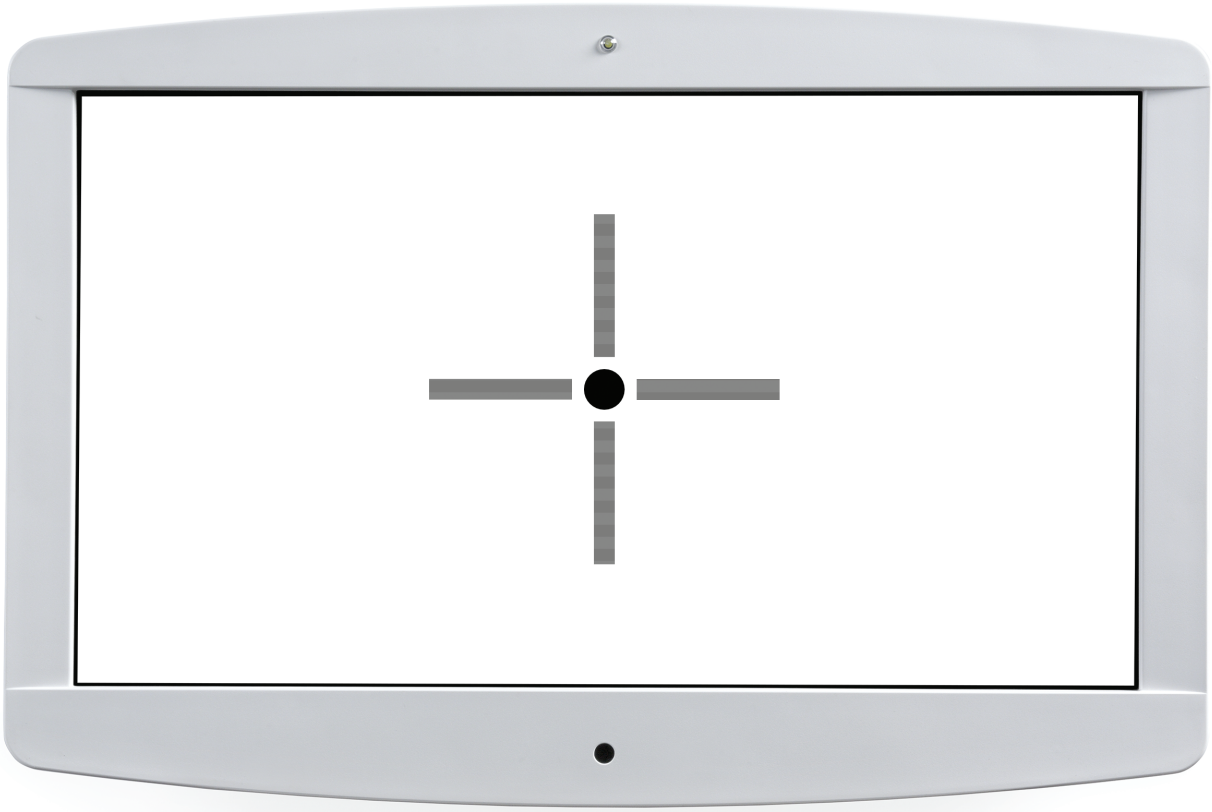
ClearChart® 4P

Polarized Digital Acuity System

Instructions for Use



Reichert®
AMETEK®

Scan for additional information and languages:

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The information contained in this document was accurate at time of publication. Specifications subject to change without notice. Reichert, Inc. reserves the right to make changes in the product described in this manual without notice and without incorporating those changes in any products already sold.

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

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Warnings & Cautions

Reichert, Inc. (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 THIS INSTRUMENT WITHOUT AUTHORIZATION FROM THE MANUFACTURER. ANY REPAIR OR SERVICE TO THIS INSTRUMENT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS WHO ARE TRAINED BY REICHERT OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: MODIFICATIONS TO THIS INSTRUMENT ARE NOT ALLOWED. ANY MODIFICATION TO THIS UNIT MUST BE AUTHORIZED BY REICHERT OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

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

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

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 OR DAMAGE TO IT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

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

WARNING: THE BATTERY SHOULD ONLY BE REPLACED WITH THE BATTERY SPECIFIED IN THIS MANUAL. USE OF ANOTHER BATTERY MAY CAUSE FIRE OR AN EXPLOSION.

WARNING: DO NOT PLACE A SHORTING DEVICE BETWEEN THE BATTERY TERMINALS, OR ALLOW THE BATTERY TO BECOME WET. MISUSE OR IMPROPER DISPOSAL OF THIS BATTERY MAY CAUSE IT TO BECOME VERY HOT, IGNITE OR EXPLODE. DAMAGE TO THIS UNIT AND/OR SERIOUS PERSONAL INJURY MAY RESULT.

WARNING: DO NOT RECHARGE THE BATTERIES. THE BATTERY IS NOT DESIGNED TO BE CHARGED BY ANY ELECTRICAL SOURCE. CHARGING COULD GENERATE GAS AND INTERNAL SHORT-CIRCUITING, LEADING TO DISTORTION, LEAKAGE, OVERHEATING, EXPLOSION OR FIRE.

WARNING: DO NOT EXPOSE THE BATTERIES TO TEMPERATURES ABOVE 130ºF FOR ALKALINE BATTERIES, OR ABOVE 140ºF FOR LITHIUM BATTERIES, OR DISASSEMBLE THE BATTERIES, OR DAMAGE TO THIS UNIT AND/OR SERIOUS PERSONAL INJURY MAY RESULT.

Warnings & Cautions

WARNING: NEVER ALLOW LIQUID LEAKING FROM THE BATTERY TO GET IN YOUR EYES OR MOUTH AS THIS LIQUID COULD CAUSE SERIOUS PERSONAL INJURY. IF IT COMES IN CONTACT WITH YOUR EYES OR MOUTH, FLUSH THEM IMMEDIATELY WITH PLENTY OF WATER AND CONSULT A PHYSICIAN.

WARNING: ALWAYS KEEP BATTERIES OUT OF THE REACH OF INFANTS AND YOUNG CHILDREN TO PREVENT THEM FROM BEING SWALLOWED. IF SWALLOWED, CONSULT A PHYSICIAN IMMEDIATELY.

WARNING: REMOVE THE BATTERIES FROM THE REMOTE CONTROL IF THE DEVICE WILL NOT BE USED FOR AN EXTENDED PERIOD OF TIME. THIS WILL PREVENT POSSIBLE DAMAGE TO THE REMOTE CONTROL DUE TO BATTERY LEAKAGE.

WARNING: THE USE OF ACCESSORIES OR CABLES OTHER THAN THOSE SPECIFIED, WITH THE EXCEPTION OF THOSE SOLD BY THE MANUFACTURER AS REPLACEMENT PARTS FOR THE INTERNAL COMPONENTS, MAY RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

WARNING: ANY NON-MEDICAL ELECTRICAL EQUIPMENT USED WITH THIS DEVICE MUST BE COMPLIANT WITH APPLICABLE IEC OR ISO SAFETY STANDARDS.



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 THIS USER'S GUIDE.

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 TECHNOLOGIES UNLESS THE OTHER EQUIPMENT HAS BEEN TESTED TO APPLICABLE IEC OR ISO STANDARDS.

CAUTION: DO NOT INSTALL ANY ADDITIONAL SOFTWARE OTHER THAN WHAT WAS SUPPLIED WITH THIS INSTRUMENT. INSTALLATION OF ADDITIONAL SOFTWARE MAY CAUSE UNEXPECTED OPERATION RESULTING IN MALFUNCTION OF THIS INSTRUMENT.

Symbol Information

The following symbols appear on the instrument:

	Warning
	Alternating Current Power
	Follow instructions for use
	Protective Earth Connection
I O	ON / OFF
REF	Catalog Number
SN	Serial Number
 YYYY-MM-DD	Date of Manufacture
	Manufacturer
	Waste of Electrical and Electronic Equipment
	Compliance with relevant EU requirements
 9800131	Authorized to mark given by Intertek ETL Semko for conformance with electrical standards
	Fragile Contents in Shipping Container - handle with care
	Keep Dry - Package shall be kept away from rain
	This Way Up - Indicates correct upright position of package
EC REP	Authorized Representative in European Community
CH REP	Authorized Representative for Switzerland
MD	Medical Device

Introduction

Congratulations on your purchase of the Reichert® ClearChart® 4P.

The ClearChart 4P 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. For additional copies of this manual or questions related to the ClearChart 4P contact your local authorized Reichert dealer or contact our Customer Service department directly at:

Tel: +1 716-686-4500
Toll Free: 888-849-8955
Fax: +1 716-686-4555
E-mail: reichert.information@ametek.com

Any serious incident associated with this device should be reported to Reichert and to your national health agency.

Indications for Use

The device provides images and charts, including those with letters and symbols in graduated sizes, intended for measuring visual acuity and determining patient subjective refraction.

Contraindications

None.

Installation, Features, & Functions

Unpacking and Contents

Great care has been taken to deliver your ClearChart 4P 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 unit from its packaging:

1. Remove the accessories from the top tray in the box. Refer to Figure SU-01.
2. Remove the tray from the box. Refer to Figure SU-02.
3. Lift the ClearChart 4P out of the box. Refer to Figure SU-03.



Figure SU-01 Accessories



Figure SU-02 Top Foam



Figure SU-03 ClearChart 4P

There are three different catalog numbers for ClearChart 4P with unique remote controls to address the need for specific acuity notations and optotype size progressions in different parts of the world.

- P/N 13785AG ClearChart 4P and remote control P/N 13781 with Logmar Progression and Decimal Notation (Also Known as Acuity Grade per ISO standard.)
- P/N 13785SE ClearChart 4P and remote control P/N 13782 with Standard progression and Snellen notation
- P/N 13785DL and remote control P/N 13783 with Linear Decimal progression and Decimal Notation

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

- ClearChart 4P(13785AG, 13785SE, or 13785DL)
- Remote Control (P/N 13781, 13782, or 13783)
- Two AAA batteries (P/N 13950000-902)
- Power Cords (P/N WCBL10018* and P/N 13375-409*) or (P/N WCBL10027† and P/N 13775-410†)
- Wall Mount with Screws (P/N 13775-023) (Includes Thumb Screws (4) (P/N 13775-015)
- Polarized Glasses (P/N 13780-008)
- Key Card for Pigassou Optotypes (P/N 13780-104)
- Key Card for Sheridan Gardiner Optotypes (P/N 13780-105)
- Wall Anchor Toggle Bolts Hardware (P/N 13775-026)
- User's Guide (P/N 13785-101)

Optional Accessories:

- Wall Mount Bracket Adaptor (For use with ClearChart Wall Mount) (P/N 13775-852)
- USB Bluetooth adapter (P/N 13779)
- Wireless Dongle Kit (P/N 13778)
- Red/Green Glasses(P/N 11866-803)

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.

