Phoroptor® VRx
Digital Refraction System

User's Guide

AMETEK®
ULTRA PRECISION TECHNOLOGIES

Reichert®
TECHNOLOGIES

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

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Warnings and Cautions

Reichert Technologies® (Reichert®) is not responsible for the safety and reliability of this instrument when unauthorized dealers or persons assemble, disassemble, repair, or modify the instrument, or when a person does not use the instrument in accordance with this User's Guide.

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

WARNING: UNITED STATES FEDERAL LAW AND EUROPEAN REGULATIONS REQUIRE THAT ONLY A LICENSED PRACTITIONER OR A PERSON ACTING ON BEHALF OF A LICENSED PRACTITIONER PURCHASE THIS DEVICE.

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

WARNING: DO NOT REPAIR OR SERVICE THIS INSTRUMENT WITHOUT AUTHORIZATION FROM THE MANUFACTURER. EXPERIENCED PERSONNEL OR DEALERS WHO ARE TRAINED BY REICHERT MUST PERFORM ANY REPAIR OR SERVICE TO THIS INSTRUMENT TO PREVENT SERIOUS INJURY TO THE OPERATOR OR PATIENT.

WARNING: NO PERSON IS ALLOWED TO MODIFY THIS INSTRUMENT. REICHERT MUST AUTHORIZE ANY MODIFICATION TO THIS UNIT TO ENSURE CORRECT OPERATION.

WARNING: IF ANY PERSON MODIFIES THIS INSTRUMENT, REICHERT MUST CONDUCT INSPECTION AND TESTING OF THE INSTRUMENT TO ENSURE ITS CONTINUED SAFE USE.

WARNING: CONNECT THIS EQUIPMENT ONLY TO A SUPPLY MAINS WITH PROTECTIVE EARTH TO AVOID THE RISK OF ELECTRIC SHOCK AND TO PREVENT DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: APPLY RATED INPUT VOLTAGE TO THE UNIT AS INDICATED ON THE DATA PLATE TO PREVENT DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: ONLY PLUG THE INSTRUMENT INTO AN OUTLET WITH AN EARTH GROUND. DO NOT REMOVE OR DEFEAT THE INSTRUMENT'S EARTH GROUND CONNECTION ON THE POWER INPUT CONNECTOR OR THE UNIT'S POWER CORD, OR YOU COULD CAUSE DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: DO NOT USE THE EQUIPMENT OR SYSTEM ADJACENT TO OR STACKED WITH OTHER EQUIPMENT. IF YOU NEED TO USE ADJACENT OR STACKED EQUIPMENT, OBSERVE THE EQUIPMENT OR SYSTEM TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH YOU USE IT.

WARNING: RISK OF ELECTRIC SHOCK OR FIRE. THIS DEVICE IS NOT INTENDED TO BE USED WITH LIQUIDS. DO NOT PLACE OR USE OPEN LIQUID CONTAINERS NEAR THE DEVICE, DUE TO THE RISK OF SPILLAGE OF LIQUID ONTO THE DEVICE.

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

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, MIGHT RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

Warnings and Cautions (continued)

WARNING: PRIOR TO INSTALLING THE PHOROPTOR HEAD ONTO THE STAND ARM, VERIFY THAT THE ROD ON THE STAND ARM IS SECURE BEFORE ATTEMPTING TO INSTALL THE PHOROPTOR HEAD OR YOU MIGHT DAMAGE THE UNIT AND/OR INJURE THE PATIENT.

WARNING: OTHER ELECTRICAL OR ELECTRONIC EQUIPMENT CAN INTERFERE WITH THE BLUETOOTH WIRELESS CONNECTION TRANSMITTERS OR RECEIVERS, EVEN IF THAT EQUIPMENT ALSO COMPLIES WITH CISPR EMISSIONS REQUIREMENTS.

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

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

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT TO ENSURE THAT YOU DO NOT DAMAGE THE UNIT. SEE THE MAINTENANCE SECTION OF THIS GUIDE FOR DETAILED CLEANING INSTRUCTIONS.

CAUTION: DO NOT USE AMMONIA-BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) TO ENSURE THAT YOU DO NOT DAMAGE THE DISPLAY. SEE THE MAINTENANCE SECTION OF THIS GUIDE FOR DETAILED CLEANING INSTRUCTIONS.

CAUTION: MEDICAL ELECTRONIC EQUIPMENT REQUIRES SPECIAL PRECAUTIONS REGARDING EMC AND IT 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.

CAUTION: DO NOT USE THIS INSTRUMENT NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

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

CAUTION: DO NOT INSTALL ANY ADDITIONAL SOFTWARE OTHER THAN WHAT IS SUPPLIED WITH THIS INSTRUMENT. IF YOU INSTALL ADDITIONAL SOFTWARE, IT MIGHT CAUSE UNEXPECTED OPERATION, RESULTING IN INSTRUMENT MALFUNCTION.

CAUTION: YOU MUST PLUG THIS INSTRUMENT INTO AN OUTLET WITH AN EARTH GROUND THAT IS CONNECTED TO THE RECEPTACLE TO PREVENT DAMAGE TO THE UNIT. DO NOT DISABLE OR REMOVE THE GROUND PIN.

CAUTION: INGRESS PROTECTION CLASSIFICATION FOR THE PHOROPTOR HEAD IS IP2X, WHILE THE CONTROLLER, AND CENTRAL UNIT ARE IP3X. DO NOT SPRAY, SPLASH, OR IMMERSE THESE INSTRUMENTS IN CLEANING SOLUTIONS.

Symbol Information

The following symbols appear on the instrument.


Consult Instructions for Use symbol indicating important operating and maintenance instructions included in this User's Guide


Caution symbol indicating important information and maintenance instructions included in this User's Guide


Type B Product Classification


Protective Earth


Alternating Current Power


ON / OFF

Date of Manufacture

Catalog Number

Serial Number

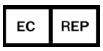

Waste of Electrical and Electronic Equipment


Compliance to Medical Device Directive 93/42/EEC


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


Fragile Contents in Shipping Container - handle with care


Keep Dry - Keep package away from rain



Authorized Representative in European Community


Unplug before opening

Introduction

Congratulations on your purchase of the Reichert Technologies (hereafter referred to as Reichert) Phoroptor® VRx.

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. Only properly trained eye care professionals, such as ophthalmologists, optometrists, opticians, and eye care technicians should operate this instrument. All parts of this Medical Electrical system are suitable for use within the patient environment.

Please retain this guide for future reference and to share with other users. For additional copies of this manual or questions related to the Phoroptor VRx, contact your local authorized Reichert dealer, or contact our Customer Service department directly:

Tel: 716-686-4500
Fax: 716-686-4555
Email: reichert.information@ametek.com

Indications for Use

The digital refractor Phoroptor VRx is designed for:

- Subjective measurement of the refractive error of the eye.
- Determination of correction data for refraction anomalies and binocular functions as the basis for manufacturing eyeglasses and contact lenses.
- Use in refraction rooms in clinics and practices of physicians, optometrists, or opticians.
- Connection to other medical examination equipment or to an office Electronic Medical Records (EMR) system.
- Operation by physicians, optometrists, opticians, or properly trained clinical personnel.
- Installation under the conditions for medical equipment.
- The digital refractor Phoroptor VRx with Prism is additionally designed for:
    - Measurement of ocular deviation in patients with latent or manifest strabismus.

Contra-Indications

- There are none associated with the Phoroptor VRx system.

Unpacking Instructions

Great care is taken to deliver your Phoroptor VRx to you intact. Please read this User's Guide before operating the unit.

We package the instrument in shipping containers to protect the instrument from damage during shipping. Please carefully remove the Phoroptor Head, Controller, Central Unit, and Accessories Box from the packaging material.

Note: Please retain the original packaging and use it if future transportation of the instrument is required.

The main components of the Phoroptor VRx are packed in two separate boxes. The first box contains the Phoroptor Head and Reading Rod, and the second box contains the Central Unit, Controller, and Accessories Box.

1. Open the first box, containing the Phoroptor Head and Reading Rod.
2. Remove the top foam layer.
3. Remove the Reading Rod. (Please refer to Figure IS-01.)

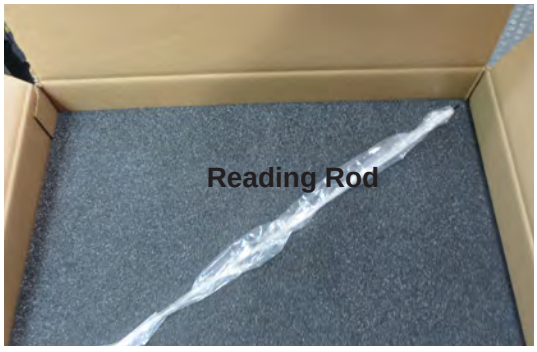


Figure IS-01, Top Foam Layer

4. Remove the second foam layer.
5. Remove the Phoroptor Head (wrapped in plastic) from the box. (Please refer to Figure IS-02.)

Figure IS-02, Packaging - Phoroptor Head

6. Remove the plastic wrapping from the Phoroptor Head, carefully placing the Phoroptor Head aside with the patient side down.
7. Open the second box, containing the Central Unit, Controller, and Accessories Box.

Unpacking Instructions (continued)

8. Remove the white cardboard Accessories Box. (Please refer to **Figure IS-03.**)

Figure IS-03, Packaging - Accessories Box

Note: The Accessories Box includes a power cord, cable for the Phoroptor Head, Bluetooth antenna for the Central Unit, near vision card and illuminator, face shields, dust covers for the Phoroptor Head and Controller, and User's Guide.

9. Remove the Controller (wrapped in plastic) from the box. (Please refer to Figure IS-04.)

Figure IS-04, Packaging - Controller

10. Remove the plastic wrapping from the Controller.
11. Remove the Central Unit (packed in foam) from the box. (Please refer to Figure IS-05.)

Figure IS-05, Packaging - Central Unit

Note: If any of the above accessories or parts are missing, immediately contact Reichert so we can ship the missing accessories or parts.

Parts Identification

One of the following Phoroptor VRx Systems is in the shipping container, depending on the system specifications you ordered:

Description – System Catalog Number			REF
Phoroptor VRx, Middle Mount			16241
Includes	•	Phoroptor VRx Head Assembly	16212
	•	Central Unit	16219
	•	Controller	16217
Phoroptor VRx with Prism, Middle Mount			16242
Includes	•	Phoroptor VRx with Prism Head Assembly	16213
	•	Central Unit	16219
	•	Controller	16217

The following are included in all Phoroptor VRx Systems:

Item	REF
Dust Cover – Phoroptor Head	559-153
Dust Cover – Controller	16217-029
Phoroptor Cable	559-275
User's Guide	16241-101
USB Derive with Instructional Video	16212-107
Power Cord 115V or	WCBL10018
Power Cord 230V	WCBL10027
Card Beam Assembly	11636-860
Near Bright Illuminator Kit	16200-869
Face Shield Kit (2 sets)	16200-835
Quick Reference Card	16212-105
Bluetooth Adapter	13779

Optional Accessories

The following optional accessories are available for use with the Phoroptor VRx System:

Item	REF
Decimal Near Vision Kit	16237
Snellen Near Vision Kit	16236
Thermal Printer	16230
Extension Cable (15ft), VRx Head or Controller	16213-432
Extension Cable (25ft), VRx Head or Controller	16213-433
Cables and Bluetooth Dongle Kits - for connecting auxiliary equipment	Appendix A

Parts Identification (continued)

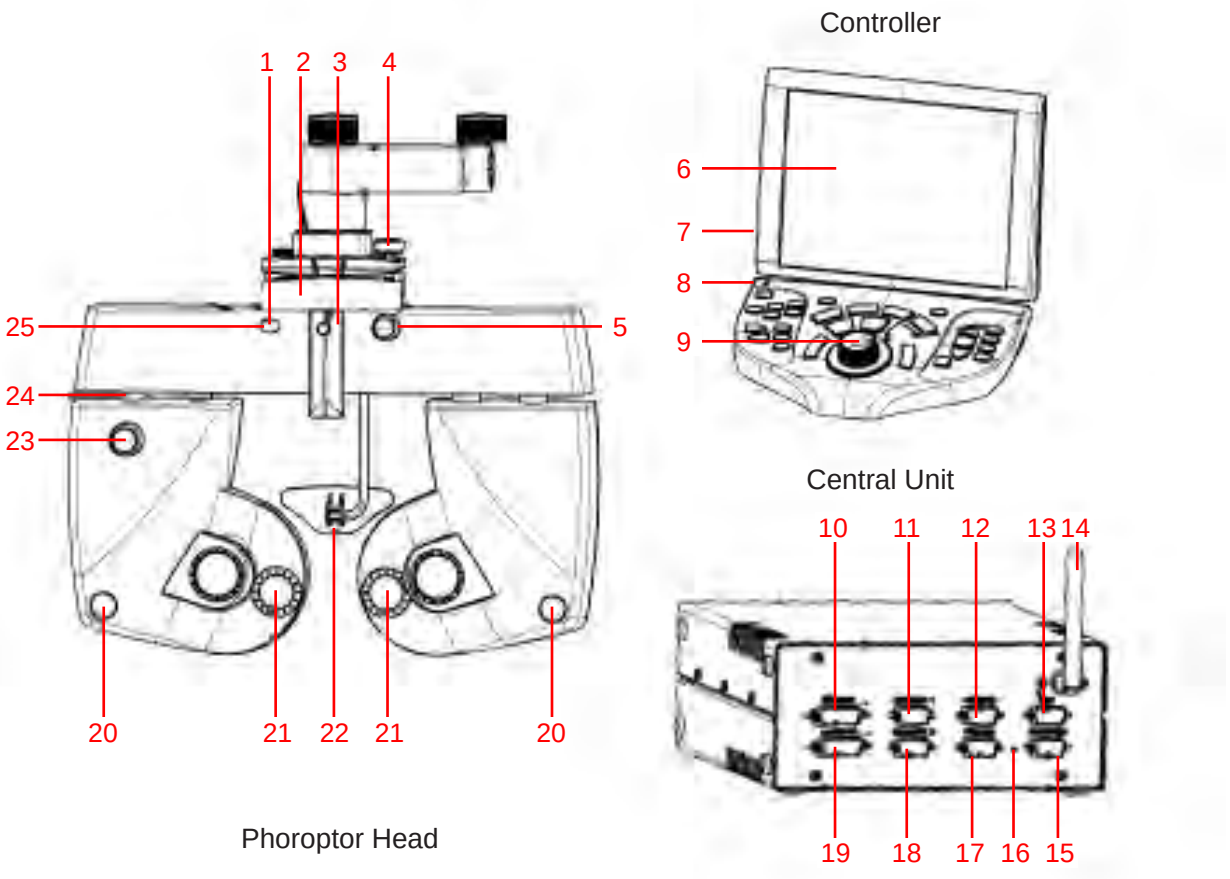


Figure IS-06, Parts Identification

1. Illuminated Bubble Level
2. Convergence Lever
3. Threaded Pin for Near Vision Rod
4. Leveling Thumb Screw
5. Forehead Rest Adjustment Knob
6. Touch Screen Display
7. USB Port
8. Power Indicator Light
9. Control Knob
10. Phoroptor Connection Port
11. Instrument 1 Connection Port for connecting auxiliary equipment
12. Projector Connection Port
13. EMR Port for connecting to a computer
14. Wireless Antenna
15. Transfer Port
16. Power Indicator Light
17. Printer Connection Port
18. Instrument 2 Connection Port for connecting auxiliary equipment
19. Controller Connection Port
20. Target Device Corneal Vertex Distance
21. Lens Apertures
22. Forehead Rest
23. Height Adjustment Knob
24. Mid Position Height Marking
25. Power Indicator Light

Setup

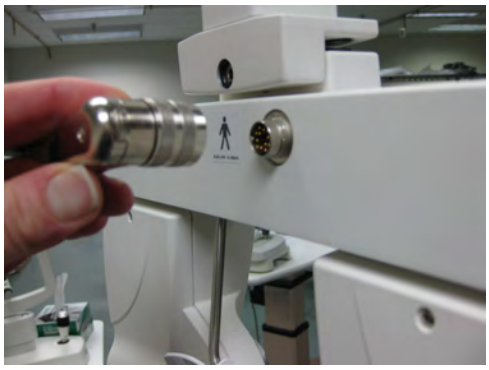
Connecting the Phoroptor VRx System Components

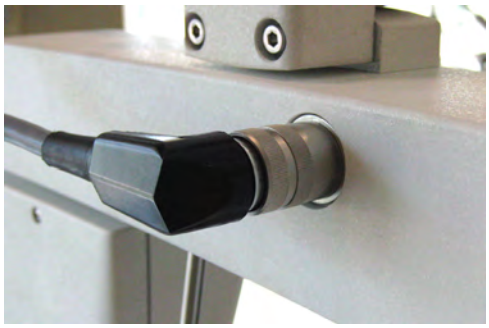
WARNING: APPLY RATED INPUT VOLTAGE TO THE UNIT AS INDICATED ON THE DATA PLATE TO PREVENT DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: CAREFULLY ARRANGE THE CABLES FOR THE UNIT AND ACCESSORIES, SO THE CABLES DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT.

WARNING: POSITION THIS INSTRUMENT SO THE PLUG IS EASILY ACCESSIBLE.

WARNING: DO NOT PLUG IN THE UNIT UNTIL THE COMPUTER SYSTEM IS SETUP.





1. Connect the Phoroptor Cable (**REF 559-275**) to the Phoroptor Head by aligning the cable to the Pins in the Phoroptor Head and securely attaching the Cable. (Please refer to the picture at the top right.)
2. Secure the metal Collar on the Phoroptor Cable by turning it clockwise, until the cord is fully secured and properly seated to the back of the Phoroptor Head. (Please refer to the picture at the bottom right.)
3. Connect the Phoroptor head to the Central Unit by attaching the Phoroptor Cable (**REF 559-275**) to the Phoroptor port in the Central Unit. (Please refer to Figure IS-07**.**)
4. Connect the Controller to the Central Unit by attaching the built-in cable to the Controller port in the Central Unit. (Please refer to Figure IS-07**.**)
5. Connect the Projector to the Central Unit by attaching the cable or pairing a Bluetooth adapter to the projector port in the Central Unit. (Please refer to Figure IS-07**.**)
6. Connect a computer to the Central Unit by attaching the cable or pairing a Bluetooth adapter to the EMR port in the Central Unit. (Please refer to Figure IS-07**.**)
7. Connect Lensmeters or Auto Refractors to the Central Unit by attaching the cable or pairing a Bluetooth adapter to the Instrument 1 or Instrument 2 port in the Central Unit, as needed.

   Note: The instrument includes connection cables for the Phoroptor Head and the Controller. You must purchase separately all connection cables or Bluetooth adapters for connecting Lensmeters, Auto Refractors, projectors, and computers.
8. Plug in the power cord to an outlet providing appropriate voltage.
9. Connect the Phoroptor VRx to another Phoroptor VRx through the Transfer port to send data from one device to another. You can make the connection using the appropriate serial cable or Bluetooth adapter.

Setup (continued)

Please refer to the Connection Diagram in Figure IS-07 for plug and cable layout.

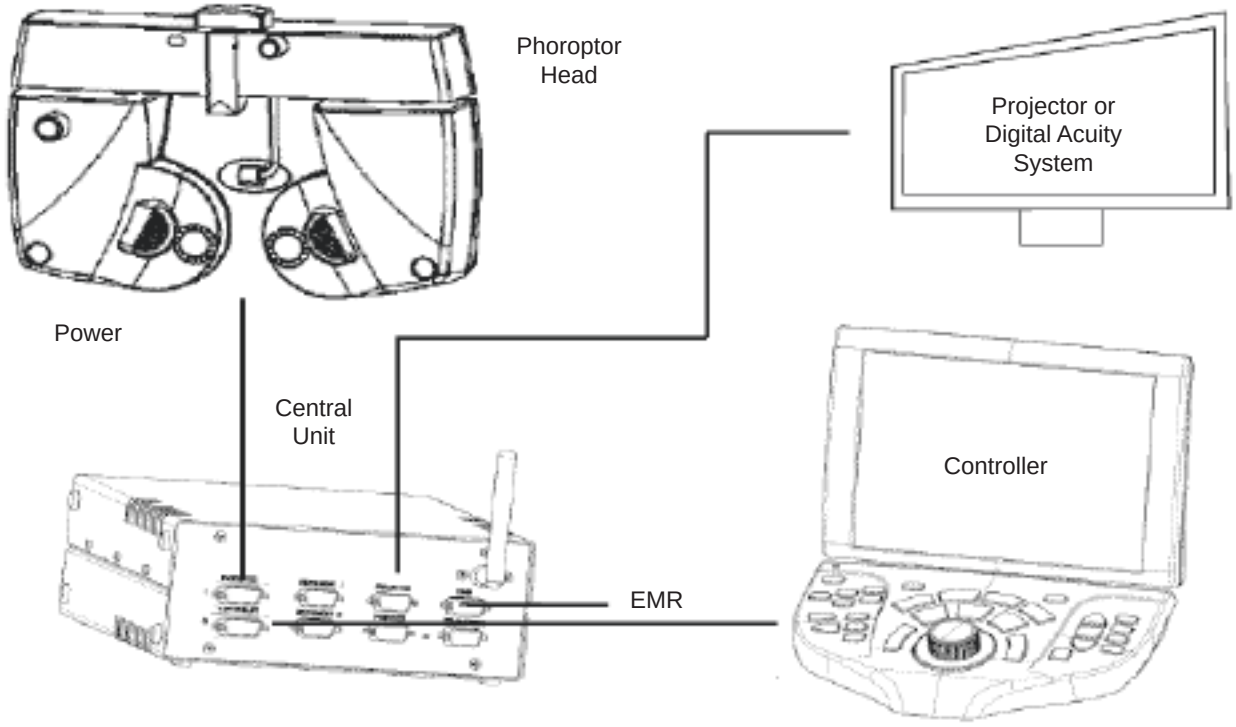


Figure IS-07, Connection Diagram

Setup (continued)

Leveling the Phoroptor Head

After you install the Phoroptor Head onto the stand and connect all the wires, check to see if the Phoroptor Head requires leveling. If the Phoroptor Head is not level, adjust it by rotating the Thumb Screw on the top of the Phoroptor Head.

1. Check the bubble inside the Level on the Phoroptor Head.

   Note: The Level is illuminated when the Phoroptor Head is powered on, enabling you to see the bubble more clearly. (Please refer to Figure IS-08.)

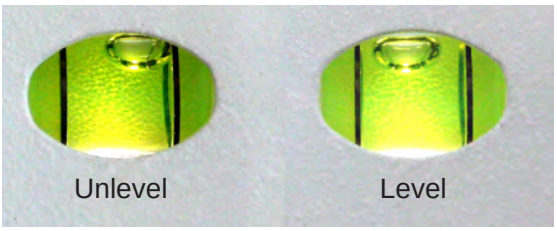


Figure IS-08, Level

2. Turn the Thumb Screw slowly clockwise or counterclockwise to adjust the level of the Phoroptor Head, using the illuminated Level on the front of the Phoroptor head.
   (Please refer to Figure IS-09.)

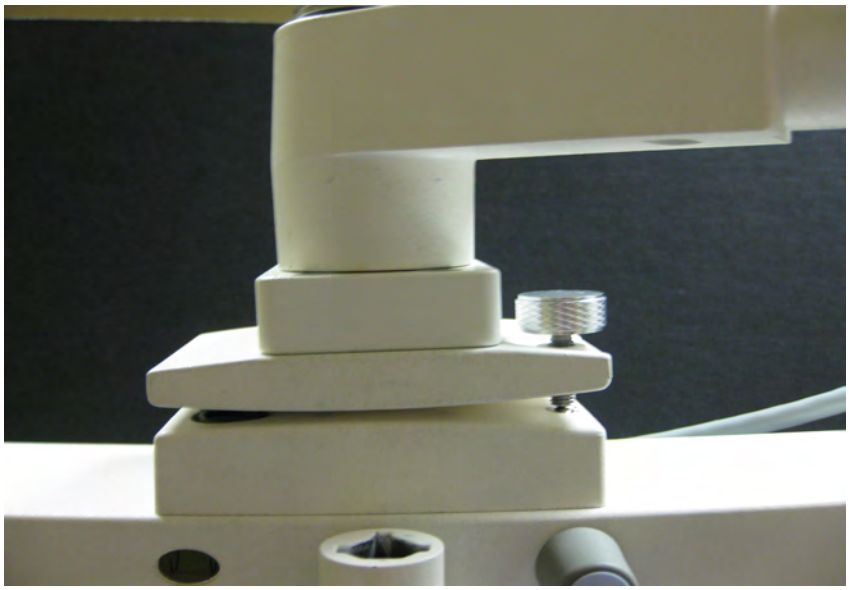


Figure IS-09, Thumb Screw

3. Continue leveling the Phoroptor Head, until the bubble in the Level looks like the “Level” picture at the right side of Figure IS-08.

Setup (continued)

Face Shields

Face shields are provided for the patient side of the Phoroptor VRx Head to help keep the equipment clean. Magnets hold the face shields in place, enabling the user to easily remove, clean, and replace the shields. The Phoroptor VRx comes with two sets of face shields.

Figure IS-10, Face Shield

Setup (continued)

Near Vision Rod and Card

The near vision testing accessories include a rod, reading card, and a card illuminator. The reading card is attached to the card illuminator. Place three AAA batteries provided in the card illuminator. Slide the card illuminator onto the near vision rod and position it at the desired reading distance. Loosen the thumb screw on the convergence lever in the center of the Phoroptor head. Mount the near vision rod in the convergence lever and tighten the thumb screw. The Reading Rod Holder is held in the stored position by a spring clip. The Rod Hinge contains two pins, which engage into the clip when moved to the vertical position. Please exercise caution when moving the Phoroptor head to make sure the rod is not inadvertently lowered (Please refer to Figure IS-11).

The reading card automatically illuminates when the near vision rod is lowered. Reduce the illumination level by pressing the button on the underside of the card illuminator (Please refer to figure IS-12). The card illuminator automatically shuts off when the near vision rod is raised. The card illuminator automatically shuts off after 15 minutes when the rod is lowered.

Figure IS-11, Near Vision Rod and Card Holder

Figure IS-12, Reading Card Illuminated

Turn the Unit On and Off

The ON/OFF switch for the Phoroptor VRx is located on the Central Unit. The entire system (Phoroptor Head and Controller), is connected to the Central Unit and turned ON/OFF from this unit.

The initialization time of the computer in the Phoroptor VRx is approximately 50 seconds. When the Phoroptor Head is turned ON, it automatically starts to check all lenses and settings, cycling through all possible lens changes and moving the Pupillary Distance back and forth to check for any malfunctions.

To shut down the system, set the ON/OFF switch to OFF.

Connect External Devices to the Phoroptor VRx

The basic system setup contains three items programmed to interact with each other: the Phoroptor Head, the Central Unit, and the Controller. The Central Unit directs communication between the Phoroptor Head, Controller, and other external devices, while the Controller acts as the user interface and controls the Phoroptor Head and the Input/Output of data.

The Phoroptor VRx is also designed to communicate with acuity systems, available from Reichert and a few other manufacturers. These acuity systems are configured to communicate with the Phoroptor VRx. (Please refer to **Appendix A** for a complete list of acuity systems that interface with the Phoroptor VRx.)

Note: Ensure that the device with which you are interfacing is compatible with the Phoroptor VRx. (Please refer to **Appendix A** for a list of external devices that connect to the Phoroptor VRx.)

External devices, including digital acuity systems, projectors, Lensmeters, Auto Refractors, printers, and computers are connected using serial cables or Bluetooth wireless serial adapters. (Please refer to **Appendix A** for a complete list of external devices and necessary connection cables or Bluetooth dongle kits to communicate with the Phoroptor VRx.)

External devices are also connected using Bluetooth wireless serial adapters. (Please refer to **Appendix A** for a complete list of Bluetooth dongle kits for connecting different external devices to the Phoroptor VRx.)

The following instructions describe how to connect external devices to the Phoroptor VRx Central Unit using Bluetooth wireless serial adapters.

Connect External Devices with Reichert Wireless Serial Adapters

Bluetooth Dongle

Reichert designed a proprietary Bluetooth serial adapter to connect external devices to the Phoroptor VRx. In order to establish wireless communications between the Phoroptor VRx and an external device, you must first configure the Reichert Bluetooth dongle for a specific Central Unit port (*e.g.,* Projector, EMR, Instrument #1) and program the adapter with the serial communications parameters (baud rate, data bits, parity, stop bits) required by the external device.

Perform these steps to configure a Bluetooth dongle for communication with an external device using a specific Central Unit port:

1. Turn on the Phoroptor VRx.
2. Touch **OPTIONS/SETUP MENU** on the Controller screen, located at the top right of the screen.
3. Touch **PORTS** on the Settings screen.
4. In the Port Selection panel, select the port that you would like to configure (e.g., Instrument 1, Instrument 2, etc).
5. On the Port Settings panel, select the device you are connecting to from the drop-down menu.
6. Set the Connection Type to Bluetooth (Dongle) for the wireless connection.

Note: if using a wired cable refer to Setting-Up a Port for Communication with an External Device section in this manual.

7. If necessary, set the serial communication parameters to match the settings on the device you are connecting to.
8. Provide power to the Bluetooth dongle using the power adapter provided. (Please refer to Figure IS-13.) The LED light should illuminate green.
9. Press and hold the Bluetooth dongle's reset switch, using an appropriate object (e.g., paperclip) until the green LED goes out (approximately two seconds). The LED should now blink at a slow rate (once every 2 seconds).

Note: The reset switch is accessed via the small hole located on the antenna end of the Bluetooth dongle.

10. Connect the Bluetooth dongle to the appropriate Central Unit port, using the provided null modem serial cable. (Please refer to Figure IS-13.)

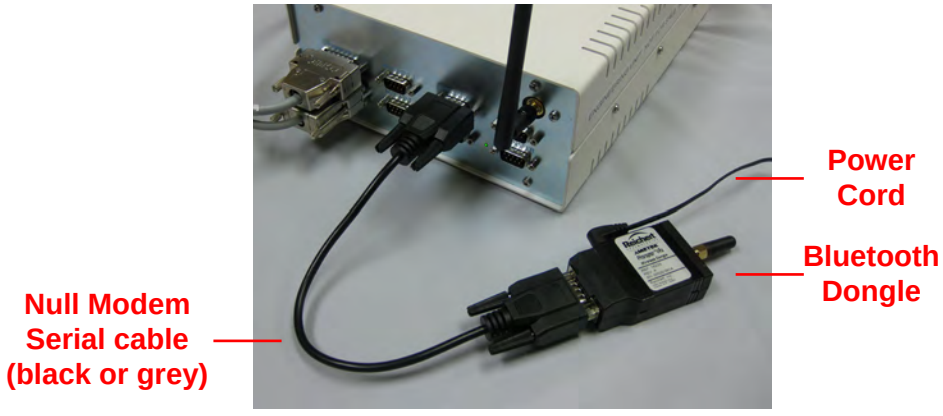


Figure IS-13, Bluetooth Dongle to Central Unit

Connect External Devices with Reichert Wireless Serial Adapters (continued)

11. On the Port Settings panel tap the Pair button.
12. The LED indicator on the Bluetooth dongle will first blink about once every second. Once the connection has been established, the LED indicator will remain on constantly.

Note If the connection was successfully paired, the word “Connected” will be shown in the upper right corner of the panel. If “Failed” appears, then refer to the previous steps starting with providing power to the Bluetooth.

13. Remove power from the Bluetooth dongle and disconnect it from the Central Unit.
14. Connect the Bluetooth dongle to the external device’s serial port and then provide power using the required adapter or cable.
15. The LED indicator on the Bluetooth dongle will first blink at a rate of once per 0.6 seconds. Once the connection has been established again, the LED indicator will remain on constantly.

Note: At this point the Central Unit and/or the Bluetooth dongle may be powered off and on in any order. The wireless connection will be established automatically once both devices are powered on.

CAUTION: DO NOT TOUCH THE PAIR BUTTON AGAIN. IF THE PAIR BUTTON IS ACTIVATED, IT WILL BE NECESSARY TO REPEAT THE ABOVE PROCEDURE TO RE-ESTABLISH THE WIRELESS CONNECTION.

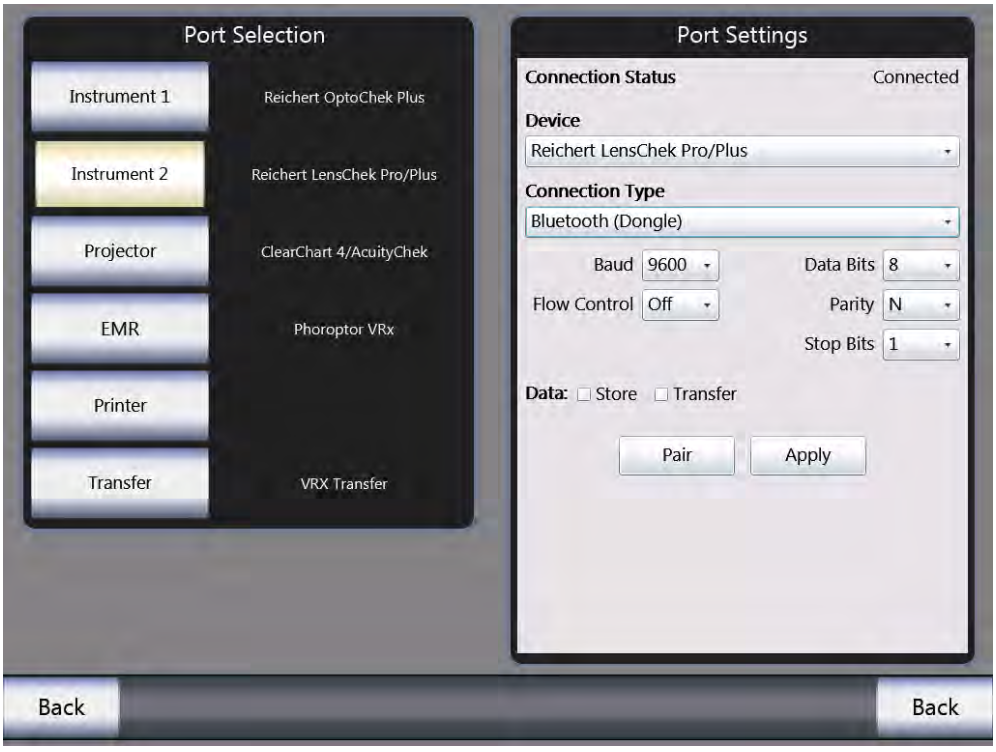


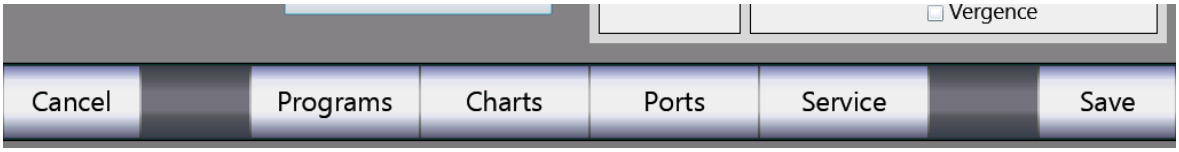
Figure IS-14, Port Settings Screen

Connect External Devices with Reichert Wireless .. (Continued)

ClearChart 4 Bluetooth USB

Reichert has a Bluetooth USB option to connect a ClearChart 4, 4X or 4P to the Phoroptor VRx. In order to establish wireless communications between the Phoroptor VRx and a ClearChart, you must first pair the Projector port to the Bluetooth USB adapter:

1. Turn on the Phoroptor VRx.
2. Touch **OPTIONS/SETUP MENU** on the Controller screen, located at the top right of the screen.



