

# **LIGHTBOX SOFTWARE SOLUTIONS**

## USER MANUAL



# **COMPUTERIZED ACUITY CHAT (VA CHAT)**

## READ THIS FIRST

### Quick Start Guide

So, you have opened the package, seen the equipment and are thinking, “What have I let myself in for”? Don’t worry, within ten minutes you will be happily flicking between all your familiar test charts. Just follow the following steps.

1. Before starting the system, check that your computer screen is hung. And all the plugs are firmly in their socket.

2. Press down the start/on button, the system will start booting.

3. The software is on a Windows platform; hence you’ll have to allow the computer to complete booting. This takes approximately 3mins.

4. A remote control radio frequency pointer ball tracker is used to navigate the application on your screen. This serves as your hand-held input or instruction device.

5. Use the remote to click on the program you intend to use for the test.

6. The screen will immediately change to the test you clicked on, follow up on this with your remote control.

7. At the close of work for the day or whenever you chose to shut down the unit,

you can close from the Windows platform or just press down on the on/off button and the system will proceed to close. Avoid shutting down using the power socket as this can destroy your computers operating system. Remember it is software running on Windows platform.



## **Computerized Acuity Chart**

Lightbox is a very powerful system with an enormous array of tests and options. However, the user interface is very straightforward and most users say that they feel completely at home using it within a day or so.

### **The Test Chart For The New Millennium**

Lightbox software is a Windows-based program designed to display a wide range of visual/optometric test stimuli on a standard PC monitor, thus replacing a conventional test chart or projector.

What is possible in your Chart

- ❖ Randomizable letters so that memorization of the chart is impossible.
- ❖ Contrast sensitivity test
- ❖ Astigmatic Test with Fan dial, Arrows, Cross Cyl targets, Block charts.
- ❖ Duo-chrome test for refining your sphere powers.
- ❖ Fixation Disparity chart.
- ❖ Clinical images for illustrations and counselling.
- ❖ Worth four dot test
- ❖ Color vision test

### **Controlling the Program**

Considerable effort has gone into ensuring that lightbox chart is quick and easy to use. The remote button is all that is required to navigate around your preferred sequence of charts and displays. The software can be controlled using the remote, keyboard or the mouse.

### **Optotype button on the Remote**

This controls the optotype that is displayed on the screen. Available options are Snellen, E-illiterate chart, Lea Chart and the language chart.

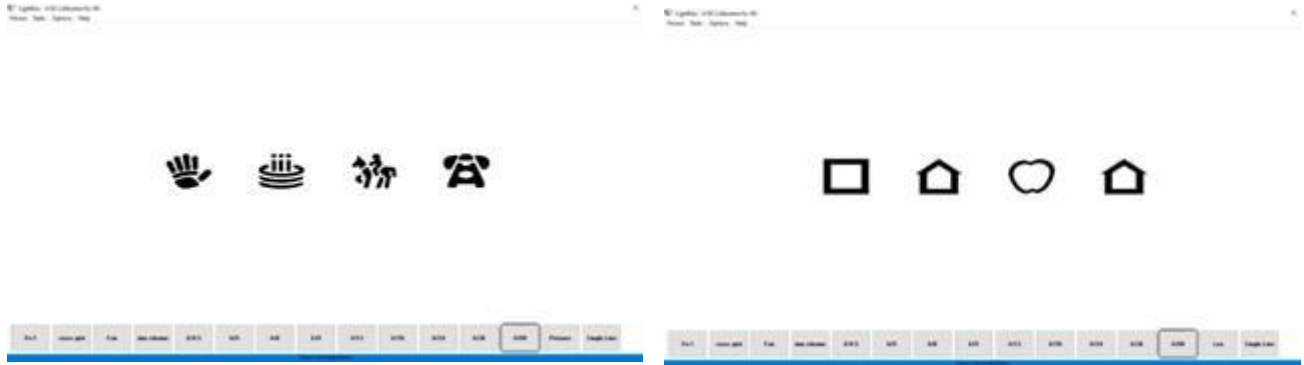




## Computerized Acuity Chat

### Lea chart

Click on the the Lea chart button to locate the chart and follow the same instructions above to access different options.



### Language chart Chinese

Click on the language button to access the Chinese language chart.



