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# Nanoscope Instruments, Inc.

## NS-LVMPT Product Manual

### Introduction



Please read this instruction manual before operating the LVMPT product. All statements regarding safety and any technical specifications only apply when the product is operated correctly.

This product is intended for research use only and is NOT cleared or certified for clinical diagnosis.



This product contains a high-powered LED device. Avoid directly looking at the device at the full power setting.

Please read the full instructions for use available in the shipping box with this product. You can also access the instructions for use by contacting [info@nanoscopeinstruments.com](mailto:info@nanoscopeinstruments.com) and/or calling 817-719-2692 before operating the NS-LVMPT device. All statements regarding safety and any technical specifications only apply when the product is operated correctly.

The Nanoscope Instruments NS-LVMPT device is a low vision multi-parameter test device designed for quantitatively measuring visual level of low vision subjects in clinical use. The LVMPT system is designed to track a user's vision using smart display devices (used in daily activities such as cell phones, tablets, computers) and 3D objects lit by emulating room lighting. A user with 20/200 vision or better is able to perform all the tests within the LVMPT system without difficulty. Nanoscope's LVMPT enables quantitative measurements of vision level that can be correlated with low-vision subject's real-life visual perception and interaction.

The team at Nanoscope Instruments is available to support your work. If you have questions or feedback, please contact us at the email address or phone number below.

Contact: Nanoscope Instruments, Inc., 1312 Brown Trail, Suite D, Bedford, TX 76022 (USA)

Email: [info@nanoscopeinstruments.com](mailto:info@nanoscopeinstruments.com)

Phone: 1 (817)719 2692

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*Manual version: 1.1*

*NS-LVMPT hardware version: 2.0*

*Software version: 1.0.*



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# Quick Start

Carefully open the shipping box and unpack all items. Contents include:

1. Laptop (tablet) with its charger
2. User Manual
3. NS-LVMPT Chassis
4. Box containing 3 objects (Sphere, cube, and pyramid)
5. Appropriate Power supply with 12V DC cord (US, EU, AU, IN, and UK)
6. String with 30 cm and 50 cm marked with beads
7. Keyboard and mouse
8. Lux meter
9. Laptop stand

*If any items are missing, please contact us directly at [info@NanoscopeInstruments.com](mailto:info@NanoscopeInstruments.com).*

1. Prior to setting up the NS-LVMPT Chassis, please set up the provided laptop.
2. Plug 12V DC power supply from the NS-LVMPT Chassis into the electrical outlet.
3. Plug USB port from the NS-LVMPT Chassis to the provided laptop.

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# NS-LVMPT

## Software

Enter Subject ID:

### Low Vision Testing Module

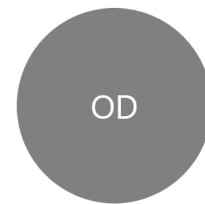
*L V M P T*



2D Shape Recognition

3D Shape Recognition

Optical Flow



*Mobility Test*

Connect USB and Restart for Y Mobility

SN:19-002-022721-01

### Starting

Before following testing, protocol make sure to have the following done.

1. The LVMPT Chassis should be plugged in.
2. The Low vision testing module software should be running.
3. Verify that the LVMPT program is communicating with the device.

### Instructions

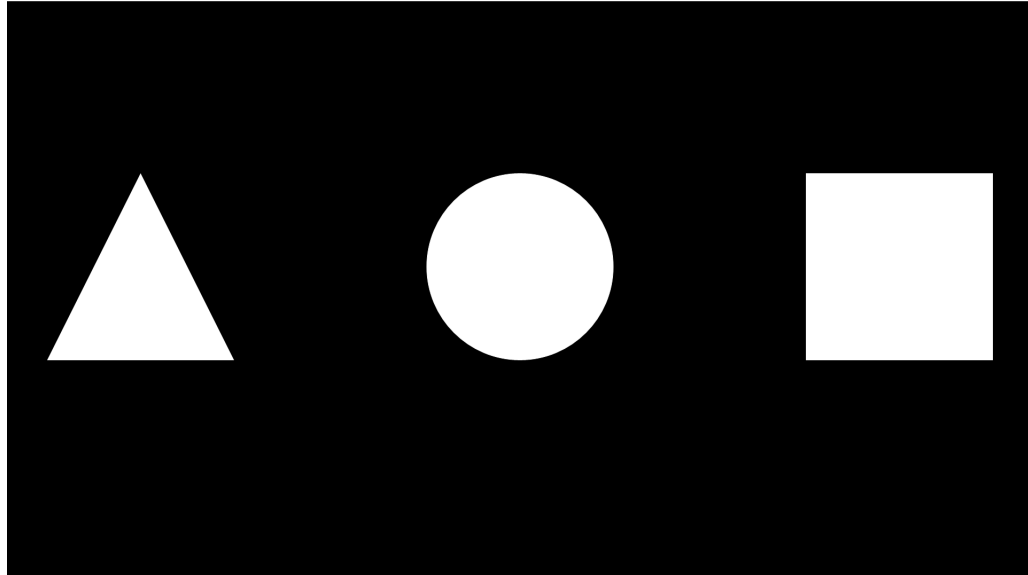
*Make sure the following are consistent throughout the testing procedure.*

