Alternately Occluding Dichoptic Modifier of Stereoscopic Transmission 32 v1.00
User Manual

Index

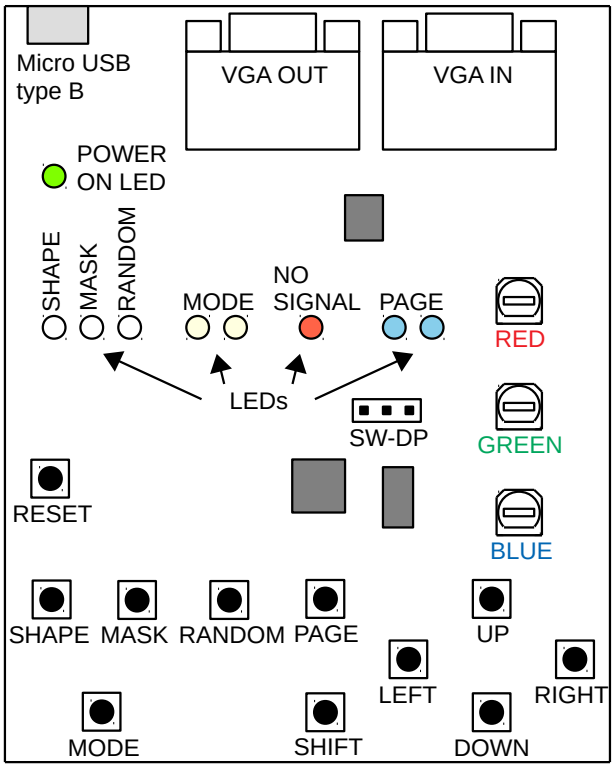
Connecting AODMoST 32

Plug VGA Input into your video source and VGA Output into 3D display. Preferably it should be done when all devices are turned off, but VGA generally can be hot plugged. If your video source or 3D display does not have VGA connector, you may use appropriate converter. Connect AODMoST 32 to a 5V USB port using the cable that has micro USB connector.

When everything is hooked up, turn on video source and 3D display. AODMoST after being powered on, at first enters synchronization pulse detection mode (indicated by a red NO SIGNAL LED being light up). When detection is completed and display starts receiving VGA signal, AODMoST enters MODE 0: VIDEO PASS-THROUGH.

If you hot plugged display, it may not be detected. Manually detecting display in display settings of video source should solve the problem.

User Interface



You may change MODE (there are 3 of them, they will be described in detail later) by pressing MODE button. Current mode is indicated by yellow MODE LEDs.

Pressing PAGE button changes PAGE to the next one (indicated by blue PAGE LEDs). Pressing SHIFT + PAGE buttons simultaneously changes page to the previous one.

Pressing MODE + PAGE at the same time restores default settings in all modes. Restoring singular settings will be described in detail on following pages of manual.

Adjusting trimpots changes color of overlay laid by AODMoST on top of video send to a display. There are 3 components to overlay color: RED, GREEN and BLUE. Each of them has a separate trimpot. Turning trimpot with screwdriver clockwise increases intensity of component color, turning it counterclockwise decreases insensitivity. Lowest intensity is achieved at the center position of trimpot.
AODMoST can store its settings in a non-volatile memory, so that they can be restored at the next device launch. It is done automatically after 10 seconds of no buttons being pressed.

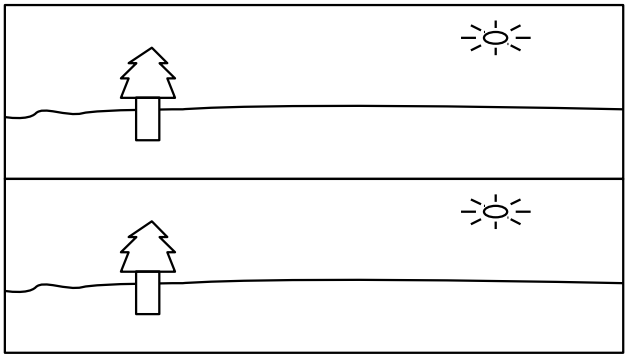
Resolutions and picture issues

AODMoST 32 can work with resolutions up to 1920x1080 (and possibly even higher ones, but it has not been tested). If you are going to use 1080p screen to display lower resolution picture, I recommend that you use 720p, instead of something like 768p, as it should scale up better. Also, 3D content in TOP – BOTTOM format usually looks sharper than SIDE BY SIDE format.

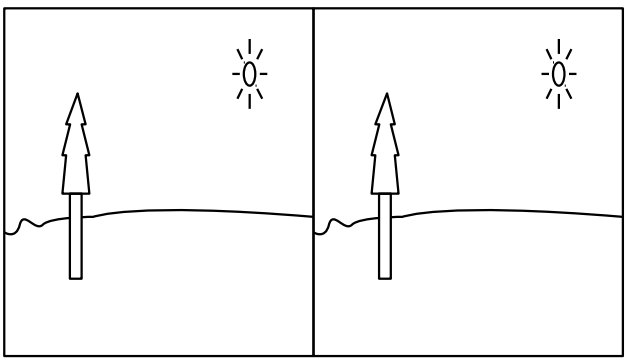
Some configurations of objects that form overlay may cause artifacts on your display, try to avoid that. Placing objects beyond to the edges of a display may cause display to stop working temporarily, to resolve the issue press RESET or restore default settings. AODMoST 32 uses Watchdog Timer built in into its STM32F103C8T6 microcontroller, so it should automatically reset itself in case of its software failure. Reset also occurs during change of resolution.

Stereoscopy guide

AODMoST 32 can work with two types of 3D content:



One of them is TOP – BOTTOM, where upper part of every video frame transmitted is supposed to be displayed exclusively to the one eye (usually the left one), and the lower part to the other.

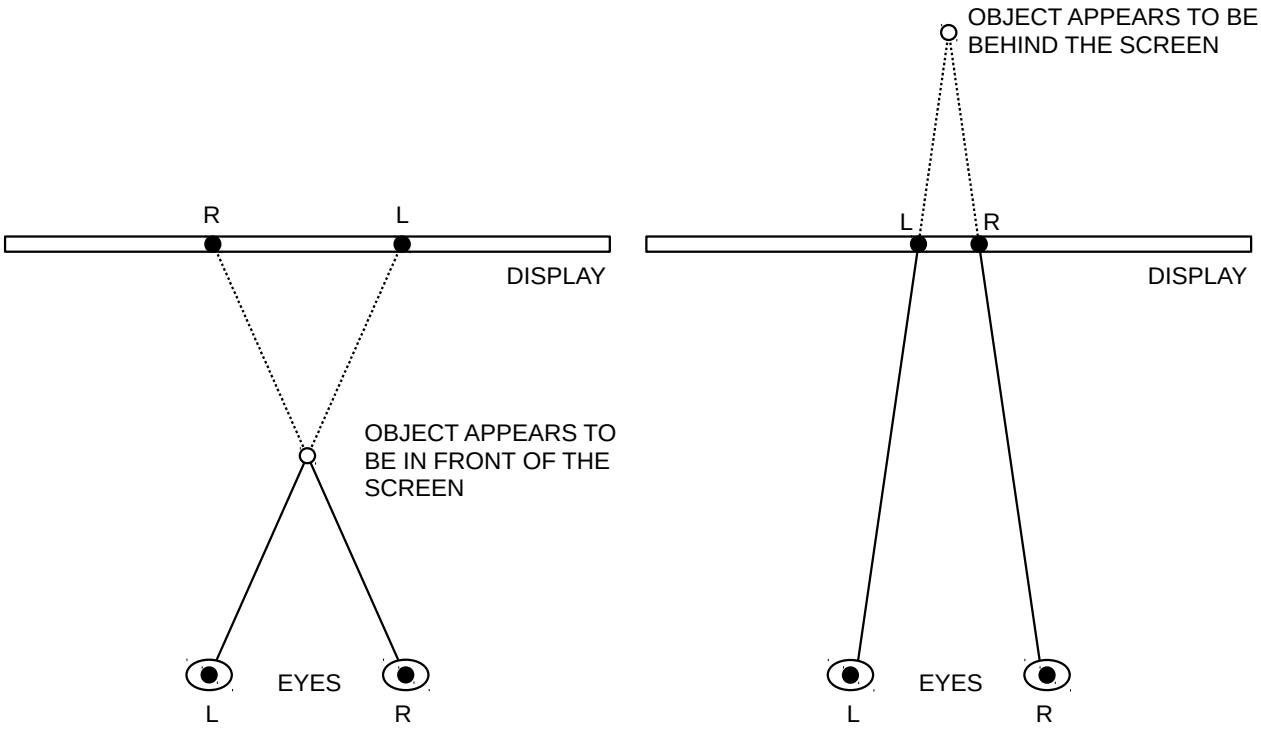


The other format is SIDE BY SIDE, where the left part of the picture is supposed to be displayed exclusively to the one eye (usually the left one), and the right part to the other.

When video source is generating 3D content in one of those two formats, you need to find an option in yours display menu that will activate correct 3D viewing mode, and possibly manually turn on 3D glasses.

When display's 3D mode is on, now both parts of the screen (those for the left and right eye) are enlarged to fit the whole screen and presented simultaneously to the corresponding eyes. It is achieved either with the use of passive technology (alternating rows of pixels emit light with different polarization, and then glasses with different filters for each eye separate them) or active shutter technology (display alternates between showing left image and right image using all pixels, and shutter glasses occlude the eye that is not supposed to see the image). Passive 3D uses cheaper and lighter glasses that do not contain any electronic circuits, but reduce resolution by half (AODMoST 32 can only use half of native resolution anyway) compared to the active shutter 3D.

When object (e.g. a ball) presented to the one eye is situated in the same place on the screen as this same object viewed by the other eye, then it is perceived as being at the same distance as the screen. When object viewed by the right eye is situated to the right of the object viewed by the left eye, then it is perceived as being located behind the screen. When object is viewed by the right eye is situated to the left of the object viewed by the left eye, then it is perceived as being located in front of the screen.



Distance between object's image dedicated to the left and right eyes is called parallax. When right eye's image stays on the right side of the screen, the parallax is positive. When right eye's image is on the left, then parallax is negative.

Maximum amount of parallax that lets the eyes focus on the images, while they are converged at the perceived distance is called comfort zone. When 3D display is viewed from a distance of 6-7 feet, the range of parallaxes that fit into comfort zone is from -1 inch to +1 inch. See this article for more details: 3D's "Immersive Experience" at Home: Why the home 3D experience will Not Rival that of the Theater (unfortunately site that originally hosted this file went down, so I re-uploaded article on my own).

Object types (TOP – BOTTOM and SIDE BY SIDE modes)

This device draws video overlay that at one time consist of at most two objects. One of them, Alternately Occluding object (AO), is supposed to occupy most, if not all of the picture part that is dedicated to be seen by one of the eyes. Its shape is a rectangle (although when MASK setting is either 1 or 2 there is a hole inside AO object, shaped exactly like the DI object dedicated to be seen by the another eye). The other object is Dichoptic object (DI), which is supposed to be smaller than AO (it can never extend beyond the edges of AO displayed on the same part of the screen). DI can have one of three shapes: rectangle, cross, octagon (SHAPE setting decides which one, RANDOMIZATION settings can override it). DI's (or hole's in its shape) horizontal position on the lower/right part of the screen can also be offset to change perceived depth at which DI appears.

Both objects by default alternate between occupying one part of the screen and the other. You can change frequency of those alternations, occlusion rate (for what percentage of alternation cycle object occupies one part of the picture or another) or completely turn objects off. Their size and position can also be changed.

When AO and DI object occupy the same part of the screen, only AO object is visible.