3. Touch **PORTS** on the Settings screen.

Figure IS-14A, Ports

4. In the Port Selection panel, select the Projector port

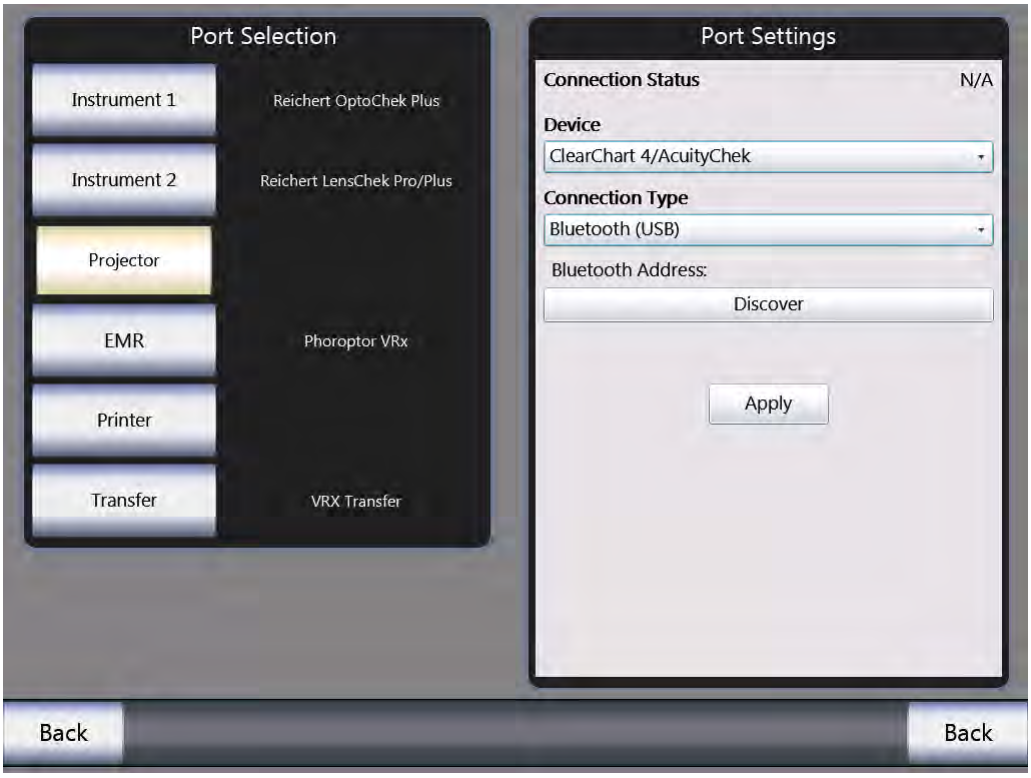


Figure IS-14B, Ports

5. On the Port Settings panel, select the ClearChart model from the drop-down menu.

Note: The Bluetooth USB is only compatible with the ClearChart 4, 4X or 4P.

6. Set the Connection Type to Bluetooth (USB).

ClearChart 4 Bluetooth USB (Continued)

7. Install the Bluetooth USB into the ClearChart. Then power ON the ClearChart.
   Note: The Bluetooth USB must be installed in the Clearchart before the ClearChart is powered ON or the Bluetooth USB will not be paired properly.

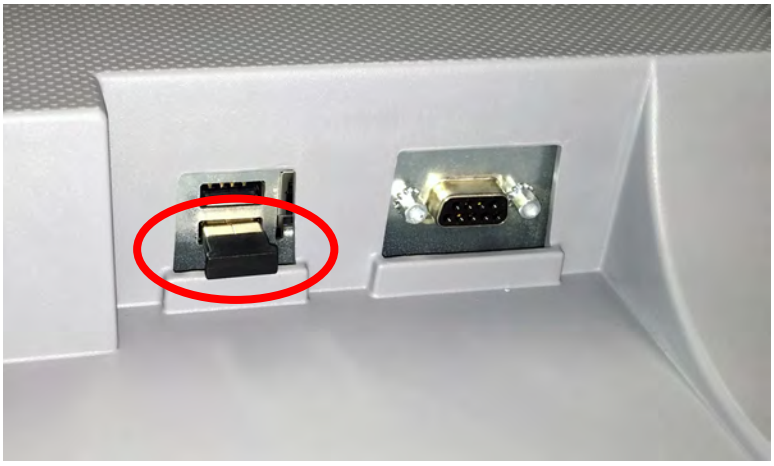


Figure IS-14C, Bluetooth Installed

8. Press the Menu button on the ClearChart remote and view the Bluetooth address in the lower right corner of the ClearChart.

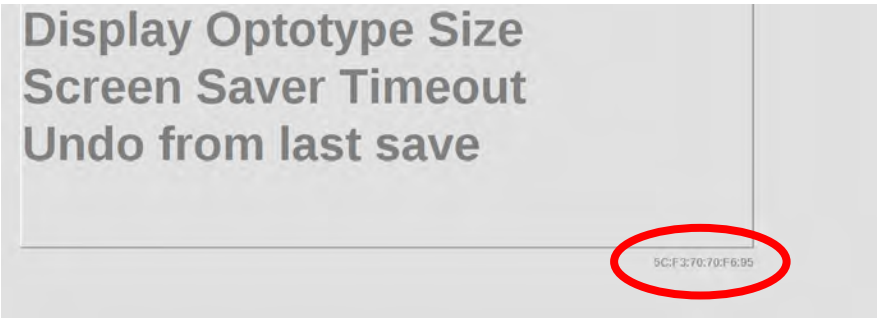


Figure IS-14D, Bluetooth Address

9. On the VRx Port page press the Discover button and then it will search for the bluetooth device.

Note: If the desired Bluetooth USB device is not found, press the “Discover” button again.

10. Once the Bluetooth address is displayed, select the address that matches the address on the ClearChart and click “Pair.” (Clicking on “Apply” is not needed after “Pair” is selected.)
11. If unsuccessful pairing the VRx to the ClearChart, check all the connections and repeat the steps in this section.

Connect ClearChart® 2 or ClearChart® 3 Series to the Phoroptor VRx

Auto Projector Systems are directly connected to the Projector port on the Central Unit using a cable or a wireless Bluetooth dongle, according to the cables specified in **Appendix A**.

Wired communication between the ClearChart 2 or ClearChart 3P and the Phoroptor VRx requires connection of a cable, according to the cables specified in **Appendix A**. The cable connects to the serial port on the ClearChart and the Projector port on the Central Unit.

Wireless communication between the ClearChart 2 or ClearChart 3P and the Phoroptor VRx requires connection of the Bluetooth serial adapter to the serial port on the bottom of the ClearChart 2 or ClearChart 3P, powered by the USB connection on the side of the device or with a separate AC adapter. (Please refer to Figure IS-15.)

Figure IS-15, ClearChart Bluetooth Dongle Mount

The Phoroptor VRx Central Unit communicates through built-in Bluetooth using the antenna at the back of the unit. (Please refer to Figure IS-16.) (Please refer to the instructions in the previous section, **Connecting Auxiliary Equipment with Reichert Wireless Serial Adapters**, to connect devices to the Phoroptor VRx using Bluetooth dongle serial adapters.)

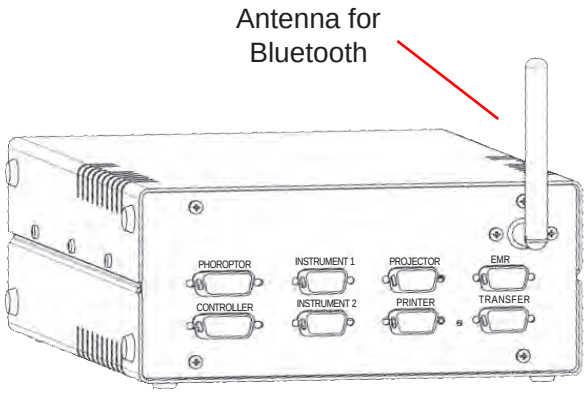


Figure IS-16, Antenna for Bluetooth - Central Unit

Connect Multiple Phoroptor VRx External Devices

1. Connect Lensmeters and Auto Refractors to either of the Instrument ports on the Central Unit using a serial cable designated for use with a specific manufacturer's external device. (Please refer to Appendix A for a list of different manufacturer's external devices that communicate with the Phoroptor VRx and the specifications of serial cables used to connect these devices.)

   Note: Auxiliary external devices can also communicate wirelessly with the Phoroptor VRx. (Please refer to the instructions in the Connecting Auxiliary Equipment with Reichert Wireless Serial Adapters section to connect auxiliary external devices to the Phoroptor VRx using Bluetooth serial adapters.
   (Please refer to Appendix A for a list of Bluetooth dongle connecting kits required to connect specific external devices.)

   Note: Configure the Instrument ports to communicate with specific external devices. (Please refer to the instructions in the **Options/Set-up Menu** section to configure the settings.)

Connecting Multiple Phoroptor VRx Units

Multiple Phoroptor VRx units can be setup to communicate with each other as a means of transferring data from one set of pre-test equipment (Auto Refractor and Lensmeter) to multiple exam rooms.

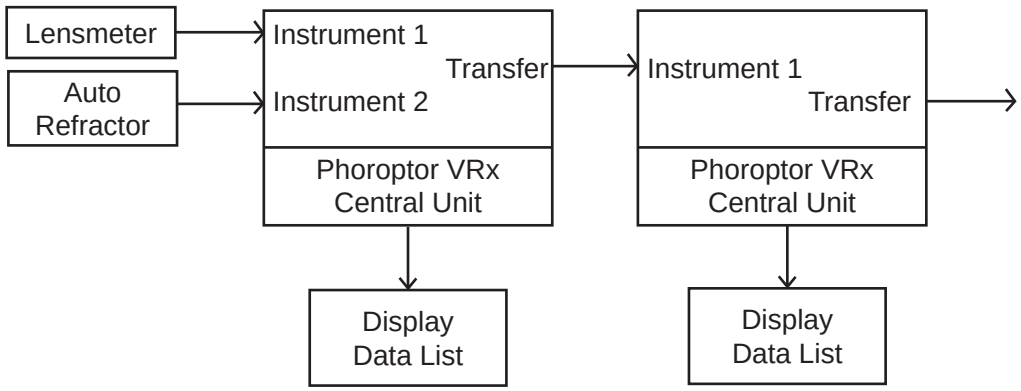


Figure IS-17, Connecting Multiple Units

Connect Multiple Phoroptor VRx External Devices (continued)

1. Setup the Auto Refractor and Lensmeter to communicate with the Phoroptor VRx closest to that location, using wired or wireless connections to the Instrument 1 and Instrument 2 ports.
2. Connect the Central Unit of the first Phoroptor VRx to the Central Unit of the Phoroptor VRx next in line, using a cable or Bluetooth dongle connection, according to the cables specified in **Appendix A**. The Transfer port on the first Phoroptor VRx is the data output port, and the Instrument 1 port on the next Phoroptor VRx receives the data.
3. Continue this process, until you connect all exam rooms with Phoroptor VRx systems. There is no limit to the number of Phoroptor VRx units you can link together.
4. Select the Transfer port of the Port Selection panel. (Refer to Figure IS-14)
5. Set the parameters as per Figure IS-19.

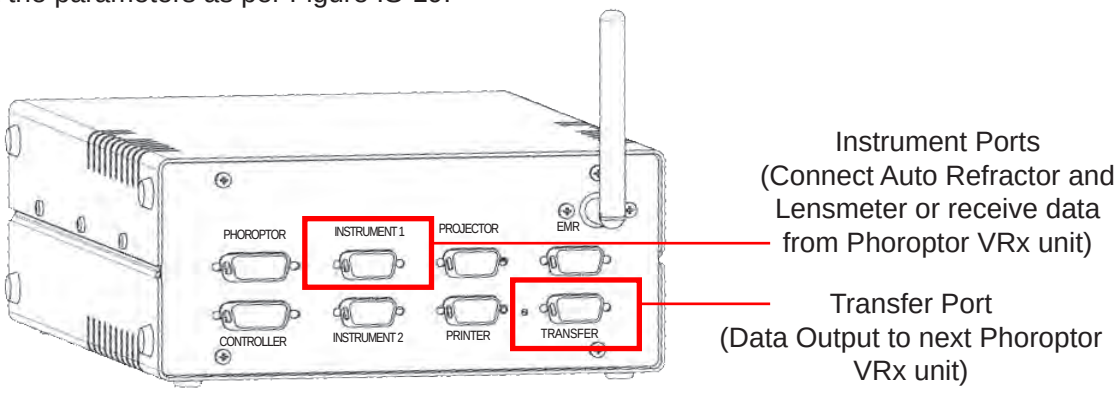


Figure IS-18, Multiple Phoroptor VRx Systems Set-Up

6. Select the Instrument 1 port of the Port Selection panel. (Refer to Figure IS-14.)
7. Set the parameters as per Figure IS-20.

Figure IS-19, Port Setting for Transferring Data from one VRx unit to another

Figure IS-20, Port Setting for Receiving Data from the previous VRx in a daisy chain

User Guide Standards

The Phoroptor VRx performs all refraction methods. The user selects the order of the examination steps. Windows CE is the operating system of the Phoroptor VRx. Activate the functions using the Phoroptor VRx Controller Keypad buttons, the Control Knob, or the Controller Touchscreen.

Control Knob Use

Turn the Control Knob clockwise or counterclockwise to change the numeric values and the selection of fields as follows:

- Clockwise rotation (turning the Control Knob to the right) increases the plus (+) Sphere power, plus (+) Cylinder power, or increases the power of prism in a certain direction.
- Counterclockwise rotation (turning the Control Knob to the left) increases the minus (-) Sphere power, minus (-) Cylinder power, or increases the power of prism in a certain direction.

  Note: If you press and turn the Control Knob (at the same time), the changes are made in larger steps.

Press the Control Knob to do the following:

- Enter the data.
- Move to the next Refraction step.
- Finish the operation.

  Note: To adjust a specific measurement, touch the data field on the screen and turn the Control Knob to adjust the value (*e.g.,* sphere in the right eye).

Press and turn the Control Knob (at the same time) either clockwise or counterclockwise to do the following:

- Adjusts the Sphere by 1.00 D increments
- Adjusts the Cylinder by 1.00 D increments
- Adjusts the Axis by 10° increments

Control Knob, Screen Icon, and Keypad Button Standards

From this point forward, when the guide refers to the Control Knob, Screen Icons, or Keypad Buttons, the instructions state:

Control Knob

- “Press the **CONTROL KNOB**”
- “Turn the **CONTROL KNOB**”
- “Press and turn the **CONTROL KNOB** (at the same time).”

Screen Icon

- “Touch **XXXX**...”

Keypad Button

- “Press the **XXXX** button.”

Control Knob and Screen Icon Choice

- “Press the **CONTROL KNOB**, or touch **XXXX**...”

Controller Keypad

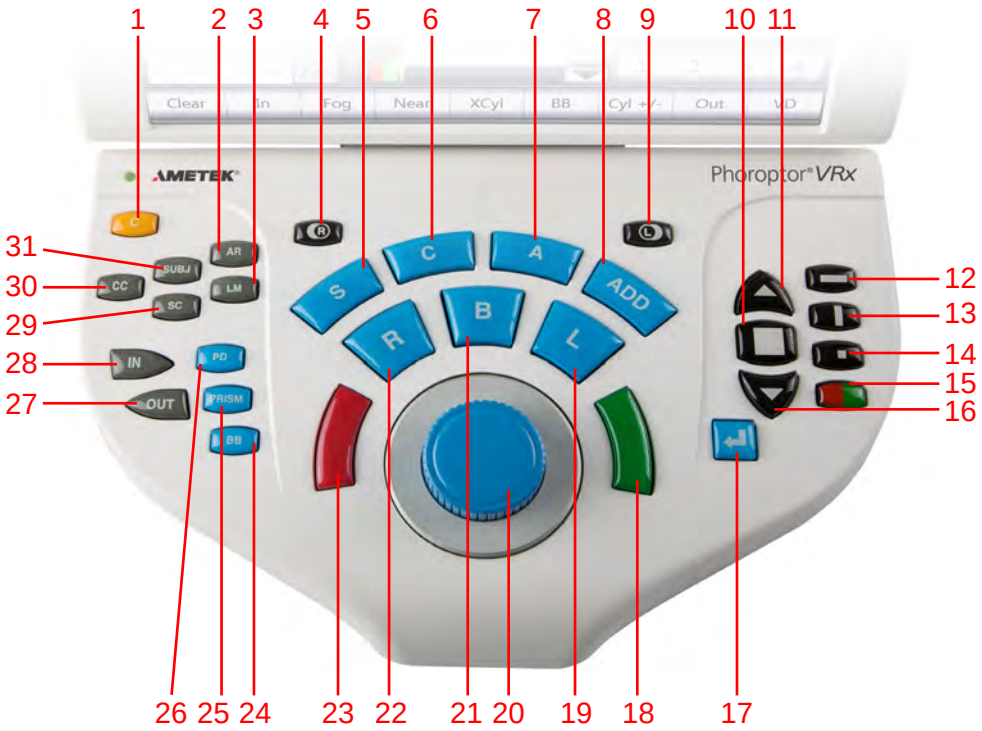


Figure IS-21, Controller Keypad

1. C—Clear data
2. AR—Auto Refractor
3. LM—Lensmeter
4. R—Right Eye Open/Close
5. S—Sphere Adjustment
6. C—Cylinder Adjustment
7. A—Axis Adjustment
8. ADD—Near Vision Addition
9. L—Left Eye Open/Close
10. Display Multiple Lines of Optotypes
11. Improved Visual Acuity or Increase Optotype Size
12. Horizontal Line Mask
13. Vertical Line Mask
14. Single Optotype Mask
15. Red/Green Filter
16. Decreased Visual Acuity or Decrease Optotype Size
17. Enter Key for Cross Cylinder Tests
18. Green button for Split Prism Test
19. L—Left eye aperture
20. Control Knob
21. B—Binocular Vision Measurement
22. R—Right eye aperture
23. Red button for Split Prism Test
24. BB—Binocular Balance (3 Δ base down prism in right eye, 3 Δ base up prism in left eye)
25. PRISM—Automatically brings in prism lenses
26. PD—Pupillary Distance Measurement
27. OUT—Export Data
28. IN—Import Data
29. SC—Data Without Correction
30. CC—Data With Correction/Final
31. SUBJ—Subjective Refraction Data

Icon Description

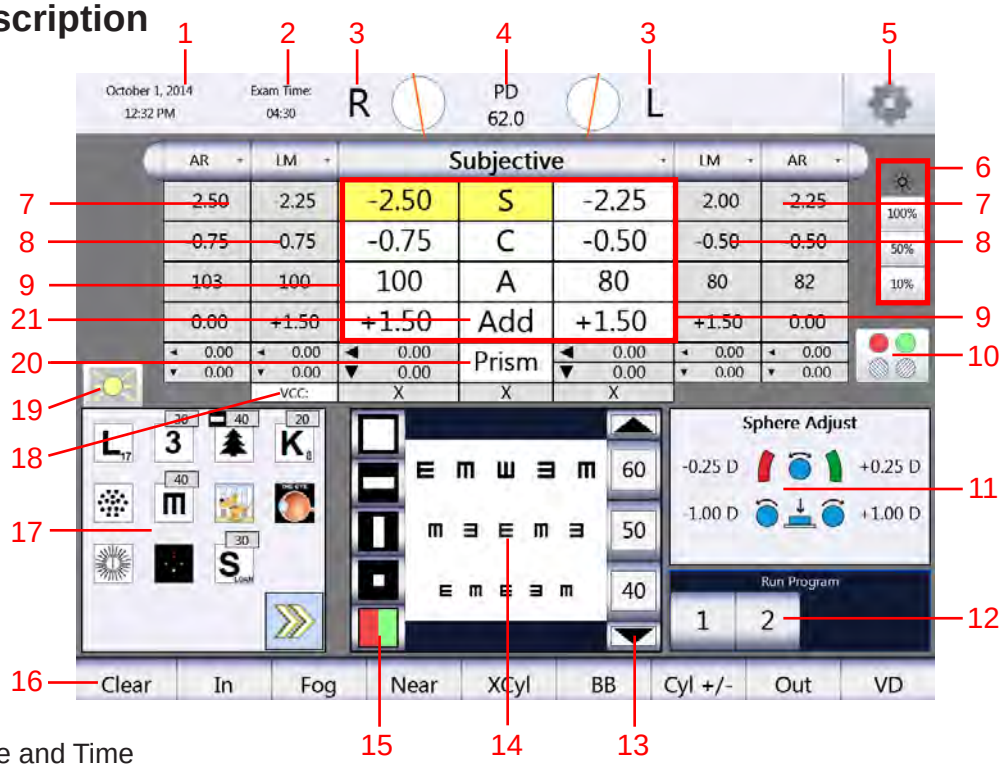


Figure IS-22, Display Screen

1. Date and Time
2. Exam Time
3. Active Lenses/Filters
4. Pupillary Distance
5. Options/Setup Menu
6. Display Illumination adjustment
7. Auto Refractor Data (Entered manually or electronically.)
8. Lensmeter Data (Entered manually or electronically.)
9. Subjective Data (Appears when data from saved/input data is changed.)
10. Auxiliary Lens Menu
11. Instructions Panel
12. Program Available or Currently Running
13. Optotype Size
14. Projected Chart View/Patient Chart View
15. Acuity Chart Masks
16. Selection Bar
17. Acuity Test Charts
18. Visual Acuity Measurement Boxes
19. On/Off for Darkening Acuity Chart Display
20. Prism Alignment
21. Near Vision Addition

Active Data Field

The larger box with data is the current/active prescription that is being adjusted. The individual measurement boxes are one of three colors. The following indicates the meaning of each color:

White - Active field that can be adjusted.
Yellow - Active field that is currently being adjusted.
Grey - Inactive field that cannot be adjusted.

Icon Description (continued)

Auxiliary Lenses or Filters

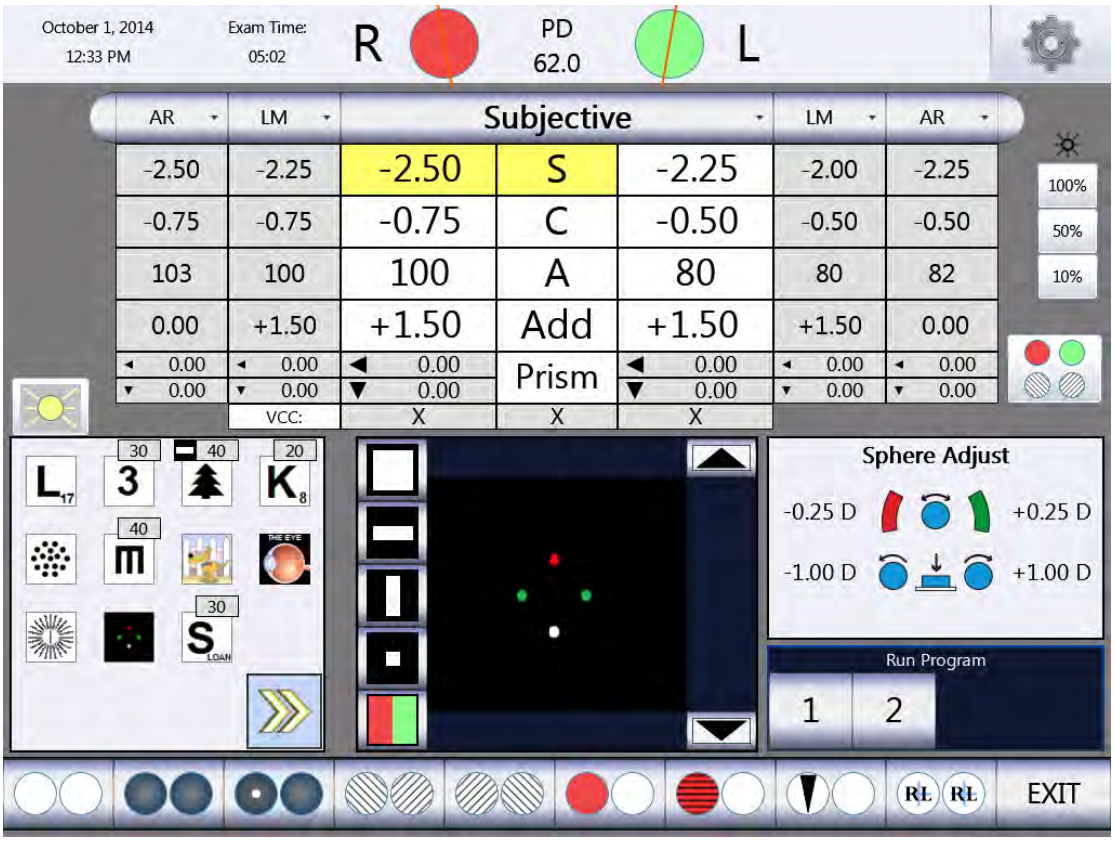


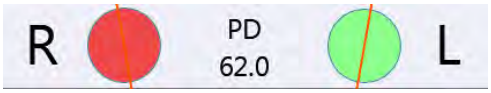
Figure IS-23, Auxiliary Lenses Screen

1. Touch **RED/GREEN/POLARIZED Lens Filters**, located on the right side of the screen, just below the illumination adjustment icons, to access the auxiliary lenses and filters. (Please refer to Figure IS-22, #10.)

   Note: The lenses and filters appear in the selection bar at the bottom of the screen.

   Note: The circles adjacent to the **R** and **L** above the Active Data Field indicate which filters are in place in the Phoroptor Head apertures.

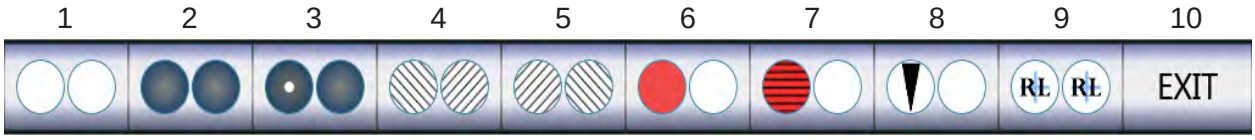
   Note: The following is an example of the R/L indication on the Controller monitor for the Red/ Green filter with the red filter in the right eye and the green filter in the left eye:



2. Press the **Lens Filters**, located at the bottom of the screen, to apply the desired filters to the lens apertures. (Please refer to Figure IS-23.)

Icon Description (continued)

Controller Button Descriptions and Effects



The following explains Controller icon operation and effects on the Phoroptor Head:

1 Open Occluder Aperture - Touch to open the aperture of the occluded eye. If both eyes are occluded, touch it once to open one eye, and again to open both apertures.

2 Close Occluder Aperture - Touch to close the one aperture. Touch it again to close both eyes.

3 Pinhole Mask - Touch to set a pinhole mask in front of the right eye and occlude the left eye. Touch it again to switch, occluding the right eye and placing a pinhole mask in the left eye.

4 Left Polarization Filter - Touch to put a left polarized filter in the right eye and a right polarized filter in the left. Touch it again to set left polarization filter in both eyes.

5 Right Polarization Filter - Touch to put a right polarized filter in the right eye and a left polarized filter in the left eye. Touch it again to set right polarization filter in both eyes.

6 Red/Green Filters - Touch to change both filters, setting a red filter for the right eye and a green filter for the left eye. Touch it again to keep the red filter and remove the green filter. Touch it a third time to return to the original setting.

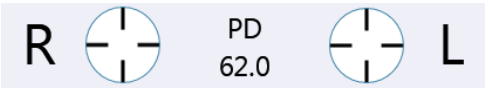
Note: The Worth 4 Dot Chart automatically displays the Red/Green filters.

7 Maddox Cylinder - Touch to place a horizontal Maddox cylinder in the right eye. Touch it again to place a vertical Maddox cylinder in the left eye. Touch it again to return to the original setting.

8 Dissociation Prisms - Touch to place a 6Δ base up prism in the right eye. Touch it again to place a 10Δ base in prism in the left eye. Touch it again to return to the original setting.

9 Retinoscopy Lens - Touch to place the retinoscopy lenses in both eyes. (The lens power is +1.5 D or +2.0 D, based on what was selected in the Settings Menu.) Touch it again to place a pinhole mask in the left lens. Touch it a third time to switch the pinhole mask to the right eye. Touch it a fourth time to remove the pinhole and place the retinoscopy lenses in both eyes. Touch **OPEN APERTURE** to remove the retinoscopy lenses.

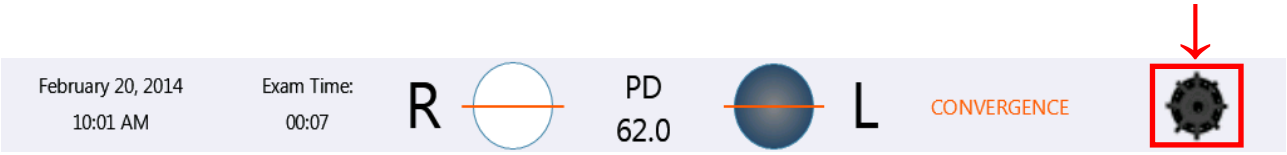
10 Exit - Touch to exit the Auxiliary lenses screen.



Note: Fixed Cross Cylinders do not have a screen icon. They automatically switch in when measuring PD. They also switch in when measuring Fused Cross Cylinder addition at near. The icon appears on the Controller in the Active Lenses/Filters, displayed in the graphic above.

Options/Setup Menu

The Options/Setup Menu is only accessible from the Main screen. The following is a summary of the Options Menu and all of the corresponding drop-down lists that coincide with each category in the Options Menu. Touch **OPTIONS** in the top right corner of the screen to access the Options screen.



1. Touch **OPTIONS/SETUP MENU** to display the Settings screen. You can change the settings on the unit and auxiliary functions in this screen.
2. Touch the white box of the menu setting you want to change, revealing a drop-down list of options.
3. Touch the option in the list you want to select.
4. Repeat Steps 1-3 for each setting you want to change.
5. Touch **SAVE** in the bottom right corner of the screen when finished to exit the Settings Menu.

Note: You can enter multiple settings before touching **SAVE**.

Screens Available through the Options/Set-Up Menu

The following screens are available by touching their screen icons at the bottom of the Options screen:

- **Programs**: Enables you to record step sequences in a program file that is played from the Main screen.
- **Charts**: Enables you to select the exam charts to display on the digital acuity screen.
- **Ports**: Enables you to set up the ports to connect with external devices.
- **Service**: Enables you to view the unit's software/driver version numbers and perform system service functions.

Options/Setup Menu (continued)

Settings

1. Open the **OPTIONS/SETUP MENU** to display the Settings screen.
2. Touch the box for each setting to customize settings. (Please refer to Figure IS-24.)
3. Touch the preferred option in the drop-down list to select it.

Note: The Options categories are described in the following pages.

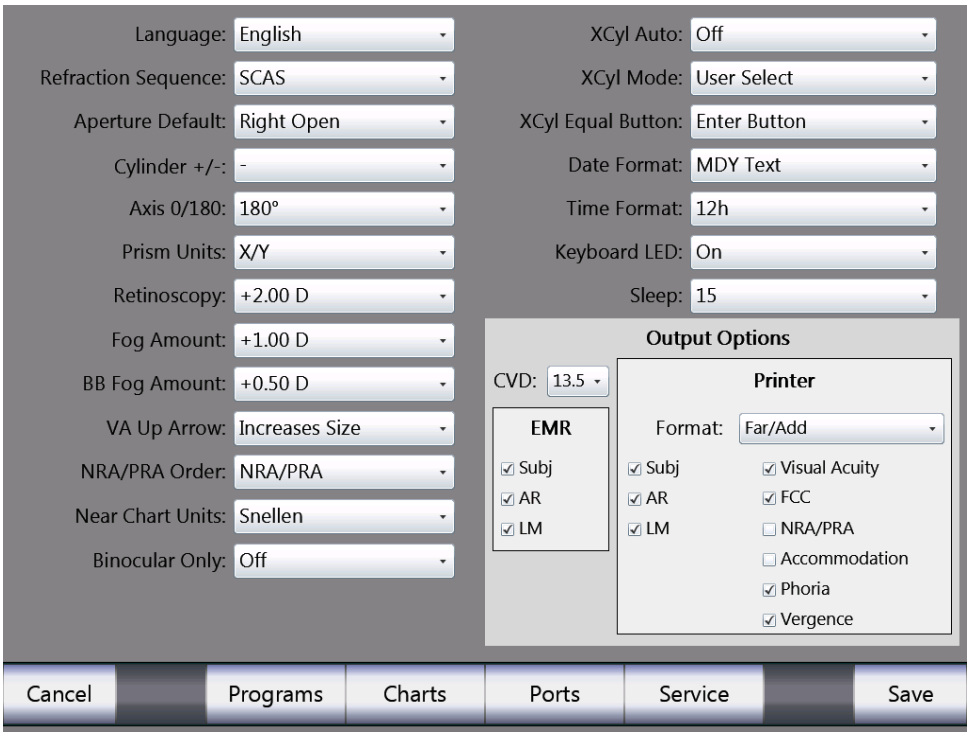


Figure IS-24, Settings Menu

Language

Use this option to change the language of the operating system.

