

# Instruction Manual

PUBLICATION NO. 6024

## Vision Screening with the VS-V Pediatric Vision Screener

Model #1154



**Keystone View**  
Excellence in Vision Testing  
[www.keystoneview.com](http://www.keystoneview.com)

**DIVISION OF MAST CONCEPTS, INC.**

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**IMPORTANT NOTICE:** The instrument is held closed by a magnetic latch. To free the latch, place thumbs on top edge of base and press up on bottom of chassis (see illustration).

**DO NOT** lift up on black eye-shield assembly.

# Introduction

## VS-V PEDIATRIC SCREENING

With the introduction of the VS type instrument, vision screening becomes more complete and convenient than ever before.

The VS-V Pediatric blends technological convenience with more than 80 years of vision testing research, expertise and excellence.

Like its predecessors, the VS-V features several unique competitive advantages such as testing in reflected light rather than with backlit targets. This allows you to reliably test everyday visual function.

Eight stereoscopic targets, a unique bifocal lens system, a +1.50 and +2.00 diopter plus lens and a series of miniature lamps tests eight visual functions: acuity, farsightedness, vertical and lateral phoria, amblyopia or suppressions, color perception, depth perception and horizontal visual fields. Any test target can be turned into a low luminance test. Results have the same high level of accuracy as VS-V tests that replicate daytime light conditions.

Binocular testing is a significant advantage of this type of instrument. Certain tests designed to check the acuity of *one* eye are given with *both eyes open*. This design format models how the eyes are used in the individual's everyday environment.

This technique also discloses if suppression (blocking of vision) exists in one eye. This condition cannot be detected when one eye is occluded during tests (as with the wall-chart technique).

## GENERAL TEST PROCEDURE

The screening process is extremely easy to administer. All tests are operated using the Elliptech hand control or Keystone View's Visionary Software. Both operation systems are included with your instrument.

The subject sits or stands before the instrument and looks into the target. The examiner explains the targets and the subject reports what he/she sees. His/her responses are checked on a record form or through the software program.

Testing is quick and enjoyable for all ages. The total screening series can be given in under five minutes.

## FOUR TESTING LENSES

The vision screener employs a unique multi-distance lens system that allows a single test target to be viewed at far point (20 feet/6m), near point (16 inches/40cm) and with +1.50 and +2.00 diopter plus lenses. The four lenses have different focal lengths and convergence characteristics. This exclusive technique triples the test target capacity.

All distances are produced optically by the unique lens system offered by Keystone View. This conserves space and allows an operator to switch lenses on the same presentation merely by pressing a button on the hand control. The Visionary Software automatically changes the Screener's lens to the specified distance.

## TEST SIGNIFICANCE

Please bear in mind screening is not intended to provide detailed diagnostic data. The various screening tests should not be directly compared with clinical findings in an ophthalmologist's or optometrist's office.

Keystone View's 80-plus years of vision screening leadership ensures accurate and dependable testing. All tests are psychologically sound and given under standardized conditions.

# The Test Instrument

The VS-V Screener is designed for standardized and confidential testing. Targets are enclosed in the unit so subjects cannot see or study them in advance. Internal target illumination ensures consistency of operating conditions, and the unit pivots through a 63-degree arc to adjust to the eye level of any subject.

Only 10 inches wide, 15 ½ inches long and 7 inches tall, the VS-V is compact and completely self-contained, easily sharing desk or table space with a desktop personal computer. When not in use, a magnetic catch holds the unit closed. The total weight is less than 11 pounds. The VS-V operates from a standard or 120 volt a.c. power outlet.



1. **Control unit:** The VS-V places test operations under push-button command with the Elliptech Soft-Touch hand control.
2. **Unique lens system:** The automated lens system allows the examiner to easily change between far, near and plus distances with simple pushes of a button.
3. **Perimeter test:** Horizontal peripheral vision fields are measured using light-emitting diode target lamps, positioned between the lenses and recessed in the temple areas of the viewing head so eyeglass frames will not interfere with testing.
4. **Headrest:** Accommodates a wide variety of eyeglass frames. During testing the subject's forehead should rest lightly against this specially-designed strip.
5. **Observation Windows:** Sliding covers in the top of the machine allow the operator to see the target being viewed by the subject and to use a pointer if necessary.
6. **Power switch:** The on/off control and USB port are at the rear of the instrument.
7. **Transformer:** To eliminate electrical and heat hazards, power for the VS-V is converted to 12 volts DC. To ensure safe operation of the equipment, the VS-V must only be used with the transformer supplied by the manufacturer.

Use of any other transformer not approved by the manufacturer could result in safety problems.

Part No. 818-470

INPUT: 110/120V AC-50/60Hz

OUTPUT: 12V DC-.83 A



Type B Device



In accordance with  
Directive 93/42/EEC

The Class II symbol on the transformer label indicates that the transformer does not only rely on basic insulation to protect against electric shock, but has double insulation as an additional safety precaution.

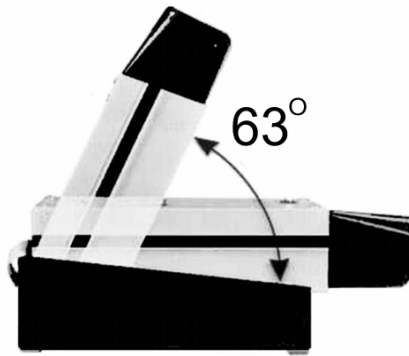
## Recommended Environment

Operating temperature: 32 to 104°F

Storage temperature: -4 to 158°F



Target drum and illumination lamps are readily accessible by removing the top cover of the case. The drum accommodates eight permanently-mounted stereoscopic tests that may be removed if required under special circumstances. (Instructions for re-installation are presented on page 14).



The VS-V adjusts effortlessly to the eye level of any test subject. It pivots through a 63° arc with free floating action fully controlled by the subject. When not in use a magnetic catch holds the unit closed.

A convenient storage area, accessible from the rear, is built into the base of the instrument. The instruction manual and extra record forms may be stored here when the VS-V not in use.