- i. Position the subject's eyes 30 cm away from the LVMPT device (Both 2D and 3D).*
- ii. Switch off room light (minimize the light level in the room).*

#### 1. 2D Shape Recognition

- a. Input the subject ID by clicking Enter Subject ID in top left corner.
- b. Choose the eye (OS or OD) for the test. Green button indicates that the test will be conducted for that specific eye.
- c. Click the 2D shape recognition test.

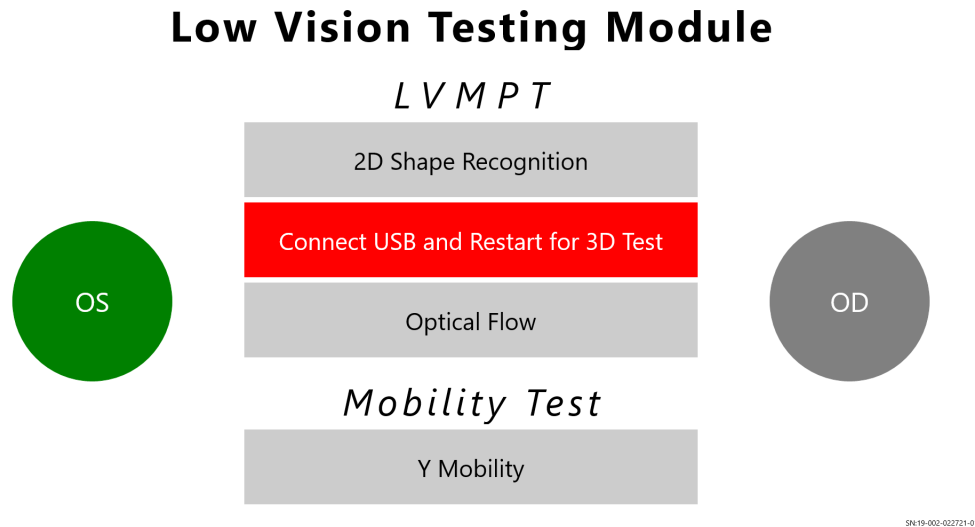
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- d. Black screen will appear with voice command, “To begin the test, touch the center of the screen”.
  - e. To begin the test, press the screen once.
  - f. Three types of shapes (circle, square, and triangle) will be displayed in randomized order.
  - g. Voice command will be activated, “press the triangle (or circle, or square)”.