Refraction Sequence

Select the preferred refraction step sequence: SCA (sphere, cylinder, axis), SAC (sphere, axis, cylinder), SCAS (sphere, cylinder, axis, sphere), SACS (sphere, axis, cylinder, sphere). Pressing the **CONTROL KNOB** advances through the selected sequence of refraction steps after each step is completed.

Aperture Default

This option sets the open lens apertures for a new exam. The options are:

- Both Open
- Right Open
- Left Open

Options/Setup Menu (continued)

Cylinder +/-
Use this option to change the default cylinder power to one of the following:

- Plus Cylinder only (“+”)
- Minus Cylinder only (“-”)
- Plus and Minus Cylinder (“+/-”)

Axis 0/180
This option selects 0º or 180º to indicate this meridian on the screen.

Prism Units
Use this option the set the prism units to one of the following:

- X/Y coordinates (Base In, Base Out, Base Up, Base Down)
- Polar (Polar coordinates)

Retinoscopy
Use this option to set the default Retinoscopy lens preferences. The options are:

- Sphere +1.5 D
- Sphere +2.0 D

Fog Amount
Select the amount of auto-fogging preferred: +0.50D, +0.75D, +1.00D, +1.50D, +2.00D.

BB Fog Amount
Select the amount of auto-fogging preferred for the Binocular Balance Test: +0.50D, +0.75D, +1.00D, +1.50D, +2.00D.

VA Up Arrow
Use this option to set the Visual Acuity screen icon preferences. The options are:

- Improves VA: Touch **VISUAL ACUITY UP** to improve visual acuity.
- Increases Size: Touch **VISUAL ACUITY UP** to increase the size of the Optotype (decrease Visual Acuity).

NRA/PRA Order
- NRA/PRA: Find the upper limit (increase plus), then the lower limit (decrease plus).
- PRA/NRA: Find the lower limit (decrease plus), then the upper limit (increase plus).

Near Chart Units
This option allows you to indicate what notation you are using for Near Vision Test charts. It is important to select the correct option for the Near Vision Acuity values that you save. The options are:

- Snellen
- Decimal

Options/Setup Menu (continued)

Binocular Only

This option allows you to leaves both eye apertures open during all far vision tests when selected to ON.

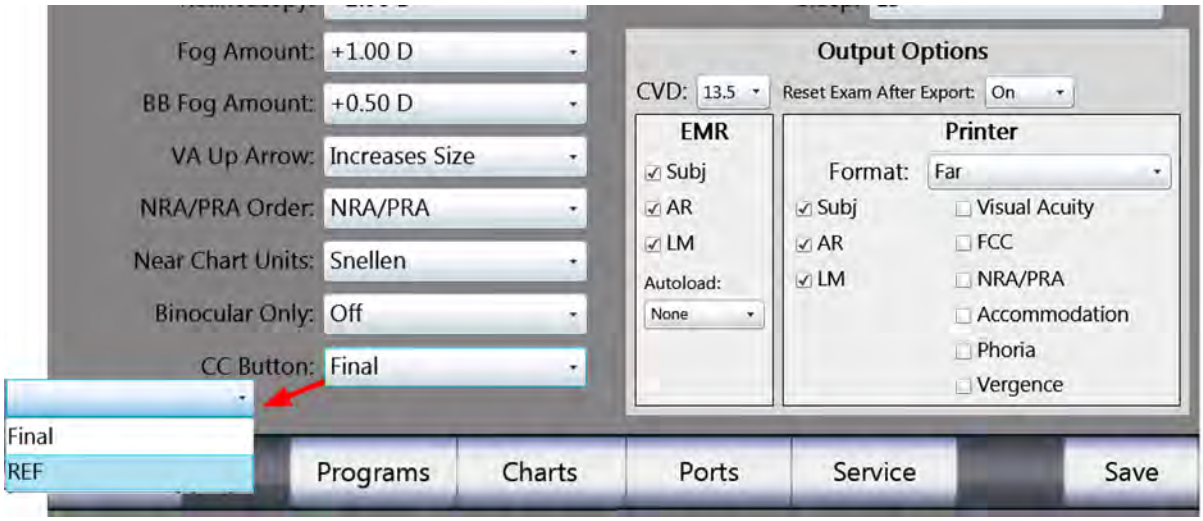


Figure IS-24A, Settings Menu - CC Button

CC Button

Option to choose either the final refraction data or the imported REF data on the display. Refer to Figure IS-24A.

XCyl Auto

XCyl Auto is either on or off. If XCYL Auto is on, the XCyl Mode selected below automatically begins when Cylinder or Axis is selected on the Main Screen or Keypad.

XCyl Mode

The XCyl Mode setting specifies the type of XCyl test that automatically starts when an XCyl test is entered. There are four modes from which to choose: User Select, Manual, Smart, and Split Cyl modes. User Select Mode brings up a button bar that allows the operator to manually select the Cross Cylinder test type for the specific patient.

XCyl Equal Keypad Button

XCyl Equal button enables the user to select which button is used during the Manual or Smart Cross Cylinder test to save the values when the patient sees two images as equal. The options are:

- **ENTER** button - When you choose the **ENTER** button option, press the **CONTROL KNOB** to select the patient's preferred image (better 1, better 2), and then press the **ENTER** button when the patient sees the images as equally blurry.
- **CONTROL KNOB** - When you choose the **CONTROL KNOB** option, press the **ENTER** button to select the patient's preferred image (better 1, better 2), and then press the **CONTROL KNOB** when the patient sees the images as equally blurry.

Options/Setup Menu (continued)

Date Format

The options are:

- YMD (Year-Month-Day)
- MDY (Month-Day-Year)
- DMY (Day-Month-Year)
- MDY TEXT (Month-Day-Year, displayed in the format “<name of the month>, <day as number>, <year as 4-digit number>”.)

Time format

The options are:

- 12h (12-hour time displays, using AM and PM)
- 24h (24-hour time displays)

Keypad LED

The buttons on the Keypad of the Controller are backlit, allowing the user to see the Controls more clearly in a dimly lit room. The options are:

- On
- Off

Sleep

Specifies the number of minutes of inactivity before the display backlight will turn off to save power. Options are Off, 5, 15, 30, or 60 minutes.

Output Options

CVD Section

The CVD drop-down list allows the user to select the preferred corneal vertex distance: The options are:

- 0 mm
- 12 mm
- 13.5 mm
- 16 mm
- 18 mm

Note: The subjective refraction data sent to EMR and the printer is adjusted according to the selected vertex distance. The CVD of the Phoroptor VRx head is 16mm and the values displayed in the main data area are shown using that CVD. The subjective refraction data sent to EMR and the printer is adjusted according to the vertex distance selected here.

Options/Setup Menu (continued)

Reset Exam

The Reset Exam drop down list sets the option to reset the exam data to the default setting after an exam is exported. Refer to Figure IS-24B.

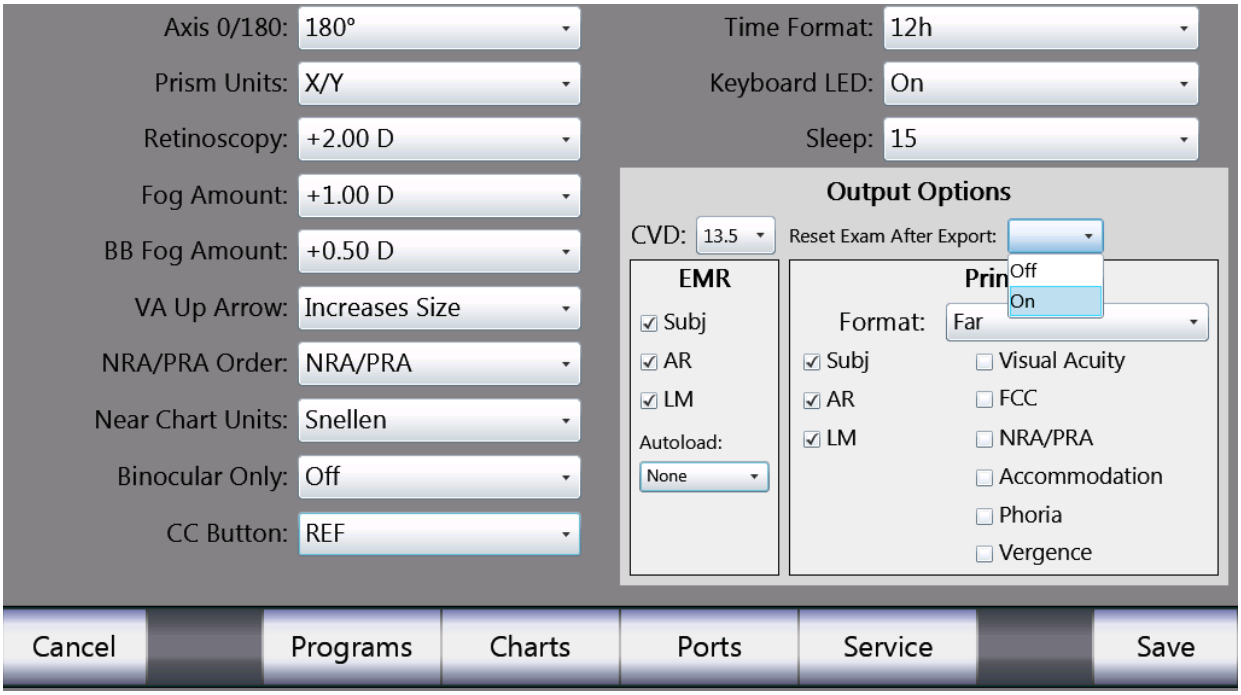


Figure IS-24B, Settings Menu - CC Button

EMR Section

The following are the options of which data to send to an Electronic Medical Records (EMR) system:

- Subj (Subjective)
- AR (Auto Refractor)
- LM (Lensmeter)

Options/Setup Menu (continued)

Autoload

The following are the options to perform an autoload function of imported data. Refer to Figure IS-24C.

- AR - Autoloads the autorefractor data
- LM - Autoloads the lensmeter data
- REF - Autoloads the imported refraction data

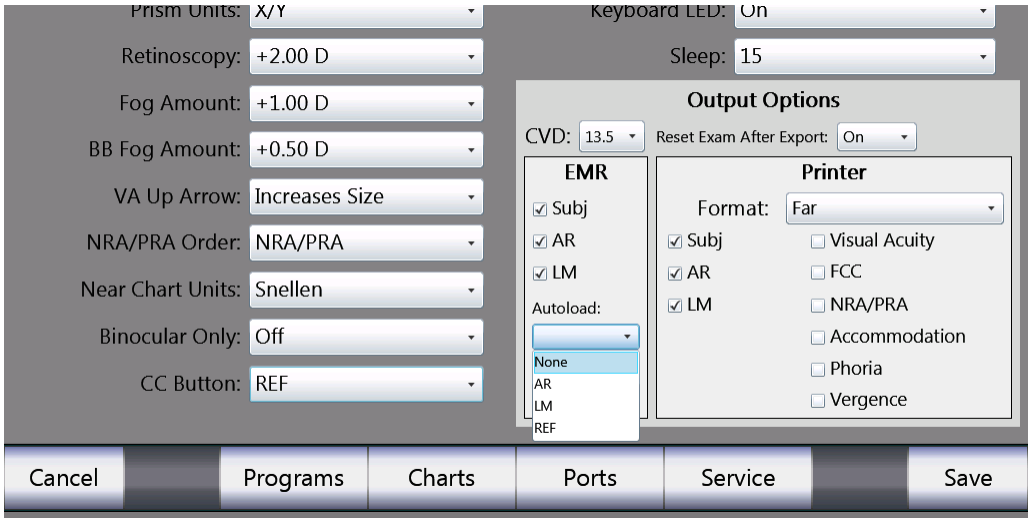


Figure IS-24C, Settings Menu - CC Button

Printer Section

From the Format drop-down list, choose which data to print:

- Far (prints only values for distance vision)
- Near (prints only values for near vision)
- Far/Near (prints values for distance and near vision)
- Far/Add (prints values for distance and near vision addition)

In the first column below the Format drop-down list, choose the options for printing values Subj, AR, and/or LM. In the second column below the Format drop-down list, choose Visual Acuity, FCC (Fused Cross Cylinder), NRA/PRA, ACC (Amplitude of Accommodation), Phoria, and Vergence values.

Programs

You can record refraction step sequences in a program file that is selected and run from the main screen. (Please refer to Figure IS-25.)

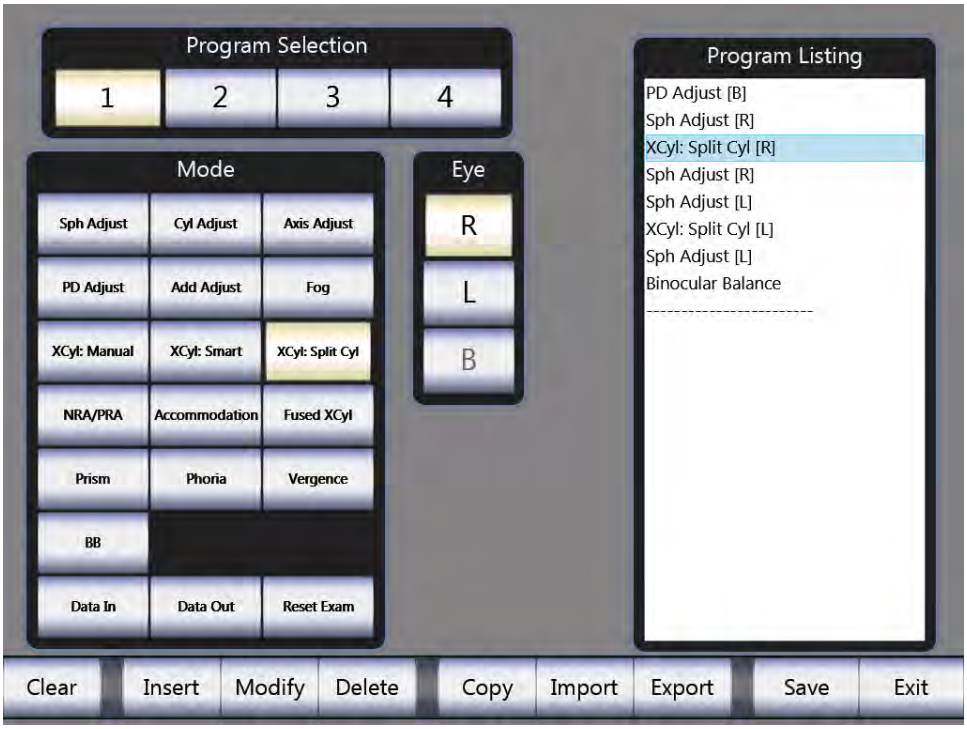


Figure IS-25, Program Screen

Creating a Program

1. Touch the **NUMBER** in the Program Selection panel to designate the program you want to setup.
2. Touch the step or test you want to add to your program in the Mode panel.
3. Touch the **EYE** upon which you want to run the test in the Eye panel. (R = right, L = left, B = both)
4. Touch **INSERT** in the menu bar at the bottom of the screen. Each refraction step or test appears in the Program Listing panel.
5. Repeat the above process to add tests or steps to your program.
6. Touch **SAVE** to save any changes made to programs.
7. Touch **EXIT** to return to the main screen.

Note: You can store a maximum of 4 programs on the device.

Programs (continued)

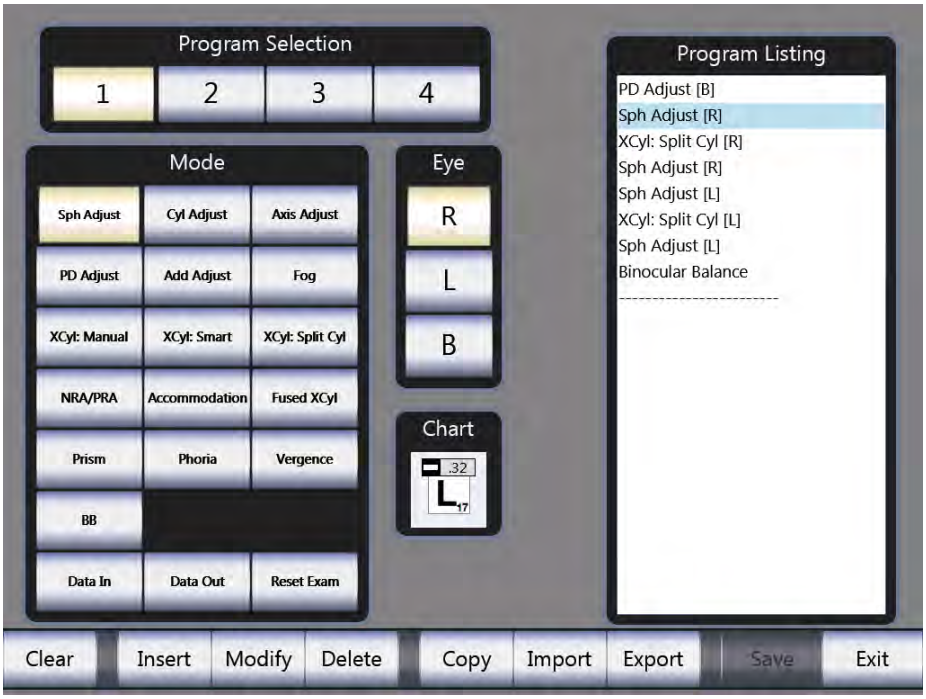


Figure IS-26, Sphere Adjustment Chart Selection

Selecting Charts for Program Steps

The Sphere Adjust, Cyl Adjust, and Axis Adjust steps allow you to associate a specific chart with that step. (Please refer to Figure IS-26.)

1. Touch the Chart icon located below the Eye section on the screen.
2. Touch the chart you want to use for that step.

   Note: The charts selected in the Charts menu for the Prism, Phoria, Vergence, XCyl, and BB tests are used for those tests.

Programs (continued)

Modifying a Step in the Program

1. Touch the step you want to modify in the Program Listing panel.
2. Touch **MODIFY** in the menu bar at the bottom of the screen.
3. Make any desired changes to the selected Mode, Eye, or Chart.

Deleting a Step from your Program

1. Touch the step you want to delete in the Program Listing panel.
2. Touch **DELETE** in the menu bar at the bottom of the screen.

   Note: This removes the step from the Program Listing panel.

Copying a Program already created

1. Touch the number of the program you want to copy in the Program Selection panel.
2. Touch **COPY** in the menu bar at the bottom of the screen.

   Note: Copy in the menu bar changes to Paste.
3. Touch the number of the program where you want to paste the copied program in the Program selection panel.
4. Touch **PASTE** in the menu bar.

   Note: The copied program replaces any previously existing steps in the selected program.

   Note: Your program displays in the Program Listing panel. Adjust the program as desired.

Exporting a Program

1. Insert the outside source (USB drive) to which you want to export the program.
2. Touch the Number of the program you want to export.
3. Touch **EXPORT** in the menu bar at the bottom of the screen.

   Note: The exported program is identified by the program number.

   Note: Exporting a program to a USB drive overwrites any programs on the drive with the same program number.

Programs (continued)

Figure IS-27, USB Drive

Importing a Program from an outside source (USB drive)

1. Insert the outside source (USB drive) from which you want to import the program. (Please refer to Figure IS-27.)
2. Touch the Number of the program into which you want to import the program steps.

   Note: The imported program number must match the program number where it is placed (*e.g.,* Program 1 from one VRx must be imported into Program 1 of another VRx unit).
3. Touch **IMPORT** in the menu bar at the bottom of the screen. The program is automatically imported into the selected program.
4. Touch **SAVE** on the menu bar at the bottom of the screen to save the imported program.

Clearing a Program

1. Touch the number of the program you want to clear in the Program Selection panel.
2. Touch **CLEAR** in the menu bar at the bottom of the screen.

   Note: Touching **EXIT** without first touching **SAVE** ignores any changes made in the Programs screen. Be sure to save any changes.

Programs (continued)

Running a Program

In the main screen, the programs you created display in the Run Program panel in the lower right corner of the screen. (Please refer to Figure IS-28.) To run a program:

1. Touch the program number you want to run at the bottom right corner of the screen.

   Note: The first step of the program automatically begins.

2. Press the **CONTROL KNOB** to advance to the next step after completing a step in the refraction program.
3. Touch the double yellow bar icon located at the bottom right of the screen to pause the program. This changes the icon to a green triangle. Touch the green triangle icon to restart the program.
4. Touch the red square icon to stop the program.

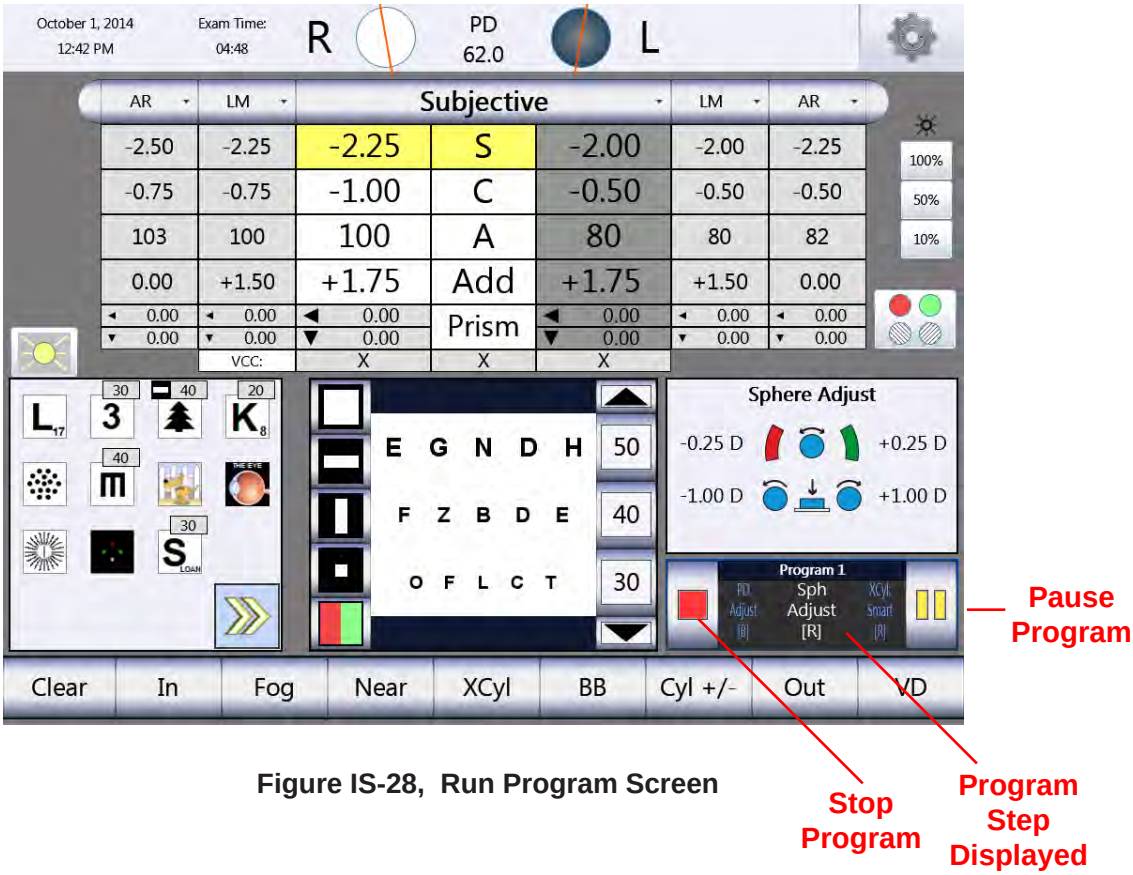


Figure IS-28, Run Program Screen

Charts

Touch **CHARTS** in the menu bar at the bottom of the Settings Menu screen (Please refer to Figure IS-24 on page 32).

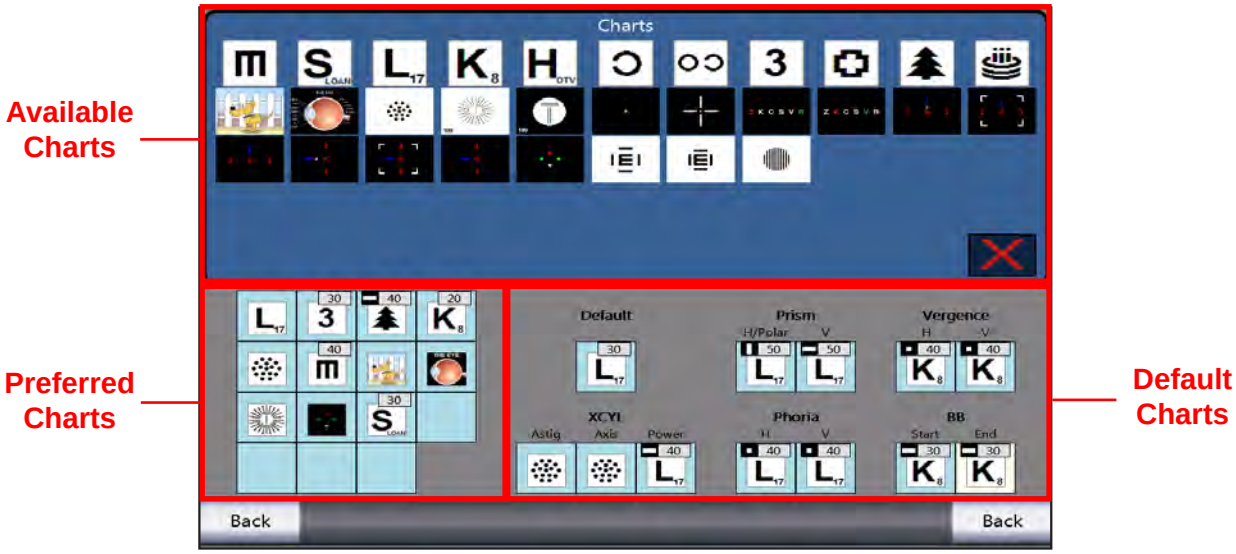


Figure IS-29, Charts Screen

The top of the Charts screen contains all available charts from which to choose. The lower left section of the screen contains your preferred charts, which are selectable from the Main screen. The lower right section displays the charts assigned to specific tests. (Please refer to Figure IS-30.)

Selecting a Chart

1. Touch an empty box or the Chart you want to change in the preferred charts section of the screen. (Please refer to Figure IS-29.)
2. Touch the desired Chart in the available charts section of the screen. The chart you select in Step 2 displays in your preferred charts section of the screen.

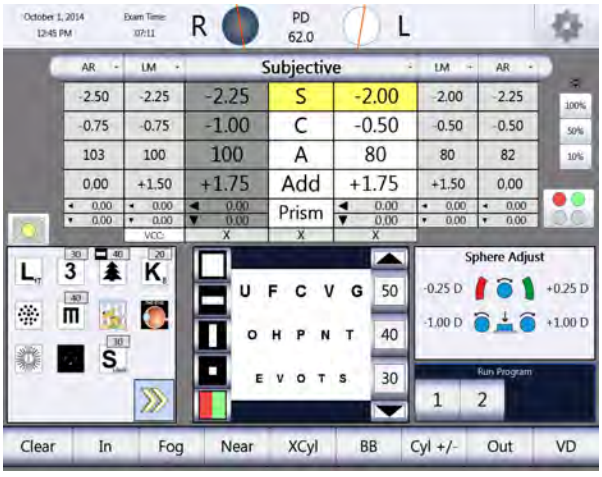


Figure IS-30, Chart Display Main Screen

Charts (continued)

Chart for Optotypes

If you select an optotype chart, the Chart Options dialog box appears.

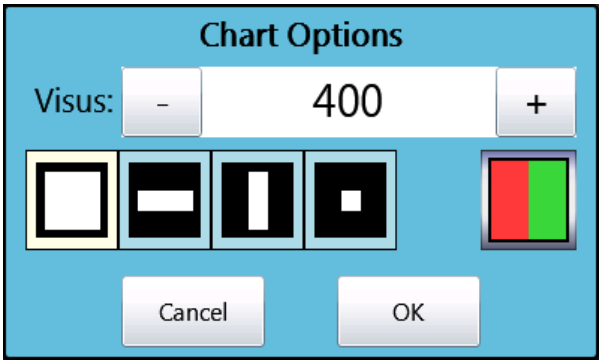


Figure IS-31, Chart Options

Note: The Chart Options dialog box allows you to select the optotype size (using the + and - icons) and change the direction and number of lines displayed. (Please refer to Figure IS-31.)

- The **OPEN BOX** displays multiple lines of optotypes.
- The **HORIZONTAL BAR** displays a single line of horizontal optotypes.
- The **VERTICAL BAR** displays a single line of vertical optotypes.
- The **SMALL SQUARE** displays a single optotype.
- The **RED/GREEN BOX** displays a default chart with red/green filters.

Default Chart

The Default Chart selection allows the user to select an optotype or specific chart that is displayed at the beginning of each patient refraction.

Selecting a Default Chart

1. Touch **DEFAULT CHART** in the Charts screen.
2. Touch the optotype or type of chart screen icon you want to use in the available charts section.
   Note: The Chart Options dialog box displays if you are using letters, numbers, or some other optotype. (Please refer to Figure IS-31.)
3. Touch **OK** to save the Default Chart options.

Prism Default Charts

The Prism Default Charts selections allow the user to select the default charts that display when checking for horizontal and vertical prism alignment, and when using Polar coordinates.

Note: Please follow the instructions in the **Selecting a Default Chart** section of this guide to select the default charts for the horizontal (H/POLAR) and vertical (V) prism alignment. If Polar Coordinates are selected for Prism adjustments, only the H/Polar chart is displayed.

Charts (continued)

XCyl Default Charts

The XCYL Default Charts selections allow the user to select specific charts that display when checking for Astigmatism correction, and adjusting Axis and Cylinder power in any of the Cross Cylinder tests.

Note: Please follow the instructions in the **Selecting a Default Chart** section of this guide to select the default charts for the Astigmatism (Astig), Axis, and Cylinder Power adjustments.

Phoria Default Charts

The Phoria Default Charts selections allow the user to select the default charts that display for Phoria testing.

Note: Please follow the instructions in the **Selecting a Default Chart** section of this guide to select the default charts for horizontal phoria (H) and vertical phoria (V) testing.

Vergence Default Charts

The Vergence Default Charts selections allow the user to select the default charts that display for Vergence testing.

Note: Please follow the instructions in the **Selecting a Default Chart** section of this guide to select the default charts for horizontal vergence (H) and vertical vergence (V) testing.

Binocular Balance (BB) Default Charts

The Binocular Balance (BB) Default Charts selections allow the user to select the default charts for the Binocular Balance test using prism.

Note: Please follow the instructions in the **Selecting a Default Chart** section of this guide to select the default charts for the Start and End of the Binocular Balance test.

Ports

Touch **PORTS** in the menu bar at the bottom of the Settings Menu screen. (Refer to Figure IS-24 in the Options/Setup Menu section of this manual.)

Figure IS-32, Ports Screen

The Ports screen allows you to connect external devices the Phoroptor VRx. The ports available on the Ports screen match the ports at the back of the Central Unit.

WARNING: THE BLUETOOTH WIRELESS CONNECTION TRANSMITTERS OR RECEIVERS CAN BE INTERFERED WITH BY OTHER ELECTRICAL OR ELECTRONIC EQUIPMENT, EVEN IF THAT EQUIPMENT ALSO COMPLIES WITH CISPR EMISSIONS REQUIREMENTS.

Setting-Up a Port for Communication with an External Device Connected by a Cable

1. Select an option for the **PORT SELECTION** (e.g., Instrument 1, Projector, EMR, etc.).
2. In the PORT SETTINGS panel, select the device you are connecting to the Phoroptor VRx. Note: the instruments available to connect to the VRx are listed in APPENDIX A.
3. Set the Connection Type to “Cable.”
4. Set the options for the device you have selected, using the drop-down lists and check boxes within the PORT SETTINGS panel.
5. Touch **APPLY** to save the settings.

   Note: The settings selected in the Phoroptor VRx must match the settings of the connected external devices. If the settings are not correct, data will not transfer.

   Note: Some devices will display connection parameters that are preset and cannot be modified.

Service Menu

Touch **SERVICE** in the menu bar at the bottom of the Settings Menu screen to display the Service (System Information) screen. (Please refer to Figure IS-24 on page 32.)

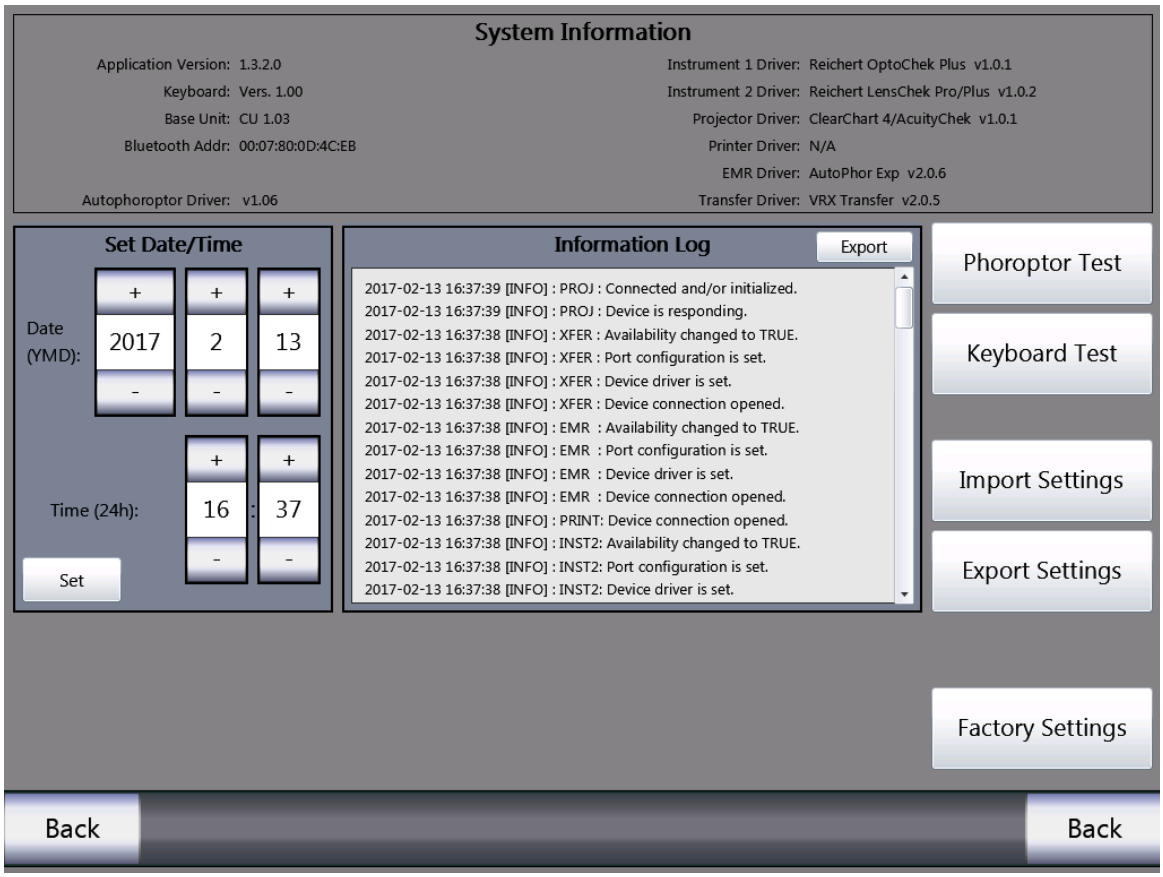


Figure IS-33, Service Menu

System Information

The Service Information section lists the following information: (Please refer to Figure IS-33.)