* These P/N's are for 120V operation.

† These P/N's are for 230V operation.

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 4 ON THE WALL SO THAT YOU ARE ABLE TO EASILY DISCONNECT THE POWER SUPPLY TO THE DEVICE.

Note: Make sure the position you choose to mount your ClearChart 4P is within the reach of a power outlet.

Direct-Throw: Your ClearChart 4P 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 4P will be positioned higher than patient eye level so that the examiner will not interfere with the patient's view of the ClearChart 4P. Arrange the ClearChart 4P and mirror so that the ClearChart 4P can be seen by the patient through the mirror.

1. Find an appropriate spot on the wall that will support the ClearChart 4P, which will hang from the VESA compliant Mounting Bracket. Ensure that the refraction distance meets the requirements for either Direct Throw or Mirror Arrangement.
2. Level the supplied Wall Mount Bracket and mark the holes on the wall. The mount should be installed in solid wood stud, brick or concrete wall. The mount should be installed in a solid wood stud or a rigid wall. If installing in drywall, use provided toggle bolts hardware kit to mount. Reference manufacturers' instructions on packaging for mount and all provided hardware.
3. Hang the ClearChart 4P by lining-up the holes on the back of the device with the four holes on the mounting bracket. Secure the ClearChart 4P to the mounting bracket with the 4 screws provided.

Installation, Features, & Functions

Wall Mounts

WARNING: BE SURE TO READ THE WALL MOUNT INSTRUCTIONS THOROUGHLY AND THAT YOU FULLY UNDERSTAND ALL THE INSTRUCTIONS AND WARNINGS BEFORE ATTEMPTING TO BEGIN YOUR INSTALLATION.

WARNING: THIS PRODUCT SHOULD ONLY BE INSTALLED BY SOMEONE WHO HAS A BASIC KNOWLEDGE OF BUILDING CONSTRUCTION, INSTALLATIONS AND FULLY UNDERSTANDS THESE INSTRUCTIONS.

WARNING: MAKE SURE THAT THE SUPPORTING SURFACE WILL SAFELY SUPPORT THE COMBINED LOAD OF THE MOUNT, THE DISPLAY AND ALL ATTACHED HARDWARE AND COMPONENTS.

WARNING: MAKE SURE THE MOUNTING SURFACE WILL SAFELY SUPPORT THE COMBINED LOAD OF THE EQUIPMENT AND ALL ATTACHED HARDWARE AND COMPONENTS.

WARNING: THIS BRACKET WILL ONLY SUPPORT FLAT PANEL DISPLAYS. THE MAXIMUM LOAD CAPACITY IS 30 POUNDS.

WARNING: IF MOUNTING TO A WALL OF WOOD STUD CONSTRUCTION, BE SURE THAT MOUNTING BOLTS ARE ANCHORED TO THE CENTER OF THE STUDS.

WARNING: ALWAYS HAVE SOMEONE ASSIST YOU TO LIFT AND POSITION YOUR EQUIPMENT.

WARNING: TIGHTEN SCREWS AND BOLTS FIRMLY, BUT DO NOT OVER TIGHTEN. OVER TIGHTENING CAN DAMAGE THE ITEMS AND GREATLY REDUCE THEIR ABILITY TO HOLD. PLEASE REFER TO SUGGESTED TORQUE VALUES WHERE APPLICABLE.

Parts Included in the Wall Mount

Make sure you have received all of the parts in the component checklist before installing the mount. Refer to Page 8. If any parts are missing or faulty contact Reichert for a replacement. (Contact information is located on the back page of this User's Guide.)



Thumb Screws
(4 Pc)

Wall Mounts

Attaching the ClearChart 4P to the Mount

1. Align the half of the mount that was removed in the previous steps to the back of the ClearChart 4P, aligning it with the screw holes. Refer to Figure SU-10.



Figure SU-10 Align Holes and Attach Mount

Note: There is a slot on the back of the mount. Be sure this slot remains in the vertical position when aligning the mount to the back of the ClearChart 4P. Refer to Figure SU-11.



Figure SU-11 Align Slot Vertically

2. Using the Thumb Screws, secure the mount to the ClearChart 4P by hand-tightening the 4 screws into the outer screw holes on the back of the case of the ClearChart 4P. Refer to Figure SU-10.

Note: The screws must make at least three full turns into the mounting hole and fit snugly into place. Do not over tighten.

3. Slide the ClearChart 4P onto the mounting bracket that is already attached to the wall, so the square slides into the slot on the mount. Refer to Figure SU-12.
4. Secure the mount by tightening the two small flathead screws on either side of the mount where the ClearChart 4P attached to the wall mount. Refer to Figure SU-13.

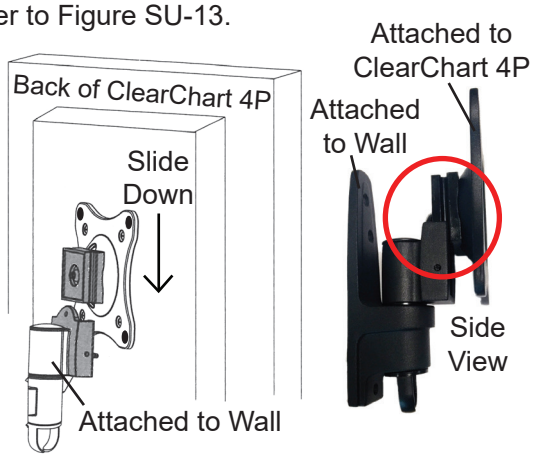


Figure SU-12 Attach ClearChart 4P to Wall Mount



Figure SU-13 Securing Screws

Wall Mounts

Maintenance

Once you have mounted the bracket and the ClearChart 4P, check that they are secure and safe to use. Follow the included manufacturer's installation instructions for the specific wall mount included with the unit. Check that the screws are fixed well every two months. If you have any concerns about the installation contact Reichert Technical Service. Contact information can be found on the back cover of this User's Guide.

Attaching ClearChart 4P to the Mount

1. Align the half of the mount that was removed in the previous steps to the back of the ClearChart 4P, aligning it with the screw holes. Refer to Figure SU-19. Use all hardware provided in the wall mount kit, do not discard any components. Follow the instructions provided by the wall mount manufactuer.

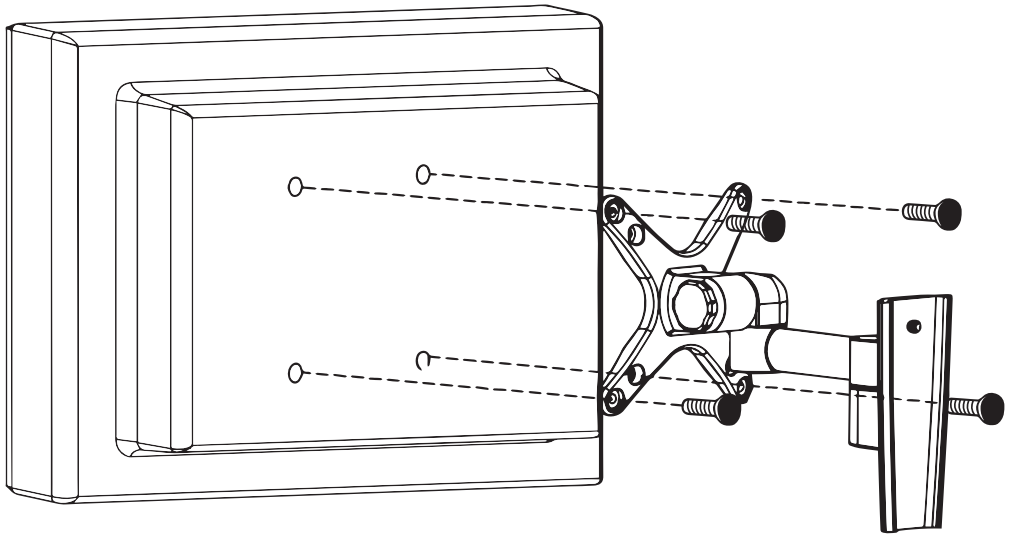


Figure SU-19 Align Holes and Attach Mount

Wall Mounts

Attaching ClearChart 4P to the Mount

Note: Be sure the mount is installed with the mount at the upper position, with the part that sides onto the wall mount in the lower position as in Figure SU-19.

1. Secure the mount to the ClearChart 4P by screwing in the Short machine Screws into the four screw holes on the back of the case of the ClearChart 4P. Refer to Figure SU-19.

Note: The screws should fit snugly into place. Do not over tighten.

2. Slide the ClearChart 4P onto the mounting bracket that is already attached to the wall, so the square slides into the slot on the mount. Refer to Figure SU-20.
3. Using the Small Hex Wrench, secure the mount by tightening the set screw on the top of the mount where the ClearChart 4P attached to the wall. Refer to Figure SU-21.
4. Use the Large Hex Wrench to adjust the set screws that secure the three joints of the wall mount. Refer to Figure SU-22.

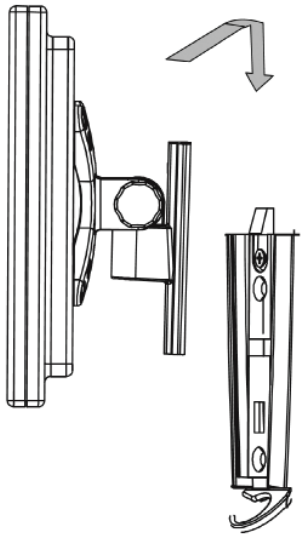


Figure SU-20 Attach ClearChart to Wall Mount

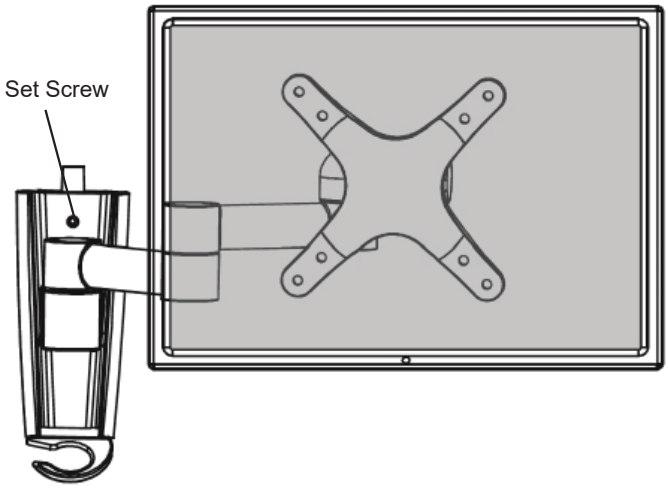


Figure SU-21 Tighten Set Screw



Figure SU-21 Adjust Set Screws

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. Refer to Figure SU-15.
2. Plug the male end of the power cord into a wall outlet of the appropriate voltage. Input voltage must not exceed the range listed in the Specifications section of this manual.
3. Set the ON / OFF switch to ON (I).