Objects alternation cycle can sometimes be synchronized. It means that on some alternation cycle beginnings, AO and DI objects will occupy opposite parts of the screen, and later their alternations will be in resonance. It happens automatically, when alternation cycle duration of one object (the one that is longer) can be divided without rest by the duration of other's object alternation cycle. For example, when AO's cycle takes 8 frames (7.5Hz, 133.3ms) and DI's cycle takes 80 frames (0.75Hz, 1.333s), object will be synchronized because 80/8=10, and 10 is a simple integer. Alternation cycle duration includes break(s).

Purpose of those object is too occlude part of a field of vision for one of the eyes, in order to force user's brain to utilize available visual information send by the other eye.

Timings and frequencies when using Vsync different than 60Hz

All times and frequencies found in this manual are given for 60Hz vertical synchronization frequency of video signal. If you are going to use other Vsync frequency, you need to use following formulas to convert values given in this manual:

$$T = \frac{60\,Hz}{f_{Vsync}} \cdot T_{manual}$$

$$f = \frac{f_{Vsync}}{60\,Hz} \cdot f_{manual}$$

Settings saving

This device stores settings when power is off, so that they can be loaded at the next start up. Settings are stored in microcontroller's Flash memory after settings are changed and 10 second [600 frames] period of no buttons being pressed passes. This process is indicated by the all LEDs lighting up for a short while. When there is no need to update Flash memory, red NO SIGNAL LED blinks every 10 seconds.

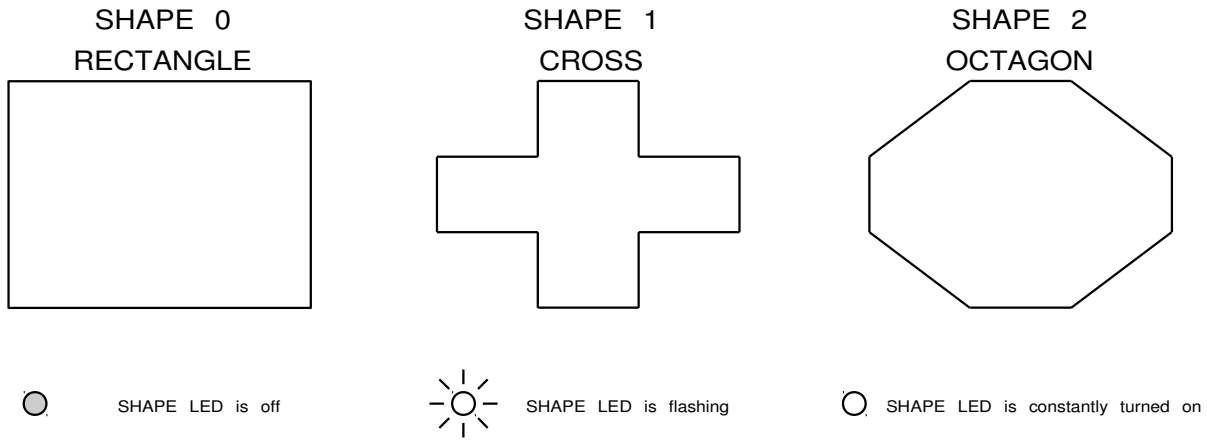
Flash memory is instantly updated when all settings are restored by pressing MODE + PAGE buttons.

Settings that correspond to the TOP – BOTTOM, SIDE BY SIDE and FREE FLOATING OBJECTS modes are saved, as well as settings specific to those main modes (Shape, Mask, Randomization mode and Randomization settings). Selection of main mode, as well as current settings page is not saved.

Shape settings

DI object can take one of the three shapes. To change the shape press the SHAPE button. White SHAPE LED indicates which shape is currently used.

In FREE FLOATING OBJECTS mode there are two objects that can change shape (FO and SO). When page is in 0-2 range (FO settings), SHAPE button changes FO shape and SHAPE LED indicates this changes. When page is in 3-5 range, SO can be changed.



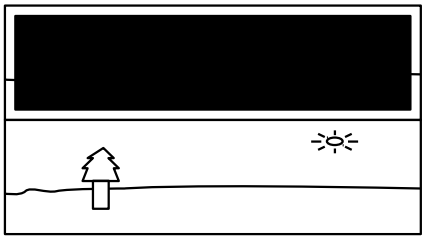
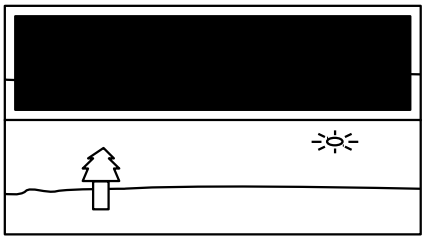
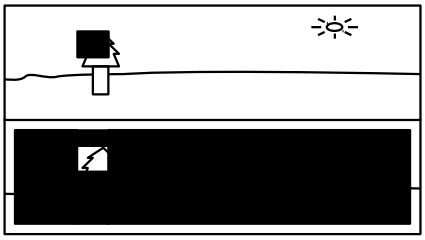
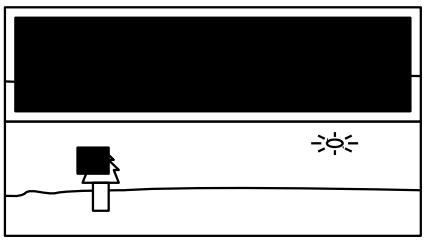
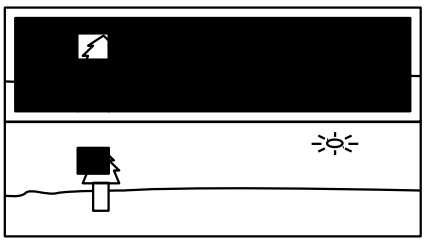
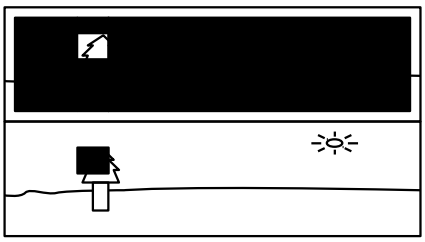
When Randomization of Shape is enabled, Randomization overrides basic Shape settings.

Mask settings

This setting allows creation of a patterned image mask for one eye and inverse of this mask for the other eye, similarly for the patterned mask in this article: Dichoptic movie viewing treats childhood amblyopia

You can change mask setting by pressing the MASK button. White MASK LED indicates which patterned image mask type is currently used.

Mask can only be activated in TOP – BOTTOM and SIDE BY SIDE modes. In FREE FLOATING OBJECTS mode MASK button can be used to quickly switch between settings of FO (First Object) and SO (Second Object) and MASK LED is always off)

MASK 0 No patterned mask or inverse mask	MASK 1 When DI is on the opposite part of the screen from AO, hole in the shape of DI is present inside AO	MASK 2 AO settings are ignored, and when DI is present on one part of the screen, AO object with a hole is always present on the opposite side
 AO on top, DI on top	 AO on top, DI on top	 AO on top, DI on top
 AO on top, DI on bottom	 AO on top, DI on bottom	 AO on top, DI on bottom
MASK LED is off	MASK LED is flashing	MASK LED is constantly turned on

Randomization settings

Device can perform constant randomization of DI object's shape, position and size. There are three randomization modes, which can be changed by pressing the RANDOM button. White RANDOM LED indicates which mode is in use.

RANDOM MODE 0 Randomization is disabled.	RANDOM MODE 1 Randomization settings are applied, six rightmost buttons are now used to change randomization settings, instead of performing their normal functions.	RANDOM MODE 2 Randomization settings are applied, but they can not be changed because all buttons perform their normal functions.
RANDOM LED is off	RANDOM LED is flashing	RANDOM LED is constantly turned on

Each of the three main modes has its own separate Randomization mode(s) and settings. Nevertheless they are changed in the same way.

There are spatial aspects of randomization settings which include how much can DI grow in size and how far DI can move from its initial position. The temporal settings specify how frequently those changes of DI's size and position happen and also how frequently DI changes shape. Those temporal aspect can be set independently of each other, and they are always synchronized and in resonance with each other.

<table>
<tr><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td colspan="2">Shape Randomization</td></tr>
<tr><td>PAGE
increase shape randomization setting</td><td rowspan="2">There are four temporal settings of shape randomization:
• <u>0</u> – shape randomization is disabled
• 1 – shape is changed every 2 DI's alternation cycles
• 2 – shape is changed every 4 DI's alternation cycles
• 3 – shape is changed every 8 DI's alternation cycles</td></tr>
<tr><td>SHIFT + PAGE
reset shape randomization setting (turn it off)</td></tr>
<tr><td colspan="2">Position Randomization (temporal aspect)</td></tr>
<tr><td>UP
increase temporal position randomization setting</td><td rowspan="3">There are four temporal settings of position randomization:
• <u>0</u> – position randomization is disabled
• 1 – position is changed every 2 DI's alternation cycles
• 2 – position is changed every 4 DI's alternation cycles
• 3 – position is changed every 8 DI's alternation cycles</td></tr>
<tr><td>DOWN
decrease temporal position randomization setting</td></tr>
<tr><td>UP + DOWN
reset temporal position randomization setting (turn it off)</td></tr>
<tr><td colspan="2">Position Randomization (spatial aspect)</td></tr>
<tr><td>SHIFT + UP
increase spatial position randomization setting</td><td rowspan="3">There are four spatial settings of position randomization. Position can change vertically and horizontally. Change is calculated separately for both axes.
• <u>0</u> – position randomization is disabled
• 1 – position is changed at most by 1/4 of the distance to the closest AO's edge. (FFO: 1/4 object size)
• 2 – position is changed at most by 1/2 of the distance to the closest AO's edge. (FFO: 1/2 object size)
• 3 – position is changed at most by full distance to the closest AO's edge. (FFO: whole object size)</td></tr>
<tr><td>SHIFT + DOWN
decrease spatial position randomization setting</td></tr>
<tr><td>SHIFT + UP + DOWN
reset spatial position randomization setting (turn it off)</td></tr>
</table>

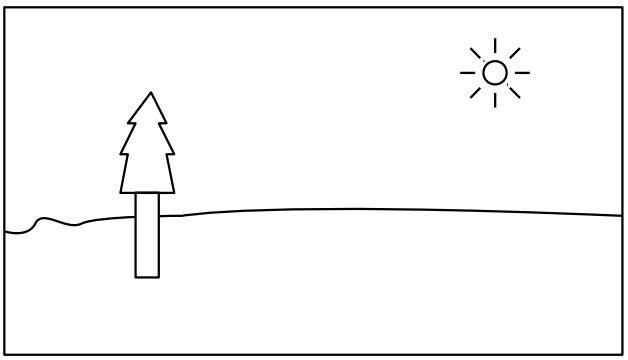
<table>
<tr><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td colspan="2">Size Randomization (temporal aspect)</td></tr>
<tr><td>LEFT
increase temporal size randomization setting</td><td rowspan="3">There are four temporal settings of size randomization:
• <u>0</u> – size randomization is disabled
• 1 – size is changed every 2 DI's alternation cycles
• 2 – size is changed every 4 DI's alternation cycles
• 3 – size is changed every 8 DI's alternation cycles</td></tr>
<tr><td>RIGHT
decrease temporal size randomization setting</td></tr>
<tr><td>LEFT + RIGHT
reset temporal size randomization setting (turn it off)</td></tr>
<tr><td colspan="2">Size Randomization (spatial aspect)</td></tr>
<tr><td>SHIFT + LEFT
increase spatial size randomization setting</td><td rowspan="3">There are four spatial settings of size randomization. Size can change vertically and horizontally. Change is calculated separately for both axes.
• <u>0</u> – size randomization is disabled
• 1 – size is changed at most by half of the original DI object size.
• 2 – size is changed at most by whole original DI object size.
• 3 – size is changed at most by two times original DI object size.</td></tr>
<tr><td>SHIFT + RIGHT
decrease spatial size randomization setting</td></tr>
<tr><td>SHIFT + LEFT + RIGHT
reset spatial size randomization setting (turn it off)</td></tr>
<tr><td colspan="2">Randomization Settings Reset</td></tr>
<tr><td>UP + DOWN + LEFT + RIGHT</td><td>Restore position and size randomization settings of selected main mode (or FFO object) to their <u>default values</u>.</td></tr>
<tr><td>SHIFT + UP + DOWN + LEFT + RIGHT</td><td>Restore all randomization settings of selected main mode (or FFO object) to their <u>default values</u>.</td></tr>
</table>

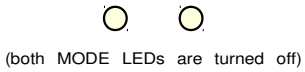
To have position randomization enabled, both temporal and spatial aspects must be enabled. The same is true for size randomization.