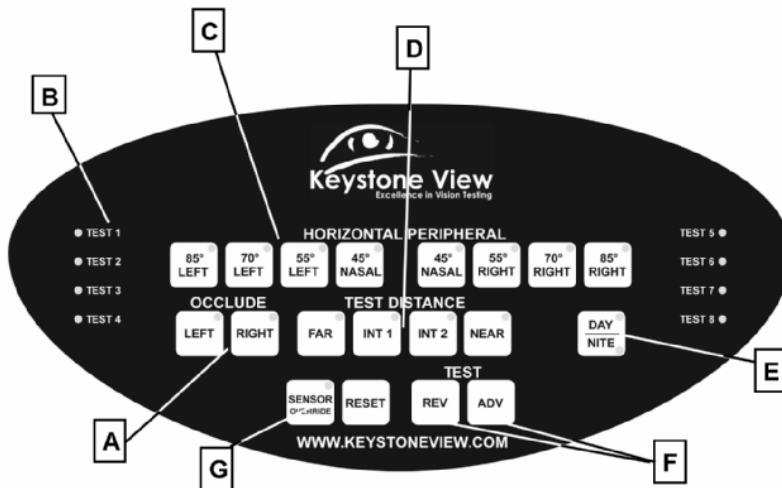
Accessible on the rear panel of the VS-V are the:

- main power switch "on/off"
- USB connection port
- serial/AC port
- main power receptacle

## Elliptech Control Unit

The VS-V Elliptech Soft-Touch hand control unit makes for easy operations of the vision screener. The comfortable design makes it suitable for hand-held or desktop operation. The hand control can not be used simultaneously with the Visionary Software. By pressing the appropriate buttons on this compact panel you can:

- Advance or reverse stereo tests
- Select near, far or intermediate test distances
- Occlude either of the subject's eyes
- Selectively light the peripheral vision test lamps
- Perform night-vision tests



- A) Occlusion is controlled by pushing separate buttons for each eye.
- B) Stereo tests are listed on the front of the control unit. A lamp next to each test number signals when that target is being presented.
- C) Peripheral vision target lamps are lit by pressing these buttons. A signal lamp indicates which eye is being tested.
- D) The test distance buttons will switch the lens to the corresponding distance. **(The +1.50 Diopter lens is put in place by pushing the "INT 1" button. The +2.00 Diopter lens is put in place by pushing the "INT 2" button. )**
- E) The Day/Nite switch allows the examiner to toggle between simulated bright "real-life" daytime illumination and dim light nighttime illumination.
- F) Touch these buttons and the stereo target drum either advances or reverses to the next test.
- G) Head Sensor override button allows operation of the machine without an examinee's head properly placed inside the headrest.

# Preparation for Testing

Place the VS-V Screener on a table, desk, or counter that provides sufficient space for the instrument, control unit, record forms and computer if using the software program. A desk/table height of 26-30 inches (66-76 cm) is recommended for most examinees.

Position the instrument near the edge of the desk or counter. If subjects are to be seated while testing, be sure sufficient knee room is provided. Chairs for both the examiner and test subject should be straight-backed.

## Equipment readiness

Before testing, check the VS-V Screener to ensure it is in proper working condition.

At the beginning of the work day, dust the VS-V Screener and lenses with a soft, soap and water-dampened cloth and examine the unit against the following checklist:

(Please note the optical sensor device included with your VS-V Screener can be overridden via the hand control or software. If turned on, the lamps will light only when an individual's head is within the viewing area or when the sensor light beam is interrupted. The sensor beam is located between the two viewing ports on the machine.)

- Is the unit transformer connected to a standard 110/120 volt a.c. outlet?
- Do both target illumination lamps light up when the power switch is turned on?
- Do the horizontal field target (peripheral) lamps light up when the appropriate buttons on the control panel are selected?
- Does the appropriate target illumination lamp go out when each of the "occlude" buttons is selected?

## General test conditions

Whenever possible VS-V Screener screening tests should be given in a reasonably quiet room. Testing can be performed in virtually any area where traffic, noise or interruptions do not disconcert either the test subject or examiner and do not interfere with the accuracy or speed of the tests.

Extremely bright room lighting or glare may adversely affect the operation of the VS-V Screener. For the best possible conditions subdued room lighting is recommended.

Examinees should be admitted to the test area one at a time. This prevents those waiting to take the exam from obtaining information concerning responses that could affect test validity. Only the subject can see the test targets, but oral remarks may be overheard by others.

The examiner may be positioned anywhere in the immediate vicinity of the examinee where space is available for the control unit and record forms.

## Corrective lenses

If the subject wears corrective lenses (regular eyeglasses or contact lenses) the tests should be conducted with the lenses worn as usual.

If lenses are worn only for reading or only for distance vision the lenses should be removed when testing that type of vision for which the lenses were not prescribed.

Exercise caution when testing a person who has recently been fitted with new glasses. Many vision specialists do not fit a patient with full-correction lenses, but rely on the patient to help him/herself as time progresses. Therefore, poor scores on the screening tests shortly after such a fitting may not be truly accurate. A retest after two months is recommended.

## Test subject's posture

Good body posture is important to good vision, so proper posture must be maintained during testing. An uncomfortable position will cause strain and distract the test subject.

The subject's back and head should be erect and the shoulders level. His/her forehead should rest comfortably against the instrument's headrest throughout testing.

Adjustment of the height and angle of the VS-V Screener is under direct control of the test subject. He/she may wish to grasp the side of the unit with one or both hands and/or with the elbows resting on the desk or counter.

Do not allow the subject to pull back or away from the instrument between individual tests. Caution him/her against tilting the head to the side at anytime.

When vision screening is conducted, it is important an organized procedure is followed and standardized questions be used. Only in this way can consistent results be assured. The sequence of the tests and the instructions given can affect the test subject's performance.

The descriptions on the following pages have been found to evoke quick responses from the average test subject. However, as the individual examiner becomes experienced in administering the tests, he/she may wish to adapt the specific wording of each question to his/her own style.