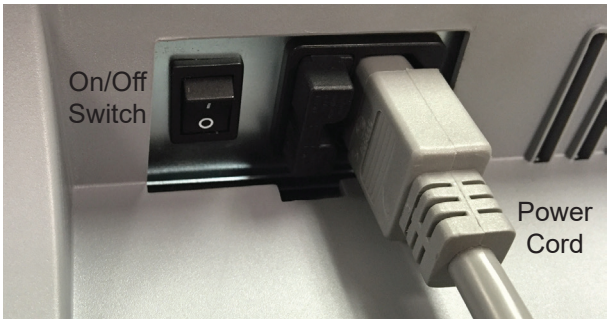


Figure SU-15 Power Cord and On/Off Switch

Disconnection of Input Power

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 4, press the ON / OFF switch to the OFF position (O).

Note: If the ClearChart 4P is intended to be OFF for an extended period of time, the ClearChart 4P can be disconnected from power by detaching the power cord from the receptacle.

Note: Even though the system has a low power mode, it is recommended to shut the instrument off at the end of the day.

Communication Ports

The ClearChart 4P has a 9 pin female serial port on the bottom of the instrument housing that can be used for either hard-wired or wireless connection to a Reichert digital refraction system. The ClearChart 4P also has two exposed USB ports to power a wireless serial adapter, connect a USB Bluetooth® adaptor, or to upload photos and videos. Refer to Figure SU-16.

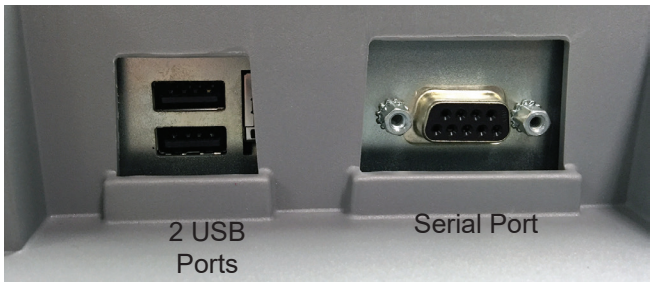


Figure SU-16 Ports

Connection with a Reichert Digital Refraction System

The ClearChart 4P can directly connect to a Reichert digital refraction system, using a cable or wirelessly connected using a Bluetooth serial adapter. Wired communication between the ClearChart 4P and the digital refraction system requires connection of a cable between the serial port on the ClearChart 4P and the digital refraction system.

Bluetooth Connection

Wireless communication between the ClearChart 4P and a Reichert digital refraction system requires connection of a Bluetooth device. Either a USB Bluetooth adapter (PN 13779) can be used, or a Bluetooth serial adaptor (PN 16251) powered by the USB port or with a separate AC adapter.

If using the USB Bluetooth adaptor (PN 13779), install the Bluetooth into one of the USB ports on the bottom of the ClearChart 4P. Refer to Figure SU-17.

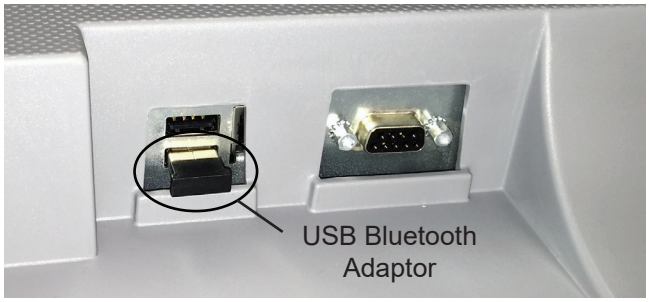


Figure SU-17 Install USB Bluetooth

-continued-

Connection with a Reichert Digital Refraction System (continued)

Bluetooth Connection (continued)

If using the Bluetooth serial adaptor (PN 16251), connect the Bluetooth Dongle to the end of the Null Modem Cable. Refer to Figure SU-18.

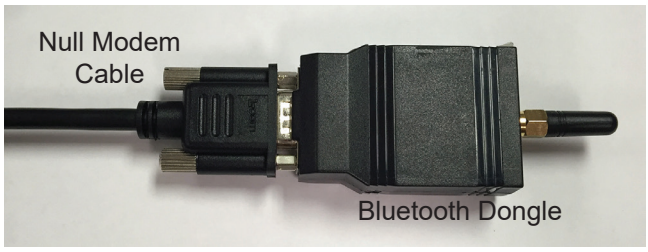


Figure SU-18 Connect Dongle to Cable

Connect the other end of the Null Modem Cable to the port on the bottom of the ClearChart 4P. If using the USB Power Adaptor, connect it to the USB port on the bottom. Refer to Figure SU-19.

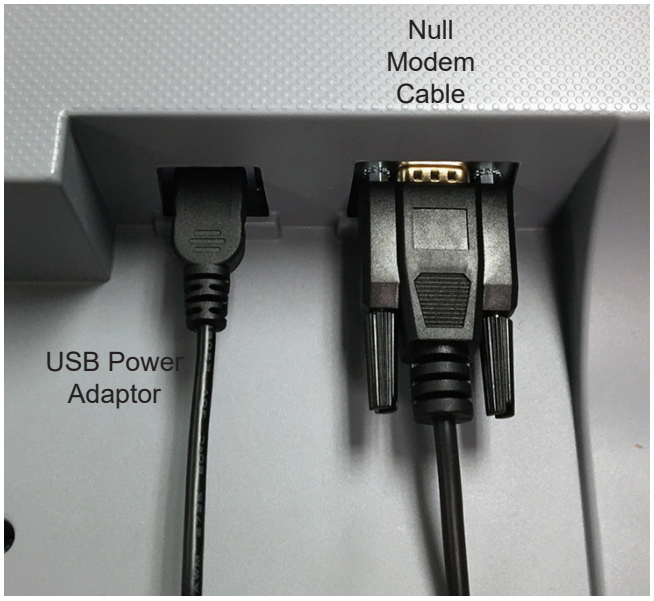


Figure SU-19 Connect USB Power and Null Modem Cable

If using an A/C power adaptor, plug the adaptor to a properly volted outlet. Connect the power cord to the Bluetooth Dongle. Refer to Figure SU-20.

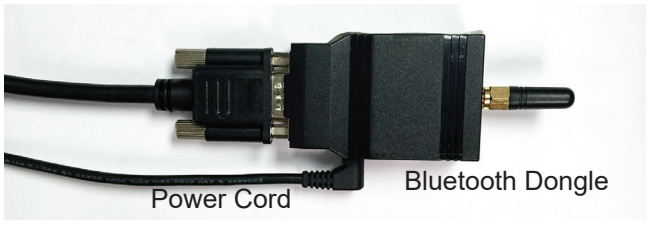


Figure SU-20 Connect Dongle to Power

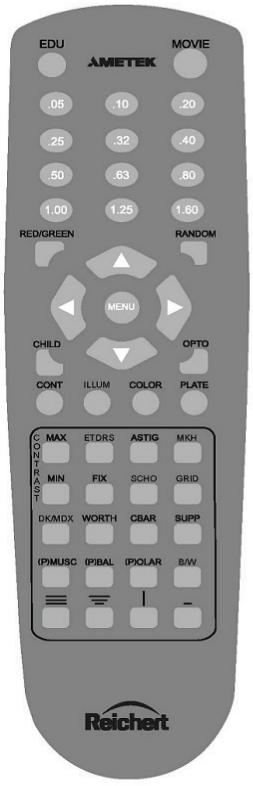
Installation, Features, & Functions

Remote Control

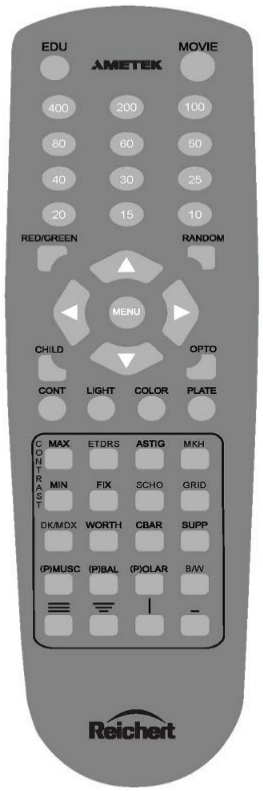
Three different configurations of the ClearChart 4P remote control are available to accommodate preferences for different optotype size progressions and different notations. The type of remote that is packaged with the ClearChart 4P depends on the catalog number of the instrument that was ordered. The numbered buttons at the top differentiate each remote control by presenting a specific optotype size progression and notation.

- ClearChart 4P P/N 13785AG Acuity Grade remote control with LogMAR Progression and Decimal Notation
- ClearChart 4P P/N 13785SE Snellen remote control with Standard progression and Snellen English Notation
- ClearChart 4P P/N 13785DL Decimal Linear with Linear progression and Decimal Notation

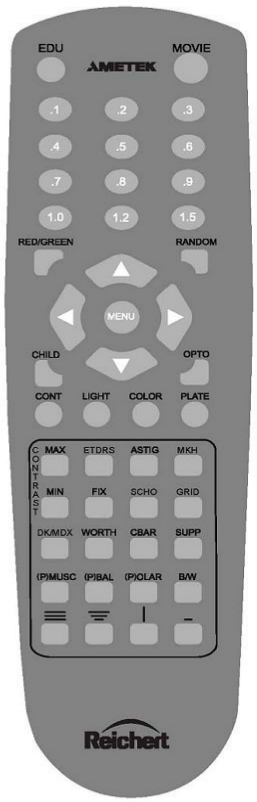
13781
Decimal LogMAR



13782
Snellen/Standard



13783
Linear/Decimal



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, & Functions

Remote Control Layout

The remote control will operate all the test charts on your ClearChart 4P. The image and chart below indicate the functions of each button. The numbered buttons in the image below represent the Decimal/LogMAR optotype progression. The Snellen and Linear/Decimal remote controls have different numbered buttons at the top of the remote. All other button functions are the same for each remote control.

