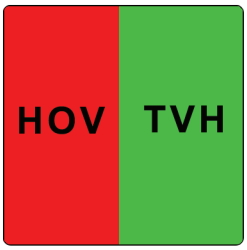
4.) 

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



5.) 

This button will place the ClearChart into 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 leave 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.



Remote Control Functions

6.) 

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

7.) 

This button will momentarily display the current size of the smallest optotypes displayed on the screen in 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.



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, as well as making selections in the menu screen. The left arrow button is also used in the hearing impaired mode of the ClearChart.
(Hearing Impaired instructions on page 19)

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, as well as making selections in the menu screen. The up arrow button is also used in the hearing impaired mode of the ClearChart.
(Hearing Impaired instructions on page 19)

10.) 

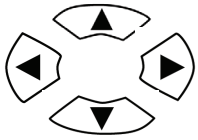
This is the right arrow button. Pressing the right arrow button will randomize the optotypes on the screen. The right arrow button is also used to select options during the initial setup of the ClearChart, as well as making selections in the menu screen. The right arrow button is also used in the hearing impaired mode of the ClearChart. (Hearing Impaired instructions on page 19)

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, as well as making selections in the menu screen. The down arrow button is also used in the hearing impaired mode of the ClearChart.
(Hearing Impaired instructions on page 19)

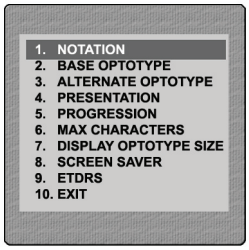
Remote Control Functions

12.) MENU



SAVE

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



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.

	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, SYMBOLS, SYMBOLS, ALLEN SYMBOLS
3.	ALTERNATE OPTOTYPE	17 LETTER SET, 8 LETTER SET, SLOAN, TUMBLING E, LANDOLT C, O LANDOLT C, HOTV, NUMBERS, SYMBOLS, SYMBOLS, 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
9.	ETDRS	SLOAN/LOGMAR
10.	EXIT	EXIT BACK TO MAIN DISPLAY

13.) FULL

The FULL button will reset the ClearChart contrast to its maximum value.

14.) SAVE

The SAVE button is used in the Menu Mode to save your selec-

CONT

15.)

16.)

Press the Contrast up and down arrows to vary the contrast for contrast acuity testing. The percent contrast will be shown in the bottom left corner of the screen. The different levels of percent contrast are: 100, 80, 63, 50, 40, 32, 25, 20, 16, 12.5, 10, 8, 6.3, 5, 4, 3.2, and 2.5%.



Note: Red/green tests do not function when in low contrast mode.

FULL

Press the FULL button to go back to full contrast and remove the contrast value from the screen.

Remote Control Functions

17.) MAX ▲

18.) ▼ MIN

Press the MAX and MIN arrows to jump to the maximum and minumum optotype size. The MAX and MIN arrows are also used in the ClearChart's hearing impaired mode to strobe up and down.
(Hearing Impaired instructions on page 19)

19.) to 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.

31.) ALT OPTO ○

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

32.) OPTO ○

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.

33.) ANIM ○

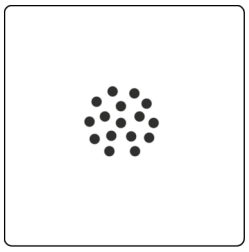
Pressing the ANIM button will animate the current optotype. Press the ANIM button a second time to stop the animation.

34.) MOVIE ○

Pressing the MOVIE button will run an animated movie of shapes and letters. Press the MOVIE button a second time to stop the movie

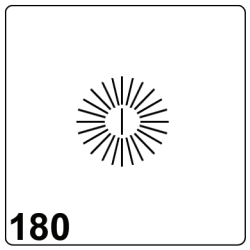
35.) XCYL ○

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



36.) ASTIG ○

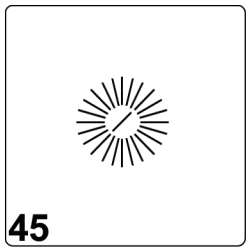
Pressing the ASTIG button will present an Astigmatic dial. Pressing the ASTIG button a second time will leave the Astigmatic Dial



▲

▼

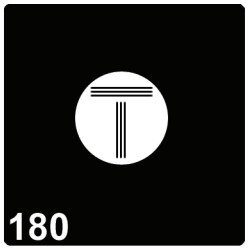
Use the UP and DOWN arrow buttons to rotate the dial and adjust the angle.