## During testing

Examinee's responses should be prompt. After each target is presented and the question asked, allow a few seconds for the subject to become oriented to the target scene and report what is seen. An obvious hesitation indicates an effort to guess. Since there is no penalty for an "incorrect" answer, encourage the subject to be as frank as possible in telling what she/he sees.

When acknowledging the responses, be careful not to indicate approval or disapproval, praise or disappointment. Do not "lead" the subject into giving the type of response that you, the examiner, wish.

Keeping the amount of conversation to a minimum during testing will help preserve the objectivity of the tests and save examining time.

## Recording the findings

Speed of recording depends on the examiner's familiarity with the test targets and what type of recording is in use. The recording form has been designed to show expected and abnormal responses, so scoring can be done by checking the appropriate space. The software program allows recording with the click of a mouse.

If undesirable visual characteristics are noted, responses are likely to be slower than usual. The examiner should allow additional time. Even in such cases the complete screening examination should take no more than five minutes.

## Using the Record Form

The VS-V Pediatric bilingual record form makes record keeping simple. Symbols or characters used on the test targets appear identical on the record form. Acuity and other values are printed on the form to give you immediate evaluation information. Snellen English and Metric acuity levels are given on both sides of the form.

Space is provided at the top of the record form for noting subject identification data. Be sure the basic data is entered before testing begins. If a number of individuals are to be tested in one session, it may be preferable to have basic information pre-recorded.

The area for noting subject responses to the tests is divided into white and shaded columns. Any checks in the shaded columns indicate potential unsatisfactory performance.

Tests are identified by a sequence number that matches call outs on the hand control.

The information on whether the individual wears corrective lenses is obtained at the time of testing. If lenses are worn at all times, both near and far point tests are given with the prescription and should be worn throughout the exam. If lenses are worn only for reading or distance vision, they should be used only for the appropriate section of the test series.

Mark the record form to indicate if glasses are worn during testing. For instance, a check mark may be used to indicate correct responses when glasses are not worn. Use a diagonal line or a circle when glasses are worn.

It is often desirable to provide a second copy of the record form, either for the test subject or for a vision specialist to whom he/she may be referred. A photo copy of the form can be created once the form has been completed. Should you copy blank record forms, you will be subject to copyright violation fines.

The record form is supplied in pads of 100 sheets each (3 pad minimum reorder). Reorder the VS-V Pediatric record form using catalog number 5650 or part number 821-922. Reordering is made easy by using the filled out rush order form attached to each pad of record forms. Use the directions on the order form to complete your order.

The image shows two overlapping forms. The top form is titled "Keystone VS-V Pediatric Formulario de Resultados" and contains fields for patient information (Name, Sex, Date of Birth, Address, Contact info) and a table for recording test results. The bottom form is titled "Keystone VS-V Pediatric Record Form" and is a detailed grid for recording test results. It includes sections for "Far Vision Tests" (with sub-sections for Acuity, Near, and Distance), "Near Vision Tests", and "Hyperopia Test". Each section contains multiple rows of test targets (represented by symbols like letters, numbers, and shapes) and columns for recording responses, with shaded areas indicating potential unsatisfactory performance. The forms also include instructions and contact information for Keystone Vision.

# VS-V Pediatric Tests

## Positive occlusion

The VS-V incorporates a unique system for occluding (blocking out) the stereoscopic test target image seen by either eye. Each side of the test target is illuminated by a separate lamp. Occlusion of the desired eye is accomplished quickly and effectively by turning off the appropriate lamp using the Visionary Software interface or Elliptech hand control.

A major function of occlusion is to determine the existence of visual suppression: the mental blocking out of the image seen by one eye so the only image registering in the brain is the one seen by the other eye. Normally, the images seen by the two eyes are fused into a single, integrated image.

Because the VS-V requires the eyes to work together, any suppression will become evident during the first test if the subject reports the image that should be visible to one eye does not appear. In such cases, occlude the vision of the **opposite** eye. This usually causes the “non-seeing” eye to work hard enough so the “missing” image becomes visible. If it does not, it may be concluded the test subject is blind in that eye.

The occlusion system is also used with certain tests to provide official medico-legal data.

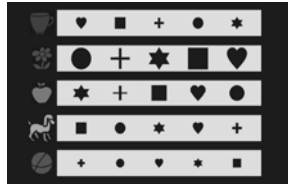
## Stereoscopic Test Targets

Each of these permanently-mounted test targets presents differing images to the two eyes (except in the binocular only acuity test). The eyes must work together to fuse, or merge, both images into a single integrated image. All targets can be used at near, far or intermediate distances. Recommended distances are included in the Test Procedure section of the manual. The Visionary Software automatically changes the lens settings to the specified distance and lighting.



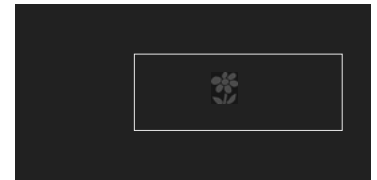
### Acuity: Binocular

Each eye is tested separately to 20/40 (6/12) Snellen equivalent. Test uses pictures only. Recommended for pre-school children and as a general binocular function test.



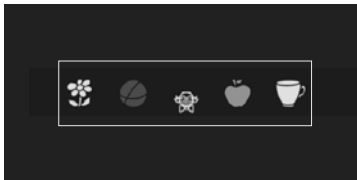
### Acuity: Binocular and Monocular

Easily tests binocular acuity at 20/40 (6/12), followed by four monocular tests. Monocular acuity is tested at 20/80 (6/24), 20/60 (6/18), 20/40 (6/12) and 20/30 (6/9).



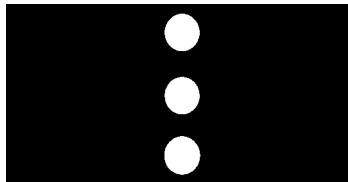
### Phoria

Determines if a subject's eye muscles are properly balanced and coordinated.