- **Application Version** - The installed system software.
- **Keyboard Version** - The installed Keyboard software.
- **Base Unit** - The installed Base Unit software.
- **Autophoroptor Driver -** The device driver for the phoroptor head.
- Bluetooth Address - Bluetooth address for the Central Unit
- **Instrument 1 Driver** - The device driver activated for the Instrument 1 port.
- **Instrument 2 Driver** - The device driver activated for the Instrument 2 port.
- **Projector Driver** - The device driver for the selected projector or acuity system.
- **Printer Driver** - The device driver activated for the Printer port.
- **EMR Driver** - The device driver activated for the EMR port.
- **Transfer Driver** - The device driver activated for the Transfer port.

The Service Menu screen allows you to set the date and time on the Phoroptor VRx. If you need to contact Reichert Technical Services, please have ready the system information referenced on this page.

Service Menu (continued)

Set Date/Time

1. Touch **+** or **-** in the Set Date/Time box to change the date and time. (Please refer to Figure IS-33.)
2. Touch **SET** to set the date and time.

Phoroptor Test

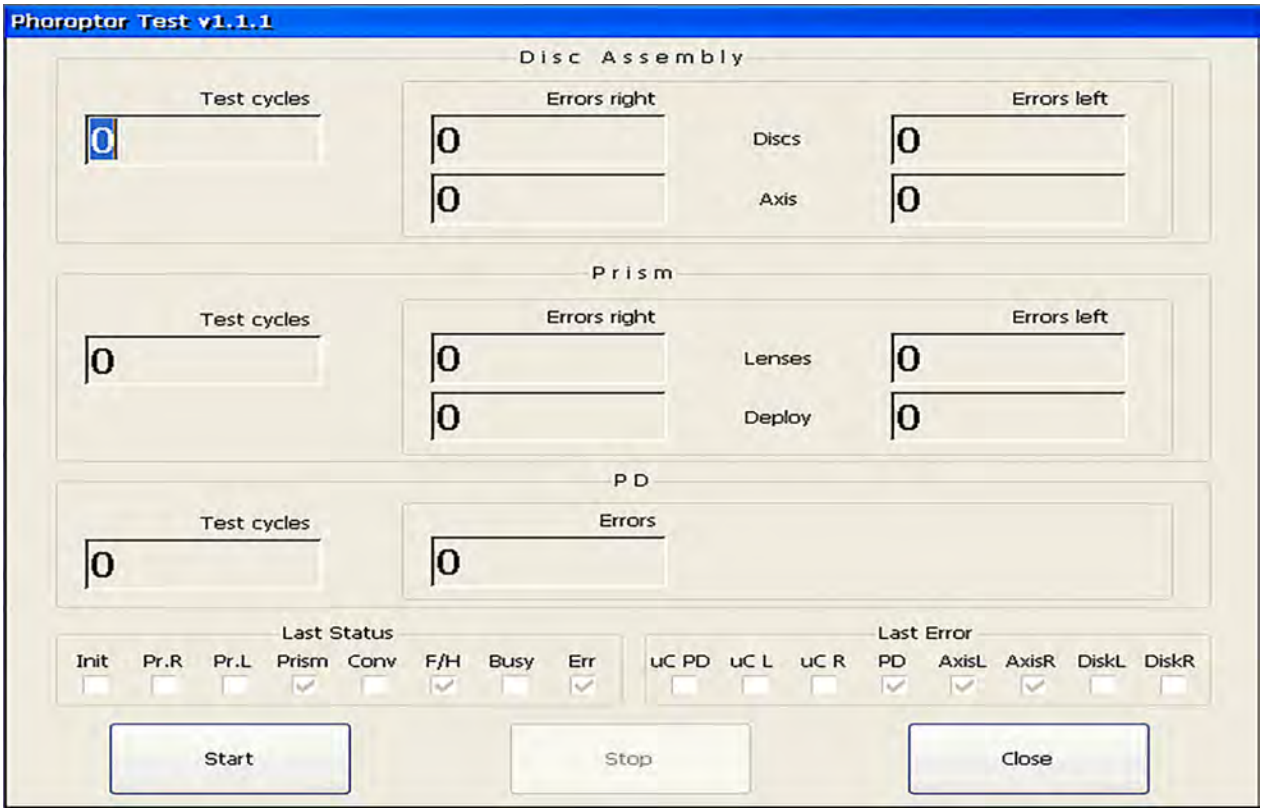


Figure IS-34, Phoroptor Test Screen

1. Touch **PHOROPTOR TEST** to run a Phoroptor Head operation check. (Please refer to Figure IS-34.)
2. Touch:
   - **START** to begin the test.
   - **STOP** to pause the test.
   - **EXIT** to end the test.

Service Menu (continued)

Keyboard Test

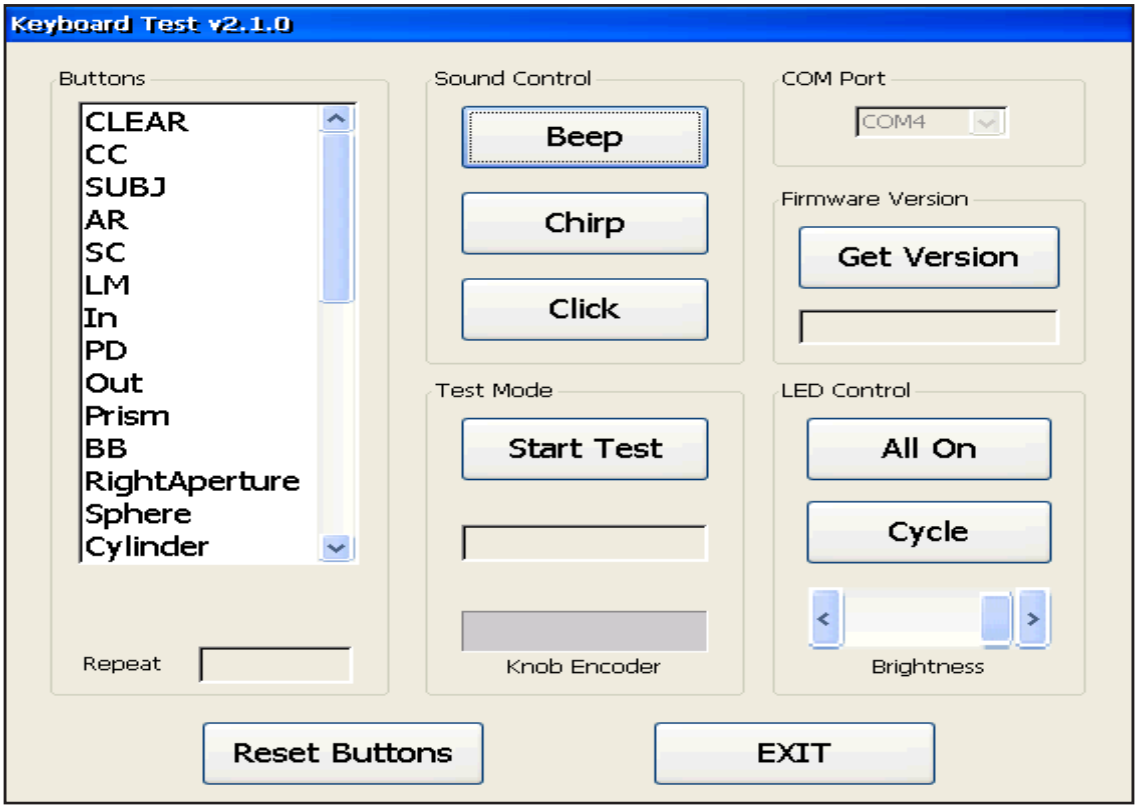


Figure IS-35, Keyboard Test Screen

Button Section

1. Touch **KEYBOARD TEST** to begin the test, which ensures that all of the Keypad buttons function properly. (Please refer to Figure IS-35.)
2. Press each Keypad button to ensure all buttons function properly.
3. Touch **RESET BUTTONS** to restore the list of buttons.

   Note: As you press each button, if the button is functioning properly, the name of the button disappears from the list.

Service Menu (continued)

Keyboard Test (continued)

Sound Control Test

The Sound Control section of the Keyboard Test window allows you to test the functioning of the sounds emitted by the Controller when performing various functions.

The following list explains the sounds:

- Beep - Indicates an error message or that certain keys are not active when performing certain operations in the Phoroptor VRx.
- Chirp - Indicates that a test or function completed successfully.
- Click - Is a response to pressing buttons or pressing and turning the Control Knob.

Test Mode Section

The Test Mode section verifies the function of the Control Knob.

1. Touch **START TEST**.
2. Turn the **CONTROL KNOB** to the right and left one click stop to test the knob.

Firmware Version Section

1. Touch **GET VERSION** to view the firmware version of the instrument.

LED Control Section

The LED Control section allows you to test all of the LED lights that back light the Keypad buttons.

- **All On** - Illuminates all of the keys at once.
- **Cycle** - Illuminates the keys one at a time.
- **Brightness** - Adjusts the illumination of the LEDs in the Keypad.

Touch the **EXIT** screen icon to close the Keyboard Test screen.

Import Settings and Export Settings

Import Settings

Import Settings allows the user to import settings from another VRx into the device from a USB drive.

Export Settings

Export Settings allows the user to export the current settings from one VRx to another VRx using a USB drive.

Factory Settings

Factory Settings allow the user to restore setting to the factory default.

Instructions for Use

Introduction

Align the Phoroptor Head with the patient to ensure you are taking reliable measurements. Once the Phoroptor Head is powered on and completes an initialization process, you can then align it and take measurements.

Aligning the Phoroptor Head

Initial Alignment

The first alignment is the general alignment of the Phoroptor Head to the patient.

1. Place the back side of the Phoroptor Head in front of the patient, centering the head in front of the patient's eyes. (Please refer to Figures IU-01 and IU-02.) The Forehead Rest is an applied part that contacts with the patient. Position the patient's head against the forehead rest.

2. Use the Illuminated Bubble on the Phoroptor Head to ensure the Phoroptor Head is level. (Please refer to Figure IU-04.) If the Phoroptor Head is not level, refer to the Setup - Leveling the Phoroptor Head section of this manual.

3. Once the Phoroptor Head is level, physically adjust the Phoroptor Head to line up with the patient's left eye. (Please refer to Figure IU-03.) Do not worry about aligning the right side of the Phoroptor Head with the patient's other eye. This is adjusted later.

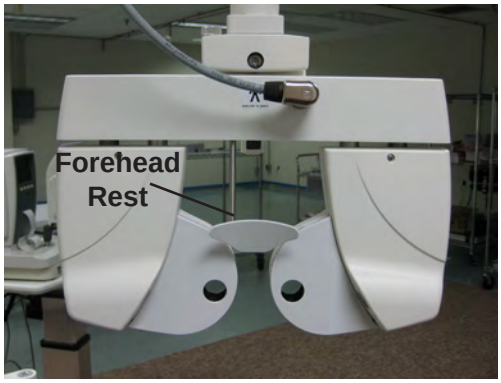


Figure IU-01, Back Side of Phoroptor Head

Figure IU-02, Placement

Figure IU-04, Level

Figure IU-03, Adjust Phoroptor Head

Aligning the Phoroptor Head (continued)

Pupillary Distance

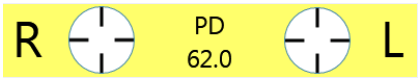
The next adjustment is the Pupillary Distance (PD). Using the Controller, adjust the pupillary distance between the right and left apertures on the Phoroptor Head. You can adjust the PD either monocularly or binocularly. Binocular adjustment is the default.

Note: If the Auto Refractor or Lensmeter data transmits PD measurements when the data is brought in as a starting point for the refraction, the Phoroptor Head automatically moves to adjust to that PD.

Perform the following steps to adjust the PD:

1. Press the **PD** button, or touch **PD** at the top of the screen. Both apertures display Fixed Cross Cylinder lenses.
2. Use the crosses in the lenses to center of the patient's pupils in each aperture. The default adjustment is binocular.

   Note: The Illumination for the Corneal Sights lights up to help with alignment.



3. Turn the **CONTROL KNOB** to the right to increase the pupil distance and to the left to decrease pupil distance.

Binocular Adjustment

Turn the **CONTROL KNOB** to the right or left to increase or decrease PD in 1 mm increments.

Monocular Adjustment

Press the **R** or **L** button, or touch **R** or **L** on the screen to adjust PD for the right or left eye. Turning the **CONTROL KNOB** adjusts PD in 0.5 mm increments.

Corneal Vertex Distance

The next adjustment is the Corneal Vertex Distance to ensure that the Refractor's lenses are at the proper distance from the patient's eyes.

Note: The default vertex distance is 16 mm.

Perform the following steps to measure the Corneal Vertex Distance:

1. Look into the Corneal Vertex Distance Windows and line up the corneas by turning the forehead rest knob, so the target line and the target mark superimpose. (Please refer to Figure IU-05.)

Figure IU-05, Corneal Sights

Aligning the Phoroptor Head (continued)

Height Level of Eyes

Adjust the Refractor so that the height of each side is level with the respective patient's eye.

1. Center the left aperture in front of the patient's left eye.
2. Center the other half of the Refractor with the patient's right eye by turning the Height Adjustment Knob. (Please refer to Figure IU-06.)

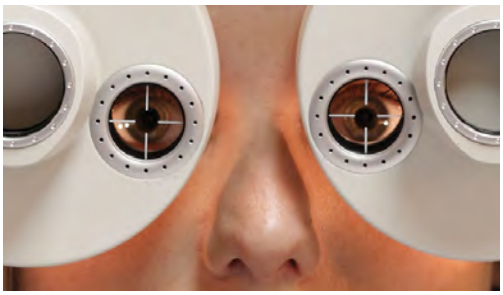


Figure IU-06, Level With Eyes

Operator Positioning

The operator positions himself or herself for the examination once the Phoroptor Head is in place in front of the patient.

The operator can sit or stand, and should be in a position to easily access the Controller. (Please refer to Figure IU-07.)

The instrument is operated the same way whether the operator is sitting or standing, or positioned on the left or right side of the patient.

The operator should position himself or herself so that the patient's view of the eye chart during the examination is not obstructed.

Figure IU-07, Operator Positioning

Data Input

Now that you have aligned the Phoroptor Head, you can begin to take measurements. You can import previous measurements as a starting point for a refraction. To do so, you need a basic understanding of the storing and importing of data.

Data Table

The data table containing columns of data is on the main screen. These columns are used to display the following comparative refractive data:

- Imported from connected equipment, such as Lensmeters or Auto Refractors.
- Entered manually.

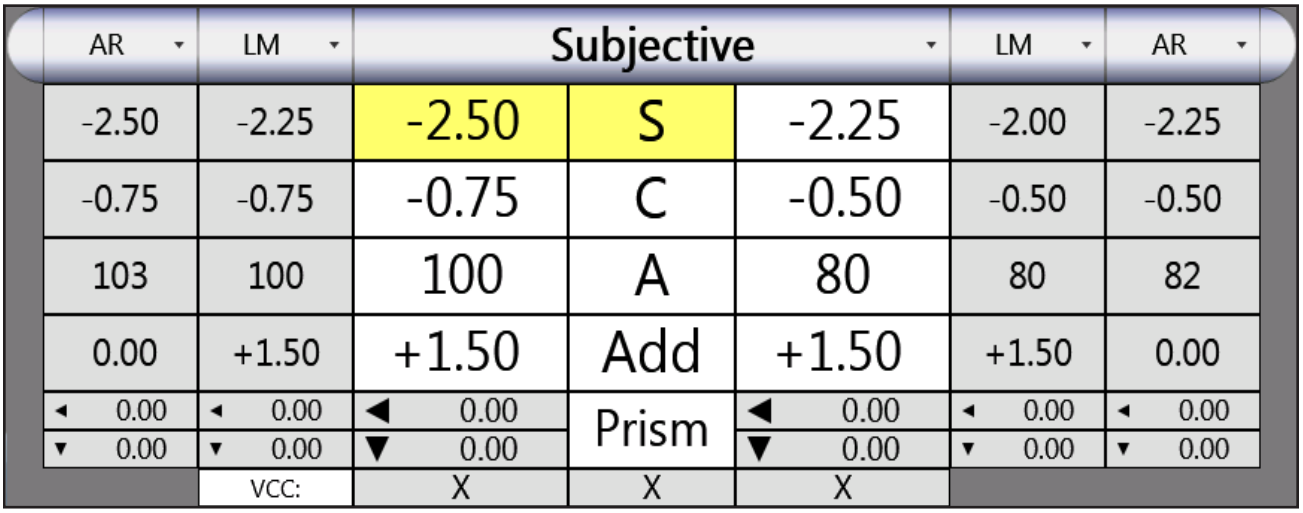


Figure IU-08, Data Table

Columns are labeled as follows: (Please refer to Figure IU-08.)

- **AR** - Auto Refractor
- **LM** - Lensmeter
- **Subjective** - Main refraction measurement data

Data Input (continued)

Entering Data Manually

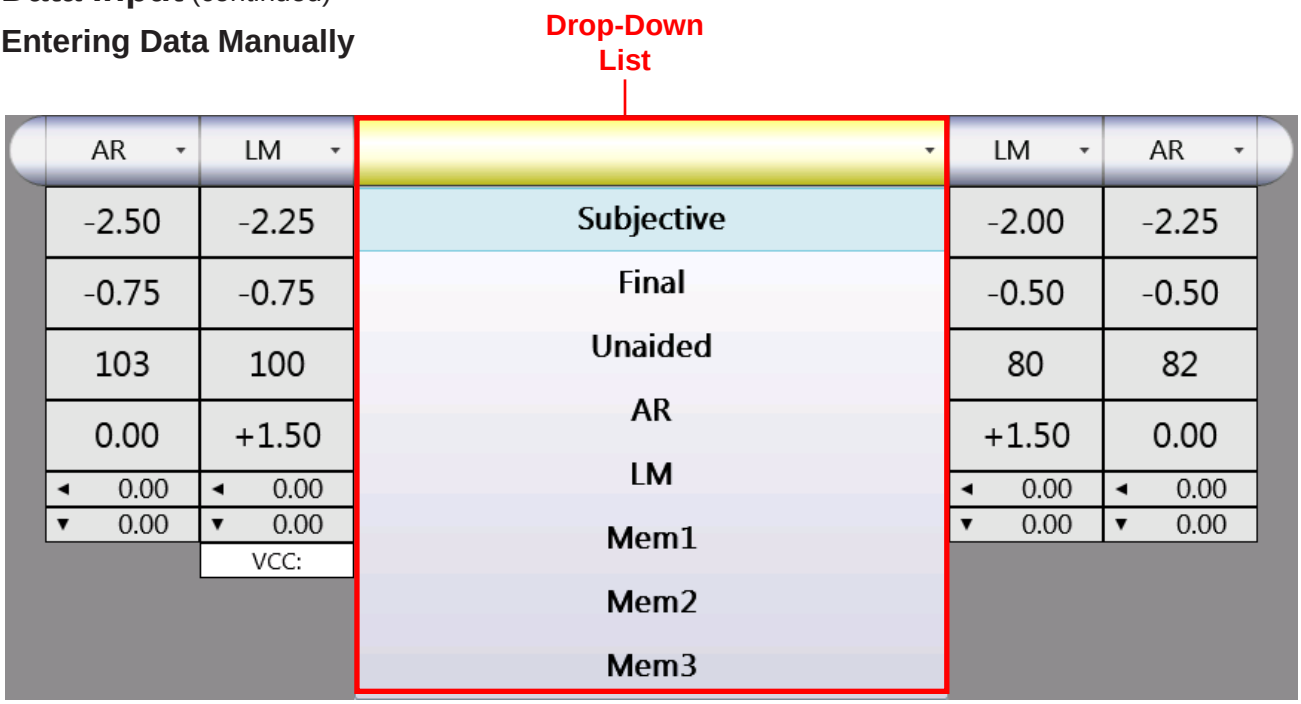


Figure IU-09, Data Input Drop-Down List

Perform the following steps to enter data manually: (Please refer to Figure IU-09.)

1. Touch the drop-down list in the main display area to open a drop-down list of different data sets.
2. Select the type of data to enter. To enter auto refractor data, touch the **AR** option in the drop-down list or press the **AR** button. To enter lensmeter data, touch the **LM** option in the drop-down list or press the **LM** button.
3. The data set is unlocked if it has not been used. If the data set has been used and you want to change it, touch **UNLOCK** at the top left of the title bar to open it. (Please refer to Figure IU-10.)

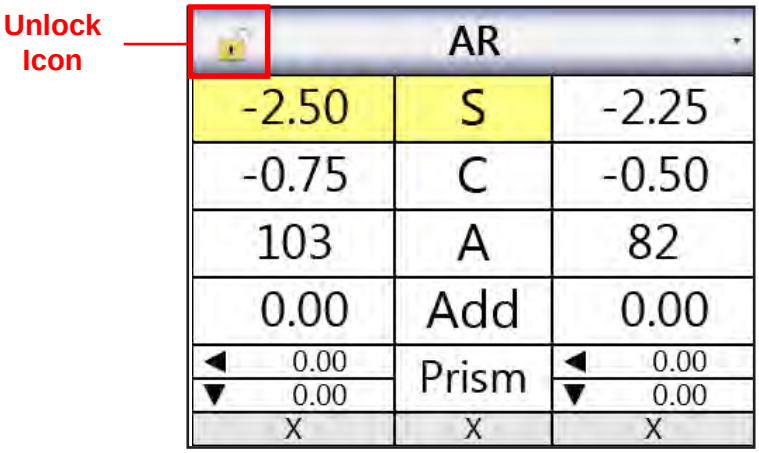


Figure IU-10, Data Input Drop-Down List

Data Input (continued)

Entering Data Manually (continued)

4. Turn the **CONTROL KNOB** to enter the values for the data fields (Sphere, Cylinder, Axis, Add etc.).
5. Press the **CONTROL KNOB** to move to the next data field.
6. Touch **LOCK**, after entering all the data for the left and right eyes to save the Auto Refractor data.
7. Repeat the above steps to enter lensmeter data.
8. Turn the **CONTROL KNOB** to begin changing Subjective data. The main measurement area title automatically changes to Subjective.

   Note: If you want to delete any of the data entered manually, touch the data field you want to delete and touch or press **CLEAR**.

Inputting Data Electronically

The Phoroptor VRx allows you to automatically enter data electronically from auxiliary external devices, such as Lensmeters and Auto Refractors. Electronically entering data into the Phoroptor VRx is possible, using one of the following options:

- Direct Connection - The external device sends data directly to the Phoroptor VRx and populates the AR and LM data fields since the device is directly connected to the Phoroptor VRx, using a serial cable or Bluetooth adapter.
- Direct Connection to a Stored Data List - The external device data is sent directly to the Phoroptor VRx and the data are stored in a Data List.
- Through EMR - If the EMR system interfacing with the Phoroptor VRx supports two-way communication, the external device sends data directly to the EMR system, and then the EMR system sends the data to the Phoroptor VRx.

Data Input (continued)

Inputting Data Electronically (continued)

Direct Connection

The measurement data from the Lensmeter and Auto Refractor directly populates the LM and AR data fields in the Controller display. The data transfer takes place when the user presses the data output buttons on each external device.

Direct Connection to a Stored Data List

The user can send Lensmeter and Auto Refractor data to a data list (Imported Data List) that you can import into the AR and LM data fields and use as the starting point of a refraction. You must check the Store box in the Port Settings for Instrument 1 and Instrument 2. The data for a specific patient is identified by a time stamp. Some external devices might also indicate an ID Number. This number is generated by the Lensmeter or Auto Refractor when the user selects the Numbering option in the Settings for the specific device.

1. Press the **IN** button to access the Imported Data List. (Please refer to Figure IU-11.)

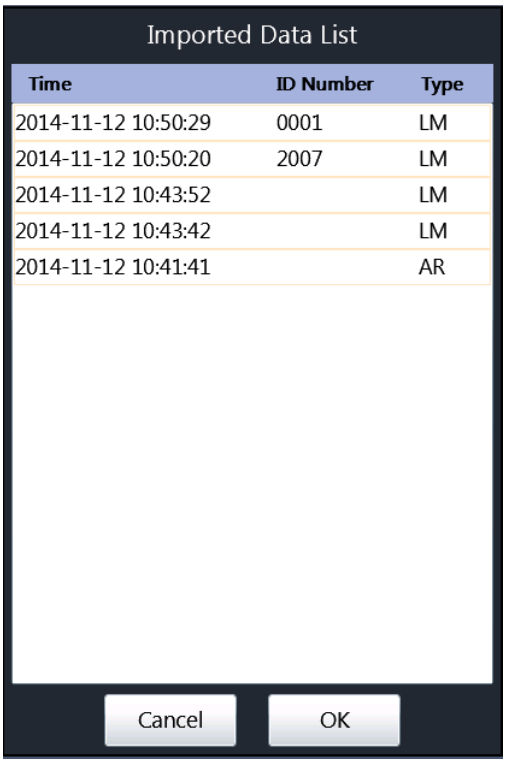


Figure IU-11, Sphere Active Boxes

2. Touch the data you want to import or use the **CONTROL KNOB** to select a data set.
   a. Touch **OK,** or press the **ENTER** button or **CONTROL KNOB** to bring the selected data set to the main screen.
   b. Touch **CANCEL** or press the **CLEAR** button to exit without importing data.

Adjust Values

Now that you aligned the Phoroptor Head and imported data, start the refraction.

Adjusting a Refraction From Previously Saved, Transferred, or Input Data

1. Touch the drop-down list in the main display area or press the **AR** or **LM** button on the keypad to select the data you want to use to start the refraction (*e.g.,* LM, AR).

   Note: The data in the boxes is transferred to the refraction data fields above and become active.

   Note: If the Subjective data set was previously modified, the AR or LM data is not copied to it.

   Note: The data is labeled the same way as in the data storage area (*e.g.,* LM).

   Note: The Phoroptor Head automatically switches in the lenses to reflect the information in the active field.

2. Adjust measurements from this starting point.
3. Once you make an adjustment, the label changes from the previous label (*e.g.,* LM, AR) to Subjective.

AR	LM	Subjective			LM	AR
-2.50	-2.25	-2.50	S	-2.25	-2.00	-2.25
-0.75	-0.75	-0.75	C	-0.50	-0.50	-0.50
103	100	100	A	80	80	82
0.00	+1.50	+1.50	Add	+1.50	+1.50	0.00
◂ 0.00	◂ 0.00	◀ 0.00	Prism	◀ 0.00	◂ 0.00	◂ 0.00
▾ 0.00	▾ 0.00	▼ 0.00		▼ 0.00	▾ 0.00	▾ 0.00
	VCC:	X	X	X		

Figure IU-12, Values Table

Eye Selection

1. Press the **R**, **L**, or **B** (Binocular) button to open the apertures for the right eye, left eye, or both eyes, respectively.

   Note: The aperture for the inactive eye automatically closes during refraction.

   Note: The default setting for the open aperture of a new exam is selected in the Setup Menu after turning on the unit.

   Note: The Refraction Sequence is determined by what you selected in the Setup Menu**.**

Adjust Values (continued)

Sphere

1. Activate the Sphere value field using one of the following two methods:

   Using the Touch Screen

   - Touch the **S** box in the main display area of the screen to activate the Sphere value field for both eyes.
   - Touch the box to the left or right of the **S** box to activate the Sphere value field for the selected eye.

   Using the Keypad

   - Press the **B** button, and then press the **S** button to activate the Sphere value field for both eyes.
   - Press the **R** or **L** button, and then press the **S** button to activate the Sphere value field for the selected eye.

   Note: The data fields for the eye you are measuring are shown in **white**.

   Note: The Sphere value field is highlighted in **yellow**, indicating it is active.

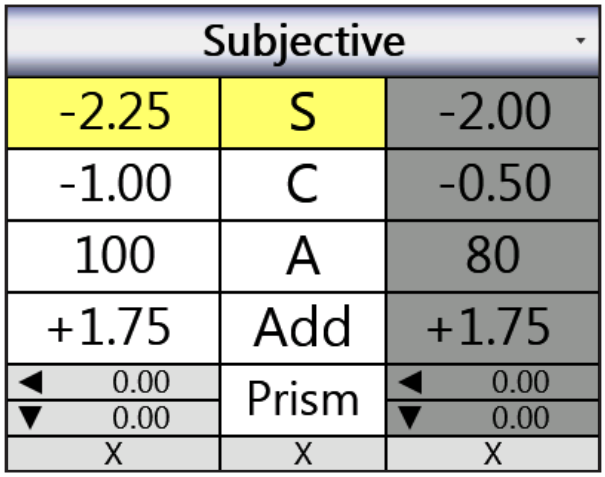


Figure IU-13, Sphere Active Boxes

2. Turn the **CONTROL KNOB** to adjust the Sphere value by ±0.25 D each.

   Note: Turn the Control Knob to the right to increase plus (+) Sphere value and to the left to increase minus (-) Sphere value.

   Note: Press and turn the **CONTROL KNOB** (at the same time) to adjust the Sphere value by ±1.00 D per click stop.

3. Press the **CONTROL KNOB** to move to the next step.

Adjust Values (continued)

Cylinder

1. Activate the Cylinder value field using one of the following two methods:

   Using the Screen

   - Touch the **C** box in the main display area of the screen to activate the Cylinder value field for both eyes.
   - Touch the box to the left or right of the **C** box to activate the Cylinder value field for the selected eye.

   Using the Keypad

   - Press the **B** button, and then press the **C** button to activate the Cylinder value field for both eyes.
   - Press the **R** or **L** button, and then press the **C** button to activate the Cylinder value field for the selected eye.

   Note: The data fields for the eye you are measuring are shown in **white**.

   Note: The Cylinder value field is highlighted in **yellow**, indicating it is active.

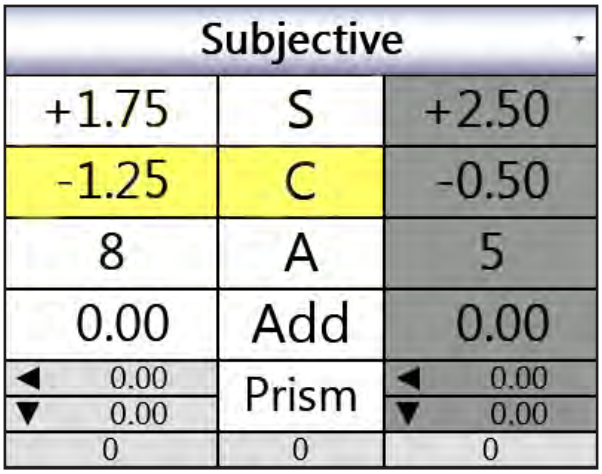


Figure IU-14, Cylinder Active Boxes

2. Turn the **CONTROL KNOB** to adjust the Cylinder value by 0.25 D in either direction. Press and turn the **CONTROL KNOB** to adjust the Cylinder value by 1.00 D per click stop.
   - If Minus (-) Cylinder is selected in the Options Menu, turn the **CONTROL KNOB** to the left to increase the Cylinder value (Axis on Axis), or turn the **CONTROL KNOB** to the right to decrease the Cylinder value (Axis against Axis).
   - If Plus (+) Cylinder is selected in the Options Menu, turn the **CONTROL KNOB** to the left to decrease the Cylinder value (Axis on Axis), or turn the **CONTROL KNOB** to the right to increase the Cylinder value (Axis against Axis).
   - If Plus/Minus (±) Cylinder is selected in the Options Menu, turn the **CONTROL KNOB** to the right to increase Plus Cylinder power and decrease Minus Cylinder power, and turn the **CONTROL KNOB** to the left to increase Minus Cylinder power and decrease Plus Cylinder power.
3. Press the **CONTROL KNOB** to move to the next step.

Adjust Values (continued)

Sphere and Cylinder - Maintaining Spherical Equivalent

You can adjust both the Sphere and Cylinder values simultaneously to maintain the spherical equivalent. This adjustment is done monocularly and binocularly.

1. Press the **C** button, or touch **C** or the data field next to the **C** on the screen when Cylinder is already selected. The data fields for the eye you are measuring are shown in **white**. Both the Sphere and Cylinder values are highlighted in **yellow**, indicating they are both active.

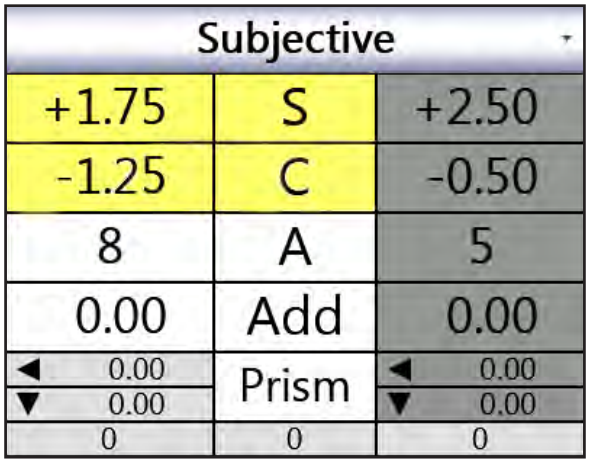


Figure IU-15, Sphere and Cylinder Active Boxes

2. Turn the **CONTROL KNOB** to adjust the Sphere and Cylinder values together. A change of 0.50 D in Cylinder power results in a corresponding 0.25 D change in Sphere power. Turning the **CONTROL KNOB** to the right increases Plus Cylinder and adds Minus to the Sphere power. Turning the **CONTROL KNOB** to the left decreases Minus Cylinder and adds Plus to the Sphere power.