EDU – Educational Images or other imported images
MOVIE – Children's Video or other imported videos

NUMBERS – Size of Optotypes in Decimal/LogMAR, Standard/Snellen, or Decimal/Linear
RED/GREEN – Red/Green Filters for Optotypes
RANDOM – Randomize Optotypes

▲ **UP ARROW** – Function depends on test chart
► **RIGHT ARROW** – Function depends on test chart
◄ **LEFT ARROW** – Function depends on test chart
▼ **DOWN ARROW** – Function depends on test chart
MENU – Menu options and settings

CHILD – Optotypes for Children
OPTO – Change Optotype Selection

CONT – Contrast Sensitivity Testing (Sine Wave Grating)
ILLUM – Change Background Illumination
COLOR – Color Tests
PLATE – License Plate Tests (U.K. License Plate Style)

MAX – Increase Contrast
MIN – Decrease Contrast
ETDRS – ETDRS Test Charts
ASTIG – Astigmatism Test Charts
MKH – Stereo Tests

FIX – Fixation Test
SCHO – Schober Test
GRID – Cross Grid

DK/MDX – Dark Screen, Maddox Light
WORTH – Worth 4 Dot Test
CBAR – Crowding Bars
SUPP – Suppression Tests

(P)MUSC – Polarized Muscle Balance Tests
(P)BAL – Polarized Binocular Balance Tests
(P)olar – Other Polarized Charts

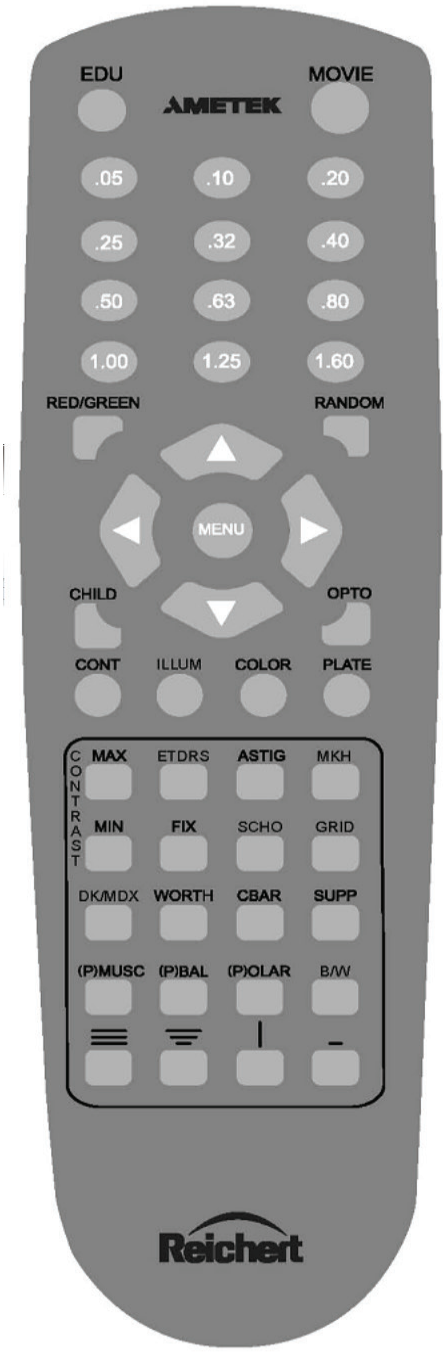
B/W – Change Contrast: White on Black, Black on White

☰ Display multiple lines of optotypes, same size

☲ Display multiple lines of optotypes, descending size

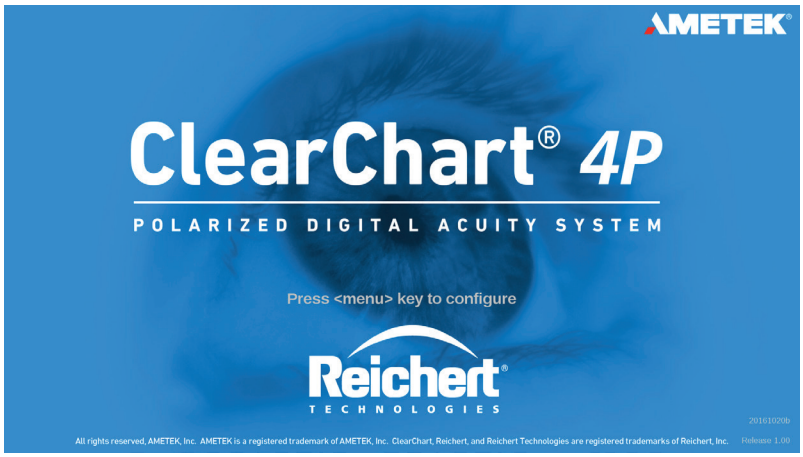
| Display a vertical line of optotypes

— Display a single optotype



Configuring the ClearChart 4P

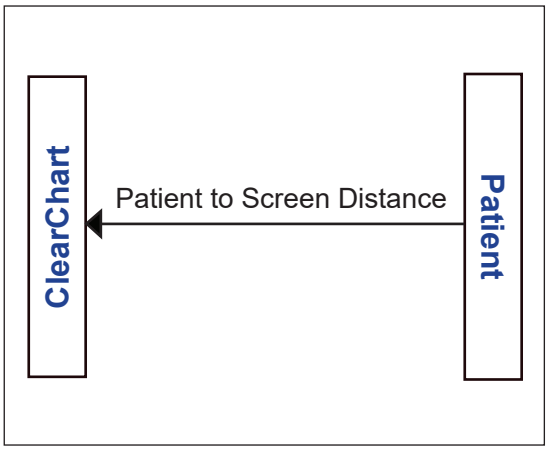
Press the ON/OFF switch located on the bottom of the instrument. The ClearChart 4P will boot-up. When the ClearChart 4P displays “Press <menu> key to configure”, press the MENU button on the remote to enter the configuration mode. Use the UP and DOWN arrows to navigate through different options.



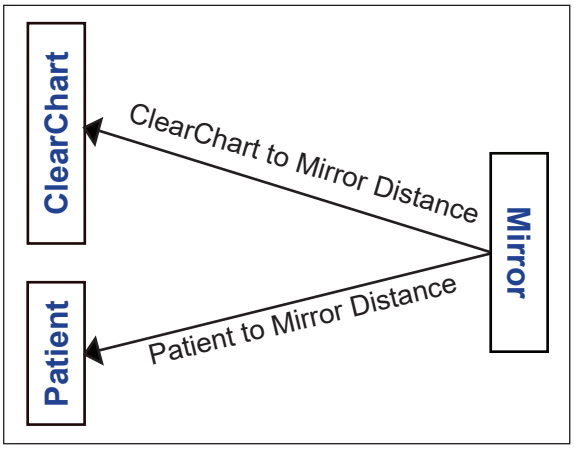
LANGUAGE
Using the LEFT/RIGHT arrows on your remote, select from English, French, Spanish, Italian, Portuguese, German and Russian. The default language is English. When you are finished, press the DOWN arrow.

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.

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 the DOWN arrow.



Direct Throw



Mirror Set Up

Configuring the ClearChart 4P (continued)

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

The EDIT LIST option allows the user to select the Optotypes that will be readily available when pressing the OPTO button on the remote. Use the UP/DOWN arrow buttons to navigate through the list. Press the OPTO button to select or deselect the optotypes that you wish to display. An asterisk will indicate the optotypes that are activated. The order of the optotypes in the list can be changed by highlighting an optotype with the UP or DOWN arrow keys and pressing the MAX or MIN button to move the optotype up or down the list.

Available optotypes are:

- 17 Letter
- 8 Letter
- Sloan
- Landolt C
- O Landolt C
- HOTV
- Cyrillic
- Tumbling E
- LEA NUMBERS®

Note: You will be able to access any optotype while using the ClearChart 4P. When you are finished, press the DOWN arrow.

CHILD OPTOTYPES

Using the LEFT/RIGHT arrows on your remote, select the child optotype you would like the ClearChart 4P to display when you press CHILD on your remote. Available optotypes are:

- Allen Symbols
- Osterberg
- Pigassou
- Sheridan Gardiner
- Lower Case Letters
- LEA SYMBOLS®

When you are finished, press the DOWN arrow.

Configuring the ClearChart 4P (continued)

LINE PRESENTATION

Using the LEFT/RIGHT arrows on your remote, select the default line presentation you would like the ClearChart 4P 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 4. When you are finished, press the DOWN arrow.

PROGRESSION

Using the LEFT/RIGHT arrows on your remote, select Standard, Decimal or LogMAR for the default size progression you would like the ClearChart 4P to display. The factory default setting is LogMAR.

Select the optotype size progression based on the version of the remote that you are using:
AG = LogMAR
SE = Standard
DL = Decimal

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. The default is No Display. When you are finished, press the DOWN arrow.

MAXIMUM CHARACTERS 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. The default is 5 characters. When you are finished, press DOWN arrow.

RED/GREEN ADJUST

Using the LEFT/RIGHT arrows on the remote, select No Change, Recalibrate or Factory Default. If you choose Recalibrate press the DOWN button to enter the adjustment mode. The R, G and B blocks on the left side of the screen are used for the Red color adjustment. To adjust red (R) use the MIN and MAX buttons to acquire the desired tone. Press the RIGHT arrow key to advance to the next color adjustment which is the green (G) tone in the red and then to the blue (B) tone in the red. The next RIGHT arrow button press will take you to the right side of the screen where the green color adjustment can be done. The R represents the red color hue in the green and the G indicates green adjust. Press the RIGHT arrow button to advance to G and use MIN and MAX to adjust green to the desired tone. Press the RIGHT arrow button to select B and adjust the blue tone in the green color if desired. Press the DOWN arrow to enable adjustment of the red tone for the suppression letters and the Worth 4 Dot chart. MIN and MAX buttons will again change the color tone. Press the RIGHT arrow to advance to G in order to adjust the green tone for the suppression letters. Use MIN and MAX buttons to adjust the color. Press the RIGHT arrow to advance to B for the blue color tone. To exit Red/Green Adjust press the DOWN arrow to re-enter the initial red/green setup screen (No Change will be displayed) and press the DOWN arrow again.

Configuring the ClearChart 4P (continued)

SWAP ODD/EVEN LINES

This menu setting allows for the reversal of left and right images and the direction of stereo displacement. The options using the RIGHT arrow button are “Swap” and “No Change”. This option accommodates the two different sets of polarization lenses with reversed orientation in the Auto Phoroptor VRx. The default is No Change.

SCREEN SAVER

The ClearChart software displays a screen saver which will show a floating image when active. Either the default ClearChart image contained in the software or a user loaded screen saver image can be loaded.

The ClearChart has an option to adjust the length of time the instrument is idle before the Screen Saver is activated. The MIN (decrease) and MAX (increase) buttons are used to change the instrument idle time. After setting the preferred time, press the DOWN arrow to finalize the selection.

After the instrument has been idle for the preferred time selected, the screen saver is activated. After the screen saver has been active for 30 minutes, the display will show a black screen to extend the lifetime of the display. Pressing any button will re-activate the screen.

MADDOX LIGHT ADJUSTMENT

CAUTION: DO NOT ADJUST THE BACKGROUND ILLUMINATION. BACKGROUND ILLUMINATION SHOULD BE ADJUSTED ONLY BY A TRAINED TECHNICIAN AND WITH THE USE OF A LIGHT METER TO VERIFY CALIBRATION OF ILLUMINATION LEVELS.