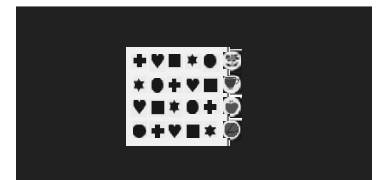
### Stereopsis, Color

This 3-D target measures depth perception, color and presence of suppression. Depth perception is measured solely to the coordinated use of the eyes.



### Fusion

Here's a check of one of the basics of visual efficiency: Whether the images seen by the two eyes merge into a single, integrated image. Two balls are presented to each eye and should fuse into a column of three balls.



### Stereopsis

This 3-D target measures depth perception using familiar shapes. The examinee must name the symbol that stands out on each line.



### Acuity: Binocular

Single target presentation tests binocular acuity at Snellen values of 20/30 (6/9), 20/40 (6/12), 20/60 (6/18), 20/80 (6/24) and 20/100 (6/30). This target is also used for Hyperopia testing.



### Acuity: Monocular

Single target presentation tests right eye and left eye separately. Snellen values of 20/30 (6/9), 20/40 (6/12), 20/60 (6/18), 20/80 (6/24) and 20/100 (6/30) are provided.

### Horizontal Fields

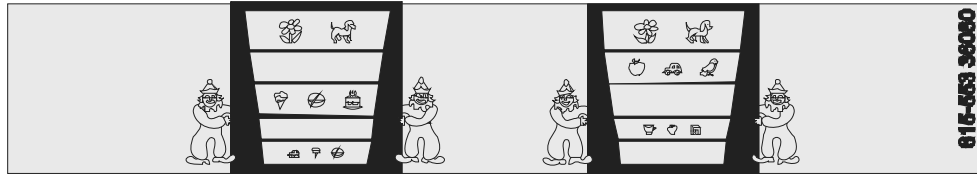
Miniature lamp (LED) targets between the lenses and recessed in the temple (side) areas of the viewing head show how far to the side a subject's visual field extends when he/she looks straight ahead. Persons with “tunnel vision”, a grossly-restricted peripheral field, are quickly identified.

# Testing Procedure

**Note:** Distances (far, near, etc) in the “Unit Instructions” area are recommended for the corresponding test. If you plan to test the same target at Far and Near distances, it is ideal to test the Far distance first.

Any test can be given in low-luminance (night) mode. Use the Exam Wizard in the software to create customized tests. If you are not using the software, push the “Day/Nite” button to switch between luminance levels. The record form has a “Night” column for recording low-luminance results.

## Test #1 Acuity: Binocular



Test symbols used are printed on the record form and appear on the software screen to allow the operator to better interpret the child’s responses. If the “Dog” figure is identified as “Puppy”, the figure is correctly identified. Be sure the child can identify the symbols used in the test by reviewing this manual page or the record form before testing is begun.














The Snellen equivalents for the symbols are 20/100 (6/30), 20/70 (6/21) and 20/40 (6/12). Each eye is tested separately, but both eyes are open and seeing. Suppression is readily apparent if the child can not see all lines.

### Unit Instructions: Distance: Far

**Question:** What do you see in the top row?

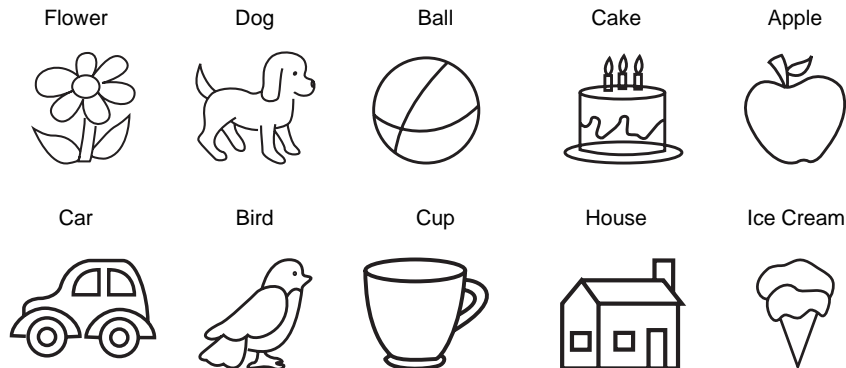
Assuming the first row of symbols is correctly identified, have the child move down the chart until all rows are completed. Lines 2 and 4 test the right eye only. Lines 3 and 5 test the left eye only.

### Correct Responses:

Top Line	 	20/100 (6/30)
Line 2	  	20/70 (6/21)
Line 3	  	20/70 (6/21)
Line 4	 	20/40 (6/12)
Line 5	  	20/40 (6/12)

**Passing:** The child must identify all symbols in all rows. It is important for the examiner to be conscious that acuities 20/70 and 20/40 are tested separately for the right and left eye.

### Test Symbols:



**Test #2 Acuity: Binocular and Monocular**

Line 1 is identified with a blue cup.  
 Line 2 is identified with a red flower.  
 Line 3 is identified with a green apple.  
 Line 4 is identified with an orange dog.  
 Line 5 is identified with a blue ball.



Line 1 of this target is for binocular testing. Lines 2 through 5 can only be used monocularly.

**Binocular Test**

**Unit instructions:** Distance: Far

**Question:** What shapes do you see in the top row (blue cup line)?

**Correct Response:** ♥ ■ + ● ★ 20/40 (6/12)

**Passing:** Correctly identifying 4 out of 5 symbols.

**Monocular Test: Right Eye**

**Unit instructions:** Occlude Left Eye. Distance: Far

**Question:** What shapes do you see in the second row (red flower line)? Assuming the second row of symbols is correctly identified, have the child move down the chart until all rows are completed.

**Correct Response:** Line Red Flower ★ ♥ ■ ● + 20/80 (6/24)  
 Line Green Apple ■ + ★ ♥ ● 20/60 (6/18)  
 Line Orange Dog ♥ ★ + ● ■ 20/40 (6/12)  
 Line Blue Ball ★ ● ♥ + ■ 20/30 (6/9)

**Passing:** To pass one line, 4 out of 5 symbols must be identified correctly on the same line.

**Monocular Test: Left Eye**

**Unit instructions:** Occlude Right Eye. Distance: Far

**Question:** What shapes do you see in the second row (red flower line)? Assuming the second row of symbols is correctly identified, have the child move down the chart until all rows are completed.