Adjust Values (continued)

Axis

1. Use one of the following two methods to activate the desired Axis value field:

   Using the Screen

   - Touch the **A** box in the main display area of the screen to activate the Axis value field for both eyes.
   - Touch the box to the left or right of the **A** box to activate the Axis value field for the selected eye.

   Using the Keypad

   - Press the **B** button, and then press the A Keypad button to activate the Axis value field for both eyes.
   - Press the **R** or **L** button, and then press the **A** button to activate the Axis value field for the selected eye.

   Note: The data fields for the eye you are measuring are shown in **white**.

   Note: The Axis value field is highlighted in **yellow**, indicating it is active.

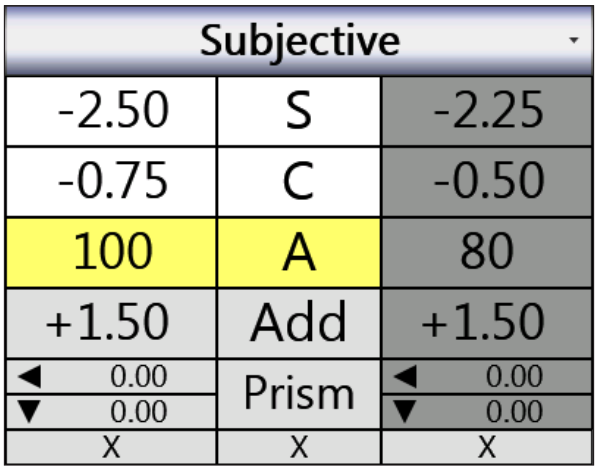


Figure IU-16, Axis Active Boxes

2. Turn the **CONTROL KNOB** to adjust the Axis value.

   Note: Turn the **CONTROL KNOB** in either direction to change Axis by 1°.

   Note: Press and turn the **CONTROL KNOB** (at the same time) to adjust the Axis value by 10° per click stop.

   Note: The actual position of the Axis is graphically shown on the display in the lens aperture icon.

3. Press the **CONTROL KNOB** to move to the next step.

Adjust Values (continued)

Near Vision Addition

1. Lower the Near Vision Rod and Card to activate the Near Vision Addition (ADD) value field using one of the following two methods: Lowering the Near Vision Rod and Card automatically converges the Phoroptor, highlights the ADD data fields in the screen, and darkens the Acuity Chart screen.

   Using the Screen

   - Touch the **ADD** box in the main display area of the screen to activate the Near Vision Addition value field for both eyes.
   - Touch the box to the left or right of the **ADD** box to activate the Near Vision Addition value field for the selected eye.

   Using the Keypad

   - Press the **B** button, and then press the **ADD** button to activate the Near Vision Addition value field for both eyes.
   - Press the **R** or **L** button, and then press the **ADD** button to activate the Near Vision Addition value field for the selected eye.

   Note: Make sure the Reading rod is lowered when measuring near vision addition. If the rod is not lowered, an error message of “Convergence” displays at the top right of the screen and a “Beep” sounds.

   Note: The data fields for the eye you are measuring are highlighted in **white**.

   Note: The Near Vision Addition (ADD) field you are changing is highlighted in **yellow**.

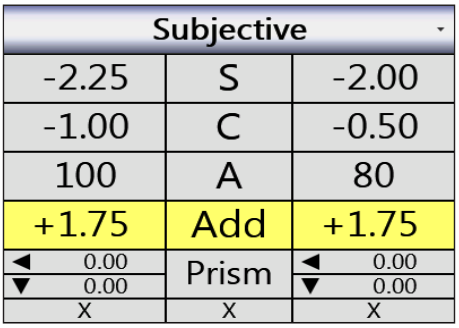


Figure IU-17, Near Vision Addition Active Boxes

2. Verify that you lowered the Near Vision Rod and Card.

   Note: You must lower the rod and card to isolate the measurements for Near Vision Addition.

3. Turn the **CONTROL KNOB** to adjust the Near Vision Addition value by ±0.25 D increments.

   Note: Turn the **CONTROL KNOB** to the right to increase plus (+) Near Vision Addition value and to the left to decrease plus (+) or add minus (-) Near Vision Addition value.

   Note: Press and turn the **CONTROL KNOB** (at the same time) to adjust the Near Vision Addition value by ±1.00 D per click stop.

4. Press the **CONTROL KNOB** to save the value and exit Near Vision mode.

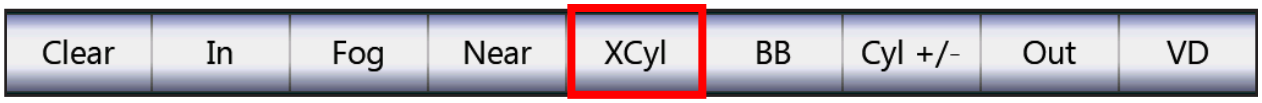
5. Raise the Near Vision Rod and Card to remove the plus (+) Sphere power lenses. The projector screen is illuminated again. If the user selected a chart while in Near Vision testing mode, that chart is displayed.

Cross Cylinder

The Cross Cylinder function enables:

- Examination for Astigmatism.
- Axis adjustment.
- Cylinder power adjustment.

1. Touch **XCyl** in the menu bar at the bottom of the main screen to activate the Cross Cylinder function.



Note: The following screen appears:

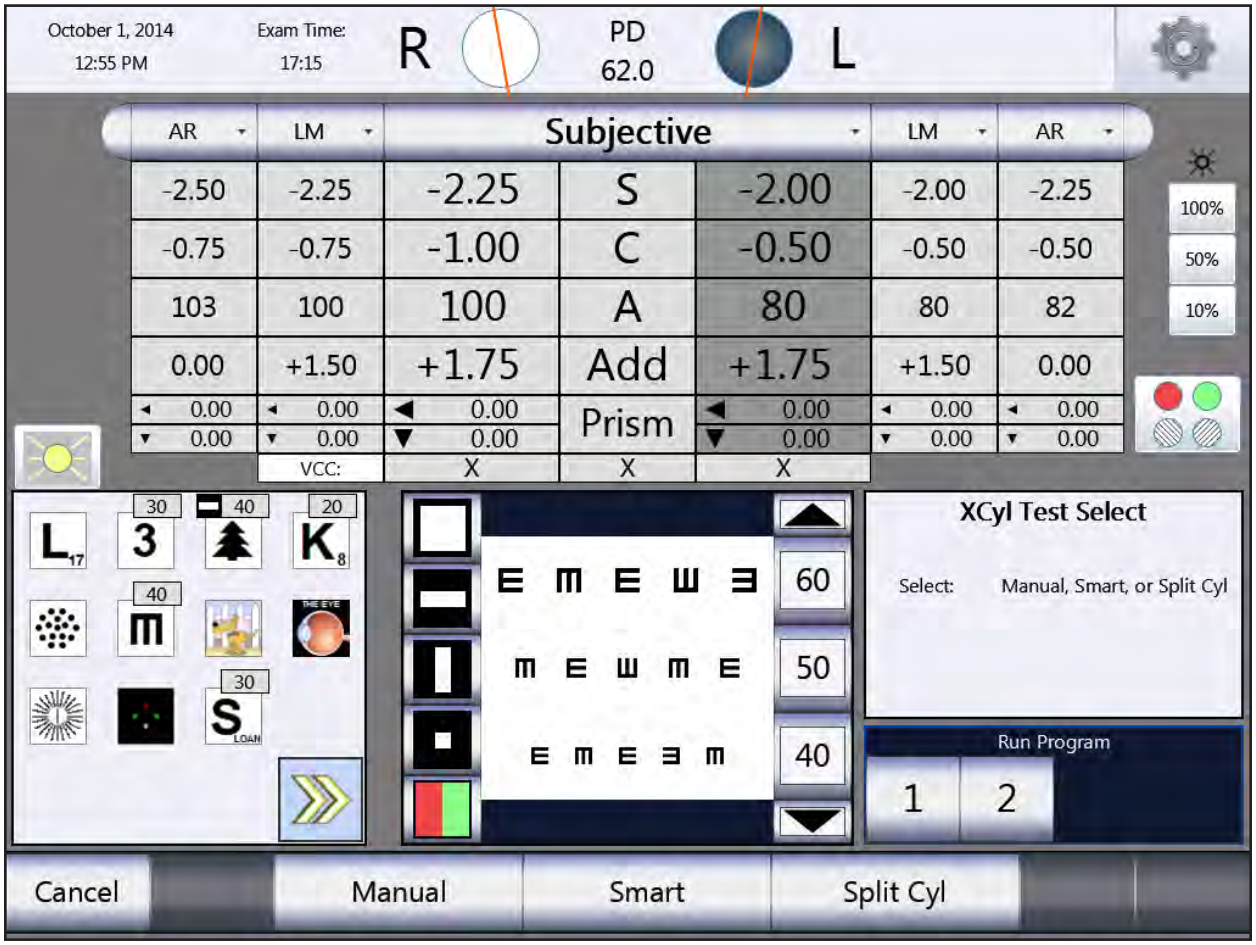


Figure IU-18, Cross-Cylinder Screen

Cross Cylinder - Smart/Manual/Split Cyl Test

If the XCyl Mode setting is “User Select,” three test options display.

- MANUAL - Refine Axis in 1°, 5°, or 10° increments, and adjust Cylinder in ±0.25 D, ±0.50 D, or ±1.00 D increments.
- SMART - Automatically bracket Axis and Cylinder based on the amount of Cylinder in the prescription.
- SPLIT Cyl - Use a Split Cyl to present two targets simultaneously to refine Axis and Cylinder.

Cross Cylinder Test Settings

The Options/Setup menu settings allow the user to select one of the following button control options for the Cross Cylinder test:

Blue Knob (Control Knob)

1. Press the **CONTROL KNOB** to select patient preference in the test (“which is better, 1 or 2?”).
2. Press the **ENTER** button if the patient states that both charts are the same to advance to the next step in the test (*e.g.,* Axis to Cylinder).

Enter Button

1. Press the **ENTER** button to select patient preference in the test (“which is better, 1 or 2?”).

Examination for Astigmatism

If the Cross Cylinder Mode (XCyl) is activated and a Cylinder value is not present, you need to perform an Astigmatism check. The Astigmatism check automatically activates in each test mode when no Cylinder power is present.

1. Turn the **CONTROL KNOB** to present the Cross Cylinder target at 0° and 90°.
2. Ask the patient “which is better, 1 or 2?”
   - If the patient states a preference, turn the **CONTROL KNOB** to that number and press or touch **1** or **2** on the screen.
   - If the patient does not see a difference between the two charts, press the **ENTER** button or touch **EQUAL** on the screen.
3. Ask the patient to compare two charts at 45° and 135°.
   - If the patient states the charts are equal, no astigmatic correction is needed.
   - If the patient has a preference, turn the **CONTROL KNOB** to that number and press or touch **1** or **2** on the screen.

Note: The test automatically advances to axis adjustment for the XCyl test that was selected.

Note: You can also adjust Sphere by touching the Sphere area in the data grid or pressing the **S** button.

Cross Cylinder - Manual Test

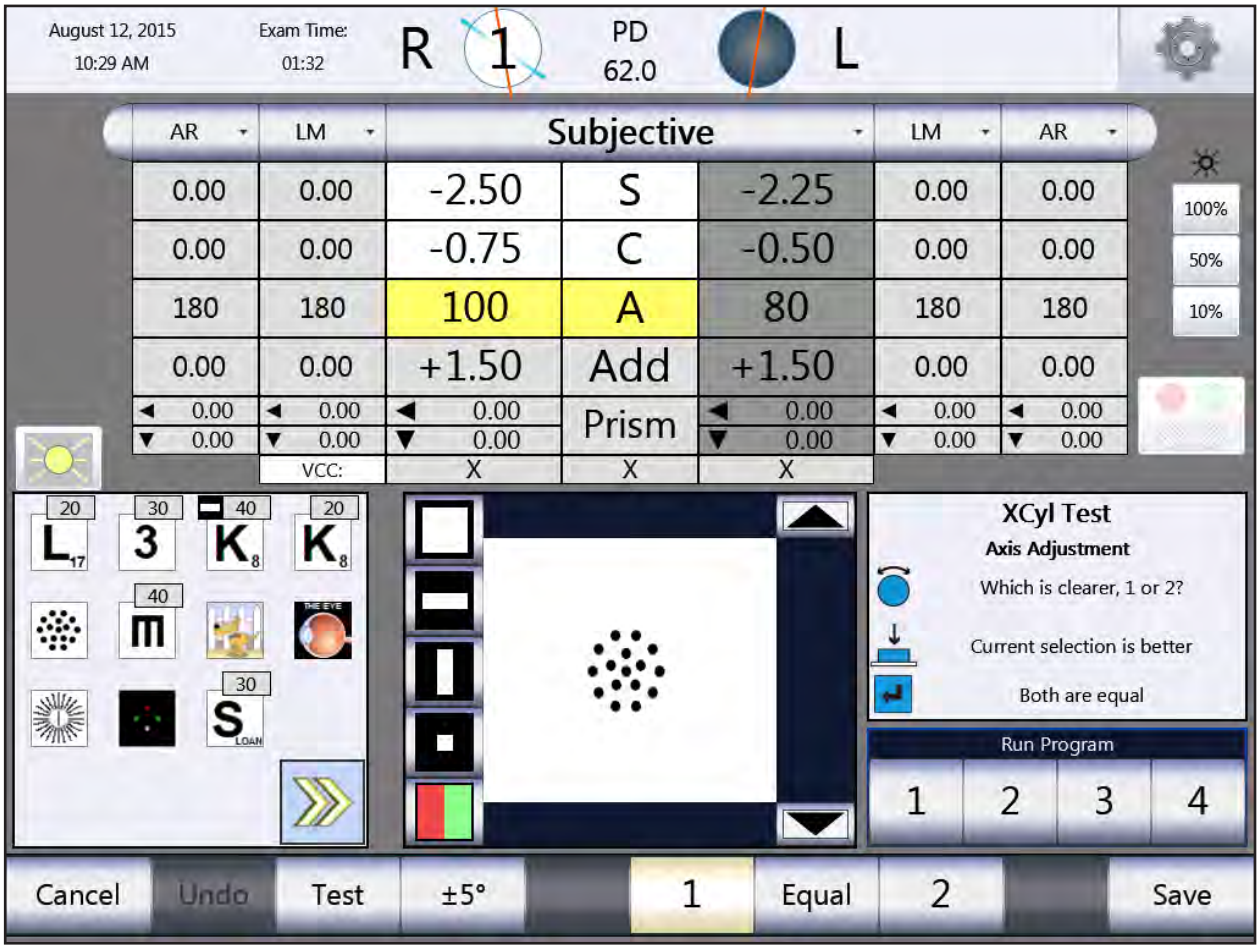


Figure IU-19, Cross Cylinder - Manual Test Screen

The Manual Cross Cylinder test allows the user to refine Axis in 1°, 5°, or 10° increments, and adjust Cylinder in ±0.25 D, ±0.50 D, or ±1.00 D increments. (Please refer to Figure IU-19.)

- The Manual Cross Cylinder Test is performed monocularly.
- The Spherical equivalent is maintained during the Cylinder power adjustment.
- If no Cylinder power if present, the Astigmatism check is done first, followed by the Axis adjustment. If default charts are selected for the XCyl test, these charts are presented to the patient. Otherwise, select a chart from the Available Chart Selection.

1. Touch **XCyl** on the menu bar at the bottom of the main screen.
2. Touch **MANUAL** to start the test.

   Note: The Manual Cross Cylinder test always begins with the Axis adjustment.
   Note: Touch Test to switch the type of XCyl test (Manual/Smart/Split Cyl).
3. Touch **1°**, **5°**, or **10°**, located in the lower left of the screen to select the increment of the Axis adjustment.

   Note: Touch it repeatedly to cycle through the different increments.

Cross Cylinder - Manual Test (continued)

4. Turn the **CONTROL KNOB** to present position 1 and position 2 to the patient. The direction of the Axis change is indicated in the lens aperture at the top of the screen.
5. Ask the patient: “Which is better, 1 or 2?”
6. Change the Cylinder Axis to this preferred direction when the patient states a preferred position.
7. Press the **CONTROL KNOB**, or touch the **NUMBER** on the screen (1 or 2), to enter the patient’s preferred selection.
8. Repeat steps 3 - 6, until Chart 1 and Chart 2 are equally clear or equally blurry.
9. Press the **CONTROL KNOB**, or touch **EQUAL** on the screen, to advance to Cylinder power adjustment.

   Note: You can Undo a step in the Cross Cylinder test by touching the **UNDO** screen icon at the bottom left of the screen.

   Note: You can also adjust Sphere by touching the Sphere area in the data grid or pressing the **S** button.

Freely Selectable Axis Adjustment

It is possible to adjust axis beyond whatever increment was selected for the axis adjustment (**1°**, **2°**, **5°**, **10°**, **20°**). Turn the **CONTROL KNOB** 8 click stops in one direction when offering position 1 or 2 to the patient. After the 8th click stop, the axis changes in **1°** increments. This allows the user to freely modify the axis in that direction.

Cross Cylinder - Smart Test

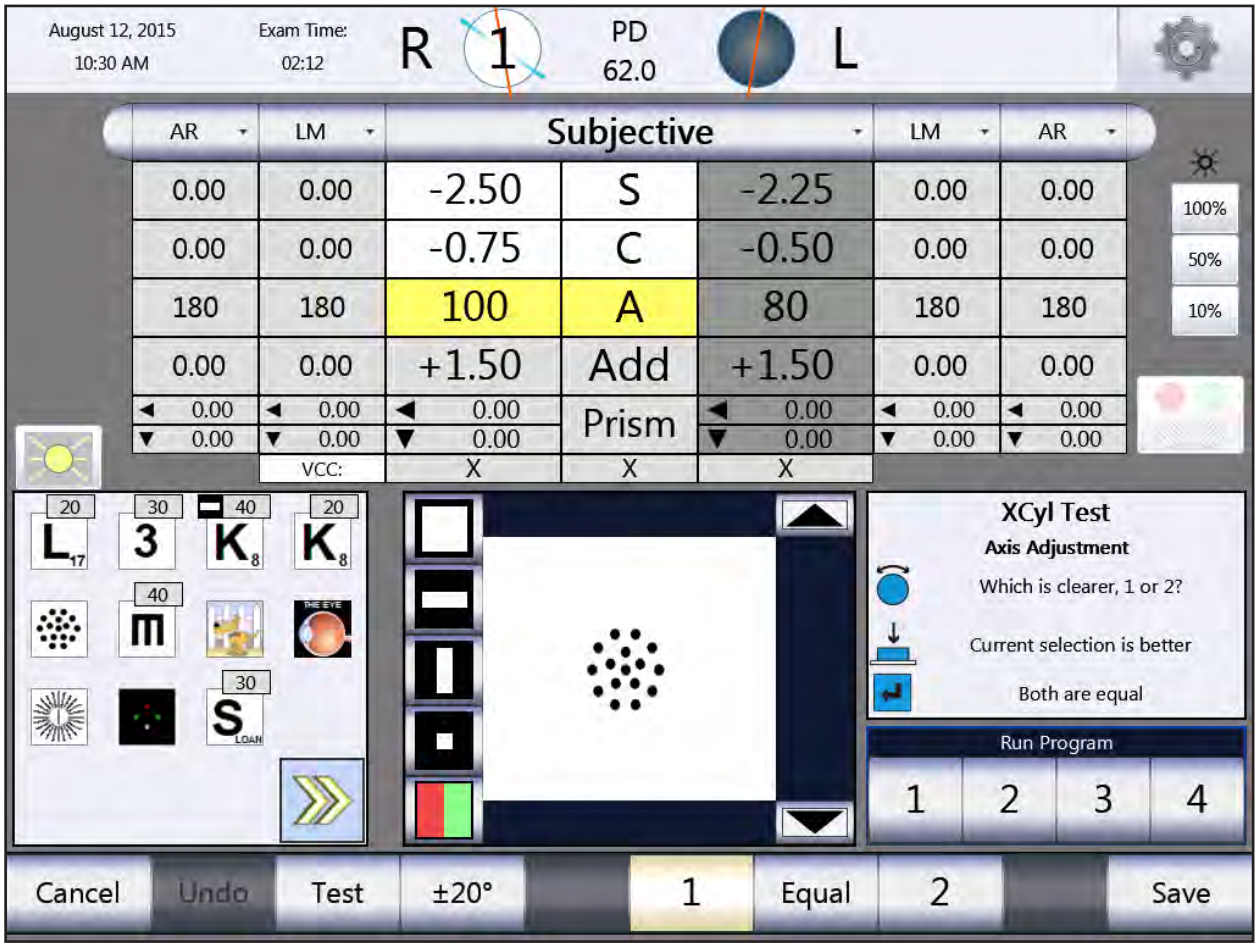


Figure IU-20, Cross Cylinder - Smart Test Screen

Axis Adjustment

1. Touch **XCyl** on the menu bar at the bottom of the main screen.
2. Touch **SMART** to begin the Smart Cylinder test.
   - The Smart Cross Cylinder test is performed monocularly.
   - Spherical equivalent is maintained during the Cylinder power adjustment.
   - If no Cylinder power is present, the Astigmatism check is done first, followed by the Axis adjustment.
   - If default charts are selected for the XCyl test, these charts are presented to the patient. Otherwise, select a chart from the available charts section.
3. Turn the **CONTROL KNOB** to change the position of the conventional Cross Cylinder.
4. Ask the patient: “Which is better (sharper and clearer), 1 or 2?”
5. Change the Cylinder Axis in the direction the patient prefers.
6. Press the **CONTROL KNOB**, or touch the **NUMBER** (1 or 2), to enter the patient’s preferred selection.

Note: Touch Test to switch the type of XCyl test (Manual/Smart/Split Cyl).

Cross Cylinder - Smart Test (continued)

Programmed Axis Adjustment

1. Turn the **CONTROL KNOB** to change the Axis value in pre-programmed steps.

   Note: The degree of the first change depends on the Cylinder power. The higher the cylinder power, the smaller the change:

Cylinder Power	First Alteration
0.25 to 0.75 D	20°
1.00 to 2.75 D	10°
3.00 to 8.00 D	5°

   Note: You can also change the degree of Axis change by touching the **1°**, **5°**, **10°**, or **20°** screen icon, located in the lower left of the screen.

2. Press the **CONTROL KNOB**, or touch **1** or **2** on the screen to enter the patient's preferred selection.

3. Press the **ENTER** button, or touch the **EQUAL** screen icon, when the patient indicates that the target appears equally clear or equally blurry.

   Note: Once you complete the Axis adjustment, the next step is Cylinder power adjustment.

   Note: Touch **UNDO** to go back any number of steps in the Cross Cylinder test.

   Note: The Axis position appears as a red line in the Lens aperture.

Freely Selectable Axis Adjustment

It is possible to adjust axis beyond whatever increment was selected for the axis adjustment (**1°**, **2°**, **5°**, **10°**, **20°**). Turn the **CONTROL KNOB** 8 click stops in one direction when offering position 1 or 2 to the patient. After the 8th click stop, the axis changes in **1°** increments. This allows the user to freely modify the axis in that direction.

Cross Cylinder - Smart Test (continued)

Programmed Cylinder Power Adjustment

1. Turn the **CONTROL KNOB** to adjust the Cylinder power.
2. Present the patient with positions 1 and 2.
   - The Cylinder power adjustment is performed in pre-programmed steps.
   - The Cylinder power initially changes in ±0.50 D increments, and then refines to ±0.25 D changes.
   - The Spherical equivalent is maintained during the entire Cross Cylinder test.
   - You can also touch the ±0.25 D, ±0.50 D, or ±1.00 D screen icon to control the amount of Cylinder power adjustment.
3. Ask the patient: “Which is better (sharper and clearer), 1 or 2?”
4. Press the **ENTER** button, or touch **EQUAL** on the screen, to enter the patient’s preferred position and end the test.

   Note: If the patient goes back and forth in a ±0.25 D change in power, select a position and end the test.

Freely Selectable Cylinder Power Adjustment

It is possible to adjust cylinder beyond whatever increment was selected for the Cylinder adjustment (±0.25 D, ±0.50 D, or ±1.00 D). Turn the **CONTROL KNOB** eight (8) click stops in one direction when offering position 1 or 2 to the patient. After the eighth (8^{th}) click stop, the cylinder changes in 0.25D increments. This allows the user to freely modify the Cylinder.

Cross Cylinder - Split Cyl Test

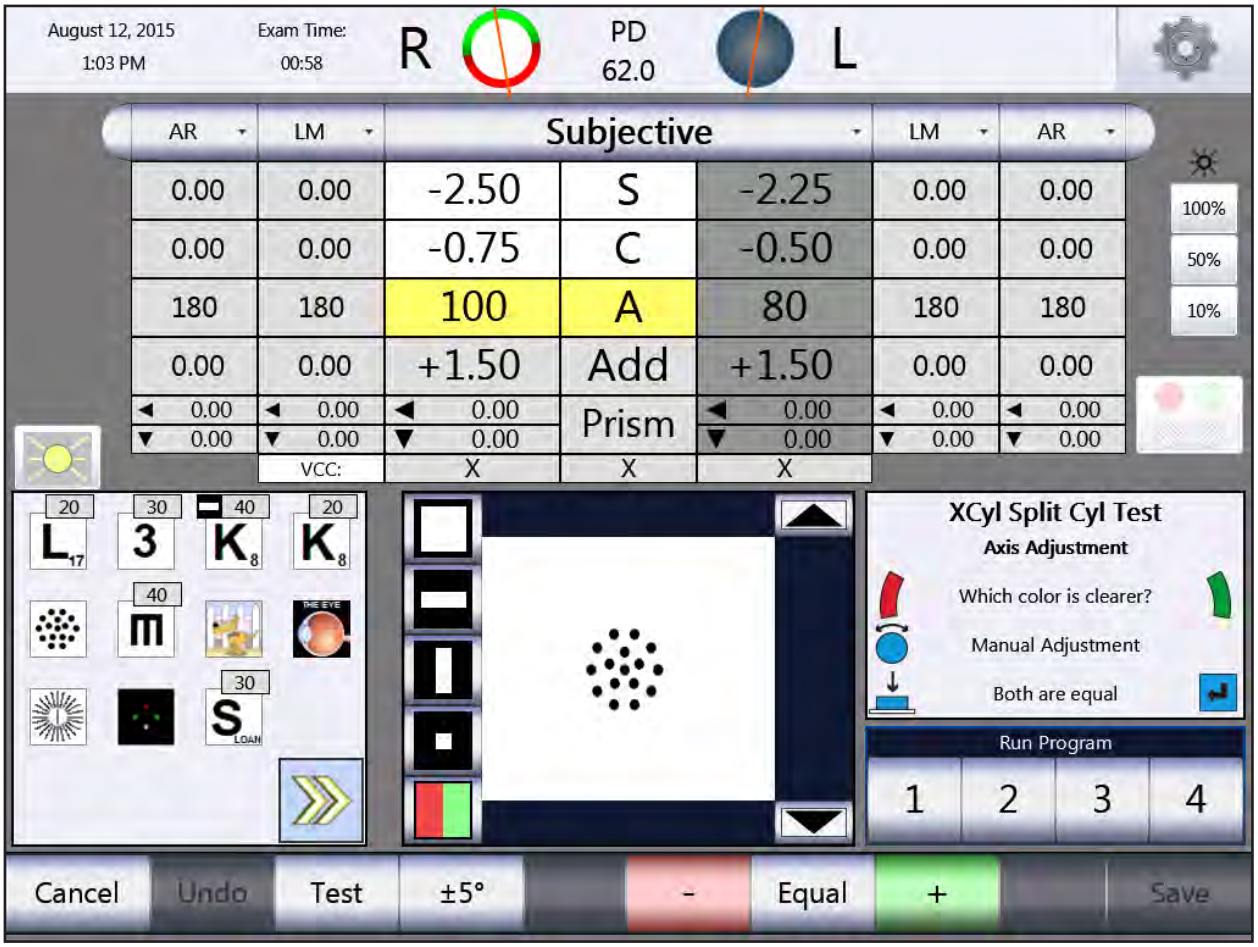


Figure IU-21, Cross Cylinder - Split Cyl Test Screen

The Split Cyl Cross Cylinder test allows the patient to see two test charts at the same time when adjusting Axis and Cylinder, making it easier for the patient to compare different Axis positions and Cylinder power values. (Please refer to Figure IU-21.)

The Split Cyl lens has red and green markings on each half of the lens. The patient indicates to the examiner which test chart appears clearer, by stating whether the chart corresponding to the red or green side of the lens appears clearer.

1. Touch **XCyl** on the menu bar at the bottom of the main screen.
2. Touch **Split Cyl** to start the test.
3. Touch **Test** to switch the type of XCyl test (Manual/Smart/Split Cyl).

Cross Cylinder - Split Cyl Test (continued)

Axis Adjustment

4. Touch the screen icon at the bottom left of the screen that indicates the degree of Axis change.
   - The degree of Axis change increments are 1°, 5°, or 10°.
   - Touch the icon repeatedly to cycle through the different increments.
5. Ensure that the patient can see the red and green sides of the Split Prism lens.
6. Ask the patient: “Which is better (sharper and clearer), the red or the green?”
7. Press the **RED** or the **GREEN** button, or touch **RED 1** or **GREEN 2**, based on the patient’s response.
8. Repeat steps 3 and 4, until the patient sees the two test chart images equally clear or equally blurry.
9. Press the **ENTER** button, or touch **EQUAL**, to save the Axis value.

   Note: Axis is freely adjustable by turning the **CONTROL KNOB**.

Cylinder Power Adjustment

Once the Axis adjustment is complete, the Split Prism Cross Cylinder test automatically advances to the Cylinder power adjustment.

1. Touch the **±0.25 D**, **±0.50 D**, or **±1.00 D** screen icon at the bottom left of the screen to change the Cylinder power values.
2. Ask the patient: “Which is better (sharper and clearer), the red or the green chart?”
3. Press the **RED** or the **GREEN** button, or touch **RED 1** or **GREEN 2**, based on the patient’s response.
4. Repeat steps 2 and 3, until the patient sees the two test chart images equally clear or equally blurry.
5. Press the **ENTER** button, or touch **EQUAL**, to save the Cylinder value. This completes the Split Cyl Cross Cylinder test.

   Note: When the patient has Sphere power equal to or greater than -12.25 D or 7.75 D, the Split Cyl test does not activate.

   Note: Cyl is freely adjustable by turning the **CONTROL KNOB**.

   Note: For all Split Cyl test, you can also adjust Sphere by touching the Sphere area in the data grid or pressing the **S** button.

Near Vision Test

If required, perform a Near Vision test with a test chart on a Near Vision rod.

1. Insert the Near Vision rod and test chart into the Convergence Lever on the bridge of the Phoroptor Head if it not already in place. The thumb screw in the center of the Convergence Lever is used to loosen or secure the Near Vision Rod.
2. Touch NEAR on the menu bar at the bottom of the main screen.

3. Lower the Near Vision rod.
   - The ADD boxes are highlighted.
   - Both apertures are open.
   - Both refractor halves converge to 15.75 in. (40 cm).

   Note: The Reading Card automatically illuminates when the Near Vision rod is lowered.
4. Press the illuminator light button on the underside of the Card Illuminator to adjust the light level.

   Note: The illuminator light has two intensity levels.
5. Turn the **CONTROL KNOB** to the right to add power in 0.25 D increments.

   Note: Ensure that the patient's forehead is positioned against the forehead rest.
6. When the Near Vision test is completed, raise the Near Vision rod. The ADD boxes are no longer active and the ADD power is removed.

   Note: If the ADD data fields are activated and the Near Vision rod is not lowered, a "Convergence" message appears at the top of the screen, reminding you to lower the rod.

   Note: If the Near Vision rod is not raised after completing the test, a message appears at the top of the screen.

Near Vision Test (continued)

The Near Vision screen provides you with three modes of operation, detailed in the following sections: (Please refer to Figure IU-22.)

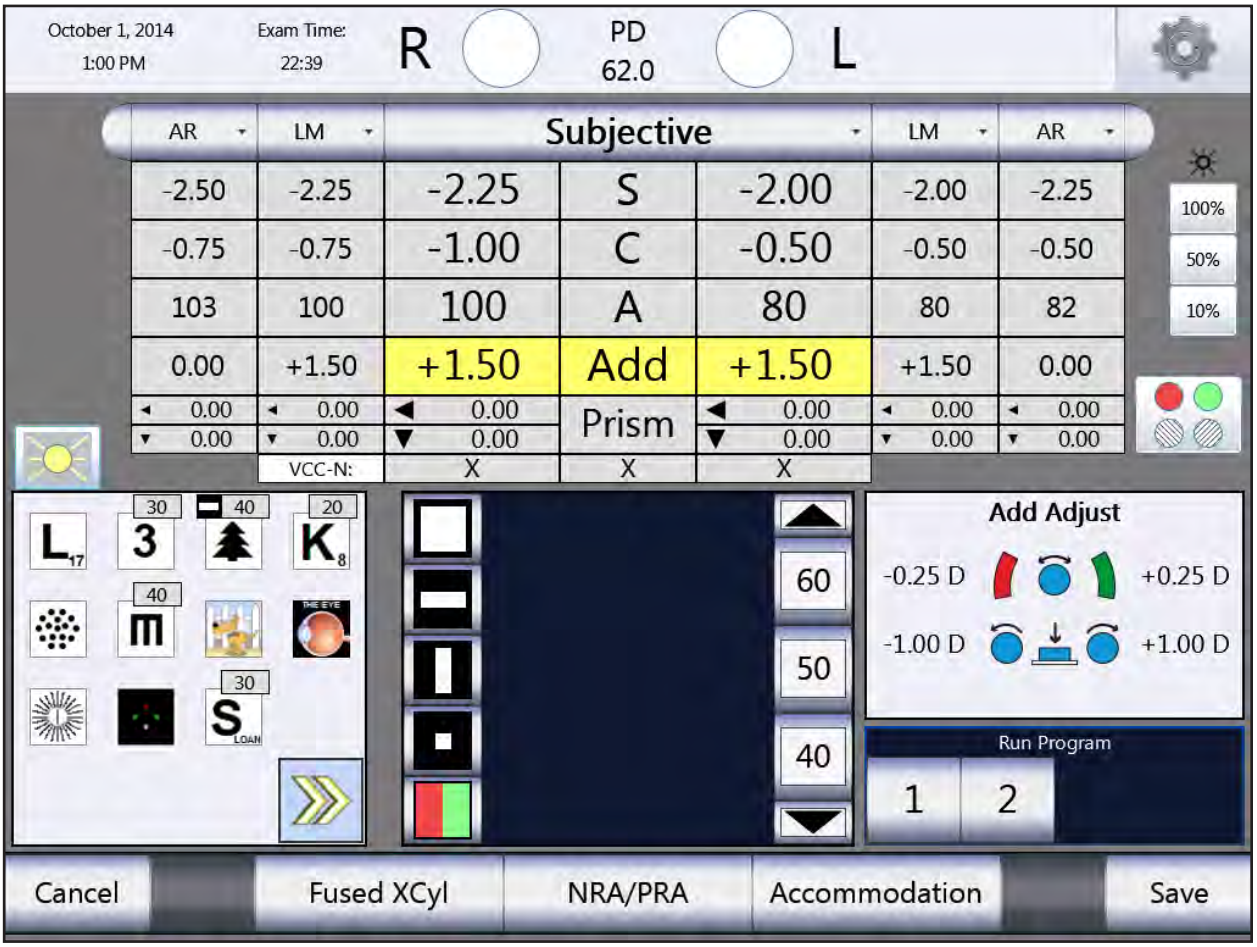


Figure IU-22, Cross Cylinder - Near Vision Test Screen

Fused Cross Cylinder Test

1. Select the Cross Grid Chart  on the reading card.

   Note: The Fixed Cross Cylinder lenses (+0.50 D, Axis 90°) are placed in the lens apertures.