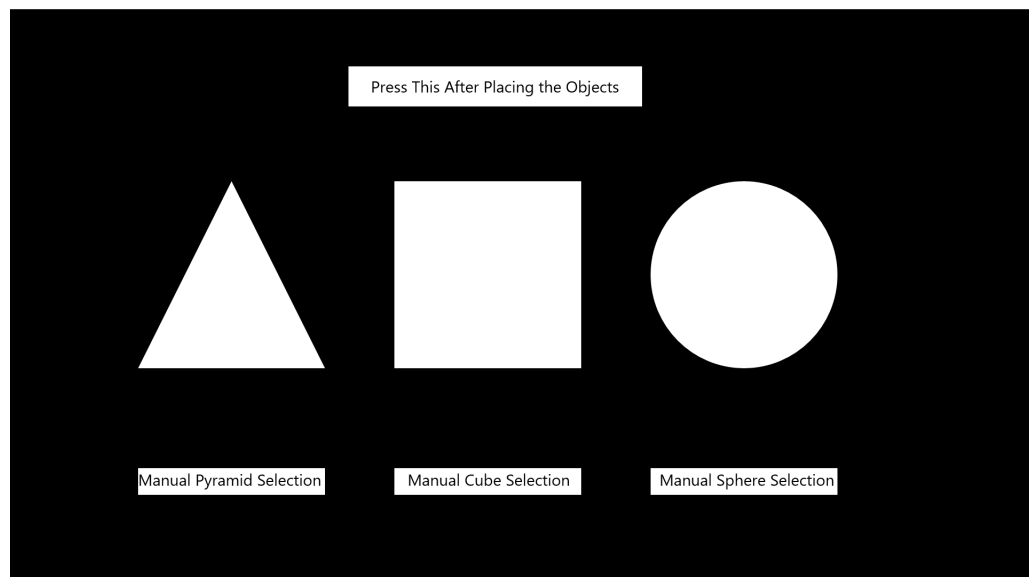
- h. Ask the Subject to press the announced shape within 15 seconds. The software will record and save exact location and time of flight for shape selection.
- i. The test will cycle through 9 randomized shape placements and 5 different light intensity levels from low to high (Total 45 tests will run).
- j. After completion of the test, press “Return to Home Screen” button to go back to main menu.
- k. Repeat the test for the other eye.

## 2. 3D Shape Recognition

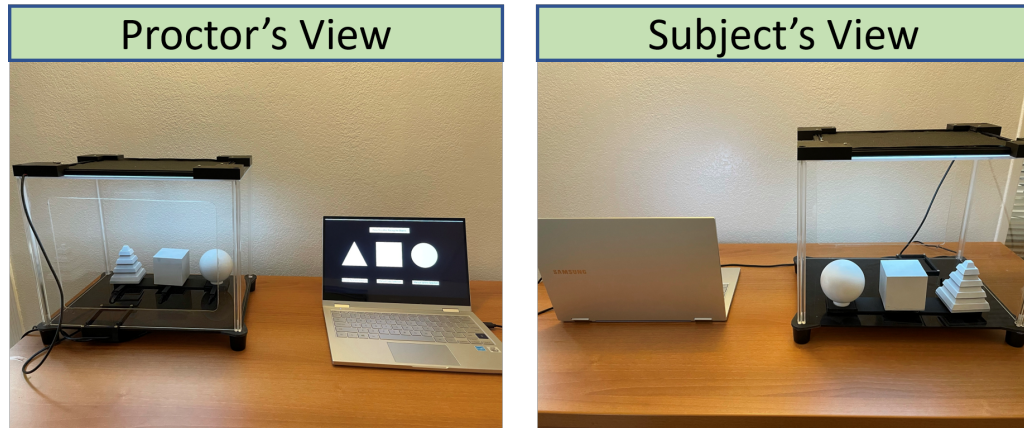
Enter Subject ID:



- If 3D test bar is lit up red, close the software and plug the USB from the LVMPT system to the laptop, then restart the software.
- The proctor should be facing the laptop on the opposite side of the subject.
- Input the subject ID by clicking Enter Subject ID in top left corner.
- Choose the eye (OS or OD) for the test. Green button indicates that the test will be conducted for that specific eye.
- Click the 3D shape recognition test.
- Black screen will appear with voice command, "To begin the test, touch the center of the screen".
- To begin the test, press the screen once.



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- h. The software will randomly generate the shape order and display it. The proctor should be placing the shapes in the identical order as displayed.