In FREE FLOATING OBJECTS (FFO) mode FO (First Object) and SO (Second Object) have their own randomization settings. When page is in 0-2 range (FO settings), randomizations described in above table for DI in other modes apply to FO. RANDOM button changes only FO status and RANDOM LED indicates those changes. When page is in 3-5 range, SO randomization settings can be changed.

There is one other change in workings of randomizations in FFO mode. Position randomization depends only on size of object, not on distance to any edge.

MODE 0: VIDEO PASS-THROUGH

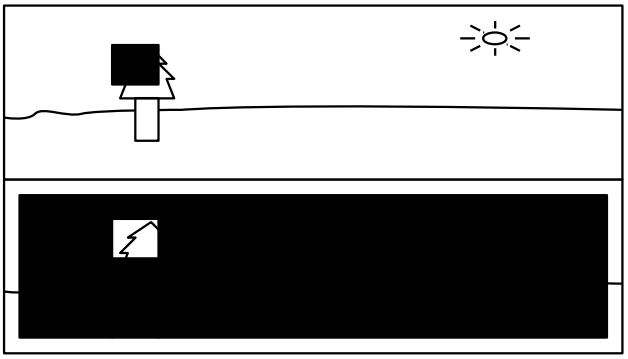




(both MODE LEDs are turned off)

AODMoST 32 always enters MODE 0 after its launch. You should keep device in this mode until your video source starts sending proper 3D material in Top – Bottom or Side By Side format. No objects are drawn upon video signal in this mode.

MODE 1: TOP – BOTTOM



(right MODE LED is turned on)

In MODE 1, AODMoST 32 draws two objects that alternate between occupying upper and lower part of the screen. Larger one, Alternately Occluding object (AO), after correct adjustment of settings, should take half or almost half of the screen. The smaller one, Dichoptic object (DI), always stays within the confines of alternately occluding object. Alternations between parts of the screen done by both objects are independent (except when MASK 2 is used). When both objects occupy the same part of the screen, Alternately Occluding object is the one visible.

When video source starts sending proper 3D material in Top – Bottom format (upper half of video is supposed to be shown to the one eye, usually the left one, lower part to the other eye), make adjustments of MODE 1 settings, so that Alternately Occluding objects occupy all or almost all area of the screen and Dichoptic object occludes chosen part of the screen. You may change frequency of alternations and which eye is occluded more (percentage of alternation cycle period by which each eye is occluded). When this is done, you should instruct your 3D display to generate 3D image, that can be viewed through 3D glasses (you most likely need to do it from your 3D display settings, they should be accessible by pressing MENU button on the remote control).

MODE 1 settings:

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="3">PAGE 0

(both PAGE LEDs are turned off)

This PAGE contains general settings of Alternately Occluding Object</td><td colspan="2">Alternately Occluding Object Frequency</td></tr>
<tr><td>UP
increase frequency</td><td rowspan="2">Available frequencies are:

• 15 Hz (U-50% : L-50%)* [4]**
• 12 Hz (U-60% : L-40%)* [5]**
• 10 Hz (U-50% : L-50%)* [6]**
• <u>7.5 Hz</u> (U-50% : L-50%)* [8]**
• 5 Hz (U-50% : L-50%)* [12]**
• 2.5 Hz (U-50% : L-50%)* [24]**
• 1.5 Hz (U-50% : L-50%)* [40]**

* default occlusion rate is set during change of frequency
** number of frames during which alternation cycle is concluded</td></tr>
<tr><td>DOWN
decrease frequency</td></tr>
</table>

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="10">PAGE 0
(continued)
 
(both PAGE LEDs are turned off)

This PAGE contains general settings of Alternately Occluding Object</td><td colspan="2">Alternately Occluding Object Occlusion Rate
(occlusions per Upper and Lower part of the screen)</td></tr>
<tr><td>LEFT
less occlusion of upper part</td><td rowspan="2">Available occlusion rates
depend on current frequency:
• 15Hz
◦ U-0% : L-100% [0:4]**
◦ U-25% : L-75% [1:3]**
◦ U-50% : L-50% [2:2]**
◦ U-75% : L-25% [3:1]**
◦ U-100% : L-0% [4:0]**
• 12Hz
◦ U-0% : L-100% [0:5]**
◦ U-20% : L-80% [1:4]**
◦ U-40% : L-60% [2:3]**
◦ U-60% : L-40% [3:2]**
◦ U-80% : L-20% [4:1]**
◦ U-100% : L-0% [5:0]**
• 10Hz
◦ U-0% : L-100% [0:6]**
◦ U-16.7% : L-83.3% [1:5]**
◦ U-33.3% : L-66.7% [2:4]**
◦ U-50% : L-50% [3:3]**
◦ U-66.7% : L-33.3% [4:2]**
◦ U-83.3% : L-16.7% [5:1]**
◦ U-100% : L-0% [6:0]**
• 7.5Hz
◦ U-0% : L-100% [0:8]**
◦ U-12.5% : L-87.5% [1:7]**
◦ U-25% : L-75% [2:6]**
◦ U-37.5% : L-62.5% [3:5]**
◦ U-50% : L-50% [4:4]**
◦ U-62.5% : L-37.5% [5:3]**
◦ U-75% : L-25% [6:2]**
◦ U-87.5% : L-12.5% [7:1]**
◦ U-100% : L-0% [8:0]**
• 5Hz
◦ U-0% : L-100% [0:12]**
◦ U-8.3% : L-91.7% [1:11]**
◦ U-16.7% : L-83.3% [2:10]**
◦ U-25% : L-75% [3:9]**
◦ U-33.3% : L-66.7% [4:8]**
◦ U-41.7% : L-58.3% [5:7]**
◦ U-50% : L-50% [6:6]**
◦ U-58.3% : L-41.7% [7:5]**
◦ U-66.7% : L-33.3% [8:4]**
◦ U-75% : L-25% [9:3]**
◦ U-83.3% : L-16.7% [10:2]**
◦ U-91.7% : L-8.3% [11:1]**
◦ U-100% : L-0% [12:0]**
• 2.5Hz
◦ U-0% : L-100% [0:24]**
◦ U-8.3% : L-91.7% [2:22]**
◦ U-16.7% : L-83.3% [4:20]**
◦ U-25% : L-75% [6:18]**
◦ U-33.3% : L-66.7% [8:16]**
◦ U-41.7% : L-58.3% [10:14]**
◦ U-50% : L-50% [12:12]**
◦ U-58.3% : L-41.7% [14:10]**
◦ U-66.7% : L-33.3% [16:8]**
◦ U-75% : L-25% [18:6]**
◦ U-83.3% : L-16.7% [20:4]**
◦ U-91.7% : L-8.3% [22:2]**
◦ U-100% : L-0% [24:0]**
• 1.5Hz
◦ U-0% : L-100% [0:40]**
◦ U-10% : L-90% [4:36]**
◦ U-20% : L-80% [8:32]**
◦ U-30% : L-70% [12:28]**
◦ U-40% : L-60% [16:24]**
◦ U-50% : L-50% [20:20]**
◦ U-60% : L-40% [24:16]**
◦ U-70% : L-30% [28:12]**
◦ U-80% : L-20% [32:8]**
◦ U-90% : L-10% [36:4]**
◦ U-100% : L-0% [40:0]**

** number of frames during which
AO occupies upper and lower part of the screen</td></tr>
<tr><td>RIGHT
more occlusion of upper part</td></tr>
<tr><td colspan="2">Alternately Occluding Object ON/OFF</td></tr>
<tr><td>SHIFT + UP
toggle on / off state of the object</td><td>Alternately Occluding Object can be completely turned off and not being visible on screen.</td></tr>
<tr><td colspan="2">Alternately Occluding Object Gap</td></tr>
<tr><td>SHIFT + LEFT
decrease gap</td><td rowspan="2">Gap is the distance between two positions of alternately occluding object. By default it is 0.</td></tr>
<tr><td>SHIFT + RIGHT
increase gap</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 0 (continued)  (both PAGE LEDs are turned off) This PAGE contains general settings of Alternately Occluding Object	Alternately Occluding Object Break	
	SHIFT + DOWN increase AO break by 16.7ms [1 frame]	Break is time between AO object appearance on upper and lower parts of the screen when AO is not visible. When break exceeds its maximum value of 133.3ms [8 frames], set it to *0*. Increasing break increase total duration of alternation cycle.
	Restoring default settings	
	UP + DOWN set default frequency	Default alternately occluding object frequency is 7.5Hz (U-50% : L-50%)* *default occlusion rate is set during change of frequency
	LEFT + RIGHT set default occlusion rate	Default occlusion rates for different frequencies : • 15 Hz (*U-50% : L-50%*) [2:2]** • 12 Hz (*U-60% : L-40%*) [3:2]** • 10 Hz (*U-50% : L-50%*) [3:3]** • 7.5 Hz (*U-50% : L-50%*) [4:4]** • 5 Hz (*U-50% : L-50%*) [6:6]** • 2.5 Hz (*U-50% : L-50%*) [12:12]** • 1.5 Hz (*U-50% : L-50%*) [20:20]** ** number of frames during which AO occupies upper and lower part of the screen
	SHIFT + LEFT + RIGHT set default gap	Default alternately occluding object gap is *0*
	SHIFT + UP + DOWN set default on/off state of AO and its break	Default state is *ON* Default break is *0*
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 0	• frequency: *7.5Hz* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • gap: *0*
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 1	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • offset: *0* • default position and size

PAGE	BUTTONS	DESCRIPTION
PAGE 1  (right PAGE LED is turned on) This PAGE contains position settings of Alternately Occluding Object	Position of Alternately Occluding Object	
	UP	position object higher up on screen
	SHIFT + UP	position object higher up on screen at increased speed
	DOWN	Position object lower down on screen
	SHIFT + DOWN	Position object lower down on screen at increased speed
	LEFT	Position object more to the left
	SHIFT + LEFT	Position object more to the left at increased speed
	RIGHT	Position object more to the right
	SHIFT + RIGHT	Position object more to the right at increased speed
	Alternately Occluding Object Offset	
	DOWN + LEFT move lower objects more to the left	When offset is *0*, both AO and DI (which is always contained within AO limits) displayed in the lower position are always directly below corresponding objects in the upper position. When offset is different than *0*, lower objects are positioned more to the left or right compared to their default positions. This should make objects appear in front or behind the screen when viewed stereoscopically.
	SHIFT + DOWN + LEFT move lower objects more to the left at increased speed	
	UP + RIGHT move lower objects more to the right	
	SHIFT + UP + RIGHT move lower objects more to the right at increased speed	
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical position of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal position of a object