2. Ask the patient: “Which is better (sharper and clearer), the horizontal or the vertical lines?”
3. Turn the **CONTROL KNOB** to add plus (+) power.
4. Repeat steps 2 and 3, until the patient states that the horizontal and vertical lines appear equally sharp and clear, or the opposite lines appear sharper or clearer.
5. Press the **CONTROL KNOB** or **ENTER** button, or touch **EQUAL**, to save the values.

Near Vision Test (continued)

Fused Cross Cylinder Test (continued)

6. Touch **SET ADD** to set the patient's Add value to that determined by the Fused Cross Cylinder test.

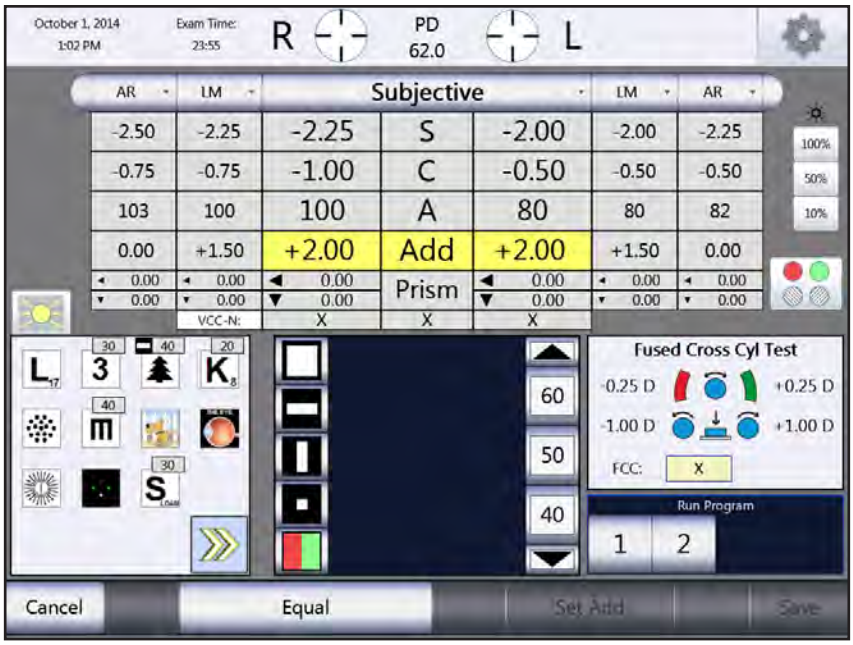


Figure IU-23, Fused XCyl Test

Near Vision Test (continued)

NRA/PRA Test

You can also determine Near Vision Addition by measuring Negative Relative Accommodation (NRA) and Positive Relative Accommodation (PRA). The order of the test depends on the settings you selected in the Options/Setup Menu, either NRA/PRA or PRA/NRA.

1. Select a target of lines of letters in descending size or other optotypes on the reading card.

   Note: The NRA/PRA test requires the user to first identify the upper limit of the accommodation range.

2. Turn the **CONTROL KNOB** to add plus (+) power in 0.25 D increments, until the patient states that the smallest lines of the optotype appear clear.
3. Continue to turn the **CONTROL KNOB** to add plus (+) power, until the patient states that the image blurs.
4. Press the **CONTROL KNOB** or **ENTER** button, or touch **BLUR**, to save the upper limit.
5. Turn the **CONTROL KNOB** in the opposite direction to decrease plus (+) power, until the patient states that the chart appears clear again.
6. Continue to turn the **CONTROL KNOB** to decrease plus (+) power, until the patient states that the image blurs again.
7. Press the **CONTROL KNOB** or **ENTER** button, or touch **BLUR,** to save the lower limit.
8. To exit the test, perform one of the following steps:

   A. Press the **CONTROL KNOB** or **ENTER** button, or touch **SET ADD**, to set the ADD value to the midpoint of the NRA and PRA values and exit the test.

   B. Touch **SAVE** to save the NRA/PRA values without setting the patient's ADD value and exit the test.

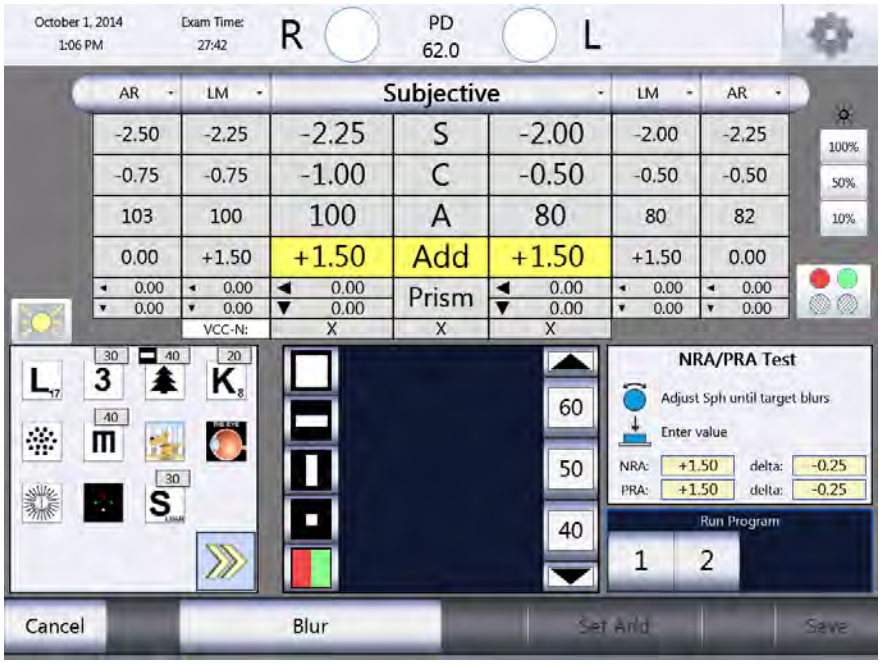


Figure IU-24, NRA/PRA Test

Near Vision Test (continued)

Amplitude of Accommodation Test

1. Touch the **ACCOMMODATION** screen icon to measure the Amplitude of Accommodation or Accommodative Response.

   Note: Amplitude of Accommodation is measured monocularly.

2. Turn the **CONTROL KNOB** to add minus (-) power to the right eye (using the patient's Near Vision addition as the starting point), until the patient states that the target blurs.

3. Press the **CONTROL KNOB** or **ENTER** button, or touch **BLUR**, to save the right eye value.

4. Turn the **CONTROL KNOB** to add minus (-) power to the left eye (using the patient's Near Vision addition as the starting point), until the patient states that the target blurs.

5. Press the **CONTROL KNOB** or **ENTER** button, or touch **BLUR,** to save the left eye value.

6. Press the **CONTROL KNOB** or **ENTER** button, or touch **SAVE,** to save the Accommodation values and exit the test.

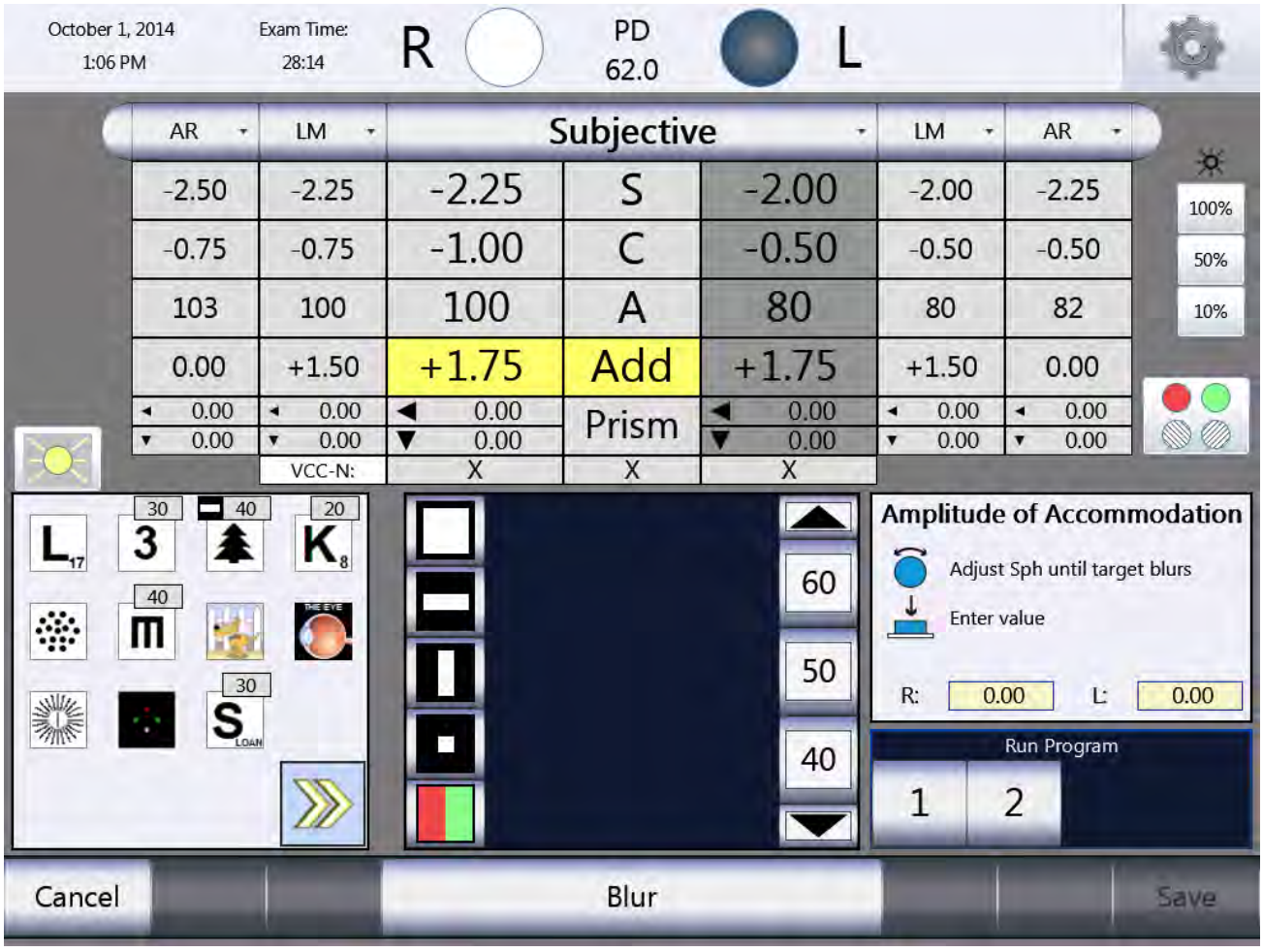


Figure IU-25, Amplitude of Accommodation Test

Prism Testing

Prism lenses are built separately into the Phoroptor VRx and move in automatically when the prism test is engaged.

Note: Not all models of the Phoroptor VRx come with prism compensators.

1. Press the **PRISM** button, or touch **PRISM,** to begin the Prism test.

   Note: The prism compensators automatically slide into place.

   Note: When using any of the automated Prism tests (*e.g.,* Phoria, Vergence, Binocular Balance), the lens apertures are occluded initially when the prism compensators are activated, and open after the prism power is in place.

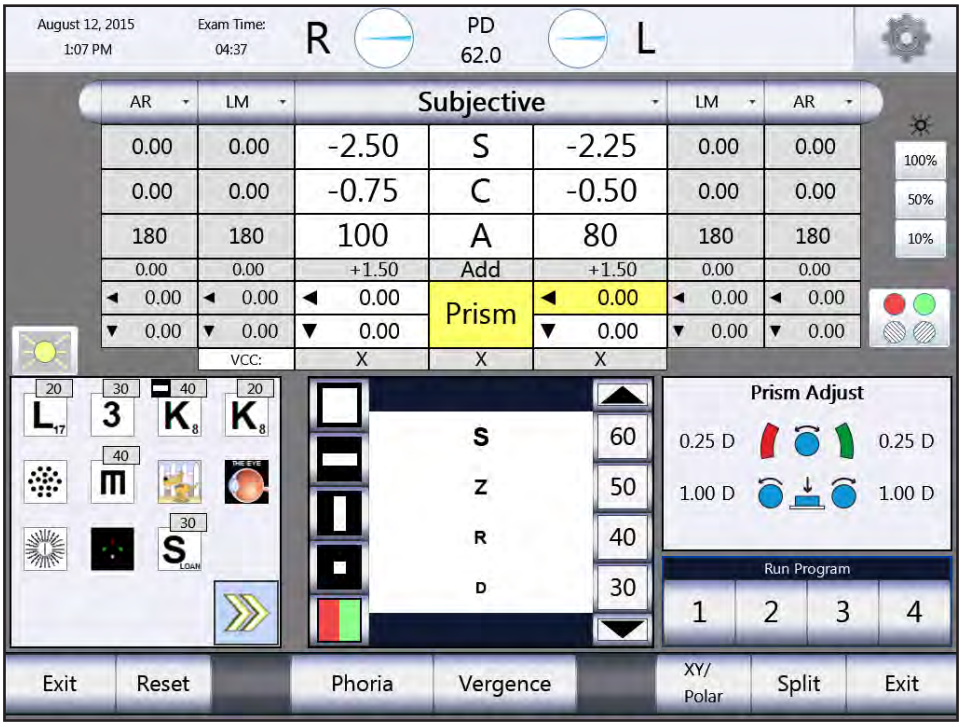


Figure IU-26, Adjust Prism Values

Note: The small triangles next to the Prism box on the data table indicate the orientation and direction of the Prism in each eye:

◄ = Horizontal prism - Right Eye: Base In (BI), Left Eye: Base Out (BO)

► = Horizontal prism - Right Eye: Base Out (BO), Left Eye: Base In (BI)

▼ = Vertical prism - Right Eye and Left Eye: Base Up (BU)

▲ = Vertical prism - Right and Left Eye: Base Down (BD)

2. Touch the box on the screen for the eye and the prism base orientation (horizontal or vertical) you want to change.
3. Turn the **CONTROL KNOB** to add Prism in either the right or left eye.

Prism Testing (continued)

Horizontal Prism - Right Eye

- Turn the **CONTROL KNOB** left to add BO prism in 0.25 D increments.
- Turn the **CONTROL KNOB** right to add BI prism in 0.25 D increments.

Horizontal Prism - Left Eye

- Turn the **CONTROL KNOB** left to add BI prism in 0.25 D increments.
- Turn the **CONTROL KNOB** right to add BO prism in 0.25 D increments.

Vertical Prism - Right and Left Eye

- Turn the **CONTROL KNOB** right to add BU prism in 0.25 D increments.
- Turn the **CONTROL KNOB** left to add BD prism in 0.25 D increments.

  Note: Press and turn the **CONTROL KNOB** (at the same time) to add prism in 1.00 D increments.

XY and Polar Coordinates

1. Touch **XY/POLAR** to temporarily view the Prism in XY (BI/BO, BU/BD) or Polar Coordinates (degrees).

Split Prism

1. Touch **SPLIT** to balance the current Prism power equally in each eye.

Prism Testing (continued)

Automated Prism Test - Phorias, Vergences

When you activate the Prism function, two different automated test options appear at the bottom of the screen: Phoria and Vergence.

- Touch **PHORIA** to sequence through a series of automated steps for measuring Phorias at distance or near.
- Touch **VERGENCE** to activate an automated test to measure vergence at distance or near.

Phoria Testing - Distance

1. Press the **PRISM** button, or touch **PRISM**.
2. Touch **PHORIA** in the menu bar at the bottom of the screen.

   Note: The Phoria test automatically places Prism power of 6 D BD in the right eye and 10 D BI in the left eye.

Adjust Initial Prism Values

1. If the default base prism values are not a good starting point for a particular patient, press the **ADJUST INITIAL VALUES** button to modify them.
2. Turn the **CONTROL KNOB** to adjust the value for the selected Phoria base.
3. Press the **CONTROL KNOB** to switch to the opposite base value.
4. After the desired base values are set, press the **SAVE** button or the **ENTER** key to save the values and return to the Phoria test.
5. Press **CANCEL** to discard the modified base values and return to the Phoria test.

Note: The base values are only set for the current exam. They will return to the original default values when a new exam is started.

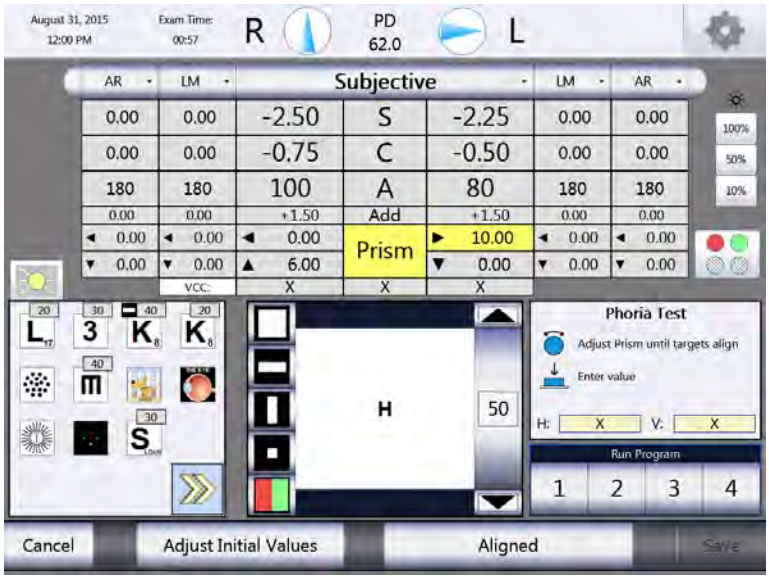


Figure IU-27, Horizontal Phoria Test Screen

Prism Testing (continued)

Horizontal Phorias Test

1. Select an appropriate test chart of a single vertical line of optotypes or a single optotype. (Please refer to Figure IU-27.)
2. Verify that the patient can see two images, one up and one down.
3. Enter BO Prism or add more BI Prism, if the patient cannot see two targets.
4. Enter BO Prism, until the two images align, like buttons on a shirt.
5. Press the **CONTROL KNOB**, or touch **ALIGNED**.

   Note: The magnitude of lateral Phoria is the power of the Prism when the images are aligned.

   Note: The power of horizontal Phoria appears in the dialog box in the section labeled “H”.

Vertical Phorias Test

After the horizontal phoria is determined, the Prism power is restored to 10 BI Prism in the left eye, as a starting value for the vertical phoria test. (Please refer to Figure IU-28.)

1. Select an appropriate test chart of a single horizontal line of optotypes or a single optotype.
2. Verify that the patient can see two images.
3. Enter BU Prism until the two images align horizontally, like headlights on a car to measure the vertical phoria.
4. Press the **CONTROL KNOB**, or touch **ALIGNED**.

   Note: The magnitude of the vertical Phoria is the power of the Prism when the images are aligned.

   Note: The power of the vertical Phoria appears in the dialog box in the section labeled “V”.

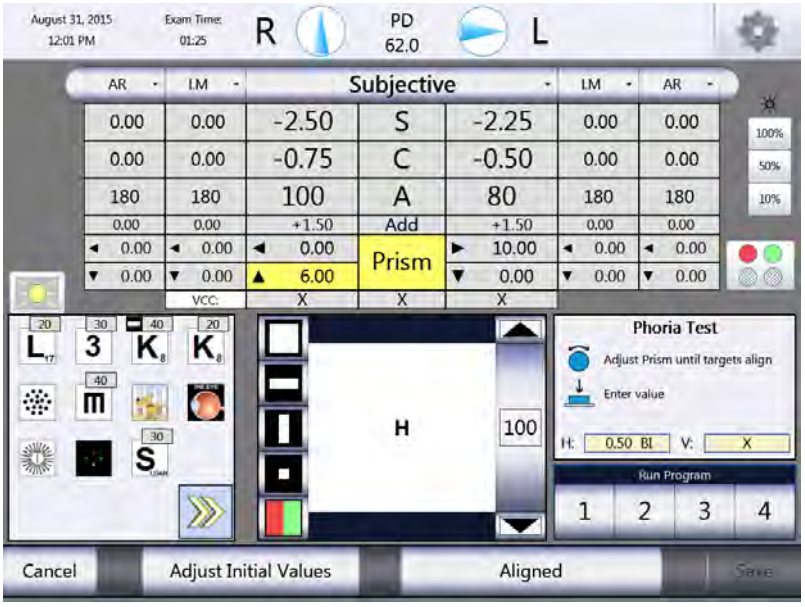


Figure IU-28, Vertical Phoria Test Screen

Prism Testing (continued)

Phoria Testing - Near

1. Lower the reading rod to converge the Phoroptor to measure Near vision horizontal phorias.
2. Press the **PRISM** button, or touch **PRISM**.
3. Touch **PHORIA** to begin the test.
4. Select a vertical line of letters or the small block of letters on the Near Vision card for the horizontal phoria test, and a single horizontal line of letters for the vertical phoria test.
5. Follow the steps in the previous section (**Phoria Testing - Distance**) to determine horizontal and vertical phorias at near.

Note: The values for the Near Vision Phoria test are saved separately from the Distance Vision test.

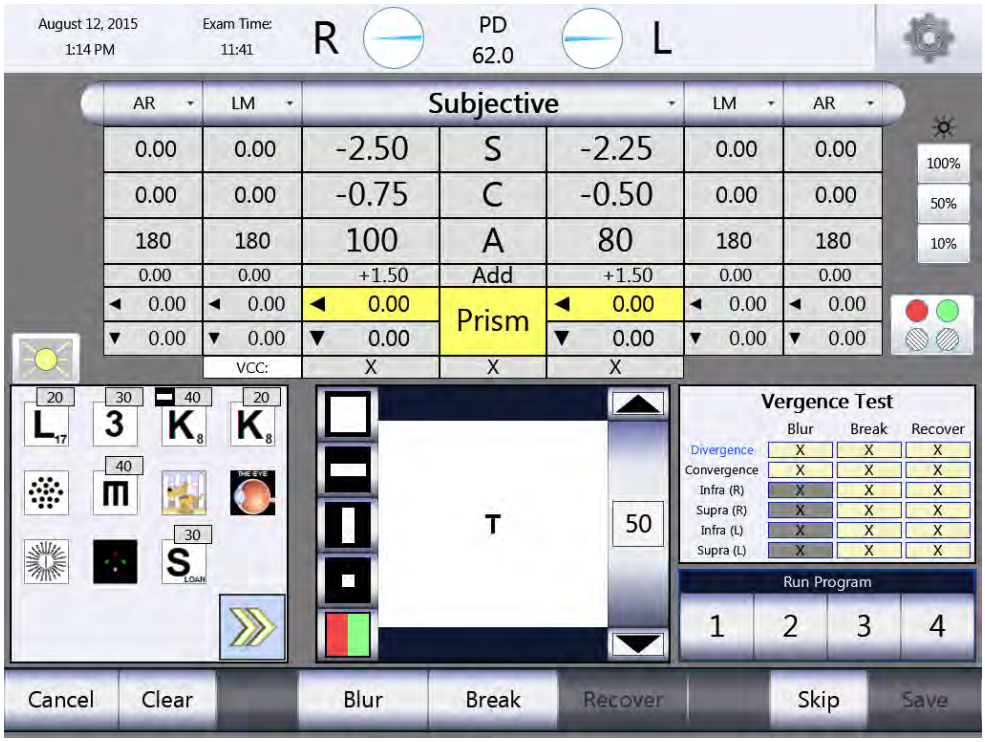


Figure IU-29, Vergence Testing Screen

Vergence Testing or Fusion Range Measurement - Distance

1. Press the **PRISM** button, or touch **PRISM**. (Please refer to Figure IU-29.)
2. Select **VERGENCE** in the menu bar at the bottom of the screen. This test automatically advances through the steps of measuring:
   - Power of Convergence
   - Power of Divergence
   - Infravergence (Right Eye and Left Eye)
   - Supravergence (Right Eye and Left Eye)

Note: If you do not want to perform all steps in the Vergence test function, touch **SKIP** to omit a specific step. Press it each time you want to skip a step in the test.

Prism Testing (continued)

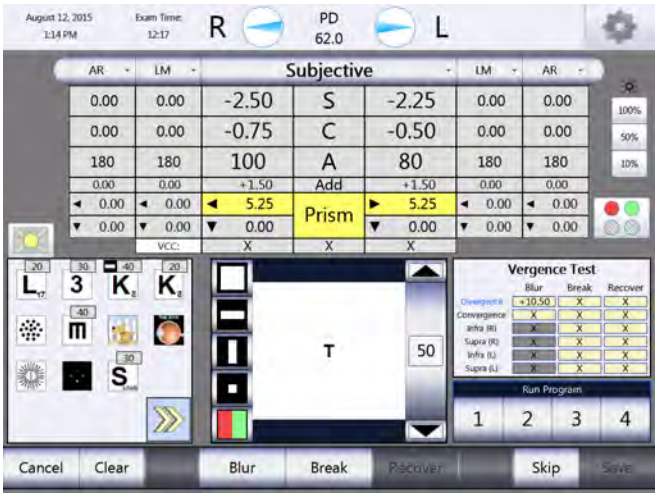


Figure IU-30, Power of Divergence - Blur Break

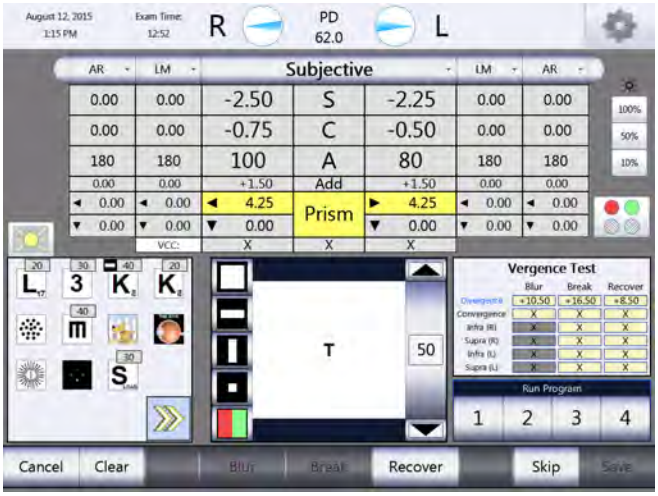


Figure IU-31, Power of Divergence - Recover

Power of Divergence

The Vergence test automatically advances to measuring Power of Divergence after determining Power of Convergence. If you do not want to perform this test, touch **SKIP** to advance. (Please refer to Figures IU-30 & IU-31.)

1. Set the acuity chart to a single vertical line of optotypes.
2. Enter BI prism slowly (starting from zero prism power), until the patient says the image is blurry.
3. Press the **CONTROL KNOB**, or touch **BLUR**.
4. Enter additional BI prism, until the patient sees two images.
5. Press the **CONTROL KNOB**, or touch **BREAK**.
6. Enter BO prism until the images converge again.
7. Press the **CONTROL KNOB**, or touch **RECOVER**.

Note: The amount of Prism at Blur/Break/Recovery appears in the designated boxes on the screen and is saved.

Prism Testing (continued)

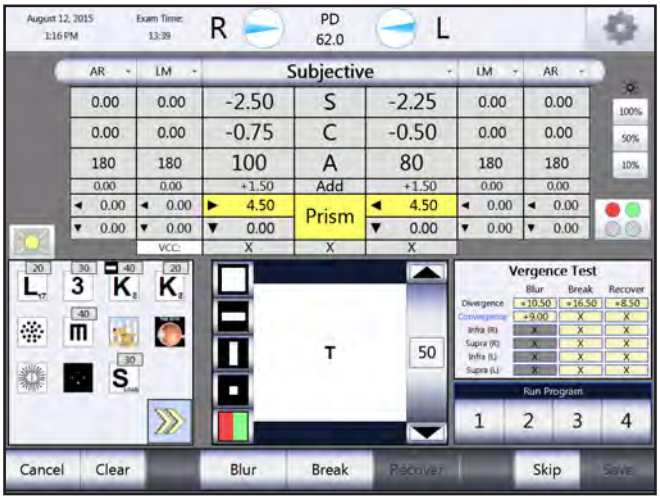


Figure IU-32, Power of Convergence - Blur Break

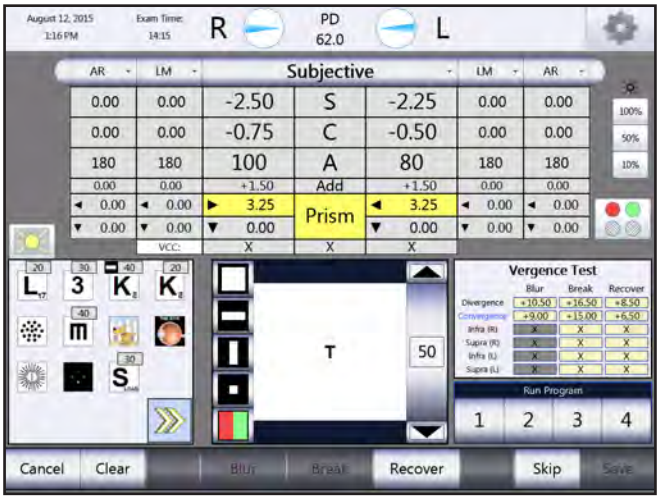


Figure IU-33, Power of Convergence - Recover

Power of Convergence

1. Set the acuity chart to a single vertical line of optotypes at or near the patient's visual acuity. (Please refer to Figures IU-32 & IU-33.)
2. Enter BO prism slowly in both eyes (starting from zero prism power), until the patient states that the image is blurry.
3. Press the **CONTROL KNOB**, or touch **BLUR**.
4. Enter additional BO prism, if necessary, until the patient sees two images.
5. Press the **CONTROL KNOB**, or touch **BREAK**.
6. Enter BI prism until the images converge again.
7. Press the **CONTROL KNOB**, or touch **RECOVER**.

Note: The amount of prism at Blur/Break/Recovery appears in the designated boxes on the screen and is saved.

Prism Testing (continued)

Infravergence and Supravergence can now be measured in each eye.

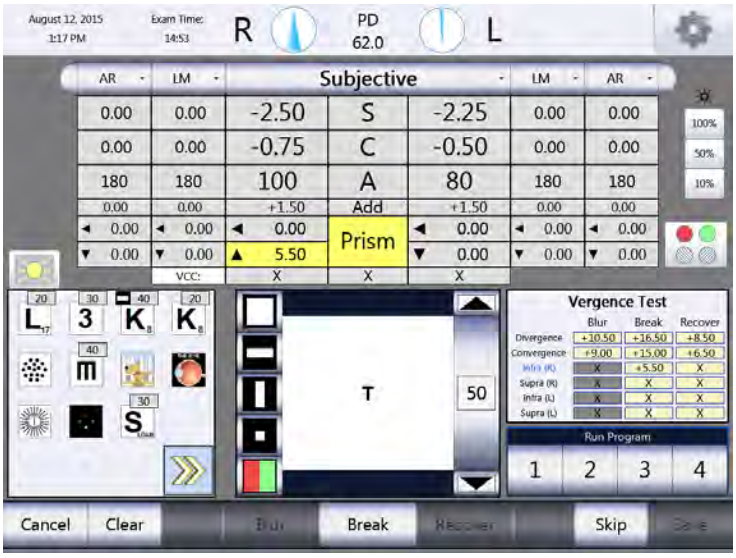


Figure IU-34, Infravergence - Break

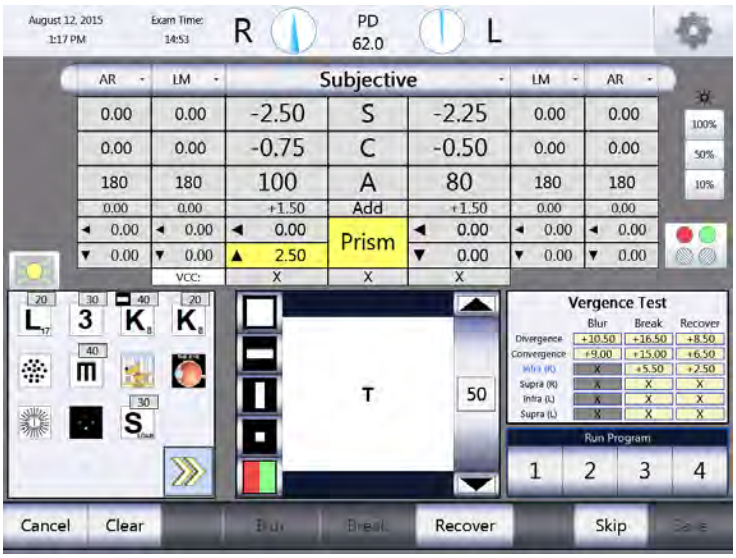


Figure IU-35, Infravergence - Recover

Infravergence

1. Enter BD prism slowly, until the patient sees two images.
   (Please refer to Figures IU-34 & IU-35.)
2. Press the **CONTROL KNOB**, or touch **BREAK**.
3. Enter BU prism until the images converge again.
4. Press the **CONTROL KNOB**, or touch **RECOVER**. The amount of Prism at Break and Recovery appears in the designated boxes on the screen and is saved.