The Maddox LED light intensity can be adjusted by accessing the default settings of the instrument. While in the start-up mode, (blue splash screen with image of the eye), press the EDU and the MENU button in sequence to access the factory default settings. Use the DOWN arrow to advance through the menu selections to reach the Brightness settings. Press the RIGHT arrow button to select Recalibrate and the DOWN arrow to display the Brightness setting screen. Use the two center buttons at the top of the remote (labeled .2 and .5 in Linear Decimal, 200 and 60 in Snellen, and .1 and .32 in Decimal LogMAR) to increase or decrease the brightness of the Maddox light. The number in the left corner of the screen indicates the brightness on a scale of 1 to 128. The default setting is 45. Press the down arrow to exit the factory default settings.

Installation, Features, & Functions

Optotypes

All of the optotypes contained within the ClearChart 4P conform to the American National Standard Institute ANSI Z80.21 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 between one and two times the width of that size optotype. The spacing between rows of descending size is between one and two times the height 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'. 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 4P, 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**.

HOTV is an additional letter set offered in the ClearChart 4P.

The **Cyrillic letters** are representative of the characters used in the Golovin-Svitsev Acuity Chart:
Ш Б М Н К Ы И

The **tumbling 'E's** are presented in four positions: 

Landolt 'C's are presented in eight positions: 

O Landolt C optotypes are also available.

CHILD OPTOTYPES

LEA SYMBOLS

Set of 4 recognizable images.

LEA NUMBERS
9 5 6 8

Set of 4 recognizable numbers.

Allen Symbols


Set of 6 recognizable images. The Allen Symbols are only available up to size 100.

Pigassou


Set of 7 recognizable images with key card.

Osterberg


Set of 13 recognizable images.

Sheridan Gardiner
T U X H V O A

Seven letter set with key card.

Lower Case Letters
c a x n s e r z v o

Set of 10 letters. Lower case letters are sometimes considered easier for children to identify.

Size Progressions

Optotype sizes are presented in the table below for the LogMAR, Standard and Linear/Decimal Progressions. The default progression is the LogMAR Scale and the default Notation is Decimal. The table below indicates the LogMAR Scale and the equivalent Decimal, Snellen and Snellen Metric optotypes sizes.

LogMAR Scale	Acuity Grade Decimal LogMAR	Snellen	Snellen (Metric)
-0.3	2.00	20/10	6/3.0
-0.2	1.60	20/12.5	6/3.8
-0.1	1.25	20/16	6/4.8
0.0	1.00	20/20	6/6.0
0.1	0.80	20/25	6/6.75
0.2	0.63	20/32	6/9.5
0.3	0.50	20/40	6/12
0.4	0.40	20/50	6/15
0.5	0.32	20/63	6/19
0.6	0.25	20/80	6/24
0.7	0.20	20/100	6/30
0.8	0.16	20/125	6/38
0.9	0.125	20/160	6/48
1.0	0.10	20/200	6/60
1.1	0.08	20/250	6/76
1.2	0.063	20/320	6/96
1.3	0.05	20/400	6/120

The Standard Progression presents visual acuity sizes as Snellen fractions.

Snellen	Snellen (Decimal)	Snellen (Metric)
20/10	2.00	6/3.0
2015	1.33	6/4.5
20/20	1.00	6/6.0
20/25	0.80	6/7.5
20/30	0.667	6/9.0
20/40	0.50	6/12.0
20/50	0.40	6/15.0
20/60	0.33	6/18.0
20/70	0.286	6/21.0
20/80	0.25	6/24.0
20/100	0.20	6/30.0
20/200	0.10	6/60.0
20/400	0.05	6/120

Size Progressions (continued)

The Linear Decimal progression is based on a 10/10 scale.

Linear Decimal
0.05
0.10
0.15
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.20
1.50
2.00

Remote Control Functions

EDU

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.

MOVIE

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.



SIZE BUTTONS

100

The optotype size buttons allow the user to quickly display an optotype in a specific size. The buttons represent optotype sizes in Decimal Notation and logMAR progression when using the Acuity Grade remote. The size buttons on the Snellen remote will represent the Snellen Notation and Standard Progression. The size buttons correspond to Decimal Notation and Linear Progression when using the DL remote.

RED/GREEN

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.

This is the LEFT ARROW button. It has multiple functions. It can be used to scroll through a sequence of optotypes (similar to randomization), display a series of charts, scroll through menu selections, and has specific functions for contrast sensitivity testing.

This is the UP arrow button. The UP Arrow is used to increase the size of the optotypes displayed, navigate through and select set-up or menu options, change the frequency of the sine waves on the Contrast Sensitivity test chart, and rotate the Astigmatic T and Astigmatic Dial.

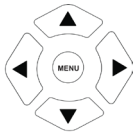
This is the RIGHT arrow button. It has multiple functions. It can be used to scroll through a sequence of optotypes (similar to randomization), display a series of charts, scroll through menu selections, and has specific functions for contrast sensitivity testing.

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

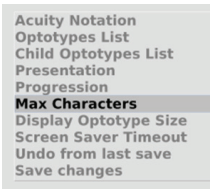
Remote Control Functions (continued)



This is the DOWN arrow button. The DOWN Arrow button is used to decrease the size of the optotypes displayed, navigate through and select set-up or menu options, change the frequency of the sine waves on the Contrast Sensitivity test chart, and rotate the Astigmatic T and Astigmatic Dial.



The MENU button presents the main menu to select default preferences for the ClearChart 4.



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, select the SAVE CHANGES option on the MENU screen.

Menu Item	Options
1. ACUITY NOTATION	Snellen, Metric, Decimal
2. OPTOTYPE LIST	17 Letter Set, 8 Letter Set, Sloan, Tumbling E, Landolt C, O Landolt C, HOTV, Numbers, Cyrillic
3. CHILDREN'S OPTOTYPES	LEA SYMBOLS, LEA NUMBERS, Allen Symbols, Pigassou, Osterberg, Sheridan Gardener, Lower Case Letters
4. PRESENTATION	Single Line, Double/Same, Double/Decreasing, Triple/Same, Triple/Decreasing, Quadruple/Same, Quadruple/Decreasing, Single Letter, Column, Column/Uneven
5. PROGRESSION	LogMAR, Standard, Decimal
6. MAX CHARACTERS	1, 2, 3, 4, 5, 6
7. DISPLAY OPTOTYPE SIZE	No Display, Display
8. SCREEN SAVER	1 TO 60 minutes
10. UNDO FROM LAST SAVE	Restore previously saved settings.
11. SAVE CHANGES	

CHILD The CHILD button allows the user to display different optotypes for Children. Press the button repeatedly to scroll through the optotypes selected for the CHILD OPTOTYPE LIST and choose the preferred option for the patient exam.

OPTO The OPTO button allows the user to display different optotypes. Press the OPTO button repeatedly to scroll through the optotypes selected for the OPTOTYPE LIST and choose the preferred option for the patient exam.

Remote Control Functions (continued)

ILLUM

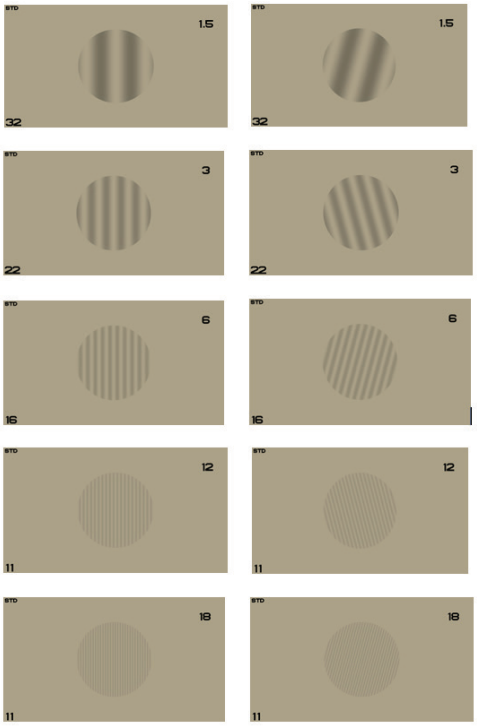
Pressing the ILLUM button changes the background illumination of the display. Three light levels are available for testing: Full illumination (220 cd/m²), Photopic or Standard (85 cd/m²) and Mesopic for low light testing (3 cd/m²).

CONT

The CONT button displays the sine wave grating chart for contrast sensitivity testing. This test is intended as a screening tool for patients who may have difficulty discerning contrast. The background illumination defaults to Standard (STD) or photopic at 85 cd/m². In this mode, the UP/DOWN arrows adjust the frequency of the sine wave grating. There are five different frequencies: 1.5, 3, 6, 12 and 18 cycles per degree. The number in the upper right corner displays the frequency. Level of contrast in the sine wave target can be adjusted using the MIN and MAX buttons. Contrast can be adjusted to fifteen different levels: 100, 63, 45, 32, 22, 16, 11, 7.9, 5.6, 4.0, 2.8, 2.0, 1.4, 1.0, 0.7. The lower left number displays the contrast level by percentage. RIGHT/LEFT arrow buttons can be used to rotate the image angle. Pressing the CONT button a second time exits this mode.



At each frequency, find the lowest level of contrast at which that patient can see the sine wave grating on the display. Change the direction of the target using the RIGHT/ LEFT arrow buttons and ask the patient if the sine waves are aligned straight up and down, to the right or to the left. Press the UP arrow to change the target to the next frequency.



Remote Control Functions (continued)

CONT (cont.)

When the lowest level of contrast seen at all five frequencies has been determined, press the UP arrow button again and a plot of a contrast sensitivity curve will appear on the display. Contrast Sensitivity is calculated using the Michaelson formula where L(max) represents the highest luminance and L(min) the lowest luminance:

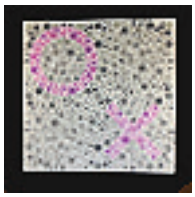
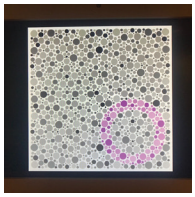
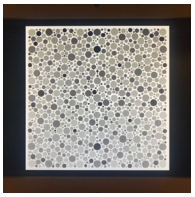
$$CS = \frac{L(max) - L(min)}{L(max) + L(min)}$$

The chart will display a green line that is a reference line for a contrast sensitivity curve and a red line that plots the patient's contrast sensitivity for each sine wave frequency. The frequency and contrast sensitivity data can also be exported to a USB drive.

COLOR

The COLOR button accesses the test charts for color vision testing. A selection of twenty four charts is available for testing color vision deficiencies. These charts are digital renderings of the American Optical H.R.R. Psuedoisochromatic Plates developed by Le Grand H. Hardy, M.D., Gertrude Rand, PH.D., and M. Catherine Rittler, B.A. in 1955. The H.R.R. images can be used as a tool to identify the need for further color vision screening. Press the RIGHT arrow button to display each chart in the sequence. Press the COLOR button again to exit the test.

The first four charts in the sequence, A, B, C and D, are demonstration plates. The fourth chart has no symbols.