### Arabic

On the top left of your screen, locate and click the task option. Locate settings and select your preferred language.





### **Theory On Viewing Distance**

Visual acuity measures perception of 5 min of arc (or roughly 0.00145 deg). This is roughly equivalent to an 8.8 mm (1/3 in) tall character viewed from 20 ft. At 10 ft, this would be 1/2 the size, at 40 ft, twice the size. The scaling routines will recalculate image sizes based on distance settings and screen calibration.

The recommended viewing distance is 20 ft. (or 10 ft if using a mirror) from observer to image, but the LightBox is capable of displaying accurate acuity chart from 5ft to 25ft, with mirrored or direct image.

Refraction can now be conducted comfortably by clicking away from your table, the charts range from your VA charts to complicated test such as color vision test.


### **The Fan Dial**

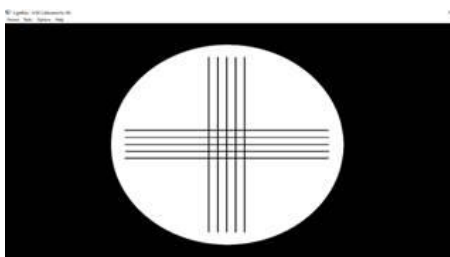
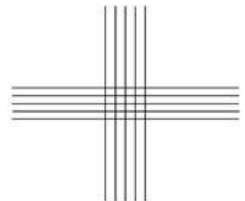
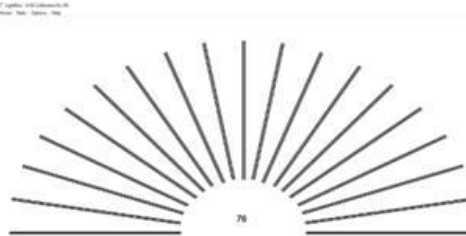
It is used to determine the axis and magnitude of astigmatism. It determines the presence of any astigmatism and its principal axes.

The fan dial test consists of series of radiating lines spaced at 10°,15° or 30° interval and arranged after the manner of rays of rising sun. The 10° spacing gives better accuracy but may be confusing which is why some practitioners prefer the wider spacing.

There is a central panel carrying a 'V' and two sets of mutually perpendicular lines (the block). The V and block simultaneously can be rotated through 180°.

### **HOW TO ACCESS THE FAN DIAL ON THE LIGHTBOX PROFESSIONAL CHART**

click on the fan dial button  on the remote to locate. Double click on the fan dial button to view other options and cross grid. Point cursor to any of the lines on the chart to show angles. When done, click on home key to return to the Lightbox acuity chart to default page.



## **TEST PROTOCOL**

Occlude one eye( preferably right eye ) The patient should be fogged with no cylinder lens in phoropter or trial frame.

Testing is done under fogging and it always results in neutralization of cylindrical error with cylinder lens of minus power. Fogging makes the eye a compound myopic astigmatism. This means that both meridians are in front of retina. One of the meridians close to retina will always be clearer and the axis of minus cylinder can be identified by this meridian. Why fogging is important?

Adding the minus cylinder gradually will push the other meridian closer to the previous meridian, which is closer to the retina until they form a point focus. Adding a plus cylinder will bring the meridian closer to retina further ahead inside the eye, creating a much blurred image of fan target. This blurred effect will not allow any response on subjective testing.

## **GETTING GOOD RESULTS**

After the eye is fogged, the patient is asked to look at the fan dial. If astigmatism is present, one or more lines on the chart will appear sharper than the others It is helpful to describe the dial for the patient in familiar terms with phrases like “similar to face of a clock” or “like a wagon wheel missing its hub”.

Next ask the patient “tell me which line is darkest, sharpest and clearest. We can also add “the one which looks as if it were printed with more ink in it. The object is for patient to identify in terms of clock position the meridian which is least blurred.

When an astigmatic eye is correctly fogged, the axis of correcting cylinder is at right angle to clearest line. The phoropter/trial frame cylinder is set at that axis and cylinder power is increased until all lines are equally clear that is patients cylinder correction. The fog is now reduced in 0.25D steps of sphere, monitoring vision at each step until the highest positive sphere power which gives best vision is obtained. Two adjacent lines are equally black. One line is darkest and the two neighboring lines are equally black. One line is darker and of the two neighboring lines, one of them is darker than the other.