PAGE	BUTTONS	DESCRIPTION
PAGE 1 (continued)  (right PAGE LED is turned on) This PAGE contains position settings of Alternately Occluding Object	UP + LEFT + RIGHT	Restore AO offset to the default value of *0*
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 1	Restore both vertical and horizontal position of a object, also the offset
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 1	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • offset: *0* • default position and size
PAGE 2  (left PAGE LED is turned on) This PAGE contains size settings of Alternately Occluding Object	Size of Alternately Occluding Object	
	UP	Decrease vertical size of a object
	SHIFT + UP	Decrease vertical size of a object at increased speed
	DOWN	Increase vertical size of a object
	SHIFT + DOWN	Increase vertical size of a object at increased speed
	LEFT	Decrease horizontal size of a object
	SHIFT + LEFT	Decrease horizontal size of a object at increased speed
	RIGHT	Increase horizontal size of a object
	SHIFT + RIGHT	Increase horizontal size of a object at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object

PAGE	BUTTONS	DESCRIPTION
PAGE 2 (continued)  (left PAGE LED is turned on) This PAGE contains size settings of Alternately Occluding Object	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 2	Restore both vertical and horizontal size of a object
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 1	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • offset: *0* • default position and size

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="8">PAGE 3
 
(both PAGE LEDs are turned on)

This PAGE contains general settings of Dichoptic Object</td><td colspan="2">Dichoptic Object Period</td></tr>
<tr><td>UP
decrease period</td><td rowspan="2">Available periods are:

• 0.4s (U-50% : L-50%)* [24]**
• 0.67s (U-50% : L-50%)* [40]**
• 1.33s (U-50% : L-50%)* [80]**
• <u>2s</u> (U-50% : L-50%)* [120]**
• 3.33s (U-50% : L-50%)* [200]**
• 4.67s (U-50% : L-50%)* [280]**
• 8s (U-50% : L-50%)* [480]**

* default occlusion rate is set during change of period
** number of frames during which alternation cycle is concluded</td></tr>
<tr><td>DOWN
increase period</td></tr>
<tr><td colspan="2">Dichoptic Object Occlusion Rate
(occlusions per Upper and Lower part of the screen)</td></tr>
<tr><td>LEFT
less occlusion of upper part</td><td rowspan="3">Available occlusion rates depend on current period:

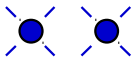
• 0.4s
◦ U-0% : L-100% [0:24]**
◦ U-25% : L-75% [6:18]**
◦ <u>U-50% : L-50% [12:12]**</u>
◦ U-75% : L-25% [18:6]**
◦ U-100% : L-0% [24:0]**
• 0.67s
◦ U-0% : L-100% [0:40]**
◦ U-25% : L-75% [10:30]**
◦ <u>U-50% : L-50% [20:20]**</u>
◦ U-75% : L-25% [30:10]**
◦ U-100% : L-0% [40:0]**
• 1.33s
◦ U-0% : L-100% [0:80]**
◦ U-25% : L-75% [20:60]**
◦ <u>U-50% : L-50% [40:40]**</u>
◦ U-75% : L-25% [60:20]**
◦ U-100% : L-0% [80:0]**
• 2s
◦ U-0% : L-100% [0:120]**
◦ U-16.7% : L-83.3% [20:100]**
◦ U-33.3% : L-66.7% [40:80]**
◦ <u>U-50% : L-50% [60:60]**</u>
◦ U-66.7% : L-33.3% [80:40]**
◦ U-83.3% : L-16.7% [100:20]**
◦ U-100% : L-0% [120:0]**
• 3.33s
◦ U-0% : L-100% [0:200]**
◦ U-10% : L-90% [20:180]**
◦ U-20% : L-80% [40:160]**
◦ U-30% : L-70% [60:140]**
◦ U-40% : L-60% [80:120]**
◦ <u>U-50% : L-50% [100:100]**</u>
◦ U-60% : L-40% [120:80]**
◦ U-70% : L-30% [140:60]**
◦ U-80% : L-20% [160:40]**
◦ U-90% : L-10% [180:20]**
◦ U-100% : L-0% [200:0]**

• 4.67s
◦ U-0% : L-100% [0:280]**
◦ U-7.1% : L-92.9% [20:260]**
◦ U-14.3% : L-85.7% [40:240]**
◦ U-21.4% : L-78.6% [60:220]**
◦ U-28.6% : L-71.4% [80:200]**
◦ U-35.7% : L-64.3% [100:180]**
◦ U-42.9% : L-57.1% [120:160]**
◦ <u>U-50% : L-50% [140:140]**</u>
◦ U-57.1% : L-42.9% [160:120]**
◦ U-64.3% : L-35.7% [180:100]**
◦ U-71.4% : L-28.6% [200:80]**
◦ U-78.6% : L-21.4% [220:60]**
◦ U-85.7% : L-14.3% [240:40]**
◦ U-92.9% : L-7.1% [260:20]**
◦ U-100% : L-0% [280:0]**
• 8s
◦ U-0% : L-100% [0:480]**
◦ U-8.3% : L-91.7% [40:440]**
◦ U-16.7% : L-83.3% [80:400]**
◦ U-25% : L-75% [120:360]**
◦ U-33.3% : L-66.7% [160:320]**
◦ U-41.7% : L-58.3% [200:280]**
◦ <u>U-50% : L-50% [240:240]**</u>
◦ U-58.3% : L-41.7% [280:200]**
◦ U-66.7% : L-33.3% [320:160]**
◦ U-75% : L-25% [360:120]**
◦ U-83.3% : L-16.7% [400:80]**
◦ U-91.7% : L-8.3% [440:40]**
◦ U-100% : L-0% [480:0]**

** number of frames during which DI occupies upper and lower part of the screen</td></tr>
<tr><td>RIGHT
more occlusion of upper part</td></tr>
<tr><td colspan="2">Dichoptic Object ON/OFF</td></tr>
<tr><td>SHIFT + UP
toggle <u>on</u> / off state of the object</td><td>Dichoptic Object can be completely turned off and not being visible on screen.</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 3 (continued)  (both PAGE LEDs are turned on) This PAGE contains general settings of Dichoptic Object	Dichoptic Object Offset	
	SHIFT + LEFT lower object more to the left	When offset is *0*, object's upper position is directly above the lower one. When offset is different than *0*, lower object is positioned more to the left or right compared to its default position. This should make object appear in front or behind the screen when viewed stereoscopically.
	SHIFT + RIGHT lower object more to the right	
	Dichoptic Object Break	
	SHIFT + DOWN increase DI break	Break is time between DI object appearance on upper and lower parts of the screen when DI is not visible. When break exceeds its maximum value, set it to *0*. Increasing break increase total duration of alternation cycle. Break is incremented differently when different periods are used: • 0.4s – increment: 0.2s [12]**; maximum 0.8s [48]** • 0.67s – increment: 0.33s [20]**; maximum 1.33s [80]** • 1.33s – increment: 0.33s [20]**; maximum 1.33s [80]** • 2s – increment: 0.33s [20]**; maximum 1.33s [80]** • 3.33s – increment: 0.33s [20]**; maximum 1.33s [80]** • 4.67s – increment: 0.33s [20]**; maximum 1.33s [80]** • 8s – increment: 0.67s [40]**; maximum 2.67s [160]** ** number of frames
	Restoring default settings	
	UP + DOWN set default period	Default dichoptic object period is *2s* (U-50% : L-50%)* *default occlusion rate is set during change of period
	LEFT + RIGHT set default occlusion rate	Default occlusion rates for different periods : • 0.4s (*U-50% : L-50%*) [12:12]** • 0.67s (*U-50% : L-50%*) [20:20]** • 1.33s (*U-50% : L-50%*) [40:40]** • 2s (*U-50% : L-50%*) [60:60]** • 3.33s (*U-50% : L-50%*) [100:100]** • 4.67 (*U-50% : L-50%*) [140:140]** • 8s (*U-50% : L-50%*) [240:240]** ** number of frames during which DI occupies upper and lower part of the screen
	SHIFT + LEFT + RIGHT set default offset	Default dichoptic object offset is *0*.
	SHIFT + UP + DOWN set default on/off state of DI and its break	Default state is *ON* Default break is *0*

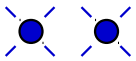
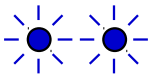
<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="2">PAGE 3
(continued)
 
(both PAGE LEDs are turned on)

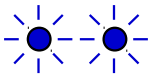
This PAGE contains general settings of Dichoptic Object</td><td>UP + DOWN + LEFT + RIGHT
restore default values for all settings from PAGE 3</td><td>• period: 2s
• occlusion rate: U-50% : L-50%
• state: ON
• break: 0
• offset: 0</td></tr>
<tr><td>SHIFT + UP + DOWN + LEFT + RIGHT
restore default values for all settings from MODE 1</td><td>Alternately Occluding Object:
• frequency: 7.5Hz
• occlusion rate: U-50% : L-50%
• state: ON
• break: 0
• gap: 0
• default position and size
• offset: 0
Dichoptic Object:
• period: 2s
• occlusion rate: U-50% : L-50%
• state: ON
• break: 0
• offset: 0
• default position and size</td></tr>
<tr><td rowspan="11">PAGE 4
 
(PAGE LEDs are flashing at low frequency)

This PAGE contains position settings of Dichoptic Object</td><td colspan="2">Position of Dichoptic Object</td></tr>
<tr><td>UP</td><td>Position object higher up on screen</td></tr>
<tr><td>SHIFT + UP</td><td>Position object higher up on screen at increased speed</td></tr>
<tr><td>DOWN</td><td>Position object lower down on screen</td></tr>
<tr><td>SHIFT + DOWN</td><td>Position object lower down on screen at increased speed</td></tr>
<tr><td>LEFT</td><td>Position object more to the left</td></tr>
<tr><td>SHIFT + LEFT</td><td>Position object more to the left at increased speed</td></tr>
<tr><td>RIGHT</td><td>Position object more to the right</td></tr>
<tr><td>SHIFT + RIGHT</td><td>Position object more to the right at increased speed</td></tr>
<tr><td colspan="2">Restoring default settings</td></tr>
<tr><td>UP + DOWN

SHIFT + UP + DOWN</td><td>Restore default vertical size of a object</td></tr>
<tr><td>LEFT + RIGHT

SHIFT + LEFT + RIGHT</td><td>Restore default horizontal size of a object</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 4 (continued)  (PAGE LEDs are flashing at low frequency) This PAGE contains position settings of Dichoptic Object	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 4	Restore both vertical and horizontal size of a object
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 1	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • offset: *0* • default position and size
PAGE 5  (PAGE LEDs are flashing at high frequency) This PAGE contains size settings of Dichoptic Object	Size of Dichoptic Object	
	UP	Decrease vertical size of a object
	SHIFT + UP	Decrease vertical size of a object at increased speed
	DOWN	Increase vertical size of a object
	SHIFT + DOWN	Increase vertical size of a object at increased speed
	LEFT	Decrease horizontal size of a object
	SHIFT + LEFT	Decrease horizontal size of a object at increased speed
	RIGHT	Increase horizontal size of a object
	SHIFT + RIGHT	Increase horizontal size of a object at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object

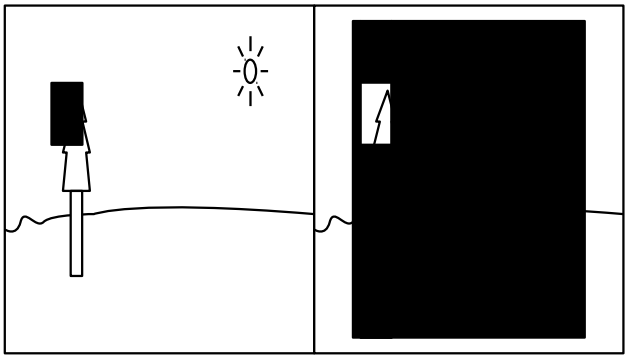
PAGE	BUTTONS	DESCRIPTION
PAGE 5 (continued)  (PAGE LEDs are flashing at high frequency) This PAGE contains size settings of Dichoptic Object	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 5	Restore both vertical and horizontal size of a object
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 1	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *U-50% : L-50%* • state: *ON* • break: *0* • offset: *0* • default position and size

Numbers that are in italics and are underlined are the default values

MODE 2: SIDE BY SIDE has almost the same settings as the ones in above table for MODE 1: TOP – BOTTOM. The only difference is that in TOP – BOTTOM mode Alternately Occluding Object Gap and Alternately Occluding Object Offset really do different things to overlay, while in SIDE BY SIDE mode those settings perform the same function. Nevertheless, in both modes, when overlay is viewed stereoscopically, Alternately Occluding Object Offset changes depth at which overlay is perceived and Alternately Occluding Object Gap allows to maintain separation between both parts of overlay (upper/lower or left/right), so that overlay can stay in the same place when viewed by both eyes.