1  2  3  4 

The first 6 Plates separate individuals with possible color deficiencies from those with normal vision. Listed below are normal responses to the images seen on each plate.

Any errors in Plates 1 – 6 indicate possible color vision deficiencies. No further errors in Plates 7 – 20 indicate a mild defect unclassified as to type.

Plate 1	X ▷	Plate 4	X
Plate 2	O ▷	Plate 5	O X
Plate 3	O	Plate 6	O ▽

Errors in Plates 7 –11 but not in 12 – 16 indicate a mild Red/Green defect.

	Normal	Protanopia	Deutanopia
Plate 7	Δ O		
Plate 8	X		
Plate 9	Δ		
Plate 10	O X		
Plate 11	O X		

Remote Control Functions (continued)

COLOR (cont.)

Errors in Plates 12 –14 but not in 15 –16 indicate Medium Red/Green Defect. Errors in Plates 15 –16 indicate Strong Red/Green Defect.

	Normal	Protanopia	Deutanopia
Plate 12	◁ O		
Plate 13	O ▷		
Plate 14	X ▷		
Plate 15	O X		
Plate 16	O ▽		

Errors in Plates 17 – 18 but not in Plates 19 –12 indicate Medium Blue/Yellow defect. Errors in Plates 19 –20 indicate Strong Blue/Yellow Defect.

	Normal	Tritanopia	Tetartanopia
Plate 17	X ▽		
Plate 18	O X		
Plate 19	O ▽		
Plate 20	◁ X		

PLATE

The PLATE button displays images of License Plates for vision testing. The license plate images follow European standards for letters, fonts, numbers and dimensions. Press the RIGHT arrow button to display the different plate images. Press PLATE a second time to EXIT this mode.



MAX/ MIN

MAX and MIN buttons are used during the initial set-up of the ClearChart 4P to enter the refracting distance and adjust red/green colors for filters and suppression tests. These buttons are also used to adjust contrast levels of the sine wave grating chart for contrast sensitivity testing, and to adjust contrast levels of optotypes.

ETDRS

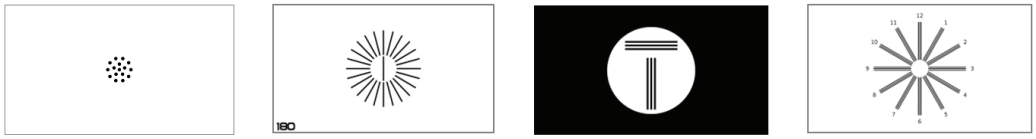
The ETDRS button accesses optotypes with Sloan letters and logmar progression that meet specific standards for ETDRS testing. Three standard ETDRS charts are available by pressing the RIGHT arrow button. The UP and DOWN arrow buttons will scroll to larger or smaller optotype sizes in the chart. Press ETDRS again to escape the chart sequence.



Remote Control Functions (continued)

ASTIG

The ASTIG buttons displays four different charts for astigmatism testing. Pressing the RIGHT arrow button displays the charts in sequence. The clock dial and the Astigmatic T can be rotated in either direction by pressing the UP/DOWN arrow buttons. Pressing the ASTIG button again exits the astigmatism tests.



MKH

The MKH button displays a series of eleven different test charts used for phoria and stereo vision testing. Press the RIGHT arrow button to move through the sequence of charts. Press the MKH button again to exit the MKH test charts.

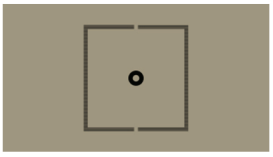


Phoria

Cyclophoria Test



Cyclophoria Test



Vertical Coincidence Test





Stereo Tests

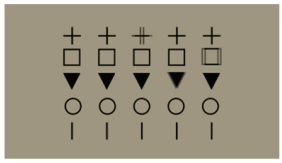


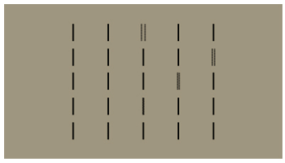


Stereo Balance Tests

Remote Control Functions (continued)

MKH (cont.)





Stereoscopic Vision Tests



Cowen Red/Green Balance Test

FIX

Pressing the FIX button will display a fixation dot target. Pressing the button a second time will display horizontal and vertical lines surrounding the fixation target. A third button press will exit the test. The test can also be terminated by pressing any of the buttons at the bottom of the remote that control the number of lines and orientation of the optotypes.





Note: It is possible to exit the fixation test and other chart functions that have a sequence of two charts by pressing any of the line presentation buttons at the bottom of the remote. The test charts this feature applies to are Schober, Fixation Dot and Lines, and Crowding Bars.

SCHO

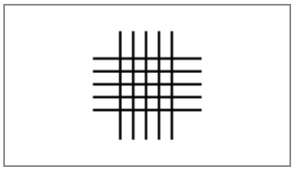
The Schober tests for binocular balance and suppression testing can be accessed by pressing the SCHO button. Press the button once to display the first chart in the sequence and press it again to display the alternate chart. A third button press will exit the test.





GRID

Press the GRID button to display the Cross Grid Chart. Press the button again to exit the test.

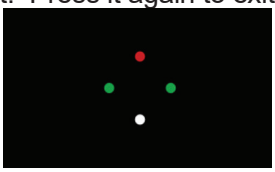


Remote Control Functions (continued)

DK/MDX The DK/MDX button displays a dark screen. A second press of the button will illuminate the Maddox LED. Press the DK/MDX button again to exit the test.



WORTH The Worth 4 Dot test is used to test for suppression in the right or left eye. Press the WORTH button to display the chart. Press it again to exit.



CBAR The CBAR button places crowding bars around a letter optotype. A second button press moves the crowding bars closer to the optotype. Press the UP/DOWN arrows to increase or decrease the size of the optotype. Press RANDOM to change the optotype. Exit the test by pressing the CBAR button again.



SUPP The SUPP button presents an alternative suppression test with white letters on a black background. The first button press will display a line of 5 letter optotypes with the first and last optotypes in red and green, reading from left to right. A second button press will change the position of the red and green optotypes. Press SUPP again to exit the test.



P(MUSC) The P(MUSC) button displays three different polarized muscle balance tests. Pressing the RIGHT arrow button displays each chart. Press the P(MUSC) button to exit the series of charts.



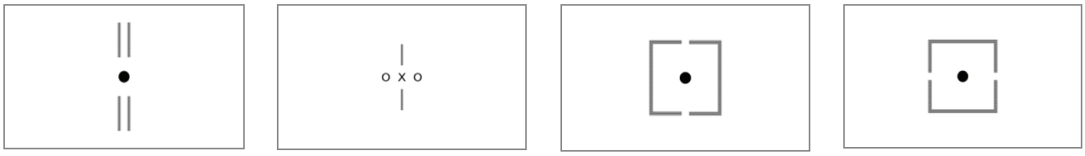
(P)BAL The (P)BAL button accesses four different polarized binocular balance tests. Press the RIGHT arrow to display each chart. Press the (P)BAL button again will exit the chart sequence.



Remote Control Functions (continued)

(P)OLAR

Additional polarized test charts can be displayed by pressing the (P)OLAR button. These charts include the Mallet Test and Horizontal and Vertical Coincidence Tests. Press the RIGHT arrow button to display each chart. Press the P(OLAR) button a second time to exit the chart sequence.



B/W

The B/W button reverses the contrast on the display. Press the button to toggle between black letters on a white background and white letters on a dark background.





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.

E K Z A G
S L F O K
O P L B U
P H T C A

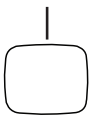
Note: At larger optotype sizes, there will be a limit of how many lines can be displayed.



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.

E K Z A G
S L F O K
O P L B U
P H T C A

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



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

O
V
H
O
V

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



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

E

Video and Image Files

Video and Image File Feature

The ClearChart 4P Digital Acuity System currently displays seventeen different educational slides and one children's video with audio for fixation. Additional video and image files of certain formats and file sizes can be imported into the device and displayed on the screen.

Video and Image File Parameters

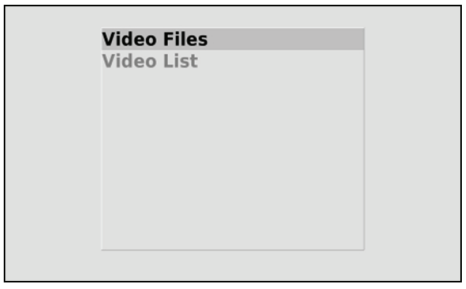
ClearChart 4P can accommodate up to 13 additional image files each no greater than 1 MB in size. The image file format required is JPEG or PNG.

Up to 4 additional video files can be accommodated. The file format required is AVI, MP4, or MOV. The supported video codec is AVC, and the supported audio codec is AAC. The maximum resolution for a video is 1920x1080, and the minimum resolution is 64x64. The maximum framerate is 30 fps. The maximum bitrate is 50 Mbps. A total of 290 MB of space is available for uploadable video files.

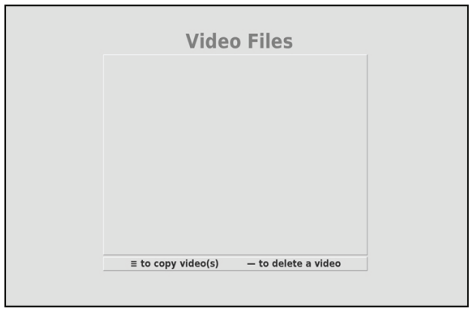
Video Files

Importing and Accessing Video Files

With the ClearChart 4P powered on, press the MENU button on the remote. Then press the MOVIE button. Two selections will be presented on the display: Video Files and Video List.



To import a video, select "Video Files" using the RIGHT arrow button on the remote. Insert a USB drive with the desired video file in one of the USB ports on the bottom of the instrument. Wait several seconds and then press the ☰ button at the lower left corner of the remote control. The video file will start copying to the ClearChart 4P hard drive immediately and a message will appear on the screen: "Copying files. Please wait...."

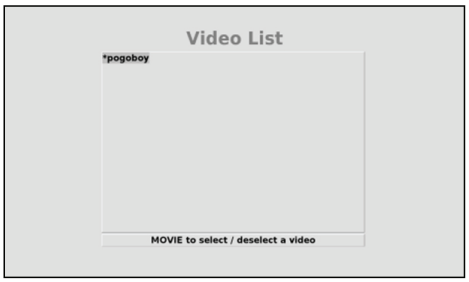


Once the copying is complete the "Copying files..." message will disappear from the screen. Press the MENU button to return the screen with the options of Video Files and Video List.

Video Files (continued)

Importing and Accessing Video Files (continued)

Access the Video List using the UP or DOWN arrow button and open the video list using the RIGHT arrow button. Use the UP or DOWN arrow button to highlight the video in the list you wish to play and press the MOVIE button to select it. An asterisk will appear next to the video name that was selected. The MOVIE button is used to select or deselect a video for display.