The three possible endpoints are:

Distinguish which meridian would really be darkest of all. This may require some extrapolation but that is not always required. In case of endpoint in which two adjacent lines are equally black, you know that of the 180 theoretically possible lines, the one which would be blackest is not on the dial, so you must extrapolate.

If any uncertainty prevails do the whole process again. We could get to know about our mistake when the patients express that the blackest line has changed its position. It may not because of



## HOW TO ACCESS THE DUOCHROME CHART ON THE LIGHTBOX PROFESSIONAL CHART

Click on the Duochrome Button  to overlay the screen with the red and green background.



Occlude one eye. Turn off the room lights to dilate the pupil, which increases the chromatic aberration of the eye.

2. Ask the patient: "Are the letters/Images clearer and darker on the red or on the green, or are they the same?" If they are the same, this suggests the best vision sphere has been obtained and the circle of least confusion is on the retina.

3. If the rings on the **green** are clearer, **add plus** +0.25 DS until you obtain balance. Note the additional spherical power needed to obtain balance.


4. If the rings on the **red** look clearer, **add minus** -0.25 DS until you obtain balance, noting the additional power required.

5 Use the additional lens power suggested by the duochrome test and double-check whether this additional power is preferred by the patient using the plus-minus technique of best vision sphere assessment.

## COLOR VISION TEST

A color vision test, measures your ability to tell the difference among colors. If you don't pass this test, you may have poor color vision, or your doctor may tell you that you're color blind. However, being truly color blind is a very rare condition in which you're only able to see shades of gray.

## **HOW TO ACCESS THE COLOR CHART ON THE LIGHTBOX PROFESSIONAL CHART.**

Click on the color vision button  to access the chart. Click on it again to go to the next color plate.



## **TEST PROTOCOL**

start with the better eye (then the second eye) cover the eye not being tested.

## **GETTING GOOD RESULTS**

sitting in a normally lit room instruct patient to cover one eye, and then, using the uncovered eye, look at a series of test cards. Each card contains a multicolored dot pattern.

There's a number or symbol in each color pattern. If patient can identify the number or symbol, he should relate to the doctor. Numbers, shapes, and symbols should be easy to distinguish from their surrounding dots if you have normal color vision. If patient has color vision impairment, he may not be able to see the symbols. Or you may have difficulty distinguishing patterns among the dots.

Repeat exercise for the second eye.

Ask patients to describe a particular color's intensity as perceived by one eye versus the other. It's possible to have a normal result on the color vision test but still experience a loss of color intensity in one eye or the other.

## **RECORDING THE RESULT**

If patient has color vision impairment, he may not be able to see the symbols. Or may have difficulty distinguishing patterns among the dots. If the patient gets the symbols correctly, press 'up' on the remote and if the person doesn't, press 'down' on the remote.

## **THE WORTH 4 DOT TEST**

The Worth Four Light Test, also known as the Worth's Four Dot test or W4LT, is a clinical test mainly used for assessing a patient's degree of binocular vision and Binocular Single Vision (BSV). Binocular vision involves an image being projected by each eye simultaneously into an area in space and being fused into a single image. The Worth Four Light Test is also used in detection of suppression of either the right or left eye. Suppression occurs during binocular vision when the brain does not process the information received from either of the eyes. This is a common adaptation to strabismus, amblyopia and aniseikonia.

The W4LT can be performed by the examiner at two distances, at near (at 33 cm from the patient) and at far (at 6m from the patient). At both testing distances the patient is required to wear red-green goggles (with one red lens over one eye, usually the right, and one green lens over the left)

Because the red filter blocks the green light and the green filter blocks the red light, it is possible to determine if the patient is using both eyes simultaneously and in a coordinated manner. With both eyes open, a patient with normal binocular vision will appreciate four lights. If the patient either closes or suppresses an eye they will see either two or three lights. If the patient does not fuse the images of the two eyes, they will see five lights.

## **INDICATION FOR USE**

The Worth Four Dot Test is indicated for use when assessing the binocular functions, the ability of eyes to work in coordination, of an individual.

It can be used to establish whether a patient has the ability for the eyes to fuse the light that is received from each eye into 4 lights.

If the images are unable to be fused the W4LT is still indicated to help to determine if an individual appreciates diplopia (double vision) or are suppressing an image from one eye.