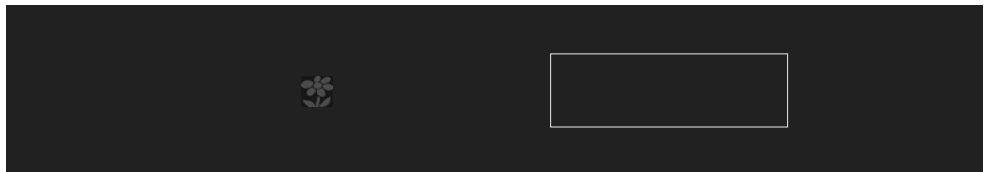
**Correct Response:** Line Red Flower ● + ★ ■ ♥ 20/80 (6/24)  
 Line Green Apple ★ + ■ ♥ ● 20/60 (6/18)  
 Line Orange Dog ■ ● ★ ♥ + 20/40 (6/12)  
 Line Blue Ball + ● ♥ ★ ■ 20/30 (6/9)

**Passing:** To pass one line, 4 out of 5 symbols must be identified correctly on the same line.

**Test #3 Phoria**

**Unit instructions:** Distance: Far

**Question:** Where is the red flower?  
*If relation to the box is not mentioned in the answer, ask 'Is the flower inside or outside the yellow box?'*



**Correct Response:** The flower is inside the box.

**Passing:** The flower is seen inside the yellow box and not touching the lines of the box.

**OPTIONAL Peripheral Visual Field Test**

The horizontal targets are selectively lit by individual buttons to show a 45° nasal field and temporal fields at angles of 85°, 70° and 55°. A total field of vision up to 130° can be measured for each eye.

Use Target #4 while testing the peripheral vision. To encourage the use of peripheral vision rather than actively moving the head, ask the examinee to tell you what he/she sees on the screen. As the examinee is explaining what is on the target, activate the peripheral lights. Ask if he/she sees a light, to tell you.

**Correct Response:** The examinee should say "left side" or "right side" for each light. The "N" button tests 45 degrees across the nose, in the nasal field. (Testing right eye nasal will yield a "left side" response.)

**Passing:** Examinees should be able to respond to at least the 55 degree and 70 degree temporal tests for each eye. If they cannot, visual problems may exist, and referrals should be made for a full professional eye examination.

**Test #4 Stereopsis (Depth Perception), Color, Suppression**

This target shows four of the familiar symbols the child has seen in earlier tests, and a little clown face wearing a hat and a bow tie. Two of the symbols stand out from the line, nearer to the child than the other symbols.

**Unit instructions:** Distance: Far

**Question:** What colors are the pictures you see?

**Correct Response:** A yellow flower, red ball, yellow clown face, green apple and a yellow cup.



**Question:** Which pictures appear closer to you?

**Correct Response:** The red ball appears closer than the flower, cup and clown. The green apple is closer than all the shapes.

**Question:** “Do you see a clown in the middle of the target?” If the child answers yes, ask him/her to describe what the clown is wearing on his head. Ask him/her to describe what is just below the clown’s face.

**Correct Response:** The clown is wearing a pointy hat and a bow-tie.

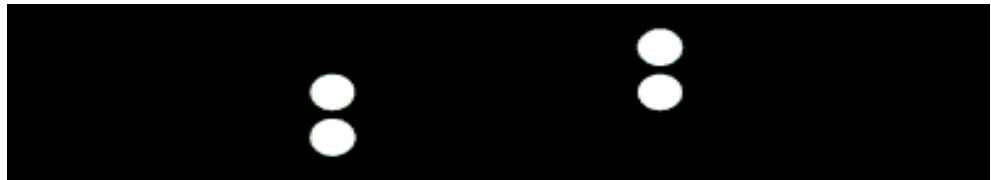
**Passing:** If the examinee cannot identify both symbols on the clown, suppression is indicated. If the right eye is not seeing, the clown wears only a bow-tie. If the left eye is not seeing, the clown wears only a hat. The information may be useful for classroom teachers and parents. The test also presents two important primary colors (red and green) for identification. If the clown is seen with both tie and hat but the child cannot determine which symbol is closer than the others, lack of stereopsis or visual immaturity is indicated.

**Test #5 Fusion**

**Unit instructions:** Distance: Far

**Question:** “How many balls do you see?”

**Correct Response:** Three balls (red on top, white, blue on bottom).



**Passing:** Seeing three balls. If only *two* balls are seen (which is highly unlikely), determine by the color whether they are seen by the right or left eye. The blue ball is presented to the left eye only. If *four* balls are seen - either initially or after a few seconds - determine if the blue ball is to the left or right of the red one. Exophoria is indicated if the right ball is to the upper right of the blue ball. Esophoria is indicated if the red ball is to the upper left of the blue ball.

**Test #6 Depth Perception**

**Unit instructions:** Distance: Far

Line 1 is identified with a red flower.  
 Line 2 is identified with a blue cup.  
 Line 3 is identified with a green apple.  
 Line 4 is identified with a blue ball.



**Question:** Does one shape appear closer to you in the top line (red flower line)?

**Correct Response:**

Line Red Flower	■	15%, 424°
Line Blue Cup	★	30%, 208°
Line Green Apple	+	50%, 103°
Line Blue Ball	●	70%, 54°

**Passing:** Must be able to identify the closer shape in line 4. The inability to identify the closer shapes identifies difficulty with depth perception.

### Test #7 Acuity: Binocular

Unit instructions: Distance: Near



**Question:** What objects do you see in the top row? Assuming the first row of symbols is correctly identified, have the examinee move down the chart until all rows are completed.