Prism Testing (continued)

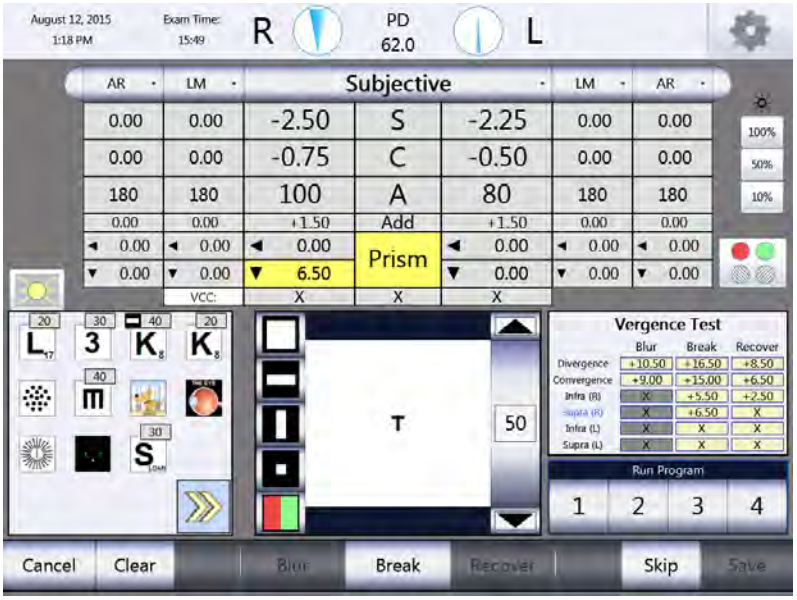


Figure IU-36, Supravergence - Break

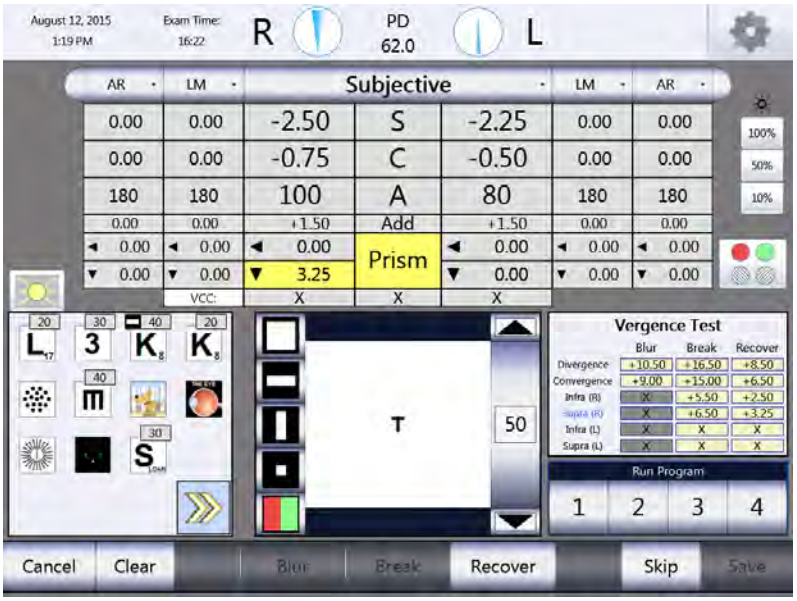


Figure IU-37, Supravergence - Recover

Supravergence

1. Enter BU prism slowly, until the patient sees two images. (Please refer to Figures IU-36 & IU-37.)
2. Press the **CONTROL KNOB**, or touch **BREAK**.
3. Enter BD prism until the images converge again.
4. Press the **CONTROL KNOB**, or touch **RECOVER**. The amount of Prism at Break and Recovery appears in the designated boxes on the screen and is saved.

Prism Testing (continued)

Vergence Testing or Fusion Range Measurement - Near

Measure vergence for near vision using the following steps:

1. Lower the reading rod to converge the Phoroptor.
2. Press the **PRISM** button, or touch **PRISM**.
3. Select **VERGENCE** in the menu bar at the bottom of the screen.
4. Follow the steps for measuring distance vergence as described in the **Vergence Testing or Fusion Range Measurement - Distance** section (previous section).

   Note: Prism values at Blur, Break and Recovery are saved as near vision measurement values.

   Note: If the reading rod is lowered during a Vergence test, the test restarts as a new test.

Prism Testing (continued)

Binocular Balance with Prisms

Use binocular balance with prism to determine if the monocular VAs are the same. (Please refer to Figures IU-38 & IU-39.)

1. Press the **BB** button, or touch **BB** on the main screen, to begin the Binocular Balance prism test.
2. Set the acuity chart to a single horizontal line of optotypes at slightly better than best visual acuity for the patient, or a single optotype. The Binocular Balance test automatically places prism in each eye (3Dio. BD in the right eye and 3Dio. BU in the left eye).
3. Verify that the patient can see two images, one up and one down.
   A. Touch **PRISM** to adjust the Prism values if the patient cannot see two images.
   B. Touch **SET PRISMS** to save the modified Prism values.

   Note: The sphere values automatically fog by the amount specified in the Settings Menu.
4. Ask the patient: "Which image is clearer, the top or the bottom?"
   - If the top image is clearer, adjust sphere in the right eye.
   - If the bottom image is clearer, adjust sphere in the left eye.
5. Add +0.25 D to the eye that sees a clearer image, until both lines look equal.
6. Press the **CONTROL KNOB**, or touch **EQUAL**.
7. Decrease sphere in both eyes to reach the best visual acuity.
8. Press the **CONTROL KNOB**, or touch **SAVE**.

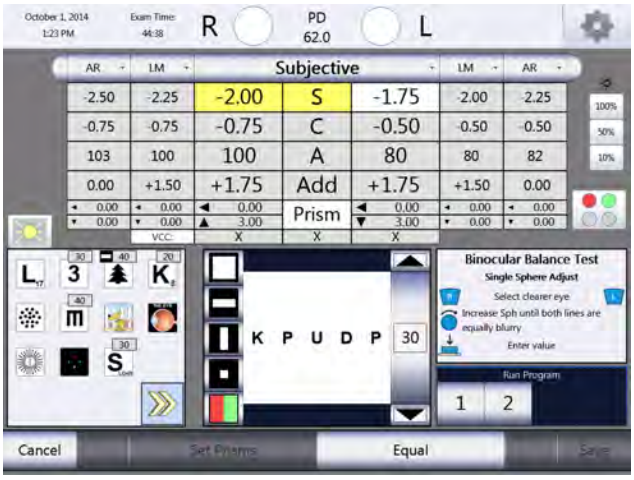


Figure IU-38, Binocular Balance with Prisms

Figure IU-39, Binocular Balance with Prisms

Vertex Distance Calculator

The Vertex Distance Calculator converts the Subjective refraction data to different values for each vertex distance. (Please refer to Figure IU-40.)

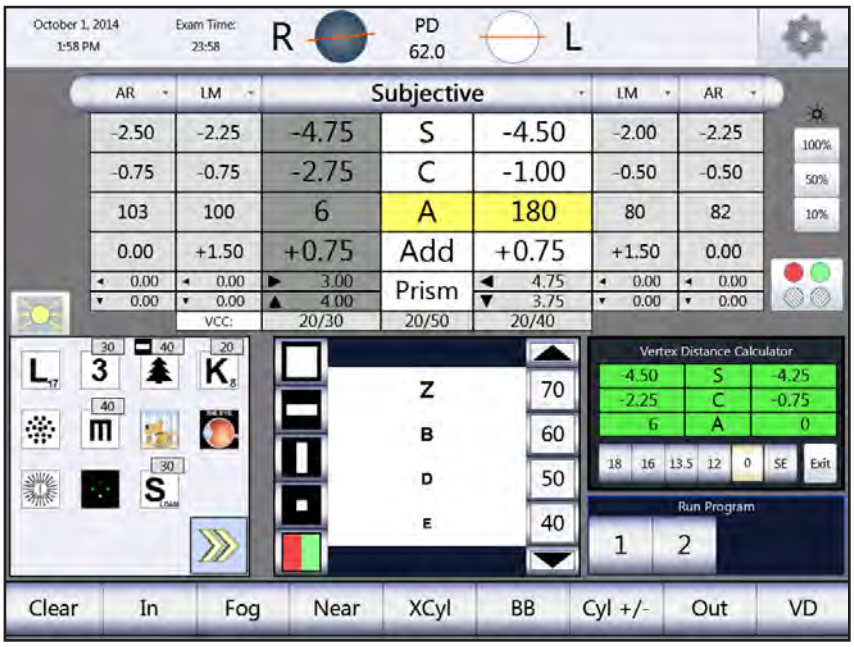


Figure IU-40, Vertex Distance Calculator

You can:

- Access the Vertex Distance Calculator by touching **VD** on the menu bar, which is located at the bottom of the screen.
- Recalculate the Sphere, Cylinder, and Axis values by touching the desired vertex distance number screen icon.
- Calculate the spherical equivalent of the refraction data by touching **SE**.
- Close the Vertex Distance Calculator by touching **EXIT**.

Note: The Vertex Distance Calculator is for reference only. The Phoroptor VRx does not send the Vertex Distance Calculator data to EMR.

Saving Visual Acuity - Distance

You can save visual acuity for monocular and binocular vision for both unaided and aided visual acuity. (Please refer to Figures IU-41 & IU-42.)

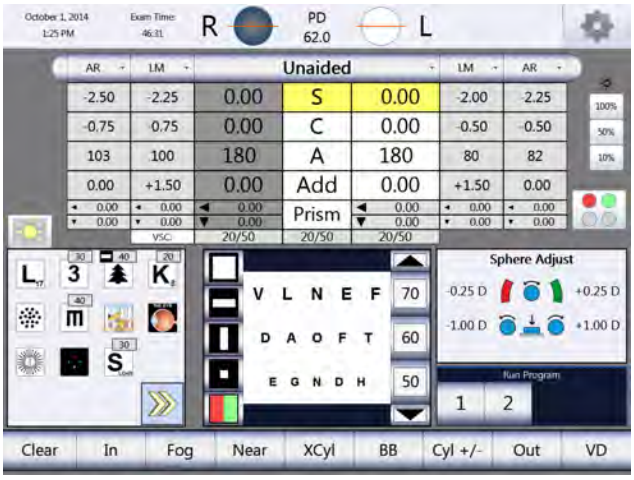


Figure IU-41, Unaided Visual Acuity

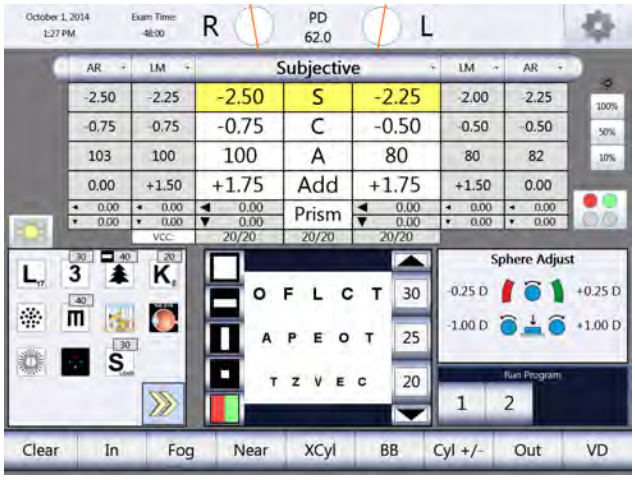


Figure IU-42, Aided Visual Acuity

Right Eye

1. Press the **R** button, or touch **R**, to isolate the right eye.
2. Show the patient a chart of multiple lines of optotypes.
3. Ask the patient to choose the smallest line of optotypes he or she can read.
4. Touch the number on the screen next to that line (*e.g.,* "20" for Snellen optotypes or 1.0 for Decimal optotypes).
   Note: VSC = Vision (sans correction)
   VCC = Vision (with correction)
   Note: This saves the visual acuity for the right eye, which appears in the data field for the right eye in the VSC or VCC box.

Left Eye

1. Press the **L** button, or touch **L**, to isolate the left eye.
2. Show the patient a chart of multiple lines of optotypes.
3. Ask the patient to choose the smallest line of optotypes he or she can read.
4. Touch the number on the screen next to that line (*e.g.,* "20" for Snellen optotypes or 1.0 for Decimal optotypes).
   Note: This saves the visual acuity for the left eye, which appears in the data field for the left eye in the VSC or VCC box.

Binocular Vision

1. Press the **B** button, or touch **B**, to measure both eyes.
2. Show the patient a chart of multiple lines of optotypes.
3. Ask the patient to choose the smallest line of optotypes he or she can read.
4. Touch the number on the screen next to that line (*e.g.,* "20" for Snellen optotypes or 1.0 for Decimal optotypes).
   Note: This saves the visual acuity for Binocular Vision, which appears in the middle data field in the VSC or VCC box..

Note: Follow the same steps for Visual Acuity - Near as you did with Visual Acuity - Distance.
Note: The VSC and VCC boxes change to VSC-N and VCC-N when working with Visual Acuity - Near.

Saving Refraction Data

Store the measurements temporarily as Final, Mem 1, Mem 2, or Mem 3, or leave the data as Subjective, once the values for a refraction are completed. Storing different data in Mem 1, Mem 2, or Mem 3 allows the option of comparing different refraction data you are considering for your patient's prescription. (Please refer to Figure IU-43.)

1. Touch the drop-down list on the top of the main refraction data area.
2. Select the category to which you want to save the refraction data.

   Note: You can save and recall the refraction data for comparison or measurement values.

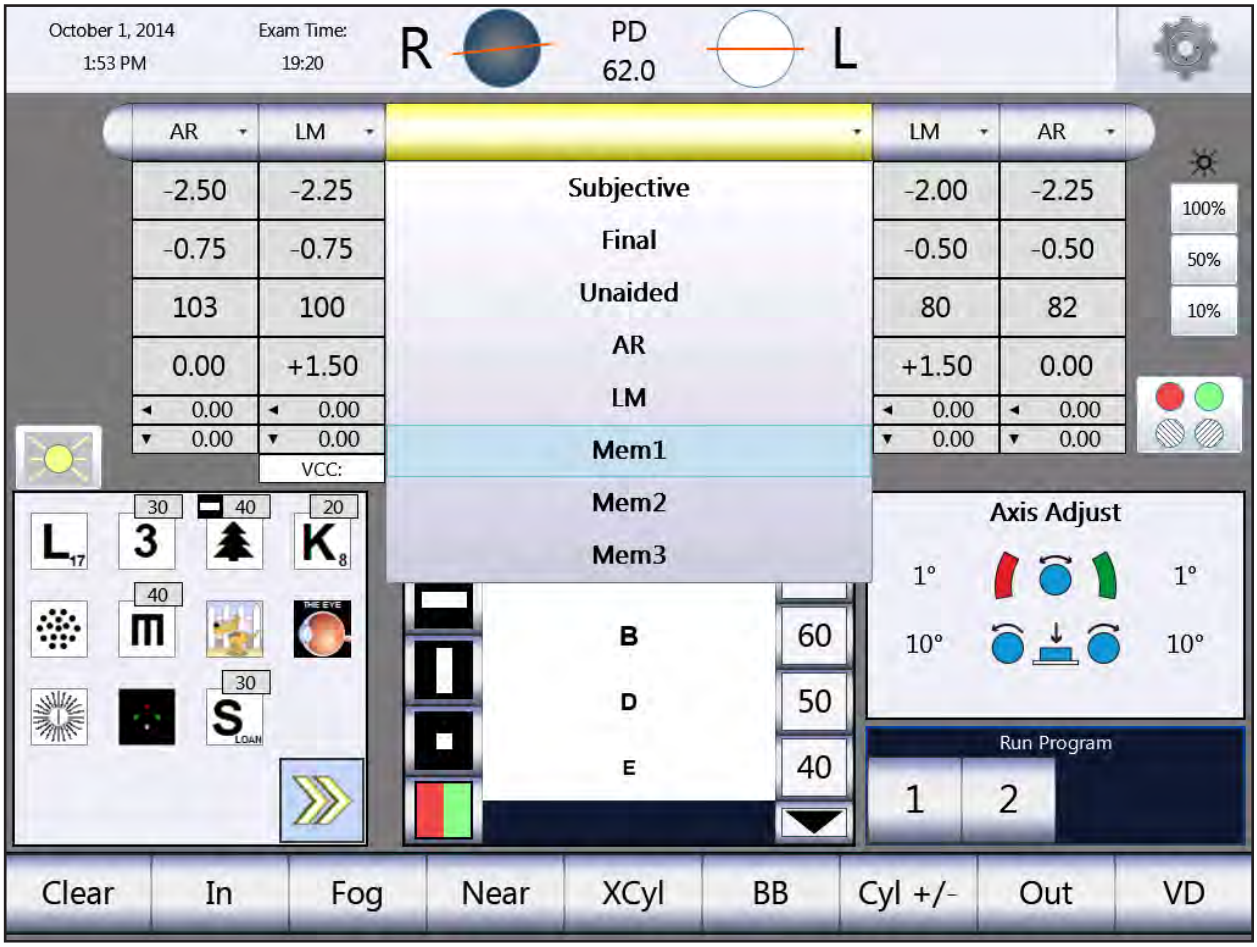


Figure IU-43, Saving Refraction Data

Comparing Refraction Data

One of the advantages of a digital refractor is the ability to quickly and easily compare different refractions with the push of a button, enabling patients to see the difference between their old and new prescriptions, or the difference between two possible prescriptions.

After completing a refraction, you can switch the measurements in the storage boxes and the current measurements, as needed, enabling comparison of different prescriptions. Once you transfer the data to the large active data field, the Phoroptor Head changes the lenses to reflect that data. This allows for easy comparison.

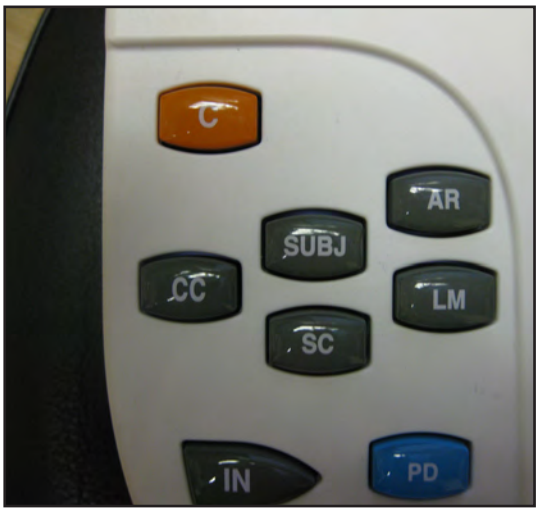
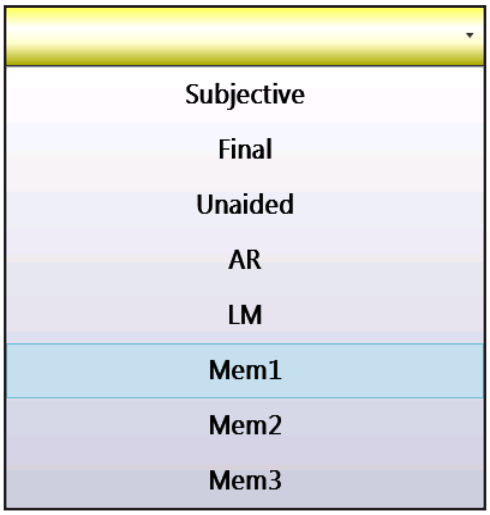


Figure IU-44, Gray Data Comparison Keys

The two methods to compare refraction are as follows: (Please refer to Figure IU-44.)

- Press the gray buttons at the top left of the Keypad to switch between different types of refraction data, including Final (CC), Subjective, Unaided (SC), Auto Refractor (AR), and Lensmeter (LM).
- Touch the drop-down list at the top of the main refraction data area to select and compare different types of refraction data, including Final (CC), Subjective, Unaided (SC), Auto Refractor (AR), Lensmeter (LM), Mem 1, Mem 2, and Mem 3.



Data Output - EMR

It is essential to either send the Final refraction data to an EMR system or the printer before clearing data and preparing for the next patient. The Final refraction data is not stored in the Phoroptor VRx, so it cannot be recalled for reference at a later time. Data output options for refraction results include sending data electronically to an EMR system, printing the data, and manually recording it. Select the EMR option in the **PORT SELECTION** panel to view or change the settings. Select APPLY to save changes which were made.

Note: Results may be both printed and sent to an EMR system as long as the user configures the printer and EMR ports for output in the setup menu. (Please refer to Figure IU-45.)

Figure IU-45, Port Settings

EMR Output Options

The options for EMR Output are the following:

- Phoroptor VRx - Sends Phoroptor VRx final refraction data and, optionally, subjective refraction data and binocular test results
- Phoroptor VRx Exp - Sends Phoroptor VRx final refraction data and, optionally, subjective refraction data and binocular test results plus auto-refractor and lensometer data, if available
- AutoPhor - Sends Phoroptor VRx final refraction data only
- AutoPhor Exp - Sends Phoroptor VRx final refraction data plus auto-refractor and lensometer data, if available
- Vis900 - Sends data in original Visutron 900+ format

Data Output - EMR (continued)

After the exam is completed and the Data Output options are set, press the **OUT** button, or touch the **OUT** icon to transfer the data to an EMR system. Refer to Figure IU-43 and the illustration below.

Note: The default data that is sent to the EMR system or the printer is Final refraction data. If you do not save the measurement results as Final refraction data, the Subjective refraction data is sent.
Note: The volume of the transferred data depends on what the EMR software is configured to receive.
Note: The volume of the printed data depends on what measurements you selected for output in the Settings Menu.

Data Output

Each patient data record includes:

- Sphere (Right and Left Eye, Far and Near)
- Cylinder (Right and Left Eye)
- Axis (Right and Left Eye)
- Prism (Right and Left Eye)
- Visual Acuity Distance Unaided and Aided (Right Eye, Left Eye, Binocular)
- Visual Acuity Near Unaided and Aided (Right Eye, Left Eye, Binocular)
- Vertex Distance
- Pupillary Distance
- Fused Cross Cylinder Add Value NRA/PRA
- Amplitude of Accommodation
- Distance Phoria (Horizontal, Vertical)
- Near Phoria (Horizontal, Vertical)
- Divergence (Blur, Break, Recover)
- Convergence (Blur, Break, Recover)
- Infravergence Right Eye (Break, Recover)
- Supravergence Right Eye (Break, Recover)
- Infravergence Left Eye (Break, Recover)
- Supravergence Left Eye (Break, Recover)

Data output also includes Lensmeter and Auto Refractor data, if you directly connected these external devices to the Phoroptor VRx. To ensure proper output of data from these devices, select SUBJ, AR, and LM data for EMR output in the Setup Menu.

In order to transfer data from the Phoroptor VRx to your EMR system, you need to download ReichertCapture™ Software. You can download ReichertCapture™ Software and the ReichertCapture™ user guide from www.Reichert.com.

Data Output - Printing

1. Connect an MCP1000 printer to the system. Refer to Figure IS-06 for the connection port.
2. Select the Device driver in the Ports Settings panel and touch **APPLY**.

Note: If using a wireless connection, configure the port for a wireless setup and pair a Bluetooth adapter. Refer to Figure IS-14.

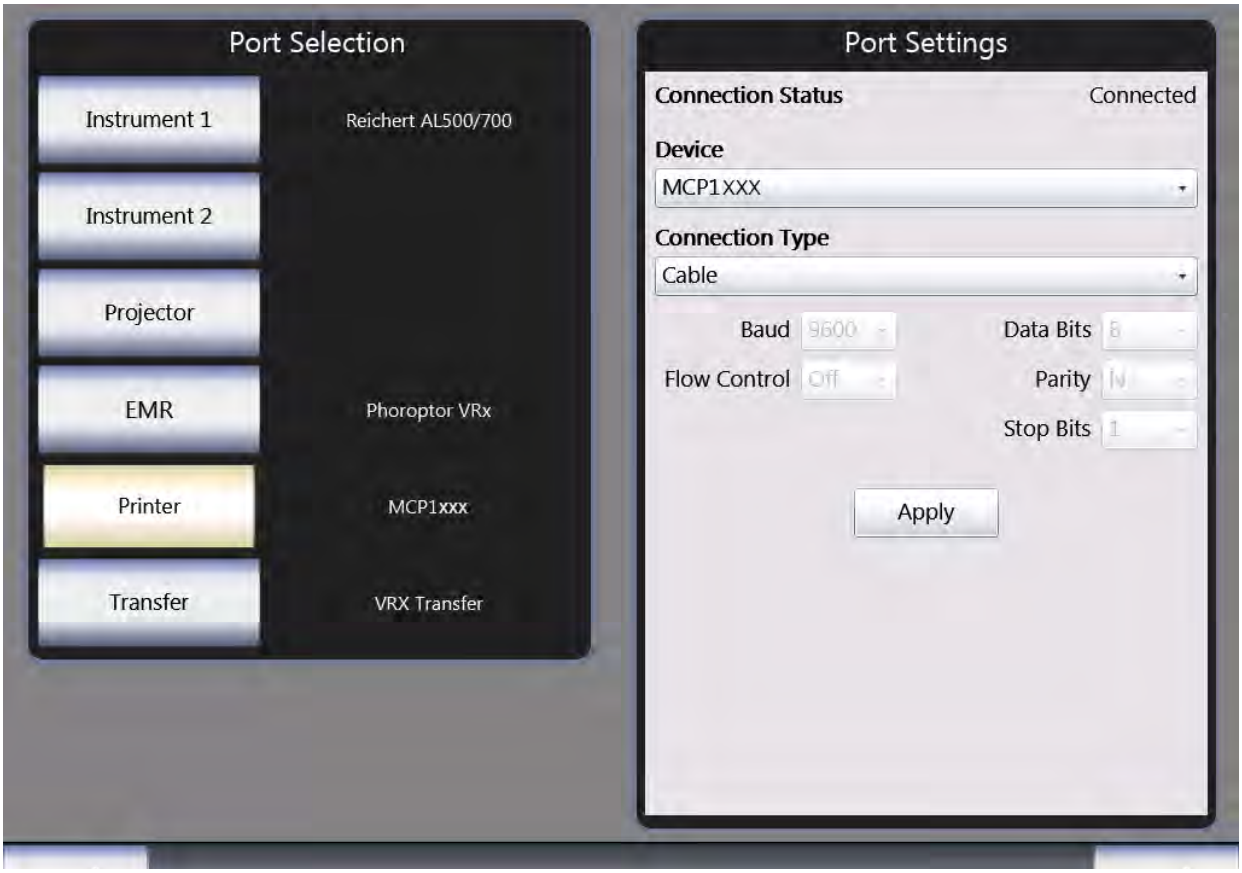


Figure IU-46, Printer Settings Screen

3. Select the Printer options in the Setup Menu. Refer to Figure IS-24.
4. Select the data you want to print in the lower right corner of the screen. The data printing options include: (Please refer to Figure IS-24C.)
   - Subj, AR, and LM values.
   - Visual Acuity, FCC, NRA/PRA, Accommodation, Phoria, and Vergence values.

   The Print Format drop-down list options include:
   - Far - Prints values for Far.
   - Near - Prints values for Near.
   - Far/Near - Prints values for Far and Near.
   - Far/Add - Prints values for Far and Near Vision Addition.
5. Press the **OUT** button, or touch **OUT** on the main screen, to immediately send the data to the printer when the exam is complete.

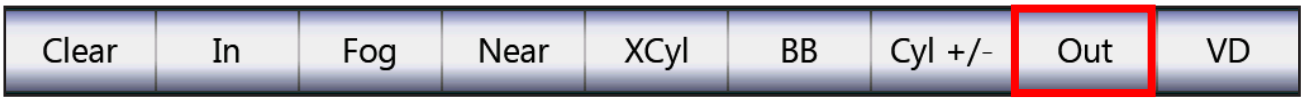
Data Output - Printing (continued)

Printer Output Options

The options for Printer Output are the following:

- Phoroptor VRx - Sends Phoroptor VRx final refraction data and, optionally, subjective refraction data and binocular test results
- Phoroptor VRx Exp - Sends Phoroptor VRx final refraction data and, optionally, subjective refraction data and binocular test results plus auto-refractor and lensometer data, if available
- AutoPhor - Sends Phoroptor VRx final refraction data only
- AutoPhor Exp - Sends Phoroptor VRx final refraction data plus auto-refractor and lensometer data, if available
- Vis900 - Sends data in original Visutron 900+ format

After the exam is completed and the Data Output options are set, press the **OUT** button, or touch the **OUT** icon to transfer the data to an EMR system. Refer to Figure IU-43 and the illustration below.



Note: The default data that is sent to the EMR system or the printer is Final refraction data. If you do not save the measurement results as Final refraction data, the Subjective refraction data is sent.

Note: The volume of the transferred data depends on what the EMR software is configured to receive.

Note: The volume of the printed data depends on what measurements you selected for output in the Settings Menu.

Printer Data Output

You can send the following information the printer:

- Date and Time
- Sphere (Right and Left Eye, Far and Near)
- Cylinder (Right and Left Eye)
- Axis (Right and Left Eye)
- ADD
- Prism (Right and Left Eye)
- Vertex Distance
- Pupillary Distance
- Visual Acuity Distance Unaided and Aided (Right Eye, Left Eye, Binocular)
- Visual Acuity Near Unaided and Aided (Right Eye, Left Eye, Binocular)
- Fused Cross Cylinder Add Value NRA/PRA
- Amplitude of Accommodation
- Distance Phoria (Horizontal, Vertical)
- Near Phoria (Horizontal, Vertical)
- Divergence (Blur, Break, Recover)
- Convergence (Blur, Break, Recover)
- Infravergence Right Eye (Break, Recover)
- Supravergence Right Eye (Break, Recover)
- Infravergence Left Eye (Break, Recover)
- Supravergence Left Eye (Break, Recover)

Note: All Phoroptor VRx, Lensmeter, and Auto Refractor/Keratometer data will be printed if those instruments are connected to the Phoroptor VRx.

Clearing Data

Press the **C** Keypad button, or touch **CLEAR**, to view the options for clearing data.

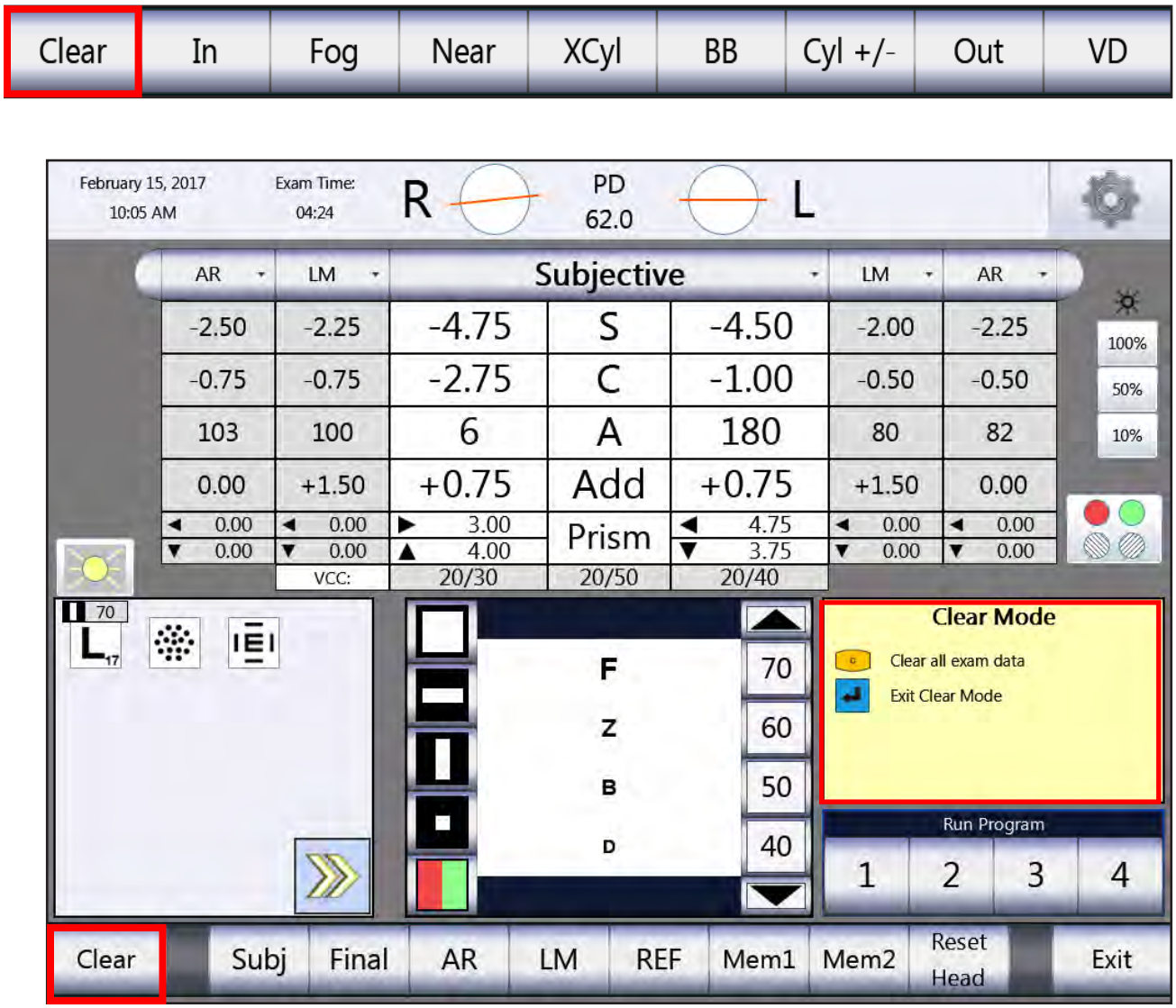


Figure IU-47, Clearing Data

Clearing All Data

1. Press the **C** button, or touch **CLEAR**. (Please refer to Figure IU-47.)
2. Press the **C** button, or touch **CLEAR**, once more to clear all the data. This clears all the data in the active refraction fields and all the storage boxes.
3. PD returns to 62 mm.

Clearing Data (continued)

Initiate the action to clear data by pressing the **C** button or touching **CLEAR** on the menu bar at the bottom of the screen. Then touch the data you want to delete as described below.

Clearing Individual Data Groups

1. Touch **Subj**, **Final**, **AR**, **LM**, **REF**, **Mem 1**, or **Mem 2**, located on the menu bar at the bottom of the screen, or press a grey Keypad button, to indicate the data set you want to clear.

Clearing Data for One Eye

1. Press the **R** or **L** button, or touch **R** or **L** next to the lens apertures.

Clearing Active Refraction Data

1. Press the **B** button.

   Note: This clears all the data for both eyes in all rows of the active refraction box.