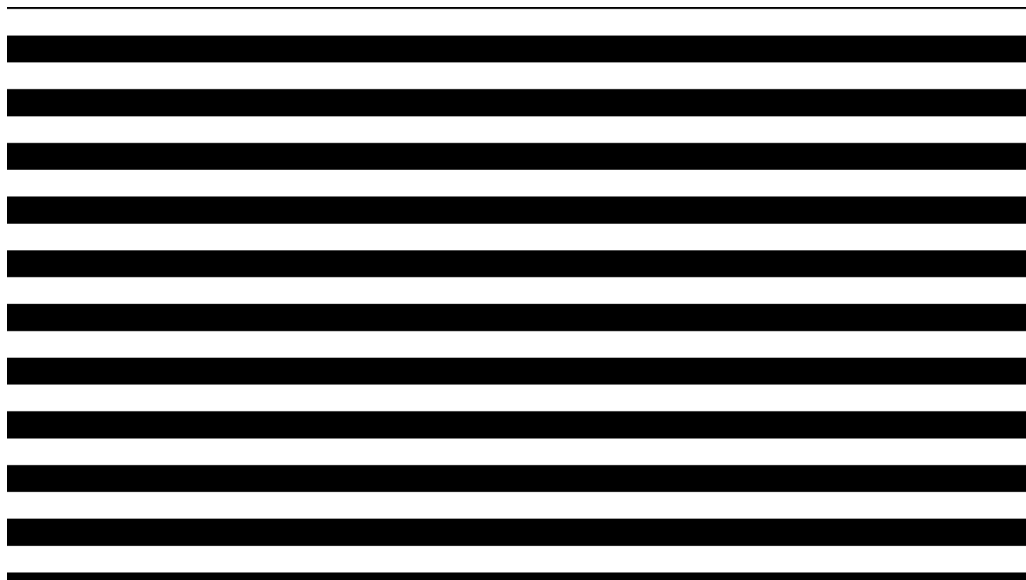


- i. Once the 3D objects are placed in the correct order, click the “Press this After Placing the Objects” button. The voice command will instruct which shape to be picked up.
- j. Wait for the subject to pick up the object. When any object is picked up, the green light will be lit up at the bottom.
- k. If proctor agrees with the detected object, press the green button. If not, press the object that the subject picked up.
- l. If no object has been picked up after 15 seconds, the next test will be displayed with new randomized object order.
- m. The test will cycle through 3 randomized shape placements and 5 different light intensity levels from low to high (Total 15 tests will be conducted).
- n. After completion of the test, press “Return to Home Screen” button to go back to main menu.
- o. Repeat the test for the other eye.

### 3. Optical Flow

- a. Input the subject ID by clicking Enter Subject ID in top left corner.
- b. Choose the eye (OS or OD) for the test. Green button indicates that the test will be conducted for that specific eye.
- c. Click the Optical Flow test.
- d. To begin the test, touch the center of the screen.
- e. Moving black and white stripes will be displayed for 15 seconds.





- f. Instruct the subject to touch the side of the strips flowing into.
- g. If no response from the subject after 15 seconds, the flow test will be displayed with randomized direction.
- h. The test will cycle through 12 randomized flow directions at identical light intensity (4 directions, 3 each in randomized order).
- i. After completion of the test, press “Return to Home Screen” button to go back to main menu.
- j. Repeat the test for the other eye.

## Data Saving

1. To access the saved data, open “Data” folder located in the desktop.
2. The saved file will have format of “Subject ID – Type of test – OS or OD -Dates – Time stamp.”
  - a. 2D Shape recognition
    - i. The saved file will contain information about intensity level (lux), displayed shape position 1,2 and 3 (left to right, as seen by the subject), target position and shape, xy coordinates of the target shape, xy coordinates of subject’s input, correctness of the subject’s decision, coordinate distance if choose an incorrect shape, and finally time it took for the decision.
    - ii. Example

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Intensity	Shape Po	Shape Po	Shape Po	Target Po	Target Sh	Target Sh	Target Sh	Coordinal	Coordina	Correct?	Distance	Time(s)
2	1	Circle	Triangle	Square	3	Square	1600.00	532.20	310.91	568.78	no	1079.00	1.03
3	1	Circle	Square	Triangle	2	Square	960.00	532.20	932.67	594.08	yes	0	1.09
4	1	Square	Triangle	Circle	2	Triangle	960.00	532.20	1617.58	558.11	no	484.31	0.87
5	1	Circle	Triangle	Square	2	Triangle	960.00	532.20	925.36	678.98	yes	0	1.05
6	1	Square	Triangle	Circle	2	Triangle	960.00	532.20	1591.65	635.13	no	435.35	0.91
7	1	Square	Circle	Triangle	1	Square	320.00	532.20	197.15	636.83	yes	0	0.90
8	1	Circle	Square	Triangle	2	Square	960.00	532.20	197.15	636.83	no	552.00	0.85
9	1	Triangle	Circle	Square	1	Triangle	320.00	532.20	197.15	636.83	yes	0	0.84
10	1	Triangle	Square	Circle	2	Square	960.00	532.20	215.18	671.63	no	534.00	1.43
11	3	Circle	Square	Triangle	3	Triangle	1600.00	532.20	217.40	685.48	no	1173.39	0.84
12	3	Circle	Triangle	Square	1	Circle	320.00	532.20	236.01	686.27	yes	0	1.00
13	3	Triangle	Circle	Square	2	Circle	960.00	532.20	236.53	686.85	no	529.22	2.35
14	3	Triangle	Circle	Square	1	Triangle	320.00	532.20	241.04	689.07	yes	0	1.89
15	3	Circle	Triangle	Square	2	Triangle	960.00	532.20	233.72	660.44	no	522.47	9.68