**Correct Response:**

Line 1		20/100 (6/30)
Line 2		20/80 (6/24)
Line 3		20/60 (6/18)
Line 4		20/40 (6/12)
Line 5		20/30 (6/9)

**Passing:** All symbols in the top row must be identified correctly to pass. Four out of 5 symbols must be correctly identified to pass each line thereafter.

### Hyperopia Test

Unit instructions: Distance: Plus Lens

Children under 8 years of age should be tested with the +2.00 lens (Int 2). Children 8 years old and older should be tested with +1.50 lens (Int 1).

**Question:** Can you see what objects are in the bottom line?

**Correct Response:** No.

**Passing:** The ability to “clear” the blurred image produced by the plus lens on the 20/30 line (bottom line) can indicate the presence of hyperopia. Authorities agree the plus lens test is a reliable indication of an ability to accommodate for near vision tasks. Therefore, the ability to “clear” or to see the 20/30 images indicates a potential difficulty with reading and other close work.

### Test #8 Acuity: Monocular

Right Eye Unit instructions: Occlude Left Eye. Distance: Near



**Question:** What objects do you see in the top row? Assuming the first row of symbols is correctly identified, have the child move down the chart until all rows are completed.

**Correct Response:**

Line 1		20/100 (6/30)
Line 2		20/80 (6/24)
Line 3		20/60 (6/18)
Line 4		20/40 (6/12)
Line 5		20/30 (6/9)

**Passing:** All symbols in the top row must be identified correctly to pass. Four out of 5 symbols must be correctly identified to pass each line thereafter.

Left Eye Unit instructions: Occlude right eye. Distance: Near

**Question:** What objects do you see in the top row? Assuming the first row of symbols is correctly identified, have the child move down the chart until all rows are completed.

**Correct Response:**

Line 1		20/100 (6/30)
Line 2		20/80 (6/24)
Line 3		20/60 (6/18)
Line 4		20/40 (6/12)
Line 5		20/30 (6/9)

**Passing:** All symbols in the top row must be identified correctly to pass. Four out of 5 symbols must be correctly identified to pass each line thereafter.

# Test Results

## General Explanation of Keystone View Vision Screening Tests

Suppression (Test #1): An unusual, but not uncommon, condition. Normally, the brain merges the images seen by each of the two eyes into a single image. With suppression, however, the brain block out one of these images centrally. The effect is that of seeing with one eye only. Suppression can generally be corrected with training.

Eye posture/Phoria (Test #3):

Up-down balance: Shows if the two eyes work in balance or if one eye tends to turn up.

In-out balance: Shows if the eyes are balanced to both look straight ahead or if they tend to turn inward or outward.

Imbalance (particularly in-out balance) is a common disorder, especially among young children. Imbalance can cause eyestrain, headaches and nervousness.

Color Vision (Test # 4): Shows if the examinee can tell various colors apart. If color blindness is indicated to any degree, the examinee should be told; especially for reasons of safety. No remedy for defective color vision is known at this time.

Fusion (Test #5): Fusion is one of the basics of visual efficiency. The test shows if the eyes are coordinated. The separate images seen by the two eyes should blend into a single image.

Depth Perception (Test #6): Shows the ability to distinguish nearby objects from those farther away. This skill is affected by practice, and may not be well-developed before the age of nine.

## Interpreting Test Results

The results of the VS-V Pediatric screening tests should not be considered separately, but as a *whole*. Taken in entirety, results provide a reliable indication of the test subject's visual efficiency.

It must be remembered the test series is designed to identify persons who may benefit from professional vision care. It is not intended to provide diagnostic or clinical data.

### Suggested Visual Standards

The Visionary Software program will automatically record each result as normal or abnormal based on the vision standards for each test. Exam results as a whole are recorded as 'Fail' or 'Pass'. Refer to the software manual for more information regarding results.

If on the record form all of an individual's test scores are recorded in the clear area of the "Acceptable" column on the record form, it may be assumed that he/she has adequate visual skills for normal living.

If some scores are marked in the lightly shaded area of the "Marginal" columns, the subject can be considered to have "doubtful performance."

Consider scores in the clear area as good general standards for visual abilities, but allow scores in the lightly shaded areas to pass if those visual tasks are not in demand.

Scores falling in the darkly shaded "Unacceptable" areas of the record form indicate the subject will benefit from a professional vision examination. Be sure to test subjects with their eye glasses on if glasses have been prescribed.

Do not refer for professional consultation for "Unacceptable" performance on the color test. No remedy has yet been perfected for defective color vision. However, for reasons of safety, persons who are color blind should be made aware of their deficiency.

Stereopsis is a highly developed visual skill subject to maturation factors. Persons over the age of 25 years may do better in this test than those under 25. However, adults whose occupations involve moving machinery or materials should (for safety reasons) score in at least the lightly shaded "Acceptable" area.

### Additional aids to test interpretation

Some children may not be able to read at the expected level before age seven, because the maturation of their binocular visual skills has not kept pace with their chronological age.

Therefore, younger children who fail the phoria test may be visually *immature* rather than visually deficient.

With individuals of any age, definite vertical phoria which is not due to bent eyeglass frames will provoke a tendency to diplopia (seeing double). At far point, this presents a definite safety hazard. At near point, it can adversely affect work or study performance. Phoria readings are important and "failure" can indicate reasons for headaches and fatigue.

### NORMAL DEPTH PERCEPTION (STEREOPSIS)

Line	1	2	3	4
Symbol	Box	Star	Cross	Circle
Shepherd-Fry Scale	15%	30%	50%	70%
Degree of Arc	424	208	103	54

### Periodic retesting

An individual's vision is not static. Vision changes with time and can be affected by such factors as age, general health, emotional disturbances, fatigue and working conditions. Thus it is desirable that visual skills be periodically re-screened.

# VS-V Pediatric Maintenance

Under normal use conditions, the VS-V Pediatric instrument requires minimum attention if it is protected by the dust cover when it is not in use. Virtually no repair or adjustment is needed, since all operating components are protected and solid-state circuitry assures exceptionally high reliability.