Press the MENU button to leave the video list, and press MENU again to get back to the active display. Press the MOVIE button to play the selected videos and scroll through them using the LEFT and RIGHT arrow buttons.

Organizing Video Files

The “MAX” and “MIN” buttons on the remote can be used to move the position of a video file in the Video List. Pressing the MAX button will move a video file up in the list and the MIN button will move the video file down the list.

Deleting Video Files

Video files may be deleted by pressing the MENU and MOVIE buttons in sequence to open up the video file management display. Select “Video Files” using the UP/DOWN arrow buttons and press the RIGHT arrow button to open the list. Select the video file you wish to delete using the UP/DOWN arrow buttons. Press the button in the lower right corner of the remote control to delete the video file.

-continued-

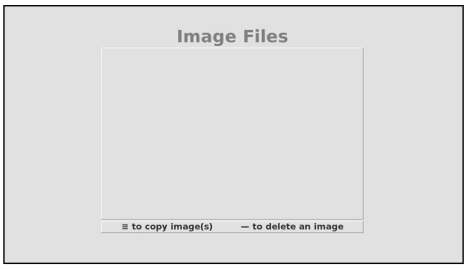
Image Files

Importing and Accessing Image Files

Press the MENU button and then the EDU button. The display will indicate three options: Image Files, Image List and Screen Saver Logo.



To import new images, select “Image Files” using the RIGHT arrow key. Insert the USB drive with the additional images into the USB port. Wait several seconds and then press the '☰' button at the lower left corner of the remote control to copy the new images to the ClearChart 4P.



Press the MENU button to return to the screen with the image file management options: Image Files, Image List, Screen Saver Logo

Use the UP or DOWN arrow buttons to scroll to “Image List” and then press the RIGHT arrow to open the list. Use the UP/DOWN arrows to highlight the image file you wish to display. Press the EDU button to select or deselect an image. An asterisk will appear next to the name of the image files that have been selected for display.



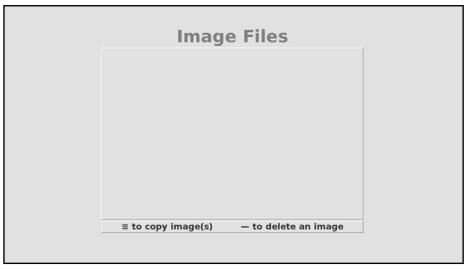
Press the MENU button to leave the image files management screen. Press MENU twice to get back to the active display. Press the EDU button to display the selected images and scroll through them using the LEFT and RIGHT arrow buttons.

Image Files (continued)

Organizing Image Files
The “MAX” and “MIN” buttons on the remote can be used to move the position of an image file in the Image List. Pressing the MAX button will move an image file up in the list and the MIN button will move the image file down the list.

Deleting Image Files
Image files may be deleted by pressing the MENU and EDU buttons in sequence to open up the image file management display. Select “Image Files” using the UP or DOWN arrow and press the RIGHT arrow button to open the list. Select the image file you wish to delete using the UP or DOWN arrow buttons. Press the button in the lower right corner of the remote control to delete the image file.

Changing the Screen Saver
Insert the USB drive that contains the new screen saver logo into one of the USB ports on the bottom of the instrument. The screen saver logo file must be in JPEG format and must be named sslogo.jpg. Go to the image management menu using the MENU and EDU buttons and select the “Screen Saver Logo” option. Three selections, accessible with the LEFT/RIGHT arrow buttons, will be displayed: Image Files, Image List, and Screen Saver Logo.



The “Logo” option displays the screen saver image most recently selected, whether it was a new image that was imported or the ClearChart 4P default screen saver. The “Default” selection displays the ClearChart 4P default screen saver image. The “New” option allows a new screen saver image to be imported into the device. Use the RIGHT arrow button to scroll to the “New” option. The following message will be displayed: “Press down arrow to read logo file from USB device”



Press the DOWN arrow and the new logo image file will be copied to the hard drive of the ClearChart 4P. After copying the file, you will be returned to the image file management screen. Exit the image file management screen by pressing MENU twice. The new screen saver logo will appear on the display when the screen saver time out period is reached.

Cleaning & Maintenance

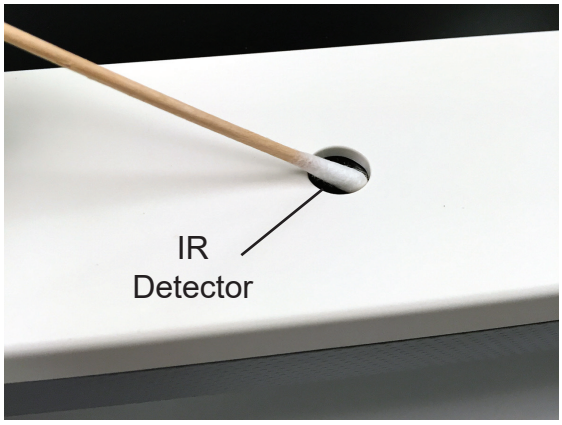
Cleaning ClearChart 4P

Use a lint-free, soft cloth lightly damped with water to clean the ClearChart 4P screen and the unit. Cleaning of the ClearChart 4P should be performed when the screen has contaminants on it or when visually, there is dust accumulation on the instrument.

CAUTION: THE POLARIZED SCREEN CAN BE EASILY DAMAGED BY CLEANERS. USE ONLY DAMP CLOTH. DO NOT USE ALCOHOL OR AMMONIA-BASED WINDOW CLEANERS. DO NOT USE PAPER TOWELS.

Cleaning the IR Detector

Use a lint-free cotton swab, clean the IR detector with a lens cleaner that is safe for plastic lenses. Refer to Figure MM-01.



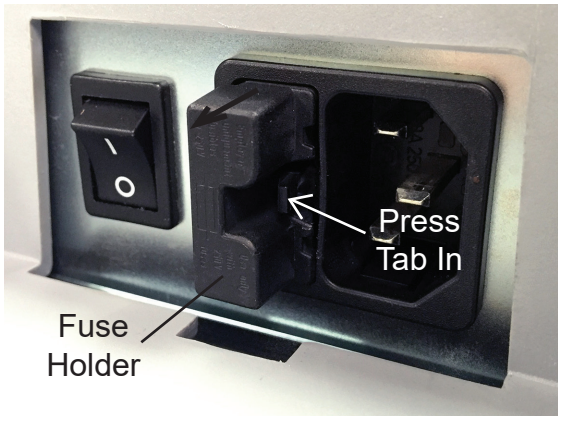
MM-01 Clean IR Detector

Fuse Replacement

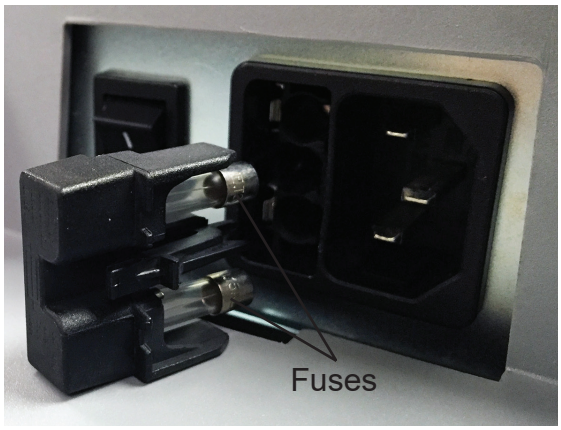
WARNING: DISCONNECT POWER BEFORE ATTEMPTING TO REMOVE THE FUSES OR SERIOUS INJURY OR DEATH MAY OCCUR.

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

1. Turn the power to the unit off, and unplug the device.
2. Press down on the tab in the middle of the Fuse Holder to release the Fuse Holder and pull the Fuse Holder out. Refer to figure MM-02.
3. Install new fuses that are indicated in the Specification section of this manual into the Fuse Holder. Refer to Figure MM-03.
4. Push the Fuse Holder into the Power Input Module until it snaps into place.



MM-02 Fuse Holder



MM-03 Fuse Removal

Troubleshooting

Troubleshooting

The following is a chart of errors with the ClearChart 4P and how to resolve them. If the following does not solve an issue with the ClearChart 4P, the unit may require servicing.

Problem	Probable Cause	Possible Solution
Unit will not turn on.	Not plugged into an outlet with power.	Plug unit into a properly volted outlet.
	Power cord not fully pushed into the power input receptacle.	Fully install power cord.
	Fuse(s) is blown.	Replace the fuse(s).
Unit will not respond to remote control.	IR Detector is dirty.	Clean the IR detector. Refer to the Cleaning & Maintenance section of this manual.
	Batteries in remote are low.	Replace the batteries in the remote.
	Unit needs to power cycle.	Turn the unit off and on.

Specifications

Catalog Number 13785AG, 13785SE, 13785DL

Physical Dimensions

Size:
Height: 15.60 in. (39.62 cm)
Width: 23.20 in. (58.92 cm)
Depth: 3.00 in. (7.62 cm)

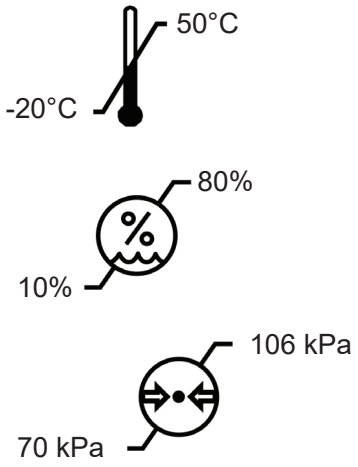
Weight, unpacked: 13.1 lbs. (5.9 Kg)

Electrical

Voltage: 100 - 240 volts AC 50/60 Hz
Input Power: 50-75 VA
Fuses: Time-Lag (2.5A, 250V), 5 x 20mm, RoHS

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%
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.

Expected Service Life

The expected service life for this instrument is 7 years.

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 is shown on the splash screen at start up. Users can also contact Reichert for the software revision. The serial number identifies the manufacture date and will be used to identify the software version.

Specifications

Classifications

The ClearChart 4P 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 4P is classified as IPX0 Equipment. IPX0 equipment is equipment enclosed without protection against ingress of water.

According to the mode of operation, the ClearChart 4P is a continuous operation instrument.

The ClearChart 4P does not have any essential performance functions. There is no risk to patient or operator due to a failure.

Guidance Tables

Guidance and Manufacturer's Declaration – Electromagnetic Emissions
Professional Healthcare Facility Environment

Electromagnetic Emissions

All Medical Electrical Equipment and Medical Electrical Systems

The Clearchart 4P is intended for use in the electromagnetic environment specified below. The customer or user of the Clearchart 4P should ensure that it is used in such an environment.