Note that when you are restoring default settings of the whole MODE 1: TOP – BOTTOM, it affects only settings mentioned in the above table, and also SHAPE, MASK and RANDOM MODE specific to the MODE 1: TOP – BOTTOM. Randomization settings are not affected by it, an if you want to reset them also, you need to do it manually when RANDOM MODE 1 is active or restore default settings for the whole device by pressing MODE + PAGE.

MODE 2: SIDE BY SIDE



(left MODE LED is turned on)

In MODE 2, AODMoST 32 draws two objects that alternate between occupying left and right part of the screen. Larger one, Alternately Occluding object (AO), after correct adjustment of settings, should take half or almost half of the screen. The smaller one, Dichoptic object (DI), always stays within the confines of alternately occluding object. Alternations between parts of the screen done by both objects are independent (except when MASK 2 is used). When both objects occupy the same part of the screen, Alternately Occluding object is the one visible.

When video source starts sending proper 3D material in Side By Side format (left half of video is supposed to be shown to the one eye, usually the left one, right part to the other eye), make adjustments of MODE 2 settings, so that Alternately Occluding objects occupy all or almost all area of the screen and Dichoptic object occludes chosen part of the screen. You may change frequency of alternations and which eye is occluded more (percentage of alternation cycle period by which each eye is occluded). When this is done, you should instruct your 3D display to generate 3D image, that can be viewed through 3D glasses (you most likely need to do it from your 3D display settings, they should be accessible by pressing MENU button on the remote control).

MODE 2 settings:

PAGE	BUTTONS	DESCRIPTION
PAGE 0 (both PAGE LEDs are turned off) This PAGE contains general settings of Alternately Occluding Object	Alternately Occluding Object Frequency	
	UP increase frequency	Available frequencies are: • 15 Hz (L-50% : R-50%)* [4]** • 12 Hz (L-60% : R-40%)* [5]** • 10 Hz (L-50% : R-50%)* [6]** • *7.5 Hz* (L-50% : R-50%)* [8]** • 5 Hz (L-50% : R-50%)* [12]** • 2.5 Hz (L-50% : R-50%)* [24]** • 1.5 Hz (L-50% : R-50%)* [40]** * default occlusion rate is set during change of frequency ** number of frames during which alternation cycle is concluded
	DOWN decrease frequency	

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="8">PAGE 0
(continued)
 
(both PAGE LEDs are turned off)

This PAGE contains general settings of Alternately Occluding Object</td><td colspan="2">Alternately Occluding Object Occlusion Rate
(occlusions per Left and Right part of the screen)</td></tr>
<tr><td>LEFT
less occlusion of left part</td><td rowspan="2">Available occlusion rates
depend on current frequency:
• 15Hz
◦ L-0% : R-100% [0:4]**
◦ L-25% : R-75% [1:3]**
◦ <u>L-50% : R-50% [2:2]**</u>
◦ L-75% : R-25% [3:1]**
◦ L-100% : R-0% [4:0]**
• 12Hz
◦ L-0% : R-100% [0:5]**
◦ L-20% : R-80% [1:4]**
◦ L-40% : R-60% [2:3]**
◦ <u>L-60% : R-40% [3:2]**</u>
◦ L-80% : R-20% [4:1]**
◦ L-100% : R-0% [5:0]**
• 10Hz
◦ L-0% : R-100% [0:6]**
◦ L-16.7% : R-83.3% [1:5]**
◦ L-33.3% : R-66.7% [2:4]**
◦ <u>L-50% : R-50% [3:3]**</u>
◦ L-66.7% : R-33.3% [4:2]**
◦ L-83.3% : R-16.7% [5:1]**
◦ L-100% : R-0% [6:0]**
• 7.5Hz
◦ L-0% : R-100% [0:8]**
◦ L-12.5% : R-87.5% [1:7]**
◦ L-25% : R-75% [2:6]**
◦ L-37.5% : R-62.5% [3:5]**
◦ <u>L-50% : R-50% [4:4]**</u>
◦ L-62.5% : R-37.5% [5:3]**
◦ L-75% : R-25% [6:2]**
◦ L-87.5% : R-12.5% [7:1]**
◦ L-100% : R-0% [8:0]**
• 5Hz
◦ L-0% : R-100% [0:12]**
◦ L-8.3% : R-91.7% [1:11]**
◦ L-16.7% : R-83.3% [2:10]**
◦ L-25% : R-75% [3:9]**
◦ L-33.3% : R-66.7% [4:8]**
◦ L-41.7% : R-58.3% [5:7]**
◦ <u>L-50% : R-50% [6:6]**</u>
◦ L-58.3% : R-41.7% [7:5]**
◦ L-66.7% : R-33.3% [8:4]**
◦ L-75% : R-25% [9:3]**
◦ L-83.3% : R-16.7% [10:2]**
◦ L-91.7% : R-8.3% [11:1]**
◦ L-100% : R-0% [12:0]**
• 2.5Hz
◦ L-0% : R-100% [0:24]**
◦ L-8.3% : R-91.7% [2:22]**
◦ L-16.7% : R-83.3% [4:20]**
◦ L-25% : R-75% [6:18]**
◦ L-33.3% : R-66.7% [8:16]**
◦ L-41.7% : R-58.3% [10:14]**
◦ <u>L-50% : R-50% [12:12]**</u>
◦ L-58.3% : R-41.7% [14:10]**
◦ L-66.7% : R-33.3% [16:8]**
◦ L-75% : R-25% [18:6]**
◦ L-83.3% : R-16.7% [20:4]**
◦ L-91.7% : R-8.3% [22:2]**
◦ L-100% : R-0% [24:0]**
• 1.5Hz
◦ L-0% : R-100% [0:40]**
◦ L-10% : R-90% [4:36]**
◦ L-20% : R-80% [8:32]**
◦ L-30% : R-70% [12:28]**
◦ L-40% : R-60% [16:24]**
◦ <u>L-50% : R-50% [20:20]**</u>
◦ L-60% : R-40% [24:16]**
◦ L-70% : R-30% [28:12]**
◦ L-80% : R-20% [32:8]**
◦ L-90% : R-10% [36:4]**
◦ L-100% : R-0% [40:0]**

** number of frames during which
AO occupies left and right part of the screen</td></tr>
<tr><td>RIGHT
more occlusion of left part</td></tr>
<tr><td colspan="2">Alternately Occluding Object ON/OFF</td></tr>
<tr><td>SHIFT + UP
toggle <u>on</u> / off state of the object</td><td>Alternately Occluding Object can be completely turned off and not being visible on screen.</td></tr>
<tr><td colspan="2">Alternately Occluding Object Gap</td></tr>
<tr><td>SHIFT + LEFT
decrease gap</td><td rowspan="2">Gap is the distance between two positions of alternately occluding object. By default it is <u>0</u>.</td></tr>
<tr><td>SHIFT + RIGHT
increase gap</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 0 (continued)  (both PAGE LEDs are turned off) This PAGE contains general settings of Alternately Occluding Object	Alternately Occluding Object Break	
	SHIFT + DOWN increase AO break by 16.7ms [1 frame]	Break is time between AO object appearance on left and right parts of the screen when AO is not visible. When break exceeds its maximum value of 133.3ms [8 frames], set it to *0*. Increasing break increase total duration of alternation cycle.
	Restoring default settings	
	UP + DOWN set default frequency	Default alternately occluding object frequency is 7.5Hz (L-50% : R-50%)* *default occlusion rate is set during change of frequency
	LEFT + RIGHT set default occlusion rate	Default occlusion rates for different frequencies : • 15 Hz (*L-50% : R-50%*) [2:2]** • 12 Hz (*L-60% : R-40%*) [3:2]** • 10 Hz (*L-50% : R-50%*) [3:3]** • 7.5 Hz (*L-50% : R-50%*) [4:4]** • 5 Hz (*L-50% : R-50%*) [6:6]** • 2.5 Hz (*L-50% : R-50%*) [12:12]** • 1.5 Hz (*L-50% : R-50%*) [20:20]** ** number of frames during which AO occupies left and right part of the screen
	SHIFT + LEFT + RIGHT set default gap	Default alternately occluding object gap is *0*
	SHIFT + UP + DOWN set default on/off state of AO and its break	Default state is *ON* Default break is *0*
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 0	• frequency: *7.5Hz* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • gap: *0*

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td>PAGE 0
(continued)
 
(both PAGE LEDs are turned off)

This PAGE contains general settings of Alternately Occluding Object</td><td>SHIFT + UP + DOWN + LEFT + RIGHT
restore default values for all settings from MODE 2</td><td>Alternately Occluding Object:
• frequency: 7.5Hz
• occlusion rate: L-50% : R-50%
• state: ON
• break: 0
• gap: 0
• default position and size
• offset: 0
Dichoptic Object:
• period: 2s
• occlusion rate: L-50% : R-50%
• state: ON
• break: 0
• offset: 0
• default position and size</td></tr>
<tr><td rowspan="11">PAGE 1
 
(right PAGE LED is turned on)

This PAGE contains position settings of Alternately Occluding Object</td><td colspan="2">Position of Alternately Occluding Object</td></tr>
<tr><td>UP</td><td>position object higher up on screen</td></tr>
<tr><td>SHIFT + UP</td><td>position object higher up on screen at increased speed</td></tr>
<tr><td>DOWN</td><td>Position object lower down on screen</td></tr>
<tr><td>SHIFT + DOWN</td><td>Position object lower down on screen at increased speed</td></tr>
<tr><td>LEFT</td><td>Position object more to the left</td></tr>
<tr><td>SHIFT + LEFT</td><td>Position object more to the left at increased speed</td></tr>
<tr><td>RIGHT</td><td>Position object more to the right</td></tr>
<tr><td>SHIFT + RIGHT</td><td>Position object more to the right at increased speed</td></tr>
<tr><td colspan="2">Alternately Occluding Object Offset</td></tr>
<tr><td>DOWN + LEFT
move right objects more to the left</td><td rowspan="4">When offset is different than 0, both AO and DI (which is always contained within AO limits) displayed on the right side of the screen are moved to the left or right. This should make objects appear in front or behind the screen when viewed stereoscopically.