## Cleaning

*Be sure to disconnect the unit from its power supply before cleaning.*

Periodically some cleaning will be necessary. The main instrument housing and Elliptech control unit should be dusted with a soft cloth or brush, and the lenses washed with a soap-and-water dampened cloth and dried with a soft cloth or tissue. If the instrument has become very soiled, it may be cleaned with a mild soap-and-water, or general purpose cleaner, dampened cloth. Other solvents are not recommended.

## Lamp Replacement

Two Nichia NSPW515BS Daylight LED lamps provide illumination of the stereo targets. The peripheral vision test targets in the viewing head and the signal lights on the Elliptech control panel are light-emitting diodes (LEDs). Though the lamps are long-life rated, replacement may eventually be required. Contact your local distributor to order replacement LEDs. Carefully follow the instructions provided with the lamps as improperly installing them can cause immediate failure.

## Removal and Installation of the Stereo Test Target Drum

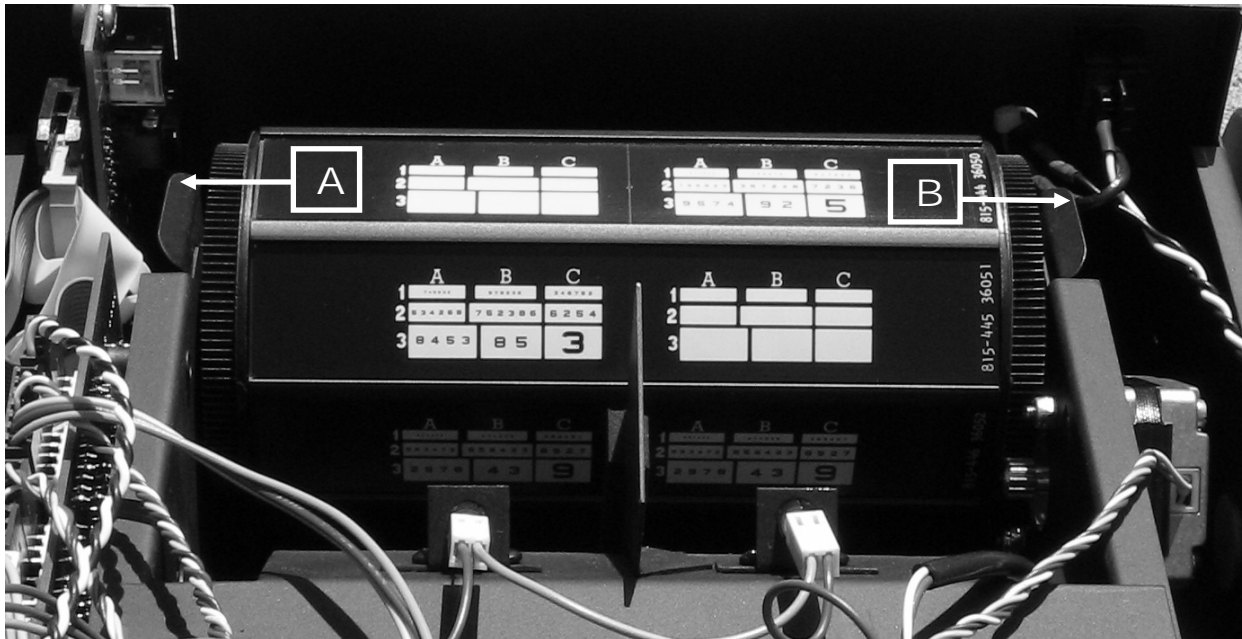
The VS-V Pediatric Screener is shipped ready for operation, with the target drum installed and synchronized with the Elliptech control panel. It is recommended that instrument owners ***do not*** remove the drum except for replacement or in an emergency situation.

*Drum removal:* Wear light cotton gloves or use a facial tissue to protect the stereo target areas from finger prints. Handle the drum near the end cap gears.

1. Push the spring clips, "A" and "B", outward from the ends of the drum.
2. Without releasing the spring clips, slide the drum towards the rear of the instrument and lift it out.

*Drum replacement:*

1. Insert the drum between the spring clips ("A" and "B"). Slide the drum forward toward the lenses until the clips snap in toward the drum.
2. Turn the power switch on. The drum will automatically advance to the first target.



# Detailed Explanation of Stereo Vision

## Two Eyes = Two Separate Views!

The eyes of a human being are positioned side-by-side. Each eye takes a view of the same area from a slightly different angle. The two eye views have plenty in common, but each eye picks up visual information the other doesn't.

## Two Eyes = Three Dimensions (3D)!

Each eye captures its own view and the two separate images are sent on to the brain for processing. When the two images arrive simultaneously in the back of the brain they are united into one picture. The mind combines the two images by matching up the similarities and adding in the small differences. The small differences between the two images add up to a big difference in the final picture! The combined image is more than the sum of its parts. It is a three-dimensional *stereo* picture.

The word "stereo" comes from the Greek word "stereos" which means firm or solid. With stereo vision you see an object as solid in three spatial dimensions--width, height and depth--or x, y and z. It is the added perception of the depth dimension that make stereo vision so rich and special.

## Stereo Vision Has Many Advantages

Stereo vision--or stereoscopic vision --likely evolved as a means of survival. With stereo vision, we can see **where** objects are in relation to our own bodies with much greater precision--especially when objects are moving toward or away from us in the depth dimension. We can see some around solid objects without moving our heads and can even perceive and measure "empty" space with our eyes and brains.

## If You've Got Stereo Vision, Count Your Blessings!

According to the web site of the American Academy of Ophthalmology, September, 1996: "many occupations are not open to people who have good vision in one eye only [*people without stereo vision*]"

Here are a few examples of occupations that depend heavily on stereo vision:

- Baseball player
- Waitress
- Driver
- Architect
- Surgeon
- Dentist

Here are just a few examples of general actions that depend heavily on stereo vision:

- Throwing, catching or hitting a ball
- Driving and parking a car
- Planning and building a three-dimensional object
- Threading a needle and sewing
- Reaching out to shake someone's hand
- Pouring into a container
- Stepping off a curb or step

## Make sure your examinees have Stereo Vision

Persons who do not have stereo vision often do not know what they're missing, because they've never had it. Vision testing with the Keystone View vision screener will allow you to identify if examinees have stereo vision problems. If defects are found refer the examinee to an optometrist or ophthalmologist for a full eye exam. Vision therapies are available to aid persons who have problems with stereo vision.