Remote Control Functions

37.) T

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





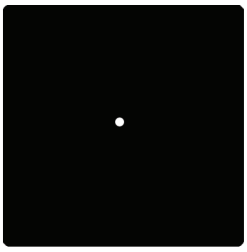


Use the UP and DOWN arrow buttons to rotate the T and adjust the angle.

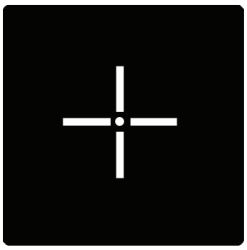


38.) FIX

Pressing the FIX button will present a fixation target.



Pressing the FIX button a second time will present a second fixation target. Press the FIX button a third time to leave the Fixation Target mode.



39.) SUPP

Pressing the SUPP button will take you into Color Supression 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.



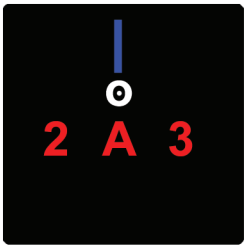
Pressing the SUPP button a second time will present the second screen of the Color Supression mode. Press the SUPP button a third time to leave the Color Supression mode.



Remote Control Functions

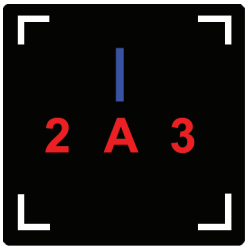
40.) HDISP

Pressing the HDSIP button will present a horizontal disparity test.



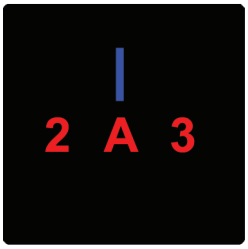
HDISP

Press the HDISP button a second time for a second type of horizontal disparity test.



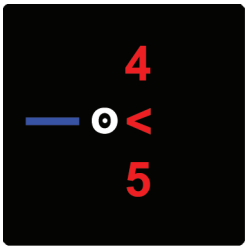
HDISP

Press the HDISP button a third time for a third type of horizontal disparity test. Pressing the HDISP button a fourth time will take you out of the Horzizontal Disparity testing mode.



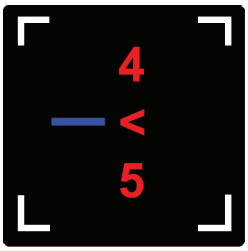
41.) VDISP

Pressing the VDSIP button will present a vertical disparity test.



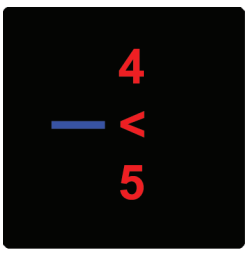
VDISP

Press the VDISP button a second time for a second type of vertical disparity test.



VDISP

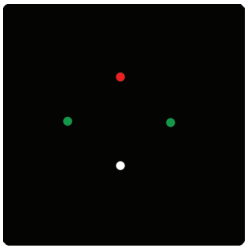
Press the VDISP button a third time for a third type of vertical disparity test. Pressing the VDISP button a fourth time will take you out of the Vertical Disparity testing mode.



Remote Control Functions

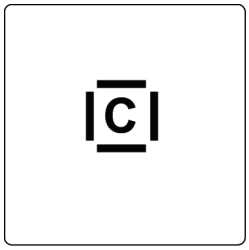
42.) WORTH

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



43.) CBAR

Pressing the CBAR button will present a single letter of the current optotype you are using 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 displayed within the crowding bars by pressing the OPTO button.

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.

44.) DEAF

Pressing the DEAF button will place the ClearChart in its hearing impaired mode. Please see page 19 for in-depth instructions.

45.) DARK

Pressing the DARK button will put the ClearChart in dark mode. Press any button to leave DARK mode.



Hearing Impaired Mode

The ClearChart allows for communicating with deaf patients while they are being refracted. This feature is designed to facilitate giving instructions and asking questions of deaf patients while they are behind a refractor. Historically, it has been difficult to communicate to these patients in this setting other than by the examiner tapping them on the leg or waving his or her hands in front of them. This type of communication has proven to be confusing to both patient and examiner alike.