Alternately Occluding Object Gap does basically the same thing and effects of both of those settings are cumulative.</td></tr>
<tr><td>SHIFT + DOWN + LEFT
move right objects more to the left at increased speed</td></tr>
<tr><td>UP + RIGHT
move right objects more to the right</td></tr>
<tr><td>SHIFT + UP + RIGHT
move right objects more to the right at increased speed</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 1 (continued)  (right PAGE LED is turned on) This PAGE contains position settings of Alternately Occluding Object	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical position of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal position of a object
	UP + LEFT + RIGHT	Restore AO offset to the default value of *0*
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 1	Restore both vertical and horizontal position of a object, also the offset
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 2	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • offset: *0* • default position and size
PAGE 2  (left PAGE LED is turned on) This PAGE contains size settings of Alternately Occluding Object	Size of Alternately Occluding Object	
	UP	Decrease vertical size of a object
	SHIFT + UP	Decrease vertical size of a object at increased speed
	DOWN	Increase vertical size of a object
	SHIFT + DOWN	Increase vertical size of a object at increased speed
	LEFT	Decrease horizontal size of a object
	SHIFT + LEFT	Decrease horizontal size of a object at increased speed
	RIGHT	Increase horizontal size of a object
	SHIFT + RIGHT	Increase horizontal size of a object at increased speed

PAGE	BUTTONS	DESCRIPTION
PAGE 2 (continued)  (left PAGE LED is turned on) This PAGE contains size settings of Alternately Occluding Object	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 2	Restore both vertical and horizontal size of a object
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 2	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • offset: *0* • default position and size

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="8">PAGE 3
 
(both PAGE LEDs are turned on)

This PAGE contains general settings of Dichoptic Object</td><td colspan="2">Dichoptic Object Period</td></tr>
<tr><td>UP
decrease period</td><td rowspan="2">Available periods are:

• 0.4s (L-50% : R-50%)* [24]**
• 0.67s (L-50% : R-50%)* [40]**
• 1.33s (L-50% : R-50%)* [80]**
• <u>2s</u> (L-50% : R-50%)* [120]**
• 3.33s (L-50% : R-50%)* [200]**
• 4.67s (L-50% : R-50%)* [280]**
• 8s (L-50% : R-50%)* [480]**

* default occlusion rate is set during change of period
** number of frames during which alternation cycle is concluded</td></tr>
<tr><td>DOWN
increase period</td></tr>
<tr><td colspan="2">Dichoptic Object Occlusion Rate
(occlusions per Left and Right part of the screen)</td></tr>
<tr><td>LEFT
less occlusion of left part</td><td rowspan="2">Available occlusion rates depend on current period:

• 0.4s
◦ L-0% : R-100% [0:24]**
◦ L-25% : R-75% [6:18]**
◦ <u>L-50% : R-50% [12:12]**</u>
◦ L-75% : R-25% [18:6]**
◦ L-100% : R-0% [24:0]**
• 0.67s
◦ L-0% : R-100% [0:40]**
◦ L-25% : R-75% [10:30]**
◦ <u>L-50% : R-50% [20:20]**</u>
◦ L-75% : R-25% [30:10]**
◦ L-100% : R-0% [40:0]**
• 1.33s
◦ L-0% : R-100% [0:80]**
◦ L-25% : R-75% [20:60]**
◦ <u>L-50% : R-50% [40:40]**</u>
◦ L-75% : R-25% [60:20]**
◦ L-100% : R-0% [80:0]**
• 2s
◦ L-0% : R-100% [0:120]**
◦ L-16.7% : R-83.3% [20:100]**
◦ L-33.3% : R-66.7% [40:80]**
◦ <u>L-50% : R-50% [60:60]**</u>
◦ L-66.7% : R-33.3% [80:40]**
◦ L-83.3% : R-16.7% [100:20]**
◦ L-100% : R-0% [120:0]**
• 3.33s
◦ L-0% : R-100% [0:200]**
◦ L-10% : R-90% [20:180]**
◦ L-20% : R-80% [40:160]**
◦ L-30% : R-70% [60:140]**
◦ L-40% : R-60% [80:120]**
◦ <u>L-50% : R-50% [100:100]**</u>
◦ L-60% : R-40% [120:80]**
◦ L-70% : R-30% [140:60]**
◦ L-80% : R-20% [160:40]**
◦ L-90% : R-10% [180:20]**
◦ L-100% : R-0% [200:0]**
• 4.67s
◦ L-0% : R-100% [0:280]**
◦ L-7.1% : R-92.9% [20:260]**
◦ L-14.3% : R-85.7% [40:240]**
◦ L-21.4% : R-78.6% [60:220]**
◦ L-28.6% : R-71.4% [80:200]**
◦ L-35.7% : R-64.3% [100:180]**
◦ L-42.9% : R-57.1% [120:160]**
◦ <u>L-50% : R-50% [140:140]**</u>
◦ L-57.1% : R-42.9% [160:120]**
◦ L-64.3% : R-35.7% [180:100]**
◦ L-71.4% : R-28.6% [200:80]**
◦ L-78.6% : R-21.4% [220:60]**
◦ L-85.7% : R-14.3% [240:40]**
◦ L-92.9% : R-7.1% [260:20]**
◦ L-100% : R-0% [280:0]**
• 8s
◦ L-0% : R-100% [0:480]**
◦ L-8.3% : R-91.7% [40:440]**
◦ L-16.7% : R-83.3% [80:400]**
◦ L-25% : R-75% [120:360]**
◦ L-33.3% : R-66.7% [160:320]**
◦ L-41.7% : R-58.3% [200:280]**
◦ <u>L-50% : R-50% [240:240]**</u>
◦ L-58.3% : R-41.7% [280:200]**
◦ L-66.7% : R-33.3% [320:160]**
◦ L-75% : R-25% [360:120]**
◦ L-83.3% : R-16.7% [400:80]**
◦ L-91.7% : R-8.3% [440:40]**
◦ L-100% : R-0% [480:0]**

** number of frames during which DI occupies left and right part of the screen</td></tr>
<tr><td>RIGHT
more occlusion of left part</td></tr>
<tr><td colspan="2">Dichoptic Object ON/OFF</td></tr>
<tr><td>SHIFT + UP
toggle <u>on</u> / off state of the object</td><td>Dichoptic Object can be completely turned off and not being visible on screen.</td></tr>
</table>

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="8">PAGE 3
(continued)
 
(both PAGE LEDs are turned on)

This PAGE contains general settings of Dichoptic Object</td><td colspan="2">Dichoptic Object Offset</td></tr>
<tr><td>SHIFT + LEFT
right object more to the left</td><td rowspan="2">When offset is different than <u>0</u>, right object is positioned more to the left or right compared to its default position. This should make object appear in front or behind the screen when viewed stereoscopically.</td></tr>
<tr><td>SHIFT + RIGHT
right object more to the right</td></tr>
<tr><td colspan="2">Dichoptic Object Break</td></tr>
<tr><td>SHIFT + DOWN
increase DI break</td><td>Break is time between DI object appearance on left and right parts of the screen when DI is not visible. When break exceeds its maximum value, set it to <u>0</u>. Increasing break increase total duration of alternation cycle. Break is incremented differently when different periods are used:

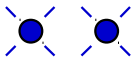
• 0.4s – increment: 0.2s [12]**; maximum 0.8s [48]**
• 0.67s – increment: 0.33s [20]**; maximum 1.33s [80]**
• 1.33s – increment: 0.33s [20]**; maximum 1.33s [80]**
• 2s – increment: 0.33s [20]**; maximum 1.33s [80]**
• 3.33s – increment: 0.33s [20]**; maximum 1.33s [80]**
• 4.67s – increment: 0.33s [20]**; maximum 1.33s [80]**
• 8s – increment: 0.67s [40]**; maximum 2.67s [160]**

** number of frames</td></tr>
<tr><td colspan="2">Restoring default settings</td></tr>
<tr><td>UP + DOWN
set default period</td><td>Default dichoptic object period is <u>2s</u> (L-50% : R-50%)*
*default occlusion rate is set during change of period</td></tr>
<tr><td>LEFT + RIGHT
set default occlusion rate</td><td>Default occlusion rates for different periods :

• 0.4s (<u>L-50% : R-50%</u>) [12:12]**
• 0.67s (<u>L-50% : R-50%</u>) [20:20]**
• 1.33s (<u>L-50% : R-50%</u>) [40:40]**
• 2s (<u>L-50% : R-50%</u>) [60:60]**
• 3.33s (<u>L-50% : R-50%</u>) [100:100]**
• 4.67 (<u>L-50% : R-50%</u>) [140:140]**
• 8s (<u>L-50% : R-50%</u>) [240:240]**

** number of frames during which DI occupies left and right part of the screen</td></tr>
<tr><td>SHIFT + LEFT + RIGHT
set default offset</td><td>Default dichoptic object offset is <u>0</u>.</td></tr>
<tr><td>SHIFT + UP + DOWN
set default on/off state of DI and its break</td><td>Default state is <u>ON</u>
Default break is <u>0</u></td></tr>
</table>

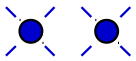
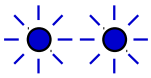
<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="2">PAGE 3
(continued)
 
(both PAGE LEDs are turned on)

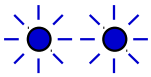
This PAGE contains general settings of Dichoptic Object</td><td>UP + DOWN + LEFT + RIGHT
restore default values for all settings from PAGE 3</td><td>• period: 2s
• occlusion rate: L-50% : R-50%
• state: ON
• break: 0
• offset: 0</td></tr>
<tr><td>SHIFT + UP + DOWN + LEFT + RIGHT
restore default values for all settings from MODE 2</td><td>Alternately Occluding Object:
• frequency: 7.5Hz
• occlusion rate: L-50% : R-50%
• state: ON
• break: 0
• gap: 0
• default position and size
• offset: 0
Dichoptic Object:
• period: 2s
• occlusion rate: L-50% : R-50%
• state: ON
• break: 0
• offset: 0
• default position and size</td></tr>
<tr><td rowspan="11">PAGE 4
 
(PAGE LEDs are flashing at low frequency)

This PAGE contains position settings of Dichoptic Object</td><td colspan="2">Position of Dichoptic Object</td></tr>
<tr><td>UP</td><td>Position object higher up on screen</td></tr>
<tr><td>SHIFT + UP</td><td>Position object higher up on screen at increased speed</td></tr>
<tr><td>DOWN</td><td>Position object lower down on screen</td></tr>
<tr><td>SHIFT + DOWN</td><td>Position object lower down on screen at increased speed</td></tr>
<tr><td>LEFT</td><td>Position object more to the left</td></tr>
<tr><td>SHIFT + LEFT</td><td>Position object more to the left at increased speed</td></tr>
<tr><td>RIGHT</td><td>Position object more to the right</td></tr>
<tr><td>SHIFT + RIGHT</td><td>Position object more to the right at increased speed</td></tr>
<tr><td colspan="2">Restoring default settings</td></tr>
<tr><td>UP + DOWN

SHIFT + UP + DOWN</td><td>Restore default vertical size of a object</td></tr>
<tr><td>LEFT + RIGHT

SHIFT + LEFT + RIGHT</td><td>Restore default horizontal size of a object</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 4 (continued)  (PAGE LEDs are flashing at low frequency) This PAGE contains position settings of Dichoptic Object	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 4	Restore both vertical and horizontal size of a object
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 2	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • offset: *0* • default position and size
PAGE 5  (PAGE LEDs are flashing at high frequency) This PAGE contains size settings of Dichoptic Object	Size of Dichoptic Object	
	UP	Decrease vertical size of a object
	SHIFT + UP	Decrease vertical size of a object at increased speed
	DOWN	Increase vertical size of a object
	SHIFT + DOWN	Increase vertical size of a object at increased speed
	LEFT	Decrease horizontal size of a object
	SHIFT + LEFT	Decrease horizontal size of a object at increased speed
	RIGHT	Increase horizontal size of a object
	SHIFT + RIGHT	Increase horizontal size of a object at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object

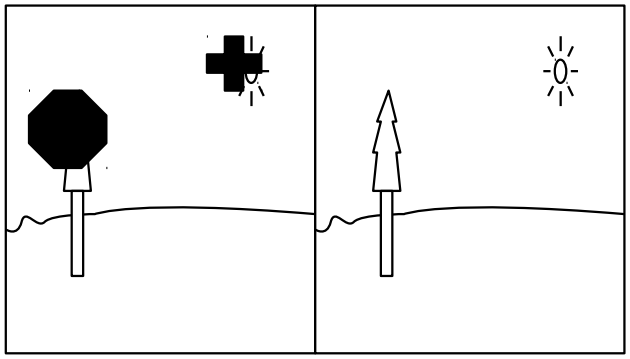
PAGE	BUTTONS	DESCRIPTION
PAGE 5 (continued)  (PAGE LEDs are flashing at high frequency) This PAGE contains size settings of Dichoptic Object	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 5	Restore both vertical and horizontal size of a object
	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 2	Alternately Occluding Object: • frequency: *7.5Hz* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • gap: *0* • default position and size • offset: *0* Dichoptic Object: • period: *2s* • occlusion rate: *L-50% : R-50%* • state: *ON* • break: *0* • offset: *0* • default position and size

Numbers that are in italics and are underlined are the default values

MODE 1: TOP – BOTTOM has almost the same settings as the ones in above table for MODE 2: SIDE BY SIDE. The only difference is that in TOP – BOTTOM mode Alternately Occluding Object Gap and Alternately Occluding Object Offset really do different things to overlay, while in SIDE BY SIDE mode those settings perform the same function. Nevertheless, in both modes, when overlay is viewed stereoscopically, Alternately Occluding Object Offset changes depth at which overlay is perceived and Alternately Occluding Object Gap allows to maintain separation between both parts of overlay (upper/lower or left/right), so that overlay can stay in the same place when viewed by both eyes.