Clearing Lensmeter and Auto Refractor Data

1. Press the **LM** or **AR** button on the top right of the Keypad.

Clearing Individual Refraction Data

1. Touch the box on the screen for the individual data field you want to delete (*e.g.,* Touch the **RIGHT EYE, SPHERE** data field).

Cleaning and Maintenance

WARNING: ANY REPAIR OR SERVICE TO THIS INSTRUMENT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS THAT ARE TRAINED BY REICHERT SO THAT CORRECT OPERATION OF THIS INSTRUMENT IS MAINTAINED.

WARNING: ALWAYS UNPLUG THE POWER CORD BEFORE CLEANING ANY SURFACE ON THE INSTRUMENT.

CAUTION: INGRESS PROTECTION CLASSIFICATION FOR THE AUTO PHOROPTOR HEAD IS IP2X, WHILE THE CENTRAL UNIT AND CONTROLLER ARE IP3X. DO NOT SPRAY, SPLASH, OR IMMERSE IN CLEANING SOLUTIONS.

The Phoroptor VRx is an enclosed unit with an ingress protection classification of IP2X (Phoroptor Head) or IP3X (Central Unit and Controller). The lenses and other internal parts cannot be accessed by the operator for cleaning.

The Phoroptor VRx requires no user maintenance. It is recommended that you send in your Phoroptor Head to Reichert if interior lens cleaning is necessary.

To ensure that your Phoroptor Head remains clean, cover your Phoroptor Head with the dust cover when not in use. Consistent use of the dust cover will help keep dust and other contaminants off of the unit and from getting inside and possibly affecting operation.

Note: Make sure the power to the Phoroptor VRx is OFF before you cover the instrument.

External Cleaning

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT OR DAMAGE TO THE UNIT MAY OCCUR.

CAUTION: USE OF AMMONIA BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) OR ANY PLASTIC SURFACE MAY CAUSE DAMAGE TO THE INSTRUMENT.

Clean the external surfaces of this instrument using a clean, soft cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean water).

Controller Screen Cleaning

Clean the touch screen with a lint-free cloth, lightly dampened with a neutral detergent or isopropyl alcohol.

CAUTION: DO NOT USE ANY CHEMICAL SOLVENT, ACIDIC, OR ALKALI SOLUTIONS.

Face Shield Cleaning and Disinfection

For hygienic reasons, you can clean the Face Shield with a clean cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean, filtered water (filtered below 5 microns)).

Note: If the Face Shield must be sanitized, you can use a 70% isopropyl alcohol wipe. Be sure the Face Shield is completely dry before positioning another patient.

Cleaning and Maintenance (continued)

Forehead Rest Cleaning and Disinfection

For hygienic reasons, you can clean the Forehead Rest with a clean cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean, filtered water (filtered below 5 microns)).

Note: If the Forehead Rest must be sanitized, you can use a 70% isopropyl alcohol wipe. Be sure the Forehead Rest is completely dry before positioning another patient.

Figure CM-01, Fuse Holder

Fuse Replacement

1. Unplug the Central Unit power cord.
2. Squeeze in the tabs on the Fuse Holder and pull the Fuse Holder out.

   Note: Tweezers or a similar tool can be used to remove the fuse holder.
3. Remove the fuses that require replacement, and install new fuses.

   Note: Refer to the Specifications section of this manual for fuse specifications.
4. Install the Fuse Holder into the Central Unit until it snaps into place.

Battery Replacement

Time and Date are maintained in memory by a long-life battery (CR 2032 Lithium Coin Cell Battery), in the Controller. This long-life battery lasts many years. If the Time and Date do not work, contact Reichert (Please refer to the Troubleshooting section of this manual).

Troubleshooting

Only those errors indicated on the display are directly important to the user and are listed below. In case of support requests, please refer to the Error Log File (OPTIONS - Service - Show Error Log File) where you will find a detailed listing of all errors, warnings, and status messages.

Error Source [identification code]; Necessary for all support requests.
Brief Description.

Error Source	Probable Cause	Solution
Refractor [PH:yy]	• Cable to refractor failure, damaged, or loose. • Incorrect initiation. • Failure of refractor electronics.	• Turn the unit on and off. • Check the cable to the refractor.
EMR-Port [Dxx.yy]	• Wrong unit driver. • Wrong interface parameters. • Connection cable failure, damaged, or loose.	• Touch the Options Menu on the screen, and open the Ports Settings screen. • Check the connection cable.
Instrument 1 or 2 Port [Dxx:yy]	• Wrong unit driver. • Wrong interface parameters. • Connection cable failure, damaged, or loose.	• Touch the Options Menu on the screen, and open the Ports Settings screen. Set the correct unit driver and interface parameters for Instrument 1 or 2. • Check the connection cable.
Projector [Pxx:yy]	• Projector not connected. • Projector turned off. • Wrong projector driver. • Projector cable failure, damaged, or loose.	• Connect the projector to the central unit and turn on. • Select a suitable projector driver. • Setup the correct interface parameters in the Ports Settings screen. • Check the connection cable.
Base-Unit [BU:yy]	• Incorrect power supply. • Failure of central unit.	• Check the power supply.
Application [MA:yy]	• Failure of software. • Failure of Controller. • Cable to central unit failure, damaged, loose, or positioned near an interfering source. • Failure of power supply.	• Perform a software update. • Check the cable to the central unit. • Check the power supply.
Green LED on the central unit not lit.	• Cable not connected. • Switch set to OFF.	• Connect the cable. • Set the switch to ON.

Troubleshooting (continued)

Error Source	Probable Cause	Solution
No image in the display despite switched-on unit.	• Failure of fuses on the cable plug of the central unit.	• Exchange the fuses on the cable plug of the central unit.
Time & date do not work.	• Long-life battery empty or failure.	• Replace the long-life battery in the Controller. Contact Reichert for service.
Split Cylinder Red/ Green color rings do not match controller display orientation. (Causes operator to walk cylinder.)	• Unit powered-down during lens motion. • Lens dial stall.	• In turn, press and hold a 3 - Button sequence: • Right side correction: “R”, “A”, Red/ Green • Left side correction: “L”, “A”, Red/ Green

xx = Driver identification code.

yy = Identification code for error, warning, or status messages.

If failures cannot be remedied by one of these measures, please contact Reichert Technical Support as indicated on the back of this manual.

Specifications

REF 16241 / 16242

Physical Dimensions

Phoroptor Head

Spherical Effects	+17.75 to -22.25 D
Steps	0.25 and 1.0 D
Cylinder Power	-8.0 to +8.0 D
Steps	0.25 and 1.0 D
Axis Adjustment	0° to 180°
Steps	1° and 10°
Cross Cylinder Test	±0.25 D
Prismatic Effects (Optional)	+ 0.20Δ per eye
Steps	0.50Δ per eye 0.25Δ per eye
Corneal Vertex Distance	16 mm
Pupil Distance	50 to 80 mm
Steps	1 mm binocular
Convergence	400 mm
Height Level of Eyes, adjustment	±3 mm
Leveling	via bubble level
Free Aperture	19 mm
Thickness of Housing at the Viewing Aperture	26 mm
W x H x D (at PD = 64 mm)	31 x 20.3 x 7.1 cm (12.2 x 8 x 2.8 in.)
Weight With Mount and Without Prism Compensator	4.42 kg (9.75 lb)
Weight With Mount and With Prism Compensator	4.65 kg (10.25 lb)
Weight Without Mount and Without Prism Compensator	3.95 kg (8.70 lb)
Weight Without Mount and With Prism Compensator	4.17 kg (9.20 lb)

Controller With Display

Controller (W x H x D)	23.4 x 4.6 x 16.8 cm (9.9 x 1.5 x 6.9 in.)
Display (W x H x D)	22.4 x 15.7 x 1.5 cm (10.0 x 7.0 x 2.8 in.)
Display Size (Diagonal)	10.0 in. (25.4 cm)
Total Height with Display	8.4 in. (21.3 cm)
Weight	6.40 lb (2.90 kg)

Central Unit

Physical Dimensions

Width	20.1 cm (7.9 in.)
Height	8.9 cm (3.5 in.)
Depth	26.7 cm (10.5 in.)
Weight	3.2 kg (7.1 lb)

Electrical

Model	16219
Input Voltage	100 - 240V~
Frequency	50 - 60 Hz
Current (max.)	60 VA
Fuses	T2AL 250V

Ports: (1 each)

Phoroptor, Controller (Keypad), Projector, Printer, Instrument 1 I/O, Instrument 2 I/O, EMR Port, Transfer Port

Environmental:
The environmental conditions are as follows:

Operating:

Temperature: 10° to 35° C (50° to 95° F)

Relative Air Humidity: 30 to 90%

Air Pressure: 80 kPa to 106 kPa

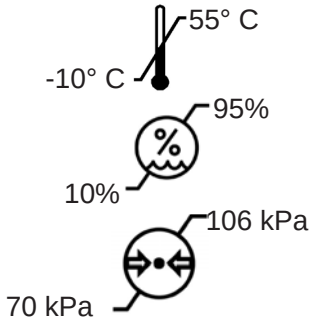
Transportation and Storage:

Temperature: -10° to 55° C (14° to 131° F)

Relative Air Humidity: 10 to 95%

Air Pressure: 70 kPa to 106 kPa

Operation permitted in explosion proof atmosphere only.



Disposal

Dispose of the Phoroptor VRx in accordance with local regulations. The Phoroptor VRx contains no hazardous materials.

Software Revision

You can obtain the software version by opening up the Service Menu in the Controller, or by contacting Reichert with the Central Unit serial number.

Classifications

Compliance

The Phoroptor VRx complies with:

IEC 60601-1
AAMI ES60601-1
CSA C22.2#60601-1
IEC 60601-1-6
IEC 62366
UL 60601-1
CSA C22.2#601.1
IEC 60601-1-4
IEC 60601-1-2
CENELEC EN60601-1
ETSI EN 301 489-1
ETSI EN 301 489-17
ISO 15004-1

Device Classification

Electrical Protection:	Class I
Ingress Protection Rating:	IP3X (Central Unit and Controller) or IP2X (Phoroptor Head)
Instrument Type (60601-1):	Type B
Operating Mode (60601-1):	Continuous
US FDA:	REF 16241 Class I, 21 CFR 886.1770
	REF 16242 Class I, 21 CFR 886.1665 and 886.1770
EU Medical Device Directive:	Class I, Rule 12
CAN CMDR:	Class I, Rule 12

Guidance Tables

Table 201 – Guidance and Manufacturer's Declaration

Electromagnetic Emissions

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The Phoroptor VRx is intended for use in the electromagnetic environment specified below. The customer or user of the Phoroptor VRx should ensure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment** - Guidance -
RF Emissions CISPR 11	Group 1 Class B	The Phoroptor VRx uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonics IEC 61000-3-2	Class A	The Phoroptor VRx is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies building for domestic power.
Flicker IEC 61000-3-3	Complies	

Bluetooth RF Transmitter Characteristics - Central Unit

- Contains FCC ID: QOQWT11I
- Contains IC: 5123A - BGTWT11I
  - Frequency 2400.0 - 2483.5 MHz, Spread Spectrum, 0.02 Watts

Bluetooth Adapter (Dongle) Characteristics

- Contains ICC ID: S7AIW02
- Contains IC: 8154A - 1W02
  - Frequency 2400.0 - 2483.5 MHz, Spread Spectrum, 0.0264 Watts

FCC / IC Statements

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC test procedures. This transmitter is considered as mobile device.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Table 202 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The Phoroptor VRx is suitable for use in electromagnetic environment specified below. The customer or user of the Phoroptor VRx should ensure that it is used in such an environment.

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

Table 204 – Guidance and Manufacturer's Declaration
Electromagnetic Immunity
Equipment and Systems that are NOT Life-supporting

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

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

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	(V1)=3V/m	Portable and mobile RF communications equipment should be no closer to any part of the Phoroptor VRx, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance: d=(3.5/V1)(Sqrt P) d=(3.5/V1)(Sqrt P) 80 to 800 MHz d=(7/E1)(Sqrt P) 800 MHz to 2.5 GHz Where P is the max output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels in each frequency range. Interference may occur in the vicinity of equipment containing a transmitter. 
Radiated RF IEC 61000-4-3	80 MHz to 2.5 GHz @ 3V/m	(E1)=3V/m	

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

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

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

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

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

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

The Phoroptor VRx is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the Phoroptor VRx can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the Phoroptor VRx 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 d=(3.5/V1)(Sqrt P)	Separation (m) 80 to 800 MHz d=(3.5/E1)(Sqrt P)	Separation (m) 800 MHz to 2.5 GHz d=(7/E1)(Sqrt P)
0.01	0.1166	0.1166	0.2333
0.1	0.3689	0.3689	0.7378
1	1.1666	1.1666	2.3333
10	3.6893	3.6893	7.3786
100	11.6666	11.6666	23.3333

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Appendix A - Instrument Cables and Bluetooth Kits

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

LENSMETERS	CABLE REF	LENGTH	DESCRIPTION
HUMPHREY LA-350	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
HUVITZ CLM-3100	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
LUNEAU 70	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
NIDEK LM 970	559-471	8M / 26 FT.	CIRCULAR 8 PIN/DB9-F (NULL MODEM)
REICHERT AL 200	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
REICHERT AL 500	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
REICHERT AL 700	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
REICHERT LENSCHEK PRO	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
REICHERT LENSCHEK PLUS	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
TOMEY TL 2000	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
TOMEY TL 3000	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
TOPCON CL 100	559-470	8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F RIGHT ANGLE
TOPCON CL 200	559-470	8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F RIGHT ANGLE
TOPCON CL 2000	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
TOPCON CL 2500	559-469 OR 559-470	8M / 26 FT. OR 8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F STRAIGHT CIRCULAR 8 PIN/ DB9-F RIGHT ANGLE
RODENSTOCK AL 4500	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
RODENSTOCK AL 4600	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
AUTO REFRACTORS/ KERATOMETERS	CABLE REF	LENGTH	DESCRIPTION
CANON RF 10	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
CANON RK F1	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
CANON RK F2	16200-440 OR 559-473	11M / 35 FT. OR 8M / 26 FT.	DB9-M/DB9-F (NULL MODEM) DB9-M/DB9-F (NULL MODEM)
CANON RK 5	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
HUMPHREY HARK-599	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
HUVITZ MRK-3100	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
HUVITZ 8000A	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
NIKON SPEEDY K	559-466	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
NIDEK ARK 710 A	559-471	8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F STRAIGHT
NIDEK ARK 530	559-471	8M / 26 FT	CIRCULAR 8 PIN/ DB9-F STRAIGHT
NIDEK AR 800	559-471	8M / 26 FT	CIRCULAR 8 PIN/ DB9-F STRAIGHT
NIDEK RKT 7700	559-471	8M / 26 FT	CIRCULAR 8 PIN/ DB9-F STRAIGHT
NIDEK TONOREF II	559-471	8M / 26 FT	CIRCULAR 8 PIN/ DB9-F STRAIGHT
REICHERT OPTOCHEK PLUS	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
REICHERT RK600	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
REICHERT RK700	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
RETINOMAX K+, K2	559-472	8M / 26 FT.	DB9-F/DB25-F (1 TO 1)
RODENSTOCK CX1000	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
TOMEY RC 5000	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
TOMEY TR 4000	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)
TOPCON KR 3500	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
TOPCON 800S	559-473	8M / 26 FT.	DB9-M/DB9-F (NULL MODEM)

Appendix A - Instrument Cables and Bluetooth Kits (Continued)

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

TOPCON KR 8X00 (UP TO KR 8900)	559-470	8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F RIGHT ANGLE
TOPCON KR-1	559-470	8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F RIGHT ANGLE
TOPCON KR-1W	559-470	8M / 26 FT.	CIRCULAR 8 PIN/ DB9-F RIGHT ANGLE
TOPCON RMA 2000	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
TOPCON RMA 3000	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
TOPCON RMA 6000	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
TOPCON RMA 6500	559-461	8M / 26 FT.	DB9-F/DB25-M (NULL MODEM)
VISIONIX L80	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
ACUITY SYSTEMS COMPUTERS	CABLE REF	LENGTH	DESCRIPTION
REICHERT AP250 AUTO PROJECTOR	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
REICHERT CLEARCHART® 2	16200-440 OR 559-473	11M / 35 FT. OR 8M / 26 FT.	DB9-M/DB9-F (NULL MODEM) DB9-M/DB9-F (NULL MODEM)
REICHERT CLEARCHART® 3P	16200-440 OR 559-473	11M / 35 FT. OR 8M / 26 FT.	DB9-M/DB9-F (NULL MODEM) DB9-M/DB9-F (NULL MODEM)
REICHERT SIGHTCHEK™	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
REICHERT M3000	559-262	7.6M / 25 FT.	DB9-M/DB9-F (1-TO-1)
REICHERT SERIAL TO USB CONVERTER	13207112	1 FT	USB DB9 M
M&S SMART SYSTEM	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
POLAPHOR	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
POLASTAR ACUITY SYSTEM	559-263	15M / 49 FT.	DB9-F/DB9-F (NULL MODEM)
WINDOWS® COMPUTER	559-261	7.6M / 25 FT.	DB9-F/DB9-F (NULL MODEM)

REICHERT INSTRUMENTS - WIRELESS CONNECTION	**REF**	**DESCRIPTION**
WIRELESS CONNECTION TO CLEARCHART 3P, AL200	16250	BLUETOOTH DONGLE KIT
WIRELESS CONNECTION TO CLEARCHART 2	16251	BLUETOOTH DONGLE KIT
WIRELESS CONNECTION TO AP250, AL700, RK 700	16253	BLUETOOTH DONGLE KIT
WIRELESS CONNECTION TO RK600	16254	BLUETOOTH DONGLE KIT
WIRELESS CONNECTION AL500, COMPUTER	16255	BLUETOOTH DONGLE KIT
SINGLE BLUETOOTH DONGLE WITH NULL MODEM PAIRING CABLE, WIRELESS CONNECTING VRX	16233	BLUETOOTH DONGLE KIT
WIRELESS CONNECTION TO CLEARCHART 4 SERIES	13779	WIRELESS BLUETOOTH ADAPTER

Appendix B - Compatibility Chart

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

Auto Refractors

REICHERT RK600/700
CANON RF 10/RK F1/RKF2
HUMPHREY HARK 599
NIDEK AR 2
NIDEK AR 800/900
NIDEK ARK 710/AR 800/900
NIDEK Tonoref II
RIGHTON/NIKON RETINOMAX
RIGHTON/NIKON Speedy
RODENSTOCK CX 1000
TOMEY TR 4000/5000
TOPCON KR 8x00
TOPCON KR 8900
TOPCON RMA 6500
UNICOS URK 800
VISONIX L80

Projectors

ClearChart® 2
ClearChart® 3P
AP250
L29 Typ 17D
M3000
Polastar
M&S Smart System 2020

Lensmeters

REICHERT AL 200
REICHERT AL 500
REICHERT AL 700
HUMPHREY LA 350
LUNEAU L70
NIDEK LM 1
RODENSTOCK AL 4500/4600
TOMEY TL 2000/ 3000
TOPCON CL 2000/100
TOPCON CL 200

Printer

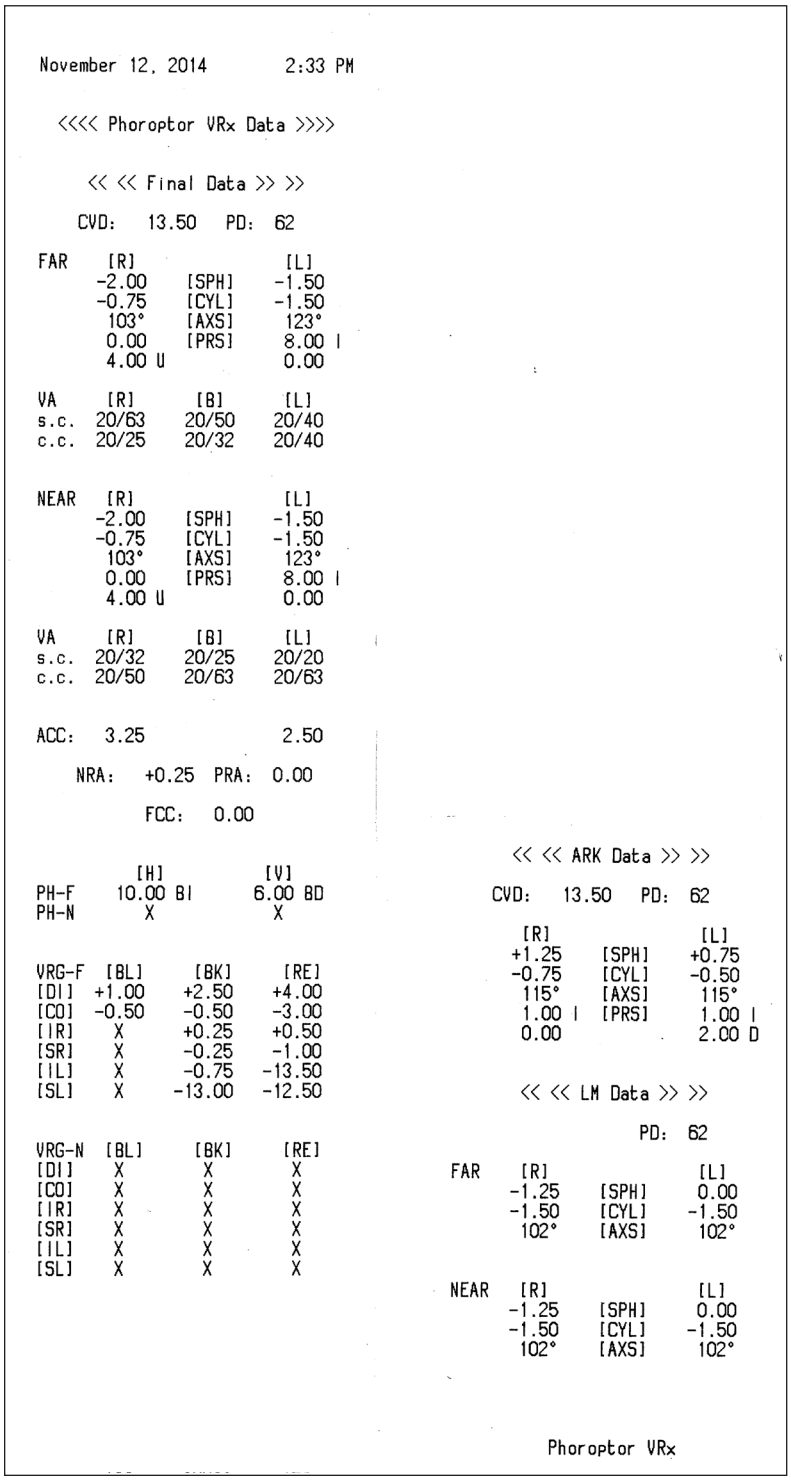
Martel MCP 1000 Printer

Transfer / EMR

VRx Transfer
Autophoroptor Receive
EMR AutoPhor Expanded
EMR Vis 900
EMR Auto Phor

Appendix C - Phoroptor VRx, Lensmeter, and Auto Refractor Data

Data output from the printer will now always include final subjective refraction data from the Phoroptor VRx and Auto Refractor and Lensmeter data if they were sent to the Phoroptor VRx. This is a sample of the printer data output.



November 12, 2014 2:33 PM

<<<< Phoroptor VRx Data >>>>

<< << Final Data >> >>

CVD: 13.50 PD: 62

FAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 U		0.00

VA	[R]	[B]	[L]
s.c.	20/63	20/50	20/40
c.c.	20/25	20/32	20/40

NEAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 U		0.00

VA	[R]	[B]	[L]
s.c.	20/32	20/25	20/20
c.c.	20/50	20/63	20/63

ACC: 3.25 2.50

NRA: +0.25 PRA: 0.00

FCC: 0.00

	[H]	[V]
PH-F	10.00 BI	6.00 BD
PH-N	X	X

VRG-F	[BL]	[BK]	[RE]
[DI]	+1.00	+2.50	+4.00
[CO]	-0.50	-0.50	-3.00
[IR]	X	+0.25	+0.50
[SR]	X	-0.25	-1.00
[IL]	X	-0.75	-13.50
[SL]	X	-13.00	-12.50

VRG-N	[BL]	[BK]	[RE]
[DI]	X	X	X
[CO]	X	X	X
[IR]	X	X	X
[SR]	X	X	X
[IL]	X	X	X
[SL]	X	X	X

<< << ARK Data >> >>

CVD: 13.50 PD: 62

	[R]		[L]
	+1.25	[SPH]	+0.75
	-0.75	[CYL]	-0.50
	115°	[AXS]	115°
	1.00 I	[PRS]	1.00 I
	0.00		2.00 D

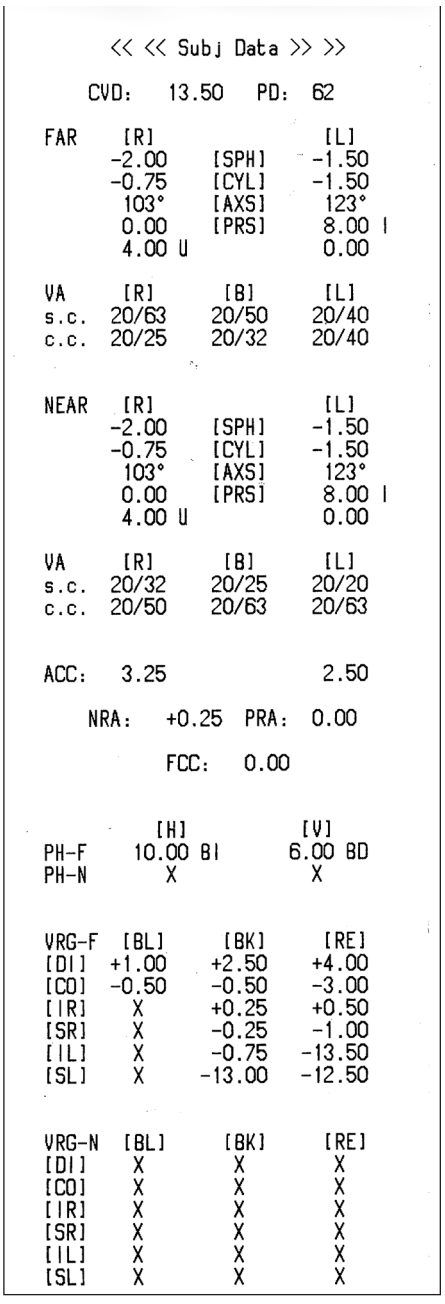
<< << LM Data >> >>

PD: 62

FAR	[R]		[L]
	-1.25	[SPH]	0.00
	-1.50	[CYL]	-1.50
	102°	[AXS]	102°

NEAR	[R]		[L]
	-1.25	[SPH]	0.00
	-1.50	[CYL]	-1.50
	102°	[AXS]	102°

Phoroptor VRx



<< << Subj Data >> >>

CVD: 13.50 PD: 62

FAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 U		0.00

VA	[R]	[B]	[L]
s.c.	20/63	20/50	20/40
c.c.	20/25	20/32	20/40

NEAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 U		0.00

VA	[R]	[B]	[L]
s.c.	20/32	20/25	20/20
c.c.	20/50	20/63	20/63

ACC: 3.25 2.50

NRA: +0.25 PRA: 0.00

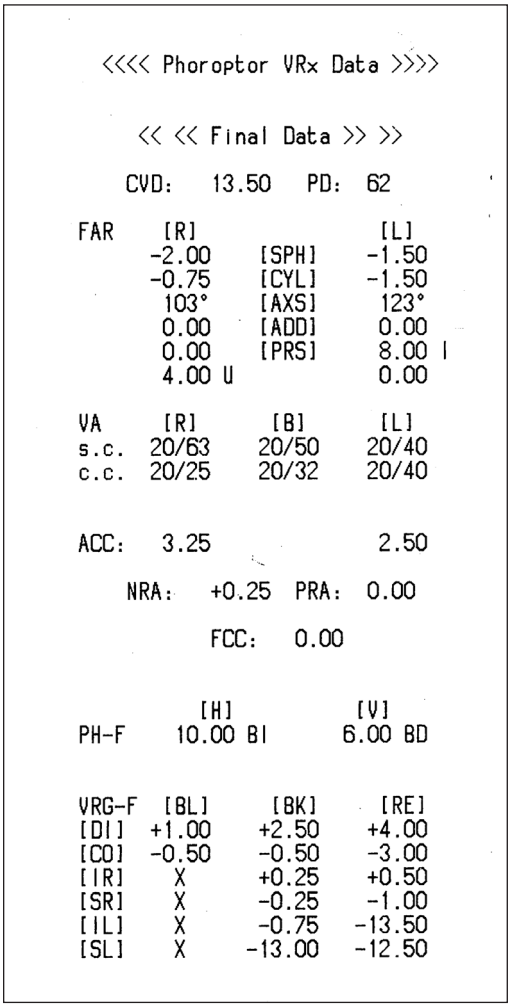
FCC: 0.00

	[H]	[V]
PH-F	10.00 BI	6.00 BD
PH-N	X	X

VRG-F	[BL]	[BK]	[RE]
[DI]	+1.00	+2.50	+4.00
[CO]	-0.50	-0.50	-3.00
[IR]	X	+0.25	+0.50
[SR]	X	-0.25	-1.00
[IL]	X	-0.75	-13.50
[SL]	X	-13.00	-12.50

VRG-N	[BL]	[BK]	[RE]
[DI]	X	X	X
[CO]	X	X	X
[IR]	X	X	X
[SR]	X	X	X
[IL]	X	X	X
[SL]	X	X	X

Appendix D - Phoroptor VRx Data Only



<<<< Phoroptor VRx Data >>>>

<< << Final Data >> >>

CVD: 13.50 PD: 62

FAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[ADD]	0.00
	0.00	[PRS]	8.00 I
	4.00 U		0.00

VA	[R]	[B]	[L]
s.c.	20/63	20/50	20/40
c.c.	20/25	20/32	20/40

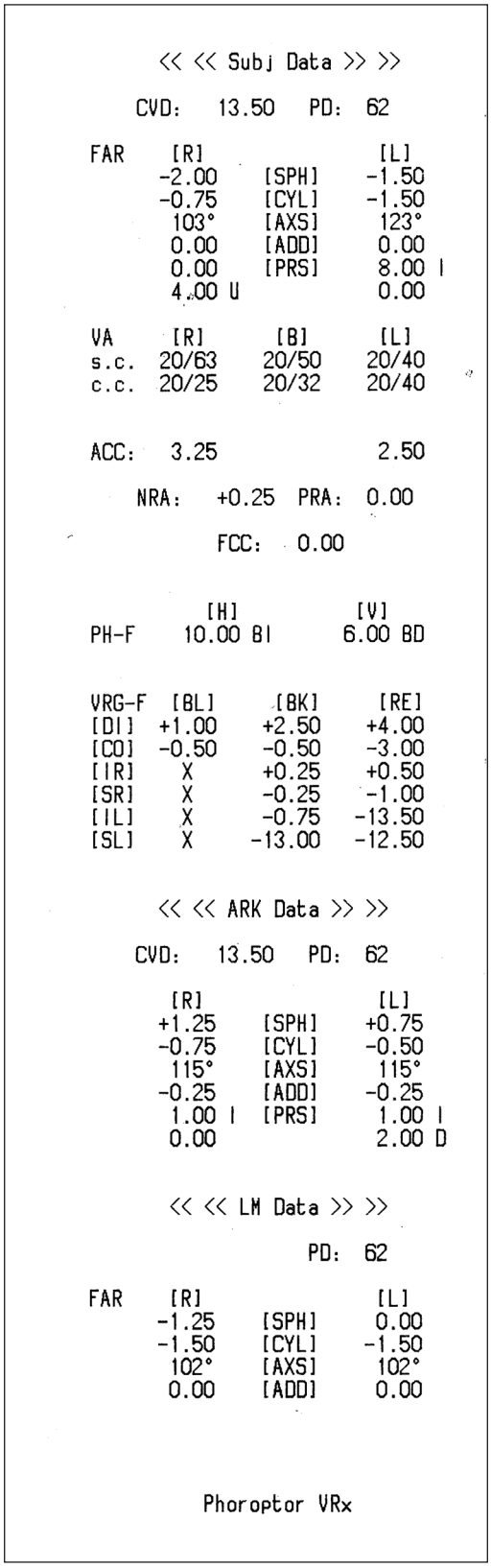
ACC: 3.25 2.50

NRA: +0.25 PRA: 0.00

FCC: 0.00

	[H]	[V]
PH-F	10.00 BI	6.00 BD

VRG-F	[BL]	[BK]	[RE]
[DI]	+1.00	+2.50	+4.00
[CO]	-0.50	-0.50	-3.00
[IR]	X	+0.25	+0.50
[SR]	X	-0.25	-1.00
[IL]	X	-0.75	-13.50
[SL]	X	-13.00	-12.50



<< << Subj Data >> >>

CVD: 13.50 PD: 62

FAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[ADD]	0.00
	0.00	[PRS]	8.00 I
	4.00 U		0.00

VA	[R]	[B]	[L]
s.c.	20/63	20/50	20/40
c.c.	20/25	20/32	20/40

ACC: 3.25 2.50

NRA: +0.25 PRA: 0.00

FCC: 0.00

	[H]	[V]
PH-F	10.00 BI	6.00 BD

VRG-F	[BL]	[BK]	[RE]
[DI]	+1.00	+2.50	+4.00
[CO]	-0.50	-0.50	-3.00
[IR]	X	+0.25	+0.50
[SR]	X	-0.25	-1.00
[IL]	X	-0.75	-13.50
[SL]	X	-13.00	-12.50

<< << ARK Data >> >>

CVD: 13.50 PD: 62

[R]		[L]
+1.25	[SPH]	+0.75
-0.75	[CYL]	-0.50
115°	[AXS]	115°
-0.25	[ADD]	-0.25
1.00 I	[PRS]	1.00 I
0.00		2.00 D

<< << LM Data >> >>

PD: 62

FAR	[R]		[L]
	-1.25	[SPH]	0.00
	-1.50	[CYL]	-1.50
	102°	[AXS]	102°
	0.00	[ADD]	0.00

Phoroptor VRx

Warranty and Limitation of Liability

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

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or that has 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 applicable Reichert instruction manual, nor to a product that has been sold, serviced, installed or repaired other than by a Reichert factory, Technical Service Center, or authorized Reichert Technologies Dealer.

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

All claims under this warranty must be in writing 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 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 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 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 in advertently overlooked when the unit was packed.
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 should be filed within 30 days.

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.

Reichert®
TECHNOLOGIES

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