The ClearChart eliminates this confusion. By displaying various flashing green bars at the sides, top and bottom of the display, the ClearChart makes it a simple task to deliver questions and instructions to the patient. The meanings of these bars of light can be adapted by each practitioner to their own needs. Below, we present a suggested way to ask questions and give instructions to the deaf patient. However, if these instructions do not fit your style of refraction, change and modify them to make them more useful to you. We also suggest you write down your instructions and present them to your patient prior to being refracted. We have also included a sample set of instructions on the next page.

A sample refraction:

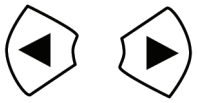
A patient is told that when a green flashing bar is seen to one side of the display, that indicates that choice ‘one’ is being presented. A flashing green bar on the opposite side of the display indicates choice ‘two’. Green bars that *strobe up*ward on either side of the display, ask the question: ‘Is this better?’. Green bars that *strobe downward* on either side of the display, ask the question: ‘Is this worse?’. A flashing green bar at the top of the display indicates that a new set of lens choices is about to be presented. A flashing green bar at the bottom of the display prompts the patient to read aloud the letters on the chart.

With a little practice, an examiner can become adept at doing a silent refraction while using only the light bars to communicate.

Hearing Impaired Operating Instructions

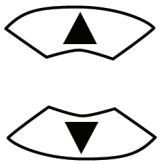


First, press the DEAF button to enter Hearing Impaired Mode. A second press of the DEAF button will take you out of Hearing Impaired Mode.



Use the LEFT and RIGHT arrow buttons to flash the green bar on the left and right side of the screen respectively



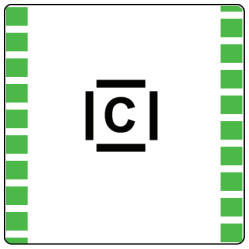


Use the UP and DOWN arrow buttons to flash the green bar on the top and bottom of the screen respectively





Use the MAX and MIN arrow buttons to strobe the green line up and down the side of the screens respectively.



Note: In RED/GREEN mode, the green bar on the right (green) side of the screen will appear red instead of green.

Sample Instructions for Hearing Impaired Patients

To make the vision examination easier for hearing-impaired individuals, our office employs a special communication method during the examination. In order to measure the prescription for glasses, a patient is placed behind a refractor which allows the examiner to place different lens combinations in front of the patient's eyes. The patient views letters on a visual acuity chart. We use a digital screen to present these charts. While a hearing-impaired individual is behind a refractor, communication is difficult because the view through the refractor is only of the acuity chart. Signing, lip reading or other visual cues are rendered useless since the view through the refractor is restricted.

Our digital screen which presents the visual acuity chart can also present bars of light on the edges of the display to indicate questions or instructions from the examiner. There are only a few simple questions or instructions, so they will be easy to learn.

(Examiner - the following instructions are for determining sphere)

When a bar of light is presented at the **top edge** of the display, the examiner is indicating to you that you are about to be presented with two new choices.

Choice one is indicated to you by a bar of light on the **left side** of the display. Choice two is indicated by a bar of light on the **right side** of the display. You can indicate which choice seems clearer and better by pointing in the direction of the bar of light which represents the better choice. It may be the case that neither choice seems perfectly clear. That is OK, simply choose which choice seems better.

If neither choice seems better than the other, indicate that they seem the same. *This is always a perfectly legitimate answer. You do not have to pick one choice as better if they seem the same to you.*

When a bar of light is presented at the **bottom edge** of the display, the examiner is asking you to read the letters that you see.

(Examiner - the following is for Jackson flip-cross cylinder test)

Next, you will see a pattern of dots. You will be presented with choices just as you were when you were looking at the letters of the eye chart. However, all of these choices will seem somewhat blurred or distorted. Once again point to the left or right to show which choice is better or else indicate that the choices seem equal. Often, people notice that a choice is distorted in one direction while the other choice is distorted in another direction. But neither seems actually better, they are simply different. If this is the case, indicate that they seem the same.