## **HOW TO ACCESS THE WORTH 4 DOT TEST ON THE LIGHTBOX PROFESSIONAL CHART.**

Click on the once astigmatism button  once. The worth4dot chat will appear.



## **RECORDING AND INTERPRETING RESULTS**

When recording results for the W4LT it is important to ask the patient a series of questions in order to ensure you correctly record exactly what they are seeing. This is essential in order to interpret the patient's results and then make an accurate diagnosis.

The questions are:

1. How many lights can you see?
2. What color or colors are they? Where are they located?
3. Are all the lights in line? Or are some higher than the others?
4. Do all the lights show up at one time, or are they flashing on and off?

When recording results it is important to indicate the test used, a description of the lights seen and an indication of what the result means. It is also important to note the distance at which the test was conducted and whether or not the patient wore their own refractive correction.

### **RESULTS**

There are a number of possible results demonstrated by a W4LT

The patient sees all four dots:

Normal binocular response with no manifest deviation (NRC with no heterotropia)

Harmonious ARC with manifest squint.

The patient sees five dots:

uncrossed diplopia with esotropia, red dots appear to the right

crossed diplopia with exotropia, red dots appear to the left of the green dots.

The patients see three green dots, suppression of the right eye

The patient sees two red dots, suppression of the left eye

### **SCHOBER'S TEST**

Schober test assesses the client's binocular coordination. The test measures the relative horizontal and vertical deviation of the eyes, one with respect to the other, when fusion is broken (In this chart, using a red and green goggles).

Schober's test often helps in the diagnostic assessment of children with anisometropic amblyopia. The test picture contains two green rings and a red cross. When viewed through red - green lenses a binocular person sees both the rings and the red cross. If there is a phoria, the cross moves corresponding to the angle of phoria.

### **Computerized Acuity Chart**

If the child sees the rings when the green lens is in front of the amblyopic eye but not the cross when the red lens is in front of the amblyopic eye, the area of suppression of the image of that eye is very small, the size of the cross.

### **HOW TO ACCESS THE SCHOBER'S TEST IN LIGHTBOX PROFESSIONAL CHART**

Click on the astigmatism button  twice to access the chart



### **TEST PROTOCOL**

Put a red lens in front of the patient's right eye and the green lens in front of the left eye over the patient's corrected prescription. The patient stands 2 to 3 ft from the screen.

Ask the patient about the position of the red cross in relation to the green circles. If there is a phoria, the cross moves corresponding according to the angle of phoria. With the use of prism, you measure the direction and strength of phoria

### **INTERPRETING RESULTS**

EXOPHORIA (the cross is moved into the left, or the circles are moved into the right) ->  
Correction: PRISM BASE NASAL

ESOPHORIA (the cross is moved into the right, or the circles are moved into the left) ->  
Correction: PRISM BASE TEMPORAL

RIGHT HYPOPHORIA or LEFT HYPERPHORIA (the cross is moved upwards, or the circles are moved downwards) -> Correction: PRISM BASE UP

RIGHT HYPERPHORIA or LEFT HYPOPHORIA (the cross is moved downwards, or the circles are moved upwards) -> Correction: PRISM BASE DOWN

Combinations:

EXOPHORIA AND RIGHT HYPOPHORIA (the cross is moved into the left and upwards, or the circles are moved into the right and downwards)

### **Computerized Acuity Chart**

EXOPHORIA AND RIGHT HYPERPHORIA (the cross is moved into the left and downwards, or the circles are moved into the left and upwards)

ESOPHORIA AND RIGHT HYPOPHORIA (the cross is moved into the left and upwards, or the circles are moved into right and downwards)

ESOPHORIA AND RIGHT HYPERPHORIA (the cross is moved into the right and downwards, or the circles are moved into the left and upwards)

### **SPECIAL CASES**

Schober test may also help in the diagnostic assessment in pediatrics with anisometropic (unequal refractive power of the two eyes) amblyopia. If a child sees the rings when the green lens is in front of the amblyopic eye but not the cross when the red lens is in front of the amblyopic eye, the area of suppression of the image of that eye is very small, the size of the cross. If suppression of the amblyopic eye is weak, a child might report that the cross may be seen “blinking”, which means the cross appears for a short time and then disappears again for a short time. In such case suppression is weak and can be usually broken in a short time. If the child has intensively trained the amblyopic eye, visual acuity may become normal within a month.