EMISSIONS TEST	COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT - GUIDANCE -
Conducted and Radiated RF Emissions CISPR 11	Group 1	Clearchart 4P 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.
Conducted and Radiated RF Emissions CISPR 11	Class A	Clearchart 4P 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.*
Harmonic Distortion IEC 61000-3-2	Class A	
Voltage Fluctuations and Flicker IEC 61000-3-3	Complies	

Note: *The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

Guidance Tables

Guidance and Manufacturer's Declaration – Electromagnetic Immunity
Professional Healthcare Facility Environment

Electromagnetic Immunity

All Medical Electrical Equipment and Medical Electrical Systems

The Clearchart 4P is suitable for use in electromagnetic environment specified below.
The customer or user of Clearchart 4P should ensure that it is used in such an environment.

IMMUNITY TEST	IEC 60601-1-2 TEST LEVEL	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT - GUIDANCE -
Electrostatic Discharge IEC 61000-4-2	±2kV, ±4kV, ±8kV Contact ±2kV, ±4kV, ±8kV, ±15kV Air	±2kV, ±4kV, ±8kV Contact ±2kV, ±4kV, ±8kV, ±15kV Air	Floors should be wood, concrete, or ceramic tile. If floors are synthetic, the R/H should be at least 30%.
Electrical Fast Transients/Bursts IEC 61000-4-4	±0.5kV, ±1kV, ±2kV Mains Power Lines ±0.5kV, ±1.0kV I/O Lines 100 kHz repetition frequency	±0.5kV, ±1kV, ±2kV Mains Power Lines ±0.5kV, ±1.0kV I/O Lines 100 kHz repetition frequency	Mains power quality should be that of a typical residential, commercial or hospital environment.
Surges IEC 61000-4-5	±0.5kV, ±1.0kV Line-to-line ±0.5kV, ±1.0kV, ±2.0kV Line-to-ground	±0.5kV, ±1.0kV Differential Mode ±0.5kV, ±1.0kV, ±2.0kV Common Mode	Mains power quality should be that of a typical residential, commercial or hospital environment.
Voltage Dips IEC 61000-4-11	<5% Ut, 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	<5% Ut, 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	Mains power quality should be that of a typical residential, commercial or hospital environment. If the user of the Clearchart 4P requires continued operation during power mains interruptions, it is recommended that the Clearchart 4P be powered from an uninterruptible power supply or battery.
	0% Ut, 1.0 cycle 70% Ut, 25/30 cycles for 50 Hz and 60 Hz respectively Single phase: at 0°	0% Ut, 1.0 cycle 70% Ut, 25/30 cycles for 50 Hz and 60 Hz respectively Single phase: at 0°	
Voltage Interruptions IEC 61000-4-11	<5% Ut, 250/300 cycles for 50 and 60 Hz, respectively Single phase: at 0°	<5% Ut, 250/300 cycles for 50 and 60 Hz, respectively Single phase: at 0°	
Power Frequency 50/60Hz Magnetic Field IEC 61000-4-8	30A/m 50 Hz or 60 Hz	30A/m 50 Hz or 60 Hz	Power frequency magnetic fields should be that of a typical residential, commercial or hospital environment.

Guidance Tables

Guidance and Manufacturer's Declaration – Electromagnetic Immunity
Professional Healthcare Facility Environment

Electromagnetic Immunity

All Medical Electrical Equipment and Medical Electrical Systems

The Clearchart 4P is suitable for use in electromagnetic environment specified below.
The customer or user of Clearchart 4P should ensure that it is used in such an environment.

IMMUNITY TEST	IEC 60601-1-2 TEST LEVEL	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT - GUIDANCE -
Conducted disturbances induced by RF fields IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz 6 Vrms in ISM bands between 150 kHz and 80 MHz 80% AM at 1 kHz	(V1) = 3 Vrms 150 kHz to 80 MHz (V2) = 6 Vrms in ISM bands between 150 kHz and 80 MHz 80% AM at 1 kHz	Portable and mobile RF communications equipment should be no closer to any part of the Clearchart 4P, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance: $d = 3.5/V1(\sqrt{P})$ 150kHz to 80 MHz $d = (10/3)(3.5)/V2(\sqrt{P})$ 150kHz to 80 MHz in ISM bands $d = 3.5/E1(\sqrt{P})$ 80 to 800 MHz $d = 7/E1(\sqrt{P})$ 800 MHz to 2.7 GHz $d = 12/E2(\sqrt{P})$ 80 MHz to 800 MHz $d = 23/E2(\sqrt{P})$ 800 MHz to 2.7 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 Electromagnetic Fields IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	(E1) = 3 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	
	10 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	(E2) = 10 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	

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.
*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 may be necessary, such as reorienting 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.
*The ISM (industrial, scientific and medical) bands between 0.15 MHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40.66 MHz to 40.70 MHz. The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz to 2.0 MHz, 3.5 MHz to 4.0 MHz, 5.3 MHz to 5.4 MHz, 7 MHz to 7.3 MHz, 10.1 MHz to 10.15 MHz, 14 MHz to 14.2 MHz, 18.07 MHz to 18.17 MHz, 21.0 MHz to 21.4 MHz, 24.89 MHz to 24.99 MHz, 28.0 MHz, to 29.7 MHz and 50.0 MHz to 54.0 MHz.

Guidance Tables

Guidance and Manufacturer's Declaration – Electromagnetic Immunity
Professional Healthcare Facility Environment

Recommended Separation Distances between
Portable and Mobile RF Communications Equipment from Medical Electrical Equipment and Medical Electrical Systems

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the Clearchart 4P

The Clearchart 4P is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the Clearchart 4P can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and Clearchart 4P as recommended below, according to the maximum output power of the communications equipment.

Max Output Power of Transmitter (W)	Separation (m) 150 kHz to 80 MHz Outside ISM Bands d = 1.2(√P)	Separation (m) 150 kHz to 80 MHz In ISM Bands d =1.9444(√P)	Separation (m) 80 to 800 MHz d = 1.2(√P)	Separation (m) 800 MHz to 2.7 GHz d = 2.3(√P)
0.01	0.1166	0.1944	0.1166	0.2333
0.1	0.3689	0.6149	0.3689	0.7378
1	1.1666	1.1944	1.1666	2.3333
10	3.6893	6.1489	3.6893	7.3786
100	11.6666	19.4444	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.

Note 3: The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.7 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 has been incorporated into the formula used in calculating the recommended separation distance for transmitters in these frequency ranges.

Guidance Tables

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

Professional Healthcare Facility Environment

Electromagnetic Immunity

Immunity to Proximity Fields from RF Wireless Communications Equipment

The Clearchart 4P is intended for use in the electromagnetic environment as specified below related to proximity fields from RF wireless communications equipment.

Immunity Test	Table 9 IEC 60601-1-2 Test Level							Compliance Level	Electromagnetic Environment - Guidance
	Test Frequency (MHz)	Band (MHz)	Service (MHz)	Modulation	Maximum Power (W)	Distance (m)	Immunity Test Level (V/m)	Compliance Level	
Radiated RF IEC 61000-4-3	385	380-390	TETRA 400	Pulse Modulation 18 Hz	1.8	0.3	27	27 V/m	d = 6/E√P where d = Minimum separation distance in meters E = Immunity test level in V/m P = Maximum power in Watts (W)
	450	430-470	GMRS 460, FRS 460	FM ±5 kHz deviation 1 kHs sine	2	0.3	28	28 V/m	
	710	704-787	LTE Band 13, 17	Pulse Modulation 217 Hz	0.2	0.3	9	9 V/m	
	745								
	780								
	810	800-960	GSM 800/900; TETRA 800; iDEN 820; CDMA 850; LTE Band 5	Pulse Modulation 18 Hz	2	0.3	28	28 V/m	
	870								
	930								
	1720	1700-1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse Modulation 217 Hz	2	0.3	28	28 V/m	
	1845								
	1970								
	2450	2400-2570	Bluetooth WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse Modulation 217 Hz	2	0.3	28	28 V/m	
	5240	5100-5800	WLAN 802.11 a/n	Pulse Modulation 217 Hz	0.2	0.3	9	9 V/m	
	5500								
	5785								

Guidance Tables

Guidance and Manufacturer's Declaration – Electromagnetic Immunity
Professional Healthcare Facility Environment

Electromagnetic Immunity

Immunity to Proximity Magnetic Fields in the Frequency Range of 9 kHz to 13,56 MHz

The Clearchart 4P is intended for use in the electromagnetic environment as specified below related to proximity magnetic fields.

IMMUNITY TEST	IEC 60601-1-2 TEST LEVEL			COMPLIANCE LEVEL
Radiated Magnetic Fields IEC 61000-4-39	Test Frequency	Modulation	Immunity Test Level (A/m)	Compliance Level
	30 kHz [a]	CW	8	N/A
	134,2 kHz	Pulse Modulation [b] 2,1 kHz	65 [c]	65 A/m
	13,56 MHz	Pulse Modulation [b] 50 kHz	7,5 [c]	7,5 A/m

a) This test is applicable only to ME EQUIPMENT and ME SYSTEMS intended for use in HOME HEALTHCARE ENVIRONMENT.

b) The carrier shall be modulated using a 50% duty cycle square wave signal.

c) r.m.s, before modulation is applied.

Wireless Communication Integration

The ClearChart 4P has the ability to work with two types of RF transmitters with the following specifications and characteristic:

Configuration	USB Module
Protocol	Bluetooth
Frequency Band	2.4 - 2.4835 GHz ISM Band
Modulation Method	GFSK for 1Mbps, π/4-DQPSK for 2Mpbs, 8-DPSK (EDR Mode)
Channel Access Protocol	FHSS (Frequency Hopping Spread Spectrum)
RF Output Power	Class 1 (+8 dBm typical) up to +20dBm

Configuration	RS-232 Module
Protocol	Bluetooth
Frequency Band	2.4020 - 2.4800 GHz
Modulation Method	GFSK (Basic Mode), π/4-DQPSK, 8-DPSK (EDR Mode)
Channel Access Protocol	FHSS (Frequency Hopping Spread Spectrum)
RF Output Power	Class 1 (+18 dBm typical) up to +20dBm

Care must be taken when using other equipment operating under the same frequency band above or any other RF band. The ClearChart 4P may affect or be affected by other equipment while operating in wireless mode. Therefore, if the ClearChart 4P affects or is affected by other equipment, proper separation may be required by relocating or re-orienting the equipment.



Generates non-ionizing radiation.
May be affected by non-ionizing radiation.

Appendix A

Instrument Cables

WARNING: ANY NON-MEDICAL ELECTRICAL EQUIPMENT USED WITH THE CLEARCHART 4P MUST BE COMPLIANT WITH AN APPLICABLE IEC OR ISO SAFETY STANDARD.

Cable Reference	Length	Description
16200-440	11m / 35ft	DB9 M/F Null Modem Cable (shielded)
Any	<15m / 49 ft (2500 pF MAX Capacitance)	DB9 M/F Null Modem Cable (shielded)

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 three 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.

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.

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