Now, we will do the same procedure on your other eye. *(Examiner - repeat sphere and cylinder test on other eye).*

(Examiner - the following is for accommodative balance test using prism-dissociation)

Next, you will see two lines of letters, one above the other. Both lines of letters will seem slightly blurred. Now the bars of light will flash on the top and the bottom. You should indicate which line of letters seems clearer or if they seem equally blurred.

Finally, you will see one, slightly blurred, line of letters. The examiner will make a change in the lens power and the letters should become slightly clearer. With each change of power, the letters will get slightly clearer until eventually there will be no increase in clarity, they will seem equall clear. (At this point, a change in lens power may make the letters seem darker but not really clearer. You should make the distinction between really clearer and only darker).

The examiner will ask you if each change is in fact clearer by strobbing bars of light up either side of the chart. You should indicate whether the change has made the letters clearer or if they seem just as clear as before the change was made.

When a bar of light is flashed at the **bottom edge** of the display, then the examiner is asking you to please read the letters that you see (if you can).

Specifications and Maintenance

Catalog Number.....13750

Electrical:
Rated .....100-240 volts AC 50/60 Hz 70-83 VA


Fuses.....TI.6AL250 (IEC 127 Type, 5 x 20 mm)

Physical Dimensions:
Height..... 14.0 inches (35.6 cm)
Width..... 17.0 inches (43.2 cm)
Length.....2.34 inches (5.94 cm)
Weight, unpacked.....9.2 lbs. (4.17Kg)

Transportation & Storage Conditions
This instrument can withstand the following conditions while packed for transportation or storage:

- an ambient temperature range of -20°C (-4°F) to +70°C (158°F)
- a relative humidity range of 10% to 90%
- an atmospheric pressure range of 55 kPa (412.5 mmHg) to 106 kPa (795.1 mmHg)

Exposure to extreme temperature conditions indicated above must not exceed 15 weeks. Daily-use temperatures should not exceed 10°C (50°F) to 43°C (110°F).

Operational Conditions

MAX: 35°C (95°F) at 75% R.H.

Classifications

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

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

Preventive Inspection & Maintenance

Cleaning ClearChart Display
Oils contaminate electronics and will smear LCD surfaces. Use 90% Isopropyl Alcohol and a lint-free, soft cloth to clean the ClearChart screen.

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

Guidance and Manufacturer's Declerations

Guidance and Manufacturer's Declaration - Emissions
The ClearChart is intended for use in the electromagnetic environment specified below. The customer or user of the ClearChart should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF Emissions CISPR 11	Group 1	The ClearChart 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 CISPR 11	Class B	The ClearChart is suitable for use in all establishments, including domestic, and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonics IEC 61000-3-2	Class A	
Flicker IEC 61000-3-3	Complies	

Guidance and Manufacturer's Declaration - Immunity
The ClearChart is intended for use in the electromagnetic environment specified below. The customer or user of the ClearChart 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 value 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 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 commercial or hospital environment.
Voltage Dips/Dropouts 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 commercial or hospital environment. If the user of the ClearChart requires continued operation during power mains interruptions, it is recommended that the ClearChart 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 commercial or hospital environment.

Guidance and Manufacturer's Declarations

Guidance and Manufacturer's Declaration - Emissions
The ClearChart is intended for use in the electromagnetic environment specified below. The customer or user of the ClearChart should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
			Portable and mobile communications equipment should be separated from the ClearChart by no less than the distances calculated/listed below:
Conducted RF IEC 61000-4-6	3 Vrms 150 KHz to 80 Mhz	(V1) Vrms	D = (3.5/V1)(Sqrt P)
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	(E1) V/m	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 power in watts and D is the recommended separation distance in meters. Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels (V1 and E1). Interference may occur in the vicinity of

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

Max Ouput Power (Watts)	Separation (m) 150KHz to 80MHz D=1.1667(Sqrt P)	Separation (m) 80 to 800MHz D=1.1667(Sqrt P)	Separation (m) 800MHz to 2.5GHz D=2.3333(Sqrt P)
0.01	0.11667	0.11667	0.23333
0.1	0.36894	0.36894	0.73785
1	1.1667	1.1667	2.3333
10	3.6894	3.6894	7.3785
100	11.667	11.667	23.333

Warranty

This product is warranted by Reichert, Inc. (herein after referred to as Reichert) against defective material and workmanship under normal use for a period of one year 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.

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.

Notes

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