### **TEST PROTOCOL**

#### **CONTRAST SENSITIVITY TEST**

Contrast sensitivity test is a powerful tool for determining the capability of the visual system to process information about the everyday objects we see. The current gold standard in the assessment of vision, Visual Acuity, provides only a limited amount of information, obtained under artificial conditions.

Contrast sensitivity measures visual function, especially in situations of low light, fog or glare, when the contrast between objects and their background often is reduced. Driving at night is an example of an activity that requires good contrast sensitivity for safety.

Therefore, contrast sensitivity testing enables the eye practitioner to diagnose selective deficits in visual processing at an earlier stage than is possible with conventional testing methods.

#### **Indications for contrast sensitivity test**

Subjects with night driving difficulty.

Inability to see in room with dim lighting.

## Computerized Acuity Chart


Complaints of tiring easily while reading or watching television

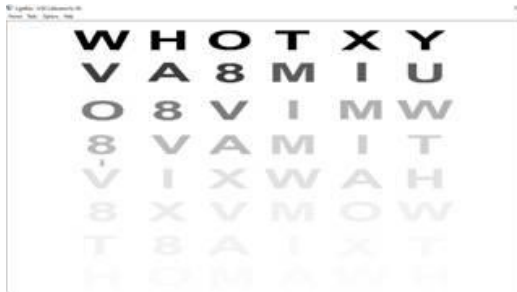
Low contrast sensitivity can be a symptom of certain eye conditions or diseases such as [cataracts](#), [glaucoma](#) or [diabetic retinopathy](#).


Changes in contrast sensitivity also can occur after [LASIK](#), [PRK](#) and other types of refractive surgery.

Lightbox acuity chart contrast sensitivity chart is modelled after the popular Pelli-Robson contrast sensitivity chart tests. The ability to detect letters that are gradually less contrasted with the white background as the subject eyes move down the chart.

## HOW TO ACCESS THE CONTRAST SENSITIVITY TEST IN LIGHTBOX PROFESSIONAL CHART.

Click on the contrast sensitivity button  to access the Chart. Click on the CS button to randomize the chart to avoid memorization. Point the cursor to any of the line on the chart and click, a number will appear in red showing the Log Contrast sensitivity of the position you are on.



When done, click on the Home Key (HK)  to return the Lightbox acuity Chart to default page.

## GETTING GOOD RESULT

The contrast sensitivity test is administered after a standard visual acuity test

Avoid dilating the pupil.

The testing typically is done with the subject wearing his/her best corrected glasses or contact lenses.

Subject to stand 3 to 4ft directly in front of the monitor

For evaluation of [eye disease](#), contrast sensitivity usually is tested on each eye individually.

### **Computerized Acuity Chart**

For other reasons, such as sports vision testing or to evaluate vision after contact lens fitting, LASIK or cataract surgery, the testing is to be done with both eyes open.

### **RECORDING THE RESULT**

Starting with three dark letters in the upper left-hand corner and reading horizontally across the entire line. The subject should read as much as they can, encourage the patient to guess even when they believe that the letters are invisible. Be patient for some seconds so that the fairest letters will appear. Only stop the test when 2 or 3 letters are guessed wrongly. The reliability of the result depends on this.

The patient sensitivity result is obtained by clicking on the set of triplet letters for which 2 or 3 letters are named correctly. The log contrast sensitivity will appear in red color. To clear the result, click on the return button or home key to refresh the lightbox acuity chart. When the chart is restarted a fresh chart will appear.

### **TEST PROTOCOL**

Start with the better eye, (then the second eye) covering the eye not tested. Then do a binocular test. The three measurements should be completed under 8 mins.

Hint: binocular log contrast sensitivity test is normally a step (0.15) better than monocular

### **Obtaining help**

Users are entitled to ongoing email and telephone support. Please read this manual carefully before calling and have details of your user name and serial number available.

We are always looking for ways of improving our programs and value your feedback.

Email: [framesplus2002@yahoo.com](mailto:framesplus2002@yahoo.com)

Helpline: +971 55 419 7094

[www.lightboxmec.com](http://www.lightboxmec.com)