Note that when you are restoring default settings of the whole MODE 2: SIDE BY SIDE, it affects only settings mentioned in the above table, and also SHAPE, MASK and RANDOM MODE specific to the MODE 2: SIDE BY SIDE. Randomization settings are not affected by it, an if you want to reset them also, you need to do it manually when RANDOM MODE 1 is active or restore default settings for the whole device by pressing MODE + PAGE.

MODE 3: FREE FLOATING OBJECTS



(both MODE LEDs are turned on)

In this mode there are two objects: First Object (FO) and Second Object (SO). They behave similarly to DI in other modes, as they can change shape. Each of these two objects has its own independent settings, both regular ones and settings of randomization.

There is no patterned image mask in this mode (because AO would be needed to produce negative). MASK LED is always turned off. MASK button however has a new function: it allows for quick switching between two objects. When MASK button is pressed it changes current settings PAGE in such a way, that when PAGE 0 (FO general settings) is active, after a a button is pressed, it changes to PAGE 3 (SO general settings). PAGE 1 (FO position settings) changes to PAGE 4 (SO position settings) and PAGE 2 (FO size settings) changes to PAGE 5 (SO size settings).

To change SHAPE of FO, PAGE with FO settings must be selected (0-2), and now both SHAPE button and SHAPE LED are responsible for FO. To change SHAPE of SO, PAGE has to be in 3-5 range.

RANDOM MODE is common for both objects (general status of randomization set by RANDOM button and indicated by RANDOM LED). However, more detailed randomization settings are specific to the both objects. So each one of the object has its own Shape Randomization, Position Randomization (temporal and spatial aspects) and Position Randomization (temporal and spatial aspects). Randomization settings for FO can be changed when PAGE is in 0-2 range, while SO settings can be changed when PAGE is in 3-5 range.

When it comes to occlusion rate, instead of changing ratio of object occupying one part of the screen or another, now only ratio of object being visible to object not appearing on screen can be changed. Break settings extend period of object not appearing on screen. Inversion setting allows to switch meaning of those periods, so when it is active it makes object invisible when it should be visible and vice versa. Inversion settings allows objects to appear alternately (when one is visible, then the other is not).

When synchronization requirements are met object are in resonance with each other. There is also another kind of synchronization present when randomization is enabled that allows timings of parameter randomization to stay synced between objects. As basic period of object being visible-invisible can be multiplied even by a factor of 8 during randomization, this different synchronization might take some time before it kicks in.

When object is being moved (change of position settings) and it encounters other object they switch places. When object is resized and it collides with another object, then further increase in size is prevented.

MODE 3 settings:

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="3">PAGE 0
 
(both PAGE LEDs are turned off)

This PAGE contains general settings of First Object</td><td colspan="2">First Object Period</td></tr>
<tr><td>UP
decrease period</td><td rowspan="2">Available periods are:

• 0.4s (V-50% : I-50%)* [24]**
• 0.67s (V-50% : I-50%)* [40]**
• 1.33s (V-50% : I-50%)* [80]**
• 2s (V-50% : I-50%)* [120]**
• 3.33s (V-50% : I-50%)* [200]**
• 4.67s (V-50% : I-50%)* [280]**
• 8s (V-50% : I-50%)* [480]**

* default occlusion rate is set during change of period
** number of frames during which visible-invisible cycle is concluded</td></tr>
<tr><td>DOWN
increase period</td></tr>
</table>

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="6">PAGE 0
(continued)
 
(both PAGE LEDs are turned off)

This PAGE contains general settings of First Object</td><td colspan="2">First Object Occlusion Rate
(for how long object is being Visible and Invisible)</td></tr>
<tr><td>LEFT
shorten period of object being visible</td><td rowspan="2">Available occlusion rates
depend current period:
• 0.4s
◦ V-0% : I-100% [0:24]**
◦ V-25% : I-75% [6:18]**
◦ V-50% : I-50% [12:12]**
◦ V-75% : I-25% [18:6]**
◦ V-100% : I-0% [24:0]**
• 0.67s
◦ V-0% : I-100% [0:40]**
◦ V-25% : I-75% [10:30]**
◦ V-50% : I-50% [20:20]**
◦ V-75% : I-25% [30:10]**
◦ V-100% : I-0% [40:0]**
• 1.33s
◦ V-0% : I-100% [0:80]**
◦ V-25% : I-75% [20:60]**
◦ V-50% : I-50% [40:40]**
◦ V-75% : I-25% [60:20]**
◦ V-100% : I-0% [80:0]**
• 2s
◦ V-0% : I-100% [0:120]**
◦ V-16.7% : I-83.3% [20:100]**
◦ V-33.3% : I-66.7% [40:80]**
◦ V-50% : I-50% [60:60]**
◦ V-66.7% : I-33.3% [80:40]**
◦ V-83.3% : I-16.7% [100:20]**
◦ V-100% : I-0% [120:0]**
• 3.33s
◦ V-0% : I-100% [0:200]**
◦ V-10% : I-90% [20:180]**
◦ V-20% : I-80% [40:160]**
◦ V-30% : I-70% [60:140]**
◦ V-40% : I-60% [80:120]**
◦ V-50% : I-50% [100:100]**
◦ V-60% : I-40% [120:80]**
◦ V-70% : I-30% [140:60]**
◦ V-80% : I-20% [160:40]**
◦ V-90% : I-10% [180:20]**
◦ V-100% : I-0% [200:0]**
• 4.67s
◦ V-0% : I-100% [0:280]**
◦ V-7.1% : I-92.9% [20:260]**
◦ V-14.3% : I-85.7% [40:240]**
◦ V-21.4% : I-78.6% [60:220]**
◦ V-28.6% : I-71.4% [80:200]**
◦ V-35.7% : I-64.3% [100:180]**
◦ V-42.9% : I-57.1% [120:160]**
◦ V-50% : I-50% [140:140]**
◦ V-57.1% : I-42.9% [160:120]**
◦ V-64.3% : I-35.7% [180:100]**
◦ V-71.4% : I-28.6% [200:80]**
◦ V-78.6% : I-21.4% [220:60]**
◦ V-85.7% : I-14.3% [240:40]**
◦ V-92.9% : I-7.1% [260:20]**
◦ V-100% : I-0% [280:0]**
• 8s
◦ V-0% : I-100% [0:480]**
◦ V-8.3% : I-91.7% [40:440]**
◦ V-16.7% : I-83.3% [80:400]**
◦ V-25% : I-75% [120:360]**
◦ V-33.3% : I-66.7% [160:320]**
◦ V-41.7% : I-58.3% [200:280]**
◦ V-50% : I-50% [240:240]**
◦ V-58.3% : I-41.7% [280:200]**
◦ V-66.7% : I-33.3% [320:160]**
◦ V-75% : I-25% [360:120]**
◦ V-83.3% : I-16.7% [400:80]**
◦ V-91.7% : I-8.3% [440:40]**
◦ V-100% : I-0% [480:0]**

** number of frames during which FO is visible and invisible</td></tr>
<tr><td>RIGHT
lengthen period of object being visible</td></tr>
<tr><td colspan="2">First Object ON/OFF</td></tr>
<tr><td>SHIFT + UP
toggle on / off state of the object</td><td>First Object can be completely turned off and not being visible on screen.</td></tr>
<tr><td colspan="2">First Object Inversion</td></tr>
<tr><td>SHIFT + DOWN
toggle inversion of the object</td><td>When inversion is enabled, object is visible when normally it should be invisible and vice versa.</td></tr>
</table>

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="8">PAGE 0
(continued)
 
(both PAGE LEDs are turned off)

This PAGE contains general settings of First Object</td><td colspan="2">First Object Break</td></tr>
<tr><td>SHIFT + LEFT
decrease FO break</td><td rowspan="2">Break is an additional time during which FO is invisible Increasing break increase total duration of alternation cycle. Break is incremented differently when different periods are used:

• 0.4s – increment: 0.4s [24]**; maximum 1.6s [96]**
• 0.67s – increment: 0.67s [40]**; maximum 2.67s [160]**
• 1.33s – increment: 0.67s [40]**; maximum 2.67s [160]**
• 2s – increment: 0.67s [40]**; maximum 2.67s [160]**
• 3.33s – increment: 0.67s [40]**; maximum 2.67s [160]**
• 4.67s – increment: 0.67s [40]**; maximum 2.67s [160]**
• 8s – increment: 1.33s [80]**; maximum 5.33s [320]**

** number of frames</td></tr>
<tr><td>SHIFT + RIGHT
increase FO break</td></tr>
<tr><td colspan="2">Restoring default settings</td></tr>
<tr><td>UP + DOWN
set default period</td><td>Default First Object
period is <u>2s</u> (V-50% : I-50%)*
*default occlusion rate is set during change of period</td></tr>
<tr><td>LEFT + RIGHT
set default occlusion rate</td><td>Default occlusion rates for different periods :

• 0.4s (<u>V-50% : I-50%</u>) [12:12]**
• 0.67s (<u>V-50% : I-50%</u>) [20:20]**
• 1.33s (<u>V-50% : I-50%</u>) [40:40]**
• 2s (<u>V-50% : I-50%</u>) [60:60]**
• 3.33s (<u>V-50% : I-50%</u>) [100:100]**
• 4.67 (<u>V-50% : I-50%</u>) [140:140]**
• 8s (V<u>-50% : I-50%</u>) [240:240]**

** number of frames during which FO is visible and invisible</td></tr>
<tr><td>SHIFT + UP + DOWN
set default on/off state of FO and its inversion setting</td><td>Default state is <u>ON</u>
By default inversion is <u>disabled</u></td></tr>
<tr><td>SHIFT + LEFT + RIGHT
set default break</td><td>Default break of First Object is <u>0</u>.</td></tr>
<tr><td>UP + DOWN + LEFT + RIGHT
restore default values for all settings from PAGE 1</td><td>• period: <u>2s</u>
• occlusion rate: V<u>-50% : I-50%</u>
• state: <u>ON</u>
• inversion: <u>disabled</u>
• break: <u>0</u></td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 0 (continued)  (both PAGE LEDs are turned off) This PAGE contains general settings of First Object	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 3	First Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size Second Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size
PAGE 1  (right PAGE LED is turned on) This PAGE contains position settings of First Object	Position of First Object	
	UP	Position object higher up on screen
	SHIFT + UP	Position object higher up on screen at increased speed
	DOWN	Position object lower down on screen
	SHIFT + DOWN	Position object lower down on screen at increased speed
	LEFT	Position object more to the left
	SHIFT + LEFT	Position object more to the left at increased speed
	RIGHT	Position object more to the right
	SHIFT + RIGHT	Position object more to the right at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 1	Restore both vertical and horizontal size of a object