*(Info provided by Optometrist Network  
www.optometrists.org)*

# Vision Terms Glossary

**Accommodation:** The power to adjust the focus of the eyes for seeing objects distinctly at different distances.

**Acuity, visual:** Sharpness of vision. Ability to distinguish detail.

**Amblyopia:** Sometimes referred to as "lazy eye", amblyopia is decreased vision in one or both eyes not caused by anatomical damage. Vision therapy often is used to treat amblyopia, since the condition is usually uncorrectable by optical means (e.g. eyeglasses).

**Astigmatism:** A common condition, often occurring with near-sightedness or far-sightedness, where all of the rays of light entering the eye do not focus on the same plane, resulting in out of focus vision. The cause is unknown. A minor degree of astigmatism is considered normal and does not need correction.

**Binocular:** Using two eyes simultaneously.

**Binocular Vision:** The ability to use the two eyes simultaneously to focus on the same object and to fuse the two images into a single image.

**Color blindness:** An inherited condition most commonly seen in men and with the colors red and green. It is caused by a deficiency of certain "cones", or color detectors, in the eye. Although there is no cure, this condition does not significantly impact most day to day vision functions.

**Convergence:** Inward movement of eyes toward each other.

**Depth perception:** Stereopsis - is how a person judges how far away an object is from him/her, combining such factors as the apparent size of the object, its apparent rate of motion, the object's height in the field of vision, the image's clarity and various shadows.

**Diplopia:** Commonly known as "double vision," when a person sees two images of an object instead of one. Binocular diplopia - double vision in both eyes - is caused by a misalignment of the eyes and is often treated with vision therapy. Monocular diplopia - double vision in only one eye - can be caused by factors including astigmatism, dry eye and retinal problems.

**Esophoria:** Commonly referred to as "being cross-eyed" or under

convergence - occurs when the two eyes do not aim simultaneously at the same object and instead point in different directions - in this case inward. Esophoria impacts binocular vision - the ability of both eyes to work together - and depth perception.

**Exophoria:** Commonly referred to as "being wall-eyed" or Over convergence - occurs when the two eyes do not aim simultaneously at the same object and instead point in different directions - in this case outward. Esophoria impacts binocular vision - the ability of both eyes to work together - and depth perception.

**Far Point:** 6 meters (20 feet) to infinity.

**Fusion:** Term that defines how well both eyes work together to combine the images seen into one clear, coherent joined image.

**Heterophoria:** A squint due to weak eye muscles.

**Hyperopia - or farsightedness:** Occurs when light rays focus behind a person's retina, as opposed to directly on it. A farsighted person can see distant objects clearly but has difficulty seeing objects close by.

**Ishihara test:** A test that screens individuals for color blindness.

**Monocular:** Pertaining to one eye.

**Muscle Balance:** The tendency of either eye to remain in the position of fixation, when fusion of images is prevented; orthophoria.

**Muscle Imbalance:** The tendency of either eye to turn away from the position of fixation, when fusion of images is prevented; esophoria or exophoria.

**Myopia - or nearsightedness:** Occurs when light rays focus in front of a person's retina, as opposed to directly on it. A nearsighted person can see objects close to them clearly but has difficulty seeing objects that are far away.

**Near Point:** The average reading distance, 14 to 16 inches.

**Occluders:** Any device used by a vision health professional to temporarily obscure vision in one or both eyes while testing eye functions.

**Orthophoria:** Expected position of eyes in relation to each other.

**Peripheral vision:** Refers to the areas at the edges of the vision field - what a person sees "out of the corner of their eyes." Loss of peripheral vision - often called "tunnel vision" - can be caused by stroke, glaucoma, migraine headaches or retinal damage.

**Phoria, Lateral:** Descriptive of the relative horizontal position assumed by the eyes when dissociated (no fusion). When the tendency is to turn outward from a given position, the condition is known as exophoria. When the tendency is inward, the condition is known as esophoria. Phoria are indices of the accommodative-convergence relationship and indicate a lack of coordination between the eyes.

**Phoria, Vertical:** Description of the relative, vertical position assumed by the eye when dissociated. When the tendency is for the right eye to turn upward, the condition is known as right hyperphoria. When the left eye tends to turn up, the condition is left hyperphoria.

**Snellen Chart:** Printed letters of a special design, arranged in groups of different sizes on a test card and used to determine visual acuity.

**Strabismus:** "Crossed eyes" - a condition where a person cannot correctly align both of his/her eyes - one or both eyes turn up, down, in or out. To correct for the double vision that results from this, people with strabismus often "suppress" the visual input from one of the eyes, causing the non-suppressed eye being stronger than the suppressed one.

**Stereopsis:** See Depth Perception

**Stereotarget:** A pair of photographs or reproductions mounted in an instrument designed to present each eye with a separate image.

**Suppression:** The voluntary or involuntary non-use of vision, usually by one eye.

**Vision Screening:** A test for many facets of functional vision, designed to identify subjects who can benefit from an examination by a vision specialist.

**Vision Specialist:** Ophthalmologist or Optometrist.

**SNELLEN EQUIVALENTS**

20/20 = 6/6  
20/25 = 6/7.5  
20/30 = 6/9  
20/40 = 6/12  
20/50 = 6/15  
20/60 = 6/18  
20/70 = 6/21  
20/100 = 6/30  
20/200 = 6/60

**NEAR VISION EQUIVALENTS**

20/20 = N.4 / J.1  
20/25 = N.5 / J.2  
20/30 = N.6 / J.4  
20/40 = N.8 / J.6  
20/50 = N.10 / J.8  
20/60 = N.12 / J.10  
20/70 = N.14 / J.12  
20/100 = N.18 / J.14  
20/200 = N.36



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