b. 3D shape recognition

- i. The saved file will contain information about Intensity level (lux), displayed shape position 1,2, and 3 (left to right, as seen by the subject), target position and shape, object selected by the subject, correctness of the decision, and time it took for the decision.

ii. Example

	A	B	C	D	E	F	G	H	I
1	Intensity	Shape Po	Shape Po	Shape Po	Target Po	Target Sh	Object Se	Correct?	Time(s)
2	0.3	Pyramid	Cube	Sphere	1	Pyramid	Sphere	no	2.35
3	0.3	Pyramid	Cube	Sphere	1	Pyramid	Nothing	no	1.89
4	0.3	Cube	Sphere	Pyramid	3	Pyramid	Pyramid	yes	9.68
5	1	Pyramid	Sphere	Cube	1	Pyramid	Cube	no	2.00
6	1	Pyramid	Cube	Sphere	2	Cube	Cube	yes	5.99
7	1	Cube	Pyramid	Sphere	3	Sphere	Sphere	yes	5.62
8	3	Pyramid	Cube	Sphere	1	Pyramid	Cube	no	12.61
9	3	Cube	Pyramid	Sphere	3	Sphere	Pyramid	no	0.93

c. Optical flow

- i. The saved data will contain information about the flow direction (left, right, up and down), xy coordinates of the subject's decision, the correctness of the decision and the time it took for making the decision.

ii. Example

	A	B	C	D	E
1	Flow Dire	X Coordin	Y Coordin	Correct?	Time(s)
2	Down	1321.97	989.48	Correct	1.00
3	Left	1322.25	988.99	InCorrect	0.55
4	Up	1321.97	988.52	InCorrect	0.40
5	Left	1321.75	988.99	InCorrect	0.80
6	Down	1321.97	989.43	Correct	1.26

## Customized LVMPPT Product Configuration

### Software Configuration File

Software configuration file can be modified to enable more advanced options in the User Interface. If you need access and modify the configuration file, please contact us at [info@nanoscopeinstruments.com](mailto:info@nanoscopeinstruments.com).

### Hardware

The hardware and software (Shape configuration) of the NS-LVMPPT product can be configured and is customizable depending on the user's request and application. However, there are no user-adjustable or serviceable parts inside chassis, and the warranty will be void if either the chassis is opened. For customization, upgrade, and service, please contact [info@nanoscopecinstruments.com](mailto:info@nanoscopecinstruments.com)

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# Customer Support

If you need further support, you can contact us at: [info@nanoscopeinstruments.com](mailto:info@nanoscopeinstruments.com), or by phone at **1 (817) 719-2692**.

To facilitate customer support, TeamViewer has been installed on the laptop. Provided that the product has an internet connection, we can, with your permission, remotely control the NS-LVMPT product to assist with any issues. Using TeamViewer requires the following steps:

1. Contact us by phone or email to discuss any issues and to set up a meeting time and contact phone number.
2. At the meeting time, start TeamViewer from the icon on the desktop.
3. We will call your phone number.
4. You will give us the access code from TeamViewer.
5. We will remote in from our machine and assist with the issues discussed.
6. Once completed, you will shut down the TeamViewer application on the NS-LVMPT product.

Note that we cannot access your product without you giving us the TeamViewer code generated by your product. We do not collect any information beyond what is needed to troubleshoot issues for which you have requested help.

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