PAGE	BUTTONS	DESCRIPTION
PAGE 1 (continued)  (right PAGE LED is turned on) This PAGE contains position settings of First Object	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 3	First Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size Second Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size
PAGE 2  (left PAGE LED is turned on) This PAGE contains size settings of First Object	Size of First Object	
	UP	Decrease vertical size of a object
	SHIFT + UP	Decrease vertical size of a object at increased speed
	DOWN	Increase vertical size of a object
	SHIFT + DOWN	Increase vertical size of a object at increased speed
	LEFT	Decrease horizontal size of a object
	SHIFT + LEFT	Decrease horizontal size of a object at increased speed
	RIGHT	Increase horizontal size of a object
	SHIFT + RIGHT	Increase horizontal size of a object at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 2	Restore both vertical and horizontal size of a object

PAGE	BUTTONS	DESCRIPTION
PAGE 2 (continued)  (left PAGE LED is turned on) This PAGE contains size settings of First Object	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 3	First Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size Second Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size

<table>
<tr><th>PAGE</th><th>BUTTONS</th><th>DESCRIPTION</th></tr>
<tr><td rowspan="8">PAGE 3
 
(both PAGE LEDs are turned on)

This PAGE contains general settings of Second Object</td><td colspan="2">Second Object Period</td></tr>
<tr><td>UP
decrease period</td><td rowspan="2">Available periods are:

• 0.4s (V-50% : I-50%)* [24]**
• 0.67s (V-50% : I-50%)* [40]**
• 1.33s (V-50% : I-50%)* [80]**
• <u>2s</u> (V-50% : I-50%)* [120]**
• 3.33s (V-50% : I-50%)* [200]**
• 4.67s (V-50% : I-50%)* [280]**
• 8s (V-50% : I-50%)* [480]**

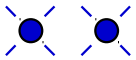
* default occlusion rate is set during change of period
** number of frames during which visible-invisible cycle is concluded</td></tr>
<tr><td>DOWN
increase period</td></tr>
<tr><td colspan="2">Second Object Occlusion Rate
(for how long object is being Visible and Invisible)</td></tr>
<tr><td>LEFT
shorten period of object being visible</td><td rowspan="2">Available occlusion rates depend on current period:

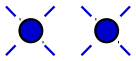
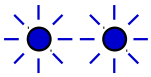
• 0.4s
◦ V-0% : I-100% [0:24]**
◦ V-25% : I-75% [6:18]**
◦ <u>V-50% : I-50% [12:12]**</u>
◦ V-75% : I-25% [18:6]**
◦ V-100% : I-0% [24:0]**
• 0.67s
◦ V-0% : I-100% [0:40]**
◦ V-25% : I-75% [10:30]**
◦ <u>V-50% : I-50% [20:20]**</u>
◦ V-75% : I-25% [30:10]**
◦ V-100% : I-0% [40:0]**
• 1.33s
◦ V-0% : I-100% [0:80]**
◦ V-25% : I-75% [20:60]**
◦ <u>V-50% : I-50% [40:40]**</u>
◦ V-75% : I-25% [60:20]**
◦ V-100% : I-0% [80:0]**
• 2s
◦ V-0% : I-100% [0:120]**
◦ V-16.7% : I-83.3% [20:100]**
◦ V-33.3% : I-66.7% [40:80]**
◦ <u>V-50% : I-50% [60:60]**</u>
◦ V-66.7% : I-33.3% [80:40]**
◦ V-83.3% : I-16.7% [100:20]**
◦ V-100% : I-0% [120:0]**
• 3.33s
◦ V-0% : I-100% [0:200]**
◦ V-10% : I-90% [20:180]**
◦ V-20% : I-80% [40:160]**
◦ V-30% : I-70% [60:140]**
◦ V-40% : I-60% [80:120]**
◦ <u>V-50% : I-50% [100:100]**</u>
◦ V-60% : I-40% [120:80]**
◦ V-70% : I-30% [140:60]**
◦ V-80% : I-20% [160:40]**
◦ V-90% : I-10% [180:20]**
◦ V-100% : I-0% [200:0]**

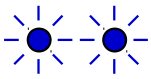
• 4.67s
◦ V-0% : I-100% [0:280]**
◦ V-7.1% : I-92.9% [20:260]**
◦ V-14.3% : I-85.7% [40:240]**
◦ V-21.4% : I-78.6% [60:220]**
◦ V-28.6% : I-71.4% [80:200]**
◦ V-35.7% : I-64.3% [100:180]**
◦ V-42.9% : I-57.1% [120:160]**
◦ <u>V-50% : I-50% [140:140]**</u>
◦ V-57.1% : I-42.9% [160:120]**
◦ V-64.3% : I-35.7% [180:100]**
◦ V-71.4% : I-28.6% [200:80]**
◦ V-78.6% : I-21.4% [220:60]**
◦ V-85.7% : I-14.3% [240:40]**
◦ V-92.9% : I-7.1% [260:20]**
◦ V-100% : I-0% [280:0]**
• 8s
◦ V-0% : I-100% [0:480]**
◦ V-8.3% : I-91.7% [40:440]**
◦ V-16.7% : I-83.3% [80:400]**
◦ V-25% : I-75% [120:360]**
◦ V-33.3% : I-66.7% [160:320]**
◦ V-41.7% : I-58.3% [200:280]**
◦ <u>V-50% : I-50% [240:240]**</u>
◦ V-58.3% : I-41.7% [280:200]**
◦ V-66.7% : I-33.3% [320:160]**
◦ V-75% : I-25% [360:120]**
◦ V-83.3% : I-16.7% [400:80]**
◦ V-91.7% : I-8.3% [440:40]**
◦ V-100% : I-0% [480:0]**

** number of frames during which SO is visible and invisible</td></tr>
<tr><td>RIGHT
lengthen period of object being visible</td></tr>
<tr><td colspan="2">Second Object ON/OFF</td></tr>
<tr><td>SHIFT + UP
toggle <u>on</u> / off state of the object</td><td>Second Object can be completely turned off and not being visible on screen.</td></tr>
</table>

PAGE	BUTTONS	DESCRIPTION
PAGE 3 (continued)  (both PAGE LEDs are turned on) This PAGE contains general settings of Second Object	Second Object Inversion	
	SHIFT + DOWN toggle inversion of the object	When inversion is enabled, object is visible when normally it should be invisible and vice versa.
	Second Object Break	
	SHIFT + LEFT decrease SO break	Break is an additional time during which SO is invisible Increasing break increase total duration of alternation cycle. Break is incremented differently when different periods are used: • 0.4s – increment: 0.4s [24]**; maximum 1.6s [96]** • 0.67s – increment: 0.67s [40]**; maximum 2.67s [160]** • 1.33s – increment: 0.67s [40]**; maximum 2.67s [160]** • 2s – increment: 0.67s [40]**; maximum 2.67s [160]** • 3.33s – increment: 0.67s [40]**; maximum 2.67s [160]** • 4.67s – increment: 0.67s [40]**; maximum 2.67s [160]** • 8s – increment: 1.33s [80]**; maximum 5.33s [320]** ** number of frames
	SHIFT + RIGHT increase SO break	
	Restoring default settings	
	UP + DOWN set default period	Default Second Object period is *2s* (V-50% : I-50%)* *default occlusion rate is set during change of period
	LEFT + RIGHT set default occlusion rate	Default occlusion rates for different periods : • 0.4s (*V-50% : I-50%*) [12:12]** • 0.67s (*V-50% : I-50%*) [20:20]** • 1.33s (*V-50% : I-50%*) [40:40]** • 2s (*V-50% : I-50%*) [60:60]** • 3.33s (*V-50% : I-50%*) [100:100]** • 4.67 (*V-50% : I-50%*) [140:140]** • 8s (V*-50% : I-50%*) [240:240]** ** number of frames during which SO is visible and invisible
	SHIFT + UP + DOWN set default on/off state of SO and its inversion setting	Default state is *ON* By default inversion is *disabled*
	SHIFT + LEFT + RIGHT set default break	Default break of Second Object is *0*.
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 1	• period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0*

PAGE	BUTTONS	DESCRIPTION
PAGE 3 (continued)  (both PAGE LEDs are turned on) This PAGE contains general settings of Second Object	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 3	First Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size Second Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size
PAGE 4  (PAGE LEDs are flashing at low frequency) This PAGE contains position settings of Second Object	Position of Second Object	
	UP	Position object higher up on screen
	SHIFT + UP	Position object higher up on screen at increased speed
	DOWN	Position object lower down on screen
	SHIFT + DOWN	Position object lower down on screen at increased speed
	LEFT	Position object more to the left
	SHIFT + LEFT	Position object more to the left at increased speed
	RIGHT	Position object more to the right
	SHIFT + RIGHT	Position object more to the right at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 1	Restore both vertical and horizontal size of a object

PAGE	BUTTONS	DESCRIPTION
PAGE 4 (continued)  (PAGE LEDs are flashing at low frequency) This PAGE contains position settings of Second Object	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 3	First Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size Second Object: • period: *2s* • occlusion rate: V*-50% : I-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size
PAGE 5  (PAGE LEDs are flashing at high frequency) This PAGE contains size settings of Second Object	Size of Second Object	
	UP	Decrease vertical size of a object
	SHIFT + UP	Decrease vertical size of a object at increased speed
	DOWN	Increase vertical size of a object
	SHIFT + DOWN	Increase vertical size of a object at increased speed
	LEFT	Decrease horizontal size of a object
	SHIFT + LEFT	Decrease horizontal size of a object at increased speed
	RIGHT	Increase horizontal size of a object
	SHIFT + RIGHT	Increase horizontal size of a object at increased speed
	Restoring default settings	
	UP + DOWN SHIFT + UP + DOWN	Restore default vertical size of a object
	LEFT + RIGHT SHIFT + LEFT + RIGHT	Restore default horizontal size of a object
	UP + DOWN + LEFT + RIGHT restore default values for all settings from PAGE 2	Restore both vertical and horizontal size of a object

PAGE	BUTTONS	DESCRIPTION
PAGE 5 (continued)  (PAGE LEDs are flashing at high frequency) This PAGE contains size settings of Second Object	SHIFT + UP + DOWN + LEFT + RIGHT restore default values for all settings from MODE 3	First Object: • period: *2s* • occlusion rate: V*-50%* : I*-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size Second Object: • period: *2s* • occlusion rate: V*-50%* : I*-50%* • state: *ON* • inversion: *disabled* • break: *0* • default position and size

Numbers that are in italics and are underlined are the default values

Objects that appear in MODE 3: FREE FLOATING OBJECTS have very similar settings to the ones found in dichoptic objects of other modes. Position (PAGE 1 and 4) and size (PAGE 2 and 5) settings are basically the same. When it comes to general settings (PAGE 0 and 3), period and occlusion rate works in the same manner between those different objects, as well as ON/OFF setting. Break settings can be changed by SHIFT + LEFT and SHIFT + RIGHT key combinations (while timings may seem different, it is only because there were two shorter periods of break in others modes, in FFO there is only one period that takes twice as long). There is new Inversion setting activated by the SHIFT + DOWN.

Note that when you are restoring default settings of the whole MODE 3: FREE FLOATING OBJECTS, it affects only settings mentioned in the above table, and also SHAPE of FO, SHAPE of SO and RANDOM MODE specific to the MODE 3: FREE FLOATING OBJECTS. Randomization settings are not affected by it, an if you want to reset them also, you need to do it manually when RANDOM MODE 1 is active (both objects have separate randomization settings that have to be reset separately). Alternatively, you can restore default settings for the whole device by pressing MODE + PAGE.